



Critical Citrix Vulnerability

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The Vulnerability

- Directory traversal (at least part of it)
- No authentication required
- Can lead to code execution on Citrix Application Delivery Controller / Citrix Gateway
- Easy to exploit (but no public exploit out yet)

Who/What is Affected?

- Citrix ADC / Gateway 13.0
- Citrix ADC / NetScaler Gateway 12.1 / 12.0 / 11.1
- Citrix Netscaler ADC / NetScaler Gateway 10.5

Citrix Suggested Fix

- No actual “patch” released yet
- Instead, Citrix published a workaround
- Workaround blocks access to URLs that contain “/vpns/” or “/../”
- The directory traversal part (“/../”) only matters if the user (attacker) is connected to the VPN.

Citrix Added Policy

```
add responder action respondwith403 respondwith  
  "\ HTTP/1.1 403 Forbidden\r\n\r\n"
```

```
add responder policy ctx267027  
  "HTTP.REQ.URL.DECODE_USING_TEXT_MODE.CONTAINS  
  (\ "/vpns/" ) && (!CLIENT.SSLVPN.IS_SSLVPN ||  
  HTTP.REQ.URL.DECODE_USING_TEXT_MODE.CONTAINS  
  (\ "/../" ))" respondwith403 bind responder  
global ctx267027 1 END -type REQ_OVERRIDE
```

Possible False Positives

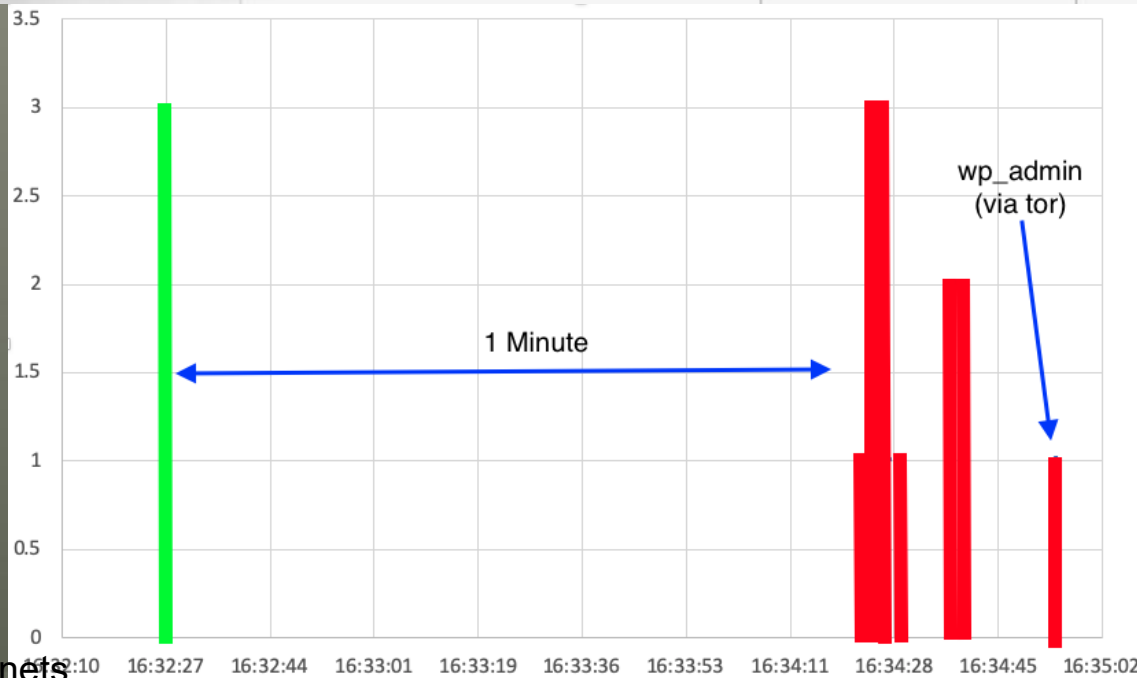
- Application sitting behind a Citrix gateway uses '/vpns/' as part of a URL
- Admin UI links to '/vpns/script/vista/*.exe' for plugins. This will be blocked
- This looks like a simple (too simple?) blacklist.
- Policy may apply to the admin interface as well

How Do Attackers Find Vuln. Systems?

- Shodan/Google/Others... may list some of them
- Certificate Transparency logs
 - Experiment:
 - Configured web server with hostname 'vpn.*' or 'remote.*'
 - Access within minutes after certificate was issued
- Attacker may just scan for files commonly found on server
- Citrix Gateway sets several specific cookies

Certificate Transparency

vpn. [blurred]	Let's Encrypt Authority X3	5	Dec 28, 2019
citrix [blurred]	Let's Encrypt Authority X3	1	Dec 27, 2019



Directory Traversal Vulnerability

```
GET /download.php?file=../../../../etc/passwd
```

- Classic input validation flaw
- Impact may be limited if permissions are limited
- Typically associated with information leakage
- But once exploited, can often be leveraged to bypass authentication (reading files with credentials)
- Or can be used to find other vulnerabilities (reading source code)

Fortigate SSLVPN CVE-2018-13379

```
snprintf(s, 0x40, "/migadmin/lang/%s.json", lang)
```

```
https://example.com/remote/fgt_lang?lang=  
../../../../../../../../dev/cmdb/sslvpn_websession
```

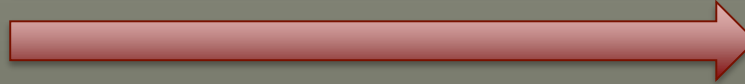
What Did We Find?

- Trivial to upload files to the system without authentication (but filename is somewhat restricted)
- Several directories / files that are writeable by web server and exposed to unauthenticated users
- Missing input validation, and at least in one case, input validation was commented out (debug code left in the release?)

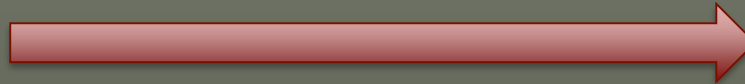
Possible Exploitation (1)



```
http://example.com/vpns/...  
param1=../../../../var/www/file.php  
param2=<?php exec("rm -rf /")
```



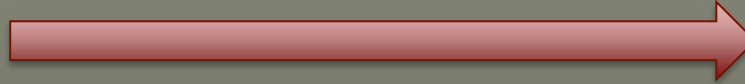
```
http://example.com/file.php
```



Possible Exploitation (1)



```
http://example.com/vpns/...  
param1=../../../../../var/www/file.php  
param2=<?php exec("rm -rf /")
```



```
http://example.com/file.php
```

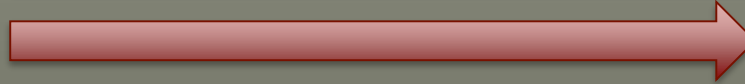


Possible Exploitation (1)



Email
link

```
http://example.com/vpns/...  
param1=../../..../var/www/file.php  
param2=<?php exec("rm -rf /")
```



```
http://example.com/file.php
```



Tactical Mitigations

- Apply the Citrix mitigations
- Consider additional monitoring
 - HTTP requests with /vpns/ and/or /../
 - Citrix ADC, Gateway abnormal traffic towards internal network
 - Do not assume that login will be triggered (it's not required to exploit)
- Layered defense – apply the same blocking and monitoring logic on other inline traffic gateways
- Citrix ADC / Gateway network access review – wide open to internal network?
- Watch for the release of the patch and apply quickly

Thank You!

Questions?

<http://isc.sans.edu/slack>

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