



Container Instances, Virtual Machines, & Functions

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What is an Azure Virtual Machine (VM)?

An Azure virtual machine gives you the flexibility of virtualization without having to buy and maintain the physical hardware that runs it. However, you still need to maintain the virtual machine by performing tasks, such as configuring, patching, and installing the software that runs on it.

Azure virtual machines can be used in various ways. Some examples are:

- **Development and test** – Azure virtual machines offer a quick and easy way to create a computer with specific configurations required to code and test an application.
- **Applications in the cloud** – Because demand for your application can fluctuate, it might make economic sense to run it on a virtual machine in Azure. You pay for extra virtual machines when you need them and shut them down when you don't.
- **Extended datacenter** – virtual machines in an Azure virtual network can easily be connected to your organization's network.

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What are containers?

Just as shipping industries use physical containers to isolate different cargos—for example, to transport in ships and trains—software development technologies increasingly use an approach called containerization.

A standard package of software—known as a container—bundles an application's code together with the related configuration files and libraries, and with the dependencies required for the app to run. This allows developers and IT pros to deploy applications seamlessly across environments.

Azure Container Instances (ACI)

Containers are becoming the preferred way to package, deploy, and manage cloud applications. Azure Container Instances offers the fastest and simplest way to run a container in Azure, without having to manage any virtual machines and without having to adopt a higher-level service.

Azure Container Instances is a great solution for any scenario that can operate in isolated containers, including simple applications, task automation, and build jobs. For scenarios where you need full container orchestration, including service discovery across multiple containers, automatic scaling, and coordinated application upgrades, we recommend Azure Kubernetes Service (AKS).

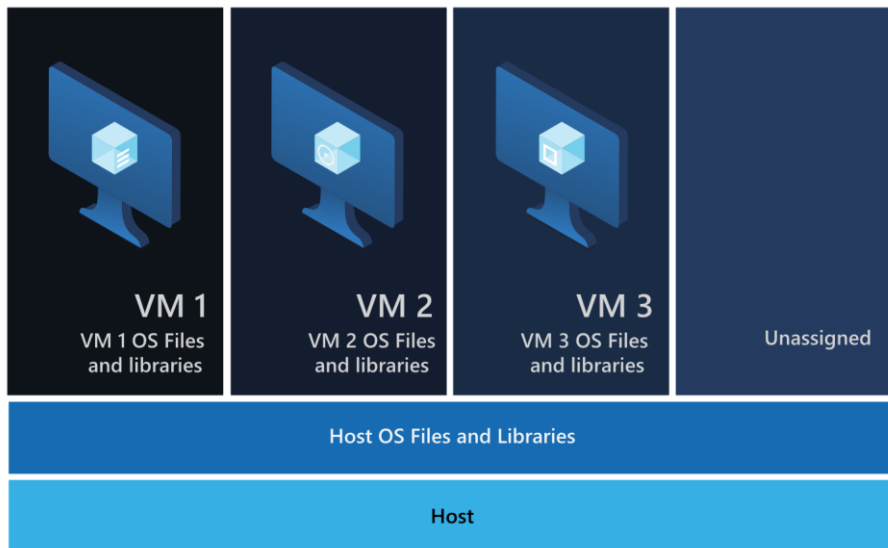


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Containers vs. Virtual Machines Part 1

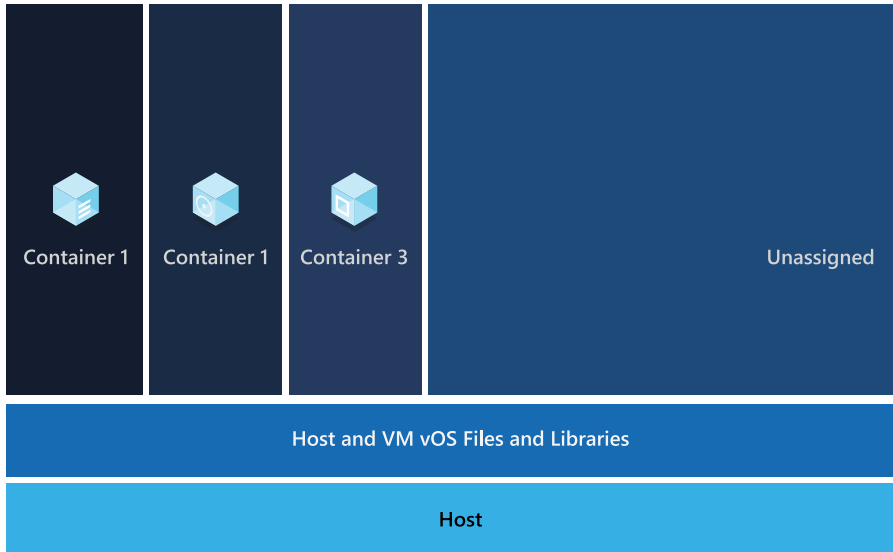


At a high level, VMs virtualize the underlying hardware so that multiple operating system (OS) instances can run on the hardware. Each VM runs an OS and has access to virtualized resources representing the underlying hardware.

VMs have many benefits. These include the ability to run different operating systems on the same server, more efficient and cost-effective utilization of physical resources, and faster server provisioning. On the flip side, each VM contains an OS image, libraries, applications, and more, and therefore can become quite large.



Containers vs. Virtual Machines Part 2



A container virtualizes the underlying OS and causes the containerized app to perceive that it has the OS—including CPU, memory, file storage, and network connections—all to itself. Because the differences in underlying OS and infrastructure are abstracted, as long as the base image is consistent, the container can be deployed and run anywhere.

Since containers share the host OS, they don't need to boot an OS or load libraries. This enables containers to be much more efficient and lightweight. Containerized applications can start in seconds, and many more instances of the application can fit onto the machine as compared to a VM scenario. The shared OS approach has the added benefit of reduced overhead when it comes to maintenance, such as patching and updates.

Azure Functions

Azure Functions is a serverless solution that allows you to write less code, maintain less infrastructure, and save on costs. Instead of worrying about deploying and maintaining servers, the cloud infrastructure provides all the up-to-date resources needed to keep your applications running.

You focus on the code that matters most to you, in the most productive language for you, and Azure Functions handles the rest.

If you want to...	then...
Build a web API	Implement an endpoint for your web applications using the HTTP trigger
Process file uploads	Run code when a file is uploaded or changed in blob storage
Build a serverless workflow	Create an event-driven workflow from a series of functions using durable functions
Respond to database changes	Run custom logic when a document is created or updated in Azure Cosmos DB
Run scheduled tasks	Execute code on pre-defined timed intervals
Create reliable message queue systems	Process message queues using Queue Storage , Service Bus , or Event Hubs
Analyze IoT data streams	Collect and process data from IoT devices
Process data in real time	Use Functions and SignalR to respond to data in the moment

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