

# Choose an Azure compute service for your application

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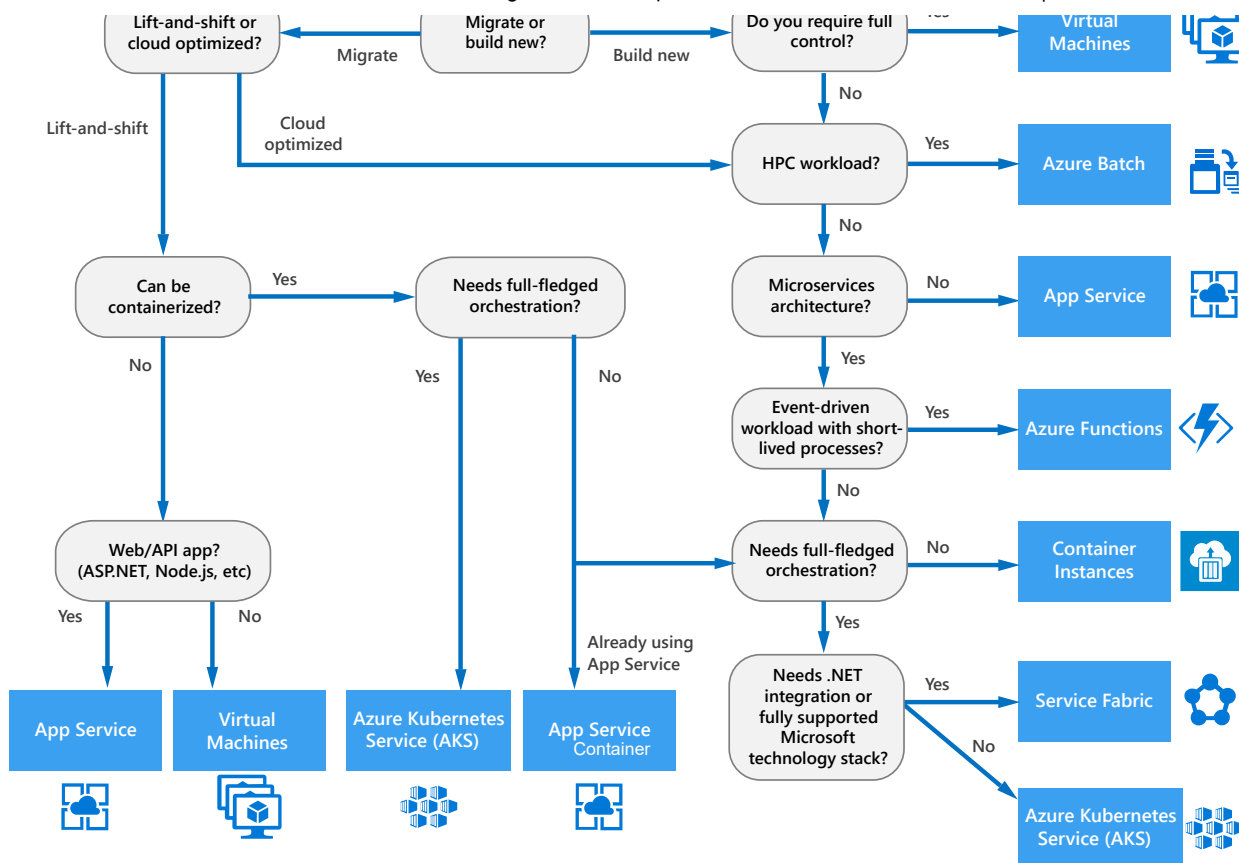
Azure offers a number of ways to host your application code. The term *compute* refers to the hosting model for the computing resources that your application runs on. The following flowchart will help you to choose a compute service for your application.

If your application consists of multiple workloads, evaluate each workload separately. A complete solution may incorporate two or more compute services.

## Choose a candidate service

Use the following flowchart to select a candidate compute service.





### Definitions:

- **"Lift and shift"** is a strategy for migrating a workload to the cloud without redesigning the application or making code changes. Also called *rehosting*. For more information, see [Azure migration center](#).
- **Cloud optimized** is a strategy for migrating to the cloud by refactoring an application to take advantage of cloud-native features and capabilities.

The output from this flowchart is a **starting point** for consideration. Next, perform a more detailed evaluation of the service to see if it meets your needs.

## Understand the basic features

If you're not familiar with the Azure service selected in the previous step, read the overview documentation to understand the basics of the service.

- [App Service](#). A managed service for hosting web apps, mobile app back ends, RESTful APIs, or automated business processes.
- [Azure Kubernetes Service \(AKS\)](#). A managed Kubernetes service for running containerized applications.
- [Batch](#). A managed service for running large-scale parallel and high-performance computing (HPC) applications
- [Container Instances](#). The fastest and simplest way to run a container in Azure.

- [Container instances](#). The fastest and simplest way to run a container in Azure, without having to provision any virtual machines and without having to adopt a higher-level service.
- [Functions](#). A managed FaaS service.
- [Service Fabric](#). A distributed systems platform that can run in many environments, including Azure or on premises.
- [Virtual machines](#). Deploy and manage VMs inside an Azure virtual network.

## Understand the hosting models

Cloud services, including Azure services, generally fall into three categories: IaaS, PaaS, or FaaS. (There is also SaaS, software-as-a-service, which is out of scope for this article.) It's useful to understand the differences.

**Infrastructure-as-a-Service (IaaS)** lets you provision individual VMs along with the associated networking and storage components. Then you deploy whatever software and applications you want onto those VMs. This model is the closest to a traditional on-premises environment, except that Microsoft manages the infrastructure. You still manage the individual VMs.

**Platform-as-a-Service (PaaS)** provides a managed hosting environment, where you can deploy your application without needing to manage VMs or networking resources. Azure App Service is a PaaS service.

**Functions-as-a-Service (FaaS)** goes even further in removing the need to worry about the hosting environment. In a FaaS model, you simply deploy your code and the service automatically runs it. Azure Functions are a FaaS service.

There is a spectrum from IaaS to pure PaaS. For example, Azure VMs can autoscale by using virtual machine scale sets. This automatic scaling capability isn't strictly PaaS, but it's the type of management feature found in PaaS services.

In general, there is a tradeoff between control and ease of management. IaaS gives the most control, flexibility, and portability, but you have to provision, configure and manage the VMs and network components you create. FaaS services automatically manage nearly all aspects of running an application. PaaS services fall somewhere in between.

## Consider limits and cost

Next, perform a more detailed evaluation, looking at the following aspects of the service:

- [Service limits](#)
- [Cost](#)
- [SLA](#)
- [Regional availability](#)

Based on this analysis, you may find that the initial candidate isn't suitable for your particular application or workload. In that case, expand your analysis to include other compute services.

The following tables contain additional comparison points, which may be useful when choosing.

## Hosting model

Criteria	Virtual Machines	App Service	Service Fabric	Azure Functions	Azure Kubernetes Service
Application composition	Agnostic	Applications, containers	Services, guest executables, containers	Functions	Containers
Density	Agnostic	Multiple apps per instance via app service plans	Multiple services per VM	Serverless <sup>1</sup>	Multiple containers per node
Minimum number of nodes	1 <sup>2</sup>	1	5 <sup>3</sup>	Serverless <sup>1</sup>	3 <sup>3</sup>
State management	Stateless or Stateful	Stateless	Stateless or stateful	Stateless	Stateless or Stateful
Criteria	Virtual Machines	App Service	Service Fabric	Azure Functions	Azure Kubernetes Service
Web hosting	Agnostic	Built in	Agnostic	Not	Agnostic

				applicable	Service
Can be deployed to dedicated VNet?	Supported	Supported <sup>5</sup>	Supported	Supported <sup>5</sup>	<a href="#">Supported</a>
Hybrid connectivity	Supported	Supported <sup>6</sup>	Supported	Supported <sup>7</sup>	Supported

## Notes

1. If using Consumption plan. If using App Service plan, functions run on the VMs allocated for your App Service plan. See [Choose the correct service plan for Azure Functions](#).
2. Higher SLA with two or more instances.
3. Recommended for production environments.
4. Can scale down to zero after job completes.
5. Requires App Service Environment (ASE).
6. Use [Azure App Service Hybrid Connections](#).
7. Requires App Service plan.

## DevOps

Criteria	Virtual Machines	App Service	Service Fabric	Azure Functions	Azure Kubernetes Service
Local debugging	Agnostic	IIS Express, others <sup>1</sup>	Local node cluster	Visual Studio or Azure Functions CLI	Minikube, others
Programming model	Agnostic	Web and API applications, WebJobs for background tasks	Guest executable, Service model, Actor model, Containers	Functions with triggers	Agnostic
Application update	On built-in OS	Deployment slots	Service Fabric upgrade	Deployment slots	Azure Kubernetes Service update

Notes

- 1. Options include IIS Express for ASP.NET or node.js (iisnode); PHP web server; Azure Toolkit for IntelliJ, Azure Toolkit for Eclipse. App Service also supports remote debugging of deployed web app.
- 2. See [Resource Manager providers, regions, API versions and schemas](#).

Scalability

Criteria	Virtual Machines	App Service	Service Fabric	Azure Functions	Azure Kubernetes Service	Cloud
Autoscaling	Virtual machine scale sets	Built-in service	Virtual machine scale sets	Built-in service	Pod auto-scaling <sup>1</sup> , cluster auto-scaling <sup>2</sup>	Microsoft
Load balancer	Azure Load Balancer	Integrated	Azure Load Balancer	Integrated	Azure Load Balancer or Application Gateway	Microsoft
Scale limit <sup>3</sup>	Platform image: 1000 nodes per scale set, Custom image: 600 nodes per scale set	20 instances, 100 with App Service Environment	100 nodes per scale set	200 instances per Function app	100 nodes per cluster (default limit)	200 instances per cluster (default limit)

1. See [Autoscale pods](#).
2. See [Automatically scale a cluster to meet application demands on Azure Kubernetes Service \(AKS\)](#).
3. See [Azure subscription and service limits, quotas, and constraints](#).

## Availability

Criteria	Virtual Machines	App Service	Service Fabric	Azure Functions	Azure Kubernetes Service	Container Instances
SLA	<a href="#">SLA for Virtual Machines</a>	<a href="#">SLA for App Service</a>	<a href="#">SLA for Service Fabric</a>	<a href="#">SLA for Functions</a>	<a href="#">SLA for AKS</a>	<a href="#">SLA for Container Instances</a>
Multi region failover	Traffic manager	Traffic manager	Traffic manager, Multi-Region Cluster	<a href="#">Azure Front Door</a>	Traffic manager	Not supported

For guided learning on Service Guarantees, review [Core Cloud Services - Azure architecture and service guarantees](#).

## Other criteria

Criteria	Virtual Machines	App Service	Service Fabric	Azure Functions	Azure Kubernetes Service
SSL	Configured in VM	Supported	Supported	Supported	<a href="#">Ingress controller</a>
Cost	<a href="#">Windows, Linux</a>	<a href="#">App Service pricing</a>	<a href="#">Service Fabric pricing</a>	<a href="#">Azure Functions pricing</a>	<a href="#">AKS pricing</a>
Suitable architecture styles Criteria	<a href="#">N-Tier, Big compute (HPC)</a> Virtual Machines	<a href="#">Web-Queue-Worker, App N-Tier</a> App Service	<a href="#">Microservices, Event-driven architecture</a> Service Fabric	<a href="#">Microservices, Event-driven architecture</a> Azure Functions	<a href="#">Microservices, Event-driven architecture</a> Azure Kubernetes Service

The output from this flowchart is a **starting point** for consideration. Next, perform a more detailed evaluation of the service to see if it meets your needs.

## Understand the basic features

If you're not familiar with the Azure service selected in the previous step, read one of the following overview articles:

- [App Service](#)
- [Azure Kubernetes Service](#)
- [Batch](#)
- [Container Instances](#)
- [Functions](#)
- [Service Fabric](#)
- [Virtual machines](#)

## Consider limits and cost

Next, perform a more detailed evaluation, looking at the following aspects of the service:

- [Service limits](#)
- [Cost](#)
- [SLA](#)
- [Regional availability](#)
- [Compute comparison tables](#)

Based on this analysis, you may find that the initial candidate isn't suitable for your particular application or workload. In that case, expand your analysis to include other compute services.

## Next steps

- [Core Cloud Services - Azure compute options](#). This Microsoft Learn module explores how compute services can solve common business needs.

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Is this page helpful?

 Yes  No

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