# Azure App Service (AAS)

Azure App Service is an HTTP-based service for hosting web applications, REST APIs, and mobile back ends.

scale up/down – scale number of cores/RAM of the underlying machine.

scale out/in – scale the number of machines

 Azure App Service works with orchestration platforms: Windows containers and Docker Compose (.yml file). For Kubernetes use **Azure Kubernetes Service** **(AKS)** instead of AAS.

Containers (Windows or Linux) are pulled from Azure Container Registry or Docker Hub.

Summery:

* Windows apps are run without container
* Linux based apps are run within single container – Azure creates it under the hood
* To configure custom container(s) you can use orchestration and any registry (Docker Hub etc.)

For Linux containers **custom container** reads app files faster than **built-in image** because in built-in image the app files are in separate from container place – in Azure Storage.

**App Service Environment** **(ASE)**

* A premium, isolated version of App Service.
* Runs inside your own virtual network (VNet).
* You get your own VM
* Isolated and IsolatedV2 plans

Ideal for high-security, high-scale, or compliance-restricted scenarios.

**App Service plan** - scale unit of the App Service apps. Each App Service plan defines:

* Operating System (Windows, Linux)
* Region (West US, East US, etc.)
* Number of VM instances
* Size of VM instances (Small, Medium, Large)
* Pricing tier (Free, Shared, Basic, Standard, Premium, PremiumV2, PremiumV3, Isolated, IsolatedV2)

Free and Shared tier – can’t scale out, your apps are on the same VM (and other customers apps)

Basic, Standard, Premium, PremiumV2, and PremiumV3 ­– you can scale out, but still VM shared with other customers. But your code is isolated from others code – Compute isolation.

Isolated and IsolatedV2 tiers run dedicated Azure VMs on dedicated Azure Virtual Networks. Network isolation on top of compute isolation. Maximum scale-out capabilities.

Scaling out the plan:

* An app runs on all the VM instances configured in the App Service plan.
* If multiple apps are in the same App Service plan, they all share the same VM instances.
* If you have multiple deployment slots for an app, all deployment slots also run on the same VM instances.

If the plan is configured to run five VM instances, then all apps in the plan run on all five instances – every app will be run on every of 5 VM, but requests from users to app will be divided between VM equally (1 request handles 1 VM). But if you have a singleton service – the singleton state will be encapsulated within VM and other VM won’t track state changes. Multiple apps can be deployed within one plan.

**Deployment**

Automated deployment: Azure DevOps, GitHub, BitBucket  
Manual deployment:

* GIT – generate Git URL in Azure and paste it to local git repo as **remote** and git push azure master – Azure automatically builds and deploys the app
* CLI (az webapp up --name myapp --resource-group myrg) – the fastest way to deploy in Azure.
* ZIP – pack to ZIP and sent via POST to Azure, example:  
  curl -X POST -u <username>:<password> \

--data-binary @app.zip \

https://<your-app-name>.scm.azurewebsites.net/api/zipdeploy

* FTP/S: Azure gives you FTP credentials and an FTP hostname. You use an FTP client (like FileZilla or VS Code extensions) to connect. You drag and drop your files into the web root folder.

Slots allow firstly to deploy a new production build to a staging environment, warm up the necessary worker instance to match production scale and then swap staging and production slot.

Sidecar container – separate container related to main app container. Available up to nine sidecar containers for each sidecar-enabled custom container app. Add in **Deployment Center** in the app's management page.

**AAP Authentication and Authorization**

AAP provides own solution for authentication and authorization. User accounts managed through **Microsoft Entra ID**. It easily works with third party authorization (through MS/Google/Meta/X accounts etc.). ASP roles (attributes) can be connected to AAP authorization – the APP can send configurated roles in token. But the passwords or passwords hashes are hidden and there is no access to them. Access another user account can be through code changes (turn off authorization etc.).

Two ways of authorization:

* **Server-directed flow** – without provider SDK, typically for web projects. The authorization takes place on provider’s login page.
* **Client-directed flow** – with provider SDK, typically for browser-less apps. The application signs users in to the provider manually (using SDK code) and then submits the authentication token to App Service for validation. This applies to REST APIs, Azure Functions and native mobile apps.

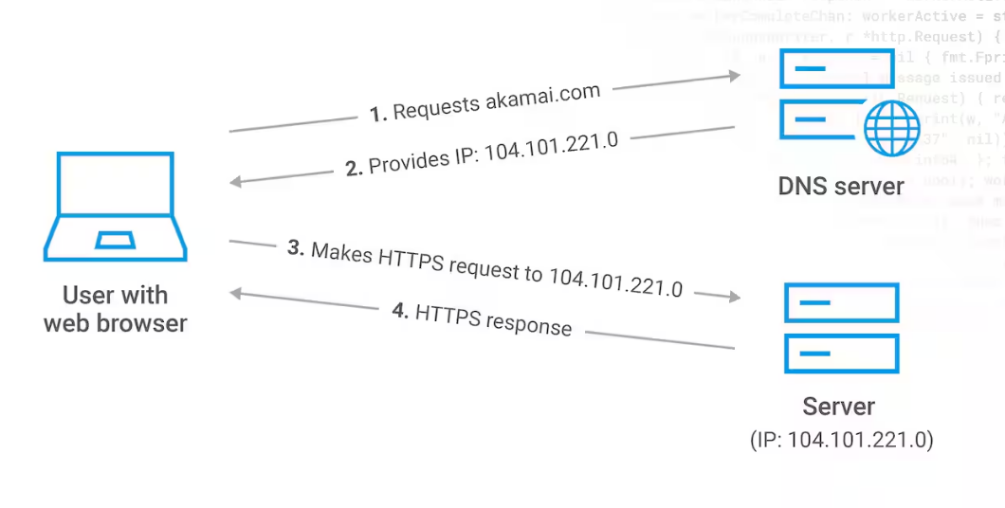
Authentication can be configured to allow or not allow the unauthenticated requests. For allowed unauthenticated requests the provider will pass all requests to application, but only authenticated requests will have authentication info in the HTTP headers. For disallowed unauthenticated requests – disallowed unauthenticated requests will be redirected to another chosen auth provider /.auth/login/<provider> or simply rejected by HTTP 401 Unauthorized response. **This restriction applies to all calls to application, to any page.**

AAP writes all logs about authentication and authorization with details, it available to browse.

**App Service networking features**

Most plans deploy apps in shared VMs, so different apps may have same network. That is why connecting and configuring the network are available only in App Service Environment (Iso IsoV2). But in other plans the network can be configured through **networking features**. The features dedicated to configure calls TO app can’t be used to configure calls FROM app, same for opposite.

**Worker** – a VM managed by Azure.

**DNS –** domain name system. It converts entered e. g. in browser domain like <https://yourapp.azurewebsites.net> to real ip address. The requests go to real ip address.  
**Inbound IP** – the IP that users can use to reach the app. AAP by default don't have a guaranteed dedicated inbound IP — it's shared. You get a dedicated IP with App Service Environment. When client enter the azure app URL, the Azure DNS resolves it to IP address.

1. User accesses your app via a domain like:  
   <https://yourapp.azurewebsites.net>
2. The DNS lookup resolves this to a shared inbound IP, like:  
   20.42.72.18
3. The request hits Azure’s **App Service Front End**, which is a **load balancer** that:  
   - Accepts traffic on that IP  
   - Inspects the **Host header** in the HTTP request:  
   Host: yourapp.azurewebsites.net
4. Azure knows which app matches yourapp.azurewebsites.net and routes the request to your specific app instance behind the scenes.

**Outbound IP** – the IP from which app send requests to another resources (API, servers, apps). If the app makes a request like:

HttpClient.Get("https://api.something.com/data");

The request will appear to come from one of the outbound IP addresses assigned to your App Service.

Outbound IPs are shared by all apps running on the same worker (or workers running within same unit scale – plan).

#the outbound IP addresses currently used by app (equal to all used outbound IP used by plan)

az webapp show \

    --resource-group <group\_name> \

    --name <app\_name> \

    --query outboundIpAddresses \

    --output tsv #tsv fomrat - tab separated values

A **resource group** is like a **folder** or **container** in Azure that holds all the related resources for an application or project (App Service app, App Service plan, accounts, databases, Key Vaults, Application Insights…).

For most plans the Azure might change the current used outbound IPs e. g. when switching the Plan tier or during scale in/out. But the new outbound IPs are taken from limited list of all possible outbound IPs for current scale unit.

#Check all possible outbound Ips of plan (enter any app\_name from plan)

az webapp show \

    --resource-group <group\_name> \

    --name <app\_name> \

    --query possibleOutboundIpAddresses \

    --output tsv

Changing the region of plan requires creating a new plan, so the list of possible outbound IPs will change as well.

Azure App Service **does not guarantee fixed outbound IPs. IPs might be changed without any interruption from developer.**

**If you're using this IP to whitelist firewalls or APIs, you should always whitelist the full possibleOutboundIpAddresses set, not just the current active ones.**

**There are several ways to guarantee static outbound IP, e. g. using App Service Environment.**

**The command** > az webapp up without parameters performs the following actions:

* Create a default resource group if one isn't specified.
* Create a default app service plan.
* Create an app with the specified name.
* Zip deploy files from the current working directory to the web app.

**Application settings configuration**

**App settings** – variables passed as environment variables to the application code, they're injected into app environment at app startup. When you add, remove, or edit app settings, App Service triggers an app restart.