Tools for managing and deploying Azure resources.

- Azure Portal
- Azure Cloud Shell – Azure Command-Line Interface (CLI) and Azure PowerShell

Azure Portal

A visual way of managing resources within Microsoft subscription.

Need an account and a few ways to get one: free trial, pay-as-you-go, most companies have enterprise agreements

In long run this may not be the way to manage resources. You may want to automate things, which would reduce human error.

Azure PowerShell

This is a downloadable command-line that can run on your server/desktop which support different platform (Windows/Linux, ...)

Azure Command-Line Interface (CLI)

Azure CLI is a cross-platform tool that simplifies managing Azure resources from the command line. Optimized for automation and ease of use, it supports interactive sessions and scripting with straightforward commands that integrate seamlessly with the Azure Resource Manager model.

The Azure CLI is available to install in Windows, Linux, and macOS environments. It can also be run in a Docker container and Azure Cloud Shell. In this case we have to log in to our account.

Azure Cloud Shell

Azure Cloud Shell is an interactive, authenticated, browser-accessible terminal for managing Azure resources.

Since it is browser accessible, we do not need to set up anything in the computer.

It provides flexibility of choosing the shell experience that best suits the way you work, either Bash or PowerShell.

Azure Arc

It is a service available in Azure. This allows you to virtual machines, physical servers, and containers outside of Azure as they are Azure VM and containers.

This offers one interface for management of servers across environments that include Azure environment, on premises environment, AWS, Google cloud (this offers extensions).

Support data services

Works with Kubernetes clusters

Works with Azure policy

Let's check out a couple of different platforms:

Servers: Manage Windows and Linux and physical servers and virtual machines outside of Azure. Install Azure VM extensions on non-Azure windows and Linux VMs.

VM extensions give you:

- Collect log data for Log Analytics and Monitor
- Use VM Insights to analyze performance
- Download and execute scripts to hybrid connected machines
- Refresh certification using Key Vault

Kubernetes (open-source orchestration software for deploying, managing, and scaling containers): Attach Azure to Kubernetes clusters running anywhere.

Infrastructure as Code (IaC)

As a programmer/developer you may want to back up your code (e.g. GitHub). But how do you restore your configuration in Azure (e.g. 2 VMs, 2 webapps, SQL database, firewall settings). For this we have a concept called "Infrastructure as Code (IaC)."

Infrastructure (n): All the servers, storage, database settings, network settings, firewall, load balancers, etc.

How do you back up your infrastructure?

> Infrastructure as code. Basically, as a developer you will create a file (we can write a script to create this file). Then we will deploy that file. We can even move/recreate to different regions (duplication).

There is a related concept called "Desired state configuration (DSC)." Here maintaining the configuration become difficult over time (one can make change and not reflected in IaC (drift). We may use automation to ensure configuration does not drift from the original setup. For this we have IaC Options:

- ARM Templates (JSON)
- Bicep
- Terraform (3rd party software)
- ...

ARM Templates

Arm stands for Azure Resource Manager. These are pieces of codes/files, which define how infrastructure will look like. It has JSON format.

Management layer that allows you to create, update, and delete resources called "deployments."

All actions that take to manage Azure resources goes through the ARM layer. It will create ARM template, and it will deploy.

Example: When creating a VM, at the last stage, "Review + create", we can download the ARM template, "Download a template for automation". This can be used to create VMs with that configuration repeatedly. Or from the template itself, we can try deployment called "Custom deployment."