

Azure Command-Line Interface (CLI) documentation

The Azure command-line interface (Azure CLI) is a set of commands used to create and manage Azure resources. The Azure CLI is available across Azure services and is designed to get you working quickly with Azure, with an emphasis on automation.

About Azure CLI

OVERVIEW

[What is Azure CLI?](#)

[Onboarding cheat sheet](#)

[Get started](#)

[Terminology and support levels](#)

Installation

DOWNLOAD

[Install](#)

[Install - Windows](#)

[Install - macOS](#)

[Install - Linux](#)

[Run in Azure Cloud Shell ↗](#)

[Azure CLI in Docker](#)

What's new

WHAT'S NEW

[What's new highlights](#)

[Release notes](#)

Upcoming breaking changes

Azure CLI Reference

REFERENCE

[Reference index A to Z](#)

[About CLI extensions](#)

[Available extensions](#)

Identity and Authentication

WHAT'S NEW

[Sign in with Web Account Manager \(WAM\)](#)

[Azure AD Graph to Microsoft Graph migration](#)

HOW-TO GUIDE

[Authentication methods](#)

[Work with service principals](#)

Learn to use the Azure CLI

HOW-TO GUIDE

[Use Bash with the Azure CLI](#)

[Query command output](#)

[Work in interactive mode](#)

[Work in multiple clouds](#)

[Use the Azure CLI successfully](#)

CONCEPT

[Configure settings](#)

[Output formats](#)

[Use variables](#)

[Use persisted parameters](#)

Indexes of Azure CLI content

OVERVIEW

[List of conceptual docs A to Z](#)

[List of samples A to Z](#)

[List of references A to Z](#)

Manage cloud resources with the Azure CLI

HOW-TO GUIDE

[Manage Azure subscriptions](#)

[Manage Azure resource groups](#)

[Create virtual machines](#)

TRAINING

[Create Azure resources](#)

[Control Azure services](#)

[Manage virtual machines](#)

[Connect an application to Azure Storage](#)

[Run parallel tasks in Azure Batch](#)

TUTORIAL

[Create virtual machines on the same subnet with the Azure CLI](#)

[Create an Azure service principal](#)

Azure CLI extensions

OVERVIEW

[About CLI extensions](#)

REFERENCE

[Available extensions](#)

Azure CLI reference

REFERENCE

[Full command reference](#)

[Output formats](#)

[Configuration settings](#)

[Query CLI command results](#)

[Release notes](#)

Give feedback and get support

CONCEPT

[Request a new feature ↗](#)

[Report a product bug ↗](#)

[Get help from the community ↗](#)

[Request support using the Azure CLI](#)

What is the Azure CLI?

Article • 08/02/2023

The Azure Command-Line Interface (CLI) is a cross-platform command-line tool to connect to Azure and execute administrative commands on Azure resources. It allows the execution of commands through a terminal using interactive command-line prompts or a script.

For interactive use, you first launch a shell such as cmd.exe on Windows, or Bash on Linux or macOS, and then issue a command at the shell prompt. To automate repetitive tasks, you assemble the CLI commands into a shell script using the script syntax of your chosen shell, and then you execute the script.

You can install the Azure CLI locally on Linux, Mac, or Windows computers. It can also be used from a browser through the Azure Cloud Shell or run from inside a Docker container.

Current Version

The current version of the Azure CLI is 2.51.0. For information about the latest release, see the [release notes](#). To find your installed version and see if you need to update, run `az version`.

Data collection

Azure CLI collects telemetry data by default. Microsoft aggregates collected data to identify patterns of usage to identify common issues and to improve the experience of Azure CLI. Microsoft Azure CLI doesn't collect any private or personal data. For example, the usage data helps identify issues such as commands with low success and helps prioritize our work.

While we appreciate the insights this data provides, we also understand that not everyone wants to send usage data. You can disable data collection with the `az config set core.collect_telemetry=false` command. You can also read our [privacy statement](#) ↗ to learn more.

Prepare your environment

Before running Azure CLI commands, you need to set up your environment.

- Use the Bash environment in [Azure Cloud Shell](#). For more information, see [Quickstart for Bash in Azure Cloud Shell](#).

 [Launch Cloud Shell](#) 

- If you prefer to run CLI reference commands locally, [install](#) the Azure CLI. If you're running on Windows or macOS, consider running Azure CLI in a Docker container. For more information, see [How to run the Azure CLI in a Docker container](#).
 - If you're using a local installation, sign in to the Azure CLI by using the [az login](#) command. To finish the authentication process, follow the steps displayed in your terminal. For other sign-in options, see [Sign in with the Azure CLI](#).
 - When you're prompted, install the Azure CLI extension on first use. For more information about extensions, see [Use extensions with the Azure CLI](#).
 - Run [az version](#) to find the version and dependent libraries that are installed. To upgrade to the latest version, run [az upgrade](#).

Azure CLI examples

This article provides different Azure CLI examples for:

- Subscription syntax
- Role assignment syntax
- PowerShell syntax

Subscription syntax example

The Azure CLI syntax follows a simple `reference name - command - parameter - parameter value` pattern. For example, switching between subscriptions is often a common task. Here's the syntax.

Azure CLI

```
az account set --subscription "my subscription name"
```

Now, how easy was that?! See [Manage subscriptions with Azure CLI](#) to learn more about using the Azure CLI to work with subscriptions and create management groups.

Role assignment syntax example

Another common use of the Azure CLI is managing role assignments.

Azure CLI

```
az role assignment create --assignee servicePrincipalName --role Reader --  
scope /subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName  
az role assignment delete --assignee userSign-inName --role Contributor
```

See [Create an Azure service principal with the Azure CLI](#) for an in-depth tutorial on managing service principals and role assignments.

PowerShell syntax comparison

[Choose the right command-line tool](#) explains the difference between `tools` and `environments` with an emphasis on the Azure CLI and Azure PowerShell. It also gives many [side-by-side command comparisons](#). Here are two examples:

Command	Azure CLI	Azure PowerShell
Create Resource Group	az group create --name <ResourceGroupName> --location eastus	New-AzResourceGroup -Name <ResourceGroupName> -Location eastus
Create Azure Storage Account	az storage account create --name <StorageAccountName> --resource-group <ResourceGroupName> --location eastus --sku Standard_LRS --kind StorageV2	New-AzStorageAccount -Name <StorageAccountName> -ResourceGroupName <ResourceGroupName> -Location eastus -SkuName Standard_LRS -Kind StorageV2

See Also

- [Get started with the Azure CLI](#)
- [Control Azure services with the Azure CLI](#)
- [Azure resources that the Azure CLI can manage](#)
- [Full command reference list for the Azure CLI](#)

Get started with Azure CLI

Article • 08/02/2023

Welcome to the Azure Command-Line Interface (CLI)! This article introduces the CLI and helps you complete common tasks.

ⓘ Note

In scripts and on the Microsoft documentation site, Azure CLI examples are written for the `bash` shell. One-line examples will run on any platform. Longer examples which include line continuations (`\`) or variable assignment need to be modified to work on other shells, including PowerShell.

Install or run in Azure Cloud Shell

The easiest way to learn how to use the Azure CLI is by running it in an Azure Cloud Shell environment through your browser. To learn about Cloud Shell, see [Quickstart for Bash in Azure Cloud Shell](#).

When you're ready to install the CLI, see the [installation instructions](#).

After installing the CLI for the first time, check that it's installed and you've got the correct version by running `az --version`.

ⓘ Note

If you're using the Azure classic deployment model, [install the Azure classic CLI](#).

How to sign into the Azure CLI

Before using any Azure CLI commands with a local install, you need to sign in with [az login](#).

1. Run the `login` command.

```
Azure CLI
```

```
az login
```

If the CLI can open your default browser, it initiates [authorization code flow](#) and open the default browser to load an Azure sign-in page.

Otherwise, it initiates the [device code flow](#) and tell you to open a browser page at <https://aka.ms/devicelogin> and enter the code displayed in your terminal.

If no web browser is available or the web browser fails to open, you may force device code flow with `az login --use-device-code`.

2. Sign in with your account credentials in the browser.

After logging in, you see a list of subscriptions associated with your Azure account. The subscription information with `isDefault: true` is the currently activated subscription after logging in. To select another subscription, use the [az account set](#) command with the subscription ID to switch to. For more information about subscription selection, see [Use multiple Azure subscriptions](#).

There are ways to sign in non-interactively, which are covered in detail in [Sign in with Azure CLI](#).

Common Azure CLI commands

This table lists some common commands used in the CLI and links to their reference documentation.

Resource type	Azure CLI command group
Resource group	az group
Virtual machines	az vm
Storage accounts	az storage account
Key Vault	az keyvault
Web applications	az webapp
SQL databases	az sql server
CosmosDB	az cosmosdb

Finding commands

Azure CLI commands are organized as *commands of groups*. Each group represents an Azure service, and commands operate on that service.

To search for commands, use `az find`. For example, to search for command names containing `secret`, use the following command:

```
Azure CLI
```

```
az find secret
```

Use the `--help` argument to get a complete list of commands and subgroups of a group. For example, to find the CLI commands for working with Network Security Groups (NSGs):

```
Azure CLI
```

```
az network nsg --help
```

The CLI has full tab completion for commands under the bash shell.

Globally available arguments

There are some arguments that are available for every command.

- `--help` prints CLI reference information about commands and their arguments and lists available subgroups and commands.
- `--output` changes the output format. The available output formats are `json`, `jsonc` (colorized JSON), `tsv` (Tab-Separated Values), `table` (human-readable ASCII tables), and `yaml`. By default the CLI outputs `json`. To learn more about the available output formats, see [Output formats for Azure CLI](#).
- `--query` uses the [JMESPath query language](#) to filter the output returned from Azure services. To learn more about queries, see [Query command results with Azure CLI](#) and the [JMESPath tutorial](#).
- `--verbose` prints information about resources created in Azure during an operation, and other useful information.
- `--debug` prints even more information about CLI operations, used for debugging purposes. If you find a bug, provide output generated with the `--debug` flag on when submitting a bug report.

Interactive mode

The CLI offers an interactive mode that automatically displays help information and makes it easier to select subcommands. You enter interactive mode with the `az`

[interactive](#) command.

```
Azure CLI
```

```
az interactive
```

For more information on interactive mode, see [Azure CLI Interactive Mode](#).

There's also a [Visual Studio Code plugin](#) that offers an interactive experience, including autocomplete and mouse-over documentation.

Learn CLI basics with quickstarts and tutorials

To learn how to use the Azure CLI, try an in-depth tutorial for setting up virtual machines and using the power of the CLI to query Azure resources.

[Create virtual machines with the Azure CLI tutorial](#)

There are also Quickstarts for other popular services.

- [Create a storage account using the Azure CLI](#)
- [Transfer objects to/from Azure Blob storage using the CLI](#)
- [Create a single Azure SQL database using the Azure CLI](#)
- [Create an Azure Database for MySQL server using the Azure CLI](#)
- [Create an Azure Database for PostgreSQL using the Azure CLI](#)
- [Create a Python web app in Azure](#)
- [Run a custom Docker Hub image in Azure Web Apps for Containers](#)

Give feedback

We welcome your feedback for the CLI to help us make improvements and resolve bugs. You can [file an issue on GitHub](#) or use the built-in features of the CLI to leave general feedback with the `az feedback` command.

```
Azure CLI
```

```
az feedback
```

See also

- [Onboarding cheat sheet](#)

- Learn to use Bash with the Azure CLI
- Full command reference list for the Azure CLI

Azure CLI onboarding cheat sheet

Article • 08/03/2023

If you're looking to onboard quickly with the Azure CLI, you have come to the right place! Use this page to learn tips and techniques when getting started with the Azure CLI.

Content indexes

Jump straight to reference command examples, sample scripts, and tutorials using these links:

- Find an index of quickstarts, how-to guides and tutorials in [Azure CLI doc index A-Z](#).
- Choose a tested script and make it your own from the [Azure CLI sample index A-Z](#).
- For a published format of in-line help, go to the [Reference index A-Z](#).
- Go to [Microsoft Learn Modules for CLI tools](#) for free on-line training with a sandbox environment.

Getting started

Question	Answer	Learn more
What advantage is there to using Azure CLI?	You can manage multiple Azure resources concurrently from a flexible command-line. For example, create 50 Azure storage accounts, or update multiple user permissions through a script.	Choose the right command-line tool
Where can I run the Azure CLI?	The Azure CLI runs in Windows (Cmd or PowerShell), Linux, macOS, Docker containers, and Azure Cloud Shell. Using Azure Cloud Shell is the quickest way to get started.	Run Azure Cloud Shell
Do I have to install the Azure CLI?	Azure Cloud Shell and some Linux distributions have the Azure CLI preinstalled. For all other environments, you must install the Azure CLI.	Install the Azure CLI
How do I run the Azure CLI in a Docker container?	<pre>docker run -it mcr.microsoft.com/azure-cli</pre>	How to run the Azure CLI in a Docker container
What URLs do I need for proxy	This depends on the Cloud you are using. For a complete list see the list of endpoints needed for proxy	Azure CLI endpoints for

Question	Answer	Learn more
bypass?	bypass.	proxy bypass
How do I sign in?	Use <code>az login</code> inside your console window. Use your own Azure username and password, a service principal, managed identity or WAM.	Sign in with Azure CLI

Using reference commands

Question	Answer	Learn more
What is the Azure CLI syntax pattern?	"command group + <i>command subgroup</i> + command + --parameters" Example: "az storage account create --name myStorageAccount"	Azure CLI syntax components .
What is the difference between a command group, cmdlet, command, alias, module, and reference?	Good question! The Azure CLI only has command groups, reference commands, and user-defined aliases. You may be thinking of Azure PowerShell if you are looking for cmdlets and modules.	Azure CLI syntax components .
What is an extension and why does it have to be installed separately?	Extensions are command group add-ins that are not shipped as part of the core Azure CLI. You are prompted to install an extension the first time you use it. Get a list of available extensions by running <code>az extension list-available -output table</code> .	Use and manage extensions with the Azure CLI
How do I get a list of all commands, both core and extension?	For a list of command groups, in your console type <code>az</code> and <code>Enter</code> . For a list of subgroups and commands, use the <code>--help</code> parameter. Example: <code>az account --help</code> or <code>az account subscription --help</code> outputs a command list for just the group or subgroup.	Reference index A-Z
Does the Azure CLI have tab completion?	Yes! When typing a command in PowerShell, press your <code>Tab</code> key. This feature is only available in PowerShell.	Enable Tab Completion on PowerShell
How do I get in-line help?	Every command has a <code>--help</code> parameter that results in descriptions and tips to display in your console. Example: <code>az account --help</code> or <code>az vm create --help</code>	You can also Request support .
How can I learn to use multiple reference commands to complete	We're glad you asked! The Azure CLI provides several interactive commands that provide syntax and next steps. In the next section, learn about <code>az interactive</code> , <code>az scenario</code> , <code>az next</code> , and <code>az find</code> .	Learning Azure CLI

Question	Answer	Learn more
a single job to be done?		

For a side-by-side comparison of Azure CLI and Azure PowerShell syntax, see [Azure CLI vs Azure PowerShell: Side-by-side Command Comparison](#).

See script comparisons between Bash, PowerShell, and Cmd in [How to query Azure CLI command output using a JMESPath query](#).

Learning Azure CLI

There are several reference commands that provide interactive prompts to help you learn the Azure CLI.

Command	Description	Example
<code>az interactive</code>	In a PowerShell console, get auto-completion, command descriptions, and examples as you type.	See Work in interactive mode for more information. Example: Type <code>az interactive</code> in your console window then <code>Enter</code> .
<code>az scenario</code>	Get end to end (E2E) examples and execute them with walk-through prompts.	Type <code>az scenario guide "keywords of interest"</code> in your console then <code>Enter</code> . The Azure CLI returns scenarios based on your keyword(s). Example: <code>az scenario guide "virtual machines"</code>
<code>az next</code>	Get recommendations for the next Azure CLI command based on customer execution patterns. You are prompted to select a command path.	Type <code>az next</code> in your console then <code>Enter</code> . Pick from 1 of 7 preset command paths.
<code>az find</code>	This is an AI robot that will return reference examples for keywords.	Type <code>az find "active subscription"</code> in your console then <code>Enter</code> .

Another great way to learn to use the Azure CLI is through [Microsoft Learn Modules for CLI tools](#). When the module provides a sandbox environment, use the sandbox to try new commands without incurring costs.

Common usage questions

Question	Reference command answer	Learn more
How do I know what subscription I'm using?	<code>az account show --output table</code>	How to manage Azure subscriptions with the Azure CLI
How do I change my subscription?	<code>az account set --subscription "mySubscriptionName"</code>	How to manage Azure subscriptions with the Azure CLI
How can I set a default resource group and location?	<code>az config set defaults.location=westus2 defaults.group=MyResourceGroup</code>	Configure settings using az config
How do I query command output?	<code>az account show --query "{tenantId:tenantId,subscriptionid:id}"</code>	See How to query Azure CLI command output using a JMESPath query for many <code>--query</code> examples in Bash, PowerShell and Cmd.
How do I format output from a command?	<code>az account list --output table</code>	Output formats for Azure CLI commands
Can you help me to learn Bash with Azure CLI commands?	Absolutely! We all have different technical strengths, and for that reason, Microsoft offers a How-to guide for learning Bash. Enjoy!	Learn to use Bash with the Azure CLI

Would you like to see more onboarding tips in this article? Use the [Feedback for this page](#) and let us know!

Overview: Azure CLI terminology and support levels

Article • 08/02/2023

This article explains Azure CLI terminologies. There are syntax components, reference types, and statuses. It's the status that determines the support level.

Azure CLI syntax components

The Azure CLI syntax is a combination of groups, references, commands, and parameters. Often the **full reference command** is referred to as **command**.

Azure Service	Reference group	Reference subgroup(s)	Command	Full reference command	Parameter Examples
Azure CLI	az config			<code>az config</code>	--local, --output -o
Azure Network	az network	application-gateway	create	az network application-gateway create	--name, --resource-group, --capacity
Azure DevOps Server	az pipelines	agent	list	az pipelines agent list	--pool-id, --agent-name, --demands

A **reference subgroup** can have multiple levels such as `az network application-gateway private-link ip-config add`

Reference Group	Subgroup 1	Subgroup 2	Subgroup 3	Command
network	application-gateway	private-link	ip-config	add

See [Reference list A to Z](#) for a complete list of reference commands.

What is reference type?

Azure CLI commands are either part of the **core** Azure CLI service, or they're an **extension**. Extensions are optional add-ons. The reference type determines the release schedule, status and installation method as described here:

Core	Extension
References	Are part of the primary Azure CLI service
	Are optional reference commands that must be installed
Install	Jointly with the MSI installer
	Individually with <code>az extension add</code>
Released	On a schedule
	As new features or updates become available
Status	Can be GA (Generally Available), preview or experimental
	Also can be GA, preview or experimental

To get a list of command groups, run `az`. For a list of extensions, use [az extension list-available --output table](#) commands.

```
Azure CLI

# Get list of all command groups
az

# Get list of extensions
az extension list-available --output table
```

Core

Azure CLI references that have been published as a permanent part of the CLI are called **core references**. All core references install with the Azure CLI and you can't choose a subset of references. If you run the CLI through Azure Cloud Shell, core references are always up to date.

Extension

Extensions aren't shipped as part of the CLI but run as CLI commands. Some extensions are a permanent part of the Azure CLI, but often, an extension gives you access to preview and experimental commands. A single reference group, such as `az iot hub`, can have both core and extension commands. Here are two examples:

Full reference command	Is Core	Is Extension
<code>az iot hub list</code>	yes	
<code>az iot hub job list</code>		yes

You're prompted to install an extension upon first use. You can also install an extension by running the `az extension add` command.

You can learn more about extension references including installation and updating in [Use extensions with the Azure CLI](#). See [Available extensions for the Azure CLI](#) for a complete list of extension reference commands.

What is reference status?

Regardless of reference type, Azure CLI references fall into three status categories: **GA** (Generally Available), **public preview** or **experimental**. It's the reference command status (not type) that determines stability and support level.

	GA	Public preview	Experimental
Stability	Permanent	Can change in response to customer feedback. Is subject to the terms of Microsoft Azure Previews .	Can change in response to customer feedback. Often migrates to public preview. Can be removed.
Support level	Full	Partial	None

ⓘ Note

Warnings indicating **public preview** or **experimental** are part of the Azure CLI command output and should be expected.

Most commands and parameters for a single reference have a single status, but not always. A GA reference that is being built out to offer more commands can have GA, preview, and experimental reference commands. As new parameters are added to increase functionality, a single command can also have parameters that fall under different status categories. Here are example references that have different statuses:

Full reference command	Parameters	Type	GA	Public preview	Experimental
az network dns zone list	All	Core	yes		
az network dns zone create	--name, --resource-group, --if-none-match, --parent-name	Core	yes		

Full reference command	Parameters	Type	GA	Public preview	Experimental
	--newFutureParameter1	Core		yes	
	--newFutureParameter2	Core			yes
az network vhub list	All	Extension	yes		
az network vhub create	--address-prefix, --name, --resource-group, -vwan, --location, --sku	Extension	yes		
	--newFutureParameter1	Extension		yes	
	--newFutureParameter2	Extension			yes
az network firewall create	All	Extension			yes

The above table is only an example and **isn't** representative of current reference status for examples.

See also

- [Azure CLI A - Z reference list](#)
- [Available extensions for the Azure CLI](#)

Differences between Azure CLI products

Article • 08/08/2023

As of the end of June 2018, explicit version numbers have been removed from Azure CLI product names. This change helps eliminate confusion when documentation instructed to use "the Azure CLI," but was unclear what version of the product was being referenced. If you're familiar with the old product names, here's how they have changed:

- Azure CLI versions 2.0 and later are now referred to only as "Azure CLI."
- Earlier Azure CLI versions (1.x and lower) are now referred to as "Azure classic CLI."

The name change to Azure classic CLI makes it clear that this tool is meant to be used only with the classic deployment model. The classic CLI is also no longer updated or maintained. For this reason, and many more, it's recommended that you move any classic deployments to use the Azure Resource Manager model. Migrate to the latest available version of the Azure CLI.

If you're still using the classic CLI, you can learn about the process of migrating in the following articles:

- [Migrate from Classic to Azure Resource Manager](#)
- [Install the Azure CLI](#)
- [Migrating from Azure classic CLI to Azure CLI ↗](#)

Azure command line tools survey guidance

Article • 06/26/2023

When using the Azure CLI, you may be invited to participate in a survey to tell us about your experience. By responding to the survey, you help to identify common issues and areas for improvement. Understanding your experiences and opinions helps to make future releases of Azure command line tools better for you and others.

What data is collected

The survey collects anonymized feedback about your satisfaction with Azure command line tools and doesn't collect any private or personal data.

While we appreciate the insights this data provides, we understand not everyone wants to be prompted to complete a survey. You can disable being prompted to participate in surveys with the `az config` command or via an environment variable.

Disable the survey

In the following example, the `az config` command is used to disable the survey message.

Azure CLI

```
az config set core.survey_message=false
```

You can also use the `AZURE_CORE_SURVEY_MESSAGE` environment variable to disable the survey message.

Privacy statement

Your privacy is important to us. [Microsoft's Privacy Statement](#) explains the personal data Microsoft processes, how Microsoft processes it, and for what purposes.

How to install the Azure CLI

Article • 09/28/2023

The Azure CLI is available to install in Windows, macOS and Linux environments. It can also be run in a Docker container and Azure Cloud Shell.

Install

The current version of the Azure CLI is **2.53.0**. For information about the latest release, see the [release notes](#). To find your installed version and see if you need to update, run `az version`.

- [Install on Windows](#)
- [Install on macOS](#)
- Install on Linux or Windows Subsystem for Linux (WSL) ([What is WSL?](#))
 - [Install on RHEL/CentOS with dnf](#)
 - [Install on SLES/OpenSUSE with zypper](#)
 - [Install on Ubuntu/Debian with apt](#)
 - [Install on Azure Linux with tdnf](#)
 - [Install from script](#)
- [Run in Docker container](#)
- [Run in Azure Cloud Shell](#)

Note

If you're using the Azure classic deployment model, [install the Azure classic CLI](#).

FAQ

Where is the Azure CLI installed?

When installing the Azure CLI, you can't select an install location. In Windows, the 32-bit Azure CLI installs in `C:\Program Files (x86)\Microsoft SDKs\Azure\CLI2` and the 64-bit in `C:\Program Files\Microsoft SDKs\Azure\CLI2`. In Linux, the Azure CLI is installed in `/opt/az/` on Ubuntu and Debian, and in `/lib64/az/` on CentOS, RHEL and Azure Linux.

User-specific configuration files are located in `$HOME/.azure` on macOS and Linux, and `%USERPROFILE%\azure` on Windows. These locations are known as the `AZURE_CONFIG_DIR`.

What version of the Azure CLI is installed?

Type `az version` in a terminal window to know what version of the Azure CLI is installed. Your output looks like this:

```
Output

{
  "azure-cli": "x.xx.0x",
  "azure-cli-core": "x.xx.x",
  "azure-cli-telemetry": "x.x.x",
  "extensions": {}
}
```

What extensions are installed?

Use the `az extension list` command to see installed extension. You can also use `az version`, but `az extension list` provides additional information including the installation path and status. For information on managing extensions, see [Use and manage extensions with the Azure CLI](#).

See also

- [Sign in with the Azure CLI](#)
- [Azure CLI Onboarding cheat sheet](#)
- [Find Azure CLI samples and published docs](#)
- [How to use the Azure CLI successfully](#)

Install Azure CLI on Windows

Article • 09/14/2023

The Azure Command-Line Interface (CLI) is a cross-platform command-line tool that can be installed locally on Windows computers. You can use the Azure CLI for Windows to connect to Azure and execute administrative commands on Azure resources. The Azure CLI for Windows can also be used from a browser through the Azure Cloud Shell or run from inside a Docker container.

For Windows, the Azure CLI is installed via an MSI, which gives you access to the CLI through the Windows Command Prompt (CMD) or PowerShell. When you perform an installation for Windows Subsystem for Linux (WSL), packages are available for your Linux distribution. See the [main install page](#) for the list of supported package managers or how to install manually under WSL.

The current version of the Azure CLI is **2.53.0**. For information about the latest release, see the [release notes](#). To find your installed version and see if you need to update, run `az version`.

Install or update

The MSI distributable is used for installing or updating the Azure CLI on Windows. You don't need to uninstall current versions before using the MSI installer because the MSI updates any existing version.

ⓘ Important

After the installation is complete, you will need to **close and reopen any active terminal window to use the Azure CLI**.

Microsoft Installer (MSI)

Latest version

Download and install the latest release of the Azure CLI. When the installer asks if it can make changes to your computer, select the "Yes" box.

[Latest release of the Azure CLI \(32-bit\)](#)

[Latest release of the Azure CLI \(64-bit\)](#)

If you have previously installed the Azure CLI, running either the 32-bit or 64-bit MSI will overwrite an existing installation.

Specific version

If you prefer, you can download a specific version of the Azure CLI by using a URL.

To download the MSI installer for a specific version, change the version segment in URL `https://azcliprod.blob.core.windows.net/msi/azure-cli-<version>.msi` (32-bit) or `https://azcliprod.blob.core.windows.net/msi/azure-cli-<version>-x64.msi` (64-bit).

For example, to install the 32-bit MSI of Azure CLI version [2.51.0](#), your URL would be `https://azcliprod.blob.core.windows.net/msi/azure-cli-2.51.0.msi`. The corresponding 64-bit install would be

`https://azcliprod.blob.core.windows.net/msi/azure-cli-2.51.0-x64.msi`.

Available Azure CLI versions can be found at [Azure CLI release notes](#). The 64-bit MSI is available from version [2.51.0](#).

Run the Azure CLI

You can now run the Azure CLI with the `az` command from either Windows Command Prompt or PowerShell.

Enable Tab Completion in PowerShell

Tab completion, also known as "Azure CLI completers", provides completion on inputs to provide hints, enable discovery and speed up input entry. Command names, command group names, parameters and certain parameter values can be automatically inserted into the command line by pressing the `Tab` key.

Tab completion is enabled by default in Azure Cloud Shell and in most Linux distributions. Starting in Azure CLI version 2.49, you can enable tab completion for the Azure CLI in PowerShell. Follow these steps:

1. Create or edit the profile stored in the variable `$PROFILE`. The simplest way is to run `notepad $PROFILE` in PowerShell. For more information, see [How to create your profile](#) and [Profiles and execution policy](#).
2. Add the following code to your PowerShell profile:

```
PowerShell

Register-ArgumentCompleter -Native -CommandName az -ScriptBlock {
    param($commandName, $wordToComplete, $cursorPosition)
    $completion_file = New-TemporaryFile
    $env:ARGCOMPLETE_USE_TEMPFILES = 1
    $env:_ARGCOMPLETE_STDOUT_FILENAME = $completion_file
    $env:COMP_LINE = $wordToComplete
    $env:COMP_POINT = $cursorPosition
    $env:_ARGCOMPLETE = 1
    $env:_ARGCOMPLETE_SUPPRESS_SPACE = 0
    $env:_ARGCOMPLETE_IFS = "`n"
    $env:_ARGCOMPLETE_SHELL = 'powershell'
    az 2>&1 | Out-Null
    Get-Content $completion_file | Sort-Object | ForEach-Object {
        [System.Management.Automation.CompletionResult]::new($_, $_,
        "ParameterValue", $_)
    }
    Remove-Item $completion_file, Env:\_ARGCOMPLETE_STDOUT_FILENAME,
Env:\ARGCOMPLETE_USE_TEMPFILES, Env:\COMP_LINE, Env:\COMP_POINT,
Env:\_ARGCOMPLETE, Env:\_ARGCOMPLETE_SUPPRESS_SPACE,
Env:\_ARGCOMPLETE_IFS, Env:\_ARGCOMPLETE_SHELL
}
```

3. To display all available options in the menu, add `Set-PSReadlineKeyHandler -Key Tab -Function MenuComplete` to your PowerShell profile.

Troubleshooting

Here are some common problems seen when installing the Azure CLI on Windows. If you experience a problem not covered here, [file an issue on GitHub](#) ↗.

Proxy blocks connection

If you can't download the MSI installer because your proxy is blocking the connection, make sure that you have your proxy properly configured. For Windows 10, these settings are managed in the `Settings > Network & Internet > Proxy` pane. Contact your system administrator for the required settings, or for situations where your machine may be configuration-managed or require advanced setup.

Important

These settings are also required to be able to access Azure services with the CLI, from both PowerShell or the Command Prompt. In PowerShell, you do this with the following command:

PowerShell

```
(New-Object System.Net.WebClient).Proxy.Credentials = `  
[System.Net CredentialCache]::DefaultNetworkCredentials
```

In order to get the MSI, your proxy needs to allow HTTPS connections to the following addresses:

- <https://aka.ms/>
- <https://azcliprod.blob.core.windows.net/>

Migrate to 64-bit Azure CLI

Starting from 2.51.0, Azure CLI also provides 64-bit MSI which is recommended for better performance.

Follow these steps to migrate to Azure CLI 64-bit:

1. Check your current CLI version and installed extensions by running `az --version`.
2. Extensions will need to be reinstalled. It is recommended to perform a backup of the current extension folder `%userprofile%\azure\cliextensions` by renaming it in case you choose to revert back to 32-bit. This folder is created automatically when you reinstall an extension.
3. Download and install latest 64-bit installer as described in [Install or update](#). The 32-bit MSI will be automatically uninstalled.
4. Install extensions by running `az extension add --name <extension> --version <version>`. If you don't want to reinstall extensions manually, the Azure CLI will prompt you to install an extension on first use. For more information on installing extensions, see [How to install extensions](#).

If you have issues after migration, you can uninstall the 64-bit and reinstall the 32-bit MSI. If you have made a backup of your 32-bit extension folder, restore (rename) your extension folder after the change.

Update the Azure CLI

Beginning with version [2.11.0](#), the Azure CLI provides an in-tool command to update to the latest version.



This command also updates all installed extensions by default. For more `az upgrade` options, see the [command reference page](#). For Azure CLI versions prior to [2.11.0](#), update by reinstalling as described in [Install the Azure CLI](#).

Uninstall

If you decide to uninstall the Azure CLI, we're sorry to see you go. Before you uninstall, use the `az feedback` command to let us know what could be improved or fixed. Our goal is to make the Azure CLI bug-free and user-friendly. If you found a bug, we'd appreciate it if you [file a GitHub issue](#).

You uninstall the Azure CLI from the Windows "Apps and Features" list. To uninstall:

Platform	Instructions
Windows 11	Start > Settings > Apps > Installed apps
Windows 10	Start > Settings > System > Apps & Features
Windows 8 and Windows 7	Start > Control Panel > Programs > Uninstall a program

Once on this screen type **Azure CLI** into the program search bar. The program to uninstall is listed as **Microsoft CLI 2.0 for Azure**. Select this application, then select the `Uninstall` button.

Remove data

If you don't plan to reinstall Azure CLI, remove its data from `C:\Users\<username>\.azure\msal_token_cache.bin` or `C:\Users\<username>\.azure\msal_token_cache.json`.

Next Steps

Now that you've installed the Azure CLI on Windows, learn about the different ways to sign in.

[Sign in with Azure CLI](#)

Install Azure CLI on macOS

Article • 06/19/2023

The Azure Command-Line Interface (CLI) allows the execution of commands through a terminal using interactive command-line prompts or a script. You can install the Azure CLI locally on macOS computers. The Azure CLI on macOS allows the execution of various commands through a terminal using interactive command-line prompts or a script.

For the macOS platform, you can install the Azure CLI with [homebrew package manager](#). Homebrew makes it easy to keep your installation of the CLI update to date. The CLI package has been tested on macOS versions 10.9 and later.

The current version of the Azure CLI is **2.49.0**. For information about the latest release, see the [release notes](#). To find your installed version and see if you need to update, run `az version`.

Install with Homebrew

Homebrew is the easiest way to manage your CLI install. It provides convenient ways to install, update, and uninstall. If you don't have homebrew available on your system, [install homebrew](#) before continuing.

You can install the Azure CLI on macOS by updating your brew repository information, and then running the `install` command:

Bash

```
brew update && brew install azure-cli
```

ⓘ Important

The Azure CLI has a dependency on the Homebrew `python@3.10` package, and will install it.

Troubleshooting

If you encounter a problem when installing the CLI through Homebrew, here are some common errors. If you experience a problem not covered here, [file an issue on github](#).

Completion is not working

The Homebrew formula of Azure CLI installs a completion file named `az` in the Homebrew-managed completions directory (default location is `/usr/local/etc/bash_completion.d/`). To enable completion, please follow Homebrew's instructions [here ↗](#).

For Zsh, add the following two lines to the bottom of your `.zshrc` file, then save and reload your Zsh profile.

```
autoload bashcompinit && bashcompinit
source $(brew --prefix)/etc/bash_completion.d/az
```

Unable to find Python or installed packages

There may be a minor version mismatch or other issue during homebrew installation. The CLI doesn't use a Python virtual environment, so it relies on finding the installed Python version. A possible fix is to install and relink the `python@3.10` dependency from Homebrew.

Bash

```
brew update && brew install python@3.10 && brew upgrade python@3.10
brew link --overwrite python@3.10
```

CLI version 1.x is installed

If an out-of-date version was installed, it could be because of a stale homebrew cache. Follow the [update](#) instructions.

Proxy blocks connection

You may be unable to get resources from Homebrew unless you have correctly configured it to use your proxy. Follow the [Homebrew proxy configuration instructions ↗](#).

 **Important**

If you are behind a proxy, `HTTP_PROXY` and `HTTPS_PROXY` must be set to connect to Azure services with the CLI. If you are not using basic auth, it's recommended to export these variables in your `.bashrc` file. Always follow your business' security policies and the requirements of your system administrator.

In order to get the bottle resources from Homebrew, your proxy needs to allow HTTPS connections to the following addresses:

- `https://formulae.brew.sh`
- `https://homebrew.bintray.com`

Update

The CLI is regularly updated with bug fixes, improvements, new features, and preview functionality. A new release is available roughly every three weeks.

The CLI provides an in-tool command to update to the latest version:

Azure CLI

```
az upgrade
```

ⓘ Note

The `az upgrade` command was added in version 2.11.0 and will not work with versions prior to 2.11.0. Older versions can be updated by reinstalling as described in [Install the Azure CLI](#).

This command will also update all installed extensions by default. For more `az upgrade` options, please refer to the [command reference page](#).

You can also update your local Homebrew repository information and then upgrade the `azure-cli` package.

Bash

```
brew update && brew upgrade azure-cli
```

Uninstall

If you decide to uninstall the Azure CLI, we're sorry to see you go. Before you uninstall, use the `az feedback` command to let us know what could be improved or fixed. Our goal is to make the Azure CLI bug-free and user-friendly. If you found a bug, we'd appreciate it if you [file a GitHub issue ↗](#).

Use homebrew to uninstall the `azure-cli` package.

```
Bash
```

```
brew uninstall azure-cli
```

Remove data

If you don't plan to reinstall Azure CLI, remove its data.

```
Bash
```

```
rm -rf ~/.azure
```

Other installation methods

If you can't use homebrew to install the Azure CLI in your environment, it's possible to use the manual instructions for Linux. Note that this process is not officially maintained to be compatible with macOS. Using a package manager such as Homebrew is always recommended. Only use the manual installation method if you have no other option available.

For the manual installation instructions, see [Install Azure CLI on Linux manually](#).

Next Steps

Now that you've installed the Azure CLI on macOS, take a short tour of its features and common commands.

[Get started with the Azure CLI](#)

Install the Azure CLI on Linux

Article • 08/08/2023

This article explains how to install the Azure CLI on Linux. Select the appropriate package manager for your distribution from the options at the top of the page. Using a Linux distribution's package manager is recommended, but you may manually install the Azure CLI on Linux by selecting the [Install script](#) option.

The current version of the Azure CLI is 2.51.0. For information about the latest release, see the [release notes](#). To find your installed version and see if you need to update, run `az version`.

Before you begin

- The `apt` package manager contains x86_64 and ARM64 packages for the Azure CLI that has been tested on the following distributions.

Distribution	Version
Ubuntu	20.04 LTS (Focal Fossa), 22.04 (Jammy Jellyfish)
Debian	10 (Buster), 11 (Bullseye), 12 (Bookworm)

- Ubuntu 20.04 (Focal Fossa) and 20.10 (Groovy Gorilla) include an `azure-cli` package with version `2.0.81` provided by the `universe` repository. This package is outdated and not recommended. If this package is installed, remove the package before continuing by running the command `sudo apt remove azure-cli -y && sudo apt autoremove -y`. For more information on `apt remove`, see the [Ubuntu package management](#) or [ask ubuntu](#).

Install Azure CLI

There are two options to install the Azure CLI on your system. You can download an install script that runs the install commands for you, or you can execute the install commands yourself in a step-by-step process.

Option 1: Install with one command

The easiest way to install the Azure CLI is through a script maintained by the Azure CLI team. This script runs all installation commands in one step. This script is downloaded

via `curl` and piped directly to `bash` to install the CLI.

If you wish to inspect the contents of the script yourself before executing, download the script first using `curl` and inspect it in your favorite text editor.

Bash

```
curl -sL https://aka.ms/InstallAzureCLIDeb | sudo bash
```

Option 2: Step-by-step installation instructions

If you prefer a step-by-step installation process, complete the following steps to install the Azure CLI.

1. Get packages needed for the installation process:

Bash

```
sudo apt-get update
sudo apt-get install ca-certificates curl apt-transport-https lsb-release gnupg
```

2. Download and install the Microsoft signing key:

Bash

```
sudo mkdir -p /etc/apt/keyrings
curl -sLS https://packages.microsoft.com/keys/microsoft.asc |
    gpg --dearmor |
    sudo tee /etc/apt/keyrings/microsoft.gpg > /dev/null
sudo chmod go+r /etc/apt/keyrings/microsoft.gpg
```

3. Add the Azure CLI software repository:

Bash

```
AZ_REPO=$(lsb_release -cs)
echo "deb [arch=`dpkg --print-architecture` signed-by=/etc/apt/keyrings/microsoft.gpg]
https://packages.microsoft.com/repos/azure-cli/ $AZ_REPO main" |
    sudo tee /etc/apt/sources.list.d/azure-cli.list
```

4. Update repository information and install the `azure-cli` package:

Bash

```
sudo apt-get update  
sudo apt-get install azure-cli
```

Install specific version

Configure the `azure-cli` repository information as shown previously. Available versions can be found at [Azure CLI release notes](#).

1. To view available versions with command:

```
Bash  
  
apt-cache policy azure-cli
```

2. To install specific version:

```
Bash  
  
sudo apt-get install azure-cli=<version>-1~bullseye
```

Update Azure CLI

Beginning with version [2.11.0](#), the Azure CLI provides an in-tool command to update to the latest version.

```
Azure CLI  
  
az upgrade
```

This command also updates all installed extensions by default. For more `az upgrade` options, see the [command reference page](#). For Azure CLI versions prior to [2.11.0](#), update by reinstalling as described in [Install the Azure CLI](#).

You can also use `apt-get upgrade` to update the CLI package. This command upgrades all of the installed packages on your system that haven't had a dependency change.

```
Bash  
  
sudo apt-get update && sudo apt-get upgrade
```

To upgrade the CLI only, use `apt-get install`.

Bash

```
sudo apt-get update && sudo apt-get install --only-upgrade -y azure-cli
```

Uninstall Azure CLI

If you decide to uninstall the Azure CLI, we're sorry to see you go. Before you uninstall, use the `az feedback` command to let us know what could be improved or fixed. Our goal is to make the Azure CLI bug-free and user-friendly. If you found a bug, we'd appreciate it if you [file a GitHub issue](#).

1. Uninstall with `apt-get remove`:

Bash

```
sudo apt-get remove -y azure-cli
```

2. If you don't plan to reinstall the CLI, remove the Azure CLI repository information:

Bash

```
sudo rm /etc/apt/sources.list.d/azure-cli.list
```

3. If you aren't using other packages from Microsoft, remove the signing key:

Bash

```
sudo rm /etc/apt/trusted.gpg.d/microsoft.gpg
```

4. Remove any unneeded packages:

Bash

```
sudo apt autoremove
```

Remove data

If you don't plan to reinstall Azure CLI, remove its data.

Bash

```
rm -rf ~/.azure
```

Troubleshooting

Here are some common problems seen when installing with `apt`. If you experience a problem not covered here, [file an issue on GitHub](#).

The `azure-cli` package supports ARM64 architecture from CLI version [2.46.0](#).

No module issue on Ubuntu 20.04 (Focal)/WSL

If you installed `azure-cli` on `Focal` without adding the Azure CLI software repository in [step 3](#) of the manual install instructions or using our [script](#), you may encounter issues such as no module named 'decorator' or 'antlr4' as the package you installed is the outdated `azure-cli 2.0.81` from the `focal/universe` repository. Remove it first by running `sudo apt remove azure-cli -y && sudo apt autoremove -y`, then follow the above [instructions](#) to install the latest `azure-cli` package.

`lsb_release` doesn't return the correct base distribution version

Some Ubuntu or other Debian-derived distributions (such as Linux Mint) may not return the correct version name from `lsb_release`. This value is used in the install process to determine the package to install. If you know the code name of the Ubuntu or Debian version that your distribution is derived from, you can set the `AZ_REPO` value manually when [adding the repository](#). Otherwise, look up information for your distribution on how to determine the base distribution code name and set `AZ_REPO` to the correct value.

No package for your distribution

Sometimes, an updated Azure CLI package isn't immediately available following a distribution version release. The Azure CLI is designed to be resilient to future versions of dependencies and relies on as few of them as possible. If there's no package available for your base distribution, try a package for an earlier distribution.

To try a package for an earlier distribution, set the value of `AZ_REPO` manually when [adding the repository](#). For Ubuntu distributions, use the latest `jammy` repository:

Bash

```
AZ_REPO="jammy"
```

For Debian distributions, use the latest `bookworm` repository:

Bash

```
AZ_REPO="bookworm"
```

ⓘ Important

Distributions released before Ubuntu Bionic and Debian Buster are not supported.

Elementary OS (EOS) fails to install the Azure CLI

EOS fails to install the Azure CLI because `lsb_release` returns `HERA`, which is the EOS release name. The solution is to fix the file `/etc/apt/sources.list.d/azure-cli.list` and change `hera main` to `bionic main`.

Original file contents:

```
deb [arch=amd64] https://packages.microsoft.com/repos/azure-cli/ hera main
```

Modified file contents

```
deb [arch=amd64] https://packages.microsoft.com/repos/azure-cli/ bionic main
```

Proxy blocks connection

If you're unable to connect to an external resource due to a proxy, make sure that you've correctly set the `HTTP_PROXY` and `HTTPS_PROXY` variables in your shell. You need to contact your system administrator to know what host(s) and port(s) to use for these proxies.

The values in these variables are used by many Linux programs, and during the install process. To set these values:

Bash

```
# No auth
export HTTP_PROXY=http://[proxy]:[port]
export HTTPS_PROXY=https://[proxy]:[port]

# Basic auth
export HTTP_PROXY=http://[username]:[password]@[proxy]:[port]
export HTTPS_PROXY=https://[username]:[password]@[proxy]:[port]
```

ⓘ Important

If you are behind a proxy, these shell variables must be set to connect to Azure services with the CLI. If you are not using basic auth, it's recommended to export these variables in your `.bashrc` file. Always follow your business' security policies and the requirements of your system administrator.

You may also want to explicitly configure `apt` to always use this proxy. Make sure that the following lines appear in an `apt` configuration file in `/etc/apt/apt.conf.d/`. We recommend using either your existing global configuration file, an existing proxy configuration file, `40proxies`, or `99local`, but follow your system administration requirements.

apt.conf

```
Acquire {
    http::proxy "http://[username]:[password]@[proxy]:[port]";
    https::proxy "https://[username]:[password]@[proxy]:[port]";
}
```

If your proxy doesn't use basic auth, remove the `[username]:[password]@` portion of the proxy URI. If you require more information for proxy configuration, see the official Ubuntu documentation:

- [apt.conf manpage ↗](#)
- [Ubuntu wiki - apt-get howto ↗](#)

In order to get the Microsoft signing key and get the package from our repository, your proxy needs to allow HTTPS connections to the following address:

- <https://packages.microsoft.com>

CLI fails to install or run on Windows Subsystem for Linux

Since [Windows Subsystem for Linux \(WSL\)](#) is a system call translation layer on top of the Windows platform, you might experience an error when trying to install or run the Azure CLI. The CLI relies on some features that may have a bug in WSL. If you experience an error no matter how you install the CLI, there's a good chance it's an issue with WSL and not with the CLI install process.

To troubleshoot your WSL installation and possibly resolve issues:

- If you can, run an identical install process on a Linux machine or VM to see if it succeeds. If it does, your issue is likely related to WSL. To start a Linux VM in Azure, see the [create a Linux VM in the Azure portal](#) documentation.
- Make sure that you're running the latest version of WSL. To get the latest version, [update your Windows 10 installation ↗](#).
- Check for any [open issues ↗](#) with WSL that might address your problem. Often there are suggestions on how to work around the problem, or information about a release where the issue is fixed.
- If there are no existing issues for your problem, [file a new issue with WSL ↗](#) and make sure that you include as much information as possible.

If you continue to have issues installing or running on WSL, consider [installing the CLI for Windows](#).

Next Steps

Now that you've installed the Azure CLI, take a short tour of its features and common commands.

[Get started with the Azure CLI](#)

Azure CLI endpoints for proxy bypass

Article • 08/01/2023

If your organization is secured with a firewall or proxy server, you must add certain IP (internet protocol) addresses and domain URLs (uniform resource locators) to the **allowlist** prior to installing the Azure CLI.

Two URLs are used during installation to download Python packages: pypi.org and files.pythonhosted.org.

The following tables provide lists of the endpoints and suffixes used by the Azure CLI. These endpoints are specific to the Azure cloud where your organization is deployed. We don't recommend adding other Azure CLI-related URLs aside from the URLs needed for specific Azure CLI reference groups, although you may want to add URLs related to other Microsoft products and services.

Endpoints

Endpoint group	Endpoint
management	https://management.core.windows.net/
resource_manager	https://management.azure.com/
sql_management	https://management.core.windows.net:8443/
batch_resource_id	https://batch.core.windows.net/
gallery	https://gallery.azure.com/
active_directory	https://login.microsoftonline.com_
active_directory_resource_id	https://management.core.windows.net/
active_directory_graph_resource_id	https://graph.windows.net/
microsoft_graph_resource_id	https://graph.microsoft.com/
active_directory_data_lake_resource_id	https://datalake.azure.net/
vm_image_alias_doc	https://raw.githubusercontent.com/Azure/azure-rest-api-specs/main/arm-compute/quickstart-

Endpoint group	Endpoint
	templates/aliases.json_
media_resource_id	https://rest.media.azure.net_
osrdbms_resource_id	https://osrdbms-aad.database.windows.net_
app_insights_resource_id	https://api.applicationinsights.io_
log_analytics_resource_id	https://api.loganalytics.io_
app_insights_telemetry_channel_resource_id	https://dc.applicationinsights.azure.com/v2/track_
synapse_analytics_resource_id	https://dev.azuresynapse.net_
attestation_resource_id	https://attest.azure.net_
portal	https://portal.azure.com_

Endpoint suffixes

Suffix name	Suffix
storage_endpoint	*.core.windows.net
storage_sync_endpoint	*.afs.azure.net
keyvault_dns	*.vault.azure.net
mhsm_dns	*.managedhsm.azure.net
sql_server_hostname	*.database.windows.net
mysql_server_endpoint	*.mysql.database.azure.com
postgresql_server_endpoint	*.postgres.database.azure.com
mariadb_server_endpoint	*.mariadb.database.azure.com
azure_datalake_store_file_system_endpoint	*.azuredatalakestore.net
azure_datalake_analytics_catalog_and_job_endpoint	*.azuredatalakeanalytics.net
acr_login_server_endpoint	*.azurecr.io
synapse_analytics_endpoint	*.dev.azuresynapse.net
attestation_endpoint	*.attest.azure.net

Extensions

Azure CLI extensions are optional and installed separately. The Azure CLI uses <https://aka.ms/azure-cli-extension-index-v1> to fetch a list of extensions. This *aka.ms* link points to https://github.com/Azure/azure-cli/blob/3feea02888ea67f033f407174a3a7a340158b81a/src/azure-cli-core/azure/cli/core/extension/_index.py#L11.

All extensions install with endpoint **azcliprod.blob.core.windows.net** with the following exceptions:

Extension name	Endpoint
arcappliance	arcplatformcliextprod.blob.core.windows.net
customlocation	
arcdat	azurearcdatcli.blob.core.windows.net
azure-batch-cli-extensions	github.com\Azure
azure-devops	
azure-iot	
baremetal-infrastructure	
csvmware	
deploy-to-azure	
sap-hana	
azure-cli-ml	azurecliext.blob.core.windows.net
azurestackhci	hybridaksstorage.z13.web.core.windows.net
Hybridaks	
fzf	pahealyfzf.blob.core.windows.net
image-copy-extension	files.pythonhosted.org
managementpartner	
resource-graph	
ml	azuremlsdktestpypi.blob.core.windows.net
qbs	qbsazcliextension.blob.core.windows.net

See also

- [How to use the Azure CLI effectively - Work behind a proxy](#)
- [Work with existing on-premises proxy servers](#)
- [Azure Firewall threat intelligence configuration - Allowlist addresses](#)
- [Azure IP ranges and Service Tags](#)
 - [Public Cloud ↗](#)
 - [US Government Cloud ↗](#)
 - [China Cloud ↗](#)

How to update the Azure CLI

Article • 08/02/2023

You can rely on package managers to update a local install of the Azure CLI on Windows, macOS and Linux environments (see the `Update` section in each platform-specific install instruction). The CLI also provides in-tool commands to upgrade manually or automatically.

Manual Update

Beginning with version [2.11.0](#), the Azure CLI provides an in-tool command to update to the latest version.

```
Azure CLI
az upgrade
```

This command also updates all installed extensions by default. For more `az upgrade` options, see the [command reference page](#). For Azure CLI versions prior to [2.11.0](#), update by reinstalling as described in [Install the Azure CLI](#).

`az upgrade` is supported on Windows, macOS and some Linux distros as long as installation is supported. It only supports upgrading to the latest version. If you're running the Azure CLI through Azure Cloud Shell, you're most likely already using the most recent Azure CLI install. If not due to cases like ad-hoc release of a minor bug fix version, you need to wait for the next build of Azure Cloud Shell as `az upgrade` isn't supported in Azure Cloud Shell.

When `azure-cli` is already the latest version, running `az upgrade` checks and updates all installed [extensions](#).

Automatic Update

By default, autoupgrade for Azure CLI is disabled. If you would like to keep up with the latest version, you can enable autoupgrade through [configuration](#).

```
Azure CLI
az config set auto-upgrade.enable=yes
```

The Azure CLI will check new versions regularly and prompt you to upgrade after any command finishes running once the update is available.

The prompt message and output messages during upgrade may interrupt your command result if it's assigned to some variable or in an automated flow. To avoid interruption, you can use the following configuration to allow the update to happen automatically without confirmation, and only show warnings and errors during the upgrade.

```
Azure CLI
```

```
az config set auto-upgrade.prompt=no
```

By default, all installed extensions are also updated. You can disable extension update through configuration.

```
Azure CLI
```

```
az config set auto-upgrade.all=no
```

ⓘ Note

Please wait for `az upgrade` to complete before proceeding to the next set of commands, else the new versions of the CLI (+extensions) may have breaking changes.

If you decide not to use the automatic update feature anymore for cases like keeping command scripts running stably, you can turn it off through configuration.

```
Azure CLI
```

```
az config set auto-upgrade.enable=no
```

How to run the Azure CLI in a Docker container

Article • 08/08/2023

You can use Docker to run a standalone Linux container with the Azure CLI preinstalled. Docker gets you started quickly with an isolated environment to run the CLI in. The image can also be used as a base for your own deployments.

Start the Docker container with Azure CLI preinstalled

ⓘ Note

The Azure CLI has migrated to [Microsoft Container Registry](#). Existing tags on Docker Hub are still supported, but new releases will only be available as `mcr.microsoft.com/azure-cli`.

Open a command prompt and then start the Docker container with Azure CLI preinstalled using the following command.

Bash

```
docker run -it mcr.microsoft.com/azure-cli
```

ⓘ Note

If you want to pick up the SSH keys from your user environment, use `-v ${HOME}/.ssh:/root/.ssh` to mount your SSH keys in the environment.

Bash

```
docker run -it -v ${HOME}/.ssh:/root/.ssh mcr.microsoft.com/azure-cli
```

The CLI is installed on the image as the `az` command in `/usr/local/bin`.

Run the Docker container with a specific version of the Azure CLI

Available versions can be found at [Azure CLI release notes](#).

To run a specific version of the Azure CLI in the Docker container, use this command:

Bash

```
docker run -it mcr.microsoft.com/azure-cli:<version>
```

Update Docker image

Updating with Docker requires both pulling the new image and re-creating any existing containers. For this reason, you should try to avoid using a container that hosts the CLI as a data store.

Update your local image with `docker pull`.

Bash

```
docker pull mcr.microsoft.com/azure-cli
```

Uninstall Docker image

If you decide to uninstall the Azure CLI, we're sorry to see you go. Before you uninstall, use the `az feedback` command to let us know what could be improved or fixed. Our goal is to make the Azure CLI bug-free and user-friendly. If you found a bug, we'd appreciate it if you [file a GitHub issue ↗](#).

After halting any containers running the CLI image, remove it.

Bash

```
docker rmi mcr.microsoft.com/azure-cli
```

Next Steps

Now that you're ready to use the Azure CLI in a Docker container, take a short tour of its features and common commands.

[Get started with the Azure CLI](#)

Quickstart for Azure Cloud Shell

Article • 10/09/2023

This document details how to get started using Azure Cloud Shell.

Prerequisites

Before you can use Azure Cloud Shell, you must register the **Microsoft.CloudShell** resource provider. Access to resources is enabled through provider namespaces that must be registered in your subscription. You only need to register the namespace once per subscription.

To see all resource providers, and the registration status for your subscription:

1. Sign in to the [Azure portal](#).
2. On the Azure portal menu, search for **Subscriptions**. Select it from the available options.
3. Select the subscription you want to view.
4. On the left menu, under **Settings**, select **Resource providers**.
5. In the search box, enter `cloudshell` to search for the resource provider.
6. Select the **Microsoft.CloudShell** resource provider register from the provider list.
7. Select **Register** to change the status from **unregistered** to **Registered**.

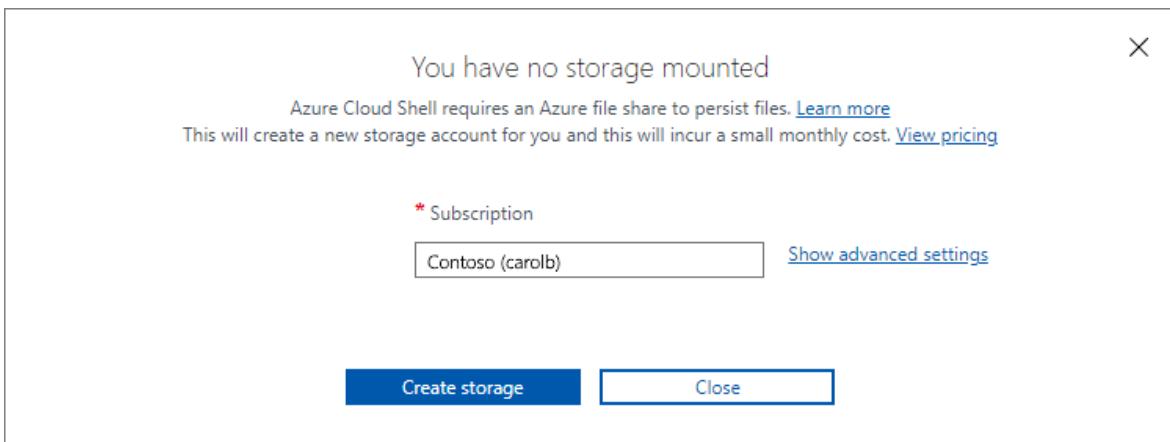
The screenshot shows the Microsoft Azure portal interface. In the top navigation bar, the URL is https://portal.azure.com/. The search bar contains 'Search resources, services, and docs (G+)'. The user is signed in as carolb@contoso.com. The main content area is titled 'Contoso (carolb) | Resource providers'. On the left, there's a sidebar with links like 'Programmatic deployment', 'Billing properties', 'Resource groups', 'Resources', etc., and a 'Resource providers' link which is highlighted with a red box. The main table lists a provider named 'Microsoft.CloudShell' with a status of 'unregistered'. A red box highlights the 'Microsoft.CloudShell' row. At the top of the main area, there are buttons for 'Register', 'Unregister', 'Refresh', and 'Feedback'.

Start Cloud Shell

1. Launch **Cloud Shell** from the top navigation of the Azure portal.



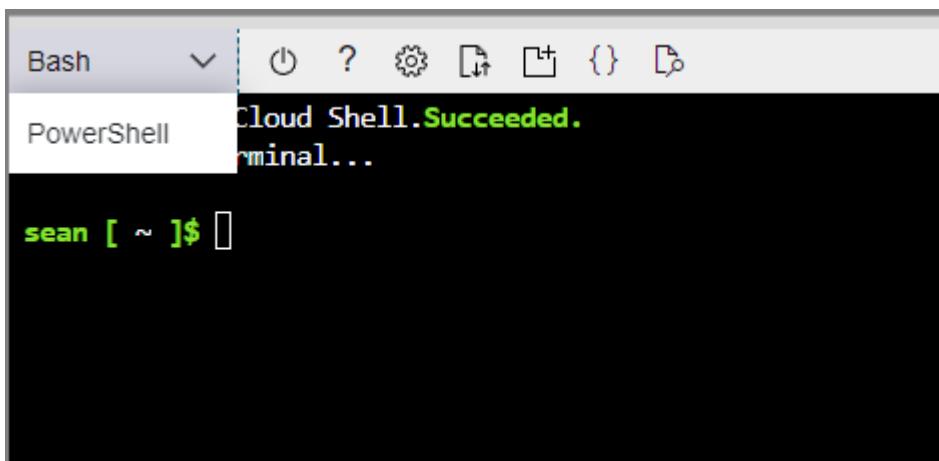
The first time you start Cloud Shell you're prompted to create an Azure Storage account for the Azure file share.



2. Select the **Subscription** used to create the storage account and file share.
3. Select **Create storage**.

Select your shell environment

Cloud Shell allows you to select either **Bash** or **PowerShell** for your command-line experience.



Set your subscription

1. List subscriptions you have access to.

A screenshot of the Azure Cloud Shell interface. The 'Azure CLI' tab is selected. In the terminal window, the command 'az account list' is typed in blue text. The terminal background is light gray.

2. Set your preferred subscription:

A screenshot of the Azure Cloud Shell interface. The 'Azure CLI' tab is selected. In the terminal window, the command 'az account set --subscription 'my-subscription-name'' is typed in blue text. The terminal background is light gray.

Tip

Your subscription is remembered for future sessions using
`/home/<user>/.azure.azureProfile.json`.

Get a list of Azure commands

Azure CLI

Run the following command to see a list of all Azure CLI commands.

```
Azure CLI
```

```
az
```

Run the following command to get a list of Azure CLI commands that apply to WebApps:

```
Azure CLI
```

```
az webapp --help
```

Next steps

- [Learn about persisting files in Cloud Shell](#)
- [Learn about Azure CLI](#)
- [Learn about Azure Files storage](#)

Sign in with Azure CLI

Article • 09/29/2023

The Azure CLI supports several authentication methods. Restrict sign-in permissions for your use case to keep your Azure resources secure.

Authentication methods

There are five authentication options when working with the Azure CLI:

Authentication method	Advantage
Azure Cloud Shell	Azure Cloud Shell automatically logs you in, so this is the easiest way to get started.
Sign in interactively	This is a good option when learning Azure CLI commands and running the Azure CLI locally. Log in through your browser with the az login command.
Sign in using a service principal	When you write scripts, using a service principal is the recommended approach. You grant just the appropriate permissions needed to a service principal keeping your automation secure.
Sign in with a managed identity	A common challenge for developers is the management of secrets, credentials, certificates, and keys used to secure communication between services. Using a managed identity eliminates the need for you to manage these credentials.
Sign in using Web Account Manager (WAM)	WAM is a Windows 10+ component that acts as an authentication broker. WAM provides enhanced security and enhancements are shipped with Windows.

Find or change your current subscription

After you sign in, CLI commands are run against your default subscription. If you have multiple subscriptions, you can change your default subscription using `az account set -subscription`. To learn more about managing Azure subscriptions, see [How to manage Azure subscriptions with the Azure CLI](#).

Refresh tokens

When you sign in with a user account, Azure CLI generates and stores an authentication refresh token. Because access tokens are valid for only a short period of time, a refresh token is issued at the same time the access token is issued. The client application can then exchange this refresh token for a new access token when needed. For more information on token lifetime and expiration, see [Refresh tokens in the Microsoft identity platform](#).

 **Note**

Depending on your sign in method, your tenant may have Conditional Access policies that restrict your access to certain resources.

See also

- [Azure CLI Onboarding cheat sheet](#)
- [Manage Azure subscriptions with the Azure CLI](#)
- [Find Azure CLI samples and published docs](#)

Sign in interactively

Article • 09/28/2023

The Azure CLI's default authentication method for logins uses a web browser and access token to sign in.

1. Run the `login` command.

```
Azure CLI
```

```
az login
```

If the CLI can open your default browser, it initiates [authorization code flow](#) and open the default browser to load an Azure sign-in page.

Otherwise, it initiates the [device code flow](#) and tell you to open a browser page at <https://aka.ms/devicelogin> and enter the code displayed in your terminal.

If no web browser is available or the web browser fails to open, you may force device code flow with `az login --use-device-code`.

2. Sign in with your account credentials in the browser.

Sign in with credentials on the command line

Provide your Azure user credentials on the command line. Only use this authentication method for learning Azure CLI commands. Production-level applications should use a service principal or managed identity.

This approach doesn't work with Microsoft accounts or accounts that have two-factor authentication enabled. You receive an *interactive authentication is needed* message.

```
Azure CLI
```

```
az login --user <username> --password <password>
```

ⓘ Important

If you want to avoid displaying your password on console and are using `az login` interactively, use the `read -s` command under `bash`.

```
Bash
```

```
read -sp "Azure password: " AZ_PASS && echo && az login -u <username> -p $AZ_PASS
```

Under PowerShell, use the `Get-Credential` cmdlet.

PowerShell

```
$AzCred = Get-Credential -UserName <username>  
az login -u $AzCred.UserName -p $AzCred.GetNetworkCredential().Password
```

Sign in with a different tenant

You can select a tenant to sign in under with the `--tenant` argument. The value of this argument can either be an `.onmicrosoft.com` domain or the Azure object ID for the tenant. Both interactive and command-line sign-in methods work with `--tenant`.

Azure CLI

```
az login --tenant 00000000-0000-0000-0000-000000000000
```

After signing in, if you want to change your active tenant, see [How-to change your active tenant](#).

Troubleshooting

When your default browser is Microsoft Edge, you might encounter the following error when attempting to sign in to Azure interactively with `az login`: *"The connection for this site is not secure."* To resolve this issue, visit <edge://net-internals/#hsts> in Microsoft Edge. Add `localhost` under "*Delete domain security policy*" and select `Delete`.

See also

- [Azure CLI Onboarding cheat sheet](#)
- [Manage Azure subscriptions with the Azure CLI](#)
- [Find Azure CLI samples and published docs](#)

Sign in with a service principal

Article • 10/05/2023

Service principals are accounts not tied to any particular user, which can have permissions on them assigned through predefined roles. Authenticating with a service principal is the best way to write secure scripts or programs, allowing you to apply both permissions restrictions and locally stored static credential information. To learn more about service principals, see [Work with Azure service principals using the Azure CLI](#).

To sign in with a service principal, you need:

- The URL or name associated with the service principal
- The service principal password, or the X509 certificate used to create the service principal in PEM format
- The tenant associated with the service principal, as either an `.onmicrosoft.com` domain or Azure object ID

Note two important facts when working with service principals and the Azure CLI:

- A **CERTIFICATE** must be appended to the **PRIVATE KEY** within a PEM file. For an example of a PEM file format, see [Certificate-based authentication](#).
- If your service principal uses a certificate that is stored in Key Vault, that certificate's private key must be available without signing in to Azure. To retrieve the certificate for `az login`, see [Retrieve certificate from Key Vault](#).

Azure CLI

```
az login --service-principal -u <app-id> -p <password-or-cert> --tenant <tenant>
```

ⓘ Important

If you want to avoid displaying your password on console and are using `az login` interactively, use the `read -s` command under `bash`.

Bash

```
read -sp "Azure password: " AZ_PASS && echo && az login --service-principal -u <app-id> -p $AZ_PASS --tenant <tenant>
```

Under PowerShell, use the `Get-Credential` cmdlet.

PowerShell

```
$AzCred = Get-Credential -UserName <app-id>
az login --service-principal -u $AzCred.UserName -p
$AzCred.GetNetworkCredential().Password --tenant <tenant>
```

See also

- [Azure CLI Onboarding cheat sheet](#)
- [Manage Azure subscriptions with the Azure CLI](#)
- Find Azure CLI samples and [published docs](#)

Sign in with a managed identity

Article • 09/28/2023

On resources configured for managed identities for Azure resources, you can sign in using the managed identity. Here are some of the benefits of using managed identities:

- You don't need to manage credentials. Credentials aren't even accessible to you.
- You can use managed identities to authenticate to any resource that supports Azure AD authentication, including your own applications.
- Managed identities can be used at no extra cost.

Signing in with the resource's identity is done through the `--identity` flag.

Azure CLI

```
az login --identity
```

If the resource has multiple user assigned managed identities and no system assigned identity, you must specify the client ID or object ID or resource ID of the user assigned managed identity with `--username` for login.

Azure CLI

```
az login --identity --username <client_id|object_id|resource_id>
```

To learn more about managed identities for Azure resources, see [Configure managed identities for Azure resources](#). Here are more articles showing the use of the `--identity` parameter.

- [How to use managed identities for Azure resources on an Azure VM for sign-in](#).
- [Use an Azure managed identity to authenticate to an Azure container registry](#)

See also

- [Azure CLI Onboarding cheat sheet](#)
- [Manage Azure subscriptions with the Azure CLI](#)
- [Find Azure CLI samples and published docs](#)

Sign in with Web Account Manager (WAM)

Article • 09/28/2023

The Azure CLI now offers preview support for Web Account Manager (WAM). WAM is a Windows 10+ component that acts as an authentication broker. (An authentication broker is an application that runs on a user's machine that manages the authentication handshakes and token maintenance for connected accounts.)

Using WAM has several benefits:

- Enhanced security. See [Conditional Access: Token protection \(preview\)](#).
- Support for Windows Hello, conditional access policies, and FIDO keys.
- Streamlined single sign-on.
- Bug fixes and enhancements shipped with Windows.

Signing in with WAM is a preview, opt-in feature. Once enabled, the previous browser-based user interface is replaced.

Azure CLI

```
az config set core.allow_broker=true  
az account clear  
az login
```

At the current stage of development, there are a few known limitations to WAM:

- WAM is available on Windows 10 and later, and on Windows Server 2019 and later. On Mac, Linux, and earlier versions of Windows, the Azure CLI automatically defaults to a browser.
- Microsoft Accounts (for example @outlook.com or @live.com) aren't currently supported. We're working with the Microsoft Identity team to bring the support later.

See also

- [Azure CLI Onboarding cheat sheet](#)
- [Manage Azure subscriptions with the Azure CLI](#)
- [Find Azure CLI samples and published docs](#)

What's new in the Azure CLI

Article • 10/16/2023

This page highlights new features, articles and learning paths for the Azure CLI. Use these quick links to jump straight to the article containing detailed information:

- [Reference type and status](#)
- [64-bit install](#)
- [Tab completion](#)
- [WAM sign in](#)
- [Cheat sheet](#)
- [Article index](#)
- [Sample index](#)

Reference type and status

Reference type and status information is now available in Azure CLI reference content. Why is this important? Reference command status determines the support level.

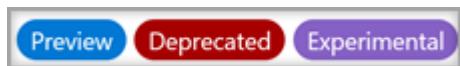
You see this information in three places:

- New "type" and "status" columns in reference list tables.

Name	Description	Type	Status
Command name 1	Command description 1	Core	GA
Command name 2	Command description 2	Extension	Preview

For a live example, see the [reference index](#) or drill down to [az account](#).

- New status indicators under command names.



If there is no status indicator, the command group or reference command is GA (Generally Available). For a live example, see [az account subscription](#).

- New status indicator for parameters. Only deprecated parameters show a status. All other parameters inherit the status of the reference command.

For more information on Azure CLI statuses, see [Azure CLI terminology and support levels](#).

64-bit Windows install

You can now [install the Azure CLI on Windows](#) with a 64-bit MSI. The 32-bit MSI, PowerShell command and Windows Package Manager are still available, but the 64-bit MSI is new! Anytime you install the Azure CLI, previously installed versions are updated automatically. This behavior allows you to try out the 64-bit install but reinstall the 32-bit MSI if you choose.

Tab completion in PowerShell

If you run the Azure CLI in PowerShell, tab completion is now available! Follow the instructions in [enable tab completion on PowerShell](#). The parameter values needed for PowerShell's `Register-ArgumentCompleter` command are provided in the article.

Tab completion is also available in [Azure Cloud Shell](#) and in most Linux distributions.

Sign in with Web Account Manager (WAM)

The Azure CLI now offers preview support for sign in with Web Account Manager (WAM). Read about the benefits of WAM and how to enable the feature in [Sign in with Web Account Manager](#)

New search tools

Onboarding cheat sheet

If you're new to the Azure CLI, there's now a one-page [onboarding cheat sheet](#) to help you get started. The cheat sheet answers common questions, like "How do I change my subscription?" and "What is the Azure CLI syntax pattern?". Also find links to help you learn to use the Azure CLI with step-by-step interactive prompts.

Conceptual article index A-Z

It's often helpful to see how different Azure services use the same reference command. The [Azure CLI conceptual article list](#) is an A to Z index of popular Quickstarts, How-to guides and Tutorials that use Azure CLI commands. Use your keyboard shortcut (Ctrl + F in Windows) to quickly jump to a reference group.

Samples index A-Z

Are you looking for a tested script that completes a common job to be done? The [Azure CLI sample's list](#) is an A to Z index of tested sample scripts.

 **Note**

The **Reference index A-Z** is a list of all Azure CLI reference commands. For new Azure CLI reference commands, see [Release notes](#).

Azure CLI release notes

Article • 09/26/2023

September 26, 2023

Version 2.53.0

ACR

- `az acr token create`: Fix random order of repo valid actions and gateway valid actions in the help message

AKS

- `az aks update`: Add new parameter `--private-dns-zone` to support private DNS zone for AKS private cluster
- `az aks update`: Add new parameter `--disable-windows-gmsa` to support disabling Windows gMSA in an AKS cluster
- `az aks update`: Add forceupgrade settings to aks stable cli

App Config

- `az appconfig kv import/export`: Remove `skip-features` and `skip-keyvault` restriction for snapshots

App Service

- `az functionapp create`: Enable distributed tracing for non consumption apps

ARM

- `az deployment group create`: Make `--template-file` parameter optional when used with `.bicepparam` parameter file
- `az account list-locations`: Add new parameter `--include-extended-locations` to support listing extended locations

Backup

- `az backup backup-properties`: Add option for setting `--soft-delete-feature-state` to "AlwaysOn", and `--soft-delete-duration` with values between 14 to 180 (inclusive)
- `az backup vault list-soft-deleted-containers`: List all soft-deleted containers in a backup vault

Compute

- `az vm/vmss extension set`: Enable auto upgrade by default for CodeIntegrityAgent extension
- `az vm create`: Add warning message for Basic option removal
- `az vmss create`: Add warning message for Basic option removal

Containerapp

- `az containerapp`: Move `containerapp` from CLI extension to core CLI
- `az containerapp env create`: Add `--enable-workload-profiles` to specify if the environment is enabled to have workload profiles
- `az containerapp env dapr-component create`: Fix the sample link for `--yaml` parameter

Cosmos DB

- `az cosmosdb postgres`: GA Cosmos DB for PostgreSQL

MySQL

- `az mysql flexible-server replica create`: Add new parameters to support replica creation

NetAppFiles

- `az netappfiles volume`: Add new command `get-groupid-list-for-ldapuser` to Get Group Id List for LDAP User
- `az netappfiles account update`: Add parameter `--identity-type`
- `az netappfiles volume update`: Add parameter `--snapshot-dir-visible`. If enabled (true) the volume will contain a read-only snapshot directory which provides access to each of the volume's snapshots (defaults to true)

Network

- `az network virtual-appliance`: Add parameter `--additional-nics`
- `az network vnet subnet`: Add parameter `--default-outbound-access`
- `az network public-ip create`: Add warning message for Basic option removal
- `az network lb create`: Add warning message for Basic option removal

RDBMS

- `az postgres flexible-server create/update`: Add capability to enable/disable storage auto-grow during creation and update

Service Connector

- `az spring connection`: Add deprecated message for `--deployment` breaking change
- `az webapp connection`: Add new parameter `--slot` to support webapp slot connection

SQL

- `az sql failover-group set-primary`: Add parameter `--try-planned-before-forced-failover` to support hybrid geo-failover

Storage

- Fix #26732: `az storage blob copy start-batch`: Add `--rehydrate-priority` to batch copy
- Fix #27052: `az storage blob delete-batch`: Use utc as default timezone to remove "Datetime with no tzinfo will be considered UTC." warning

September 05, 2023

Version 2.52.0

AKS

- `az aks create/update`: Add new parameter `--enable-vpa` to support enabling vertical pod autoscaler for cluster

- `az aks update`: Add new parameter `--network-datalane` to specify the network dataplane used in the Kubernetes cluster
- `az aks create/update`: Add new parameter `--node-os-upgrade-channel` to specify which OS on your nodes is updated
- `az aks update`: Retain value in network profile in mc object only when decorator is in update mode
- `az aks update`: Outbound ip/outbound ipprefix and managed outbound ip should be mutually exclusive

App Config

- `az appconfig kv import`: Add new parameter `--import-mode` to specify whether to overwrite already existing key-values or ignore matching keys
- `az appconfig kv export`: Add new parameter `--snapshot` to support exporting all key values from a snapshot of the source configuration
- `az appconfig kv import`: Add new parameter `--src-snapshot` to support importing all key values from a snapshot of the source configuration

App Service

- Fix #26736: `az logicapp create`: Add `--runtime-version` and `--functions-version` optional parameters
- `az webapp config connection-string set`: Allow users to use json file to set the connection string

ARM

- Fix #26112: `az deployment group create`: Fix the warning log `mode is not a known attribute of class TemplateLink`
- `az bicep build-params`: Support generating `parameters.json` file from the given `bicepparam` file with the `--file` argument
- `az bicep decompile-params`: Support generating `parameters.bicepparam` file from the given `parameters.json` file with the `--file` argument
- `az bicep generate-params`: Support generating `main.parameters.json` with the parameters that doesn't have default values in the given `.bicep` file
- `az bicep generate-params`: Add new parameter `--output-format` to support generating parameter file in `bicepparam` and `json` formats
- `az bicep generate-params`: Add new parameter `--include-params` to support generating parameter file with all the parameters in the given `bicep` file, or with

only parameters that doesn't have default values in the given `bicep` file

ARO

- `az aro create`: Add new `--outbound-type` parameter, allowing users to select "Loadbalancer" (default) or "UserDefinedRouting"
- `az aro create`: Perform pre-flight validation of prerequisite permissions before creation
- `az aro validate`: New command to perform explicit validation of prerequisite permissions

Backup

- `az backup restore restore-azurefileshare`: Add `--target-rg-name` parameter to specify the resource group of the destination storage account

Batch

- `az batch`: Fix batch cloud console authentication issue

Cognitive Services

- `az cognitiveservices account deployment create`: Add `--model-source` parameter

Compute

- `az vmss create/update`: Add `--enable-hibernation` parameter to enable hibernation capability on VMSS
- `az vmss update`: Add `--security-type` parameter to enable Trusted Launch on existing VMSS
- `az vmss deallocate`: Add `--hibernate` parameter to support hibernating a VM while deallocating
- `az ppg update`: Add new parameter `--type` to support setting proximity placement group type

Cosmos DB

- `az cosmosdb restore`: Support enabling/disabling public network access

Key Vault

- Fix #27220: `az keyvault certificate import`: Fix invalid policy issue when no `content_type` provided
- `az keyvault storage`: Announce deprecation since keyvault service doesn't maintain this since long ago

MySQL

- `az mysql flexible-server parameter set-batch`: Add new command to support updating multiple parameters
- `az mysql flexible-server export create`: Add Export Backup CLI implementation

Network

- `az network private-endpoint-connection`: Add provider `Microsoft.EventGrid/namespaces` and `Microsoft.EventGrid/partnerNamespaces`
- Fix #27066: `az network vnet list`: Fix -o table cannot be used
- `az network express-route port delete`: Add confirmation while deleting
- `az network application-gateway waf-policy custom-rule`: Add an example of using `--group-by-user-session`
- `az network express-route update`: Fix `properties.ServeProviderProperties` unexpected null
- Fix #26730: `az network public-ip update`: `--ip-tags` cannot be correctly parsed
- `az network application-gateway waf-policy managed-rule rule-set`: Support Microsoft_BotManagerRuleSet version 1.0
- `az network vnet peering create`: Mark `--remote-vnet` as required

Redis

- `az redis update`: Fix public network access default value issue

Storage

- `az storage file upload-batch`: Allow uploading files in parallel to improve performance
- Fix #27202: `az storage entity insert`: Fix case when using sas token with only `add` permission

Upgrade

- `az upgrade`: Support upgrading with 64-bit MSI

August 01, 2023

Version 2.51.0

AKS

- `az aks nodepool snapshot update`: Add aks nodepool snapshot update command
- `az aks create`: Add new parameter `--k8s-support-plan` to support LTS onboarding, also add new tier enum `premium`
- `az aks update`: Support enabling/disabling LTS via new parameter `--k8s-support-plan`
- `az aks create`: Add node taint support when create cluster use `az aks` command
- `az aks update`: Add update node taint support on cluster level use `az aks` command
- `az aks enable-addons`: Fix the default value of option `--enable-msi-auth-for-monitoring` being overwritten to `False` when specified
- `az aks update`: Add new parameter `--outbound-type` to support cluster outbound type.
- `az aks maintenanceconfiguration list`: Add new command to list all maintenance windows in a cluster
- `az aks maintenanceconfiguration show`: Add new command to display a specific maintenance window of a cluster
- `az aks maintenanceconfiguration add`: Add new command to add a new maintenance window configuration for a cluster
- `az aks maintenanceconfiguration update`: Add new command to update an existing maintenance window configuration of a cluster
- `az aks maintenanceconfiguration delete`: Add new command to delete an existing maintenance window configuration of a cluster
- `az aks update`: Fix aks network profile update error

App Config

- `az appconfig kv delete/set/set-keyvault`: Add key validations for null or empty space keys
- `az appconfig kv export/import/restore`: Update key-value diffing and preview

- `az appconfig snapshot`: Remove status code property from snapshot object
- `az appconfig snapshot list`: Use enums for status parameter

App Service

- Fix #26214: `az webapp show`: Fix the bug caused by missing leading slash causes web app and plan commands to fail for s-clouds
- Fix #26214: `az appservice plan show`: Fix the bug caused by missing leading slash causes web app and plan commands to fail for s-clouds
- Fix #26601: `az functionapp create`: Throw error for consumption function app created with vnet
- Fix #21133: `az webapp/functionapp config ssl bind/unbind`: Search for matching certificates in the subscription by App Service Plan Id

ARM

- `az stack`: Fix the bug that the required `--deny-settings-mode` parameter should not return None (should be a string)
- `az stack`: Fix the bug that the `--deny-settings-excluded-principals` parameter was accidentally reset

Batch

- `az batch job/pool all-statistics`: Remove no longer worked commands
- `az batch pool create`: Add new parameter `--enable-accelerated-networking` to determine whether this pool should enable accelerated networking

Cognitive Services

- `az cognitiveservices account deployment create`: Add `--sku-name` and `--sku-capacity` parameters
- `az cognitiveservices usage`: Add new command `list`
- `az cognitiveservices model`: Add new command `list`

Compute

- `az vm/vmss create`: Enable auto upgrading of guest attestation extension by default for Trusted Launch enabled VMs and VMSS

- `az vm/vmss create`: Add new parameter `--disable-integrity-monitoring-autoupgrade` to support disabling auto upgrading of guest attestation extension for Trusted Launch enabled VMs and VMSS
- `az sig image-version undelete`: Add new command to support softdeleted image recovery
- `az vm/vmss/disk create`: Add new option `Standard` for `--security-type` for backward compatibility
- `az sig image-definition create`: Add new option `Standard` for `--security-type` for backward compatibility

Cosmos DB

- `az cosmosdb restore`: Add `--assign-identity` and `--default-identity` to allow PITR restoring with identity
- `az cosmosdb postgres`: Add new command groups to support Cosmos DB for PostgreSQL

Key Vault

- `az keyvault restore start`: Add `--key-name` to support selective key restoring
- `az keyvault key sign/verify`: Add new commands to support signing with keyvault key and verify the signature

MySQL

- `az mysql flexible-server ad-admin set`: Enable AAD for replica

Network

- `az network nic create/update`: Add parameters `--auxiliary-mode` and `--auxiliary-sku` to support setting auxiliary mode and sku
- `az network public-ip`: Add parameter `--dns-name-scope` to specify different options
- `az network private-endpoint-connection`: Add provider `Microsoft.ElasticSan/elasticSans`

Packaging

- Drop Python 3.7 support

- Support x86 and x64 MSI builds

Resource

- `az resource invoke-action`: Add new parameter `--no-wait` to support not waiting the long-running operation to finish

Role

- `az ad sp create-for-rbac`: Add alias `--json-auth` for `--sdk-auth`

Service Connector

- `az functionapp connection`: Add new command group to support service connector on Function App
- `az spring connection`: Enable new auth types for Spring Boot and Cosmos SQL connection

SQL

- `az sql mi start/stop/start-stop-schedule`: Add SQL MI manual and scheduled start stop

Storage

- `az storage container-rm update`: `--default-encryption-scope` and `--deny-encryption-scope-override` should not be specified during updating
- Fix #22704: `az storage account create`: `--encryption-key-type-for-queue` and `--encryption-key-type-for-table` no longer remove other settings
- Fix #26587: `az storage file upload`: Add `--file-url` to support supplying the url instead of share/file name

July 04, 2023

Version 2.50.0

AKS

- `az aks get-versions`: Both json payload and table format changed

- `az aks create`: Add condition to disable `--enable-msi-auth-for-monitoring` for service principle

APIM

- `az apim graphqlapi resolver create`: Add new command to create gql api resolver
- `az apim graphqlapi resolver show`: Add new command to show gql api resolver
- `az apim graphqlapi resolver list`: Add new command to show gql api resolver list
- `az apim graphqlapi resolver delete`: Add new command to delete gql api resolver
- `az apim graphqlapi resolver policy create`: Add new command to create resolver policy
- `az apim graphqlapi resolver policy show`: Add new command to show resolver policy
- `az apim graphqlapi resolver policy list`: Add new command to list resolver policies
- `az apim graphqlapi resolver policy delete`: Add new command to delete a policy

App Config

- `az appconfig feature`: Improve error handling for invalid feature flags
- `az appconfig snapshot create`: Add new command to support creating a snapshot
- `az appconfig snapshot show`: Add new command to support showing the properties of an app configuration snapshot
- `az appconfig snapshot list`: Add new command to support listing snapshots of a given app configuration
- `az appconfig snapshot archive`: Add new command to support archiving a snapshot
- `az appconfig snapshot recover`: Add new command to support recovering an archived snapshot

App Service

- Fix #21168: `az webapp deploy`: Call OneDeploy through ARM proxy if `--src-url` is provided
- Fix #26647: `az webapp show`: Remove duplicate IPs from outbound addresses
- Fix #25497: `az webapp deploy`: Fix extension parsing if `src-path` has multiple '.'s

ARM

- `az managedapp definition create/update`: Add new parameter `--deployment-mode` to support setting deployment policy
- `az resource move`: Add help example for moving multiple resources
- `az stack`: Add new command group to support deployment stacks
- `az stack mg`: Add new command group to manage deployment stack at management group scope
- `az stack sub`: Add new command group to manage deployment stack at subscription scope
- `az stack group`: Add new command group to manage deployment stack at resource group scope

ARO

- `az aro get-admin-kubeconfig`: Add new command to download an admin kubeconfig for a created ARO cluster

Backup

- `az backup vault create`: Add parameter `--cross-subscription-restore-state` to set the CSR state of the vault at the time of creation as well as updating
- `az backup recoveryconfig show`: Add parameter `--target-subscription-id` to provide the target subscription as the input while triggering cross subscription restore for SQL or HANA workloads
- `az backup protection backup-now`: Allow `--enable-compression` to be set to `true` for SAPHANA Workloads
- `az backup recoveryconfig show`: Add new parameter `--target-instance-name` to specify the target instance name for the restore operation

Compute

- `az vmss update`: Add new parameter `--custom-data` to support updating custom data
- `az image builder optimizer`: Add subgroup to manage image template optimizer
- `az image builder create`: Add parameter `--validator` to specify the type of validation to be used on the Image
- `az vm update`: Add parameter `--security-type` to support VM Gen2 to Trusted Launch conversion

- `az sig image-definition create`: Add examples for TrustedLaunchSupported and TrustedLaunchAndConfidentialVmSupported
- `az capacity`: Fix short summaries for groups
- Fix #26516: `az vm create`: Fix warning log for public IP even when no public IP is being created

Eventhub

- `az eventhubs eventhub`: Enum value for `cleanup_policy` change to `compact` from `compaction`
- `az eventhubs namespace list`: Support list command without mandatory `resource_group` parameter
- `az eventhubs eventhub create/update`: Event Hubs Capture MSI feature added to eventhub entity

IoT

- `az iot hub route`: Hide the deprecated command, please use `az iot hub message-route` instead of it.
- `az iot hub routing-endpoint`: Hide the deprecated command, please use `az iot hub message-endpoint` instead of it.

Key Vault

- Fix #26527: `az keyvault certificate show`: Show policy.x509CertificateProperties.subjectAlternativeNames correctly

Monitor

- `az monitor metrics alert create`: Add `()` into `--condition` grammar

MySQL

- `az mysql flexible-server import create`: Add new command to facilitate migrations from mysql single to flexible servers
- `az mysql flexible-server restore/geo-restore/replica create`: Support `--tags`

NetAppFiles

- `az netappfiles volume replication resume`: Add warning on action to re-sync replication volumes that if destination volume has quota rules they will be overwritten by the source volumes quota rules.

Network

- `az network dns zone import`: Fix alias records cannot be imported
- Fix #26438: `az network vnet peering sync`: Doesn't work in cross-tenant scenario
- `az network application-gateway waf-policy policy-setting update`: Add support for log scrubbing
- `az network application-gateway waf-policy policy-setting update`: Add support for inspection limit
- `az network application-gateway waf-policy custom-rule`: Support rate limit in WAF policy
- Fix #24695: `az network traffic-manager`: Add command context
- Fix #26638: `az network traffic-manager endpoint`: Declare `--min-child-endpoints`, `--min-child-ipv4` and `--min-child-ipv6` as integer type
- `az network dns`: Support DNSSEC configuration and DS/TLSA record set

Packaging

- Add Debian Bookworm support

RDBMS

- `az postgres flexible-server migration update`: Remove unsupported update parameters `--db-names` and `--overwrite-dbs`
- `az postgres flexible-server migration create`: Add support for tags and location using `--tags` and `--location`
- `az postgres flexible-server revive-dropped`: Add support to revive a dropped PostgreSQL flexible server
- `az postgres flexible-server create`: Add support to create PostgreSQL flexible server with data encryption enabled for geo-backup enabled server by passing parameters `--geo-redundant-backup`, `--backup-key` and `--backup-identity`
- `az postgres flexible-server show-connection-string`: Add support to pass `--pg-bouncer` in connection strings for cmd and programming languages with PgBouncer enabled for PostgreSQL flexible server. Updated connection strings to show port as well as database

- `az postgres flexible-server update`: Add support for parameter `--private-dns-zone` during update operation, to update private DNS zone for a VNET enabled PostgreSQL flexible server

Service Bus

- `az servicebus namespace list`: Support list command without mandatory `resource_group` parameter

Service Fabric

- `az sf managed-cluster network-security-rule add`: Add network security rule to managed cluster

SQL

- `az sql midb move/copy`: Add new commands for Managed Database Move/Copy feature

SQL VM

- Fix #2442969: `az sql vm enable-azure-ad-auth/validate-azure-ad-auth`: Workaround Graph API bug by using client side filtering upon failure
- `az sql vm update`: Add configuration options for new SQL Assessment prerequisites MMA->AMA migration

Storage

- `az storage blob upload(-batch)/set-tier/copy start(-batch)`: Cold Tier GA, add new tier type `--tier cold`
- `az storage blob download-batch`: When matching pattern, list blobs with prefix to reduce the number of list calls
- Fix #26673: `az storage account or-policy create`: Now throw server error that was previous silently ignored.

Synapse

- `az synapse workspace create/update`: Support workspace encryption and user-assignment management identity

May 23, 2023

Version 2.49.0

ACR

- `az acr create`: Remove `Classic` from `sku` option

AKS

- [BREAKING CHANGE] `az aks create`: Specify `--pod-cidr` with Azure CNI will return an error instead of logging a warning when not use `overlay` mode
- [BREAKING CHANGE] `az aks create`: Change the default value of `--enable-msi-auth-for-monitoring` to true and add check for airgap clouds
- `az aks update`: Support updating user assigned control plane identity for parameter `--assign-identity`
- `az aks install-cli`: Add validation for installation path and update help message for parameters `--install-location` and `--kubelogin-install-location`
- Fix #26353: `az aks install-cli`: Fix incorrect architecture detection on Darwin/arm64
- `az aks create/update`: Add parameter `--enable-azure-monitor-metrics` to enable managed prometheus (Azure Monitor Metrics Addon)
- `az aks create/update`: Add parameter `--azure-monitor-workspace-resource-id` to store metrics for the managed prometheus addon
- `az aks create/update`: Add parameter `--grafana-resource-id` to link the Azure Monitor Workspace with a Grafana instance for viewing metrics and dashboards
- `az aks create/update`: Add parameter `--enable-windows-recording-rules` to enable windows recording rule groups on the Azure Monitor Workspace (by default they get created but are disabled)
- `az aks create/update`: Add parameter `--ksm-metric-labels-allow-list` to support the additional Kubernetes label keys that will be used in the resource's labels metric
- `az aks create/update`: Add parameter `--ksm-metric-annotations-allow-list` to support the Kubernetes annotations keys that will be used in the resource's labels metric
- `az aks update`: Add parameter `--disable-azure-monitor-metrics` to disable the Azure Monitor Metrics addon
- `az aks create` and `az aks nodepool add`: Add warning message when specifying `-os-sku` to `Mariner` OR `CBLMariner`

App Config

- [BREAKING CHANGE] `az appconfig feature`: Update feature name validation to disallow the colon character
- [BREAKING CHANGE] `az appconfig kv import`: Update feature name validation. Invalid feature flags will be skipped during import
- [BREAKING CHANGE] `az appconfig`: Update default connection string resolution logic

App Service

- `az functionapp create`: Add new parameter `--min-replicas` and `--max-replicas` to support minimum and maximum replicas
- `az functionapp create`: Add new parameter `--registry-server` to support Centauri function app
- `az functionapp create`: Update the default image to `mcr.microsoft.com` for Centauri
- Fix #26445: `az webapp deploy`: Fix deployment failing with HTTP 400

ARM

- Fix #26216: `az bicep format`: Fix the TypeError `expected str, bytes or os.PathLike object, not bool`
- Fix #26256: `az bicep publish/restore/generate-params`: Fix version checks without bicep installed
- `az bicep publish`: Add new parameter `--force` to allow overwriting existing module
- Fix #26352: `az ts create`: Fix for the TypeError `string indices must be integers`

Backup

- `az backup`: Add support for HANA HSR workload

Compute

- `az vm create`: Support new license type `UBUNTU_PRO` and `UBUNTU`
- `az vm extension set`: Enable auto-upgrade by default for GuestAttestation extension

- `az image builder trigger`: Add subgroup to manage image builder template trigger
- `az image builder output versioning`: Add subgroup to manage image builder template output versioning
- `az image builder output add`: Add parameter `--versioning` to support describing how to generate new x.y.z version number for distribution
- `az image builder output add`: Add parameter `--vhd-uri` to support specifying storage uri for the distributed VHD blob

Container

- `az container create`: Add new parameters for container security context for confidential ContainerGroupSku

Cosmos DB

- [BREAKING CHANGE] `az cosmosdb create/update`: Rename `--enable-public-network true/false` to `--public-network-access`
ENABLED/DISABLED/SECUREDBYPERIMETER
- `az cosmosdb create/update`: Add `--continuous-tier` to support continuous backup tier
- `az cosmosdb create/update`: Enable Partition Merge feature for CosmosDB

Eventhub

- [BREAKING CHANGE] `az eventhubs namespace network-rule`: This command group is removed and replaced by `az eventhubs namespace network-rule-set`
- [BREAKING CHANGE] `az eventhubs namespace network-rule add`: This command is removed and replaced by `az eventhubs namespace network-rule-set ip-rule/virtual-network-rule add`
- [BREAKING CHANGE] `az eventhubs namespace network-rule remove`: This command is removed and replaced by `az eventhubs namespace network-rule-set ip-rule/virtual-network-rule remove`
- [BREAKING CHANGE] `az eventhubs eventhub create/update`: Remove `--message-retention` parameter, it is replaced by `--retention-time-in-hours`
- [BREAKING CHANGE] `az eventhubs namespace application-group policy remove`: Rename `--throttling-policy-config` to `--policy` and remove `metric-id` and `rate-limit-threshold` properties in it

- `az eventhubs eventhub create/update`: Add `--cleanup-policy`, `--retention-time-in-hours` and `--tombstone-retention-time-in-hours` to support Retention-Description feature

IoT

- `az iot hub create/update/delete`: Fix poller issues

Key Vault

- [BREAKING CHANGE] `az keyvault create`: `--retention-days` becomes required for MHSM creation
- [BREAKING CHANGE] `az keyvault backup start`: The output will only contain `folderUrl`
- [BREAKING CHANGE] `az keyvault restore start`: Nothing will return for successful run
- [BREAKING CHANGE] `az keyvault role assignment delete`: Nothing will return for successful run
- [BREAKING CHANGE] `az keyvault certificate show/set-attributes/import`: No longer return `x509CertificateProperties.basicConstraints`, `pending`
- [BREAKING CHANGE] `az keyvault certificate contact delete`: Return an empty list instead of the deleted contact for consistency if the operation would remove the last contact
- [BREAKING CHANGE] `az keyvault certificate issuer create`: `organizationDetails.zip` is no longer returned by service, use 0 as the default
- `az keyvault security-domain upload`: Fix sd warpping keys with passwords
- `az keyvault setting`: New command group to manage MHSM settings

Monitor

- `az monitor`: Add new subgroup `account` to support managing monitor workspace
- `az monitor log-analytics workspace table create/update`: Max `--total-retention-time` changed from 2555 to 2556

NetAppFiles

- [BREAKING CHANGE] `az netappfiles volume create`: Remove optional parameter `--vault-id` as this is not longer needed

- [BREAKING CHANGE] `az netappfiles vault list`: Remove command `vault list` as this is not longer needed
- `az netappfiles account create`: Add optional parameter `--identity-type`
- `az netappfiles account ad add`: Add optional parameter `--preferred-servers-for-ldap-client`
- `az netappfiles volume create`: Add optional parameter `--is-large-volume`
- `az netappfiles volume account create`: Add optional parameter `--identity-type`
- `az netappfiles volume quota-rule update`: Add optional parameter `--tags`
- `az netappfiles volume`: Add new command `break-file-locks` to break all the file locks on a volume

Network

- [BREAKING CHANGE] `az network cross-region-lb rule`: Remove parameters `--enable-tcp-reset` and `--idle-timeout`
- [BREAKING CHANGE] `az network application-gateway http-settings update`: Use `null` instead of `""` to detach
- [BREAKING CHANGE] `az network application-gateway settings update`: Use `null` instead of `""` to detach
- [BREAKING CHANGE] `az network application-gateway url-path-map update`: Use `null` instead of `""` to detach
- [BREAKING CHANGE] `az network nic update`: Use `null` instead of `""` to detach
- [BREAKING CHANGE] `az network nic ip-config update`: Use `null` instead of `""` to detach
- [BREAKING CHANGE] `az network nsg rule update`: Use `null` instead of `""` to detach
- [BREAKING CHANGE] `az network vnet update`: Use `null` instead of `""` to detach
- [BREAKING CHANGE] `az network vnet subnet update`: Use `null` instead of `""` to detach
- [BREAKING CHANGE] `az network application-gateway client-cert remove`: Deprecate the output of command
- [BREAKING CHANGE] `az network application-gateway ssl-profile remove`: Deprecate the output of command
- [BREAKING CHANGE] `az network private-endpoint dns-zone-group remove`: Deprecate the output of command
- [BREAKING CHANGE] `az network private-endpoint ip-config remove`: Deprecate the output of command

- [BREAKING CHANGE] `az network private-endpoint asg remove`: Deprecate the output of command
- [BREAKING CHANGE] `az network nic ip-config address-pool remove`: Deprecate the output of command
- [BREAKING CHANGE] `az network nic ip-config inbound-nat-rule remove`: Deprecate the output of command
- [BREAKING CHANGE] `az network lb address-pool tunnel-interface remove`: Deprecate the output of command
- [BREAKING CHANGE] `az network cross-region-lb address-pool address remove`: Deprecate the output of command
- `az network private-endpoint-connection`: Add provider
`Microsoft.HardwareSecurityModules/cloudHsmClusters`
- Fix #26248: `az network dns record-set cname set-record`: Declare TTL as integer type
- Fix #26326: `az network vnet subnet update`: `--nat-gateway` cannot be set to null
- Fix #26318: `az network vnet subnet create`: `--nsg` and `--route-table` cannot be used as name from Azure Stack

RDBMS

- [BREAKING CHANGE] `az mysql/postgres flexible-server create/update`: Deprecate `Enabled` for `--high-availability` argument
- `az mysql flexible-server restore/georestore/replica create`: Add `--public-access` parameter for restore, replication and georestore

Service Bus

- [BREAKING CHANGE] `az servicebus georecovery-alias fail-over`: Remove `--parameters` argument
- [BREAKING CHANGE] `az servicebus namespace network-rule`: This command group is removed and replaced by `az servicebus namespace network-rule-set`
- [BREAKING CHANGE] `az servicebus namespace network-rule add`: This command is removed and replaced by `az servicebus namespace network-rule-set ip-rule/virtual-network-rule add`
- [BREAKING CHANGE] `az servicebus namespace network-rule remove`: This is removed and replaced by `az servicebus namespace network-rule-set ip-rule/virtual-network-rule remove`

- [BREAKING CHANGE] `az servicebus queue update`: Remove deprecated parameters `--enable-partitioning`, `--enable-session` and `--duplicate-detection`

Service Connector

- `az spring connection create`: Enable user-assigned managed identity for spring apps and deprecate Postgresql single server

SQL

- [BREAKING CHANGE] `az sql mi link create`: Remove `--replication-mode` argument
- `az sql elastic-pool`: Add `--preferred-enclave-type` argument
- `az sql mi link update`: Fix update command to use PATCH api

Storage

- `az storage account blob-service-properties cors-rule`: Add new command group to manage blob cors rules

April 25, 2023

Version 2.48.1

App Service

- Hotfix: Use basic auth with SCM sites if supported, else use AAD auth

April 25, 2023

Version 2.48.0

App Service

- Fix #25642: `az functionapp deployment user show`: Fix the AttributeError '`'function'` object has no attribute `'metadata'`'
- `az staticwebapp appsettings`: Add `--environment-name` parameter to allow app setting operation on preview environments
- `az functionapp create`: Update `'kind'` attribute for Centauri function apps

Compute

- Fix #26118: `az vm list-ip-addresses`: Fix the KeyError when attributes missing in public IP address
- Fix #26164: `az vmss update`: Fix unexpected error while running the update instance protection command on VMSS flex instances
- Fix #26185: `az sig update`: Fix issues that `is_soft_delete_enabled` may not exist
- `az vm host resize`: Add new command to support resizing dedicated host
- `az vm host list-resize-options`: Add new command to support getting possible resize options

DMS

- `az dms project task create`: Add support for database schema migration

Eventhub

- `az eventhubs namespace application-group policy remove`: Add upcoming breaking change notification

Network

- `az network nic update`: Add `--ip-configurations` to support shorthand syntax
- `az network public-ip prefix create`: Add parameter `--ip-tags`
- `az network cross-region-lb rule create`: Set default value for `--enable-tcp-reset` and `--idle-timeout`

RDBMS

- `az mysql flexible-server create/update/gtid reset`: Add GTID reset and fix public-access

SQL

- `az sql midb ledger-digest-uploads`: Support SQL Ledger
- `az sql mi server-configuration-option`: New command group to manage server configuration options

SQL VM

- `az sql vm enable-azure-ad-auth/validate-azure-ad-auth`: Single mode improvement

Storage

- `az storage file/directory`: Add `--auth-mode login` and `--backup-intent` to support OAuth
- `az storage blob sync`: Add positional argument `extra_options` to pass through options to `azcopy`

April 04, 2023

Version 2.47.0

AKS

- `az aks create/update`: Add `--tier` argument will specify the sku tier that customer wants
- `az aks nodepool operation-abort`: Add new command to support aborting last running operation on nodepool
- `az aks operation-abort`: Add new command to support aborting last running operation on managed cluster
- `az aks create`: Raise a ClientRequestError when creating the same cluster again
- `az aks create/update`: Add new parameter `--enable-image-cleaner` to enable Image Cleaner service
- `az aks create/update`: Add new parameter `--image-cleaner-interval-hours` to set Image Cleaner scanning interval
- `az aks create`: Add new parameter `--network-plugin-mode` to support creating Azure CNI Overlay clusters
- `az aks create/update`: Add new parameter `--enable-workload-identity` to support enabling workload identity addon
- `az aks create`: Add new parameter `--network-dataplane` to support creating Cilium clusters
- `az aks update`: Add parameter `--network-plugin-mode` to update the mode of a network plugin
- `az aks update`: Add parameter `--pod-cidr` to update the pod CIDR for a cluster

App Config

- `az appconfig import/export`: Add warning log info to output even when `--yes` flag is set
- `az appconfig kv import`: Ensure the case of imported boolean values does not change for string conversion from file

App Service

- Fix #25375: `az functionapp deployment source config-zip`: Fix the `Could not find a 'AzureWebJobsStorage' application setting` error
- Fix #25876: `az webapp config ssl import`: Fix the `UnboundLocalError local variable 'cert_name' referenced before assignment`
- `az functionapp create`: Support container app deployments
- `az functionapp delete`: Add a validation to check whether Azure Functions is not in the Azure Container app environments

ARM

- `az deployment group create`: Support deployment with bicepparam files
- `az resource patch`: Add new command to support updating resource by PATCH request
- Fix #25706: `az bicep format`: Fix the `TypeError ensure_bicep_installation() missing 1 required positional argument 'cli_ctx'`
- Fix #25715: `az bicep install/upgrade`: Fix the `configparser.NoSectionError: No section: 'bicep'`

Compute

- `az vm reimagine`: Add new command to support reimaging a virtual machine
- `az vm/vmss create`: Deprecate image alias `UbuntuLTS` and `Win2008R2SP1`. Please use the image alias including the version of the distribution you want to use. For example: Please use `Ubuntu2204` instead of `UbuntuLTS`

Cosmos DB

- `az cosmosdb identity assign`: Allow refreshing user assigned identities if they're reassigned to an account

Extension

- `az extension add`: Add actionable message for extension not found error

Key Vault

- `az keyvault region`: GA MHSM region commands

Monitor

- `az monitor activity-log alert`: Adjust help message

NetAppFiles

- `az netappfiles volume update`: Patch assign snapshotpolicyID

Network

- [BREAKING CHANGE] `az network`: Clean up irrelevant commands in azure-stack profiles.
- [BREAKING CHANGE] `az network application-gateway waf-policy custom-rule`: Rename output property `applicationGatewayIpConfigurations` to `applicationGatewayIPConfigurations` to keep consistent with the name in API
- `az network routeserver create/update`: Add parameter `--hub-routing-preference`
- Drop `azure-mgmt-network` SDK
- Fix #25784: `az network private-link-service update`: `--lb-frontend-ip-configs` cannot be used

RDBMS

- [BREAKING CHANGE] `az postgres flexible-server replica create`: Fix the behavior of AZ selection in case zone is not passed as parameter
- Fix #368903181: Fix zone selection during creation of replica
- `az mysql flexible-server restore/geo-restore`: Add parameters to enhance PITR
- `az mysql flexible-server replica create`: Add parameters to support cross region paired vnet

Service Bus

- `az servicebus namespace/topic/queue authorization-rule keys renew/list`: Add `-n` option for `--authorization-rule-name` to create auth rule

SQL

- `az sql server refresh-external-governance-status`: New command for refreshing external governance status
- `az sql db geo/ltr-backup restore`: Add more parameters to geo restore and ltr restore

Storage

- `az storage blob copy start`: Fix auth issue when providing source uri containing sas token
- `az storage container/blob list`: Fix MemoryError when service returns less num than requested
- `az storage account create`: GA partition DNS account support

Synapse

- `az synapse spark pool create/update`: Update `--node-size-family` and `--node-size` allowed values

March 07, 2023

Version 2.46.0

ACR

- `az acr token\scope-map`: Tokens and Scope-Maps are Generally Available
- `az acr manifest`: Support oci image index
- `az acr cache`: Add new command group to manage cache rules
- `az acr credential-set`: Add new command group to manage credential sets
- Fix #24886: `az acr`: Improve the 429 error handling for CONNECTIVITY_REFRESH_TOKEN_ERROR

AKS

- `az aks check-acr`: Fix mariner node missing cert
- Fix #25521: `az aks nodepool upgrade`: Fix the crashes when the version passed in through the parameter `--kubernetes-version` is the same as the cluster version

- Fix #25530: `az aks nodepool upgrade`: Fix agent pool property name used for fetching current k8s version
- `az aks create`: Add new parameter `--pod-cidrs` for setting the IP ranges used to allocate IPs to pods
- `az aks create`: Add new parameter `--service-cidrs` for setting the K8s service IPs
- `az aks create`: Add new parameter `--ip-families` for setting the IP types that should be used in a cluster (IPv4 or IPv6)
- `az aks create`: Add new parameter `--load-balancer-managed-outbound-ipv6-count` for setting the number of IPv6 outbound IPs that AKS should manage for a cluster with IPv6 enabled
- `az aks update`: Support changing the load balancer managed outbound IPv6 count property
- Fix #22321: `az aks get-credentials`: Fix path separator for Windows when finding `kubeconfig_path`

APIM

- Fix #25168: `az apim update`: Fix the bug that `--public-network-access` doesn't work to disable public network access

App Service

- `az webapp deleted restore`: Add new parameter `--target-app-svc-plan` to support setting app service plan for new azure web app
- Fix #14729: `az webapp config ssl upload`: Refine error handling for `OpenSSL.crypto.Error` when obtaining the certificate's thumbprint failed
- `az functionapp create`: Add new parameter `--environment` to support setting the name of container app environment
- `az webapp config ssl bind/unbind`: Allow user to specify hostname to (un)bind with `--hostname`
- `az webapp config ssl create/upload/import`: Allow user to specify certificate name with `--certificate-name`
- `az functionapp create`: Add new parameter `--environment` to support setting the name of container app environment

ARM

- `az bicep publish`: Update command to support new optional parameter `--documentationUri`

- Fix #25510: `az bicep`: Set `bicep.use_binary_from_path` to false when installed using Azure CLI
- `az bicep format`: Add new command to support formatting a Bicep file

ARO

- `az aro create`: Rename the create `install-version` parameter to `version`

Compute

- `az vmss reimagine`: Fix the bug that all instances will be reimaged after using `--instance-id` and add new parameter `--instance-ids` to replace `--instance-id`
- `az vm create`: Support recommending more suitable regions through warning log when creating VM
- `az vm/vmss identity assign`: Add warning and modify help message for `--role`: Please note that the default value of `--role` will be removed in the breaking change release of the fall of 2023, so please specify `--role` and `--scope` at the same time when assigning a role to the managed identity.

Container

- `az container create`: Add new parameters `--priority`, `--sku` and `--cce-policy` for container group

Cosmos DB

- `az cosmosdb container create`: GA Client Side Encryption feature
- `az cosmosdb container update`: Fix updates failure for containers with client encryption policy
- `az cosmosdb restore`: Add `--gremlin-databases-to-restore`, `--tables-to-restore` parameters to support restore of gremlin and table accounts
- `az cosmosdb gremlin restorable-resource list`: New command that list restorable gremlin resources
- `az cosmosdb gremlin restorable-database list`: New command that list restorable gremlin databases
- `az cosmosdb gremlin restorable-graph list`: New command that list restorable graphs under a gremlin database
- `az cosmosdb gremlin retrieve-latest-backup-time`: New command that retrieve latest backup time for a graph under a database

- `az cosmosdb table restorable-resource list`: New command that list restorable table resources
- `az cosmosdb table restorable-table list`: New command that list restorable tables
- `az cosmosdb table retrieve-latest-backup-time`: New command that retrieve latest backup time for a table

Deployment Manager

- [BREAKING CHANGE] `az deploymentmanager`: Remove command module since it is no longer maintained by service

Key Vault

- `az keyvault create/update-hsm`: Add `--public-network-access` for MHSM creating or updating

Network

- [BREAKING CHANGE] `az network lb address-pool create/update`: Replace preview argument `--backend-addresses-config-file` and `--config-file` by `--backend-addresses` which supports Json, files and shorthand syntax formats
- [BREAKING CHANGE] `az network lb address-pool`: Output properties `privateIpAddress`, `privateIpAddressVersion`, `privateIpAllocationMethod`, `publicIpAddress` and `publicIpPrefix` are renamed by `privateIPAddress`, `privateIPAddressVersion`, `privateIPAllocationMethod`, `publicIPAddress` and `publicIPPrefix` to keep consistent with the name in API
- [BREAKING CHANGE] `az network cross-region-lb probe`: Deprecate command group as probes are not supported for global load balancer
- [BREAKING CHANGE] `az network nic create/update`: Rename output property `enableIpForwarding` to `enableIPForwarding` to keep consistent with the name in API
- [BREAKING CHANGE] `az network nic create/update`: Rename output property `privateIpAllocationMethod` to `privateIPAllocationMethod` to keep consistent with the name in API
- [BREAKING CHANGE] `az network nic create/update`: Rename output property `publicIpAddress` to `publicIPAddress` to keep consistent with the name in API
- [BREAKING CHANGE] `az network lb`: Update output property names in `2017-03-09-profile`, `2018-03-01-hybrid`, `2019-03-01-hybrid` and `2019-03-01-hybrid` profiles

to keep consist with the `latest` profile.

- [BREAKING CHANGE] `az network cross-region-1b`: Remove in `2017-03-09-profile`, `2018-03-01-hybrid`, `2019-03-01-hybrid` and `2019-03-01-hybrid` profiles.
- [BREAKING CHANGE] `az network nic ip-config`: Rename output property `privateIpAddress` to `privateIPAddress` to keep consistent with the name in API
- [BREAKING CHANGE] `az network nic ip-config`: Rename output property `privateIpAllocationMethod` to `privateIPAllocationMethod` to keep consistent with the name in API
- [BREAKING CHANGE] `az network local-gateway`: Update output property names in `2017-03-09-profile`, `2018-03-01-hybrid`, `2019-03-01-hybrid` and `2019-03-01-hybrid` profiles to keep consist with the `latest` profile.
- [BREAKING CHANGE] `az network vpn-connection`: Update output property names in `2017-03-09-profile`, `2018-03-01-hybrid`, `2019-03-01-hybrid` and `2019-03-01-hybrid` profiles to keep consist with the `latest` profile.
- [BREAKING CHANGE] `az network vnet-gateway`: Update output property names in `2017-03-09-profile`, `2018-03-01-hybrid`, `2019-03-01-hybrid` and `2019-03-01-hybrid` profiles to keep consist with the `latest` profile.
- [BREAKING CHANGE] `az network nic`: Update output property names in `2017-03-09-profile`, `2018-03-01-hybrid`, `2019-03-01-hybrid` and `2019-03-01-hybrid` profiles to keep consist with the `latest` profile
- [BREAKING CHANGE] `az network watcher flow-log`: Remove the deprecated command `configure`
- [BREAKING CHANGE] `az network vrouter`: Deprecate `vrouter` and use `routesserver` instead
- [BREAKING CHANGE] `az network watcher connection-monitor endpoint add`: Remove deprecated parameters `filter-item` and `filter-type`
- `az network nsg rule list`: Fix `-o table` cannot be used
- `az network private-endpoint-connection`: Add provider `Microsoft.Monitor/Accounts`
- `az network express-route gateway connection create/update`: Add parameters `--inbound-route-map` and `--outbound-route-map` to support route map
- Fix #25408: `az network application-gateway rule create`: Creation fails with `--redirect-config` when there are multiple pools
- `az network private-endpoint-connection`: Add provider `Microsoft.DBforMySQL/flexibleServers`

Packaging

- Remove openssl1.1-compat and use openssl-dev in docker image
- Support ARM64 on Linux

PolicyInsights

- Fix #25538: `az policy remediation create`: Fix the `Required` property `'policyAssignmentId'` not found in JSON error

RDBMS

- `az postgres flexible-server migration`: Use Cloud supplied URL's rather than hardcoded management URL's
- `az mysql flexible-server replica create`: Add `--location` to support specifying replica location
- `az mysql flexible-server update`: Fix `--storage-auto-grow` parameter unable to be set

Role

- `az role assignment create`: Show warning if `--scope` argument is not specified: `--scope` argument will become required for creating a role assignment in the breaking change release of the fall of 2023. Please explicitly specify `--scope`.
- Migrate `azure-mgmt-authorization` SDK to Track 2 and bump API version to 2022-04-01

Service Bus

- `az servicebus namespace`: Add `--premium-messaging-partitions` to support ServiceBus Namespace ScaleSet

Service Connector

- `az connection create`: Add new param `--customized-keys`

SQL

- `az sql instance-failover-group`: Add `--secondary-type` parameter to create and update commands
- `az sql midb restore`: Add tags parameter

- `az sql mi create/update`: Add `--zone-redundant` to support zone redundancy
- `az sql db tde-key revalidate/revert`: New commands to revert and revalidate the TDE protector key for the database and SQL server
- `az sql db create/update/show`: Add `--keys`, `--encryption-protector`, `--assign-identity`, `--user-assigned-identity-id` parameters to support Per DB CMK

SQL VM

- `az sql vm create/update`: Deprecate `--sql-mgmt-type` argument
- `az sql vm update`: Update no longer requires the mode to be sent as full
- `az sql vm enable-azure-ad-auth/validate-azure-ad-auth`: New commands for Sqlvm Azure AD authentication

Storage

- `az storage blob copy start-batch`: Add `--destination-blob-type` and `--tier`
- Fix #25402: `az storage account network-rule`: Support adding and removing multiple IPs

February 07, 2023

Version 2.45.0

ACR

- [BREAKING CHANGE] `acr manifest list-referrers`: Support OCI reference types and remove ORAS artifact reference types
- `az acr check-name`: Make command work with different profile

AKS

- Make ContainerInsights DataCollectionRuleName consistent with Portal and other onboarding clients
- `az aks upgrade`: Show warning if the Kubernetes version isn't supplied
- `az aks create`: Deprecate parameters `--aad-client-app-id`, `--aad-server-app-id` and `--aad-server-app-secret`
- `az aks update-credentials`: Deprecate parameters `--reset-aad`, `--aad-client-app-id`, `--aad-server-app-id` and `--aad-server-app-secret`

App Service

- `az webapp create-remote-connection`: Update the host address of SSH tunnel from 0.0.0.0 to 127.0.0.1
- Add support to create ASPs with Memory Optimized Workers
- Fix #17720: `az functionapp function`: Add new command to list functions in a function app
- Fix #24285: `az webapp config access-restriction add`: Fix the bug that it does not support more than one Front Door ID in X-Azure-FDID
- Fix #23603: `az functionapp config set`: Add new parameter to set PowerShell version
- `az webapp config appsettings`: Register settings as deployment slot setting anytime when using `--slot-settings`
- `az webapp config backup delete`: Add new command to delete a backup of the webapp

ARM

- `az bicep`: Add configuration `bicep.use_binary_from_path`. Possible values include `if_running_in_ci` (default) and Booleans
- `az bicep`: Add configuration `bicep.check_version` that accepts Boolean values. If set to `False`, version checks for Bicep CLI will be disabled
- `az deployment what-if`: Fix an issue where formatting nested array changes throws an exception
- Fix #25022: `az resource tag`: Fix the issue of `the serializedData field is missing or null` when updating tag for Microsoft.insights/workbooks

ARO

- `az aro create/update`: Add NetworkContributor role to NAT Gateways in Cluster Resource Group when creating or updating clusters
- `az aro create`: Change `--pull-secret` parameter to no longer require `@` prefix on filenames

Backup

- `az backup vault`: Add new parameter `--public-network-access` to support enabling public network access for the backup vault

- `az backup vault create`: Add new parameter `--immutability-state` to support configuring immutability settings for the backup vault

Batch

- Fix #24007: `az batch pool create`: Fix bug that caused 'MissingRequiredProperty' error when parameter `--encryption-key-identifier` is used

Compute

- `az image builder identity assign`: Add this command to add managed identity to an existing image builder template
- `az image builder identity remove`: Add this command to remove managed identity from an existing image builder template
- `az image builder identity show`: Add this command to display managed identity of an existing image builder template
- `az vmss reimagine`: Let `--instance-id` support multiple ids
- Fix #25308: `az disk create`: Fix help message for creating a standard disk for uploading blobs
- `az vmss create/update`: Add new parameter `--enable-osimage-notification` to support enabling OS image scheduled event
- `az vmss create`: Add new parameter `--max-surge` to support enabling rolling upgrade policy max surge

Cosmos DB

- `az managed-cassandra datacenter update`: Add support to update `--sku`

DMS

- `az dms project task create`: Update DMS MySQL API to support new migration types

Feedback

- Stop including error messages in the feedback body

IoT

- `az iot hub wait`: Add wait commands
- `az iot hub delete`: Fix functionality issue for parameter `--no-wait`

Key Vault

- `az keyvault security-domain restore-blob`: Support restoring blob offline
- `az keyvault security-domain upload`: Add `--restore-blob` to prevent exposing keys in online environment

NetAppFiles

- `az netappfiles volume update`: Fix volume patch dataprotection props

Network

- [BREAKING CHANGE] `az network application-gateway ssl-profile`: Rename output property `verifyClientCertIssuerDn` to `verifyClientCertIssuerDN` to keep consistent with the name in API
- [BREAKING CHANGE] `az network cross-region-lb frontended-ip`: Rename output properties with `publicIp` prefix to `publicIP` prefix to keep consistent with the names in API response
- [BREAKING CHANGE] `az network lb frontended-ip`: Rename output properties with `publicIp` prefix to `publicIP` prefix to keep consistent with the names in API response
- [BREAKING CHANGE] `az network lb frontended-ip`: Rename output properties with `privateIp` prefix to `privateIP` prefix to keep consistent with the names in API response
- [BREAKING CHANGE] `az network lb inbound-nat-pool`: Rename output property `enableFloatingIp` to `enableFloatingIP` to keep consistent with the name in API
- [BREAKING CHANGE] `az network lb inbound-nat-pool`: Rename output property `frontendIpConfiguration` to `frontendIPConfiguration` to keep consistent with the name in API
- [BREAKING CHANGE] `az network lb inbound-nat-rule`: Rename output property `enableFloatingIp` to `enableFloatingIP` to keep consistent with the name in API
- [BREAKING CHANGE] `az network lb inbound-nat-rule`: Rename output property `frontendIpConfiguration` to `frontendIPConfiguration` to keep consistent with the name in API

- [BREAKING CHANGE] `az network lb rule`: Rename output property `enableFloatingIp` to `enableFloatingIP` to keep consistent with the name in API
- [BREAKING CHANGE] `az network lb rule`: Rename output property `frontendIpConfiguration` to `frontendIPConfiguration` to keep consistent with the name in API
- [BREAKING CHANGE] `az network cross-region-lb rule`: Rename output property `enableFloatingIp` to `enableFloatingIP` to keep consistent with the name in API
- [BREAKING CHANGE] `az network cross-region-lb rule`: Rename output property `frontendIpConfiguration` to `frontendIPConfiguration` to keep consistent with the name in API
- [BREAKING CHANGE] `az network lb outbound-rule`: Rename output property `frontendIpConfigurations` to `frontendIPConfigurations` to keep consistent with the name in API
- [BREAKING CHANGE] `az network cross-region-lb address-pool`: Rename output property `loadBalancerFrontendIpConfiguration` to `loadBalancerFrontendIPConfiguration` to keep consistent with the name in API
- [BREAKING CHANGE] `az network cross-region-lb address-pool create`: Replace preview argument `--backend-addresses-config-file --config-file` by `--backend-addresses` which supports Json, files and shorthand syntax formats
- [BREAKING CHANGE] `az network bastion`: Move Azure Bastion to Azure CLI Extension `bastion`
- Fix #25130: `az network list-usages -o table` cannot be used
- Fix #25124: `az network vnet-gateway create`: Active-Active gateway fails with insufficient IP configurations
- `az network dns zone export`: Fix the export to emit all ALIAS records for a particular record set name
- `az network public-ip create`: Add parameter `--ddos-protection-plan` to link a DDoS protection plan to public IP
- Fix #25181: `az network nsg rule create`: Use `*` as default value for protocol
- `az network cross-region-lb address-pool update`: Add new command to update an address-pool

PolicyInsights

- `az policy attestation`: Add new command groups to manage resource policy attestation

RDBMS

- `az mysql flexible-server create/update`: Add `--auto-scale-iops` to enable or disable autoscale of iops
- `az mysql flexible-server start/stop`: Add no-wait support
- `az postgres flexible-server start/stop`: Add no-wait support
- `az postgres flexible-server migration`: Change behavior of cancel/cutover and added Offline Flag for FMS based migrations

Service Bus

- `az servicebus topic subscription rule create/update`: Add `--correlation-filter` to support custom filters

SQL

- `az sql midb recover`: Add support for managed database recover creation option
- `az sql recoverable-midb show`: Add support for getting geo replicated backup
- `az sql recoverable-midb list`: Add support for listing geo replicated backups
- `az sql db geo-backup restore/show/list`: New commands to manage geo redundant backups
- `az sql db threat-policy`: Change expiration version for cmd group to 2.49.0
- `az sql mi dtc`: Add managed instance DTC commands
- `az sql midb restore`: Add support for cross-subscription restore
- `az sql db geo/ltr-backup restore`: Add service objective parameter to ltr restore and geo restore

Storage

- `az storage account create`: Ongoing breaking change warning for disallowing blob public access by default
- `az storage container immutability-policy create`: Allow user to not specify `--resource-group`

January 11, 2023

Version 2.44.1

Network

- Hotfix: Fix #25086: `az network lb probe`: Expose parameter `--probes`

January 10, 2023

Version 2.44.0

ACR

- `az acr manifest`: Support oci artifact manifest

AKS

- `az aks create`: Add new parameter `--data-collection-settings` to support for AKS Monitoring Addon in MSI auth mode
- `az aks install-cli`: Automatically add the installation directories to system path on windows
- `az aks create/update`: Add support for KEDA workload auto-scaler

APIM

- `az apim api create`: Parse URL to detect Protocol and API type

App Service

- Fix #23488: `az appservice plan create`: Fix zone redundant ASP creation fails for ASEv3
- Fix #24858: Support for new isolated v2 (I4v2, I5v2, I6v2) SKUs
- `az appservice ase upgrade/send-test-notification`: Add new commands for ASE to support ASE upgrade and sending test notifications
- `az appservice ase update`: Add `--allow-incoming-ftp-connections` to allow incoming FTP connections
- `az appservice ase update`: Add `--allow-remote-debugging` to allow remote debugging
- Fix #19893: `az appservice plan create`: Fix the bug that cannot create app plan in a different subscription for ASEv3
- Fix #16478: `az functionapp cors credentials`: Add enable/disable CORS creds commands
- Fix #22934: `az functionapp delete`: Add new parameter `--keep-empty-plan` to support keeping empty app service plan

- Fix #19469: `az functionapp vnet-integration add`: Add consumption plan validation
- `az staticwebapp functions link`: Add new parameter `--environment-name` to support setting the environment name of static site

ARM

- Fix #24810: Support ARM64 architecture for Bicep installation

Batch

- `az batch pool create/set`: Add new parameter `--target-communication` to support setting the desired node communication mode for the pool

Compute

- Fix #24896: `az vm create`: Fix the bug that the VM cannot be created from ACG image to other resource group
- `az disk create`: Add new parameter `--performance-plus` to support boosting the performance target
- `az vm list`: Add new parameter `--vmss` to support querying VM instances in a specific VMSS
- `az sig image-version create/update`: Add parameters `--target-edge-zone-encryption` and `--target-edge-zones` to support edge zones

Container

- `az container export`: Fix export when identity is set

Key Vault

- `az keyvault key create`: Support OKP key and Ed25519 curve

Monitor

- [BREAKING CHANGE] `az monitor action-group test-notifications create`: Remove notification in resource group and subscription level
- `az monitor diagnostic-settings create`: Create with resource id and export without workspace

NetAppFiles

- `az volumes qouta-rule create`: Add volume quota rule create command
- `az volumes qouta-rule show`: Add volume quota rule show command
- `az volumes qouta-rule list`: Add volume quota rule list command
- `az volumes qouta-rule update`: Add volume quota rule update command
- `az volumes qouta-rule delete`: Add volume quota rule delete command

Network

- `az network vnet-gateway create`: Add parameter `--edge-zone-vnet-id` for local gateway
- Fix #24853: `az network nsg rule create`: `--destination-asgs` and `--source-asgs` cannot be used
- Fix #24883: `az network application-gateway stop/start`: Add missed parameter `--ids`
- `az network watcher packet-capture create`: Resolve local path issue for Linux VM
- `az network lb update`: Expose parameter `--tags`

Redis

- `az redis import/export`: Add new optional parameter `--preferred-data-archive-method`
- `az redis server-link`: Linked server has two new properties: `geoReplicatedPrimaryHostName` and `primaryHostName`

Security

- `az security alert update`: `--status` now support `resolve` and `inprogress`

Service Connector

- `az connection`: Support local connection which allows local environment to connect Azure resource
- Fix #24806: `az webapp connection create mysql-flexible`: Fix mysql connection command with `--system-identity`

SQL

- `az sql server/db/mi/midb advanced-threat-protection-setting show/update`: Support `advanced-threat-protection-setting` commands
- `az sql db threat-policy`: Declare deprecation of this command group in version 2.45.0
- `az sql db`: Add `--preferred-enclave-type` argument

Storage

- `az storage blob copy start`: Fix `--tier` to support setting blob tier when copying

December 06, 2022

Version 2.43.0

Core

- `aaz`: Fix `has_value` function for list, dict and object arg types (#24625)
- `aaz`: Support argument preview and experimental (#24637)
- `aaz`: Add registered property for `AAZBaseArg` (#24640)
- `aaz`: Add `aazlist` and `aazdict` args transform help functions (#24690)
- `aaz`: Support camel case key in `AAZObjectType` (#24771)
- Disable removing and updating system extension in Cloud Shell (#24361)

AKS

- `az aks enable-addons`: Add `--enable-syslog` parameter to monitoring addon
- `az aks nodepool`: Unify the option names used to specify the nodepool name and cluster name. For nodepool name, option names are `--nodepool-name`, `--name` and `-n`. For cluster name, option name is `--cluster-name`
- `az aks nodepool add`: Support the new SKU Mariner for parameter `--os-sku`

App Config

- `az appconfig`: Update raised errors in app config command module

App Service

- `az staticwebapp backends link`: Link an backend to a static webapp. Also known as "Bring your own Backend."
- `az staticwebapp backends unlink`: Unlink backend from a static webapp
- `az staticwebapp backends show`: Show details on the backend linked to a static webapp
- `az staticwebapp backends validate`: Validate an backend for a static webapp
- `az webapp config snapshot restore`: Fix the AttributeError `str object has no attribute get`
- `az appservice plan create/update`: Add new environment SKU for parameter `--sku`
- `az staticwebapp create`: Add new parameter `--login-with-ado` to create azure dev ops token automatically
- Fix #24506: `az functionapp keys set/delete`: Update the wrong accepted parameter value `systemKey` to `systemKeys` for `--key-type`
- `az webapp create`: Add `--public-network-access` parameter to support enabling public access
- `az staticwebapp hostname show`: Fix dns-txt-token validation command to show command
- Fix #24620: `az webapp create`: Improve the error message to show that the `az webapp list-runtimes` command depends on the specified runtime

ARM

- `az deployment mg create`: Add new parameter `--mode` to support setting the mode for deploying resources
- `az group lock list`: Mark the `--resource-group` as required in help message
- `az bicep install`: Address issue installing bicep on non-musl default systems with musl

Backup

- `az backup restore restore-disks`: Allow `--disk-encryption-set-id` for cross region restore

Compute

- Fix #24624: `az sig image-version create`: Fix the error that the `--os-vhd-storage-account` must be a managed disk or snapshot

IoT

- Fix #22257: `az iot dps linked-hub create`: Improve error handling for linked hubs
- `az iot hub create/delete`: Add `--no-wait` parameter to support no wait operation

Key Vault

- `az keyvault`: Add check-name command, support Security Domain Properties

Monitor

- `az monitor diagnostic-settings`: Add `--marketplace-partner-id` parameter

Network

- `az network bastion rdp`: Allow rdp session customization
- `az network private-endpoint-connection`: Enable private link support for provider `Microsoft.DesktopVirtualization/hostpools` and `Microsoft.DesktopVirtualization/workspaces`
- `az network application-gateway`: Support OCSP revocation check on client certificate
- `az network traffic-manager endpoint`: Add `--always-serve` to manage the health check on endpoints
- `az network public-ip create`: Fix `--ip-tags` cannot be used
- `az network private-endpoint-connection`: Add Provider `Microsoft.MachineLearningServices/registries`

RDBMS

- `az postgres flexible-server geo-restore/replica`: Introduce read replicas and geo-restore
- `az postgres flexible-server upgrade`: Add major version upgrade for PostgreSQL flexible server
- `az postgres flexible-server create/update/restore/replica`: Postgres flex byok
- `az postgres flexible-server identity`: Add user managed identity operations for PostgreSQL flexible server
- `az postgres flexible-server create/update/ad-admin`: Add Azure Active Directory Administrator operations for PostgreSQL flexible server

Service Connector

- `az webapp/spring/containerapp connection create mysql`: Deprecate mysql single server connection command

SQL

- `az sql server ipv6-firewall-rule`: Add new command group for AZ SQL server IPv6 firewall rule

SQL VM

- `az sql vm update`: Deprecate the `--yes` prompt to upgrade SqlIaaSAgent extension to full mode
- `az sql vm create/update`: Add `--least-privilege-mode` to take minimal permissions on their SQL Server
- `az sql vm group create/update`: Add `--cluster-subnet-type` to support High Availability configuration

Storage

- Fix #23893, #24528: `az storage account show-connection-string/keys renew`: Fix resource group auto completion
- Fix #23216: `az storage file upload-batch`: Fix `--dryrun` to show correct file paths
- `az storage blob copy start`: Add `--destination-blob-type` to allow switching between blob types when copying
- `az storage account encryption-scope list`: Add `--filter`, `--include`, `--maxpagesize` to support advanced list
- `az storage account failover`: Add `--failover-type` to support planned failover

November 01, 2022

Version 2.42.0

ACR

- `az acr task update`: Fix logic issue for updating encoded task

AKS

- Fix #24188: `az aks list`: Fix pagination handling error
`ContainerServiceClientConfiguration` object has no attribute `api_version` when there are many list results
- Fix #24188: `az aks nodepool list`: Fix pagination handling error
`ContainerServiceClientConfiguration` object has no attribute `api_version` when there are many list results
- `az aks create/update`: Add new parameters `--enable-blob-driver` and `--disable-blob-driver` to enable/disable Blob CSI Driver
- `az aks create/update`: Add new parameter `--enable-oidc-issuer` to support enabling oidc issuer feature
- `az aks oidc-issuer rotate-signing-keys`: Add new command to support rotating oidc issuer service account signing keys

APIM

- `az apim create/update`: Add `--public-network-access` to support specifying whether or not public endpoint access is allowed for this API management service
- `az apim create/update`: Add `--disable-gateway` to support disabling gateway in the master region

App Config

- `az appconfig`: Update raised errors in app config command module

App Service

- Fix #23050: `az functionapp deployment source config-zip`: Fix the bug that zip deployment will fail if app settings contain any values of null

Backup

- `az backup restore restore-disks`: Update Cross Zonal Restore behaviour for ZRS vaults and primary region CRR scenarios
- `az backup job show`: Change subtask start/end time from minimum value to null for ongoing or yet-to-start operation

Compute

- `az vm run-command create/update`: Change help messages and add examples for `-output-blob-uri` parameter to illustrate that `--output-blob-uri` must be SAS URI
- Fix #24187: `az vm list`: Fix the AttributeError 'ComputeManagementClientConfiguration' object has no attribute 'api_version'
- `az vm extension list`: Add new parameter `--ids` to support listing extensions by VM id
- `az sig image-version create/update`: Add `--allow-replicated-location-deletion` to support removing gallery image version from replicated regions
- Fix #24263: `az snapshot create`: Fix the KeyError 'IMPORT_ENUM' when creating snapshot from source blob uri
- `az sig image-version update`: Support `excludeFromLatest` for `--add` parameter to exclude this image version when using the latest version of image definition
- `az sig image-version update`: Support `safetyProfile.allowDeletionOfReplicatedLocations` for `--set` parameter to allow users to remove the gallery image version from replicated regions

HDInsight

- [BREAKING CHANGE] `az hdinsight create`: Remove the enum value 1.0 and 1.1 from the `--minimal-tls-version`, HDInsight doesn't support TLS version which is less than 1.2 now.

IoT

- `az iot hub create`: Enforce data residency property on hubs created in `qatarcentral`

NetAppFiles

- `az netappfiles account renew-credentials`: Add `renew-credentials` command to renew identity credentials that are used to authenticate to key vault, for customer-managed key encryption

Network

- `az network public-ip`: Add alias `--ddos-protection-mode` to `--protection-mode`
- `az network custom-ip prefix`: Add parameters `--asn`, `--geo`, `--no-internet-advertise` and so on

- Fix #21551: `az network nic ip-config update`: ASGs update with multiple IP configurations
- Fix #24169: `az network application-gateway waf-policy managed-rule exclusion rule-set remove`: Remove exclusion with different matchers
- Fix #24377: `az network public-ip create`: Derive Public IPs in different resource group from Public IP Prefix
- `az network lb probe`: Support probe threshold via `--probe-threshold`

RDBMS

- [BREAKING CHANGE] `az postgres flexible-server migration show`: Remove `--level` parameter
- [BREAKING CHANGE] `az postgres flexible-server migration delete`: Remove this command. Deleting a migration is not supported for now.
- [BREAKING CHANGE] Change `az postgres flexible-server migration update --cutover` to `az postgres flexible-server migration update --cutover db1 db2 db3`
- `az postgres flexible-server migration create`: Add `--migration-mode` to support offline and online(with CDC) migrations. Default mode when `--migration-mode` not passed will be offline.
- Add `az postgres flexible-server migration update --cancel db1 db2 db3` to cancel a migration.

Resource

- `az resource delete`: Add new parameter `--no-wait` to support not waiting the long-running operation to finish

Role

- `az role assignment create`: Support bring-your-own role assignment name
- `az role assignment delete`: If `--ids` is provided, ignore other arguments, instead of raising error

SQL

- `az sql midb log-replay start`: Add `--storage-identity` parameter

Storage

- `az storage account show-connection-string/keys renew`: Update options for `--key` parameter
- `az storage account create/update`: GA `--key-vault-federated-client-id`

Synapse

- `az synapse workspace create`: Add parameter `--managed-resource-group-name`
- `az synapse spark pool`: Add parameter `--enable-dynamic-executor-allocation`

October 11, 2022

Version 2.41.0

Core

- Support Continuous Access Evaluation
- PREVIEW: Support Web Account Manager (WAM) login on Windows. To opt in, run
`az config set core.allow_broker=true`
- Revert #23514: Rename entry script `az.ps1` to `azps.ps1`
- `aaz`: Support `yaml` file as value for compound arguments
- `aaz`: Fix recursion depth exceeded for `to_serialized_data` of `AAZObject`
- `aaz`: Support customized life cycle callback functions for `AAZCommand`
- `aaz`: Fix two `AAZObjects` or `AAZDicts` comparison

ACS

- [BREAKING CHANGE] `az acs`: Remove the deprecated command group

AD

- Support special characters in user principal name

AKS

- Fix #23779: `az aks install-cli`: Support determining the arch of binaries based on system information

APIM

- Fix #20863: `az apim api import`: Fix the issue to import GraphQL API's using graphqllink

App Config

- [BREAKING CHANGE] `az appconfig kv import`: Add validation to JSON file import to ensure that only valid JSON objects are imports
- [BREAKING CHANGE] `az appconfig kv export`: Update the array conversion logic to prevent dropping keys during export
- `az appconfig kv export`: Fix MemoryError while exporting large stores
- `az appconfig replica`: New command group to support geo-replication
- `az appconfig kv export`: Support exporting app configuration settings as references to App Service
- `az appconfig kv import`: Ensure app configuration references are not imported from App Service
- `az appconfig feature filter update`: Add new command to support updating functionality for feature filters

App Service

- `az functionapp deployment github-actions`: Add support for linux powershell runtimes
- `az functionapp deployment github-actions`: Fix issue where publish profile would not be populated before the github action was run
- `az webapp up`: No longer show status during linux deployments
- `az webapp deployment source config-zip`: No longer show status during linux deployments

ARM

- `az deployment group what-if`: Fix an issue where `complete` deployment mode does not work

Backup

- `az backup policy`: Add support for Smart Tiering policy

Compute

- [BREAKING CHANGE] `az vmss create`: Update NAT pool to NAT rule V2 for Standard LB SKU when creating VMSS
- `az vm/vmss create`: `--enable-secure-boot` is set to True by default when the `--security-type` used by the VM/VMSS creation is `TrustedLaunch`
- `az restore-point create`: Add new parameter `--consistency-mode` to support setting consistency mode
- `az vmss create/update`: Add new parameters `--priority-count` and `--priority-percentage` to support setting priority mix policy
- `az vm/vmss create/update`: Add new parameter `--disk-controller-type` to support setting disk controller type
- `az disk create`: Add warning log in three scenarios to later support creating disk with Gen2 and TLVM as default
- `az vmss create`: Add new parameter `--nat-rule-name` to specify the name of NAT rule V2 when creating a new load balancer (NAT rule V2 is used to replace NAT pool)

Cosmos DB

- `az cosmosdb mongodb role/user definition`: New command groups for enforcing RBAC on Cosmos DB Mongo accounts
- `az cosmosdb create/update`: GA mongo server version

Event Hubs

- [BREAKING CHANGE] `az eventhubs namespace update`: Remove `--key-source`, `--key-name`, `--key-vault-uri` and `--key-version`. Please use `az eventhubs namespace encryption` to manage keys
- [BREAKING CHANGE] `az eventhubs namespace create/update`: Remove `--identity`. Please use `--mi-user-assigned` and `--mi-system-assigned` parameters and `az eventhubs namespace identity` commands
- [BREAKING CHANGE] `az eventhubs namespace create/update`: Remove `--default-action` and `--enable-trusted-service-access`. Please use `az eventhubs namespace network-rule update` command instead

Key Vault

- [BREAKING CHANGE] `az keyvault create/update`: Finally remove `--enable-soft-delete` parameter

- Fix #23527: `az keyvault secret set`: Add alias `--content-type` for `--description`

Monitor

- [BREAKING CHANGE] `az monitor diagnostic-settings list`: Drop `value` property in output, return a list instead of a dict
- `az monitor autoscale`: Upgrade monitor autoscale api version
- `az monitor autoscale`: Add predictive metric show cmd

NetAppFiles

- `az netappfiles account create`: Add optional parameters `--key-name`, `--key-source`, `--keyvault-resource-id`, `--user-assigned-identity`
- `az netappfiles account update`: Add optional parameters `--key-name`, `--key-source`, `--keyvault-resource-id`, `--user-assigned-identity`
- `az netappfiles volume create`: Add optional parameters `--smb-access-based-enumeration`, `--smb-non-browsable`, `--delete-base-snapshot`
- `az netappfiles resource`: Add new command `query-region-info`

Network

- [BREAKING CHANGE] `az network watcher connection-monitor create`: Deprecate classic connection monitor creation
- [BREAKING CHANGE] `az network application-gateway waf-policy managed-rule rule-set`: Change parameter `--rules` to `--rule` and support multi-properties
- [BREAKING CHANGE] `az network vnet`: Deprecate parameter `--defer`
- [BREAKING CHANGE] `az network public-ip`: Change `publicIpAllocationMethod` to `publicIPAllocationMethod`
- [BREAKING CHANGE] `az network public-ip`: Change `publicIp.publicIpPrefix` to `publicIp.publicIPPrefix`
- [BREAKING CHANGE] `az network public-ip`: Change `publicIpAddressVersion` to `publicIPAddressVersion`
- Fix #23884: `az network application-gateway rule create`: Compatible with v1 SKU
- `az network private-endpoint-connection`: Add Provider `Microsoft.AgFoodPlatform/farmBeats`
- `az network application-gateway waf-policy managed-rule rule-set`: Support per rule actions in web application firewall
- `az network public-ip`: Support ddos protection mode via `--protection-mode`

Packaging

- Drop Mariner 1.0 RPM package

RDBMS

- `az mysql flexible-server update`: Expose `--geo-redundant-backup` argument
- `az mysql/postgres flexible-server create/update`: Deprecate `Enabled` for `--high-availability` argument
- `az mysql flexible-server stop`: Change stopped time logging message
- `az mysql flexible-server ad-admin delete`: Disable `aad_auth_only` when dropping AAD admin
- `az mysql flexible-server identity remove`: Allow removing all identities in a MySQL server

Reservations

- Move commands from `azure-cli` to `reservation` extension

Service Bus

- [BREAKING CHANGE] `az servicebus namespace create/update`: Remove `--default-action`. Please use `az servicebus namespace network-rule update` command instead
- `az servicebus queue/topic create/update`: Support setting max message size
- `az servicebus topic subscription create`: Support client affine

Service Connector

- `az spring-cloud connection create postgres`: Add `--system-identity` for springcloud-postgres connection

SQL

- `az sql server audit-policy show`: Add `isManagedIdentityInUse` info in output

Storage

- `az storage blob/container`: Support `--account-name` for non-standard account URL
- `az storage account update`: Fix ADProperties wipe out issue when updating `--default-share-permission`
- Fix #19311: `az storage remove`: Add support for connection-string

September 06, 2022

Version 2.40.0

ACR

- `az acr config authentication-as-arm show`: Add new command to support showing the configured 'Azure AD authenticate as ARM' policy
- `az acr config authentication-as-arm update`: Add new command to support updating 'Azure AD authenticate as ARM' policy
- `az acr config soft-delete show`: Add new command to show soft-delete policy
- `az acr config soft-delete update`: Add new command to update soft-delete policy
- `az acr repository list-deleted`: Add new command to list deleted repositories
- `az acr manifest list-deleted`: Add new command to list deleted manifests
- `az acr manifest list-deleted-tags`: Add new command to list deleted tags
- `az acr manifest restore`: Add new command to restore deleted manifests and tags
- `az acr network-rule`: Deprecate params `--subnet` and `--vnet-name`
- `acr config`: Fix bug in some commands that would in certain circumstances attempt to pull a nonexistent model from SDK

AKS

- Fix #23468: `az aks nodepool wait` crashes with error "'Namespace' object has no attribute 'nodepool_name'"
- `az aks check-acr`: Append acr suffix to option `--acr` according to cloud env
- `az aks`: Add `--gpu-instance-profile` for Nvidia multi-instan...
- `az aks update`: Update without args prompts to reconcile
- `az aks create/update`: Add new parameters `--enable-disk-driver` and `--disable-disk-driver` to enable/disable AzureDisk CSI Driver. When creating new cluster, AzureDisk CSI Driver is enabled by default.

- `az aks create/update`: Add new parameters `--enable-file-driver` and `--disable-file-driver` to enable/disable AzureFile CSI Driver. When creating new cluster, AzureFile CSI Driver is enabled by default.
- `az aks create/update`: Add new parameters `--enable-snapshot-controller` and `--disable-snapshot-controller` to enable/disable CSI Snapshot Controller. When creating new cluster, CSI Snapshot Controller is enabled by default.
- `az aks nodepool add`: Add option `Windows2019`, `Windows2022` to `--os-sku` parameter
- Fix #23653: `az aks create`: Fix the CrashLoopBackOff issue when set `--network-policy` to 'Calico'

App Service

- Fix #23417: `az functionapp github-actions add`: Fix the functionapp github actions on java
- `az functionapp list-runtimes`: Add linuxFxVersion to output
- `az webapp up`: Show status during deployment for linux apps
- `az webapp deployment source config-zip`: Show status during deployment for linux apps
- `az logicapp deployment`: Add a new command group to support managing logic app deployments
- `az logicapp scale`: Add a new command to support scaling a logic app
- `az logicapp config`: Add a new command group to support configuring a logic app
- `az logicapp update`: Add a new command to support updating a logic app

ARM

- `az bicep`: Use `AZURE_CLI_DISABLE_CONNECTION_VERIFICATION` when checking Bicep CLI versions

Backup

- `az backup vault create/backup-properties set`: Add support for Alert Settings
- Fix #23655: `az backup restore restore-disks`: Support storage account being in a different resource group

Batch

- Fix #23445: `az batch pool supported-images list`: Fix the `NoneType object has no attribute startswith` bug for getting supported images list

Compute

- `az vm run-command invoke`: Add new parameters `--no-wait` to support not waiting for the long running operation to finish
- Fix #23194: `sig image-version create`: Fix the `Parameter tags must be of type dict` error when `--tags` parameter is passed as `key=value` pairs
- Fix #23540: `az ppg create`: Fix the `Parameter tags must be of type dict` error when `--tags` parameter is passed as `key=value` pairs
- `az sig update`: Add parameters to support updating gallery from private to community
- `az sig share reset`: Update gallery from community to private
- `az vm/vmss create`: `--enable-vtpm` is set to `True` by default when the `--security-type` used by the VM/VMSS creation is `TrustedLaunch`
- Fix #23341: `az vm list-skus`: Fix filtering out VM sizes that are available regionally when they are restricted in all zones
- `az vm run-command show/list`: Add validation and refine help message for parameter combination
- `az identity federated-credential`: Add subgroup to support managing federated identity credentials of existing user assigned identities

Cosmos DB

- `az cosmos db service`: Add service support for cosmosDB
- `az cosmosdb gremlin graph`: Add `analyticalStorageTTL` property to sql containers

Feedback

- `az survey`: New command for CLI survey

Monitor

- `az monitor action-group test-notifications create`: Add new command
- `az monitor metric alert`: Support metric namespace with dash
- `az monitor action-group create`: Add optional parameter `--location`

NetAppFiles

- `az netappfiles volume create`: Add optional parameter `--kv-private-endpoint-id`
- `az netappfiles volume-group create`: Add optional parameter `--kv-private-endpoint-id`
- `az netappfiles volume update`: Add optional parameter `--cool-access`
- `az netappfiles volume update`: Add optional parameter `--coolness-period`
- `az netappfiles pool update`: Add optional parameter `--cool-access`

Network

- `az network application-gateway create`: Support rule priority field provided as part of configuration
- `az network private-endpoint-connection`: Add `Microsoft.OpenEnergyPlatform/energyServices` provider
- Fix #22594: `az network bastion create`: Add no wait support for bastion create
- Fix #23525: `az network bastion create/update`: Add missing arguments and update command
- `az network watcher packet-capture create`: Add VMSS support in packet capture

Packaging

- Build RPM for RHEL 9 and CentOS Stream 9

RDBMS

- `az mysql flexible-server upgrade`: Add major version upgrade for MySQL flexible server
- `az mysql/postgres flexible-server backup`: Add backup commands for flexible servers
- `az postgres flexible-server create/update`: Add `SameZone` for HA in PostgreSQL flexible server
- `az mysql flexible-server create/update/restore/geo-restore/replica`: Add BYOK for MySQL Flexible Server
- `az mysql flexible-server identity/ad-admin`: User Identity and AAD Admin for MySQL flexible server

Security

- `az security security-solutions-reference-data`: Add new command group
- `az security security-solutions`: Add new command group

Service Bus

- `az servicebus namespace create/update`: Support specifying `--min-tls`
- `az servicebus namespace network-rule update`: Support updating network rules for given namespace

Service Connector

- `az spring connection`: Update description after spring app renames

SignalR

- `az signalr custom-domain`: Support custom domain
- `az signalr custom-certificate`: Support custom certificate

SQL

- `az sql mi endpoint-cert`: New command group to manage endpoint certificates
- `az sql mi partner-cert`: New command group to manage partner certificates
- `az sql mi link`: New command group to manage instance link

Storage

- `az storage fs file set-expiry`: New command to support setting expiry for files in ADLS Gen2 file system
- `az storage account create/update`: Add `--enable-files-aadkerb` to support AAD Kerberos authentication for Azure Files
- `az storage account local-user`: New command group to manage identities when using SFTP
- `az storage account create/update`: Add `--enable-sftp` and `--enable-local-user` to support SSH File Transfer Protocol
- `az storage fs create`: Support encryption scope
- `az storage fs directory/fs generate-sas`: Support generating SAS token with specified encryption scope

August 02, 2022

Version 2.39.0

ACR

- [BREAKING CHANGE] Update manifest list-referrers to comply with RC1 ORAS spec
- `az acr update`: Update networkRuleSet.defaultAction to deny when `--public-network-enabled` is disabled
- Fix #23340: `az acr task credential add`: Fix crashes when given a password but no username

AD

- `az ad app federated-credential`: Federated identity credential GA

Advisor

- Fix #11070: `az advisor recommendation disable`: Fix NoneType error

AKS

- Fix snapshot not resolved according to the subscriptions field in the `--snapshot-id` option
- `az aks check-acr`: Bump canipull to v0.1.0 to add 5s wait to avoid attach race condition
- `az aks update`: Fix the issue of `NoneType` error when updating the config of keyvault secret provider
- Remove warning message when using "BYO vnet + system MSI"
- Fix the bug related to AKS Monitoring MSI auth when the location value with spaces
- Fix #2457: Clarify subnet id description to resource id
- `az aks create`: Add new parameter `--host-group-id` to support Azure dedicated host
- `az aks nodepool add`: Add new parameter `--host-group-id` to support Azure dedicated host
- `az aks create/update`: Add new parameters `--enable-azure-keyvault-kms`, `--azure-keyvault-kms-key-id`, `--azure-keyvault-kms-key-vault-network-access`, `--`

- `az keyvault kms key-vault-resource-id` and `--disable-azure-keyvault-kms` to support Key Management Service feature with Azure Key Vault
- `az aks create`: Add `--network-plugin=none` support for BYO CNI
- `az aks create/update`: Add parameter `--http-proxy-config` to support setting HTTP Proxy configuration

App Service

- Fix #23135: `az functionapp plan create`: Add validation for the valid value of `--number-of-workers` option
- `az functionapp/logicapp create`: Add new `--https-only` parameter
- `az functionapp/webapp create`: Allow vnet integration for basic and elastic premium SKUs
- `az webapp list-runtimes`: Add Java 17 Support
- `az webapp create`: Add Java 17 Support
- `az webapp up`: Add Java 17 Support
- `az functionapp deployment github-actions add`: Add command to create GitHub actions to deploy to a Function App
- `az functionapp deployment github-actions remove`: Add command to remove Function App GitHub actions
- `az webapp deployment github-actions`: Add validation to ensure app is Web App

ARM

- Fix #23246: Fix interchanged policy samples

Backup

- `az backup protection backup-now`: Fix bug for SQL/HANA backup retention

Batch

- `az batch account network-profile show`: Add show network profile command for batch account
- `az batch account network-profile set`: Add set network profile command for batch account
- `az batch account network-profile network-rule list`: Add rule list command for batch account network

- `az batch account network-profile network-rule add`: Add rule add command for batch account network
- `az batch account network-profile network-rule delete`: Add rule delete command for batch account network
- `az batch account create`: Add managed identity support with `--mi-user-assigned` parameter
- `az batch account identity assign`: Add command to add identity to existing batch accounts
- `az batch account identity remove`: Add remove identity for existing batch accounts
- `az batch account identity show`: Add show identity for batch accounts
- `az batch pool create`: Update help text for `--json-file` to point to json schema

Compute

- `az ppg create/update`: Add parameter `--intentvmsizes` to specify possible sizes of VM that can be created in the proximity placement group
- `az ppg create`: Add parameter `--zone` to support specifying availability zone where the ppg should be created
- Fix #22995: `az image-version create`: Unbind the usage of `--target-region-encryption` and `--target-region-cvm-encryption`
- Fix #22654: `az vm run-command create/update`: Parameter `--protected-parameters` does not achieve the desired effect
- `az vmss run-command create/update`: Parameter `--protected-parameters` does not achieve the desired effect
- `az vmss create`: Add new parameter `--os-disk-delete-option` to support configuring whether the VM OS disks of Flex VMSS will be deleted or detached upon VM deletion
- `az vmss create`: Add new parameter `--data-disk-delete-option` to support configuring whether the VM data disks of Flex VMSS will be deleted or detached upon VM deletion
- `az image builder create`: Add parameter `--staging-resource-group` to support custom resource group naming
- `az image builder validator`: Add subgroup to manage validate information of template
- `az vm disk detach`: Add parameter `--force-detach` to support force-detaching managed data disks from a VM

Container

- `az container create`: Add environment variable interpolation in container group yaml

Event Grid

- Add commands for partner and event-subscription customer facing features

Eventhub

- `az eventhubs namespace`: Add `--minimum-tls-version`
- `az eventhubs cluster`: Add `--supports-scaling`

IoT

- Change certificate loading to encode to b64 strings by default

Key Vault

- `az keyvault security-domain upload`: Fix `password must be bytes-like` for `--passwords`

Monitor

- `az monitor autoscale rule create`: Suppress warning from antlr
- `az monitor metrics alert create/update`: Suppress warning from antlr

Network

- `az network vnet subnet list-available-ips`: Get list of available IPs for subnet
- `az network private-endpoint-connection`: Enable private link support for provider `Microsoft.KubernetesConfiguration/privateLinkScopes`
- `az network private-endpoint-connection`: Enable private link support for provider `Microsoft.Dashboard/grafana`
- `az network dns zone export`: Add support for ALIAS record
- `az network dns zone import`: Add support for ALIAS record
- `az network application-gateway waf-policy custom-rule match-condition add`: Add validation for WAF custom rule condition
- `az network watcher flow-log`: Add support for `--vnet`, `--subnet`, `--nic` as target ID

- `az network private-endpoint create`: Add an example for creating with ASGs

Packaging

- Drop CentOS 7 RPM package
- Drop Python 3.6 support
- Build RPM for Fedora
- Drop Ubuntu 21.10 Impish Indri DEB package

Profile

- `az account list`: Add `TenantId` column to table output

RDBMS

- `az mysql flexible-server server-logs`: Add server logs for MySQL Flexible Server

Service Connector

- `az spring connection create eventhubs`: Add new parameter `--client-type kafka-springBoot`
- `az webapp connection create`: Add `--config-connstr` to support webapp connection strings
- `az webapp connection create`: Use webapp name and resource group from config

SQL

- `az sql log-replay stop`: Drop DB only if it was created with LRS

Storage

- `az storage fs undelete-path`: Encode `--deleted-path-name` automatically
- Fix #23179: `az storage file upload/upload-batch`: Fix `--content-md5` for upload, ignore `--content-md5` for upload-batch
- `az storage file show`: Fix JSON error when content-md5 is not None
- `az storage blob/file update`: Fix `--content-md5` TypeError
- `az storage container policy create`: No longer use default value for start and expiry time

- `az storage blob upload`: Add back `--socket-timeout` which has been renamed by SDK
- Fix #23262: `az storage blob metadata`: Add `--lease-id` back
- `az storage blob download/download-batch`: Add `--overwrite`

Synapse

- `az synapse workspace`: Add `--last-commit-id` for git repo config
- `az synapse ad-only-auth`: New command group for supporting synapse azure ad only authentication

September 01, 2023

Version 2.38.1

This version is only available on CentOS 7 and RHEL 7.

App Service

- `az webapp ssh`: Backport #25141 to 2.38

July 05, 2022

Version 2.38.0

ACR

- `az acr`: Show replication region endpoint status in table output
- `az acr task run`: Add Dockerfile to source upload if context is local directory

AD

- `az ad app/sp update`: Support generic update `--set` on root level
- Support special characters in object names
- `az ad app federated-credential`: Support federated identity credentials

AKS

- `az aks get-credentials`: Fix permission prompt when saving config file to symlink

- `az aks command invoke`: Add support for `--no-wait`
- `az aks get-credentials`: Fix the command error when KUBECONFIG is empty
- `az aks nodepool stop/start`: Add nodepool stop/start bindings

APIM

- `az apim`: Update experimental flag to get out of experimental state
- `az apim deletedservice`: Add command group to support managing soft-deleted azure API Management services

App Config

- `az appconfig`: GA features - soft-delete, feature-filter, strict-import and disable-local-auth

App Service

- [BREAKING CHANGE] `az webapp up`: Remove premium container SKUs (PC2, PC3, PC4)
- [BREAKING CHANGE] `az appservice plan create/update`: Remove premium container SKUs (PC2, PC3, PC4)
- [BREAKING CHANGE] `az functionapp plan create`: Remove premium container SKUs (PC2, PC3, PC4)
- Fix #22722: `az webapp config ssl import` fixes to support new GraphAPI for SP queries
- `az webapp up`: Fix bug where runtime is detected even when `--runtime` is provided
- `az staticwebapp enterprise-edge`: Move command group from extension to official CLI
- `az appservice plan create`: Allow creating Hyper-V App Service Plans hosted on App Service Environments
- `az webapp/functionapp deployment slot create`: Allow using `--configuration-source` for apps with storage accounts added
- `az webapp up`: Fix bug when deploying to an App Service Environment (ASE) where the ASE is incorrectly categorized as an internal load balancing (ILB) ASE and fails validation
- Fix #20901: `az functionapp update`: Update `--slot` logic to work correctly

ARM

- Fix #22621: `az bicep build`: `--stdout` does not work
- Fix #22930: `az bicep generate-params`: Add support for bicep generate-params command
- `az deployment`: Fix the error message of ARM deployment to the correct JSON format

Backup

- `az backup restore restore-disks`: Add Cross Subscription Restore for IaaSVM ALR
- `az backup protection enable-for-vm`: Add a Linux specific example
- `az backup protectable-item list`: SQLAG container fetch failure bug fix

Bot Service

- [BREAKING CHANGE] `az bot create`: Remove `--kind`, `--password`, `--lang` arguments. Add `--app-type`, `--tenant-id`, `--msi-resource-id` arguments

Cognitive Services

- `az cognitiveservices account deployment create`: Support standard scale type

Compute

- `az disk create`: Fix the issue that specifying encryption type as `EncryptionAtRestWithPlatformKey` does not take effect when creating a disk
- `az disk update`: Fix the `(InvalidParameter) Resource xxx encrypted with platform key has disk encryption set id specified` error when updating the encryption type to platform managed keys
- `az sig image-version create`: Add new parameters `--virtual-machine` and `--image-version` to support creating image version from different source
- `az vm`: Support a new disk storage SKU PremiumV2_LRS
- `az sig show-community`: Add new command to support listing image versions in community gallery
- `az sig image-definition show-community`: Add new command to support getting an image in a gallery community
- `az sig image-definition list-community`: Add new command to support listing VM Image definitions in a gallery community
- `az sig image-version show-community`: Add new command to support getting an image version in a gallery community

- `az sig image-version list-community`: Add new command to support listing VM image versions in a gallery community
- `az sig share enable-community`: Add new command to support sharing gallery to community
- `az sig gallery-application version`: Add new parameter `--package-file-name` to specify the downloaded package file on the VM
- `az sig gallery-application version`: Add new parameter `--config-file-name` to specify the downloaded config file on the VM
- `az disk create`: Add support for `--gallery-image-reference` to allow creating disk from shared gallery image version or community gallery image version
- `az disk create`: Add support for `--source` to allow creating a disk from disk restore point
- `az vm/vmss application set`: Add new parameter `--treat-deployment-as-failure` to treat any failure in the gallery application version as deployment failure
- `az vm image list`: Add parameter `--architecture` to filter image with its architecture
- `az disk-encryption-set create`: The `--encryption-type` parameter supports new value `ConfidentialVmEncryptedWithCustomerKey` for confidential VM
- `az disk create`: The `--security-type` parameter supports new value `ConfidentialVM_DiskEncryptedWithCustomerKey` for confidential VM
- `az disk create`: Add new parameter `--secure-vm-disk-encryption-set` to provide ID or name of disk encryption set created with `ConfidentialVmEncryptedWithCustomerKey` encryption type
- `az disk-encryption-set create/update`: Add new parameter `--federated-client-id` to access key vault in a different tenant
- `az disk-encryption-set create`: Add new parameters `--mi-system-assigned` and `--mi-user-assigned` to support assigning system and user assigned identities during disk encryption set creation
- `az disk-encryption-set identity`: Add new command groups with parameters `--system-assigned` and `--user-assigned` to support managing system and user assigned identities on existing disk encryption set
- `sig list-community`: Add new command to support listing community gallery
- `sig list-community`: GA shared/community image gallery related feature
- `az vm/vmss create`: The `--security-type` parameter supports new value `ConfidentialVM` for Confidential VM
- `az vm/vmss create`: Add new parameter `--os-disk-security-encryption-type` to support setting the encryption type of the OS managed disk for Confidential VM

- `az vm/vmss create`: Add new parameter `--os-disk-secure-vm-disk-encryption-set` to allow users to provide ID or name for disk encryption set created with `ConfidentialVmEncryptedWithCustomerKey` encryption type
- `az disk create`: Add new parameter `--security-data-uri` to specify the blob URI of VHD to be imported into VM guest state
- `az disk create`: Add new parameter `--upload-type` to extend and replace `--for-upload` which supports standard disk only upload and OS Disk upload along with VM guest state
- `az disk grant-access`: Add new parameter `--secure-vm-guest-state-sas` to support getting security data access SAS on managed disk with VM guest state

Cosmos DB

- `az cosmosdb sql container create`: Add support to create containers with client encryption policy

Event Hubs

- `az eventhubs namespace application-group`: New command group to support management operations on EventHubs application groups
- `az eventhubs namespace network-rule update`: New command to update Network Rule Sets

IoT

- `az iot hub/dps certificate list`: Add table transform to certificate list commands

Key Vault

- `az keyvault role assignment`: Fix 'dict' object has no attribute 'object_id' error
- Fix #16390: `az keyvault set-policy`: Allow clearing permissions

Monitor

- `az monitor log-analytics query-pack`: Add query pack commands.
- `az monitor log-analytics update`: Support empty string for `--key-version`

NetAppFiles

- `az netappfiles account create`: Change `--location` to an optional parameter
- `az netappfiles pool create`: Change `--location` to an optional parameter
- `az netappfiles volume create`: Change `--location` to an optional parameter
- `az netappfiles snapshot create`: Change `--location` to an optional parameter
- `az netappfiles snapshot policy create`: Change `--location` to an optional parameter
- `az netappfiles snapshot policy update`: Change `--location` to an optional parameter
- `az netappfiles backup create`: Change `--location` to an optional parameter
- `az netappfiles backup-policy create`: Change `--location` to an optional parameter
- `az netappfiles volume-group create --help`: Fix typo in option `global-placement-rules`
- `az netappfiles volume create`: Add optional parameter `--zones`
- `az netappfiles volume replication list`: Add operation to list volume replications
- `az netappfiles volume reset-cifs-pw`: Add operation to reset CIFS password
- `az netappfiles volume relocate`: Add operation to relocate volume to a new stamp
- `az netappfiles volume finalize-relocation`: Add operation to finalize volume relocation
- `az netappfiles volume revert-relocation`: Add operation to revert volume relocation

Network

- [BREAKING CHANGE] `az network vnet subnet create`: Disable `PrivateEndpointNetworkPolicies` by default
- `az network application-gateway ssl-policy`: Support new SSL policy `CustomV2`
- `az network private-endpoint-connection`: Enable Private link support for provider `Microsoft.Authorization/resourceManagementPrivateLinks`
- Fix #22097: `az network dns zone import`: Fix importing zone files starting with space
- `az network public-ip prefix create`: Support cross-subscription association for Custom IP Prefix
- `az network public-ip create`: Reuse prefix info when creating Public IP

Packaging

- Use Python 3.9 in RHEL 8's RPM

RDBMS

- Fix #22926: `az mysql server create/update`: Update default value for mysql storage size

REST

- `az rest`: Support Unicode characters in JSON request body

Search

- `az search service create`: Add `--hosting-mode` argument to support S3HD SKU

Security

- `az security atm cosmosdb`: Add CLI support for ATP settings (Defender) on Cosmos DB

Service Connector

- `az webapp connection create`: Add `--private-endpoint` to support private endpoint connection
- `az spring connection create`: Remove client-type limitation

Service Fabric

- `az sf managed-cluster create`: Fix tag parsing for cluster command

SQL

- `az sql elastic-pool create`: Add support for HighAvailabilityReplica count for HS Elastic pools
- `az sql midb update`: Add update command

SQL VM

- `az sql vm update`: Add configuration options for SQL Assessment pre-requisites

Storage

- [BREAKING CHANGE] `az storage share close-handle`: Remove `--marker` which is not supported by sdk
- [BREAKING CHANGE] `az storage share snapshot`: Now only returns version, etag and last_modified info instead of all share properties
- `az storage account generate-sas`: Fix output sas random ordering for `srt` segment
- Fix #22563: `az storage blob upload`: Fix storage blob upload to a through pipe encode error
- Fix #20452: `az storage container policy create\update\list\show\delete`: Add new permissions, currently support `racwdxyltmei`
- Fix #22679: `az storage account file-service-properties update`: Fix `AttributeError: 'NoneType' object has no attribute 'smb'`
- Fix #22845: `az storage account genarete-sas`: Fix the flag `--auth-mode login` cause `AttributeError`

Synapse

- `az synapse sql pool create`: Add parameter `--collation`
- `az synapse link-connection`: New command group to support synapse link connections

May 24, 2022

Version 2.37.0

ACR

- Fix some `az acr manifest` commands do not correctly handle `-u/-p` credentials resulting in auth failure when not logged in to `az cli`
- Fix some `az acr` commands do not handle certain next-link tokens correctly resulting in exceptions when paging
- Fix some `az acr manifest` commands do not correctly parse some FQDNs resulting in exceptions

AKS

- [BREAKING CHANGE] `az openshift`: Remove the deprecated command group
- `az aks create`: Add new option `--node-resource-group` to specify the name of the resource group where user resources are stored

- `az aks get-credentials`: Raise exception when existing config file is invalid
- `az aks check-acr`: Add new option `--node-name` to specify the name of a specific node to perform acr pull test checks
- Fix #22032: `az aks nodepool add/update`: Fix autoscaler parameters for user node pools
- `az aks create/update`: Add Microsoft Defender security profile support
- GA Kubernetes version alias
- `az aks update`: Add support for updating kubelet identity with `--assign-kubelet-identity`

API Management

- Fix apim's `apply-network-updates` command

App Service

- Fix #18151: `az webapp config backup restore`: Fix the bug that 'WebAppsOperations' object has no attribute 'restore_slot'

ARM

- `az resourcemanagement private-link create`: Create Resource management private link
- `az resourcemanagement private-link delete`: Delete Resource management private link
- `az resourcemanagement private-link show`: Get Resource management private link
- `az resourcemanagement private-link list`: List Resource management private link
- `az private-link association create`: Create private link association
- `az private-link association delete`: Delete private link association
- `az private-link association show`: Get private link association
- `az private-link association list`: List private link association
- `az group delete`: Add new parameter `--force-deletion-types` to support force deletion
- `az bicep restore`: Add new command to restore external modules
- `az bicep build`: Add new parameter `--no-restore` to allow compilation without restoring external modules
- `az bicep decompile`: Add new parameter `--force` to allow overwriting existing Bicep files

- `az resource wait`: Fix `--created` keeps waiting even when `az resource show` returns "provisioningState": "Succeeded"

ARO

- `az aro create`: Add support for FIPS modules, host encryption, and disk encryption for master and worker nodes

Backup

- `az backup vault resource-guard-mapping`: Add support for updating, showing, and deleting ResourceGuardProxy
- Add multiple user authentication (MUA) support for critical operations: `az backup vault backup-properties set/az backup item set-policy/az backup policy set/az backup protection disable`
- Add `--tenant-id` parameter in critical commands: `az backup vault backup-properties set/az backup item set-policy/az backup policy set/az backup protection disable/az backup vault resource-guard-mapping` for cross-tenant scenario

Compute

- `az vm image list`: Add new server version aliases `Win2022AzureEditionCore` for offline list
- `az vm update`: Add additional license type SLES for `--license-type`
- `az vmss create`: Support enabling single placement group for Flexible VMSS
- `az disk create/update`: Add new parameter `--data-access-auth-mode` to support data access authentication mode
- `az sig show`: Add new parameter `--sharing-groups` to support query shared gallery group
- `az vm host group create`: Add new parameter `--ultra-ssd-enabled` to support Ultra SSD

Cosmos DB

- `az cosmosdb sql container update`: Fix bug to accept analyticalStorageTTL arg

Event Hubs

- `az eventhubs namespace schema-registry`: Add cmdlets for schema registry

Identity

- `az identity list-resources`: Add new command to support list the associated resources for identity

IoT

- `az iot dps policy` and `az iot dps linked-hub`: Fix DPS state updating
- `az iot central app private-link-resource list`: Add a new command to support listing private link resources
- `az iot central app private-endpoint-connection show`: Add a new command to support showing details of a private endpoint connection of the IoT Central app
- `az iot central app private-endpoint-connection approve`: Add a new command to support approving a private endpoint connection for the IoT Central app
- `az iot central app private-endpoint-connection reject`: Add a new command to support rejecting a private endpoint connection for the IoT Central app
- `az iot central app private-endpoint-connection delete`: Add a new command to support deleting a private endpoint connection for the IoT Central app

Key Vault

- Fix #22457: `az keyvault key decrypt/encrypt`: Fix returning bytes for `--output tsv`

Monitor

- [BREAKING CHANGE] `az monitor alert`: Deprecate whole command group, please use `az monitor metrics alert`
- [BREAKING CHANGE] `az monitor autoscale-settings`: Deprecate whole command group, please use `az monitor autoscale`
- [BREAKING CHANGE] `az monitor activity-log list`: Deprecate parameter `--filters`.
- [BREAKING CHANGE] `az monitor activity-log list`: Deprecate parameter flag `--resource-provider`, please use `--namespace`

NetAppFiles

- `az netappfiles volumes export-policy add`: Fix `rule-index` validation and parameter made non required
- `az netappfiles ad add`: Add new optional parameter `site`
- `az netappfiles ad update`: Add new optional parameter `site`

Network

- `az network watcher connection monitor create`: Change for using user-provided workspace-ids even if output-type is missing
- `az network dns zone export`: Support traffic manager resources
- Private link add `Microsoft.Kusto/clusters` provider
- `az network lb create`: Add warnings for default SKU
- `az network lb address-pool`: Support connection draining on load balancer
- `az network application-gateway`: Add `settings`, `listener` and `routing-rule` command groups
- `az network application-gateway create`: Add parameter `--priority`
- `az network application-gateway probe`: Add parameter `--host-name-from-settings`
- [BREAKING CHANGE] `az network vnet peering`: Deprecate parameter flag `--remote-vnet-id`

Packaging

- Bump embedded Python to 3.10 for deb packages
- Use Mariner 2.0 GA image to build RPM

RDBMS

- `az mariadb server create/update`: Support `--minimal-tls-version`
- Change MySQL MemoryOptimized tier name to BusinessCritical

Reservations

- Update Reservation command with latest SDK

Role

- [BREAKING CHANGE] `az az/role`: Migrate the underlying API of `az ad` and `az role` from AD Graph API to Microsoft Graph API. For more details, see [Microsoft Graph migration](#)

Security

- `az security alerts-suppression-rule`: Add alerts suppression rules to security module

Service Bus

- `az servicebus queue update`: Fix message time to live
- `az servicebus queue`: Add `ReceiveDisabled` to `--status`
- `az servicebus namespace create/update`: Add `--disable-local-auth` to enable or disable SAS authentication
- `az servicebus namespace private-endpoint-connection/private-link-resource`: New command groups

Service Connector

- [BREAKING CHANGE] `az containerapp connection create`: Default `client_type` changed to `none`
- `az containerapp connection`: Add new command group to support container app connection
- `az containerapp connection create`: Add `--container` parameter in interactive mode
- `az spring connection`: Add support for `az spring-cloud` renaming Add new parameter key value pair to support password from KeyVault

Service Fabric

- `az sf cluster node-type add`: Fix the unexpected error that 'StorageAccountsOperations' object has no attribute 'create'

SQL

- Fix #22316: `az sql server ad-admin create`: Fix Display Name and Object ID to be required

SQL VM

- `az sql vm update`: Add configuration options for SQL Best Practices Assessment

Storage

- [BREAKING CHANGE] `az storage share show`: Remove contentLength, hasImmutabilityPolicy and hasLegalHold from the output result
- [BREAKING CHANGE] `az storage blob snapshot`: Now only returns version info instead of all blob properties
- Fix #21819: `az storage fs directory`: Add new command `generate-sas`
- `az storage account show-connection-string`: Append endpoints by default
- Fix #22236: `az storage entity insert`: Fix `--if-exists fail` not working
- `az storage copy`: Fix `--exclude-path` TypeError
- `az storage blob download`: Allow downloading to stdout for pipe support
- Fix #22209: `az storage entity insert`: Fix `Edm.Boolean` not working
- `az storage directory/file list`: Add `--exclude-extended-info` to exclude some properties info from response, default to `False`
- Fix #21781: `az storage blob upload/download`: Progress fix
- `az stroage entity query`: Fix UUID type is not JSON serializable
- `az storage blob delete-batch`: No longer exits after individual delete failure

April 26, 2022

Version 2.36.0

ACR

- `acr task run`: Add `--no-format` option
- `acr task logs`: Add `--no-format` option
- `acr taskrun logs`: Add `--no-format` option

AKS

- `az aks create`: Add `--nat-gateway-managed-outbound-ip-count` and `--nat-gateway-idle-timeout` to support nat gateway integration
- `az aks create`: Add `managedNATGateway` and `userAssignedNATGateway` to supported outbound type
- `az aks check-acr`: Bump canipull to 0.0.4-alpha to skip location check if cname returns only privatelink

AMS

- `az ams asset-track create`: Add command to create an asset track
- `az ams asset-track show`: Add command to show an asset track
- `az ams asset-track list`: Add command to list all tracks under an asset
- `az ams asset-track update`: Add command to update the parameters of a track
- `az ams asset-track update-data`: Add update-data command to refresh the server in case track file was updated
- `az ams asset-track delete`: Add command to delete track
- `az ams streaming-endpoint get-skus`: Add command to get skus under a streaming endpoint

App Config

- Fix feature flag import for missing description when using 'appconfig/kvset' profile

App Service

- `az staticwebapp create`: Allow creating Static Web Apps not connected to a github repo
- Fix #21943: `az webapp config backup create`: Fix AttributeError 'str' object has no attribute 'get'

Backup

- `az backup policy create/set`: Add support for creating/updating IaaSVM MBPD policy

Bot Service

- `az bot directline/email/facebook/kik/msteams/skype/slack/sms/telegram create`: Add `--location` argument as specified by user to channel creation for regionality/EUDB

CDN

- `az afd rule create`: Fix rule creation failure with action type RouteConfigurationOverride
- `az afd route create`: Fix route creation issue with disabled `--link-to-default-domain` option
- Fix #22066: `az cdn name-exists` missing type argument

Compute

- `az vm create`: Fix the bug of "NoneType object has no attribute lower" when creating Flex VMSS without `--vm-sku` parameter
- `az restore-point create`: Add a new parameter `--source-restore-point` to support cross region copy
- `az restore-point show`: Add a new parameter `--instance-view` to show the instance view of a restore point and replace the deprecated `--expand`
- `az restore-point collection show`: Add a new parameter `--restore-points` to show all contained restore points in the restore point collection and replace the deprecated `--expand`
- `az sig image-version create`: Add new parameter `--target-region-cvm-encryption` to support Confidential VM encrypting the OS disk
- `az vm/vmss create`: Install guest attestation extension and enable system managed identity by default when Trusted Launch configuration is met
- `az vm/vmss create`: Add new parameter `--disable-integrity-monitoring` to disable the default behavior (installing guest attestation extension and turning on MSI) when creating VM/VMSS compliant with Trusted Launch

IoT

- [BREAKING CHANGE] `iot dps access-policy`: Deprecate `access-policy` in favor of `policy`

Key Vault

- `az keyvault key`: GA SKR and keyvault key rotation
- Fix #20520: `az keyvault network-rule`: Support removing multiple IP

NetAppFiles

- `az netappfiles volume-group`: Add command group to manage volume group resources

Network

- Fix #21845: `az network routeserver create` required `--public-ip-address` argument

- Fix #21829: `az network traffic-manager endpoint update` required `--type` argument
- Private link add `Microsoft.Network/privateLinkServices` provider
- Fix #22085: `az network nsg rule create` has no attribute "is_default"

Packaging

- Release DEB package for Ubuntu 22.04 Jammy Jellyfish
- Release RPM package for RHEL 8, CentOS Stream 8
- Release RPM package for Mariner 1.0, 2.0 preview

RDBMS

- `az postgres server create`: Fix error message for invalid server names

Security

- Add `az security automation` CLI commands

Service Bus

- `az servicebus namespace create`: Add zone redundant parameter
- `az servicebus namespace authorization-rule keys renew`: Add `--key-value` parameter

Service Connector

- `az webapp connection`: Add command `create sql/webpubsub` to support more target resources

SQL

- `az sql mi create`, `az sql mi update`: Add `--service-principal-type` parameter to support Win Auth (Kerberos)

Storage

- Fix #21914: `az storage blob upload`: Make block size larger (100MB) for large files (>200GB)

- `az storage account/container/blob generate-sas`: Add `--encryption-scope`
- Fix #21920: `az storage copy` & `az storage remove`: Hide credentials in warning message
- Add `--blob-endpoint`/`--file-endpoint`/`--table-endpoint`/`--queue-endpoint` for data service commands to support customized service endpoint
- GA storage file datalake soft delete
- `az storage cors add`: Allow `PATCH` for `--methods`
- `az storage entity`: Support specifying `EdmType` for `--entity`
- Fix #21966: `az storage blob download-batch`: Fix failure when `--pattern` is blob name
- Fix #21414: `az storage blob sync`: Fix the flag `--delete-destination` default to false
- `az storage account blob-inventory-policy create`: Add missing fields, add `excludePrefix` in filter

April 05, 2022

Version 2.35.0

ACR

- [BREAKING CHANGE] `az acr create`: Reject request with a name using uppercase letters
- [BREAKING CHANGE] `az acr connected-registry create`: Reject request with a name using uppercase letters
- `az acr update`: Disable public network now displays a warning message
- Deprecate `az acr manifest metadata` command group
- `az acr manifest`: Add `show-metadata`, `list-metadata` and `update-metadata` commands

AKS

- `az aks create/update`: Add new parameters `--enable-gmsa`, `--gmsa-dns-server`, `--gmsa-root-domain-name` to support Windows gMSA v2
- `aks enable-addons`: Add new parameter `--enable-msi-auth-for-monitoring` to support enabling managed identity auth
- `az aks snapshot create`: Move to `az aks nodepool snapshot create`
- `az aks snapshot delete`: Move to `az aks nodepool snapshot delete`

- `az aks snapshot list`: Move to `az aks nodepool snapshot list`
- `az aks snapshot show`: Move to `az aks nodepool snapshot show`
- `az aks create`: Add `--pod-subnet-id` to support dynamically assigne pod ip
- `az aks nodepool add`: Add `--pod-subnet-id` to support dynamically assigne pod ip
- `az aks create`: Add `--kubelet-config` and `--linux-os-config` to support custom node configuration
- `az aks nodepool add`: Add `--kubelet-config` and `--linux-os-config` to support custom node configuration

AMS

- `az ams account identity assign`: Add ability to assign managed identity to media services account
- `az ams account identity remove`: Add ability to assign managed identity to media services account
- `az ams transform create`: Add new parameter `blur-type` for FaceDetector presets
- `az ams account encryption set`: Add new parameters `system-assigned` and `user-assigned` to allow users to set managed identities to their account encryption
- `az ams account storage set-authentication`: Add new parameters `system-assigned` and `user-assigned` to allow users to set managed identities for their storage account attached to Media Services

APIM

- `apim api schema create`: Add new command to support creating a schema for graphql API
- `apim api schema delete`: Add new command to support deleting the schema of an API
- `apim api schema list`: Add new command to support showing the list of schema's of an API
- `apim api schema show`: Add new command to support getting the schema of an API
- `apim api schema entity`: Add new command to support getting the schema entity tag
- Onboard to private endpoint for API Management

App Config

- `az appconfig kv export`: Stop throwing error if no key-values are exported to App Service
- `az appconfig create`: Add new options `retention-days` and `enable-purge-protection`
- `az appconfig list-deleted`: Add new command to list all deleted but not yet purged App Configurations
- `az appconfig show-deleted`: Add new command to show properties of a deleted but not yet purged App Configuration
- `az appconfig recover`: Add new command to recover a deleted but not yet purged App Configuration
- `az appconfig purge`: Add new command to purge a deleted store

App Service

- Fix #21439: `az webapp deploy`: Fix `--async` argument value in help message
- Fix #21574: `az webapp vnet-integration add`: Fix the AttributeError that 'NoneType' object has no attribute 'server_farm_id'
- `az staticwebapp create` : Change default output location and API location to `None`. Change default app location to "/". Remove unnecessary properties from output
- `az staticwebapp show` : Remove unnecessary properties from output
- `az staticwebapp list` : Remove unnecessary properties from output
- `az staticwebapp update` : Remove unnecessary properties from output
- `az webapp deployment slot create`: Allow overriding container settings
- Fix #21080: `az webapp up`: Fix object has no attribute 'response'
- Fix #19747: `az webapp up`: Fix TypeError: 'NoneType' object is not iterable
- `az webapp up`: Validate that ASE exists, is an ASE v3, and not an ILB ASE; Validate that preexisting plan is on the ASE; Default to I1V2 SKU if using an ASE
- Fix #20240: `az functionapp deployment source config-zip`: Fix the bug that the parameter `--slot` doesn't work
- Fix #12090: `az webapp create`: Allow plan in different resource group from web app
- `az staticwebapp identity assign`, `az staticwebapp hostname set`, `az staticwebapp create`: Fix #21186: Show detailed error message instead of "bad request"
- `az staticwebapp update`: Fix #21465: Allow specifying static web app resource group
- Fix #21728: `az webapp deployment github-actions add`: Allow passing in runtime with colon delimiter

- `az webapp config`: Fix for Web App Persistent Storage gets disabled after each deployment
- `az appservice ase create-inbound-services`: Add support for Azure private DNS zone creation in ASEv3

ARM

- Fix #20842: `az bicep`: Fix to use requests environment variables for CA bundle
- `az policy assignment create`: Support `--subscription` parameter

Backup

- List commands multi-page response bug fix
- `az backup restore restore-disks`: Add support for Original Location Restore and Alternate Location Restore
- `az backup policy create/set/list`: Add support for creating and selectively listing Enhanced policies
- `az backup protection enable-for-vm`: Add support for Trusted VM configure protection with Enhanced policies
- `az backup vault backup-properties`: Add new parameter `--hybrid-backup-security-features` to support setting the security features for hybrid backups

CDN

- Upgrade `azure-mgmt-cdn` to 12.0.0 for Azure Front Door Standard/Premium GA

Cognitive Services

- Upgrade to use API 2022-03-01
- Add new command `az cognitiveservices account list-models`

Compute

- [BREAKING CHANGE] `az vm/vmss create`: Remove the default value `Contributor` of parameter `--role`
- `az vm host`: Add new command `restart` to support dedicated host reboot
- `az vm extension show`: Add new parameters `--instance-view` to support track the vm extension progress
- Change help info of `--enable-bursting` to flag it is for on-demand only

- Fix #20174: `az vm create`: Determine plan information when using image alias
- `az disk/snapshot/sig definitiion create/update`: Add new parameters `--architecture` to support ARM64
- `az vm disk attach`: Add new parameter `--disks` to support attaching multiple disks in one API call
- `az vm/vmss create`: Support creating VM/VMSS from community gallery image
- `az vm/vmss create`: Add community gallery legal agreement acceptance
- `az vm/vmss create`: Add the verification of whether `--os-type` is correct when creating VM from community gallery image or shared gallery image

Cosmos DB

- `az cosmosdb update`: Support updating key vault key uri
- `az managed-cassandra cluster update`: Allow `--external-seed-nodes`, `--external-gossip-certificate` and `--client-certificate` to take empty list
- `az managed-cassandra cluster`: Fix `--repair-enabled` as of type three_state_flag

Event Grid

- Fix #21521: System topic subscription update attribute error
- Support user identity and mixed mode

Event Hubs

- `az eventhub namespace update`: Fix disable eventhub capture and autoinflate

Key Vault

- Fix #18319 & #21555: `az keyvault list-deleted`: List all deleted resources if no specified resource type
- `az keyvault key create`: Support `--default-cvm-policy`
- Fix #21330: `az keyvault network-rule remove`: Fix ip address remove issue

NetAppFiles

- `az netappfiles snapshot restore-files`: New command to restore specified files from the specified snapshot to the active filesystem
- `az netappfiles volume create`: Add optional parameters `--enable-subvolumes`

- `az netappfiles volume delete`: Add optional parameter `--force-delete` or `--force`
- `az netappfiles volume update`: Add optional parameter `--unix-permissions`
- `az netappfiles subvolume`: New command group to manage subvolume resources
- `az netappfiles subvolume create`: New command to create subvolume
- `az netappfiles subvolume show`: New command to get specified subvolume
- `az netappfiles subvolume update`: New command to update specified subvolume
- `az netappfiles subvolume list`: New command to get all subvolume in a specified volume
- `az netappfiles subvolume delete`: New command to delete specified subvolume
- `az netappfiles subvolume metadata`: New command group to manage subvolume metadata resources
- `az netappfiles subvolume metadata show`: New command to get details about a specified subvolume
- `az netappfiles account ad add`: New optional parameters to support ldap search scope `--user-dn`, `--group-dn` and `--group-filter`
- `az netappfiles account ad update`: New optional parameters to support ldap search scope `--user-dn`, `--group-dn` and `--group-filter`

Network

- `az network nat gateway`: Validate attaching public IPs
- `az network lb`: Support inbound NAT rule port mapping query
- Fix #21716: `az network private-dns zone import`: Allow hyphenated SRV records
- `az network application-gateway waf-policy managed-rule exclusion rule-set`: Support pre-rule exclusion creation without exclusion

Packaging

- Use Red Hat Universal Base Image 8 to build `e18` RPM package
- Bump Python image to `3.10.3-alpine3.15`
- Bump MSI embedded Python to 3.10.3

RDBMS

- Fix operations.py file installing dependencies in CloudShell

Role

- [BREAKING CHANGE] `az ad sp create-for-rbac`: Stop defaulting `--scopes` to subscription
- [BREAKING CHANGE] `az ad sp create-for-rbac`: When creating a self-signed certificate in keyvault, `validity_months` is changed from `years * 12 + 1` to `years * 12`

Service Bus

- `az servicebus topic subscription rule create`: Add filter type parameter

Service Connector

- `az webapp/spring-cloud connection create/update`: Provide `--service-endpoint` parameter to support vnet scenario
- `az webapp/spring-cloud connection`: Add command `create redis/redis-enterprise` to support more target resources

SQL

- [BREAKING CHANGE] `az sql db tde list-activity`: Command no longer exists
- [BREAKING CHANGE] `az sql mi show/create/update/list`: Instead of `backupStorageRedundancy`, `currentBackupsStorageRedundancy` and `requestedBackupStorageRedundancy` properties are returned
- `az command sql db str-policy set`: Make `diffbackup_hours` parameter optional

Storage

- [BREAKING CHANGE] Fix #21494: `az storage blob upload/upload-batch`: Fix `--content-md5` for upload, ignore `--content-md5` for upload-batch
- [BREAKING CHANGE] `az storage table/entity`: `--timeout` is removed for all sub commands
- [BREAKING CHANGE] `az storage entity query/show`: `--accept` is removed
- `az storage table/entity`: Add `--auth-mode login` to support RBAC
- `az storage blob upload/upload-batch`: Make precondition work
- `az storage blob upload-batch`: No longer exits on the first failure
- Fix #21591: `az storage blob upload`: Fix storage blob upload not auto guessing file type
- Fix `az storage entity merge`: Stop automatically casting `DisplayVersion` to float

- `az storage blob download`: Support downloading managed disk with both SASUri and OAuth by specifying `--blob-url` with `--auth-mode login`
- Fix #21699: `az storage blob upload-batch`: Fix upload-batch result url truncation issue
- `az storage account\container\blob generate-sas`: Allow new permissions

Synapse

- `az synapse role assignment list`: Fix showing only 100 results
- `az synapse notebook import`: Fix `--folder-path` parameter problem

March 03, 2022

Version 2.34.1

App Service

- Hotfix: Fix #20489: `az webapp log tail`: Fix the AttributeError that 'NoneType' object has no attribute 'host_name_ssl_states'
- Hotfix: Fix #20747: `az webapp create-remote-connection`: Fix the EOFError that ran out of input
- Hotfix: Fix #20544: `az webapp config snapshot restore`: Fix the AttributeError that 'WebAppsOperations' object has no attribute 'restore_snapshot'
- Hotfix: Fix #20011: `az webapp config ssl bind`: Fix the AttributeError that 'str' object has no attribute 'value'
- Hotfix: Fix #19492: `az webapp config backup restore`: Fix the AttributeError that 'WebAppsOperations' object has no attribute 'restore'

Storage

- [BREAKING CHANGE] `az storage blob upload/upload-batch`: Fix `--overwrite` that it no longer overwrite by default

March 01, 2022

Version 2.34.0

ACR

- `az acr manifest`: Add new command group to support managing artifact manifests in Azure Container Registries
- Deprecate `az acr repository show-manifests` command and replace with `acr manifest metadata list` command

AKS

- `az aks nodepool update`: Add `--node-taints` to allow modify node taints
- `az aks get-credentials`: Add new parameter `--format` to support specifying the format of returned credential
- `az aks nodepool`: Allow specifying `--scale-down-mode` in nodepool create and update

APIM

- `az apim api import`: Update api-id description #18306
- Fix #21187: `az apim api create/update/import`: Fix header and query param names being swapped

App Config

- `az appconfig kv import`: Add new parameter `--strict` to support strict import

App Service

- [BREAKING CHANGE] `az webapp up`: Change supported runtimes
- [BREAKING CHANGE] `az webapp create`: Change supported runtimes
- [BREAKING CHANGE] `az webapp list-runtimes`: Add `--os`/`--os-type` argument, change runtimes, change default behavior to return both linux and windows stacks, and deprecate `--linux` argument
- [BREAKING CHANGE] `az functionapp create`: Take runtime names and versions from API instead of hardcoded list
- `az functionapp plan`: Update the max value of `--max-burst` to 100
- `az functionapp list-runtimes`: Add new command to show function app runtimes, versions, and compatible functions versions
- `az webapp create`: Provide support `--https-only` flag
- `az webapp deployment github-actions remove`: Fix the bug that path cannot start with a slash

ARM

- `az account management-group entities`: Add a new command group to support entities (Management Groups and Subscriptions) operations for the authenticated user
- `az account management-group hierarchy-settings`: Add a new command group to support operations on hierarchy settings defined at the management group level
- `az account management-group tenant-backfill`: Add a new command group to support backfilling subscriptions for the tenant
- `az account management-group subscription show`: Get the details of a given subscription under a given management group
- `az account management-group subscription show-sub-under-mg`: Show what subscription is under a given management group
- `az account management-group check-name-availability`: Check if a management group name is valid and available
- `az deployment`: Fix the bug of 'bytes object has no attribute get' for error handling in retry cases

Backup

- Add private endpoints support for Microsoft.RecoveryServices/vaults

Compute

- `az vm create`: Fix the issue that VMCustomization is not enabled
- `az vm disk attach`: Modify help description to guide how to use the `--ids` parameter correctly
- `az restore-point`: Add new command group to support managing restore point
- `az vmss create/update`: Add new parameters `--security-type`, `--enable-secure-boot` and `--enable-vtpm` to support Trusted Launch
- `az vmss create/update`: Add new parameters `--automatic-repairs-action` to support repair action
- `az vmss create/update`: Add new parameters `--v-cpus-available` and `--v-cpus-per-core` to support VMSize customization

Cosmos DB

- `az managed-cassandra cluster update`: Fix to allow `--external-seed-nodes` and `--external-gossip-certificates` to be updated by the user

Eventhub

- `az eventhubs namespace create`: Add `--user-assigned`, `--system-assigned`, `--encryption-config`
- `az eventhubs namespace identity`: Cmdlets for event hubs identity
- `az eventhubs namespace encryption`: Cmdlets for event hubs encryption
- `az servicebus namespace create`: Add `--user-assigned`, `--system-assigned`, `--encryption-config`
- `az servicebus namespace identity`: Cmdlets for event hubs identity
- `az servicebus namespace encryption`: Cmdlets for event hubs encryption

IoT

- `az iot hub create`: Add the `--enforce-data-residency` parameter to support creating resources with data residency enforced (and cross-region disaster recovery disabled)
- `az iot dps create`: Add the `--enforce-data-residency` parameter to support creating resources with data residency enforced (and cross-region disaster recovery disabled)

Key Vault

- Fix #21341: `az keyvault update`: Support updating tags
- `az keyvault key create/import/set-attributes`: Support `--immutable` to mark release policy immutable
- `az keyvault key import`: Support `--kty oct` to import AES key

Monitor

- `az monitor log-analytics workspace table`: Add new command `create`, `delete` and `search-job create` to support Microsoft/Custom log/Search Results table operations
- `az monitor log-analytics workspace update`: Add a new parameter `--data-collection-rule` to support update defaultDataCollectionRuleResourceId
- `az monitor log-analytics workspace table`: Add new command `restore create` and `migrate` to support Restored logs table/migrate operations

Network

- `az bastion ssh`: Provide support for Bastion SSH access on Darwin and Linux
- `az network private-endpoint`: Associate IP configurations and ASGs when creating PE

Packaging

- [BREAKING CHANGE] Drop Ubuntu 14.04 Trusty Tahr and Debian 8 Jessie support
- [BREAKING CHANGE] Drop Ubuntu 21.04 Hirsute Hippo support
- Add Ubuntu 21.10 Impish Indri support
- Bump embedded Python to 3.8 for deb packages

Profile

- [BREAKING CHANGE] `az account show`: Drop `--sdk-auth`

RDBMS

- Fix bug for private dns zone provisioning to vnet resource group in different subscription
- Enable `rdbms-connect` extension in Cloud Shell

Role

- Add warning to `role` and `ad` commands about Microsoft Graph migration

SQL

- `az sql server create/update`: Add federated client id support

Storage

- `az storage account create/update`: Support `--sam-account-name` and `--account-type`
- `az storage blob upload`: Add `--tier`, migrate to track2
- `az storage blob upload-batch`: Migrate to track2

February 14, 2022

Version 2.33.1

Compute

- Hotfix: Fix #21224: Fix the issue that VMCustomization is not enabled

Packaging

- [BREAKING CHANGE] Drop jmespath-terminal from docker image

February 01, 2022

Version 2.33.0

ACR

- `az acr connected-registry create`: Add `--notifications` to support adding patterns for generating notification events on connected registry artifacts
- `az acr connected-registry update`: Add `--add-notifications` and `--remove-notifications` to support adding or removing patterns for generating notification events on connected registry artifacts

AKS

- `az aks nodepool add/update/upgrade`: Add new parameter `--aks-custom-headers` to support custom headers
- `az aks create`: Add new parameter `--snapshot-id` to support creating a nodepool from snapshot when creating a cluster
- `az aks nodepool add/upgrade`: Add new parameter `--snapshot-id` to support creating a nodepool from snapshot
- `az aks snapshot create/delete/list/show`: Add new commands to support the management of snapshot related operations
- `az aks update/az aks nodepool update`: Allow empty string as label value

App Config

- [BREAKING CHANGE] Support app service slots

App Service

- `az webapp vnet-integration add`: Fix a bug that prevented adding a vnet in a different subscription from the webapp
- `az functionapp vnet-integration add`: Fix a bug that prevented adding a vnet in a different subscription from the functionapp
- `az webapp create`: Support joining a vnet in a different subscription
- `az functionapp create`: Support joining a vnet in a different subscription
- `az functionapp create`: Remove preview from PowerShell runtime for linux
- `az appservice plan update`: Add `--elastic-scale` and `--max-elastic-worker-count` parameters to support elastic scale
- `az webapp update`: Add `--minimum-elastic-instance-count` and `--prewarmed-instance-count` parameters to support setting instance count
- `az webapp up`: Add help text and debug text for configuration saving and loading
- `az webapp list-runtimes`: Support node 16-lts runtime for linux and windows

Batch

- `az batch create/activate`: Add clarify application package path help info for argument `--package-file`

Bot Service

- `az bot create`: Add location as specified by user to bot creation for regionality/EUDB

Compute

- `az image builder create`: Add new parameter `--proxy-vm-size` to support proxy VM size customization
- `az image builder create`: Add new parameter `--build-vm-identities` to support user assigned identities customization
- `az vmss update`: Add new parameter `--force-deletion` to support force delete VMSS
- `az vm/vmss create`: Add warning log and modify help to inform that the default value `Contributor` of `--role` will be removed
- `az disk-encryption-set create`: Make the parameter `--source-vault` un-required
- `az vm create/update`: Add new parameters `--v-cpus-available` and `--v-cpus-per-core` to support VMSize customization

Cosmos DB

- `az managed-cassandra cluster status`: Add table format support

Key Vault

- `az keyvault create`: Add default permissions on keyvault creation

Monitor

- `az monitor action-group`: Support event hub receiver

NetAppFiles

- `az netappfiles account ad add`: Add new optional parameter named encrypt-dc-connections
- `az netappfiles volume export-policy add`: Add missing optional parameters kerberos5_read_only, kerberos5_read_write, kerberos5i_read_only, kerberos5i_read_write, kerberos5_p_read_only, kerberos5_p_read_write, has_root_access, chown_mode
- `az netappfiles account ad update`: Add command

Network

- Add Microsoft.DataFactory/factories to supported Private Endpoints
- Add Microsoft.Databricks/workspaces to supported private endpoints
- `az network private-endpoint`: Add parameter and subgroup to support IP Configuration, ASG and NicName
- `az network traffic-manager endpoint create/update`: Add new arguments `--min-child-ipv4` and `--min-child-ipv6`.
- Add Microsoft.HybridCompute/privateLinkScopes to supported Private Endpoints

Packaging

- Update Dockerfile base image from Alpine 3.14 to 3.15

RDBMS

- `az postgres flexible-server create`: Change default postgres version

Redis

- `az redis create`: Add default value for identity and public network access as `None`

ServiceConnector

- Support new target resources: servicebus, eventhub, appconfig

Storage

- Stop supporting `--auth-mode login` for `az storage blob sync` and `az storage fs directory upload/download`

January 04, 2022

Version 2.32.0

AKS

- `az aks create`: Add new parameter `--enable-fips-image` to support enabling fips image
- `az aks nodepool add`: Add new parameter `--enable-fips-image` to support enabling fips image

App Service

- [BREAKING CHANGE] `az webapp up`: Remove support for the python|3.6 (linux and windows), ruby|2.5 (linux), and php|7.3 (windows) runtimes. Add support for the python|3.9 runtime (linux), php|8.0 (linux), and ruby|2.7 (linux)
- [BREAKING CHANGE] `az webapp create`: Remove support for the python|3.6 (linux and windows), ruby|2.5 (linux), and php|7.3 (windows) runtimes. Add support for the python|3.9 runtime (linux), php|8.0 (linux), and ruby|2.7 (linux)
- [BREAKING CHANGE] `az functionapp create`: Remove python 3.6 support
- Fix #19550: `az staticwebapp users update`: Allow updating static web app user roles again
- `az logicapp create`: Autogenerate a WS1 App Service Plan when no value for `--plan` or `--consumption-plan-location` is provided
- `az appservice plan create`: Allow creating App Service Plans for Logic Apps (SKUs WS1, WS2, and WS3)

- Fix #20757: `az webapp up`: Fix list index out of range when no `--plan` argument passed
- Fix #18652: `az webapp up`: Search for *.csproj in child directories
- `az webapp list-runtimes`: Remove support for the python|3.6 (linux and windows), ruby|2.5 (linux), and php|7.3 (windows) runtimes. Add support for the python|3.9 runtime (linux), php|8.0 (linux), and ruby|2.7 (linux)

Backup

- `az backup restore restore-azurewl`: Add client side validations
- `az backup container unregister`: Support MAB type for parameter `--backup-management-type`
- `az backup protectable-item list/show`: Add auto-protection policy and node-list field in the response for SQLInstance SLAG
- `az backup protection auto-enable-for-azurewl/auto-disable-for-azurewl`: Add support for SLAG

Compute

- `az vm/vmss create/update`: Expand validate license types for `--license-type` parameter
- `az sig image-definition list-shared`: Add new parameters `--marker` and `--show-next-marker` to support paging
- `az sig image-version list-shared`: Add new parameters `--marker` and `--show-next-marker` to support paging

IoT

- `az iot hub update`: Add error handling for file-upload parameters and fixes empty \$default storage endpoint errors
- `az iot central app create`: Add new parameter `--mi-system-assigned` to support creating an app with system-assigned managed identity
- `az iot central app identity show/assign/remove`: Add new commands to manage the system-assigned managed identity to an existing IoT Central app
- `az iot dps access-policy`: Be replaced with `az iot dps policy`
- `az iot dps linked-hub create`: Add convenience arguments for linking hubs

Network

- Fix #19482: Azure Bastion AAD fix for new CLI core changes
- `az network lb inbound-nat-pool create`: Add new parameter `--backend-pool-name`

Profile

- `az account show/set`: Add `-n`, `--name` argument

Redis

- `az redis identity`: Add support for assigning and modifying Identity

REST

- [BREAKING CHANGE] `az rest`: Remove `resourceGroup`, `x509ThumbprintHex` transforms

Role

- [BREAKING CHANGE] `az ad sp create-for-rbac`: Drop `name` property from the output. Use `appId` instead
- [BREAKING CHANGE] `az ad sp create-for-rbac`: No role assignment will be created by default

Storage

- `az storage copy`: Add positional argument `extra_options` to pass through options to `azcopy`

Synapse

- [BREAKING CHANGE] `az synapse managed private endpoints create`: Remove `--resource-id` and `--group-id`, use `--file` instead
- `az synapse sql pool create/restore`: Add parameters `--storage-type` to support specifying storage account type
- `az synapse kql-script`: New command group to support Kusto script

December 07, 2021

Version 2.31.0

AKS

- `az aks update`: Support edit nodepool label after creation
- `az aks nodepool update`: Support edit nodepool label after creation
- `az aks create`: Fix issue that `--attach-acr` parameter can't work

AMS

- Remove deprecated variable 'identifier_uri' from creating sp method
- Update api version for AMS and AVA private link registration

App Service

- `az functionapp create`: Add support for creating a webapp joined to a vnet
- `az webapp up`: Fix failure to detect dotnet 6.0 web apps
- `az appservice ase update`: Support for allowing new private endpoint connections on ASEv3
- `az appservice ase list-addresses`: Support ASEv3
- `az staticwebapp identity assign`: Assign managed service identity to the static web app
- `az staticwebapp identity remove`: Disable static web app's managed service identity
- `az staticwebapp identity show`: Display static web app's managed service identity
- Fix #17507: `az staticwebapp functions`: Add support for linking existing function app to static webapp (bring your own functions)
- `az staticwebapp create`: Update help text with guidance for repos in Github organizations
- `az functionapp deployment source config-zip`: Fix #12289: Allow build on zip deploy for windows function apps
- `az staticwebapp create`: Add better error message when attempting to create a static webapp that already exists
- `az appservice`: Fix AttributeError during user error handling
- `az appservice plan create`: Add `--zone-redundant` parameter to support enabling zone redundancy for high availability
- `az webapp ssh`: Add proxy support
- `az webapp create-remote-connection`: Add proxy support
- `az webapp log download/tail`: Add proxy support
- `az webapp create`: Fix container registry server url parsing for `--deployment-container-image-name/-i` argument

- `az functionapp deployment source config-zip`: Fix returning success when the deployment did not succeed
- `az staticwebapp appsettings set`: Make set functional
- `az staticwebapp appsettings`: Switch to the new SWA app settings SDK methods
- `az functionapp plan create`: Add `--zone-redundant` parameter to give the option to create a zone redundant app service plan
- Support managed identity in App Service container

ARM

- `az resource\group list`: Support querying data only by passing the tag name to `-tag` parameter
- `az account management-group`: Add new parameters `--no-register` to skip RP registration for `Microsoft.Management`
- `az deployment`: Prettify error output for ARM deployment
- `az bicep install`: Add a new parameter `--target-platform/-t` to specify the running platform of Bicep CLI
- `az bicep upgrade`: Add a new parameter `--target-platform/-t` to specify the running platform of Bicep CLI
- `az deployment sub/tenant/mg create`: Fix the `KeyError: 'resourceGroup'` in outputting results in table format when deploying non-resource group level resources
- `az policy assignment create` and `az policy assignment identity assign` support adding user assigned identity
- `az bicep install`: Work now behind a corporate proxy

Backup

- GA `az backup` and some bug fixes
- `az backup protectable-item list/show`: Fix AttributeError for `server_name`
- `az backup restore restore-disks`: Add support for Cross Zonal Restore

Cognitive Services

- `az cognitiveservices account deployment`: Add new commands `show`, `list`, `create`, `delete`
- `az cognitiveservices account commitment-plan`: Add new commands `show`, `list`, `create`, `delete`
- `az cognitiveservices commitment-tier`: Add new command `list`

Compute

- Fix #20182: `az snapshot create`: Fix auto-detection bug for `--copy-start`
- Fix #20133: `az vm create`: Fix `--data-disk-delete-option` not working when no `--attach-data-disks` are provided
- Fix boot diagnostics decoding
- `az vm create/update`: Add new parameter `--enable-hibernation` to support enabling hibernation capability
- `az vm/vmss run-command show`: Add new parameter `--instance-view` to support tracking the progress of RunCommand
- Update the help description for unmanaged disks
- `az disk create/update`: Add `--public-network-access` argument to control the policy for export on the disk
- `az disk create/update`: Add `--accelerated-network` argument to support the accelerated networking
- `az snapshot create/update`: Add `--public-network-access` argument to control the policy for export on the disk
- `az snapshot create/update`: Add `--accelerated-network` argument support the accelerated networking
- `az snapshot create`: Fix #20258: Fix creating a snapshot of a Uniform VMSS OS disk

EventGrid

- GA `az eventgrid system-topic`

Key Vault

- `az keyvault key encrypt/decrypt`: Support AES algorithm for MHSM
- `az keyvault key rotation-policy update`: Support both camel case and snake case json for `--value`

NetAppFiles

- `az netappfiles volume create`: Fix volume export policy

Network

- `az network express-route peering connection ipv6-config`: Add new commands `set`, `remove`
- `az network application-gateway waf-policy managed-rule exclusion`: Add new subgroup `rule-set` to support per rule exclusions
- `az network bastion create`: Fix invalid validator when `--scale-units` is None
- `az network vnet create`: Add `--enable-encryption` argument to support enable encryption on virtual network
- `az network vnet update`: Add `--enable-encryption` argument to support enable encryption on virtual network
- `az network vnet create`: Add `--encryption-enforcement-policy` argument to choose If Virtual Machine without encryption is allowed in encrypted Virtual Network.
- `az network vnet update`: Add `--encryption-enforcement-policy` argument to choose If Virtual Machine without encryption is allowed in encrypted Virtual Network.

Packaging

- Support Python 3.10
- Add Dockerfile.mariner to support Mariner build

Profile

- `az logout`, `az account clear`: Remove ADAL token cache file `accessTokens.json`

RDBMS

- Fix private DNS zone suffix bug
- Fix #20124: `az mysql/postgres flexible-server db create`: Make resource group and server name required
- `az postgres flexible-server`: Remove preview tag

Storage

- `az storage share list-handle/close-handle`: New commands for share handle
- GA account level and blob version level immutable storage

Synapse

- [BREAKING CHANGE] `az synapse sql/pool audit-policy`: Remove `--blob-auditing-policy-name`
- `az synapse notebook/spark-job-definition`: Add `--folder-path` argument
- `az synapse spark pool create/update`: Add `--spark-config-file-path`
- `az synapse spark job submit`: Fix for `--main-class-name`
- `az synapse sql-script`: New command group to support sql script management

November 02, 2021

Version 2.30.0

Core

- [BREAKING CHANGE] Migrate from ADAL to MSAL. For more details, see [MSAL-based Azure CLI](#)

ACR

- [BREAKING CHANGE] `az connected-registry`: `--repository` flag short version `-t` is being removed.
- [BREAKING CHANGE] `az connected-registry install renew credentials`: Now it requires the user to confirm password generation.
- `az connected-registry install`: Deprecate and redirect to `az acr connected-registry get-settings`.
- `az connected-registry repo`: Deprecate and redirect to `az acr connected-registry permissions update`.
- `az connected-registry permissions show`: A new command that allows the user to see the sync scope map information.
- `az connected-registry get-settings`: A new command that retrieves the necessary information to install a connected registry and allows the generation of a new sync token password.
- `az connected-registry create`: No longer adds a postfix to the sync token and scope map name.

AKS

- `az aks create/update`: Add new parameter `--aks-custom-headers` to support for custom headers

- `az aks create`: Support setting `--private-dns-zone` to none for private cluster creation
- `az aks create/update`: Add new parameter `--enable-secret-rotation` and `--rotation-poll-interval` to support secret rotation
- `az aks enable-addons`: Add new parameter `--enable-secret-rotation` and `--rotation-poll-interval` to support secret rotation

App Config

- `az appconfig kv import/export`: Add new parameter `--profile` to support using `appconfig/kvset` profile

App Service

- Fix #19617: `az webapp ssh`: Open Web SSH on the specified instance
- `az staticwebapp hostname`: Support adding static webapp hostname via TXT validation
- Enable support for PowerShell on Linux function apps with V4

ARM

- `az bicep publish`: Add new command to publish bicep modules

ARO

- `az aro create`: Remove Identifier URIs

Compute

- `az disk update`: Fix the problem that updating network access policy to `AllowPrivate` failed
- `az vm update`: Add `--host` argument and `--host-group` argument to support assign an existing VM to a specific ADH
- Fix #19599: `az vm create`: Fix the issue that `--nic-delete-option` not working when no `--nics` is provided.
- `az snapshot create`: Support copyStart as createOption
- `az vmss create/update`: Support in-guest patching for VMSS
- `az vm application set/list`: Add new commands to support VM application
- `az vmss application set/list`: Add new commands to support VMSS application

- `az vm create`: Add `--ephemeral-os-disk-placement` argument to support choosing the Ephemeral OS disk provisioning location
- `az vmss create`: Add `--ephemeral-os-disk-placement` argument to support choosing the Ephemeral OS disk provisioning location
- `az vm update`: Add `--size` argument to support the resize
- `az vmss update`: Add `--vm-sku` argument to support the resize
- `az vm run-command`: Add new commands to support managing the running commands in VM
- `az vm update`: Add `--ephemeral-os-disk-placement` argument to support choose the Ephemeral OS disk provisioning location
- `az vmss update`: Add `--ephemeral-os-disk-placement` argument to support choose the Ephemeral OS disk provisioning location
- `az sig gallery-application`: Add new commands to support managing gallery application
- `az sig gallery-application version`: Add new commands to support managing gallery application version
- GA the features related to Flex VMSS

Container

- `az container create`: Add parameter `--zone` to support Availability Zone selection
- `az container create`: Fix the issue that `--subnet` or `--vnet` cannot be used with IP address type `Public` to allow `Private`
- `az container create`: Add Support for `--registry-login-server` to work with `--acr-identity`

Cosmos DB

- `az cosmosdb mongodb retrieve-latest-backup-time`: Add new command for fetching latest restorable timestamp for Mongo Account.
- `az cosmosdb locations`: Add new commands for listing account locations and their properties.
- `az managed-cassandra cluster/data-center`: GA support for managed cassandra cluster and data center

DMS

- `az dms project create/az dms project task create` : Add MySQL projects/tasks for offline migrations.

FunctionApp

- [BREAKING CHANGE] `az functionapp devops-pipeline`: Remove commands and move them to `functionapp` extension

HDInsight

- `az hdinsight create`: Add two parameters `--zones` and `--private-link-configurations` to support creating cluster with availability zones feature and creating private link enabled cluster with private link configurations feature.

Key Vault

- Support Keyvault SKR
- `az keyvault key random`: Request some random bytes from managedHSM
- `az keyvault rotation-policy/key rotate`: Support rotate key and manage key rotation policy
- `az keyvault create/update`: Add `--public-network-access` parameter

Monitor

- `az monitor metrics alert condition` : Add support for 'skip metric validation'

NetAppFiles

- [BREAKING CHANGE] `az netappfiles account backup-policy create/update`: Remove optional parameter `--yearly-backups`.
- `az netappfiles account list`: Add option to skip `--resource-group` parameter and fetch accounts for subscription.
- `az netappfiles pool create`: Add optional parameter named `--encryption-type`
- `az netappfiles volume create`: Add optional parameters: `--network-features`, `--avs-data-store`, `--default-group-quota`, `--default-user-quota`, `--is-def-quota-enabled`
- `az netappfiles volume update`: Add optional parameters: `--default-group-quota`, `--default-user-quota`, `--is-def-quota-enabled`

Network

- `az network bastion create`: Add new parameter `--scale-units` and `--sku` to support setting scale unit
- `az network vnet`: Add parameter `--bgp-community`
- `az network private-endpoint-connection`: Support "Microsoft.Cache/Redis"
- `az network private-endpoint-connection`: Support "Microsoft.SignalRService/WebPubSub"

RDBMS

- Introduce MySQL georestore command and update validators
- GA `az mysql flexible-server`

Service Bus

- Fix MU capacity to include 16 when updating namespace

ServiceConnector

- `az webapp/spring-cloud connection`: New command group to support service to service connection

SQL

- `az sql server ad-admin`: Fix breaking change made to update and delete

Synapse

- `az synapse kusto`: Add Kusto pool(mgmt) support

October 29, 2021

Version 2.29.2

ARO

- Hotfix: `az aro create`: Remove Identifier URLs

October 21, 2021

Version 2.29.1

Compute

- Hotfix: Fix static webapp commands that are broken due to the upgrade of `azurerm-mgmt-web` to 4.0.0

October 12, 2021

Version 2.29.0

AKS

- `az aks check-acr`: Bump canipull to 0.0.3 alpha to support sovereign cloud
- `az aks create/update`: Add new parameter `--disable-local-accounts` to support disable local accounts
- `az aks enable-addons`: Support open-service-mesh addon
- `az aks create/update`: Add support for updating tags

App Config

- Fix dependencies for multiple installations of `jsondiff` and `javaproPERTIES`

App Service

- `az webapp create/up`: Correct the typo of wrong java version in help
- `az logicapp create/delete/show/list`: Add new commands to support logicapp related operations
- `az staticwebapp environment delete`: Add command to support deleting static app environment
- `az functionapp show`: Add kind validation for show operation
- `az webapp config backup list`: Fix issue that returned backup configuration instead of backup list
- `az logicapp start/restart/stop`: Add new commands for logicapp
- `az webapp config storage-account`: Update parameter descriptions

ARM

- `az deployment`: Remove the log of printing request body from custom policy

- `az deployment group create`: Fix incorrect scope in the example of creating deployment from template-spec
- `az ts create`: Simplify overwrite confirmation message

Backup

- `az backup container register`: Fix refresh container bug
- `az backup`: Add CRR functionality for Azure Workload
- `az backup`: Add support for MAB backup management type in some sub commands

Compute

- `az sig create/update`: Add new parameter `--soft-delete` to support soft delete
- `az sig image-version`: Add new parameter `--replication-mode` to support setting replication mode
- `az vm/vmss update`: Fix disassociation VM/VMSS from capacity reservation
- `az vm/vmss create`: Hide alias `--data-delete-option` in help
- `az vmss create`: Support quick creation for flexible VMSS

Container

- [BREAKING CHANGE] `az container create`: Remove `--network-profile` parameter, property no longer supported
- `az container logs`: Fix the attribute error introduced by Track 2 migration
- `az container create`: Add parameter `--acr-identity` for support of MSI authenticated ACR image pull

Cosmos DB

- `az cosmosdb identity assign/remove`: Add support for user identity

Eventhub

- `az eventhubs namespace update`: Add `--infra-encryption` for encryption (enable-require-infrastructure-encryption).
- `az eventhubs namespace create/update`: Add `--disable-local-auth` to enable or disable SAS authentication.

- `az eventhubs namespace`: Add `private-endpoint-connection` and `private-link-resource` command groups

Key Vault

- [BREAKING CHANGE] Fix #18479: `az keyvault network-rule add`: Fix the bug which allows duplicate `--ip-address` with the ones already in the network-rule
- Fix #10254: `az keyvault network-rule add`: Add capability to accept multiple ip-addresses as a list in the form of `--ip-address ip1 [ip2] [ip3]...`
- `az keyvault delete`: Add warning when deleting managed HSM

Network

- Add `az network custom-ip prefix wait`
- Add `az network vnet-gateway packet-capture wait`
- Add `az network vnet-gateway vpn-client ipsec-policy wait`
- Add `az network vnet-gateway nat-rule wait`
- Add `az network vpn-connection packet-capture wait`
- Private link and endpoint support for provider `Microsoft.BotService/botServices` to supported private endpoints operations
- `az network application-gateway client-cert`: Add commands `update` and `show`
- `az network application-gateway ssl-profile`: Add commands `update` and `show`
- `az network application-gateway http-listener create`: Add parameter `--ssl-profile`
- `az network application-gateway http-listener update`: Add parameter `--ssl-profile`
- Onboard hdinsight private link2 network cmdlets
- `az network bastion create`: Add `--tags` argument
- Private link and endpoint support for provider `Microsoft.Authorization/resourceManagementPrivateLinks`
- Private link and endpoint support for provider `Microsoft.MachineLearningServices/workspaces`

Profile

- `az account show`: Deprecate `--sdk-auth`

RDBMS

- [BREAKING CHANGE] `az postgres flexible-server migration`: Change --properties @{filepath} to --properties {filepath}
- `az postgres flexible-server migration create`: User can pass in filename with double quotes or no quotes and same for absolute paths.
- `az postgres flexible-server migration check-name-availability`: Add a command to check if a migration name is available.
- `az postgres flexible-server migration update`: Add --start-data-migration to reschedule the migration to start right now.
- Update list-skus, create command location setting and replica command

Role

- `az ad sp create-for-rbac`: Deprecate --sdk-auth

Security

- Add command `az security setting update`

Storage

- Fix #19279: Add clarification for file system name to also mean container name.
- Fix #19059: Fix doc link to point to public doc website
- `az storage account hns-migration start/stop`: Support migrate a storage account to enable hierarchical namespace
- `az storage container-rm create/update`: Add --root-squash to support enable nfsv3 root squash or all squash
- Fix #17858: `az storage blob upload`: make --name optional
- `az storage account create/update`: Add --public-network-access parameter
- `az storage container immutability-policy create`: Add --allow-protected-append-writes-all/--w-all parameter
- `az storage container legal-hold set`: Add --allow-protected-append-writes-all/--w-all parameter
- `az storage account create/update`: Enable account level immutability

Synapse

- [BREAKING CHANGE] `az synapse sql/pool audit-policy update`: Add parameter blob-storage-target-state, log-analytics-target-state, event-hub-target-state (at least choose one of these 3 paras)

- `az synapse integration-runtime`: Support start/stop integration-runtime
- `az synapse trigger`: Add az synapse trigger wait
- `az synapse trigger-run`: Add az synapse trigger-run cancel
- `az synapse integration-runtime`: Deprecate `create` command and will redirect to `managed create` OR `self-hosted create` command
- `az synapse dataset/pipeline/linked-service/trigger`: Deprecate `set` command and will redirect to `update` command
- `az synapse workspace-package`: Support workspace package CRUD
- `az synapse spark pool update`: Support add or remove specific packages
- `az synapse workspace create/update`: Add arguments for supporting synapse workspace repository configuration
- `az synapse spark-job-definition`: Support spark job definition CRUD

September 09, 2021

Version 2.28.1

ARM

Hotfix: Fix #19468: pip installs azure-cli 2.0.73 because of the dependency on deprecated package `jsmin`

September 07, 2021

Version 2.28.0

ACR

- `az acr create/update`: Add support for disabling export through `--allow-exports`
- `az acr`: Bump core api-version to `2021-06-01-preview` from `2020-11-01-preview`. agent_pool, tasks and runs operations unchanged from `2019-06-01-preview`
- `az acr task credential`: Fix the issue where task credentials were not used
- `az acr task logs`: Fix the AttributeError when querying the task logs

AKS

- [BREAKING CHANGE] `az aks nodepool update`: Change rejecting the ability to use max-surge with node-image-only

- `az aks install-cli`: Add support for kubelogin darwin/arm64 releases
- Fix incorrectly passed parameter for option `--assign-kubelet-identity` in `aks create` sub-command
- Upgrade api-version to `2021-07-01` for ACS module
- `az aks create/update`: Add support for private cluster public fqdn feature
- Revert PR #18825: `az aks create/update`: Add parameter `--auto-upgrade-channel` to support auto upgrade (with fix)
- `aks create/aks nodepool add`: Add parameter `--os-sku` to support choosing the underlying container host OS

App Config

- `appconfig kv import/export`: Add endpoint validation during import and export

App Service

- `az webapp config storage-account list/add/update/delete`: Remove preview flag
- Fix #18497: `functionapp identity show`: Fix the crashes when the functionapp name does not reference an existing functionapp
- `az webapp config set`: Add additional help examples for powershell users
- Fix #17818: `az functionapp update`: Add instance validation for updating functionapp
- `az webapp config hostname add`: Fix the issue caused by AttributeError
- `az webapp config hostname add`: Fix the issue caused by AttributeError
- Fix #16470: `az staticwebapp secrets`: Add commands to manage deployment secrets
- `az webapp deployment source config-local-git`: Fix the issue caused by AttributeError when slot option is specified
- `az webapp deleted restore`: Fix the issue that 'WebAppsOperations' object has no attribute 'restore_from_deleted_app'
- `az webapp up`: Add ability to deploy Linux and Windows webapps to the same resource group
- `az webapp up`: Add support for deploying to an App Service Environment
- Fix #19098: `az webapp deployment slot auto-swap`: Fix the AttributeError error for parameters `--slot --disable`

ARM

- `az feature registration`: Add az feature registration apis

- `az tag create`: Add the note for handling existing tag in help
- `az ts create`: Fix issue where creating a template spec with inner deployments that reference a common template fails

CDN

- `az cdn endpoint create`: Fix endpoint creation failure with `--content-types-to-compress`

Compute

- `az ssh vm`: Raise error for managed identity and Cloud Shell
- Upgrade api-version for VM and VMSS from `2021-03-01` to `2021-04-01`
- `az vmss create/update`: Support spot restore policy to VM scale sets
- Add new examples for creating disk from share image gallery
- `az vm image list/list-offers/list-skus/list-publishers/show`: Add new parameter `--edge-zone` to support querying the image under edge zone
- Fix the issue caused by the lack of `os_type` when creating VM from shared gallery id
- Update shared image gallery doc
- `az capacity reservation`: Add new commands to manage capacity reservation
- `az capacity reservation group`: Add new commands to manage capacity reservation group
- `az vm create/update`: Add new parameter `--capacity-reservation-group` to support association to capacity reservation
- `az vmss create/update`: Add new parameter `--capacity-reservation-group` to support association to capacity reservation
- `az vmss create`: Support creating VMSS from shared gallery image

IoT

- `az iot hub/dps certificate update/create`: Add `--verified` argument to mark certificates as verified without proof-of-possession flow
- `az iot hub create/update`: Add `--disable-local-auth`, `--disable-device-sas`, and `--disable-module-sas` arguments to configure accepted SAS key authentication methods.

Key Vault

- `az keyvault private-endpoint-connection list`: Support list mhsm's private endpoint connections
- `az keyvault set-policy`: `--key-permissions` add new option `release`

Network

- Fix NSG rule creation example mistake
- Add a new command group `az network custom-ip prefix`.
- `az network public-ip`: Add parameter `--ip-address`.
- `az network public-ip prefix create`: Add parameter `--custom-ip-prefix-name`.
- `az network dns record-set {record-type} add-record`: Support idempotent
- PrivateLink supports `Microsoft.Purview/accounts` 2021-07-01
- `az network bastion ssh`: connect to a Virtual machine through ssh using Bastion Tunneling.
- `az network bastion rdp`: connect to a Virtual machine through native RDP using Bastion Tunneling.
- `az network bastion tunnel`: connect to a Virtual machine using Bastion Tunneling.

Packaging

- Use Python 3.9 in Homebrew formula
- When installed with RPM, run `python3.6` if available
- Add Ubuntu 21.04 Hirsute Hippo support
- Add Debian 11 Bullseye support
- Drop Ubuntu 20.10 Groovy Gorilla support

PowerBI

- Add private link provider `Microsoft.PowerBI/privateLinkServicesForPowerBI`

RDBMS

- [BREAKING CHANGE] `az postgres flexible-server migration`: Rename `--migration-id` to `--migration-name`
- [BREAKING CHANGE] `az mysql flexible-server create/update`: `--high-availability` available parameter is changed from 'Enabled' to 'ZoneRedundant' and 'SameZone'.
- Fix maintenance window update issue with MySQL and Change restart parameter to be case insensitive

- `az mysql flexible-server restore` enables network option change from private network to public network and vice versa.
- `az mysql flexible-server replica create`: Add `zone` parameter.

Role

- `az role assignment create`: Support `ForeignGroup` for `--assignee-principal-type`
- `az role assignment create`: Do not invoke Graph API if `--assignee-principal-type` is provided

SQL

- `az sql mi update`: Add `--subnet` and `--vnet-name` parameters to support the cross subnet update SLO
- Fix the enum name change in track2 Python SDK

Storage

- Fix #10765: Refine error message when account key is incorrect padding

Synapse

- [BREAKING CHANGE] Rename `az synapse workspace key update` to `az synapse workspace key activate` and remove `--is-active`
- Optimize submit spark job arguments
- `az synapse`: Add managed private endpoints feature.
- Spark pool remove library requirement

August 23, 2021

Version 2.27.2

Cosmos DB

- Hotfix: `az cosmosdb restore`: Fix the restore command for deleted accounts

August 17, 2021

Version 2.27.1

ARM

- Hotfix: Fix #19124: `az deployment what-if`: Handle unsupported and no effect change types

Batch

Upgrade batch data-plane to [azure-batch 11.0.0](#) ↗ Upgrade batch management-plane to [azure-batch-mgmt 16.0.0](#) ↗ `az batch location`: Add `list-skus` command to list SKUs available in a location `az batch account`: Add `outbound-endpoints` command to list outbound network dependencies

August 03, 2021

Version 2.27.0

ACR

- [BREAKING CHANGE] `az acr connected-registry install info`: Add a new required parameter `--parent-protocol`.
- [BREAKING CHANGE] `az acr connected-registry install renew-credentials`: Add a new required parameter `--parent-protocol`.
- `az acr import`: Support new parameter `--no-wait`
- Fix the Python SDK compatibility issue when migrating Track 2
- `az acr build`: Make file `.dockerignore` include directories with !

AKS

- `az aks check-acr`: Fix issues parsing certain client minor versions

AppConfig

- [BREAKING CHANGE] `appconfig feature set`: Set the value of parameter `--description` to empty string if it is not specified
- [BREAKING CHANGE] `az appconfig feature`: Support namespacing for feature flags and change output fields
- `az appconfig create`: Add tags support when creating resource

App Service

- `az webapp config set`: Add support for VNet Route All property.
- `az webapp vnet-integration add`: Default to VNet Route All. Allow cross subscription integration.
- `az appservice ase create`: Support for ASEv3 External and Zone redundancy
- `az webapp hybrid-connection add`: Improve help/error message and unblock Linux
- `az webapp config access-restriction remove`: Fix #18947 issue removing service endpoint rules
- : Fix #17424: `az appservice plan show`: Provide correct exit status

ARM

- `az what-if`: Fix output formatting
- `az bicep uninstall`: Add new command to uninstall bicep
- `az bicep build`: Fix an issue where running with --stdout doesn't print any output
- `az provider register`: Add deprecate info for `--accept-term`
- `az lock create/delete`: Add examples for operating different levels of locks
- `az deployment group/sub/mg/tenant create`: Add --what-if parameter for invoking What-If with the deployment create commands.
- `az deployment group/sub/mg/tenant create`: Add --proceed-if-no-change parameter to skip confirmation when --confirm-with-what-if is set and there's no changes in What-If results.
- Bump api-version from 2020-10-01 to 2021-04-01
- `az ts create`: Make parameter `--template-file` support bicep file
- `az resource create`: Add example for creating site extension to web app
- `az ts export`: Fix the issue that export template specs with no linked templates failed

Backup

- `az backup vault`: Add support for Customer Managed Keys(CMK)
- `az backup restore restore-disks`: Add MSI usage in IaaS VM Restore

CDN

- `az cdn endpoint rule`: Add OriginGroupOverride action support

Compute

- `az sig image-version create`: Support mixing disks, snapshots, and vhd
- `az vmss update`: Upgrade package version to fix securityProfile issue
- `az vm boot-diagnostics get-boot-log`: Fix crash when getting boot diagnostics log
- `az vm list-skus`: Fix the issue that it can't query the SKU which with partially zones available
- `az vm auto-shutdown`: Fix the issue that `--webhook` is required when `--email` is passed in
- `az vm create`: Support creating VM from shared gallery image
- `az vm secret add`: Add note to use Azure Key Vault VM extension instead in help

Container

- `az container exec`: Fix and improve terminal experience

DataBoxEdge

- Migrate databoxedge to track2 SDK

DMS

- `az dms project create/az dms project task create`: Remove MySQL projects/tasks for online migrations since they are no longer supported.

IoT

- `az iot hub create/update`: Add checks to prevent bad file-upload identity parameters when hub doesn't have identity
- `az iot hub create/update`: Add `--fileupload-notification-lock-duration` parameter
- `az iot hub create/update`: Deprecate `fileupload-storage-container-uri` parameter
- `az iot dps/hub certificate create`: Certificates will now always be uploaded in base64 encoding.

Key Vault

- [BREAKING CHANGE] Fix #13752: az keyvault create not idempotent. Creating existing keyvault will fail.
- Fix #6372: table output for secrets isn't correct

Maps

- `az maps creator create`: Support maps creator create managed
- `az maps creator update`: Support maps creator update managed
- `az maps creator list`: Support maps creator list managed
- `az maps creator show`: Support maps creator show managed
- `az maps creator delete`: Support maps creator delete managed

NetAppFiles

- `az netappfiles volume pool-change`: Update help description for pool-change

Network

- `az network application-gateway create`: Add `--ssl-certificate-name` argument
- Private link add Microsoft.ServiceBus/namespaces provider
- `az network application-gateway waf-policy custom-rule match-condition add`: Add examples
- `az network express-route port link update`: Add `--macsec-sci-state` argument.
- Private link add Microsoft.Web/hostingEnvironments provider
- `az network lb frontend-ip update`: Support cross tenant for argument `--gateway-lb`.
- `az network nic ip-config update`: Support cross tenant for argument `--gateway-lb`.
- Private link add Microsoft.StorageSync/storageSyncServices provider
- Private link add Microsoft.Media/mediaservices provider
- Private link add Microsoft.Batch/batchAccounts provider

Packaging

- Add licenses to all Python packages
- Add SOCKS Proxy Support

PolicyInsights

- Migrate to track 2 SDK

RDBMS

- PostgreSQL, MySQL migration to GA API

Redis

- `az redis create\update`: Add new parameter `--redis-version`

SQL

- Update Microsoft.Sql to track2 SDK
- `az sql server outbound-firewall-rule create`: Azure CLI Commands for Outbound Firewall Rules

Storage

- Fix #18352: `az storage fs file list --exclude-dir` breaks with `--show-next-marker`
- `az storage fs generate-sas`: Support generate sas token for file system in ADLS Gen2 account
- `az storage account blob-service-properties`: Support last access tracking policy
- `storage container-rm migrate-vlw`: Support Version level Worm (VLW)
- `az storage copy` add new option `--cap-mbps`

Synapse

- `synapse workspace key update`: Fix the issue that updating a workspace key failure due to parameter `--is-active-cmk` lost
- Reimport notebook failure

July 14, 2021

Version 2.26.1

ACR

- Hotfix: `az acr build\connected-registry\pack\run\scope-map`: Fix the compatibility bug caused by SDK upgrade

AKS

- Hotfix: `az aks create`: Fix the issue that `assign-kubelet-identity` option can't work

Storage

- Hotfix: Fix issue caused by jwt upgrade.
- Hotfix: `az storage fs directory download`: Fix the issue with `--sas-token` to generate valid sas url
- Hotfix: `az storage blob copy start`: Fix the issue in copy from different account

July 06, 2021

Version 2.26.0

AKS

- Migrate ACS module to track 2 SDK
- Upgrade api-version to 2021-05-01 for ACS module
- Add UltraSSD support
- Support use custom kubelet identity
- `az aks get-credentials`: Add a check for KUBECONFIG environmental variable

APIM

- Add version parameter for apim api import
- Fix apim upgrade bug when specifying protocols
- `az apim create`: Fix `--enable-managed-identity` true failure

App Config

- Stop overwriting KeyVault reference content type during import

App Service

- [BREAKING CHANGE] `az functionapp create`: Remove support for EOL Node 8 and 10
- [BREAKING CHANGE] `az webapp deployment source config`: Remove vsts-cd-manager
- [BREAKING CHANGE] `az functionapp deployment source config`: Remove vsts-cd-manager
- `az webapp/functionapp config access-restriction add`: Prevent duplicate rules using service endpoints.
- `az webapp/functionapp config access-restriction remove`: Remove service endpoints are case-insensitive
- `az webapp config access-restrictions add`: Skip validation if user does not have access to get service tag list.
- Add support for Linux Consumption and improve how content share name is generated.
- : Fix an issue where adding VNET integration & Hybrid connections on a slot is not working
- `az appservice domain create`: Fix get correct domain agreements
- `az webapp deployment github-actions add/remove`: new commands

AppConfiguration

- Add support for `disable_local_auth`

ARM

- `az provider register`: Make parameter `--accept-term` become not required

ARO

- `az aro create`: Add cidr values for pod/service
- Fail if resource doesn't exist on delete

Azurestack

- Azure Stack Hub Support for AKS and ACR has been added in 2020-09-01-hybrid profile

Backup

- `az backup container`: Fix container registration Workload container registration fix, SDK upgraded to 0.12.0, Fixed and Re-ran tests
- Add Archive Support for Azure CLI

Billing

- Migrate billing to track2 SDK

Cognitive Services

- `az cognitiveservices account`: Add list-deleted, show-deleted, recover, purge commands

Compute

- `az sig create/update`: Add --permissions to specify the permission of sharing gallery.
- `az sig share`: Manage gallery sharing profile.
- `az sig list-shared`: List shared galleries by subscription id or tenant id.
- `az sig show-shared`: Get a shared gallery.
- `az sig image-definition list-shared`: List shared galleries by subscription id or tenant id.
- `az sig image-definition show-shared`: Get a shared gallery image.
- `az sig image-version list-shared`: List shared galleries by subscription id or tenant id.
- `az sig image-version show-shared`: Get a shared gallery image version.
- `az vmss create`: Support NetworkApiVersion for Vmss with OrchestraionMode == Flexible
- Make dependent resources of VM/VMSS support edge zone
- Update from CoreOS to Flatcar
- Add the hint to suggest users use the standard public IP when creating VM

Container Registry

- Migrate to track2 SDK

Cosmos DB

- Add point-in-time restore commands to the stable branch.

- Add support for selecting Cosmos DB analytical storage schema type

HDInsight

- `az hdinsight create`: Remove the incoming breaking change notice for the parameter `--workernode-size` and `--headnode-size`.
- Add three new cmdlets to support new azure monitor feature:

NetAppFiles

- `az netappfiles account ad add`: Optional parameter added named --administrators
- `az netappfiles pool create`: Optional parameter added --cool-access
- `az netappfiles volume create`: Optional parameters added named --chown-mode, --cool-access, --coolness-period, --coolness-period
- `az netappfiles volume backup restore-status`: Command added to see backup restore status

Network

- `az network routeserver create`: Add `--public-ip-address` argument.

RDBMS

- Add autogrow parameter for MySQL and add database name to output json when created

Resource

- Third-party S2S Consent/Permission Enumeration

Security

- Remove preview from security module

SQL

- Bump sdk version
- Fix for server create in SQL 0.28

- `az sql db ledger-digest-uploads`: Support SQL Ledger
- Fix for IdentityType for UMI
- `az sql db str-policy set/show`: Add Set and Show ShortTermRetentionPolicy

Storage

- GA support secured SMB
- `az storage account create`: Support `--enable-nfs-v3` to set NFS 3.0 protocol
- Support container soft delete

June 15, 2021

Version 2.25.0

ACR

- `az acr connected-registry`: Minor bug fixes

App Service

- `az webapp deployment source config-local-git`: Fix to set SiteConfig

ARM

- `az resource tag`: Fix the problem of tagging resources with resource type `Microsoft.Network/publicIPAddresses`
- `az policy assignment non-compliance-message`: New command group for policy assignment non-compliance messages
- `az policy assignment update`: New command for partially updating existing policy assignments

Backup

- Migrate backup to track2 SDK

Compute

- Upgrade api-version for VM and VMSS from '2020-12-01' to '2021-03-01'
- `az vm create`: Support delete option for NICs and Disks for VMs in Azure CLI

- Support `user_data` for VM and VM Scale Sets

Container

- `az container exec`: Decode received bytes as utf-8 string

EventGrid

- Migrate track2 SDK

HDInsight

- Migrate to track2 Python SDK 7.0.0

IoT Hub

- Fix for user-assigned identity ARM issue on remove

Key Vault

- Fix #11871: AKV10032: Invalid issuer error for operations in nondefault tenant/subscription
- `az keyvault set-policy/delete-policy`: Support `--application-id`
- `az keyvault recover`: Support MHSM
- `az keyvault private-link-resource list`: Support MHSM
- `az keyvault private-endpoint-connection`: Support MHSM

NetAppFiles

- `az netappfiles volume backup status`: Command added to get the status of the backup for a volume.
- `az netappfiles volume update`: Optional parameter added named `--snapshot-policy-id` to assign a snapshot policy to the volume.
- `az netappfiles volume backup create`: Optional parameter added named `--use-existing-snapshot` to manually backup an already existing snapshot.
- `az netappfiles volume backup update`: Optional parameters added named `--use-existing-snapshot` to manually backup an already existing snapshot. Optional parameter `label` also added to add a label to backup.

Network

- Support `Microsoft.Sql/servers` provider in Private link
- `az network private-link-resource list`: Support `--type microsoft.keyvault/managedHSMs`
- `az network private-endpoint-connection`: Support `--type microsoft.keyvault/managedHSMs`

RDBMS

- Add commands for Github actions
- `az postgres flexible-server migration`: Add customer facing feature to migrate postgres db servers from Sterling to Meru platform
- Private DNS zone parameter added for restore command, high availability validator
- Change server default location (issue reported)

Role

- [BREAKING CHANGE] `az ad sp create-for-rbac`: `--name` is now only used as the `displayName` of the app. It is not used to generate `identifierUris` anymore. `name` in the output is now the same as `appID` (`servicePrincipalNames`) and deprecated.

SignalR

- `az signalr identity`: Add managed identity related command
- `az signalr cors update`: Add update command for cors

Storage

- `az storage blob copy start`: Support `--tier` and `--rehydrate-priority`
- GA release storage file share NFS and SMB multichannel
- [BREAKING CHANGE] `az storage account create`: Remove `StorageFileDataSmbShareOwner` option for `--default-share-permission`
- `az storage blob list`: `--delimiter` parameter value will now be honored

Synapse

- Update to AZ Synapse mgmt 2.0.0
- Spark configuration conversion, which cause the failure

Webapp

- Add to `az webapp deploy` param help text

June 02, 2021

Version 2.24.2

Container

- Hotfix: Fix #18276: `az container create` fails with `AttributeError: 'ResourcesOperations' object has no attribute 'create_or_update'`

June 01, 2021

Version 2.24.1

App Service

- Hotfix: Fix #18266 - webapp config appsettings set command causing all values to default to "false"

ARM

- Hotfix: Fix deserialization issue in the What-If formatter of ARM template

Compute

- Hotfix: Fix the bad request issue when creating VMSS in Azure Stack

IoT

- Hotfix: Fix issue for removing last user-assigned identity from IoT Hub

May 25, 2021

Version 2.24.0

AKS

- `az aks check-acr`: Add the nodeselector linux to avoid the "canipull" pod to be scheduled on the windows node
- Sdk update
- `az aks create` and `update azure-rbac`
- Add run-command cli

App Config

- Allow importing key-values with unicode characters from file

App Service

- [BREAKING CHANGE] `az webapp list-runtimes`: Add Dotnet6 support and update runtimes
- `webapp log tail`: Fix #17987: logging.warning call with invalid 'end' argument
- Fix #16838- `az cli update app setting` command always making slotsetting to true
- `az appservice`: Add function to retrieve users github personal access token
- `az staticwebapp appsettings set` issue #17792
- Fix #18033: `az staticwebapp appsettings set` of missing positional param `app_settings`
- Fix issues with APIs signature that changed with Track2 update
- Fix get resource management client properly
- Add interactive way to get token for staticwebapp
- Fix an issue where assign and remove identities would fail with a call to NoneType

ARM

- Migrate resource to track2 SDK
- `az ts`: Add UiFormDefinition file support to TemplateSpecs for GA (05/04)

ARO

- Add cluster credential rotation

Compute

- `az sshkey create`: Save private key to local file system

Cosmos DB

- Create and manage Role Definitions and Role Assignments for enforcing data plane RBAC on Cosmos DB SQL accounts

DevTestLabs

- `az labs create environment`: Fix error creating an environment from an ARM template

HDInsight

- [BREAKING CHANGE] `az hdinsight create`: Use getting default sku api to set workernode and headnode size if customer does not provide.

IoT

- `az iot hub create`: Support assigning identities and assigning roles to system-managed identity.
- `az iot hub update`: New parameter `--file-upload-storage-identity` to allow for managed-identity authenticated file upload.
- `az iot hub identity assign`: New command to assign user/system-assigned managed identities to an IoT Hub.
- `az iot hub identity show`: New command to show identity property of an IoT Hub.
- `az iot hub identity show`: New command to update identity type of an IoT Hub.
- `az iot hub identity remove`: New command to remove user/system-assigned managed identities from an IoT Hub.
- `az iot hub routing-endpoint create`: New `--identity` parameter allows choosing a user/system-assigned identity for routing endpoints.
- `az iot hub route create`: New routing source-type `DeviceConnectionStateEvents`

Kusto

- Update command group long summary

Network

- Bump api version from '2020-11-01' to '2021-02-01'
- New command group `az network lb address-pool tunnel-interface`
- `az network lb frontend-ip update`: New parameter `--gateway-lb`

- `az network nic ip-config update`: New parameter `--gateway-lb`
- `az network rule create/update`: New parameter `--backend-pools-name`
- `az network vnet-gateway create`: Add new parameter `--nat-rule`
- Add new cmd group `az network vnet-gateway nat-rule`
- `az network vpn-connection create`: Add new parameter `--ingress-nat-rule` and `--egress-nat-rule`
- `az network vnet create`: Add new parameter `--flowtimeout`

Packaging

- Support Python 3.9

RDBMS

- Change IOPS logic for MySQL
- Prevent private DNS zone track2 migration breaking `rdbms` module

Service Fabric

- [BREAKING CHANGE] `az sf cluster certificate`: Remove all commands under this group. Please follow the instructions in [Add a secondary certificate using Azure Resource Manager](#) to add/remove cluster certificates.
- [BREAKING CHANGE] `az sf managed-service update`: Remove deprecated parameter `--drop-source-replica-on-move`.
- [BREAKING CHANGE] `az sf managed-service create`: Remove deprecated parameters `--service-dns-name`, `--drop-source-replica-on-move` and `-instance-close-delay-duration`.
- [BREAKING CHANGE] `az sf cluster`: Rename parameter `--vault-resource-group` to `--vault-rg`.
- `az sf managed-cluster` and `sf managed-node-type`: Set groups as not preview
- Update `azure-mgmt-servicefabricmanagedclusters` package to the latest version 1.0.0 that uses 2021-05-01 GA api version.
- `az sf managed-cluster create`: Add parameters `--upgrade-mode`, `--upgrade-cadence` and `--code-version`.
- `az sf managed-node-type`: Add parameters `--data-disk-type`, `--is-stateless` and `--multiple-placement-groups`.

SQL

- `az sql server create`: Add a space to split the concatenated words in the help message of the argument `--assign-identity`.
- `az sql server update`: Add a space to split the concatenated words in the help message of the argument `--assign_identity`.

Storage

- [BREAKING CHANGE] `az storage share-rm delete`: Raise error when there are snapshots for target file share and add `--include` to specify deleting target file share and its snapshots
- `az storage blob generate-sas`: Add spaces to split the concatenated words in the help message of the arguments `--cache-control`, `--content-disposition`, `--content-encoding`, `--content-language` and `--content-type`.
- `az storage blob url`: Add a space to split the concatenated words in the help message of the argument `--snapshot`.
- `az storage container generate-sas`: Add spaces to split the concatenated words in the help message of the arguments `--cache-control`, `--content-disposition`, `--content-encoding`, `--content-language` and `--content-type`.
- Upgrade storage API version to 2021-04-01
- Support default share permission
- Support cross tenant object replication
- GA blob inventory
- `az storage share-rm list`: Support list with snapshots.

May 06, 2021

Version 2.23.0

ACR

- `az acr check-health`: Add support to verify dns routings to private endpoints
- Fix #17618: Update credential add/update handling for tasks created using `--auth-mode`

AKS

- `az aks update`: Add `--windows-admin-password` to support updating Windows password
- `az aks update`: Support updating from SPN cluster to MSI cluster.

- `az aks create`: Add `--enable-encryption-at-host` parameter

App Service

- [BREAKING CHANGE] Update websites SDK to the latest version (`azure-mgmt-web==2.0.0`) & Adopt track2 SDK
- [BREAKING CHANGE] Rename `az staticwebapp browse` to `az staticwebapp show`
- Add option of sku for `az staticwebapp create --sku`
- Add command `az staticwebapp update`
- `az webapp/functionapp config access-restriction add/remove`: Support for Service Tag, Http headers and multi-source rules.

ARM

- `az bicep`: Replace datetime APIs that are not available in Python 3.6
- `az deployment group create`: Fix the compatibility issue of api-version for parameter `--template-specs`

Backup

- `az backup vault create`: Add tags as an optional argument
- Make AFS configure backup flow idempotent

CDN

- `az cdn endpoint rule add`: Fix delivery rule creation for non-Microsoft SKU

Compute

- Extended location for Compute RP
- `az sig image-version create`: Support creating from a VHD
- `az vm create --count`: Support vnet and subnet configuration
- `az vmss extension upgrade`: Fix a bug
- Add error message for `vm identity assign`
- Zone-redundant storage (ZRS) managed disks
- `az disk create`: Trusted launch
- `az disk create`: Hibernation
- Fix a compatibility issue of old API version
- `az sig image version create`: Support data disk VHDS

Feedback reference

- Do not minify feedback issue body

FunctionApp

- Fix issue with zip deploy where local time was provided but UTC was expected
- Update stacks api json to add PowerShell on Linux in Functions

HDInsight

- Add Incoming BREAKING CHANGE for removing default value of `--workernode-size` and `--headnode-size`

Key Vault

- [BREAKING CHANGE] Support soft-delete feature for managed-HSM. `keyvault delete --hsm-name` will perform soft delete on a MHSMS.

Marketplace Ordering

- New command group `az term` to accept/show terms

Misc.

- Define theme for Cloud Shell

Monitor

- New command `az monitor metrics list-namespaces`

Network

- [BREAKING CHANGE] az network dns record-set a show: Property `arecords` in output will be changed to `aRecords`.
- New command `az network express-route list-route-tables-summary`.
- New command `az network express-route peering get-stats`.
- New command `az network express-route peering connection list`.
- `az network lb create`: Add new parameter `--edge-zone`

- `az network nic create`: Add new parameter `--edge-zone`
- `az network private-endpoint create`: Add new parameter `--edge-zone`
- `az network private-link-service create`: Add new parameter `--edge-zone`
- `az network public-ip create`: Add new parameter `--edge-zone`
- `az network public-ip prefix create`: Add new parameter `--edge-zone`
- `az network vnet create`: Add new parameter `--edge-zone`
- New Command `az network lb list-nic`
- `az network application-gateway show-backend-health`: support probe operation arguments.
- `az network vpn-connection list`: support parameter `--vnet-gateway`.
- New command `az network vnet-gateway disconnect-vpn-connections`.
- New command `az network vnet-gateway vpn-client show-health`.
- New command `az network vnet-gateway vpn-client ipsec-policy show`.
- New command `az network vnet-gateway vpn-client ipsec-policy set`.
- New command `az network vnet-gateway packet-capture start`.
- New command `az network vnet-gateway packet-capture stop`.
- New command `az network vnet-gateway show-supported-devices`.
- New command `az network vpn-connection list-ike-sas`.
- New command `az network vpn-connection packet-capture start`.
- New command `az network vpn-connection packet-capture stop`.
- New command `az network vpn-connection show-device-config-script`.
- `az network private-link-resource list`: support more providers for `--type`

Packaging

- Bump python to `3.8.9` in docker image
- Bump bundled python to `3.8.9` in MSI.

RDBMS

- [BREAKING CHANGE] `az mysql flexible-server create`: `--storage-size` default value is changed from 10 to 32.
- `az postgres flexible-server create`: Add `--private-dns-zone` parameter for creating server with private access.

Role

- `az role assignment create/update`: Auto complete `assignee_principal_type`

SQL

- `az sql db create`: Add --ha-replicas argument
- `az sql db replica create`: Add --ha-replicas argument
- Allow short mw policy names for mi

SQL VM

- Make SqlServerLicenseType as optional

Storage

- Fix #16272 & #16853: Refine error message
- `az storage account create`: Add edge zone support
- Support user assigned identity for storage account
- `az storage account create/update`: Support sas&key policy

Synapse

- `az synapse notebook create`: Create a notebook

April 19, 2021

Version 2.22.1

ARM

- Hotfix: Fix the issue that bicep build broken in Python 3.6

Key Vault

- Hotfix: GA for managed-HSM related commands and parameters

April 13, 2021

Version 2.22.0

ACR

- [BREAKING CHANGE] `az acr connected-registry install info`: Replace keys ACR_REGISTRY_NAME, ACR_SYNC_TOKEN_NAME, ACR_SYNC_TOKEN_PASSWORD, ACR_PARENT_GATEWAY_ENDPOINT, and ACR_PARENT_PROTOCOL with a new connected string key, ACR_REGISTRY_CONNECTION_STRING.
- [BREAKING CHANGE] `az acr connected-registry install renew-credentials`: Replace keys ACR_REGISTRY_NAME, ACR_SYNC_TOKEN_NAME, ACR_SYNC_TOKEN_PASSWORD, ACR_PARENT_GATEWAY_ENDPOINT, and ACR_PARENT_PROTOCOL with a new connected string key, ACR_REGISTRY_CONNECTION_STRING.
- `az acr connected-registry create`: Verify before the creation of the token and sync scope map that all ancestors are active.
- `az acr connected-registry create`: Add the repository and gateway permissions required for creation to all the ancestors of the new connected registry if needed prior to the connected registry creation.
- `az acr connected-registry delete`: Remove the gateway permissions of the deleted resources from all its ancestors' sync scope maps.
- `az acr connected-registry repo`: New command to add repository permissions to a connected registry and all its ancestors' sync scope maps, and remove repository permissions from the connected registry and all its descendants' sync scope maps

AKS

- `az aks create`: Add support for `--private-dns-zone` and `--fqdn-subdomain` feature

App Config

- Configure max line width for YAML parser to stop wrapping output
- Fix bug in print preview of restore command

App Service

- Fix #17219: Fix ssl bind bug
- Remove preview flag for Python 3.9 in create function app command
- Bugfix: Handle if only single publish profile is returned
- Fix #16203: az webapp log tail supports webapps running on Linix.

ARM

- [BREAKING CHANGE] `az bicep build`: Change the parameter `--files` to `--file`

- [BREAKING CHANGE] `az bicep decompile`: Change the parameter `--files` to `--file`
- Fix #17379: bicep auto install results in invalid json output from deployment
- `az bicep build`: Add a parameter `--outdir` for specifying the output directory
- `az bicep build`: Add a parameter `--outfile` for specifying the output file path
- Fix an issue where checking version upgrade for Bicep CLI throws exception if GitHub API rate limit is hit
- `az policy exemption`: Add new commands to support policy exemption

Backup

- Fix #14776: Fix `--force` parameter functionality for `az backup vault delete` command
- Fix on demand backup
- `az backup protectable-item list`: Add optional parameter `--backup-management-type`
- Fix policy create with rgNamePrefix and rgNameSuffix
- `az backup protectable-item list`: Add `--server-name` as an optional argument

Compute

- `az ssh vm`: Support VM SSH with Service Principal
- Add VMSS Rolling Upgrade opt
- New command: `vm install-patches`
- Disk encryption set: Add `--enable-auto-key-rotation`

Container

- Fix #16499: `az container create`: Fix handling of return value from `network_profiles.create_or_update`

Cosmos DB

- Support for managed service identity & default identity

EventGrid

- `az eventgrid system-topic create/update`: Add MSI Support

- `az eventgrid [partner topic | system-topic] event-subscription`: Add support for StorageQueueMessageTTL, AdvancedFilters, EnableAdvancedFilteringOnArrays
- `az eventgrid [partner topic | system-topic] event-subscription`: Add support for delivery attribute
- `az eventgrid topic create`: Add support for creating topic for azure or azurearc

Interactive

- Fix #16931: Fix `KeyError` in `az interactive --update`

NetAppFiles

- `az netappfiles account ad add`: Optional parameter added named allow-local-ldap-users
- `az netappfiles volume create`: Optional parameter added named ldap-enabled
- `az netappfiles volume backup status show`: Operation added
- Update backup tests

Network

- `az network vnet-gateway`: `--vpn-auth-type` allow multi value

Packaging

- [BREAKING CHANGE] RPM installed az now uses `python3` instead of hard-coded `/usr/bin/python3`.

RDBMS

- Allow DB server private access from different subscription
- Modify server create with private network, fix restore time bug

Search

- `az search service create`: Add async (`--no-wait`) options.
- `az search service update`: Add async (`--no-wait`) options.
- `az search shared-private-link-resource create`: Add async (`--no-wait`) options.
- `az search shared-private-link-resource update`: Add async (`--no-wait`) options.

Service Fabric

- Add managed application cli commands

Storage

- `az storage fs directory upload/download`: Support adls gen2 file system directory upload&download
- `az storage fs file list`: Support --show-next-marker
- `az storage share-rm`: Support create/show/delete snapshots

Synapse

- [BREAKING CHANGE] `az synapse role assignment create`: Role names at old version are not allowed, Sql Admin, Apache Spark Admin, Workspace Admin
- [BREAKING CHANGE] `az synapse role assignment create`: When --assignee argument can't uniquely determine the principal object, the command will raise error instead of adding a role assignment for the uncertain principal object.
- `az synapse role scope list`: List all scopes synapse supports.
- `az synapse role assignment create/list/delete`: Add --scope/--item-type/--item arguments to support manage role assignments based on scope.
- `az synapse role assignment create/list/delete`: Add --assignee-object-id argument, it will bypass Graph API and uniquely determine principal object instead of deducing principal object using --assignee argument.

March 23, 2021

Version 2.21.0

ACR

- Output a trace in `az acr login` for self-diagnosing potential docker command latency
- Fix #17172: When run check-health behind corporate proxy
- `acr update`: Support anonymous pull
- Fix #16700: Use "exists" api to check storage blob existence

AKS

- `aks update`: Add `--no-upptime-sla`
- Fix cross-sub assigning identity error and attach acr error
- Add support for node public IP prefix ID

APIM

- [BREAKING CHANGE] `apim backup`: `--storage-account-container` not support multi-value.
- [BREAKING CHANGE] `apim restore`: `--storage-account-container` not support multi-value.

App Service

- [BREAKING CHANGE] Fix #16087: `az webapp config ssl create`: set `--name` parameter as required.
- Fix #17053: `az webapp show` return null values for SiteConfig properties
- Fix #17207: `az webapp log config`: 'level' always defaults to verbose

ARM

- `az bicep build`: fix an issue where build warnings are not shown

Backup

- Add `id_part` for sub-resource names to fix `--ids`
- Fix #17094: Created separate test suite for CRR tests
- `az backup protection check-vm`: Add `--vm` and `--resource-group` as optional params

Cache

- GA `az cache`

CDN

- `az afd rule create`: Fix `--help` message

Compute

- Fix a Windows vm user update bug
- Fix #16585: `az vmss deallocate`: `--instance-ids` failed
- `az vm create`: New parameter `--platform-fault-domain` in FLEX VMSS mode
- `az vm create`: `--patch-mode` for Linux VM
- `az ssh vm`: Automatically launch browser when getting certificate fails
- `az vm create`: New parameter `--count`
- `az vm create`: Trusted Launch
- Fix #16037: `az vm open-port` accepts list of ports

Extension

- Add actionable message when an extension is not compatible with the CLI core

Key Vault

- `az keyvault role definition list`: Support `--custom-role-only` to list only custom role definitions
- Support keyvault custom role definition
- Add `--no-wait` for command `az keyvault security-domain download` and `--target-operation` for command `az keyvault security-domain wait`

NetAppFiles

- `az netappfiles account backup show`: Operation added.
- `az netappfiles account backup delete`: Operation added.
- `az netappfiles account ad add`: Parameter `--ldap-over-tls` added.
- `az netappfiles account create`: Parameter `--encryption` added.
- `az netappfiles account update`: Parameter `--encryption` added.
- `az netappfiles volume create`: Parameter `--encryption-key-source` added.
- `az netappfiles volume create`: Default export policy removed for nfsv4.1 and optional parameters added for setting up an export policy for nfsv4.1: `rule_index`, `unix_read_only`, `unix_read_write`, `cifs`, `allowed_clients`

Network

- `az network public-ip prefix create`: Support `--zone 1 2 3`
- `az network lb frontend-ip create`: Support `--zone 1 2 3`
- Bump version from '2020-08-01' to '2020-11-01'

- `az network lb address-pool`: Support subnet when creating or updating an IP-based backend pool of a load balancer.

RDBMS

- Added tests for flexible server team pipeline
- Python SDK migration
- Added PostgreSQL database create, show, and delete feature
- Updating Python SDK to 8.1.0b2

Role

- `az ad app permission list/grant`: Refine error message when no associated Service Principal exists for the App

Search

- `az search`: GA

Service Fabric

- `az sf certificate`: deprecate cluster cert commands.

SQL

- Add Server Trust Group commands

Storage

- Fix #16917: `az storage account generate-sas` fails if a connection string is provided
- Fix #16979: `az storage container create` fails when providing storage container metadata

Upgrade

- Fix #16952: Fix ImportError after upgrade

Misc.

- Allow configuring theme

March 02, 2021

Version 2.20.0

AKS

- Add support for SGX addon 'confcom'

AMS

- Update module to use 2020 Azure Media Services api.
- `az ams account encryption`: New subgroup to show or set the encryption for the media service account
- `az ams account storage set-authentication`: New command to set the authentication for the storage account associated with the media service account
- `az ams account create (mi-system-assigned)`: New --mi-system-assigned parameter for account create to set the managed identity of the media account
- `az ams account mru set`: This command will no longer work for Media Services accounts that are created with the 2020-05-01 version of the API or later.
- `az ams live-event create (stretch-mode, key-frame-interval, transcrip-lang, use-static-hostname, custom hostname)`: Add new parameter options to live-event create command
- `az ams live-event standby`: New command to put the live event in standby mode
- `az ams transform create (videoanalysismode, audioanalysis mode)`: New parameter options for transform create

App Service

- `az webapp config ssl bind`: handle if webapp and appservice plan in different rg.
Also reference text updates
- Fix #8743: az webapp deploy
- Bugfix: Add generateRandomAppNames.json to setup
- `az functionapp create`: Add preview support for creating dotnet-isolated apps.
- Fix #12150: Support for subnet ID in vnet-integration add
- `az functionapp create`: Remove preview flag from Node.js 14.

ARM

- `az deployment group/sub/mg/tenant validate/create/what-if`: Add support for Bicep files
- `az bicep install`: New command for installing Bicep CLI
- `az bicep upgrade`: New command for upgrading Bicep CLI
- `az bicep build`: New command for building Bicep files
- `az bicep version`: New command for showing the current installed version of Bicep CLI
- `az bicep list-versions`: New command for showing the available Bicep CLI versions
- `az managedapp definition update`: Add new command for updating managedapp definition

Backup

- `az backup recoverypoint show-log-chain`: Add start/end time in show-log-chain table output
- BugFix: Enable Alternate Location Restore for SQL/SAPHANA protected items

CDN

- Add cli support for AFD SKU

Compute

- `az vm (extension) image list`: Make it more robust
- `az vmss create`: Fix a license type issue
- Upgrade API version to 2020-12-01
- `az vm create`: add `--enable-hotpatching`

Cosmos DB

- Upgrade to version 3.0.0 and add support for NetworkAclBypass + Update Mongo ServerVersion + backup policy

Extension

- Support config of extension index url

IoT Central

- `az iot central app`: Address several S360 fixes
- `az iot central app update`: Remove the need of checking etag when updating the existing iotc app.
- Change the resourceType (iotApps) to be in camel case.

Key Vault

- [BREAKING CHANGE] `az keyvault role assignment/definition list`:
`roleDefinitionName` should be `roleName` in command output
- [BREAKING CHANGE] `id` changes to be `jobId`, `azureStorageBlobContainerUri` changes to be `folderUrl` in command output of `az keyvault backup/restore`, `az keyvault key restore`

Network

- Bump version from '2020-07-01' to '2020-08-01'
- `az network public-ip create`: Support '--zone 1 2 3' after '2020-08-01'
- `az network routeserver peering`: Rename `--vrouter-name` by `--routeserver`
- `az network express-route peering create`: Support ipv6 address
- `az network public-ip create`: Expose a new argument `--tier`

OpenShift

- Update of az openshift deprecation warning

Search

- `az search`: Fix the `--identity-type` helper's guide.

SQL

- Update az sql mi examples
- `az sql db/elastic-pool create/update`: Add maintenance-configuration argument
- `az sql db replica create`: Add `--secondary-type` argument

Storage

- [BREAKING CHANGE] `az storage account file-service-properties`: Default to enable delete retention policy with retention days 7 in server side

- Fix #16872: az storage blob now (2.19) requires login even if connection-string is provided
- Fix #16959: az storage copy crashes: ValidationError: local variable 'service' referenced before assignment
- Fix #14054: 'NoneType' object has no attribute 'name'
- Fix #16679: `az storage blob download` fails with "Permission denied" if the destination file is a directory
- Upgrade storage api version to 2021-01-01
- Support version in Lifecycle management policy
- Support storage account shared key access management
- `az storage account network-rule`: GA resource access rules
- Support double encryption for encryption scope
- `az storage account blob-service-properties update`: Support --change-feed-retention-days
- Support rewrite existing blob

February 10, 2021

Version 2.19.1

Key Vault

- Hotfix: Dependency package `azure-keyvault-administration` is pinned to 4.0.0b1

February 09, 2021

Version 2.19.0

ACR

- `az acr connected-registry install info`: Add new key `ACR_SYNC_TOKEN_NAME` with the same value as `ACR_SYNC_TOKEN_USERNAME`. A warning that the latter will be deprecated is displayed.
- `az acr connected-registry install renew-credentials`: Add new key `ACR_SYNC_TOKEN_NAME` with the same value as `ACR_SYNC_TOKEN_USERNAME`. A warning that the latter will be deprecated is displayed.

AKS

- Add managed cluster stop/start bindings
- `az aks check-acr`: Fix Kubernetes version check

APIM

- GA the command group

App Config

- [BREAKING CHANGE] `az appconfig feature filter add`: Support adding JSON objects as feature filter parameter values

App Service

- `az appservice ase/plan`: Support ASEv3
- Fix #16026 and #16118 for `az appservice plan`
- Fix #16509: Add support for os-preference
- Improve behavior of `appservice ase create-inbound-services` to allow skipping DNS services and support DNS for ASEv2
- `az webapp up/az webapp create`: Fix nonetype errors
- `az webapp up/create`: better error handling of app name with period
- Fix #16681: `az webapp config ssl import`: Fix bug that causes failures on national clouds

ARM

- `az provider register`: Support registering management group

Backup

- Add CRR functionality for IaaSVM and other CRR commands
- `az backup protectable-item list`: Add protectable-item-type as an optional argument

BotService

- `az bot create/update`: Add Encryption features `--cmk-key-url` and `--encryption-off`
- `az bot update`: Rename Encryption-OFF arg to CMK-OFF and updating api version

Compute

- [BREAKING CHANGE] `vmss create`: Rename orchestration mode values
- New command group `sshkey`. Allow referencing a SSH key resource when creating a VM
- `az disk create/update`: Add parameter `--enable-bursting` to support disk bursting

Extension

- Support extension command prefix match for dynamic install

HDInsight

- `az hdinsight create`: Add a new parameter `--enable-compute-isolation` to support create cluster with compute isolation feature.

Key Vault

- `az keyvault key import`: Support `--curve` parameter for importing BYOK keys
- `az keyvault certificate download`: Fix deprecated/removed method call
- `az keyvault create/update`: Remove preview tag for `--enable-rbac-authorization`

Monitor

- `az monitor metrics alert create`: Fix 'resource is not found' error

NetAppFiles

- `az netappfiles account ad add`: Add parameter `--security-operators`.
- `az netappfiles volume create`: Add parameter `--smb-continuously-available`.
- `az netappfiles volume create`: Add parameter `--smb-encryption`.
- `az netappfiles`: No longer in preview mode.

Network

- [BREAKING CHANGE] `az network vrouter`: Deprecate this command group, please use `az network routeserver`.
- `az network routeserver`: Add new command group.

- `az network application-gateway create`: Add parameter `--ssl-profile-id`
- `az network application-gateway client-cert`: Manage trusted client certificate of application gateway
- `az network application-gateway ssl-profile`: Manage ssl profiles of application gateway
- Add support for private endpoint connections to DigitalTwins

Profile

- `az login`: Launch browser in WSL 2

RDBMS

- `az mysql flexible-server create --iops`: Allow user to choose IOPS for their SKU.
- Update Postgres restore command to support available zone

Search

- Upgrade to use the latest (8.0.0) azure-mgmt-search python sdk
- `az search create`: Add support for search service creation with IP rules, public endpoint access and/or msi
- `az search update`: Add support for search service update with IP rules, public endpoint access and/or msi
- `az search private-endpoint-connection`: Manage private endpoint connection to a search service
- `az search shared-private-link-resource`: Manage shared private link resources in a search service
- `az search private-link-resource`: List available private link resources in a search service

Security

- Add new commands for `az security`

SQL

- Add managed hsm regex match to SQL
- Upgrade azure-mgmt-sql to 0.26.0

- `az sql mi create/update`: Add support for maintenance configuration in managed instance operations
- Support SQL server DevOps audit policy commands

Storage

- Fix #16079: public blob gives error
- GA Storage routing reference
- Fix #9158: Cannot generate a working SAS key from a policy
- Fix #16489: Upgrade azcopy to 10.8.0
- `az storage account blob-service-properties`: Support default service version
- Fix #16519: azcopy is given more powerful SAS than needed (has write, only needs read)

Synapse

- `az synapse workspace create`: Add parameter `--key-identifier` to support to create workspace using customer-managed key.
- `az synapse workspace key`: Add CRUD cmdlets to support to manage keys under specified synapse workspace.
- `az synapse workspace managed-identity`: Add cmdlets to support CRUD managed identity to sql access setting.
- `az synapse workspace`: Add data exfiltration protection support, add parameter `--allowed-tenant-ids`.

January 19, 2021

Version 2.18.0

ACR

- `az acr create / update`: Add `--allow-trusted-services`. This parameter determines whether trusted azure services are allowed to access network restricted registries. The default is to allow.

AKS

- `az aks check-acr`: Add new check-acr command

App Service

- Fix #13907: `az webapp config ssl import`: Change command to also import App Service Certificate
- Fix #16125: `az webapp ssh`: If using a windows client, open browser to scm link
- Fix #13291: `az webapp deployment slot swap`: The command should support preserve vnet.
- [BREAKING CHANGE] Fix regression where you can't use a runtime version with a space in the name

ARM

- `az deployment` : Add support for `--query-string`
- `az ts`: Error handling improvement for `--template-file` without `--version` prohibited

Backup

- `az backup protection backup-now`: Set default retention period to 30 days

Compute

- Fix issue of none storage_profile
- Better error handling of external tokens
- Fix a vmss reimagine issue
- `az vm/vmss extension set`: New parameter `--enable-auto-upgrade`

Container

- `az container exec`: Remove eol check to avoid closing terminal before it even started on linux

DMS

- `az dms project task create`: Added task type parameter to help distinguish if a scenario is an online migration or an offline migration.
- `az dms project task cutover`: Add new command which allows tasks with an online migration task type to cutover and end the migration.

- `az dms project create/az dms project task create`: Enable MySQL and PostgreSQL projects/tasks to be created.

IoT

- Add `--tags` to IoT Hub create and update

Monitor

- [BREAKING CHANGE] `az monitor log-analytics workspace data-export`: Remove deprecated `--export-all-tables` parameter and require `--tables` parameter

RDBMS

- Remove the preview tag for server key and add admin commands for Postgres and MySql

Role

- Fix #11594: `az role assignment create`: Only show supported values for `--assignee-principal-type`

Storage

- Fix #16072: Upload file with big size
- Fix #12291: `az storage blob generate-sas` does not properly encode `--full-uri`
- GA PITR and blob service properties in SRP

January 04, 2021

Version 2.17.1

RDBMS

- Hotfix: `az mysql create`: Revert incorrect parameter name 'serv_name' to 'service_name'

December 29, 2020

Version 2.17.0

ACR

- Support zone redundancy
- `az acr connected-registry`: New feature for on-prem Azure Container Registry
- `az acr scope-map update`: --add and --remove are deprecated, they are renamed to --add-repo --remove-repo
- `az acr scope-map create/update`: Add support to handle Gateway actions.
- `az acr token create`: support added for gateway actions

AKS

- Fix: add arguments removed by a previous PR
- `az aks get-credentials`: Clarify documentation for get-credentials

App Service

- Allow customer to create Python 3.9 function app
- Fix #14583: az webapp up should generate default name if name isn't provided
- Fix: Better error handling when trying to create duplicate ASP in diff location

ARM

- `az ts`: Add support for --tags
- `az ts`: Support deleting a single version
- `az provider register`: Add --accept-terms for registering RPaaS
- Fix parsing JSON files with multi-line strings

ARO

- `az aro delete`: Add RBAC validation on cluster deletion
- `az aro update`: Add RBAC validation on cluster update
- Ensure worker_profile is not None before getting the subnets from

Backup

- `az backup job list`: Solve -o table bug and added backup_management_type as command input

Batch

- Upgrade data plane to [azure batch 10.0.0 ↗](#)
- [BREAKING CHANGE] az batch job task-counts: Change the output from a JSON object returning task counts to a complex JSON object that includes task counts (`taskCounts`) as well as task slot counts (`taskSlotCounts`).

Compute

- New license type RHEL_ELS_6
- Adopt track2 SDK, `azure-mgmt-compute==18.0.0`

Container

- Fix misspelling in `az container create` CLI example text.

DataBoxEdge

- New command module: support for data-box-edge devices and management

IoT

- Update device key generation
- Update identity-enabled hub tests to fix endpoint RBAC issues

Key Vault

- `az keyvault key import`: Support `--kty` for importing BYOK keys

Monitor

- `az monitor metrics alert create`: Improve error message to give more actionable insight

Network

- `az network private-endpoint create`: Add more declaration of '--subnet' and '--private-connection-resource-id'
- Change validator of application-gateway ssl-cert create
- Migrate network to track2 SDK

- Fix bug for "az network traffic-manager profile create" when using "--routing-method MultiValue"

Profile

- Fix "missing secret or certificate in order to authenticate through a service principal"

Role

- `az ad sp create-for-rbac`: Deprecate creating Contributor role assignment by default

Security

- Add secure score commands
- Fix update alert command and support new value

SQL

- `az sql dw update`: do not accept backup-storage-redundancy argument
- `az sql db update`: update backup storage redundancy as requested from command

Storage

- Fix issue #15965: Clarify how to remove multiple legal hold tags with `az storage container legal-hold [clear|set]`
- `az storage account encryption-scope`: GA support
- Fix issue #9959: Trying to download a snapshot version of a file share fails with ResourceNotFound

Synapse

- Add new cmdlets `az synapse sql ad-admin show, create, update, delete`
- Add new cmdlet `az synapse workspace firewall-rule update`
- Add new cmdlets `az synapse sql audit-policy show, update`
- Add integration runtime related cmdlets

December 08, 2020

Version 2.16.0

ACR

- Update description for KEK param

AKS

- `az aks nodepool add/update/upgrade`: Take max surge parameter
- Add support for AGIC addon
- Change MSI cluster to default

API M

- `az apim restore`: New command to restore a backup of an API Management service

App Service

- Fix #14857: Let users update webapp config even with access restriction
- `az functionapp create`: Accept `--runtime python` and `--runtime-version 3.9` as Azure Functions v3 parameter
- Fix #16041: az webapp config ssl create results in unknown error

ARM

- `az deployment-scripts`: Remove preview flag

Backup

- Fix #14976: CLI error improvements for ValueError and AttributeError cases
- `az backup protection undelete`: Add support for AzureWorkload protection undelete using CLI
- Fix Bad Request Error for Correct Workload Type Input

CDN

- Add preview multi-origin support.
- Add BYOC auto-rotation.

Key Vault

- `az keyvault key/secret list`: Add a parameter `--include-managed` to list managed resources

Monitor

- `az monitor metrics alert create`: Support dynamic thresholds for condition parameter
- `az monitor metrics alert update`: Support dynamic thresholds for condition parameter
- `az monitor metrics alert dimension create`: Build a metric alert rule dimension
- `az monitor metrics alert condition create`: Build a metric alert rule condition

MySQL

- Add MySQL version upgrade CLI

NetAppFiles

- `az netappfiles account ad add`: Two optional parameters added, `aes_encryption` and `ldap_signing`
- `az netappfiles account backup-policy update`: Three optional parameters added named `tags`, `type` and `id`
- `az netappfiles snapshot policy create`: An optional parameter added named `provisioning_state`

Network

- `az network network watcher configure`: Fix `NetworkWatcherCountLimitReached` error caused by case sensitivity of `location` value
- `az network application-gateway http-listener`: Fix bug that cannot create and update with WAF policy name
- `az network route-table`: Deprecate route table V1
- `az network cross-region-lb`: Support cross-region load balancer

- `az network express-route port generate-loa`: New command to generate and download the PDF letter of authorization for a ExpressRoutePort

Packaging

- Add Ubuntu Groovy package

RDBMS

- Add single server show-connection-string and tests for local-context commands, server creation

Role

- Add long-summary/warning for commands generating credentials

Search

- Add SKU option

Service Fabric

- Update SF app docs. only support for arm deployed resources

Synapse

- Support synapse sql dw cmdlets and update az synapse workspace create cmdlet

November 20, 2020

Version 2.15.1

Profile

- Hotfix: Fix #15961: az login: UnboundLocalError: local variable 'token_entry' referenced before assignment

November 17, 2020

Version 2.15.0

ACS

- Add v3 deprecation warnings

AKS

- Add ephemeral os functionality
- Engineering improvement: Replace addon strings with constants
- `az aks install-cli`: Support customize download url
- `az aks browse`: Point to Azure Portal Kubernetes resources view if k8s >=1.19 or kube-dashboard not enabled
- Support BYO control plane identity
- `az aks use-dev-spaces`: Indicate that dev-spaces commands are deprecated

AMS

- Change "region" to "location" in output string: `az ams account sp create`

App Config

- Fix key vault client initialization

App Service

- Fix #13646: Unable to create App Service Plan in a different resource group to App Service Environment
- Fix #11698 #15198 #14862 #15409: `az webapp/functionapp config access-restriction add`
- `az functionapp create`: Add Node 14 preview support.
- `az functionapp create`: Remove preview flag from custom handlers.
- [BREAKING CHANGE] `az functionapp update`: Migrate a functionapp from Premium to Consumption plans now requires the '--force' flag.
- `az functionapp update`: Add error message if functionapp migration involves any plans on Linux.
- `az functionapp update`: Add more descriptive error message if functionapp migration fails.

ARM

- Fix an issue where What-If shows two resource group scopes with different casing
- `az deployment`: Print out error details for deployment

Backup

- Fix #14976: KeyError fixed and help text improved

Batch

- Fix #15464: Update check for pfx file without password in batch create_certificate

Billing

- [BREAKING CHANGE] `az billing invoice`: Remove properties BillingPeriodsNames and DownloadUrlExpiry from the response.
- `az billing invoice`: Support many other scopes like BillingAccount, BillingProfile and existing subscription.
- `az billing account`: New commands to support display and update existing billing accounts.
- `az billing balance`: New commands to support display balance of a billing profile.
- `az billing customer`: New commands to support display customer of billing account.
- `az billing policy`: New commands to support display and update policy of a customer or a billing profile.
- `az billing product`: New commands to manage products of a billing account.
- `az billing profile`: New commands to manage a billing profile.
- `az billing property`: New commands to display and update a billing account's properties.
- `az billing subscription`: New commands to manage the subscriptions for a billing account.
- `az billing transaction`: New commands to list transaction of an invoice.
- `az billing agreement`: New commands to manage billing agreement.
- `az billing permission`: New commands to manage billing permission.
- `az billing role-assignment`: New commands to manage role assignment.
- `az billing role-definition`: New commands to display role definition.
- `az billing instruction`: New commands to manage instructions of billing.

Compute

- Fix update permission check issue
- Enhancement of vm list-skus table format
- vm host group create: Make --platform-fault-domain-count required and update help
- Support update vm/image version when they use cross tenant images

DPS

- Allow tags in IoT DPS create command

HDInsight

- az hdinsight create: Add two parameters `--resource-provider-connection` and `--enable-private-link` to support relay outbound and private link feature.

Key Vault

- Refine error messages for HSM `list-deleted` and `purge`
- Support selective key restore for managed HSMs

NetAppFiles

- [BREAKING CHANGE] az netappfiles pool update: Remove service-level from parameters.
- `az netappfiles pool update`: Add optional parameter `qos-type`.
- `az netappfiles pool create`: Add optional parameter `qos-type`.
- `az netappfiles volume replication suspend`: Add `force-break-replication` as optional parameter.
- Add `az netappfiles volume replication re-initialize`: New command is added to re-initialise replication.
- Add `az netappfiles volume pool-change`: New command to change the pool of a volume.
- Add `az netappfiles snapshot policy`: New command group with `list`, `delete`, `update`, `show`, `create` and `volumes` commands.
- Add `az netappfiles account backup`: New command group with `show`, `list` and `delete` commands
- Add `az netappfiles volume backups`: New command group with `show`, `list`, `delete`, `update` and `create` commands.

- Add az netappfiles account backup-policy: New command group with show, list, delete, update and delete commands.
- Add az netappfiles vault list: New command is added.
- `az netappfiles account ad add`: Add optional parameters kdc-ip, ad-name, server-root-ca-certificate and backup-operators
- `az netappfiles volumes create`: Add optional parameters snapshot-policy-id, backup-policy-id, backup-enabled, backup-id, policy-enforced, vault-id, kerberos-enabled, throughput-mibps, snapshot-directory-visible, security-style, kerberos5-read-only, kerberos5-read-write, kerberos5i-read-only, kerberos5i-read-write, kerberos5p-read-only, kerberos5p-read-write and has-root-access.
- `az netappfiles volume update`: Add optional parameters vault-id, backup-enabled, backup-policy-id, policy-enforced and throughput-mibps

Network

- Fix bug that can't create a Standard_v2 application-gateway without a private static IP address
- `az network dns zone import`: Raise FileOperationError instead of FileNotFoundError if zone file doesn't exist
- Fix NoneType error crash while deleting nonexisting resources of ApplicationGateway, LoadBalancer, Nic

Private DNS

- `az network private-dns zone import`: Raise FileOperationError instead of FileNotFoundError if zone file doesn't exist

Profile

- `az login`: Add back the warning that a browser is opened

Role

- `az role assignment create`: Make `--description`, `--condition`, `--condition-version` preview

Security

- `az security pricing`: Update help to reflect current API version being called

Storage

- Fix #15600: az storage fs exists: in case fs does not exist ResourceNotFoundError is returned
- Fix #15706: The examples for storage container create are incorrect
- `az storage blob delete-batch`: Correct typo in documentation.

November 09, 2020

Version 2.14.2

App Service

- Fix #15604, #15605: Add Dotnet5 support

November 06, 2020

Version 2.14.1

ARM

- Hotfix: Add TS multiline string support for template inputs

October 27, 2020

Version 2.14.0

AKS

- Add PPG support
- Update max standard load balancer timeout to 100 minutes

APIM

- Fix issue with creating consumption tier instance

App Config

- Fix querying key-values by comma separated labels

App Service

- Bugfix: az webapp up fails when user doesn't have write permissions to project's parent directory
- Fix #13777: Fix to remove escape chars from XML
- Fix #15441: az webapp create-remote-connection fails with AttributeError: 'Thread' object has no attribute 'isAlive'
- [BREAKING CHANGE] az webapp up: add optional params (os & runtime) and updated runtimes

ARM

- Make template deployment What-If commands GA
- [BREAKING CHANGE] Add user confirmation for az ts create
- Fix the returned data when tagging multiple resources

Backup

- `az backup policy create`: Add support for IaaSVM backup policy creation from CLI
- Increasing VM protection limit from 100 to 1000

Compute

- `sig image-definition create`: add --features
- New API version of gallery_images 2020-09-30
- `az vm update / az sig image-version update`: Support update vm/image-version even it uses a cross tenant image
- Remove validation of vm host SKUs

Cosmos DB

- `az cosmosdb create/update`: Improve error message from incorrect --locations input
- `az cosmosdb sql container create/update`: Add --analytical-storage-ttl parameter

HDInsight

- [BREAKING CHANGE] az hdinsight create: remove two parameters: --public-network-access-type and --outbound-public-network-access-type

IoT Central

- Remove preview warning since it is already GAed

Key Vault

- Invalidate `--enable-soft-delete false` while creating or updating vaults
- Make `--bypass` and `--default-action` work together with network acl parameters while creating vaults

Misc.

- Add bash-completion to Dockerfile

RDBMS

- Add List-SKUS Command, Table Transformers, Local Context for Postgres, MySQL, Mariadb Single Server
- [BREAKING CHANGE] Parameter name updates. Improvements to Management Plane for MySQL and PostgreSQL
- `az postgres|mariadb|mysql server create` : Update create experience for Postgres, MySQL and MariaDB - new fields in the output , Introduce new values for `--public` parameter in create command (all,<IP>,<IPRange>,0.0.0.0)

SignalR

- `az signalr create`: Add new option `--enable-messaging-logs` for controlling service generate messaging logs or not
- `az signalr update`: Add new option `--enable-messaging-logs` for controlling service generate messaging logs or not

SQL

- [BREAKING CHANGE] Fix response for backup storage redundancy param name and value for MI
- `az sql db audit-policy show`: extend to show database's audit policy including LA and EH data
- `az sql db audit-policy update`: extend to allow LA and EH update along with database's audit policy

- `az sql db audit-policy wait`: place the CLI in a waiting state until a condition of the database's audit policy is met.
- `az sql server audit-policy show`: extend to show servers's audit policy including LA and EH data
- `az sql server audit-policy update`: extend to allow LA and EH update along with server's audit policy
- `az sql server audit-policy wait`: place the CLI in a waiting state until a condition of the server's audit policy is met.
- Add AAD-only Support for SQL Managed Instances and Servers
- `az sql db replica create`: Add --partner-database argument

Storage

- Fix #15111: `az storage logging update` fails without optional argument
- Fix bug when using set-tier command with service principal login
- Upgrade version for file datalake to 2020-02-10
- `az storage queue list`: Track2 supported
- `az storage fs access`: Support managing ACLs recursively

Synapse

- Add pipeline, linked service, trigger, notebook, data flow and dataset related cmdlets

October 13, 2020

Version 2.13.0

ACR

- `az acr helm`: Update deprecation url
- Add logtemplate and systemtask changes for ACR Tasks

AKS

- Support virtual-node with aks create: `az aks create --enable-addons virtual-node`
- Add node image only option for CLI
- Expect kube-dashboard addon be disabled by default
- `az aks create/update`: Add LicenseType support for Windows

- Support add Spot node pool
- Honor addon names defined in Azure CLI

AMS

- Fix #14687: Mixed resource group and account name in command "az ams streaming-endpoint show"

App Config

- Fix test bug
- Support AAD auth for data operations

App Service

- `az functionapp deployment source config-zip`: Fixed an issue where config-zip could throw an exception on success on linux consumption
- Bugfix: Better error messages for webapp commands
- `az appservice domain create, show-terms`: Add ability to create app service domain
- `az functionapp create`: Removed the preview flag from Java 11 when creating a new function app
- [BREAKING CHANGE] az webapp create, az webapp up - Update available webapp runtimes

ARM

- `az ts`: Add new commands for template specs
- `az deployment` : Add support for --template-spec -s

Compute

- Fix host group creation FD count limitation
- Add new command to support upgrading extensions for VMSS
- Fix the image reference is missing issue

HDInsight

- `az hdinsight create`: add deprecate information for argument --public-network-access-type and --outbound-public-network-access-type

- `az hdinsight create`: add deprecate information for argument `--public-network-access-type` and `--outbound-public-network-access-type`
- `az hdinsight create`: add parameter `--idbroker` to support customer to create ESP cluster with HDInsight Id Broker

IoT Central

- Remove deprecated 'az iotcentral' command module

Key Vault

- Support `--hsm-name` for `az keyvault key encrypt/decrypt`

Lab

- Fix #14127: `__init__()` takes 1 positional argument but 2 were given

Network

- `az network application-gateway ssl-cert show`: Add example to demonstrate certificate format and fetch information
- `az network application-gateway rule`: Support `--priority` option
- `az network application-gateway create`: Fix bug that cannot create without public IP specified
- `az network application-gateway waf-policy managed-rule rule-set add`: Expose server error to user to give more intuitive hint message.
- `az network application-gateway waf-policy managed-rule rule-set update`: Support to change rule set type version.

RDBMS

- Bugfix: `az postgres flexible-server create` Remove hardcoded API version from network client.

Role

- Fix #15278: `az role assignment list/delete`: Forbid empty string arguments

SQL

- `az sql midb log-replay`: Support for log replay service on managed database
- Ignore character casing for backup storage redundancy param value for managed instance
- [BREAKING CHANGE] `az sql db create`: Add `--backup-storage-redundancy` parameter; add warning for unspecified bsr/bsr == Geo.

SQL VM

- `az sql vm show`: Add configuration options to `--expand` flag

Storage

- [BREAKING CHANGE] `az storage blob copy start`: Fix format issue for `--destination-if-modified-since` and `--destination-if-unmodified-since`
- [BREAKING CHANGE] `az storage blob incremental-copy start`: Fix format issue for `--destination-if-modified-since` and `--destination-if-unmodified-since`
- `az storage fs`: Fix connection string issue
- `az storage share-rm`: GA release access tier
- `az storage container-rm`: Add a new command group to use the Microsoft.Storage resource provider for container management operations.

September 29, 2020

Version 2.12.1

RDBMS

- Hotfix: `az postgres flexible-server create` : Update VnetName to exclude servername and update default region for MySQL

September 22, 2020

Version 2.12.0

ACR

- Fix #14811 Add support for dockerignore override

AKS

- CLI should tolerate empty kubeconfig
- FIX #12871: az aks enable-addons: Autogenerated help example is wrong for virtual-node option
- Remove legacy aci connector actions
- Support azure policy addon in azure-cli
- Fix case sensitive issue for AKS dashboard addon
- Update mgmt-containerservice to 9.4.0 and enable 09-01 API

API

- Support product / productapi / namedValue entity commands && bump sdk version

App Config

- Support enabling/disabling PublicNetworkAccess for existing stores

App Service

- Add support for Premium V3 pricing tier
- Fix #12653: az webapp log config --application-logging false doesn't turn it off
- Fix #14684: access-restriction remove by ip address does not work; #13837-az webapp create - Example for different RSgroups for Plan and WebApp
- functionapp: Add support for custom handlers. Deprecated Powershell 6.2.
- functionapp: Fix issue where app setting was being incorrectly set for linux custom images

ARM

- `az deployment group/sub/mg/tenant what-if`: Show "Ignore" resource changes last

Compute

- Add new license_type in vm create/update: RHEL_BYOS, SLES_BYOS
- Upgrade disk API version to 2020-06-30
- disk create: add --logical-sector-size, --tier
- disk update: Support --disk-iops-read-only, --disk-mbps-read-only, --max-shares
- New command disk-encryption-set list-associated-resources

- `vm boot-diagnostics enable`: `--storage` becomes optional
- New command: `vm boot-diagnostics get-boot-log-uris`
- `vm boot-diagnostics get-boot-log`: support managed storage

Config

- Rename `local-context` to `config param-persist`

Cosmos DB

- Support for Migration APIs for Throughput resource for Autoscale feature in CosmosDB

Eventhub

Added Cluster commands and `trusted_service_access_enabled` parameter for Networkruleset

Extension

- `az extension add`: Add `--upgrade` option to update the extension if already installed
- Turn on dynamic install by default

IoT

- Enabled minimum TLS version on IoT Hub Create

IoT Central

- App delete operation is now long running operation

IoT Hub

- Deprecated 'show-connection-string' command

Key Vault

- Managed HSM public preview

- Fix the issue that `--maxresults` does not take effect while listing resources or resource versions

Kusto

- Add deprecating message

Monitor

- `az monitor log-analytics workspace linked-storage`: expose detailed error message to customers

Network

- `az network vnet subnet`: Support `--disable-private-endpoint-network-policies` and `--disable-private-link-service-network-policies`
- Fix bug while updateing flow-log when its subproperty `network_watcher_flow_analytics_configuration` is None
- API version bump to 2020-06-01
- Support `--tcp-port-behavior` while configuring a TCP configuration of a Connection Monitor V2
- Support more types and coverage level while creating Endpoint of Connection Monitor V2
- Support `--host-subnet` to create VirtualHub underneath as VirtualRouter

RDBMS

- Management Plane updates for PostgreSQL and MySQL

Role

- `az role assignment create/update`: Support `--description`, `--condition` and `--condition-version`
- `az ad app permission delete`: Support `--api-permissions` to delete specific `ResourceAccess`

Service Fabric

- Add managed cluster and node type commands

SQL

- Upgrade azure-mgmt-sql to 0.20.0
- Add backup storage redundancy optional parameter to MI create cmdlet

Storage

- `az storage share-rm stats`: Get the usage bytes of the data stored on the share.
- GA release storage blob PITR
- `az storage blob query`: Support Azure Storage Query Acceleration
- Support Soft Delete for file share
- `az storage copy`: Add account credentials support and deprecate `--source-local-path`, `--destination-local-path`, `--destination-account-name`
- `az storage account blob-service-properties update`: Add container delete retention policy support

Synapse

- Fixed typo in example of az synapse role assignment create and delete

August 28, 2020

Version 2.11.1

ACR

- Add Isolated Tier to Agent Pool
- Add OCI Artifact Source Context

AKS

- Fix aks cluster create issue

Cognitive Services

- [BREAKING CHANGE] Show additional legal term for certain APIs

Network

- [BREAKING CHANGE] Allow to create both public and private IP while creating an Application Gateway
- `az network list-service-tags`: add details on location parameter use to the help message

Storage

- `az storage blob list`: Support OR properties with new api version

August 25, 2020

Version 2.11.0

AKS

- Remove preview tag from Virtual Node add-on
- Add AKS CMK argument in cluster creation
- Set network profile when using basic load balancer.
- Remove max pods validation from CLI and let preflight handle it
- Fixing add-ons available in the help message in `az aks create`
- Bring in support for cluster autoscaler profile in core CLI

AppService

- `az webapp`: Add list-instances command
- `az webapp ssh`: Add --instance parameter to connect to a specific instance
- `az webapp create-remote-connection`: Add --instance parameter to connect to a specific instance
- Fix #14758: az webapp create errors when creating windows app with --runtime dotnetcore
- Fix #14701: Implement functionapp create --assign-identity
- Fix #11244: `az webapp auth update`: Add optional parameter to update client-secret-certificate-thumbprint
- `az functionapp keys`: Added commands that allow users to manage their function app keys
- `az functionapp function`: Added commands that allow users to manage their individual functions
- `az functionapp function keys`: Added commands that allow users to manage their function keys

- Fix #14788: az webapp create not getting correct webapp when names are substrings
- az functionapp create: Removed ability to create 2.x Functions in regions that don't support it

ARM

- az resource list: Extend the return data of `createdTime`, `changedTime` and `provisioningState`
- az resource: Add parameter `--latest-include-preview` to support using the latest api-version whether this version is preview

ARO

- CLI enhancements, including route table checking permissions

Cloud

- az cloud register: Fix registering clouds with a config file

Compute

- Update VM SKUs that support accelerated networking
- az vm create: Automatic in-guest patching
- az image builder create: Add `--vm-size`, `--os-disk-size`, `--vnet`, `--subnet`
- New command az vm assess-patches

Container

- Fix #6235: Update help text for ports parameter in container create

Datalake Store

- Fix issue #14545 for data lake join operation

EventHub

- az eventhubs eventhub create/update: Change documentation of `destination_name`

Extension

- Add `az extension list-versions` command to list all available versions of an extension

HDInsight

- Support creating cluster with autoscale configuration and Support managing autoscale configuration
- Support creating cluster with encryption at host

IoTCentral

- CLI documentation improvements

Monitor

- `az monitor metrics alert create`: support RG and Sub as the scope values

NetAppFiles

- [BREAKING CHANGE] `az netappfiles snapshot create`: Removed file-system-id from parameters
- [BREAKING CHANGE] `az netappfiles snapshot show`: Snapshot no longer has parameter file-system-id
- `az netappfiles account`: Model ActiveDirectory has a new parameter backup_operators
- `az netappfiles volume show`: Model dataProtection has a new parameter snapshot
- `az netappfiles volume show`: Model Volume has a new parameter snapshot_directory_visible

Network

- `az network dns export`: export FQDN for MX, PTR, NS and SRV type instead of relative path
- Support private link for managed disks
- `az network application-gateway auth-cert show`: Add example to demonstrate certificate format
- `az network private-endpoint-connection`: support app configuration

RBAC

- `az ad group create`: support specify description when creating a group
- `az role definition create`: print human readable message instead of exception when assignableScope is an empty array
- [BREAKING CHANGE] `az ad sp create-for-rbac`: change default permission of created certificate

SQL

- `az sql server audit-policy`: Add sql server auditing support

Storage

- `az storage blob copy start-batch`: Fix #6018 for --source-sas
- `az storage account or-policy`: Support storage account object replication policy
- Fix issue #14083 to upgrade azure-multiapi-storage package version for package issue and new api version support
- `az storage blob generate-sas`: add examples for --ip and refine error message
- `az storage blob list`: Fix next_marker issue

Synapse

- Add workspace, sparkpool, sqlpool related cmdlets
- Add spark job releted commands based on track2 sdk
- Add accesscontrol feature related commands based on track2 sdk

Upgrade

- Add `az upgrade` command to upgrade azure cli and extensions

August 11, 2020

Version 2.10.1

App Service

- Fix #9887 webapp and functionapp, support assigning/removing user managed identity

- Fix #1382, #14055: Update error messages for az webapp create and az webapp config container set
- `az webapp up`: Fix default ASP selection logic when --plan parameter is not provided

AppConfig

- Support enabling/disabling PublicNetworkAccess during store creation

Compute

- Support associating disk and snapshot with a disk-access resource

Lab

- Fix for issue #7904 date validation bug in lab vm creation

Storage

- `az storage blob upload-batch`: Fix issue #14660 with unpositional arguments

August 04, 2020

Version 2.10.0

AKS

- `az aks update`: Change --enable-aad argument to migrate a RBAC-enabled non-AAD cluster to a AKS-managed AAD cluster
- `az aks install-cli`: Add --kubelogin-version and --kubelogin-install-location arguments to install kubelogin
- Add az aks nodepool get-upgrades command

AMS

- Fix #14021: az ams account sp is not idempotent

APIM

- apim api import: support API import and enhance other api level cli commands

App Service

- Fix #13035: Add validation for az webapp config access-restriction to avoid adding duplicates

AppConfig

- Default to standard sku if not specified
- [BREAKING CHANGE] Support settings with JSON content type

ARM

- `az resource tag`: Fix the bug of managedApp tagging and some related test issues
- `az deployment mg/tenant what-if`: Add support to management group and tenant level deployment What-If
- `az deployment mg/tenant create`: Add --confirm-with-what-if/-c parameter.
- `az deployment mg/tenant create`: Add --what-if-result-format/-r parameter.
- `az deployment mg/tenant create`: Add --what-if-exclude-change-types/-x parameter.
- `az tag`: az tag support for resource id parameter

Backup

- Trigger AFS container/item discovery only when needed

CDN

- Add private link fields to origin

Compute

- `az vm/vmss create`: Select a valid username for user if the default username is invalid
- `az vm update`: support cross tenant image
- `az disk-access`: Add new command group to operate disk access resource
- Support dedicated host group automatic placement
- Support ppg and spg in VMSS orchestration mode

Config

- `az config`: Add new `config` command module

Extension

- Support automatically installing an extension if the extension of a command is not installed

HDInsight

- Add 3 parameters to the command `az hdinsight create` to support private link and encryption in transit feature:

IoT Hub

- Fix #7792: IoT Hub Create is not idempotent

IoT Central

- Add parameter option list for iot central

KeyVault

- `az keyvault key encrypt/decrypt`: add parameter `--data-type` for explicitly specifying the type of original data

Monitor

- `az monitor log-analytics workspace data-export`: support event hub namespace as the destination.
- `az monitor autoscale`: support namespace and dimensions for --condition

NetAppFiles

- `az volume revert`: Add Volume Revert to revert a volume to one of its snapshots.
- [BREAKING CHANGE] Remove `az netappfiles mount-target`.
- `az volume show`: Add site to Active Directory Properties

Network

- `az application-gateway private-link add`: support to specify an existing subnet by ID
- `az network application-gateway waf-policy create`: support version and type

Storage

- Fix #10302: Support guess content-type when synchronizing files
- `az storage blob lease`: Apply new api version for blob lease operations
- `az storage fs access`: Support AAD credential in managing access control for ADLS Gen2 account
- `az storage share-rm create/update`: add --access-tier to support access tier

July 16, 2020

Version 2.9.1

AKS

- Remove explicit setting of VMSS in Windows example command since it is now default

IoT

- [BREAKING CHANGE] `az iot pnp`: Remove IoT PNP preview commands from core CLI

REST

- Fix #14152: `az rest`: Accept ARM URLs without subscription ID

Storage

- Fix #14138: Make some permissions optional

July 14, 2020

Version 2.9.0

ACR

- Handle log artifact link from Registry to stream logs
- Deprecate helm2 commands

AKS

- `az aks create`: add --enable-aad argument
- `az aks update`: add --enable-aad argument

APIM

- Added general az apim api commands

AppConfig

- Add example for using --fields in appconfig revision

AppService

- `az functionapp create`: Added support for Java 11 and Powershell 7. Added Stacks API Support.
- Fix #14208 multi-container app creation fails
- Fix az webapp create - use hardcoded runtime stacks

ARM

- `az resource tag`: Fix the problem of tagging resources with resource type `Microsoft.ContainerInstance/containerGroups`

Compute

- Bump version disks 2020-05-01, compute 2020-06-01
- Double encryption of disk encryption set
- `az vmss update`: support specify cross tenant image.
- `az sig image-version create`: support specify cross tenant image.
- `vm/vmss create`: Encryption of cache & data-in-transit for OS/Data disks and temp disks for VM & VMSS
- Add simulate-eviction operation for VM and VMSS

CosmosDB

- Recent features: Autoscale, IpRules, EnableFreeTier and EnableAnalyticalStorage

EventGrid

- Add CLI support for 2020-04-01-preview and mark preview features with is_Preview=True

Find

- Fix #14094 az find Fix Queries failing when not logged in and when telemetry is disabled

HDInsight

- Add two commands to support hdinsight node reboot feature

Monitor

- Remove preview flag for commands under Log Analytics workspace
- `az monitor diagnostic-settings subscription`: Support diagnositc settings for subscription
- `az monitor metrics`: support ',' and '|' in metric name
- `az monitor log-analytics workspace data-export`: support log analytics data export

Network

- `az network application-gateway frontend-ip update`: Deprecating the --public-ip-address parameter
- Bump azure-mgmt-network to 11.0.0
- `az network express-route gateway connection`: support routing configuration
- `az network virtual-appliance`: Support Azure network virtual appliance.
- Application Gateway support private link feature

PolicyInsights

- `az policy state`: add trigger-scan command to trigger policy compliance evaluations

- `az policy state list`: expose versions of policy entities in each compliance record

Profile

- `az account get-access-token`: Show expiresOn for Managed Identity

RDBMS

- Support Minimum TLS version
- Add Infrastructure Encryption for Azure Postgres and MySQL

Security

- Add allowed_connections commands
- Add Adaptive network hardeningss commands
- Add adaptive_application_controls commands
- Addition of az security iot-solution/ iot-alerts/iot-recommendations/iot-analytics REST to Azure CLI
- Add regulatory compliance CLI

SignalR

- Add features including managing private endpoint connections, network rules and upstream

SQL

- `az sql mi create, az sql mi update`: Add `--tags` parameter to support resource tagging
- `az sql mi failover`: Support failover from primary or secondary point

Storage

- `az storage account create/update`: Add `--allow-blob-public-access` to allow or disallow public access for blob and containers
- `az storage account create/update`: Add `--min-tls-version` to support setting the minimum TLS version to be permitted on requests to storage.
- Remove check in token credential
- Fix the storage account name in examples

Webapp

- Bugfix: az webapp log deployment show - return deployment logs instead of log metadata
- Bugfix: az webapp vnet-integration add - fix error handling if bad vnet name, support vnet resource ID

June 23, 2020

Version 2.8.0

ACR

- Add support for region endpoint disable / routing disable
- [BREAKING CHANGE] `az acr login --expose-token` does not accept username and password

ACS

- Remove private cluster and 2019-10-27-preview API

AKS

- Support --yes for `az aks upgrade`
- Revert "change default vm sku to Standard_D2s_v3 (#13541)"
- Add "`az aks update --uptime-sla`"
- Fix typo in `az aks update` command
- Change to support 0 node agent pool and block manual scale for CAS enabled pool
- Fix typo on `VirtualMachineScaleSets` and update references to Kubernetes versions

AMS

- CHANGE help text for "`--expiry`" parameter.

AppService

- `az webapp log deployment show`: Show the latest deployment log, or the deployment logs of a specific deployment if deployment-id is specified
- `az webapp log deployment list`: List of deployment logs available

- Fix: Surface error when invalid webapp name provided
- Fix #13261 az webapp list-runtimes use static list until new Available Stacks API is available
- `az appservice ase create`: Fix create issue #13361
- `az appservice ase list-addresses`: Fix change of SDK #13140.
- Fix webapp/slot creation for Windows Containers
- `az webapp auth update`: Add optional parameter to update runtime-version
- Support list, delete, approve and reject private endpoint connection for webapp in CLI
- Fix #13888 : Add support for Static WebApps: get, list, create commands
- Improved error messages for SSH Tunnel Connection

ARM

- `az tag`: Add examples for -h
- `az deployment group/sub what-if`: Add --exclude-change-types/-x parameter.
- `az deployment group/sub/mg/tenant create`: Add --what-if-exclude-change-types/-x parameter.
- `az deployment group/sub/mg/tenant validate`: Show error messages in a better format.
- `az group export`: Add new parameters `--skip-resource-name-params` and `--skip-all-params` to support skip parameterization
- Add az feature unregister api

ARO

- Add Public, Private to params for help with ingress/apiserver visibility

Batch

- `az batch account create`: Add new parameter `--public-network-access`
- `az batch account create`: Add new parameter `--identity-type`
- `az batch account set`: Add new parameter `--identity-type`
- [BREAKING CHANGE] az batch pool create: When creating a pool using a custom image, the --image property of can now only refer to a Shared Image Gallery image.
- [BREAKING CHANGE] az batch pool create: When creating a pool with --json-file option and specifying a networkConfiguration, the publicIPs property has moved in to a new property publicIPAddressConfiguration. This new property also

supports a new ipAddressProvisioningType property which specifies how the pool should allocate IP's and a publicIPs property which allows for configuration of a list of PublicIP resources to use in the case ipAddressProvisioningType is set to UserManaged

- `az network private-link-resource`: Add support for the Microsoft.Batch batchAccount resource
- `az network private-endpoint-connection`: Add support for the Microsoft.Batch batchAccount resource

CDN

- `az cdn custom-domain enable-https`: Add BYOC support.
- `az cdn custom-domain enable-https`: Fix enabling custom HTTPS with CDN managed certificates for Standard_Verizon and Standard_Microsoft SKUs.

Cognitive Services

- [BREAKING CHANGE] `az cognitiveservices account` now have a unified structure for all commands.
- `az cognitiveservices account identity`: Add identity management for Cognitive Services.

Compute

- `az image builder`: Upgrade API version to 2020-02-14
- `az image builder create`: Add `--identity` to support identity configuration
- `az image builder customizer add`: Support Windows update customizer
- New command `az image builder cancel`
- Show a warning when a user deploys a VMSS pinned to a specific image version rather than latest

Cosmos DB

- `az cosmosdb`: Add exists command to database and container groups
- Allow creating fixed collections

EventHub

- `az eventhubs namespace create` : Add managed identity parameters

Extension

- Add --version to support to install from a specific version
- Enable CLI extensions to include packages in the 'azure' namespace

IoT Hub

- [BREAKING CHANGE] az iot hub job: Remove deprecated job commands

KeyVault

- `az keyvault key import`: Supports importing from strings via two new parameters.
- Support string/bytes encryption and decryption with stored keys

Monitor

- Support no wait for cluster creation
- `az monitor log-analytics workspace saved-search`: Support new commands for saved search

Network

- `az network application-gateway address-pool update`: Refine help message and add examples.
- `az network vnet create`: Support --nsg argument
- `az network lb address-pool`: Support create lb backend pool with backend address.
- `az network application-gateway address-pool`: Fix for --add argument

RBAC

- `az ad sp create-for-rbac`: Support name with space, slash and back slash
- `az ad sp create-for-rbac`: Refine error message when user specify an invalid scope

Security

- Add security assessment commands

SQL

- `az sql db ltr-policy/ltr-backup`: update/show long term retention policy, show/delete long term retention backups, restore long term backup

Storage

- Fix authentication issue to support get token for --subscription
- `az storage remove`: Fix issue #13459 to raise exception for operation failure
- Fix issues #13012, #13632 and #13657 to remove unused arguments for generate-sas related commands
- `az storage logging update`: Add check for logging version
- `az storage blob show`: Add more properties for blob with track 2 SDK
- Fix #13708: Refine warning message for credential
- `az storage share-rm create/update`: Add NFS protocol and root squash support
- `az storage account create`: Add support for double encryption
- [BREAKING CHANGE] `az storage blob/container/file/share/table/queue generate-sas`: make --expiry and --permissions required
- `az storage blob set-tier`: Migrate to Track 2 to support setting rehydrate priority

June 02, 2020

Version 2.7.0

ACR

- Fix a typo in an error message of token creation

AKS

- Change default vm sku to Standard_D2s_v3
- Fix creating role assignment for MSI cluster plus custom subnet

AppService

- Fix #12739 az appservice list-locations returns some invalid locations

ARM

- `az deployment`: Fix issue #13159 of incorrect message of JSON after removing comments and compressing
- `az resource tag`: Fix issue #13255 of tagging resources with resource type `Microsoft.ContainerRegistry/registries/webhooks`
- Improve the examples for the resource module

ARO

- Change CLIError to correct flag for --worker-vm-disk-size-gb

EventHub

- Fix for issue #12406 Argument --capture-interval does not update the "intervalInSeconds"

HDInsight

- Change get_json_object to shell_safe_json_parse

Monitor

- `az monitor metrics alert`: refine several help messages
- `az monitor diagnostic-settings create`: support --export-to-resource-specific argument
- Support LA workspace recover

Network

- `az network dns zone`: support - character
- `az network vpn-connection ipsec-policy`: change the --sa-lifetime and --sa-max-size to larger values in example
- Bump network to 2020-04-01
- `az network private-endpoint-connection`: support event grid
- `az network express-route list-route-tables`: fix bug that cannot list routes as table

Packaging

- Add Ubuntu Focal Package

RBAC

- `az ad sp credential reset`: modify credential generation to avoid troublesome special characters

Redis

- Fix #13529: Change documentation of parameter `enable_non_ssl_port`

Storage

- `az storage copy`: Add parameter `--follow-symlinks` to support symlinks
- Enable local context for storage account
- `az storage logging`: Fix issue #11969 to refine error message

May 19, 2020

Version 2.6.0

ACR

- Add default timeout of 5 minutes for any requests to ACR
- Support disable public network access
- `az acr token create`: expose `--days` argument
- `az acr import`: accept `--source` argument values which contain login in server name through client end correction

ACS

- Bug fix: remove fields cleanup for fields that no longer exist

AKS

- Update uptime-sla command help context
- Remove range check for updating min count for autoscaler
- Fix that cli doe not fail when user only specifies Windows password

AMS

- `az ams transform create`: Add ability to create a transform with a FaceDetector preset
- `az ams content-key-policy create` : Add ability to create a FairPlay content key policy with an offline rental configuration

AppConfig

- Bug fix for list key values with fields

AppService

- `az functionapp create`: AzureWebJobsDashboard will only be set if AppInsights is disabled
- Fix #10664- VNet Integration - Location Check Issue & fix #13257- az webapp up failing when RG needs to be created
- `az webapp|functionapp config ssl import`: Lookup key vault across resources groups in subscription and improve help and examples.
- Onboard local context for app service

ARM

- `az deployment`: Fix the problem that the templateLink will not be returned when deploying or validating template-uri
- `az deployment`: Fix the problem that deployment/validate does not support specially encoded character
- `az deployment sub/group what-if`: Fix array alignment and error handling
- `az deployment operation`: Modify the deprecate information

ARO

- Add examples to az aro create, list, list-credentials, show, delete
- Add generate_random_id function

Backup

- Allow FriendlyName in enable protection for AzureFileShare command
- Fix in IaaSVM restore-disks Command
- Add "MAB" BackupManagementType to item list command
- Add support for retrying policy update for failed items.

- Add Resume Protection functionality for Azure Virtual Machine
- Add support to specify ResourceGroup for storing instantRP during Create or Modify Policy

CI

- Support flake8 3.8.0

Compute

- New command az vm auto-shutdown
- `az vm list-skus`: Update --zone behavior, return all type skus now

Core

- Update local context on/off status to global user level

Extension

- `az extension add`: Add --system to enable installing extensions in a system path
- Support .egg-info to store wheel type extension metadata

IoT

- `az iot`: Update the IoT command module first run extension awareness message to the accurate, non-deprecated modern Id `azure-iot`.

IoT Hub

- Support for 2020-03-01 API and Network Isolation commands

NetAppFiles

- `az volume create`: Adds snapshot-id as a parameter to create volume this will allow users to create a volume from existing snapshot.

Network

- Fix ttl value changed unintended for dns add-record

- `az network public-ip create`: Inform customers of a coming breaking change
- Support generic commands for private link scenario
- `az network private-endpoint-connection`: Support mysql, postgres and mariadb types
- `az network private-endpoint-connection`: Support cosmosdb types
- `az network private-endpoint`: deprecate --group-ids and redirect to --group-id

Output

- Show update instruction in find, feedback and --help

Packaging

- Build MSI/Homebrew packages with dependencies resolved from requirements.txt

RBAC

- `az ad sp credential reset`: fix weak credential generation

Storage

- `az storage account file-service-properties update/show`: Add File Properties Support for Storage Account
- `az storage container create`: Fix #13373 by adding validator for public access
- Add ADLS Gen2 track2 support
- `az storage blob sync`: Support `--connection-string`
- `az storage blob sync`: Fix the incorrect error message when azcopy cannot find the installation location

April 30, 2020

Version 2.5.1

ACR

- `az acr check-health`: Fix "DOCKER_PULL_ERROR" on Windows

Compute

- `az vm list-ip-addresses`: Error handling
- Fix a bug of vm create if endpoint_vm_image_alias_doc is not set in cloud profile
- `az vmss create`: Add --os-disk-size-gb

Cosmos DB

- `az cosmosdb create/update`: add --enable-public-network support

Extension

- Fix loading wrong metadata for wheel type extension

Packaging

- Add az script for Git Bash/Cygwin on Windows

SQL

- `az sql instance-pool`: Add instance pools command group

Storage

- Upgrade package azure-multiapi-storage to 0.3.0
- Support GZRS for storage account creation and update
- `az storage account failover`: Add support for grs/gzrs storage account failover
- `az storage blob upload`: Add --encryption-scope parameter to support specifying encryption scope information

April 28, 2020

Version 2.5.0

ACS

- [BREAKING CHANGE] `az openshift create`: remove --vnet-peer parameter.
- `az openshift create`: add flags to support private cluster.
- `az openshift`: upgrade to `2019-10-27-preview` API version.
- `az openshift`: add `update` command.

AKS

- `az aks create`: Add support for Windows

AppService

- `az webapp deployment source config-zip`: remove sleep after request.get()

ARM

- Add template deployment What-If commands

ARO

- `az aro`: Fix table output

CI

- Onboard pytest and deprecate nose for Automation Test

Compute

- `az vmss disk detach`: fix data disk NoneType issue
- `az vm availability-set list`: Support showing VM list
- `az vm list-skus`: Fix display problem of table format

KeyVault

- Add new parameter `--enable-rbac-authorization` during creating or updating

Monitor

- Support LA cluster CMK features
- `az monitor log-analytics workspace linked-storage`: supports BYOS features

Network

- `az network security-partner`: support security partner provider

Privatedns

- Add feature in private DNS zone to import export zone file

April 21, 2020

Version 2.4.0

ACR

- `az acr run --cmd`: disable working directory override
- Support dedicated data endpoint

AKS

- `az aks list -o table` should show privateFqdn as fqdn for private clusters
- Add --uptime-sla
- Update containerservice package
- Add node public IP support
- Fix typo in the help command

AppConfig

- Resolve key vault reference for kv list and export commands
- Bug fix for list key values

AppService

- `az functionapp create`: Changed the way linuxFxVersion was being set for dotnet linux function apps. This should fix a bug that was preventing dotnet linux consumption apps from being created
- [BREAKING CHANGE] `az webapp create`: fix to keep existing AppSettings with az webapp create
- [BREAKING CHANGE] `az webapp up`: fix to create RG for az webapp up command when using -g flag
- [BREAKING CHANGE] `az webapp config`: fix to show values for non-JSON output with az webapp config connection-string list

ARM

- `az deployment create/validate`: Add parameter `--no-prompt` to support skipping the prompt of missing parameters for ARM template
- `az deployment group/mg/sub/tenant validate`: Support comments in deployment parameter file
- `az deployment`: Remove `is_preview` for parameter `--handle-extended-json-format`
- `az deployment group/mg/sub/tenant cancel`: Support cancel deployment for ARM template
- `az deployment group/mg/sub/tenant validate`: Improve the error message when deployment verification fails
- `az deployment-scripts`: Add new commands for DeploymentScripts
- `az resource tag`: Add parameter `--is-incremental` to support adding tags to resource incrementally

ARO

- `az aro`: Add Azure RedHat OpenShift V4 aro command module

Batch

- Update Batch API

Compute

- `az sig image-version create`: Add storage account type Premium_LRS
- `az vmss update`: Fix terminate notification update issue
- `az vm/vmss create`: Add support for specialized image version
- SIG API Version 2019-12-01
- `az sig image-version create`: Add `--target-region-encryption`
- Fix tests fail when running in serial due to keyvault name is duplicated in global in-memory cache

CosmosDB

- Support `az cosmosdb private-link-resource/private-endpoint-connection`

IoT Central

- Deprecate `az iotcentral`
- Add `az iot central` command module

Monitor

- Support private link scenario for monitor
- Fix wrong mocking way in test_monitor_general_operations.py

Network

- Deprecate sku for public ip update command
- `az network private-endpoint`: Support private dns zone group
- Enable local context feature for vnet/subnet parameter
- Fix wrong usage example in test_nw_flow_log_delete

Packaging

- Drop support for Ubuntu/Disco package

RBAC

- `az ad app create/update`: support --optional-claims as a parameter

RDBMS

- Add Azure active directory administrator commands for PostgreSQL and MySQL

Service Fabric

- Fix #12891: `az sf application update --application-parameters` removes old parameters that are not in the request
- Fix #12470 az sf create cluster, fix bugs in update durability and reliability and find vmss correctly through the code given a node type name

SQL

- Add `az sql mi op list`, `az sql mi op get`, `az sql mi op cancel`
- `az sql midb`: update/show long term retention policy, show/delete long term retention backups, restore long term retention backup

Storage

- Upgrade azure-mgmt-storage to 9.0.0

- `az storage logging off`: Support turning off logging for a storage account
- `az storage account update`: Enable key auto-rotated for CMK
- `az storage account encryption-scope create/update/list/show`: Add support to customize encryption scope
- `az storage container create`: Add --default-encryption-scope and --deny-encryption-scope-override to set encryption scope for container level

Survey

- Add switch to turn off survey link

April 01, 2020

Version 2.3.1

ACR

- Fix wrong version of `azure-mgmt-containerregistry` for Linux

Profile

- `az login`: Fix login failure with cloud profiles other than `latest`

March 31, 2020

Version 2.3.0

ACR

- 'az acr task update': null pointer exception
- `az acr import`: Modify help and error message to clarify the usage of `--source` and `--registry`
- Add a validator for argument 'registry_name'
- `az acr login`: Remove the preview flag on '`--expose-token`'
- [BREAKING CHANGE] 'az acr task create/update' Branch parameter is removed
- 'az acr task update' Customer now can update context, git-token, and or triggers individually
- 'az acr agentpool': new feature

AKS

- Fix apiServerAccessProfile when updating --api-server-authorized-ip-ranges
- aks update: Override outbound IPs with input values when update
- Do not create SPN for MSI clusters and support attach acr to MSI clusters

AMS

- Fix #12469: adding Fairplay content-key-policy fails due to problems with 'ask' parameter

AppConfig

- Add --skip-keyvault for kv export

AppService

- Fix #12509: Remove the tag to az webapp up by default
- az functionapp create: Updated --runtime-version help menu and added warning when user specifies --runtime-version for dotnet
- az functionapp create: Updated the way javaVersion was being set for Windows function apps

ARM

- az deployment create/validate: Use --handle-extended-json-format by default
- az lock create: Add examples of creating subresource in the help documentation
- az deployment {group/mg/sub/tenant} list: Support provisioningState filtering
- az deployment: Fix the parse bug for comment under the last argument

Backup

- Added multiple files restore capabilities
- Added support for Backing up OS Disks only
- Added restore-as-unmanaged-disk parameter to specify unmanaged restore

Compute

- az vm create: Add NONE option of --nsg-rule
- az vmss create/update: remove vmss automatic repairs preview tag

- az vm update: Support --workspace
- Fix a bug in VirtualMachineScaleSetExtension initialization code
- Upgrade VMAccessAgent version to 2.4
- az vmss set-orchestration-service-state: support vmss set orchestration service state
- Upgrade disk API version to 2019-11-01
- az disk create: add --disk-iops-read-only, --disk-mbps-read-only, --max-shares, --image-reference, --image-reference-lun, --gallery-image-reference, --gallery-image-reference-lun

Cosmos DB

- Fix missing --type option for deprecation redirections

Docker

- Update to Alpine 3.11 and Python 3.6.10

Extension

- Allow to load extensions in the system path via packages

HDInsight

- (az hdinsight create:) Support customers specify minimal supported tls version by using parameter `--minimal-tls-version`. The allowed value is 1.0,1.1,1.2

IoT

- Add codeowner
- az iot hub create : Change default sku to S1 from F1
- iot hub: Support IoTHub in the profile of 2019-03-01-hybrid

IoTCentral

- Update error details, update default application template and prompt message

KeyVault

- Support certificate backup/restore

- keyvault create/update: Support --retention-days
- No longer display managed keys/secrets while listing
- az keyvault create: support `--network-acls`, `--network-acls-ips` and `--network-accls-vnets` for specifying network rules while creating vault

Lock

- az lock delete fix bug: az lock delete does not work on Microsoft.DocumentDB

Monitor

- az monitor clone: support clone metric rules from one resource to another
- Fix IcM179210086: unable to create custom metric alert for their Application Insights metric

NetAppFiles

- az volume create: Allow data protection volumes adding replication operations: approve, suspend, resume, status, remove

Network

- az network application-gateway waf-policy managed-rule rule-set add: support Microsoft_BotManagerRuleSet
- network watcher flow-log show: fix wrong deprecating info
- support host names in application gateway listener
- az network nat gateway: support create empty resource without public ip or public ip prefix
- Support vpn gateway generation
- Support `--if-none-match` in `az network dns record-set {} add-record`

Packaging

- Drop support for python 3.5

Profile

- az login: Show warning for MFA error

RDBMS

- Add server data encryption key management commands for PostgreSQL and MySQL

March 10, 2020

Version 2.2.0

ACR

- Fix: `az acr login` wrongly raise error
- Add new command `az acr helm install-cli`
- Add private link and CMK support
- add 'private-link-resource list' command

AKS

- fix the aks browse in cloud shell
- az aks: Fix monitoring addon and agentpool NoneType errors
- Add --nodepool-tags to node pool when creating azure kubernetes cluster
- Add --tags when adding or updating a nodepool to cluster
- aks create: add `--enable-private-cluster`
- add --nodepool-labels when creating azure kubernetes cluster
- add --labels when adding a new nodepool to azure kubernetes cluster
- add missing / in the dashboard url
- Support create aks clusters enabling managed identity
- az aks: Validate network plugin to be either "azure" or "kubenet"
- az aks: Add aad session key support
- [BREAKING CHANGE] az aks: support msi changes for GF and BF for omsagent (Container monitoring)(#1)
- az aks use-dev-spaces: Adding endpoint type option to the use-dev-spaces command to customize the endpoint created on an Azure Dev Spaces controller

AppConfig

- Unblock using "kv set" to add keyvault reference and feature ...

AppService

- az webapp create : Fix issue when running the command with --runtime
- az functionapp deployment source config-zip: Add an error message if resource group or function name are invalid/don't exist
- functionapp create: Fix the warning message that appears with `functionapp create` today which cites a `--functions_version` flag but erroneously uses a `_` instead of a `-` in the flag name
- az functionapp create: Updated the way linuxFxVersion and container image name were being set for linux function apps
- az functionapp deployment source config-zip: Fix an issue caused by app settings change racing condition during zip deploy, giving 5xx errors during deployment
- Fix #5720946: az webapp backup fails to set name

ARM

- az resource: Improve the examples of the resource module
- az policy assignment list: Support listing policy assignments at Management Group scope
- Add `az deployment group` and `az deployment operation group` for template deployment at resource groups. This is a duplicate of `az group deployment` and `az group deployment operation`
- Add `az deployment sub` and `az deployment operation sub` for template deployment at subscription scope. This is a duplicate of `az deployment` and `az deployment operation`
- Add `az deployment mg` and `az deployment operation mg` for template deployment at management groups
- Add `az deployment tenant` and `az deployment operation tenant` for template deployment at tenant scope
- az policy assignment create: Add a description to the `--location` parameter
- az group deployment create: Add parameter `--aux-tenants` to support cross tenants

CDN

- Add CDN WAF commands

Compute

- az sig image-version: add `--data-snapshot-luns`

- az ppg show: add --colocation-status to enable fetching the colocation status of all the resources in the proximity placement group
- az vmss create/update: support automatic repairs
- [BREAKING CHANGE] az image template: rename template to builder
- az image builder create: add --image-template

Cosmos DB

- Add Sql stored procedure, udf and trigger cmdlets
- az cosmosdb create: add --key-uri to support adding key vault encryption information

KeyVault

- keyvault create: enable soft-delete by default

Monitor

- az monitor metrics alert create: support `~` in `--condition`

Network

- az network application-gateway rewrite-rule create: support url configuration
- az network dns zone import: `--zone-name` will be case insensitive in the future
- az network private-endpoint/private-link-service: remove preview label
- az network bastion: support bastion
- az network vnet list-available-ips: support list available ips in a vnet
- az network watcher flow-log create/list/delete/update: add new commands to manage watcher flow log and exposing `--location` to identify watcher explicitly
- az network watcher flow-log configure: deprecated
- az network watcher flow-log show: support `--location` and `--name` to get ARM-formatted result, deprecated old formatted output

Policy

- az policy assignment create: Fix the bug that automatically generated name of policy assignment exceeds the limit

RBAC

- az ad group show: fix --group value treated as regex problem

RDBMS

- Bump the azure-mgmt-rdbms SDK version to 2.0.0
- az postgres private-endpoint-connection: manage postgres private endpoint connections
- az postgres private-link-resource: manage postgres private link resources
- az mysql private-endpoint-connection: manage mysql private endpoint connections
- az mysql private-link-resource: manage mysql private link resources
- az mariadb private-endpoint-connection: manage mariadb private endpoint connections
- az mariadb private-link-resource: manage mariadb private link resources
- Updating RDBMS Private Endpoint Tests

SQL

- Sql midb Add: list-deleted, show-deleted, update-retention, show-retention
- (sql server create:) Add optional public-network-access 'Enable'/'Disable' flag to sql server create
- (sql server update:) make some customer-facing change
- Add minimal_tls_version property for MI and SQL DB

Storage

- az storage blob delete-batch: Misbehaving `--dryrun` flag
- az storage account network-rule add (bug fix): add operation should be idempotent
- az storage account create/update: Add Routing Preference support
- Upgrade azure-mgmt-storage version to 8.0.0
- az storage container immutability create: add `--allow-protected-append-write` parameter
- az storage account private-link-resource list: Add support to list private link resources for storage account
- az storage account private-endpoint-connection approve/reject/show/delete: Support to manage private endpoint connections
- az storage account blob-service-properties update: add `--enable-restore-policy` and `--restore-days`
- az storage blob restore: Add support to restore blob ranges

February 18, 2020

Version 2.1.0

ACR

- Add a new argument `--expose-token` for `az acr login`
- Fix the incorrect output of `az acr task identity show -n Name -r Registry -o table`
- az acr login: Throw a CLIError if there are errors returned by docker command

ACS

- aks create/update: add `--vnet-subnet-id` validation

Aladdin

- Parse generated examples into commands' `_help.py`

AMS

- az ams is GA now

AppConfig

- Revise help message to exclude unsupported key/label filter
- Remove preview tag for most commands excluding managed identity and feature flags
- Add customer managed key when updating stores

AppService

- az webapp list-runtimes: Fix the bug for list-runtimes
- Add az webapp|functionapp config ssl create
- Add support for v3 function apps and node 12

ARM

- az policy assignment create: Fix the error message when the `--policy` parameter is invalid
- az group deployment create: Fix "stat: path too long for Windows" error when using large parameters.json file

Backup

- Fix for item level recovery flow in OLR
- Add restore as files support for SQL and SAP Databases

Compute

- vm/vmss/availability-set update: add `--ppg` to allowing updating ProximityPlacementGroup
- vmss create: add `--data-disk-iops` and `--data-disk-mbps`
- az vm host: remove preview tag for `vm host` and `vm host group`
- [BREAKING CHANGE] Fix #10728: `az vm create`: create subnet automatically if vnet is specified and subnet not exists
- Increase robustness of vm image list

Eventhub

- Azure Stack support for 2019-03-01-hybrid profile

KeyVault

- az keyvault key create: add a new value `import` for parameter `--ops`
- az keyvault key list-versions: support parameter `--id` for specifying keys
- Support private endpoint connections

Network

- Bump to azure-mgmt-network 9.0.0
- az network private-link-service update/create: support `--enable-proxy-protocol`
- Add connection Monitor V2 feature

Packaging

- [BREAKING CHANGE] Drop support for Python 2.7

Profile

- Preview: Add new attributes `homeTenantId` and `managedByTenants` to subscription accounts. Please re-run `az login` for the changes to take effect
- `az login`: Show a warning when a subscription is listed from more than one tenants and default to the first one. To select a specific tenant when accessing this subscription, please include `--tenant` in `az login`

Role

- `az role assignment create`: Fix the error that assigning a role to a service principal by display name yields a HTTP 400

SQL

- Update SQL Managed Instance cmdlet `az sql mi update` with two new parameters: tier and family

Storage

- [BREAKING CHANGE] `az storage account create`: Change default storage account kind to StorageV2

February 04, 2020

Version 2.0.81

ACS

- Add support to set outbound allocated ports and idle timeouts on standard load balancer
- Update to API Version 2019-11-01

ACR

- [BREAKING CHANGE] `az acr delete` will prompt
- [BREAKING CHANGE] 'az acr task delete' will prompt
- Add a new command group 'az acr taskrun show/list/delete' for taskrun management

AKS

- Each cluster gets a separate service principal to improve isolation

AppConfig

- Support import/export of keyvault references from/to appservice
- Support import/export of all labels from appconfig to appconfig
- Validate key and feature names before setting and importing
- Expose sku modification for configuration store.
- Add command group for managed identity.

AppService

- Azure Stack: surface commands under the profile of 2019-03-01-hybrid
- functionapp: Add ability to create Java function apps in Linux

ARM

- Fix issue #10246: `az resource tag` crashes when the parameter `--ids` passed in is resource group ID
- Fix issue #11658: `az group export` command does not support `--query` and `--output` parameters
- Fix issue #10279: The exit code of `az group deployment validate` is 0 when the verification fails
- Fix issue #9916: Improve the error message of the conflict between tag and other filter conditions for `az resource list` command
- Add new parameter `--managed-by` to support adding managedBy information for command `az group create`

Azure Red Hat OpenShift

- Add `monitor` subgroup to manage Log Analytics monitoring in Azure Red Hat Openshift cluster

BotService

- Fix issue #11697: `az bot create` is not idempotent
- Change name-correcting tests to run in Live-mode only

CDN

- Add support for rulesEngine feature
- Add new commands group 'cdn endpoint rule' to manage rules
- Update azure-mgmt-cdn version to 4.0.0 to use api version 2019-04-15

Deployment Manager

- Add list operation for all resources.
- Enhance step resource for new step type.
- Update azure-mgmt-deploymentmanager package to use version 0.2.0.

IoT

- Deprecate 'IoT hub Job' commands.

IoT Central

- Support app creation/update with the new sku name ST0, ST1, ST2.

Key Vault

- Add a new command `az keyvault key download` for downloading keys.

Misc

- Fix #6371: Support filename and environment variable completion in Bash

Network

- Fix #2092: az network dns record-set add/remove: add warning when record-set is not found. In the future, an extra argument will be supported to confirm this auto creation.

Policy

- Add new command `az policy metadata` to retrieve rich policy metadata resources
- `az policy remediation create`: Specify whether compliance should be re-evaluated prior to remediation with the `--resource-discovery-mode` parameter

Profile

- `az account get-access-token`: Add `--tenant` parameter to acquire token for the tenant directly, needless to specify a subscription

RBAC

- [BREAKING CHANGE] Fix #11883: `az role assignment create`: empty scope will prompt error

Security

- Add new commands `az atp show` and `az atp update` to view and manage advanced threat protection settings for storage accounts.

SQL

- `sql dw create`: deprecate `--zone-redundant` and `--read-replica-count` parameters. These parameters do not apply to DataWarehouse.
- [BREAKING CHANGE] `az sql db create`: Remove "WideWorldImportersStd" and "WideWorldImportersFull" as documented allowed values for "az sql db create --sample-name". These sample databases would always cause creation to fail.
- Add New commands `sql db classification show/list/update/delete` and `sql db classification recommendation list/enable/disable` to manage sensitivity classifications for SQL databases.
- `az sql db audit-policy`: Fix for empty audit actions and groups

Storage

- Add a new command group `az storage share-rm` to use the Microsoft.Storage resource provider for Azure file share management operations.
- Fix issue #11415: permission error for `az storage blob update`
- Integrate Azcopy 10.3.3 and support Win32.
- `az storage copy`: Add `--include-path`, `--include-pattern`, `--exclude-path` and `--exclude-pattern` parameters
- `az storage remove`: Change `--inlcude` and `--exclude` parameters to `--include-path`, `--include-pattern`, `--exclude-path` and `--exclude-pattern` parameters
- `az storage sync`: Add `--include-pattern`, `--exclude-path` and `--exclude-pattern` parameters

ServiceFabric

- Add new commands to manage application and services.

January 13, 2020

Version 2.0.80

Compute

- disk update: Add --disk-encryption-set and --encryption-type
- snapshot create/update: Add --disk-encryption-set and --encryption-type

Storage

- Upgrade azure-mgmt-storage version to 7.1.0
- az storage account create: Add --encryption-key-type-for-table and --encryption-key-type-for-queue to support Table and Queue Encryption Service

January 07, 2020

Version 2.0.79

ACR

- [BREAKING CHANGE] Remove '--os' parameter for 'acr build', 'acr task create/update', 'acr run', and 'acr pack'. Use '--platform' instead.

AppConfig

- Add support for importing/exporting feature flags
- Add new command 'az appconfig kv set-keyvault' for creating keyvault reference
- Support various naming conventions when exporting feature flags to file

AppService

- Fix issue #7154: Updating documentation for command <> to use back ticks instead of single quotes

- Fix issue #11287: webapp up: By default make the app created using up 'should be 'SSL enabled'
- Fix issue #11592: Add az webapp up flag for html static sites

ARM

- Fix `az resource tag`: Recovery Services Vault tags cannot be updated

Backup

- Added new command 'backup protection undelete' to enable soft-delete feature for IaaSVM workload
- Added new parameter '--soft-delete-feature-state' to set backup-properties command
- Added disk exclusion support for IaaSVM workload

Compute

- Fix `vm create` failure in Azure Stack profile.
- vm monitor metrics tail/list-definitions: support query metric and list definitions for a vm.
- Add new reapply command action for az vm

HDInsight

- Support for creating a Kafka cluster with Kafka Rest Proxy
- Upgrade azure-mgmt-hdinsight to 1.3.0

Misc.

- Add preview command `az version show` to show the versions of Azure CLI modules and extensions in JSON format by default or format configured by --output

Event Hubs

- [BREAKING CHANGE] Remove 'ReceiveDisabled' status option from command 'az eventhubs eventhub update' and 'az eventhubs eventhub create'. This option is not valid for Event Hub entities.

Service Bus

- [BREAKING CHANGE] Remove 'ReceiveDisabled' status option from command 'az servicebus topic create', 'az servicebus topic update', 'az servicebus queue create', and 'az servicebus queue update'. This option is not valid for Service Bus topics and queues.

RBAC

- Fix #11712: `az ad app/sp show` does not return exit code 3 when the application or service principal does not exist

Storage

- `az storage account create`: Remove preview flag for --enable-hierarchical-namespace parameter
- Update azure-mgmt-storage version to 7.0.0 to use api version 2019-06-01
- Add new parameters `--enable-delete-retention` and `--delete-retention-days` to support managing delete retention policy for storage account blob-service-properties.

December 17, 2019

2.0.78

ACR

- Added support Local context in acr task run

ACS

- [BREAKING CHANGE]az openshift create: rename `--workspace-resource-id` to `--workspace-id`.

AMS

- Updated show commands to return 3 when resource not found

AppConfig

- Fixed bug when appending api-version to request url. The existing solution doesn't work with pagination.
- Added support for showing languages besides English as our backend service support unicode for globalization.

AppService

- Fixed issue #11217: webapp: az webapp config ssl upload should support slot parameter
- Fixed issue #10965: Error: Name cannot be empty. Allow remove by ip_address and subnet
- Added support for importing certificates from Key Vault `az webapp config ssl import`

ARM

- Updated azure-mgmt-resource package to use 6.0.0
- Cross Tenant Support for `az group deployment create` command by adding new parameter `--aux-subs`
- Added new parameter `--metadata` to support adding metadata information for policy set definitions.

Backup

- Added Backup support for SQL and SAP Hana workload.

BotService

- [Breaking change] Remove '--version' flag from preview command 'az bot create'. Only v4 SDK bots are supported.
- Added name availability check for 'az bot create'.
- Added support for updating the icon URL for a bot via 'az bot update'.
- Added support for updating a Direct Line channel via 'az bot directline update'.
- Added '--enable-enhanced-auth' flag support to 'az bot directline create'.
- The following command groups are GA and not in preview: 'az bot authsetting'.
- The following commands in 'az bot' are GA and not in preview: 'create', 'prepare-deploy', 'show', 'delete', 'update'.
- Fixed 'az bot prepare-deploy' changing '--proj-file-path' value to lower case (e.g. "Test.csproj" to "test.csproj").

Compute

- vmss create/update: Added --scale-in-policy, which decides which virtual machines are chosen for removal when a VMSS is scaled-in.
- vm/vmss update: Added --priority.
- vm/vmss update: Added --max-price.
- Added disk-encryption-set command group (create, show, update, delete, list).
- disk create: Added --encryption-type and --disk-encryption-set.
- vm/vmss create: Added --os-disk-encryption-set and --data-disk-encryption-sets.

Core

- Removed support for Python 3.4
- Plug in HaTS survey in multiple commands

DLS

- Updated ADLS sdk version (0.0.48).

Install

- Install script support python 3.8

IOT

- [BREAKING CHANGE] Removed --failover-region parameter from manual-failover. Now it will failover to assigned geo-paired secondary region.

Key Vault

- Fixed #8095: `az keyvault storage remove`: improve the help message
- Fixed #8921: `az keyvault key/secret/certificate list/list-deleted/list-versions`: fix the validation bug on parameter `--maxresults`
- Fixed #10512: `az keyvault set-policy`: improve the error message when none of `-object-id`, `--spn` or `--upn` is specified
- Fixed #10846: `az keyvault secret show-deleted`: when `--id` is specified, `--name/-n` is not required
- Fixed #11084: `az keyvault secret download`: improve the help message of parameter `--encoding`

Network

- az network application-gateway probe: Added support --port option to specify a port for probing backend servers when create and update
- az network application-gateway url-path-map create/update: bug fix for `--waf-policy`
- az network application-gateway: Added support `--rewrite-rule-set`
- az network list-service-aliases: Added support list service aliases which can be used for Service Endpoint Policies
- az network dns zone import: Added support .@ in record name

Packaging

- Added back edge builds for pip install
- Added Ubuntu eoan package

Policy

- Added support for Policy API version 2019-09-01.
- az policy set-definition: Added support grouping within policy set definitions with `--definition-groups` parameter

Redis

- Added preview param `--replicas-per-master` to `az redis create` command
- Updated azure-mgmt-redis from 6.0.0 to 7.0.0rc1

ServiceFabric

- Fixed in node-type add logic including #10963: Adding new node type with durability level Gold will always throw CLI error
- Updated ServiceFabricNodeVmExt version to 1.1 in creation template

SQL

- Added "--read-scale" and "--read-replicas" parameters to sql db create and update commands, to support read scale management.

Storage

- GA Release Large File Shares property for storage account create and update command
- GA Release User Delegation SAS token Support
- Added new commands `az storage account blob-service-properties show` and `az storage account blob-service-properties update --enable-change-feed` to manage blob service properties for storage account.
- [COMING BREAKING CHANGE] `az storage copy`: `*` character is no longer supported as a wildcard in URL, but new parameters `--include-pattern` and `--exclude-pattern` will be added with `*` wildcard support.
- Fixed issue #11043: Added support to remove whole container/share in `az storage remove` command

November 26, 2019

Version 2.0.77

ACR

- Deprecated parameter `--branch` from acr task create/update

Azure Red Hat OpenShift

- Added `--workspace-resource-id` flag to allow creation of Azure Red Hat Openshift cluster with monitoring
- Added `monitor_profile` to create Azure Red Hat OpenShift cluster with monitoring

AKS

- Added support cluster certificate rotation operation using "az aks rotate-certs".

AppConfig

- Added support for using ":" for `as az appconfig kv import` separator
- Fixed issue for listing key values with multiple labels including null label.
- Updated management plane sdk, azure-mgmt-appconfiguration, to version 0.3.0.

AppService

- Fixed issue #11100: AttributeError for az webapp up when create service plan

- az webapp up: Forcing the creation or deployment to a site for supported languages, no defaults used.
- Added support for App Service Environment: az appservice ase show | list | list-addresses | list-plans | create | update | delete

Backup

- Fixed issue in az backup policy list-associated-items. Added optional BackupManagementType parameter.

Compute

- Upgraded API version of compute, disks, snapshots to 2019-07-01
- vmss create: Improvement for --orchestration-mode
- sig image-definition create: Added --os-state to allow specifying whether the virtual machines created under this image are 'Generalized' or 'Specialized'
- sig image-definition create: Added --hyper-v-generation to allow specifying the hypervisor generation
- sig image-version create: Added support --os-snapshot and --data-snapshots
- image create: Added --data-disk-caching to allow specifying caching setting of data disks
- Upgraded Python Compute SDK to 10.0.0
- vm/vmss create: Added 'Spot' to 'Priority' enum property
- [Breaking change] Renamed '--max-billing' parameter to '--max-price', for both VM and VMSS, to be consistent with Swagger and Powershell cmdlets
- vm monitor log show: Added support for querying log over linked log analytics workspace.

IOT

- Fix #2531: Added convenience arguments for hub update.
- Fix #8323: Added missing parameters to create storage custom endpoint.
- Fix regression bug: Reverted the changes which overrides the default storage endpoint.

Key Vault

- Fixed #11121: When using `az keyvault certificate list`, passing `--include-pending` now doesn't require a value of `true` or `false`

NetAppFiles

- Upgraded azure-mgmt-netapp to 0.7.0 which includes some additional volume properties associated with upcoming replication operations

Network

- application-gateway waf-config: deprecated
- application-gateway waf-policy: Added subgroup managed-rules to manage managed rule sets and exclusion rules
- application-gateway waf-policy: Added subgroup policy-setting to manage global configuration of a waf-policy
- [BREAKING CHANGE] application-gateway waf-policy: Renamed subgroup rule to custom-rule
- application-gateway http-listener: Added --firewall-policy when create
- application-gateway url-path-map rule: Added --firewall-policy when create

Packaging

- Rewrote the az wrapper in Python
- Added support for Python 3.8
- Changed to Python 3 for RPM package

Profile

- Polished error when running `az login -u {} -p {}` with Microsoft account
- Polished `SSLError` when running `az login` behind a proxy with self-signed root certificate
- Fixed #10578: `az login` hangs when more than one instances are launched at the same time on Windows or WSL
- Fixed #11059: `az login --allow-no-subscriptions` fails if there are subscriptions in the tenant
- Fixed #11238: After renaming a subscription, logging in with MSI will result in the same subscription appearing twice

RBAC

- Fixed #10996: Polish error for `--force-change-password-next-login` in `az ad user update` when `--password` is not specified

Redis

- Fixed #2902: Avoid setting memory configs while updating Basic SKU cache

Reservations

- Upgraded SDK Version to 0.6.0
- Added billingplan details info after calling Get-Gatalogs
- Added new command `az reservations reservation-order calculate` to calculate the price for a reservation
- Added new command `az reservations reservation-order purchase` to purchase a new reservation

Rest

- Changed `az rest` to GA

SQL

- Updated `azure-mgmt-sql` to version 0.15.0.

Storage

- `storage account create`: Added `--enable-hierarchical-namespace` to support filesystem semantics in blob service.
- Removed unrelated exception from error message
- Fixed issues with incorrect error message "You do not have the required permissions needed to perform this operation." when blocked by network rules or `AuthenticationFailed`.

November 4, 2019

Version 2.0.76

ACR

- Added a preview parameter `--pack-image-tag` to command `az acr pack build`.
- Added support for enabling auditing on creating a registry
- Added support for Repository-scoped RBAC

AKS

- Added `--enable-cluster-autoscaler`, `--min-count` and `--max-count` to the `az aks create` command, which enables cluster autoscaler for the node pool.
- Added the above flags as well as `--update-cluster-autoscaler` and `--disable-cluster-autoscaler` to the `az aks update` command, allowing updates to cluster autoscaler.

AppConfig

- Added appconfig feature command group to manage feature flags stored in an App Configuration.
- Fixed minor bug for appconfig kv export to file command. Stop reading dest file contents during export.

AppService

- `az appservice plan create`: Added support to set 'persistscaling' on appservice plan create.
- Fixed an issue where webapp config ssl bind operation was removing existing tags from the resource
- Added `--build-remote` flag for `az functionapp deployment source config-zip` to support remote build action during function app deployment.
- Changed default node version on function apps to ~10 for Windows
- Added `--runtime-version` property to `az functionapp create`

ARM

- `az deployment/group deployment validate`: Added `--handle-extended-json-format` parameter to support multiline and comments in json template when deployment.
- Bumped azure-mgmt-resource to 2019-07-01

Backup

- Added AzureFiles backup support

Compute

- `az vm create`: Added warning when specifying accelerated networking and an existing NIC together.
- `az vm create`: Added `--vmss` to specify an existing virtual machine scale set that the virtual machine should be assigned to.
- `az vm/vmss create`: Added a local copy of image alias file so that it can be accessed in a restricted network environment.
- `az vmss create`: Added `--orchestration-mode` to specify how virtual machines are managed by the scale set.
- `az vm/vmss update`: Added `--ultra-ssd-enabled` to allow updating ultra SSD setting.
- [BREAKING CHANGE] `az vm extension set`: Fixed bug where users could not set an extension on a VM with `--ids`.
- Added new commands `az vm image terms accept/cancel/show` to manage Azure Marketplace image terms.
- Updated VMAccessForLinux to version 1.5

CosmosDB

- [BREAKING CHANGE] `az sql container create`: Changed `--partition-key-path` to required parameter
- [BREAKING CHANGE] `az gremlin graph create`: Changed `--partition-key-path` to required parameter
- `az sql container create`: Added `--unique-key-policy` and `--conflict-resolution-policy`
- `az sql container create/update`: Updated the `--idx` default schema
- `gremlin graph create`: Added `--conflict-resolution-policy`
- `gremlin graph create/update`: Updated the `--idx` default schema
- Fixed typo in help message
- database: Added deprecation information
- collection: Added deprecation information

IoT

- Added new routing source type: DigitalTwinChangeEvents
- Fixed missing features in `az iot hub create`

Key Vault

- Fixed an unexpected error when certificate file does not exist

- Fixed `az keyvault recover/purge` not working

NetAppFiles

- Upgraded azure-mgmt-netapp to 0.6.0 to use API version 2019-07-01. This new API version includes:
 - Volume creation `--protocol-types` accepts now "NFSv4.1" not "NFSv4"
 - Volume export policy property now named 'nfsv41' not 'nfsv4'
 - Volume `--creation-token` renamed to `--file-path`
 - Snapshot creation date now named just 'created'

Network

- `az network private-dns link vnet create/update`: Support cross-tenant virtual network linking.
- [BREAKING CHANGE] `az network vnet subnet list`: Changed `--resource-group` and `--vnet-name` to be required now.
- `az network public-ip prefix create`: Added support to specify IP address version (IPv4, IPv6) when creation
- Bumped azure-mgmt-network to 7.0.0 and api-version to 2019-09-01
- `az network vrouter`: Added support for new service virtual router and virtual router peering
- `az network express-route gateway connection`: Added support for `--internet-security`

Profile

- Fixed `az account get-access-token --resource-type ms-graph` not working
- Removed warning from `az login`

RBAC

- Fixed `az ad app update --id {} --display-name {}` doesn't work

ServiceFabric

- `az sf cluster create`: Fixed an issue by modifying service fabric linux and windows template.json compute vmss from standard to managed disks

SQL

- Added `--compute-model`, `--auto-pause-delay`, and `--min-capacity` parameters to support CRUD operations for new SQL Database offering: Serverless compute model.

Storage

- `az storage account create/update`: Added `--enable-files-adds` parameter and Azure Active Directory Properties Argument group to support Azure Files Active Directory Domain Service Authentication
- Expanded `az storage account keys list/renew` to support listing or regenerating Kerberos keys of storage account.

October 15, 2019

Version 2.0.75

AKS

- Changed `--load-balancer-sku` default value to `standard` if supported by the kubernetes version
- Changed `--vm-set-type` default value to `virtualmachinescalesets` if supported by the kubernetes version

AMS

- [BREAKING CHANGE] Changed the name of `job start` to `job create`
- [BREAKING CHANGE] Changed the `--ask` parameter of `content-key-policy create` to use a 32-character hex string instead of UTF8

AppService

- Added commands `webapp config access-restriction show|set|add|remove`
- Added better error handling to `webapp up`
- Added support for `Isolated` SKU to `appservice plan update`

ARM

- Added `--handle-extended-json-format` parameter to `deployment create` to support multiline and comments in json template

Compute

- Added `--enable-agent` parameter to `vm create`
- Changed `vm create` to use standard public IP SKU automatically when using zones
- Changed `vm create` to automatically create a valid computer name for a VM if none is provided
- Added `--computer-name-prefix` parameter to `vmss create` to support custom computer name prefix of virtual machines in the VMSS
- Add `--workspace` parameter to `vm create` to enable log analytics workspace automatically
- Updated galleries API version to 2019-07-01

Core

- Added syntax check for `--set` parameter in generic update command

IoT

- Fixed an issue where `iot hub show` would incorrectly error with "resource not found"

Monitor

- Added support for CRUD to `monitor log-analytics workspace`

Network

- Added support for cross-tenant virtual linking to `network private-dns link vnet [create|update]`
- [BREAKING CHANGE] Changed `network vnet subnet list` to require `--resource-group` and `--vnet-name` parameters

SQL

- Added commands to `sql mi ad-admin` that support setting an AAD administrator on managed instances

Storage

- Added `--preserve-s2s-access-tier` parameter `storage copy` to preserve access tier during service to service copy
- Added `--enable-large-file-share` parameter to `storage account [create|update]` to support large file shares for storage account

September 24, 2019

Version 2.0.74

ACR

- Added a required `--type` parameter to `acr config retention update`
- [BREAKING CHANGE] Renamed parameter `--name -n` changed to `--registry -r` for `acr config` command group

AKS

- Added `--load-balancer-sku` parameter to `aks create` command, which allows for creating AKS cluster with SLB
- Added `--load-balancer-managed-outbound-ip-count`, `--load-balancer-outbound-ips` and `--load-balancer-outbound-ip-prefixes` parameters to `aks [create|update]` commands, which allow for updating load balancer profile of an AKS cluster with SLB
- Added `--vm-set-type` parameter to `aks create` command, which allows to specify vm types of an AKS Cluster (vmas or vmss)

ARM

- Added `--handle-extended-json-format` parameter to `group deployment create` command to support multiline and comments in json template

Compute

- Added `--terminate-notification-time` parameter to `vmss [create|update]` commands to support terminate scheduled event configurability
- Added `--enable-terminate-notification` parameter to `vmss update` command to support terminate scheduled event configurability

- Added `--priority`, `--eviction-policy`, `--max-billing` parameters to `[vm|vmss] create` commands
- Changed `disk create` to allow specifying the exact size of the disk upload
- Added support for incremental snapshots for managed disks to `snapshot create`

Cosmos DB

- Added `--type <key-type>` parameter to `cosmosdb keys list` command to show key, read only keys or connection strings
- Added `cosmosdb keys regenerate` command
- [DEPRECATED] Deprecated `cosmosdb list-connection-strings`, `cosmosdb regenerate-key` and `cosmosdb list-read-only-keys` commands

EventGrid

- Fixed the endpoint help text to refer to the right parameter

Key Vault

- Fixed issue where logging in with a tenant (`login -t`) could cause `keyvault create` to fail

Monitor

- Fixed issue where `:` character was not allowed in `--condition` argument to `monitor metrics alert create`

Policy

- Added support for Policy API version 2019-06-01
- Added `--enforcement-mode` parameter to `policy assignment create` command

Storage

- Added `--blob-type` parameter to `az storage copy` command

September 10, 2019

ACR

- Added command group `acr config retention` to configure retention policy

AKS

- Added support for ACR integration with the following commands:
 - Added `--attach-acr` parameter to `aks [create|update]` to attach an ACR to an AKS cluster
 - Added `--detach-acr` parameter to `aks update` to detach the ACR from an AKS cluster

ARM

- Updated to use API version 2019-05-10

Batch

- Added new JSON configuration settings to `--json-file` for `batch pool create`:
 - Added `MountConfigurations` for file system mounts (see [Request Body](#) for details)
 - Added optional property `publicIPs` on `NetworkConfiguration` for public IPs on pools (see [Request Body](#) for details)
- Added support for shared image galleries to `--image`
- [BREAKING CHANGE] Changed default value of `--start-task-wait-for-success` on `batch pool create` to be `true`
- [BREAKING CHANGE] Changed default value for `Scope` on `AutoUserSpecification` to always be Pool (was `Task` on Windows nodes, `Pool` on Linux nodes)
 - This argument can only be set from a JSON configuration with `--json-file`

HDInsight

- GA release
- [BREAKING CHANGE] Changed parameter `--workernode-count/-c` of `az hdinsight resize` to be required.

Key Vault

- Fixed issue where subnets couldn't be deleted from network rules

- Fixed issue where duplicated subnets and IP addresses could be added to network rules

Network

- Added `--interval` parameter to `network watcher flow-log` to set traffic analysis interval value
- Added `network application-gateway identity` to manage gateway identity
- Added support for setting Key Vault ID to `network application-gateway ssl-cert`
- Added `network express-route peering peer-connection [show|list]`

Policy

- Updated to use API version 2019-01-01

August 27, 2019

Version 2.0.72

ACR

- [BREAKING CHANGE] Removed support for the `classic` SKU

API Management

- [PREVIEW] Added `apim` command group

AppService

- Fixed issue with `webapp webjob continuous start` command when specifying a slot
- Changed `webapp up` to detect `env` folder and remove it from the file used for deployment

Keyvault

- Fixed a bug in `keyvault secret set` that ignored the `--expires` argument

Network

- Added support for IPv6 addresses to `--private-ip-address-version` arguments
- Added new commands `network private-endpoint [create|update|list-types]` for private endpoint management
- Added command group `network private-link-service`
- Added `--private-endpoint-network-policies` and `--private-link-service-network-policies` arguments to `network vnet subnet update`

RBAC

- Fixed issue with `ad app update --homepage` where homepage would not be updated

ServiceFabric

- Added support for mixed-case Key Vault names
- Fixed issue when using certificates in Key Vault
- Fixed issue with using PFX certificate files
- Fixed issue with `sf cluster certificate add` when Key Vault resource group wasn't specified
- Fixed issue with `sf cluster set` not working

SignalR

- Added new commands:
 - `signalr cors`: Manage SignalR CORS
 - `signalr restart`: Restart a SignalR service
 - `signalr update`: Update a SignalR service
- Added `--service-mode` argument to `signalr create`

Storage

- Added `storage account revoke-delegation-keys` command

August 13, 2019

Version 2.0.71

AppService

- Fixed issue where `webapp webjob continuous` commands were failing for slots

BotService

- [BREAKING CHANGE] Removed support for creating v3 SDK bots

CognitiveServices

- Added `cognitiveservices account network-rule` commands

Cosmos DB

- Removed warning when updating multiple write locations
- Added CRUD commands for CosmosDB SQL, MongoDB, Cassandra, Gremlin and Table resources and resource's throughput

HDInsight

This release contains a large number of breaking changes.

- [BREAKING CHANGE] Renamed parameters for `hdinsight create`:
 - Renamed `--storage-default-container` to `--storage-container`
 - Renamed `--storage-default-filesystem` to `--storage-filesystem`
- [BREAKING CHANGE] Changed the `--name` argument of `application create` to represent the application name instead of the cluster name
- Added `--cluster-name` argument to `application create` to replace old `--name` functionality
- [BREAKING CHANGE] Renamed parameters for `application create`:
 - Renamed `--application-type` to `--type`
 - Renamed `--marketplace-identifier` to `--marketplace-id`
 - Renamed `--https-endpoint-access-mode` to `--access-mode`
 - Renamed `--https-endpoint-destination-port` to `--destination-port`
- [BREAKING CHANGE] Removed parameters for `application create`:
 - `--https-endpoint-location`
 - `--https-endpoint-public-port`
 - `--ssh-endpoint-destination-port`
 - `--ssh-endpoint-location`
 - `--ssh-endpoint-public-port`

- [BREAKING CHANGE] Renamed `--target-instance-count` to `--workernode-count` for `hdinsight resize`
- [BREAKING CHANGE] Changed all commands in the `hdinsight script-action` group to use the `--name` parameter as the name of the script action.
- Added `--cluster-name` argument to all `hdinsight script-action` commands to replace old `--name` functionality
- [BREAKING CHANGE] Renamed `--script-execution-id` to `--execution-id` for all `hdinsight script-action` commands
- [BREAKING CHANGE] Renamed `hdinsight script-action show` to `hdinsight script-action show-execution-details`
- [BREAKING CHANGE] Changed parameters to `hdinsight script-action execute --roles` to be space-separated instead of comma-separated
- [BREAKING CHANGE] Removed the `--persisted` parameter of `hdinsight script-action list`
- Changed the `hdinsight create --cluster-configurations` parameter to accept a path to a local JSON file or a JSON string
- Added command `hdinsight script-action list-execution-history`
- Changed `hdinsight monitor enable --workspace` to accept a Log Analytics workspace ID or workspace name
- Added the `hdinsight monitor enable --primary-key` argument, which is needed if a workspace ID is provided as the parameter
- Added more examples and updated descriptions for help messages

Interactive

- Fixed a loading error

Kubernetes

- Changed to use `https` if dashboard container port is using `https`

Network

- Added `--yes` argument `network dns record-set cname delete`

Profile

- Added `--resource-type` argument to `account get-access-token` to get resource access tokens

ServiceFabric

- Added all supported os version for sf cluster create
- Fixed primary certificate validation bug

Storage

- Added command `storage copy`

July 30, 2019

Version 2.0.70

ACR

- Fixed issue #9952 (a regression in the `acr pack build` command)
- Removed the default builder image name in `acr pack build`

Appservice

- Changed `webapp config ssl` to show a message if a resource is not found
- Fixed issue where `functionapp create` does not accept `Standard_RAGRS` storage account type
- Fixed an issue where `webapp up` would fail if run using older versions of python

Network

- Removed invalid parameter `--ids` from `network nic ip-config add` (fixes #9861)
- Fixes #9604. Added `--root-certs` parameter to `network application-gateway http-settings [create|update]` to support user associate trusted root certificates.
- Fixed argument `--subscription` for `network dns record-set ns create` (#9965)

RBAC

- Added `user update` command
- [DEPRECATED] Deprecated `--upn-or-object-id` from user-related commands
 - Use replacement argument `--id`
- Added `--id` argument to user-related commands

SQL

- Added management commands for managed instance keys and TDE protector

Storage

- Added `storage remove` command
- Fixed an issue with `storage blob update`

VM

- Changed `list-skus` to use newer api-version to output zone details
- Changed default of `--single-placement-group` to `false` for `vmss create`
- Added ability to select ZRS storage SKUs for `[snapshot|disk] create`
- Added new command group `vm host` to support dedicated hosts
- Added parameters `--host` and `--host-group` on `vm create` to set VM dedicated host

July 16, 2019

Version 2.0.69

Appservice

- Changed `webapp identity` commands to return a proper error message if ResourceGroupName or App name are invalid
- Fixed `webapp list` to return the correct value for numberOfSites if no ResourceGroup was provided
- Fixed side-effects of `appservice plan create` and `webapp create`

Core

- Fixed issue where `--subscription` would appear despite being not applicable

Batch

- [BREAKING CHANGE] Replaced `batch pool node-agent-skus list` with `batch pool supported-images list`

- Added support for security rules blocking network access to a pool based on the source port of the traffic when using the `--json-file` option of `batch pool create network`
- Added support for executing the task in the container working directory or in the Batch task working directory when using the `--json-file` option of `batch task create`
- Fixed error in `--application-package-references` option of `batch pool create` where it would only work with defaults

Eventhubs

- Added validation for parameter `--rights` of `authorizationrule` commands

RDBMS

- Added optional parameter to specify replica SKU for create replica command
- Fixed the issue with CI test failure with creating MySQL replica

Relay

- Fixed issue with hybrid connection when client authroization disabled [#8775](#)
- Added parameter `--requires-transport-security` to `relay wcfrelay create`

Servicebus

- Added validation for parameter `--rights` of `authorizationrule` commands

Storage

- Enable Files AADDS for storage account update
- Fixed issue `storage blob service-properties update --set`

July 2, 2019

Version 2.0.68

Core

- Command modules are now consolidated into a single Python distributable. This deprecates direct use of many `azure-cli-` packages on PyPI. This should reduce install size and only affect users who have directly installed via `pip`.

ACR

- Added support for Timer Triggers to Task

Appservice

- Changed `functionapp create` to enable application insights by default
- [BREAKING CHANGE] Removed deprecated `functionapp devops-build` command.
 - Use the new command `az functionapp devops-pipeline` instead
- Added Linux Consumption function app plan support to `functionapp deployment config-zip`

Cosmos DB

- Added support for disabling TTL

DLS

- Updated ADLS version (0.0.45)

Feedback reference

- When reporting a failed extension command, `az feedback` now attempts to open the browser to the project/repo url of the extension from the index

HDInsight

- [BREAKING CHANGE] Changed `oms` command group name to `monitor`
- [BREAKING CHANGE] Made `--http-password/-p` a required parameter
- Added completers for `--cluster-admin-account` and `cluster-users-group-dns` parameters completer
- Changed `cluster-users-group-dns` parameter to be required when `-esp` is present
- Added a timeout for all existing argument auto-completers
- Added a timeout for transforming resource name to resource id

- Changed Auto-completers to select resources from any resource group. It can be a different resource group than the one specified with `-g`
- Added support for `--sub-domain-suffix` and `--disable_gateway_auth` parameters in the `hdinsight application create` command

Managed Services

- Introducing managed service command module in preview

Profile

- Suppress `--subscription` argument for logout command

RBAC

- [BREAKING CHANGE] Removed `--password` argument for `create-for-rbac`
- Added `--assignee-principal-type` parameter to `create` command to avoid intermittent failures caused by AAD graph server replication latency
- Fixed a crash in `ad signed-in-user` when listing owned objects
- Fixed issue where `ad sp` would not find the right application from a service principal

RDBMS

- Added support for replication for MariaDB

SQL

- Documented allowed values for `sql db create --sample-name`

Storage

- Added user delegation SAS token support with `--as-user` to `storage blob generate-sas`
- Added user delegation SAS token support with `--as-user` to `storage container generate-sas`

VM

- Fixed bug where `vmss create` returns an error message when run with `--no-wait`
- Removed client-side validation for `vmss create --single-placement-group`. Does not fail if `--single-placement-group` is set to `true` and `--instance-count` is greater than 100 or availability zones are specified, but leaves this validation to the compute service
- Fixed bug where `[vm|vmss] extension image list` fails when used with `--latest`

June 18, 2019

Version 2.0.67

Core

This release introduces a new [Preview] tag to more clearly communicate to customers when a command group, command or argument is in preview status. This was previously called out in help text or communicated implicitly by the command module version number. The CLI will be removing version numbers for individual packages in the future. If a command is in preview, all of its arguments are as well. If a command group is labeled as being in preview, then all commands and arguments are considered to be in preview as well.

As a result of this change, several command groups may seem to "suddenly" appear to be in a preview status with this release. What actually happened is that most packages were in a preview status, but are being deemed GA with this release

ACR

- Added 'acr check-health' command
- Improved error handling for AAD tokens and for retrieving external commands

ACS

- Deprecated ACS commands are now hidden from help view

AMS

- [BREAKING CHANGE] Changed to return ISO 8601 time strings for archive-window-length and key-frame-interval-duration

AppService

- Added location based routing for `webapp deleted list` and `webapp deleted restore`
- Fixed issue where webapp up logged target URL ("You can launch the app at...") was not clickable in Azure Cloud Shell
- Fixed an issue where creating apps with the some SKUs was failing with an AlwaysOn error
- Added pre-validation to `[appservice|webapp] create`
- Fixed `[webapp|functionapp] traffic-routing` to use the correct actionHostName
- Added slot support to `functionapp` commands

Batch

- Fixed AAD auth regression caused by over-aggressive error reporting for Shared Key Auth

BatchAI

- BatchAI commands are now deprecated and hidden

BotService

- Added "discontinued support"/"maintenance mode" warning messages for commands that support the v3 SDK

CosmosDB

- [DEPRECATED] Deprecated the `cosmosdb list-keys` command
- Added the `cosmosdb keys list` command - replaces `cosmosdb list-keys`
- `cosmosdb create/update`: Added new format for --location to allow setting "isZoneRedundant" property. Deprecated old format

EventGrid

- Added `eventgrid domain` commands for domain CRUD operations
- Added `eventgrid domain topic` commands for domain topics CRUD operations
- Added `--odata-query` argument to `eventgrid [topic|event-subscription] list` for filtering results using OData syntax

- `event-subscription create/update`: Added servicebusqueue as new values for the `--endpoint-type` parameter
- [BREAKING CHANGE] Removed support for `--included-event-types All` with `eventgrid event-subscription [create|update]`

HDInsight

- Added support for `--ssh-public-key` parameter in `hdinsight create` command

IoT

- Added support to regenerate authorization policy keys
- Added SDK and support for DigitalTwin Repository Provisioning Service

Network

- Added Zone support for Nat Gateway
- Added command `network list-service-tags`
- Fixed issue with `dns zone import` where users could not import wildcard A records
- Fixed issue with `watcher flow-log configure` where flow logging could not be enabled in certain regions

Resource

- Added `az rest` command for making REST calls
- Fixed error when using `policy assignment list` with a resource group or subscription level `--scope`

ServiceBus

- Fixed issue with `servicebus topic create --max-size #9319 ↗`

SQL

- Changed `--location` to be optional for `sql [server|mi] create` - uses resource group location if not specified
- Fixed "'NoneType' object is not iterable" error for `sql db list-editions --available`

SQLVm

- [BREAKING CHNAGE] Changed `sql vm create` to require `--license-type` parameter
- Changed to allow setting SQL image SKU when creating or updating a sql vm

Storage

- Fixed issue with missing account key for `storage container generate-sas`
- Fixed issue with `storage blob sync` on Linux

VM

- [PREVIEW] Added `vm image template` commands to build VM images

June 4, 2019

Version 2.0.66

Core

- Fixed bug where commands fail if `--output yaml` is used with `--query`

ACR

- Added 'acr pack' command group for creating quick build Tasks using Buildpacks.

ACS

- Allow enabling/disabling AKS kube-dashboard addon
- Print a friendly message when the subscription is not approved to use Azure Red Hat OpenShift

Batch

- Improved error handling when not logged in to an account [[#9165 ↗](#)] [[#8978 ↗](#)]

IoT

- Added support for manual failover

Network

- Added `network application-gateway waf-policy` commands to support custom WAF rules.
- Added `--waf-policy` and `--max-capacity` arguments to `network application-gateway [create|update]`

Resource

- Improved error message from `deployment create` when there is no TTY available

Role

- Updated help text.

Compute

- Added support to `vm create` for VMs from a managed image with data-disk luns that do not start from 0 or that skip numbers

May 21, 2019

Version 2.0.65

Core

- Added better feedback for authentication errors
- Fixed issue where the CLI would load extensions that were not compatible with its core version
- Fixed issue with launching when `clouds.config` is corrupted

ACR

- Added support for Managed Identities to Tasks

ACS

- Fixed `openshift create` command when used with customer AAD client

AppService

- [DEPRECATED] Deprecated `functionapp devops-build` command - will be removed in next release
- Changed `functionapp devops-pipeline` to fetch build log from Azure DevOps in verbose mode
- [BREAKING CHANGE] Removed `--use_local_settings` flag from `functionapp devops-pipeline` command - was a no-op
- Changed `webapp up` to return JSON output if `--logs` is not used
- Added support for writing default resources to local config for `webapp up`
- Added support to `webapp up` for redeploying an app without using the `--location` argument
- Fixed an issue where for Linux Free SKU ASP creation use Free as SKU value was not working

BotService

- Changed to allow all casing for `--lang` parameters for commands
- Updated description for command module

Consumption

- Added missing required parameter when running `consumption usage list --billing-period-name`

IoT

- Added support to list all keys

Network

- [BREAKING CHANGE]: Removed `network interface-endpoints` command group - use `network private-endpoints`
- Added `--nat-gateway` argument to `network vnet subnet [create|update]` for attaching to a NAT gateway
- Fixed issue with `dns zone import` where record names could not match a record type

RDBMS

- Added postgres and mysql support for geo replication

RBAC

- Added support for management group scope to `role assignment`

Storage

- `storage blob sync`: add sync command for storage blob

Compute

- Added `--computer-name` to `vm create` for setting a VM's computer name
- Renamed `--ssh-key-value` renamed to `--ssh-key-values` for `[vm|vmss] create` - can now accept multiple ssh public key values or paths
 - **Note:** This is **not** a breaking change - `--ssh-key-value` will be parsed correctly as it matches only `--ssh-key-values`
- Changed the `--type` argument of `ppg create` to be optional

May 6, 2019

Version 2.0.64

ACS

- [BREAKING CHANGE] Removed `--fqdn` flag on `openshift` commands
- Changed to use Azure Red Hat Openshift GA API Version
- Added `customer-admin-group-id` flag to `openshift create`
- [GA] Removed `(PREVIEW)` from `aks create` option `--network-policy`

Appservice

- [DEPRECATED] Deprecated `functionapp devops-build` command
 - Renamed to `functionapp devops-pipeline`
- Fixed getting the correct username for cloudshell which was causing `webapp up` to fail

- Updated `appservice plan --sku` documentation updated to reflect the supported appserviceplans
- Added optional arguments for resource group and plan to `webapp up`
- Added support to `webapp ssh` to respect `AZURE_CLI_DISABLE_CONNECTION_VERIFICATION` environment variable
- Added `appserviceplan create` support for Linux Free SKU
- Changed `webapp up` to have a 30s sleep after setting `SCM_DO_BUILD_DURING_DEPLOYMENT=true` appsetting to handle kudu cold start
- Added support for `powershell` runtime to `functionapp create` on Windows
- Added `create-remote-connection` command

Batch

- Fixed bug in validator for `--application-package-references` options

Botservice

- [BREAKING CHANGE] Changed `bot create -v v4 -k webapp` to create an empty Web App Bot by default (i.e. no bot is deployed to the App Service)
- Added `--echo` flag to `bot create` to use the old behavior with `-v v4`
- [BREAKING CHANGE] Changed the default value of `--version` to `v4`
 - **NOTE:** `bot prepare-publish` still uses its old default
- [BREAKING CHANGE] Changed `--lang` to no longer default to `Csharp`. If the command requires `--lang` and it is not provided, the command will now error out
- [BREAKING CHANGE] Changed the `--appid` and `--password` args for `bot create` to be required and can now be created via `ad app create`
- Added `--appid` and `--password` validation
- [BREAKING CHANGE] Changed `bot create -v v4` to not create or use a Storage Account or Application Insights
- [BREAKING CHANGE] Changed `bot create -v v3` to require a region where Application Insights is available
- [BREAKING CHANGE] Changed `bot update` to now affect only specific properties of a bot
- [BREAKING CHANGE] Changed `--lang` flags to accept `Javascript` instead of `Node`
- [BREAKING CHANGE] Removed `Node` as an allowed `--lang` value
- [BREAKING CHANGE] Changed `bot create -v v4 -k webapp` to no longer set `SCM_DO_BUILD_DURING_DEPLOYMENT` to true. All deployments through Kudu will act according to their default behavior

- Changed `bot download` for bots without `.bot` files to create the language-specific configuration file with values from the Application Settings for the bot
- Added `TypeScript` support to `bot prepare-deploy`
- Added warning message to `bot prepare-deploy` for `Javascript` and `TypeScript` bots for when `--code-dir` does not contain `package.json`
- Changed `bot prepare-deploy` to return `true` if successful
- Added verbose logging to `bot prepare-deploy`
- Added more available Application Insights regions to `az bot create -v v3`

Configure

- Added support for folder based argument default value configurations

Eventhubs

- Added `namespace network-rule` commands
- Added `--default-action` argument for network rules to `namespace [create|update]`

Network

- [BREAKING CHANGE] Replaced `--cache` argument with `--defer` for `vnet [create|update]`

Policy Insights

- Added support for `--expand PolicyEvaluationDetails` to query policy evaluation details on the resource

Role

- [DEPRECATED] Changed `create-for-rbac` hide '--password' argument - support will be removed in May 2019

Service Bus

- Added `namespace network-rule` commands
- Added `--default-action` argument for network rules to `namespace [create|update]`

- Fixed `topic [create|update]` to allow `--max-size` support for 10, 20, 40 and 80GB values with premium SKU

SQL

- Added `sql virtual-cluster [list|show|delete]` commands

VM

- Added `--protect-from-scale-in` and `--protect-from-scale-set-actions` to `vmss update` to enable updates to the protection policy of VMSS VM instances
- Added `--instance-id` to `vmss update` to enable generic update of VMSS VM instances
- Added `--instance-id` to `vmss wait`
- Added new `ppg` command group for managing Proximity Placement Groups
- Added `--ppg` to `[vm|vmss] create` and `vm availability-set create` for managing PPGs
- Added `--hyper-v-generation` parameter to `image create`

April 23, 2019

Version 2.0.63

ACS

- Changed `aks get-credentials` to prompt to overwrite duplicated values
- Removed `(PREVIEW)` from Dev Spaces commands "aks use-dev-spaces" and "aks remove-dev-spaces"

AMS

- Fixed bug with asset and account filters update

AppService

- Added support for ASE and timeout to `webapp ssh`
- Added support for establishing CI CD to an Azure DevOps pipeline from a Github repository to Function apps

- Added `--github-pat` argument to `functionapp devops-build create` to accept Github personal access token
- Added `--github-repository` argument to `functionapp devops-build create` to accept Github repository that contains a functionapp source code
- Fixed issue where `az webapp up --logs` was failing with a error and updating default .NETCORE version to 2.1
- Removed unnecessary functionapp settings when creating a function app with consumption plan
- Changed `webapp up` so the default asp string now appends number at the end to create a new ASP based on SKU options
- Added `-b` as an option to `webapp up` to launch the app in the browser
- Changed `webapp deployment source config zip` to handle `AZURE_CLI_DISABLE_CONNECTION_VERIFICATION` environment variable

Deployment Manager

- [PREVIEW] Create and manage artifacts that support rollouts

Lab

- Fixed bug which would cause an early exit

Network

- Added auto name server delegation to `dns zone create` in parent during child zone creation

Resource

- [DEPRECATED] Deprecated `--link-id`, `--target-id` and `--filter-string` arguments of `resource link`
 - Use the arguments `--link`, `--target`, and `--filter` instead
- Fixed issue where `resource link [create|update]` commands would not work
- Fixed an issue where deleting using a resource ID could crash on error

SQL

- Added support for custom time zone on managed instances
- Changed to allow elastic pool name to be used with `sql db update`

- Added `--no-wait` support to `sql server [create|update]`
- Added command `sql server wait`

Storage

- Fixed issue with double-encoded SAS tokens in `storage blob generate-sas`

VM

- Added `--skip-shutdown` flag to `vm|vmss stop` to power-off VMs without shutdown
- Added `--storage-account-type` argument to `sig image-version create` to set the publishing profile's account type
- Added `--target-regions` argument to `sig image-version create` to allow setting region-specific storage account types

April 9, 2019

Core

- Fixed issue where some extensions showed a version of `Unknown` and could not be updated

ACR

- Added support running an image contextlessly

AMS

- [DEPRECATED]: Deprecated the `--bitrate` parameter of `account-filter` and `asset-filter`
- [BREAKING CHANGE]: Renamed the `--bitrate` parameter to `--first-quality`
- Added new encryption parameters support in `ams streaming-policy create`
- Added new parameter `--filters` to `ams streaming-locator create`

AppService

- Added `--logs` support to `webapp up`

- Fixed `functionapp devops-build create` command `azure-pipelines.yml` generation issues
- Improved `unctionapp devops-build create` error handling and indicators
- [BREAKING CHANGE] Removed the `--local-git` flag for `devops-build` command, local git detection and handling are compulsory for creating Azure DevOps pipelines
- Added support for Linux functions plan creation
- Added ability to switch a plan underneath a function app using `functionapp update --plan`
- Added support for Azure Functions premium plan scale out settings

CDN

- Added support for `Microsoft_Standard` and `Standard_ChinaCdn`

Feedback reference

- Changed `feedback` to show metadata on recently run commands
- Changed `feedback` to prompt user to assist in issue creation process by opening a browser and using an issue template
- Changed `feedback` to print out issue body when run with '--verbose'

Monitor

- Fixed issue where "count" was not a permitted value with `metrics alert [create|update]`

Network

- Fixed table format not displaying with `vnet-gateway list-bgp-peer-status`
- Added `list-request-headers` and `list-response-headers` commands to `application-gateway rewrite-rule`
- Added `list-server-variables` command to `application-gateway rewrite-rule condition`
- Fixed an issue where updating link state on an express-route port would throw an unknown attribute exception `express-route port update`

PrivateDNS

- Added `network private-dns` for Private DNS zones

Resource

- Fixed issue with `deployment create` and `group deployment create` where a parameters file with an empty set of parameters would not work

Role

- Fixed `create-for-rbac` to handle `--years` correctly
- [BREAKING CHANGE] Changed `role assignment delete` to prompt when deleting all assignments under the subscription unconditionally

SQL

- Updated `sql mi [create|update]` with the properties `proxyOverride` and `publicDataEndpointEnabled`

Storage

- [BREAKING CHANGE] Removed result of `storage blob delete`
- Added `--full-uri` to `storage blob generate-sas` to create the full uri for the blob with sas
- Added `--file-snapshot` to `storage file copy start` to copy file from snapshot
- Changed `storage blob copy cancel` to only show the error instead of exception for `NoPendingCopyOperation`

March 26, 2019

Core

- Fixed issues with dev extension incompatibility
- Error handling now points customers to issues page

Cloud

- Fixed a 'subscription not found' error in `cloud set`

ACR

- Fixed redundant sources in image import
- Added `--auth-mode` to `acr build`, `acr run`, `acr task create`, and `acr task update` commands
- Added 'acr task credential' command group for managing credentials for a Task
- Added '--no-wait' to `acr build` command

AppService

- Fixed bug where `webapp up` was not handling running from empty directory or unknown code scenario correctly
- Fixed bug where slots didn't work for `[webapp|functionapp] config ssl bind`

BOT Service

- Added `bot prepare-deploy` to prepare for deploying bots via `webapp`
- Changed `bot create --kind registration` to show password if the password is not provided
- [BREAKING CHANGE] Changed `--endpoint` in `bot create --kind registration` to default to an empty string instead of being required
- Added `SCM_DO_BUILD_DURING_DEPLOYMENT` to ARM template's Application Settings for v4 Web App Bots

CDN

- Added support for `--no-wait` to `cdn endpoint`
`[create|update|start|stop|delete|load|purge]`
- [BREAKING CHANGE]: Changed `cdn endpoint create` default query string caching behaviour. No longer defaults to "IgnoreQueryString". It is now set by the service

Cosmosdb

- Added support for `--enable-multiple-write-locations` on account update
- Added `network-rule` subgroup with commands `add`, `remove`, and `list` for managing VNET rules of a Cosmos DB account

Interactive

- Fixed incompatibility with Interactive extension installed through azdev

Monitor

- Changed to allow dimension value `*` for `monitor metrics alert [create|update]`

Network

- Added `rewrite-rule` command group to `application-gateway`

Profile

- Added tenant level account support for managed service identity to `login`

Postgres

- Added postgresql `replica` commands and `restart server` command
- Changed to get default location from resource group when not provided for creating servers and add validation for retention days

Resource

- Improved table output for `deployment [create|list|show]`
- Fixed issue with `deployment [create|validate]` where type `secureObject` was not recognized

Graph

- Added support for `--end-date` to `ad [app|sp] credential reset`
- Added support to add permissions with `ad app permission add`
- Fixed a bug with `ad app permission list` when there were no permissions
- Changed `ad sp delete` to skip role assignment delete if the current account has no subscription
- Changed `ad app create` to have `--identifier-uris` default to empty list if not provided

storage

- Added `--snapshot` to `storage file download-batch` to download from a share snapshot
- Changed `storage blob [download-batch|upload-batch]` progress bar to be less verbose and indicate current blob
- Fixed issue with `storage account update` when updating encryption parameters
- Fixed issue where `storage blob show` would fail when using oauth (`--auth-mode=login`)

VM

- Added `image update` command

March 12, 2019

Version 2.0.60

Core

- Fixed an incorrect error in `cloud set` about subscription not found

ACR

- Fixed redundant sources in image import

ACS

- Changed to ignore the `--listen-address` parameter for `aks browse` if it is not supported by kubectl

AppService

- Added `[webapp|functionapp] deployment list-publishing-credentials` to get the Kudu publishing url and its credentials
- Removed erroneous print statement for `webapp auth update`
- Fixed `functionapp` to set the correct image for runtime in Linux App Service plans
- Removed preview tag for `webapp up` and added improvements to the command

Botservice

- Added `SCM_DO_BUILD_DURING_DEPLOYMENT` to ARM template's Application Settings for v4 Web App Bots
- Added `Microsoft-BotFramework-AppId` and `Microsoft-BotFramework-AppPassword` to ARM template's Application Settings for v4 Web App Bots
- Removed single quotes from `bot publish` command output at end of `bot create`
- Changed `bot publish` to be asynchronous

Container

- Added `--no-wait` argument to `container [start|restart]`

EventHub

- Added `--skip-empty-archives` flag to `eventhub create|update` to support empty archives in capture

Find

- Major functionality update

HDInsight

- Added the `--storage-account-managed-identity` parameter to `hdinsight create` to support ADLS Gen2 MSI

Network

- Fixed issue with `vpn-connection update` where updating a VPN connection between gateways in different subscriptions would fail

Rdbms

- Minor fixes to get default location from resource group when not provided for creating servers and add validation for retention days

Role

- Fixed `role definition update` to use ID to resolve definition correctly

- Changed `ad app credential reset` to remove the assumption that app's service principal always exists

Service Fabric

- Fixed issue with `sf cluster list` was not iterable

February 26, 2019

Version 2.0.59

Core

- Fixed issue where in some instances using `--subscription NAME` would throw an exception

ACR

- Added `--target` parameter for `acr build`, `acr task create` and `acr task update` commands
- Improved error handling for runtime commands when not logged into Azure

ACS

- Added `--listen-address` option to `aks port-forward`

AppService

- Added `functionapp devops-build` command

Batch

- [BREAKING CHANGE] Removed the `batch pool upgrade os` command
- [BREAKING CHANGE] Removed the `Pacakges` property from `Application` responses
- Added the `batch application package list` command to list packages of an application
- [BREAKING CHANGE] Changed `--application-id` to `--application-name` in all `batch application` commands,

- Added the `--json-file` argument to commands for requesting the raw API response
- Updated validation to automatically include `https://` in all endpoints if missing

CosmosDB

- Added `network-rule` subgroup with commands `add`, `remove`, and `list` for managing VNET rules of a Cosmos DB account

Kusto

- [BREAKING CHANGE] Changed `hot_cache_period` and `soft_delete_period` types for database to ISO8601 duration format

Network

- Added `--express-route-gateway-bypass` argument to `vpn-connection [create|update]`
- Added command groups from `express-route` extensions
- Added `express-route gateway` and `express-route port` command groups
- Added argument `--legacy-mode` to `express-route peering [create|update]`
- Added arguments `--allow-classic-operations` and `--express-route-port` to `express-route [create|update]`
- Added `--gateway-default-site` argument to `vnet-gateway [create|update]`
- Added `ipsec-policy` commands to `vnet-gateway`

Resource

- Fixed issue with `deployment create` where type field was case-sensitive
- Added support for URI-based parameters file to `policy assignment create`
- Added support for URI-based parameters and definitions to `policy set-definition update`
- Fixed handling of parameters and rules for `policy definition update`
- Fixed issue with `resource show/update/delete/tag/invoke-action` where cross-subscription IDs did not properly honor the subscription ID

Role

- Added support for app roles to `ad app [create|update]`

VM

- Fixed issue with `vm create` where `--accelerated-networking` was not enabled by default for Ubuntu 18.0

February 12, 2019

Version 2.0.58

Core

- `az --version` now displays a notification if you have packages that can be updated
- Fixed regression where `--ids` could no longer be used with JSON output

ACR

- [BREAKING CHANGE] Removed `acr build-task` command group
- [BREAKING CHANGE] Removed `--tag` and `--manifest` options from `acr repository delete`

ACS

- Added support for case-insensitive names to `aks [enable-addons|disable-addons]`
- Added support for Azure Active Directory updating operation using `aks update-credentials --reset-aad`
- Added clarification that `--output` is ignored for `aks get-credentials`

AMS

- Added `ams streaming-endpoint [start | stop | create | update] wait` commands
- Added `ams live-event [create | start | stop | reset] wait` commands

Appservice

- Added ability to create and configure functions using ACR containers
- Added support for updating webapp configurations through json
- Improved help for `appservice-plan-update`
- Added support for app insights on functionapp create

- Fixed issues with webapp SSH

Botservice

- Improved UX for `bot publish`
- Added warning for timeouts when running `npm install` during `az bot publish`
- Removed invalid char `.` from `--name` in `az bot create`
- Changed to stop randomizing resource names when creating Azure Storage, App Service Plan, Function/Web App and Application Insights
- [DEPRECATED] Deprecated `--proj-name` argument in favor of `--proj-file-path`
- Changed `az bot publish` to remove fetched IIS Node.js deployment files if they did not already exist
- Added `--keep-node-modules` argument to `az bot publish` to not delete `node_modules` folder on App Service
- Added `"publishCommand"` key-value pair to output from `az bot create` when creating an Azure Function or Web App bot
 - The value of `"publishCommand"` is an `az bot publish` command prepopulated with the required parameters to publish the newly created bot
- Updated `"WEBSITE_NODE_DEFAULT_VERSION"` in ARM template for v4 SDK bots to use 10.14.1 instead of 8.9.4

Key Vault

- Fixed issue with `keyvault secret backup` where some users received an `unexpected_keyword` error when using `--id`

Monitor

- Changed `monitor metrics alert [create|update]` to allow dimension value `*`

Network

- Changed `dns zone export` to ensure exported CNAMEs are FQDNs
- Added `--gateway-name` parameter to `nic ip-config address-pool [add|remove]` to support application gateway backend address pools
- Added `--traffic-analytics` and `--workspace` arguments to `network watcher flow-log configure` to support traffic analytics through a Log Analytics workspace
- Added `--idle-timeout` and `--floating-ip` to `lb inbound-nat-pool [create|update]`

Policy Insights

- Added `policy remediation` commands to support resource policy remediation features

RDBMS

- Improved help message and command parameters

Redis

- Added commands for managing firewall-rules (create, update, delete, show, list)
- Added commands for managing server-link (create, delete, show, list)
- Added commands for managing patch-schedule (create, update, delete, show)
- Added support for Availability Zones and Minimum TLS Version to `redis create`
- [BREAKING CHANGE] Removed `redis update-settings` and `redis list-all` commands
- [BREAKING CHANGE] Parameter for `redis create`: 'tenant settings' is not accepted in key[=value] format
- [DEPRECATED] Added warning message for deprecating `redis import-method` command

Role

- [BREAKING CHANGE] Moved `az identity` command here from `vm` commands

SQL VM

- [DEPRECATED] Deprecated `--bootstrap-acc-pwd` argument due to typo

VM

- Changed `vm list-skus` to allow use of `--all` in place of `--all true`
- Added `vmss run-command [invoke | list | show]`
- Fixed bug where `vmss encryption enable` would fail if run previously
- [BREAKING CHANGE] Moved `az identity` command to `role` commands

January 31, 2019

Version 2.0.57

Core

- Hot Fix for [issue 8399 ↗](#).

January 28, 2019

Version 2.0.56

ACR

- Added support for VNet/IP rules

ACS

- Added Virtual Nodes Preview
- Added Managed OpenShift commands
- Added support for service principal updates operation with `aks update-credentials -reset-service-principal`

AMS

- [BREAKING CHANGE] Renamed `ams asset get-streaming-locators` to `ams asset list-streaming-locators`
- [BREAKING CHANGE] Renamed `ams streaming-locator get-content-keys` to `ams streaming-locator list-content-keys`

Appservice

- Added support for app insights on `functionapp create`
- Added support for app service plan creation (including Elastic Premium) to Function Apps
- Fixed app setting issues with Elastic Premium plans

Container

- Added `container start` command
- Changed to allow using decimal values for CPU during container creation

EventGrid

- Added `--deadletter-endpoint` parameter to `event-subscription [create|update]`
- Added storagequeue and hybridconnection as new values for 'event-subscription [create|update] --endpoint-type`
- Added `--max-delivery-attempts` and `--event-ttl` parameters to `event-subscription create` to specify the retry policy for events
- Added a warning message to `event-subscription [create|update]` when webhook as destination is used for an event subscription
- Added source-resource-id parameter for all event subscription related commands and mark all other source resource related parameters as deprecated

HDInsight

- [BREAKING CHANGE] Removed the `--virtual-network` and `--subnet-name` parameters from `hdinsight [application] create`
- [BREAKING CHANGE] Changed `hdinsight create --storage-account` to accept name or id of storage account instead of blob endpoints
- Added `--vnet-name` and `--subnet-name` parameters to `hdinsight create`
- Added support for Enterprise Security Package and disk encryption to `hdinsight create`
- Added `hdinsight rotate-disk-encryption-key` command
- Added `hdinsight update` command

IoT

- Added encoding format to routing-endpoint command

Kusto

- Preview release

Monitor

- Changed ID comparison to be case insensitive

Profile

- Enable tenant level account for managed service identity for `login`

Network

- Fixed issue with `express-route update`: where `--bandwidth` argument was ignored
- Fixed issue with `ddos-protection update` where set comprehension caused stack trace

Resource

- Added support for URI parameters file to `group deployment create`
- Added support for managed identity to `policy assignment [create|list|show]`

SQL Virtual Machine

- Preview release

Storage

- Changed fix to update only properties that are changed on the same object
- Fixed #8021, binary data is encoded in base 64 when returned

VM

- Changed `vm encryption enable` to validate disk encryption keyvault and that key encryption keyvault exists
- Added `--force` flag to `vm encryption enable`

January 15, 2019

Version 2.0.55

ACR

- Changed to allow force push a helm chart that doesn't exist
- changed to allow runtime operations without ARM requests
- [DEPRECATED] Deprecated `--resource-group` parameter in the commands:
 - `acr login`
 - `acr repository`
 - `acr helm`

ACS

- Added support for new ACI regions

Appservice

- Fixed issue with uploading certificates for apps that are hosted on an ASE, where the ASE RG & App RG are different
- Changed `webapp up` to use SKU P1V1 as default for Linux
- Fixed `[webapp|functionapp] deployment source config-zip` to show the right error message when a deployment fails
- Added `webapp ssh` command

Botservice

- Added deployment status updates to `bot create`

Configure

- Added `none` as a configurable output format

CosmosDB

- Added support for creating database with shared throughput

HDInsight

- Added commands for managing applications
- Added commands for managing script actions
- Added commands for managing Operations Management Suite (OMS)
- Added support to list regional usage to `hdinsight list-usage`
- [BREAKING CHANGE] Removed default cluster type from `hdinsight create`

Network

- Added `--custom-headers` and `--status-code-ranges` arguments to `traffic-manager profile [create|update]`
- Added new routing types: Subnet and Multivalue

- Added `--custom-headers` and `--subnets` arguments to `traffic-manager endpoint [create|update]`
- Fixed issue where supplying `--vnets ""` to `ddos-protection update` caused an error

Role

- [DEPRECATED] Deprecated `--password` argument for `create-for-rbac`. Use secure passwords generated by the CLI instead

Security

- Initial Release

Storage

- [BREAKING CHANGE] Changed `storage [blob|file|container|share] list` default number of results to be 5,000. Use `--num-results *` for original behavior of returning all results
- Added `--marker` parameter to `storage [blob|file|container|share] list`
- Added log marker for next page to STDERR for `storage [blob|file|container|share] list`
- Added `storage blob service-properties update` command with support for static websites

VM

- Changed `vm [disk|unmanaged-disk]` and `vmss disk` to have more consistent parameters
- Added support for cross tenant image referencing to `[vm|vmss] create`
- Fixed bug with default configuration in `vm diagnostics get-default-config --windows-os`
- Added argument `--provision-after-extensions` to `vmss extension set` to define what extensions must be provisioned before the extension being set
- Added argument `--replica-count` to `sig image-version update` for setting the default replication count
- Fixed bug with `image create --source` where source os disk is mistaken for a VM with the same name, even if the full resource ID is provided

December 20, 2018

Version 2.0.54

Appservice

- Fixed issue where `webapp up` would fail to redeploy
- Added support for listing and restoring webapp snapshots
- Added support for `--runtime` flag to Windows function apps

IoTCentral

- Fixed update command API call

Role

- [BREAKING CHANGE] Changed `ad [app|sp] list` to only list the first 100 objects by default

SQL

- Added support for custom collation on managed instances

VM

- Added `--os-type` parameter to `disk create`

December 18, 2018

Version 2.0.53

ACR

- Added support for image import from external Container Registries
- Condensed the table layout for task list
- Added support for Azure DevOps URLs

ACS

- Added Virtual Nodes Preview
- Removed "(PREVIEW)" from AAD arguments to `aks create`
- [DEPRECATED] Deprecated `az acs` commands. The ACS service will retire on January 31, 2020
- Added support of Network Policy when creating new AKS clusters
- Removed requirement of `--nodepool-name` argument for `aks scale` if there's only one nodepool

Appservice

- Fixed issue where `webapp config container` did not honor `--slot` parameter

Botservice

- Added support for `.bot` file parsing when calling `bot show`
- Fixed AppInsights provisioning bug
- Fixed whitespace bug when dealing with file paths
- Reduced Kudu network calls
- General command UX improvements

Consumption

- Fixed bugs for budget API to show notifications

CosmosDB

- Added support for updating account from multi-master to single-master

Maps

- Added support for the S1 SKU to `maps account [create|update]`

Network

- Added support for `--format` and `--log-version` to `watcher flow-log configure`
- Fixed issue with `dns zone update` where using "" to clear resolution and registration VNets didn't work

Resource

- Fixed handling of scope parameter for management groups in `policy assignment`
[`create|list|delete|show|update`]
- Added new command `resource wait`

Storage

- Added ability to update log schema version for storage services in `storage logging`
`update`

VM

- Fixed crash in `vm identity remove` when the specified vm has no assigned managed service identities

December 4, 2018

Version 2.0.52

Core

- Added support for cross tenant resource provisioning for multi-tenant service principal
- Fixed bug where ids piped from a command with tsv output was improperly parsed

Appservice

- [PREVIEW] Added `webapp up` command that helps in creating & deploying contents to app
- Fixed a bug on container based windows app due to backend change

Network

- Added `--exclusion` argument to `application-gateway waf-config set` to support WAF exclusions

Role

- Added support for custom identifiers for password credential

VM

- [DEPRECATED] Deprecated `vm` extension `[show|wait] --expand` parameter
- Added `--force` parameter to `vm restart` to redeploy unresponsive VMs
- Changed `[vm|vmss] create --authentication-type` to accept "all" to create a VM with both password and ssh authentication
- Added `image create --os-disk-caching` parameter to set os disk caching for an image

November 20, 2018

Version 2.0.51

Core

- Changed MSI login to not reuse subscription name in identity

ACR

- Added context token to task step
- Added support for setting secrets in acr run to mirror acr task
- Improved support for `--top` and `--orderby` for `show-tags` and `show-manifests` commands

Appservice

- Changed zip deployment default timeout to poll for the status increased to 5 mins, also adding a timeout property to customize this value
- Updated the default `node_version`. Resetting slot swap action, during a two phase swap preserves all the appsettings & connection strings
- Removed client-side SKU check for Linux app service plan create
- Fixed error when trying to get zipdeploy status

IoTCentral

- Added subdomain availability check when creating an IoT Central application

KeyVault

- Fixed bug where errors may have been ignored

Network

- Added `root-cert` subcommands to `application-gateway` to handle trusted root certificates
- Added `--min-capacity` and `--custom-error-pages` options to `application-gateway [create|update]`:
- Added `--zones` for availability zone support to `application-gateway create`
- Added arguments `--file-upload-limit`, `--max-request-body-size` and `--request-body-check` to `application-gateway waf-config set`

Rdbms

- Added mariadb vnet commands

Rbac

- Fixed an issue with attempting to update immutable credentials in `ad app update`
- Added output warnings to communicate breaking changes in the near future for `ad [app|sp] list`

Storage

- Improved handling of corner cases for storage copy commands
- Fixed issue with `storage blob copy start-batch` not using login credentials when the destination and source accounts are the same
- Fixed bug with `storage [blob|file] url` where `sas_token` wasn't incorporated into URL
- Added breaking change warning to `[blob|container] list`: will soon output only first 5000 results by default

VM

- Added support to `[vm|vmss] create --storage-sku` to specify the storage account SKU for managed OS and data disks separately
- Changed version name parameters to `sig image-version` to be `--image-version -e`

- Deprecated `sig image-version` argument `--image-version-name`, replaced by `--image-version`
- Added support to use local OS disk to `[vm|vmss] create --ephemeral-os-disk`
- Added support for `--no-wait` to `snapshot create/update`
- Added `snapshot wait` command
- Added support for using instance name with `[vm|vmss] extension set --extension-instance-name`

November 6, 2018

Version 2.0.50

Core

- Added support for service principal sn+issuer auth

ACR

- Added support for commit and pull request git events for Task source trigger
- Changed to use default Dockerfile if it's not specified in build command

ACS

- [BREAKING CHANGE] Removed `enable_cloud_console_aks_browse` to enable 'az aks browse' by default

Advisor

- GA release

AMS

- Added new command groups:
 - `ams account-filter`
 - `ams asset-filter`
 - `ams content-key-policy`
 - `ams live-event`
 - `ams live-output`
 - `ams streaming-endpoint`

- `ams mru`
- Added new commands:
 - `ams account check-name`
 - `ams job update`
 - `ams asset get-encryption-key`
 - `ams asset get-streaming-locators`
 - `ams streaming-locator get-content-keys`
- Added encryption parameters support to `ams streaming-policy create`
- Added support to `ams transform output remove` now can be performed by passing the output index to remove
- Added `--correlation-data` and `--label` arguments to `ams job` command group
- Added `--storage-account` and `--container` arguments to `ams asset` command group
- Added default values for expiry time (Now+23h) and permissions (Read) in `ams asset get-sas-url` command
- [BREAKING CHANGE] Replaced `ams streaming locator` command with `ams streaming-locator`
- [BREAKING CHANGE] Updated `--content-keys` argument of `ams streaming locator`
- [BREAKING CHANGE] Renamed `--content-policy-name` to `--content-key-policy-name` in `ams streaming locator` command
- [BREAKING CHANGE] Replaced `ams streaming policy` command with `ams streaming-policy`
- [BREAKING CHANGE] Replaced `--preset-names` argument with `--preset` in `ams transform` command group. Now you can only set 1 output/preset at a time (to add more you have to run `ams transform output add`). Also, you can set custom StandardEncoderPreset by passing the path to your custom JSON
- [BREAKING CHANGE] Renamed `--output-asset-names` to `--output-assets` in `ams job start` command. Now it accepts a space-separated list of assets in 'assetName=label' format. An asset without label can be sent like this: 'assetName='

AppService

- Fixed a bug in `az webapp config backup update` that prevents setting a backup schedule if one is not already set

Configure

- Added YAML to output format options

Container

- Changed to show identity when exporting a container group to yaml

EventHub

- Added `--enable-kafka` flag to support Kafka in `eventhub namespace [create|update]`

Interactive

- Interactive now installs the `interactive` extension, which will allow for faster updates and support

Monitor

- Added support for metric names which include characters forward-slash (/) and period (.) to `--condition` in `monitor metrics alert [create|update]`

Network

- Deprecated `network interface-endpoint` command names in favor of `network private-endpoint`
- Fixed issue with where `--peer-circuit` argument in `express-route peering connection create` would not accept an ID
- Fixed issue where `--ip-tags` did not work correctly with `public-ip create`

Profile

- Added `--use-cert-sn-issuer` to `az login` for service principal login with cert auto-rolls

RDBMS

- Added mysql replica commands

Resource

- Added support for management groups and subscriptions to `policy definition|set-definition` commands

Role

- Added support for API permission management, signed-in-user, and application password & certificate credential management
- Changed `ad sp create-for-rbac` to clarify the confusion between `displayName` and service principal name
- Added support to grant permissions to AAD apps

Storage

- Added support to connect to storage services only with SAS and endpoints (without an account name or a key) as described in [Configure Azure Storage connection strings](#).

VM

- Added `storage-sku` argument to `image create` for setting the image's default storage account type
- Fixed bug with `vm resize` where `--no-wait` option causes command to crash
- Changed `vm encryption show` table output format to show status
- Changed `vm secret format` to require json/jsonc output. Warns user and defaults to json output if an undesired output format is selected
- Improved argument validation for `vm create --image`

October 23, 2018

Version 2.0.49

Core

- Fixed issue with `--ids` where `--subscription` would take precedence over the subscription in `--ids`
- Added explicit warnings when parameters would be ignored by use of `--ids`

ACR

- Fixed an ACR Build encoding issue in Python2

CDN

- [BREAKING CHANGE] Changed `cdn endpoint create`'s default query string caching behaviour to no longer defaults to "IgnoreQueryString". It is now set by the service

Container

- Added `Private` as a valid type to pass to '--ip-address'
- Changed to allow using only subnet ID to setup a virtual network for the container group
- Changed to allow using vnet name or resource id to enable using vnets from different resource groups
- Added `--assign-identity` for adding a MSI identity to a container group
- Added `--scope` to create a role assignment for the system assigned MSI identity
- Added a warning when creating a container group with an image without a long running process
- Fixed table output issues for `list` and `show` commands

CosmosDB

- Added `--enable-multiple-write-locations` support to `cosmosdb create`

Interactive

- Changed to ensure global subscription parameter appears in parameters

IoT Central

- Added template and display name options for IoT Central Application creation
- [BREAKING CHANGE] Removed support for the F1 SKU; Use S1 SKU instead

Monitor

- Changes to `monitor activity-log list`:
 - Added support for listing all events at the subscription level
 - Added `--offset` parameter to more easily create time queries

- Improved validation for `--start-time` and `--end-time` to use wider range of ISO8601 formats and more user-friendly datetime formats
- Added `--namespace` as alias for deprecated option `--resource-provider`
- Deprecated `--filters` because no values other than those with strongly-typed options are supported by the service
- Changes to `monitor metrics list`:
 - Added `--offset` parameter to more easily create time queries
 - Improved validation for `--start-time` and `--end-time` to use wider range of ISO8601 formats and more user-friendly datetime formats
- Improved validation for `--event-hub` and `--event-hub-rule` arguments to `monitor diagnostic-settings create`

Network

- Added `--app-gateway-address-pools` and `--gateway-name` arguments to `nic create`, to support adding application gateway backend address pools to a NIC
- Added `--app-gateway-address-pools` and `--gateway-name` arguments to `nic ip-config create/update`, to support adding application gateway backend address pools to a NIC

ServiceBus

- Added Read-Only `migration_state` to `MigrationConfigProperties` to show current Service Bus Standard to Premium namespace migration state

SQL

- Fixed `sql failover-group create` and `sql failover-group update` to work with Manual failover policy

Storage

- Fixed `az storage cors list` output formatting, all items show correct "Service" key
- Added `--bypass-immutability-policy` parameter for immutability-policy blocked container deletion

VM

- Enforce disk caching mode be `None` for Lv/Lv2 series of machines in `[vm|vmss]` `create`
- Updated supported size list supporting networking accelerator for `vm create`
- Added strong typed arguments for ultrassd iops and mbps configs for `disk create`

October 16, 2018

Version 2.0.48

VM

- Fixed SDK issue that caused Homebrew installation to fail

October 9, 2018

Version 2.0.47

Core

- Improved error handling for "Bad Request" errors

ACR

- Added support for similar table format as helm client

ACS

- Added `aks [create|scale] --nodepool-name` to configure nodepool name, truncated to 12 characters, default - nodepool1
- Fixed to fall back to 'scp' when Parimiko fails
- Changed `aks create` to no longer require `--aad-tenant-id`
- Improved merging of Kubernetes credentials when duplicate entries are present

Container

- Changed `functionapp create` to support creating a Linux consumption plan type with a specific runtime
- [PREVIEW] Added support for hosting webapps on Windows containers

Event Hub

- Fixed `eventhub update` command
- [BREAKING CHANGE] Changed `list` commands to handle errors for resource(s) `NotFound(404)` in the typical way instead of showing empty list

Extensions

- Fixed issue with attempting to add an extension that is already installed

HDInsight

- Initial release

IoT

- Added extension installation command to first-run banner

KeyVault

- Changed to restrict keyvault storage commands to the latest API profile

Network

- Fixed `network dns zone create`: Command succeeds even if the user has configured a default location. See #6052
- Deprecated `--remote-vnet-id` for `network vnet peering create`
- Added `--remote-vnet` to `network vnet peering create` which accepts a name or ID
- Added support for multiple subnet prefixes to `network vnet create` with `--subnet-prefixes`
- Added support for multiple subnet prefixes to `network vnet subnet [create|update]` with `--address-prefixes`
- Fixed issue with `network application-gateway create` that prevented creating gateways with `WAF_v2` or `Standard_v2` SKU
- Added `--service-endpoint-policy` convenience argument to `network vnet subnet update`

Role

- Added support for listing Azure AD app owners to `ad app owner`
- Added support for listing Azure AD service principal owners to `ad sp owner`
- Changed to ensure role definition create & update commands accept multiple permission configurations
- Changed `ad sp create-for-rbac` to ensure home page URI is always "https"

Service Bus

- [BREAKING CHANGE] Changed `list` commands to handle errors for resource(s) `NotFound(404)` in the typical way instead of showing empty list

VM

- Fixed empty `accessSas` field in `disk grant-access`
- Changed `vmss create` to reserve large enough frontend port range to handle overprovisioning
- Fixed update commands for `sig`
- Added `--no-wait` support for managing image versions in `sig`
- Changed `vm list-ip-addresses` to show availability zone of public IP addresses
- Changed `[vm|vmss] disk attach` to set disk's default lun to the first available spot

September 21, 2018

Version 2.0.46

ACR

- Added ACR Task commands
- Added quick run command
- Deprecated `build-task` command group
- Added `helm` command group to support managing helm charts with ACR
- Added support for idempotent create for managed registry
- Added a no-format flag for displaying build logs

ACS

- Changed the `install-connector` command to set the AKS Master FQDN
- Fixed creating role assignment for vnet-subnet-id when not specifying service principal and `skip-role-assignemnt`

AppService

- Added support for webjobs (continuous and triggered) operations management
- az webapp config set supports --fts-state propertyAlso added support for az functionapp config set & show
- Added support for bring your own storage for webapps
- Added support for listing and restoring deleted webapps

Batch

- Changed adding tasks through `--json-file` to support `AddTaskCollectionParameter` syntax
- Updated documentation of accepted `--json-file` formats
- Added `--max-tasks-per-node-option` to `batch pool create`
- Changed behavior of `batch account` to show currently logged in account if no options are specified

Batch AI

- Fixed auto storage account creation failure in `batchai cluster create` command

Cognitive Services

- Added completer for `--sku`, `--kind`, `--location` arguments
- Added command `cognitiveservices account list-usage`
- Added command `cognitiveservices account list-kinds`
- Added command `cognitiveservices account list`
- Deprecated `cognitiveservices list`
- Changed `--name` to be optional for `cognitiveservices account list-skus`

Container

- Added ability to restart and stop a running container group
- Added `--network-profile` for passing in a network profile
- Added `--subnet`, `--vnet_name`, to allow creating container groups in a VNET
- Changed table output to show the status of the container group

Datalake

- Added commands for virtual network rules

Interactive Shell

- Fixed error on Windows where commands fail to run properly
- Fixed command loading problem in interactive that was caused by deprecated objects

IoT

- Added support for routing IoT Hubs

Key Vault

- Fixed Key Vault key import for RSA keys

Network

- Add `network public-ip prefix` commands to support public IP prefixes features
- Add `network service-endpoint` commands to support service endpoint policy features
- Add `network lb outbound-rule` commands to support creation of Standard Load Balancer outbound rules
- Add `--public-ip-prefix` to `network lb frontend-ip create/update` to support frontend IP configurations using public IP prefixes
- Add `--enable-tcp-reset` to `network lb rule/inbound-nat-rule/inbound-nat-pool create/update`
- Add `--disable-outbound-snat` to `network lb rule create/update`
- Allow `network watcher flow-log show/configure` to be used with classic NSGs
- Add `network watcher run-configuration-diagnostic` command
- Fix `network watcher test-connectivity` command and add `--method`, `--valid-status-codes` and `--headers` properties
- `network express-route create/update`: Add `--allow-global-reach` flag
- `network vnet subnet create/update`: Add support for `--delegation`
- Added `network vnet subnet list-available-delegations` command
- `network traffic-manager profile create/update`: Added support for `--interval`, `--timeout` and `--max-failures` for Monitor configuration Deprecated options `--monitor-path`, `--monitor-port` and `--monitor-protocol` in favor of `--path`, `--port`, `--protocol`

- `network lb frontend-ip create/update`: Fixed the logic for setting private IP allocation methodIf a private IP address is provided, the allocation will be staticIf no private IP address is provided, or empty string is provided for private IP address, allocation is dynamic.
- `dns record-set * create/update`: Add support for `--target-resource`
- Add `network interface-endpoint` commands to query interface endpoint objects
- Add `network profile show/list/delete` for partial management of network profiles
- Add `network express-route peering connection` commands to manage peering connections between ExpressRoutes

RDBMS

- Added support for MariaDB service

Reservation

- Added CosmosDb in the reserved resource enum type
- Added name property in Patch model

Manage App

- Fixed bug in `managedapp create --kind MarketPlace` causing instance creation of a Marketplace managed app to crash
- Changed `feature` commands to be restricted to supported profiles

Role

- Added support for listing user's group memberships

SignalR

- First release

Storage

- Added `--auth-mode login` parameter for use of user's login credentials for blob and queue authorization

- Added `storage container immutability-policy/legal-hold` to manage immutable storage

VM

- Fixed issue where `vm create --generate-ssh-keys` overwrites private key file if public key file is missing (#4725, #6780)
- Added support for shared image gallery through `az sig`

August 28, 2018

Version 2.0.45

Core

- Fixed issue of loading empty configuration file
- Added support for profile `2018-03-01-hybrid` for Azure Stack

ACR

- Added a workaround for runtime operations without ARM requests
- Changed to exclude version control files (eg, .git, .gitignore) from uploaded tar by default in `build` command

ACS

- Changed `aks create` to defaults to `Standard_DS2_v2` VMs
- Changed `aks get-credentials` to now call new apis to get cluster credential

AppService

- Added support for CORS on functionapp & webapp
- Added ARM tag support on create commands
- Changed `[webapp|functionapp] identity show` to exit with code 3 upon a missing resource

Backup

- Changed `backup vault backup-properties show` to exit with code 3 upon a missing resource

Bot Service

- Initial Bot Service CLI Release

Cognitive Services

- Added new parameter `--api-properties`, which is required for creating some of the services

IoT

- Fixed issue with associating linked hubs

Monitor

- Added `monitor metrics alert` commands for near-realtime metric alerts
- Deprecated `monitor alert` commands

Network

- Changed `network application-gateway ssl-policy predefined show` to exit with code 3 upon a missing resource

Resource

- Changed `provider operation show` to exit with code 3 upon a missing resource

Storage

- Changed `storage share policy show` to exit with code 3 upon a missing resource

VM

- Changed `vm/vmss identity show` to exit with code 3 upon a missing resource
- Deprecated `--storage-caching` for `vm create`

August 14, 2018

Version 2.0.44

Core

- Fixed numeric display in `table` output
- Added YAML output format

Telemetry

- Improved telemetry reporting

ACR

- Added `content-trust policy` commands
- Fixed issue where `.dockerignore` was not handled properly

ACS

- Changed `az acs/aks install-cli` to install under `%USERPROFILE%\azure-kubectl` on Windows
- Changed `az aks install-connector` to detect if the cluster has RBAC and configure ACI Connector appropriately
- Changed to role assignment to the subnet when it's provided
- Added new option to "skip role assignment" for subnet when it's provided
- Changed to skip role assignment to subnet when assignment already exists

AppService

- Fixed a bug that prevent from creating a function-app using storage accounts in external resource groups
- Fixed a crash on zip deployment

BatchAI

- Changed logger output for auto-storage account creation to specifies "resource group".

Container

- Added `--secure-environment-variables` for passing secure environment variables to a container

IoT

- [BREAKING CHANGE] Removed deprecated commands which have moved to the `iot` extension
- Updated elements to not assume `azure-devices.net` domain

IoT Central

- Initial release of IoT Central module

KeyVault

- Added commands for managing storage accounts and sas-definitions
- Added commands for network-rules
- Added `--id` parameter to secret, key, and certificate operations
- Added support for KV mgmt multi-api version
- Added support for KV data plane multi-api version

Relay

- Initial release

Sql

- Added `sql failover-group` commands

Storage

- [BREAKING CHANGE] Changed `storage account show-usage` to require `--location` parameter and will list by region
- Changed `--resource-group` parameter to be optional for `storage account` commands
- Removed 'Failed precondition' warnings for individual failures in batch commands for single aggregated message
- Changed `[blob|file] delete-batch` commands to no longer output array of nulls

- Changed `blob [download|upload|delete-batch]` commands to read sas-token from container url

VM

- Added common filters to `vm list-skus` for ease of use

July 31, 2018

Version 2.0.43

ACR

- Added `--with-secure-properties` flag to `acr build-task show` command
- Added `acr build-task update-build` command

ACS

- Changed to return return 0 (success) when ending `az aks browse` by pressing [Ctrl+C]

Batch

- Fixed bug when showing AAD token in cloudshell

Container

- Removed requirement for `--log-analytics-workspace-key` for name or ID when in set subscription

Network

- Added dns support to 2017-03-09-profile for Azure Stack

Resource

- Added `--rollback-on-error` to `group deployment create` to execute a known-good deployment on error

- Fixed issue where `--parameters {}` with `group deployment create` resulted in an error

Role

- Added support for stack profile 2017-03-09-profile
- Fixed issue where generic update parameters to `app update` would not work correctly

Search

- Added commands for Azure Search service

Service Bus

- Added migration command group to migrate a namespace from Service Bus Standard to Premium
- Added new optional properties to Service Bus queue and Subscription
 - `--enable-batched-operations` and `--enable-dead-lettering-on-message-expiration` in `queue`
 - `--dead-letter-on-filter-exceptions` in `subscriptions`

Storage

- Added support for download of large files using a single connection
- Converted `show` commands that were missed from failing with exit code 3 upon a missing resource

VM

- Added support to list availability sets by subscription
- Added support for `StandardSSD_LRS`
- Added support for application security group on creating VM scale set
- [BREAKING CHANGE] Changed `[vm|vmss] create`, `[vm|vmss] identity assign`, and `[vm|vmss] identity remove` to output user assigned identities in dictionary format

July 18, 2018

Version 2.0.42

Core

- Added support for browser-based login in WSL bash window
- Added `--force-string` flag to all generic update commands
- [BREAKING CHANGE] Changed 'show' commands to log error message and fail with exit code of 3 upon a missing resource

ACR

- [BREAKING CHANGE] Updated '--no-push' to a pure flag in 'acr build' command
- Added `show` and `update` commands under `acr repository` group
- Added `--detail` flag for `show-manifests` and `show-tags` to show more detailed information
- Added `--image` parameter to support get build details or logs by an image

ACS

- Changed `az aks create` to error out if `--max-pods` is less than 5

AppService

- Added support for PremiumV2 skus

Batch

- Fixed bug on using token credential on cloud shell mode
- Changed JSON input to be case-insensitive

Batch AI

- Fixed `az batchai job exec` command

Container

- Removed the requirement for username and password for non dockerhub registries
- Fixed error when creating container groups from yaml file

Network

- Added `--no-wait` support to `network nic [create|update|delete]`
- Added `network nic wait`
- Deprecated `--ids` argument for `network vnet [subnet|peering] list`
- Added `--include-default` flag to include default security rules in the output of `network nsg rule list`

Resource

- Added `--no-wait` support to `group deployment delete`
- Added `--no-wait` support to `deployment delete`
- Added `deployment wait` command
- Fixed issue where the subscription-level `az deployment` commands erroneously appeared for profile 2017-03-09-profile

SQL

- Fixed 'The provided resource group name ... did not match the name in the Url' error when specifying elastic pool name for `sql db copy` and `sql db replica create` commands
- Allow configuring default sql server by executing `az configure --defaults sql-server=<name>`
- Implemented table formatters for `sql server`, `sql server firewall-rule`, `sql list-usages`, and `sql show-usage` commands

Storage

- Added `pageRanges` property to `storage blob show` output that will be populated for page blobs

VM

- [BREAKING CHANGE] Changed `vmss create` to use `Standard_DS1_v2` as the default instance size
- Added `--no-wait` support to `vm extension [set|delete]` and `vmss extension [set|delete]`
- Added `vm extension wait`

July 3, 2018

Version 2.0.41

AKS

- Changed monitoring to use subscription ID

Version 2.0.40

Core

- Added a new authorization code flow for interactive login

ACR

- Added polling build status
- Added support for case-insensitive enum values
- Added `--top` and `--orderby` parameters for `show-manifests`

ACS

- [BREAKING CHANGE] Enable Kubernetes role-based access control by default
- Added `--disable-rbac` argument and deprecated `--enable-rbac` since it's the default now
- Updated options for `aks browse` command. Added `--listen-port` support
- Updated the default helm chart package for `aks install-connector` command. Use `virtual-kubelet-for-aks-latest.tgz`
- Added `aks enable-addons` and `aks disable-addons` commands to update an existing cluster

AppService

- Added support for disabling identity via `webapp identity remove`
- Removed `preview` tag for Identity feature

Backup

- Updated module definition

BatchAI

- Fixed table output for `batchai cluster node list` and `batchai job node list` commands

Cloud

- Added `acr login` server suffix to cloud config

Container

- Changed `container create` to default to long running operation
- Added Log Analytics parameters `--log-analytics-workspace` and `--log-analytics-workspace-key`
- Added `--protocol` parameter to specify which network protocol to use

Extension

- Changed `extension list-available` to only show extensions compatible with CLI version

Network

- Fixed issue where record types were case-sensitive ([#6602](#))

Rdbms

- Added `[postgres|mysql] server vnet-rule` commands

Resource

- Added new operation group `deployment`

VM

- Added support for removing system assigned identity

June 25, 2018

Version 2.0.39

CLI

- Updated file trimming in MSI installer to fix extension installation issue

June 19, 2018

Version 2.0.38

Core

- Added global support for `--subscription` to most commands

ACR

- Added `azure-storage-blob` as dependency
- Changed default CPU configuration with `acr build-task create` to use 2 cores

ACS

- Updated options of `aks use-dev-spaces` command. Added `--update` support
- Changed `aks get-credentials --admin` to not replace the user context in `$HOME/.kube/config`
- Exposed read-only `nodeResourceGroup` property on managed clusters
- Fixed `acs browse` command error
- Made `--connector-name` optional for `aks install-connector`, `aks upgrade-connector` and `aks remove-connector`
- Added new Azure Container Instance regions for `aks install-connector`
- Added the normalized location into the helm release name and node name to `aks install-connector`

AppService

- Added support for newer versions of `urllib`
- Added support to `functionapp create` to use appservice plan from external resource groups

Batch

- Removed `azure-batch-extensions` dependency

Batch AI

- Added support for workspaces. Workspaces allow to group clusters, file-servers and experiments in groups removing limitation on number of resources can be created
- Added support for experiments. Experiments allow to group jobs in collections removing limitation on number of created jobs
- Added support to configure `/dev/shm` for jobs running in a docker container
- Added `batchai cluster node exec` and `batchai job node exec` commands. These commands allow to execute any commands directly on nodes and provide functionality for port forwarding.
- Added support for `--ids` to `batchai` commands
- [BREAKING CHANGE] All clusters and fileservers must be created under workspaces
- [BREAKING CHANGE] Jobs must be created under experiments
- [BREAKING CHANGE] Removed `--nfs-resource-group` from `cluster create` and `job create` commands. To mount an NFS belonging to a different workspace/resource group provide file server's ARM ID via `--nfs` option
- [BREAKING CHANGE] Removed `--cluster-resource-group` from `job create` command. To submit a job on a cluster belonging to a different workspace/resource group provide cluster's ARM ID via `--cluster` option
- [BREAKING CHANGE] Removed `location` attribute from jobs, cluster and file servers. Location now is an attribute of a workspace.
- [BREAKING CHANGE] Removed `--location` from `job create`, `cluster create` and `file-server create` commands
- [BREAKING CHANGE] Changed names of short options to make interface more consistent:
 - Renamed `--config`, `-c` to `--config-file`, `-f`
 - Renamed `--cluster`, `-r` to `--cluster`, `-c`
 - Renamed `--cluster`, `-n` to `--cluster`, `-c`
 - Renamed `--job`, `-n` to `--job`, `-j`

Maps

- [BREAKING CHANGE] Changed `maps account create` to require accepting Terms of Service either by interactive prompt or `--accept-tos` flag

Network

- Added support for `https` to `network lb probe create` #6571 ↗
- Fixed issue where `--endpoint-status` was case sensitive. #6502 ↗

Reservations

- [BREAKING CHANGE] Added required parameter `ReservedResourceType` to `reservations catalog show`
- Added parameter `Location` to `reservations catalog show`
- [BREAKING CHANGE] Removed `kind` from `ReservationProperties`
- [BREAKING CHANGE] Renamed `capabilities` to `sku_properties` in `Catalog`
- [BREAKING CHANGE] Removed `size` and `tier` properties from `Catalog`
- Added parameter `InstanceFlexibility` to `reservations reservation update`

Role

- Improved error handling

SQL

- Fixed confusing error when running `az sql db list-editions` for a location that is not available to your subscription

Storage

- Changed table output for `storage blob download` to be more readable

VM

- Improved refine vm size check for accelerated networking support in `vm create`
- Added warning for `vmss create` that the default vm size will be switched from `Standard_D1_v2` to `Standard_DS1_v2`
- Added `--force-update` to `[vm|vmss] extension set` to update the extension even when the configuration has not changed

June 13, 2018

Version 2.0.37

Core

- Improved interactive telemetry

Version 2.0.36

AKS

- Added advanced networking options to `aks create`
- Added arguments to `aks create` to enable monitoring and HTTP routing
- Added `--no-ssh-key` argument to `aks create`
- Added `--enable-rbac` argument to `aks create`
- [PREVIEW] Added support for Azure Active Directory authentication to `aks create`

AppService

- Fixed an issue with incompatible urllib versions

June 5, 2018

Version 2.0.35

Interactive

- Added limits to the dependencies of interactive mode

Version 2.0.34

Core

- Added support for cross tenant resource referencing
- Improved telemetry upload reliability

ACR

- Added support for VSTS as a remote source location
- Added `acr import` command

AKS

- Changed `aks get-credentials` to create the kube config file with more secure filesystem permissions

Batch

- Fixed bug in Pool list table formatting [[Issue #4378 ↗](#)]

IOT

- Added support for creating Basic Tier IoT Hubs

Network

- Improved `network vnet peering`

Policy Insights

- Initial Release

ARM

- Added `account management-group` commands.

SQL

- Added new managed instance commands:
 - `sql mi create`
 - `sql mi show`
 - `sql mi list`
 - `sql mi update`
 - `sql mi delete`
- Added new managed database commands:

- `sql midb create`
- `sql midb show`
- `sql midb list`
- `sql midb restore`
- `sql midb delete`

Storage

- Added extra mimetypes for json and javascript to be inferred from file extensions

VM

- Changed `vm list-skus` to use fixed columns and add warning that `Tier` and `Size` will be removed
- Added `--accelerated-networking` option to `vm create`
- Added `--tags` to `identity create`

May 22, 2018

Version 2.0.33

Core

- Added support for expanding `@` in file names

ACS

- Added new Dev-Spaces commands `aks use-dev-spaces` and `aks remove-dev-spaces`
- Fixed typo in help message

AppService

- Improved generic update commands
- Added async support for `webapp deployment source config-zip`

Container

- Added support for exporting a container group in yaml format

- Added support for using a yaml file to create / update a container group

Extension

- Improved removal of extensions

Interactive

- Changed logging to mute parser for completions
- Improved handling of bad help caches

KeyVault

- Fixed keyvault commands to work in cloud shell or VMs with identity

Network

- Fix issue where `network watcher show-topology` would not work with vnet and/or subnet name [#6326 ↗](#)
- Fix issue where some `network watcher` commands would claim Network Watcher is not enabled for regions when it actually is [#6264 ↗](#)

SQL

- [BREAKING CHANGE] Changed response objects returned from `db` and `dw` commands:
 - Renamed `serviceLevelObjective` property to `currentServiceObjectiveName`
 - Removed `currentServiceObjectiveId` and `requestedServiceObjectiveId` properties
 - Changed `maxSizeBytes` property to be an integer value instead of a string
- [BREAKING CHANGE] Changed the following `db` and `dw` properties to be read-only:
 - `requestedServiceObjectiveName`. To update, use the `--service-objective` parameter or set the `sku.name` property
 - `edition`. To update, use the `--edition` parameter or set the `sku.tier` property
 - `elasticPoolName`. To update, use the `--elastic-pool` parameter or set the `elasticPoolId` property
- [BREAKING CHANGE] Changed the following `elastic-pool` properties to be read-only:

- `edition`. To update, use the `--edition` parameter
- `dtu`. To update, use the `--capacity` parameter
- `databaseDtuMin`. To update, use the `--db-min-capacity` parameter
- `databaseDtuMax`. To update, use the `--db-max-capacity` parameter
- Added `--family` and `--capacity` parameters to `db`, `dw`, and `elastic-pool` commands.
- Added table formatters to `db`, `dw`, and `elastic-pool` commands.

Storage

- Added completer for `--account-name` argument
- Fixed problem with `storage entity query`

VM

- [BREAKING CHANGE] Removed `--write-accelerator` from `vm create`. The same support can be accessed through `vm update` or `vm disk attach`
- Fixed extension image matching in `[vm|vmss] extension`
- Added `--boot-diagnostics-storage` to `vm create` to capture boot log
- Added `--license-type` to `[vm|vmss] update`

May 7, 2018

Version 2.0.32

Core

- Fixed an unhandled exception when retrieving secrets from a service principal account with cert
- Added limited support for positional arguments
- Fix issue where `--query` could not be used with `--ids`. [#5591 ↗](#)
- Improved piping scenarios from commands when using `--ids`. Supports `-o tsv` with a query specified or `-o json` without specifying a query
- Added command suggestions on error if users have typo in their commands
- Improved error when users type `az ''`
- Added support custom resource types for command modules and extensions

ACR

- Added ACR Build commands
- Improved resource not found error messages
- Improved resource creation performance and error handling
- Improved acr login in non-standard consoles and WSL
- Improved repository commands error messages
- Updated table columns and ordering

ACS

- Added warning that `az aks` is a preview service
- Fixed the permission issue in `aks install-connector` when `--aci-resource-group` is not specified

AMS

- Initial release - Manage Azure Media Services resources

Appservice

- Fixed a bug in `webapp delete` when `--slot` is provided
- Removed `--runtime-version` from `webapp auth update`
- Added support for `min_tls_version` & `https2.0`
- Added support for multicontainers

Batch AI

- Changed `batchai create cluster` to respect vm priority configured in the cluster's configuration file

Cognitive Services

- Fixed typo in example for `cognitiveservices account create` #5603 ↗

Consumption

- Added new commands for budget API

Container

- Removed requirement for `--registry-server` for `container create` when a registry server is included in the image name

Cosmos DB

- Introducing VNET support for Azure CLI - Cosmos DB

DMS

- Initial release - Adds support for the SQL to Azure SQL migration scenario

Extension

- Fixed bug where extension metadata stopped being shown

Interactive

- Allow interactive completers to function with positional arguments
- More user-friendly output when users type "
- Fixed completions for parameters with no help
- Fixed descriptions for command-groups

Lab

- Fixed regressions from knack conversion

Network

- [BREAKING CHANGE] Removed the `--ids` parameter for:
 - `express-route auth list`
 - `express-route peering list`
 - `nic ip-config list`
 - `nsg rule list`
 - `route-filter rule list`
 - `route-table route list`
 - `traffic-manager endpoint list`

Profile

- Fixed `disk create` source detection
- [BREAKING CHANGE] Removed `--msi-port` and `--identity-port` as they are no longer used
- Fixed typo in `account get-access-token` short summary

Redis

- Deprecated `redis patch-schedule patch-schedule show` in favor of `redis patch-schedule show`
- Deprecated `redis list-all`. This functionality has been folded into `redis list`
- Deprecated `redis import-method` in favor of `redis import`
- Added support for `--ids` to various commands

Role

- [BREAKING CHANGE] Removed deprecated `ad sp reset-credentials`

Storage

- Allow destination sas-token to apply to source for blob copy if source sas and account key are unspecified
- Exposed `--socket-timeout` for blob uploads and downloads
- Treat blob names that start with path separators as relative paths
- Allow `storage blob copy --source-sas` with starting query char, '?'
- Fixed `storage entity query --marker` to accept list of key=values

VM

- Fixed an invalid detection logic on unmanaged blob uri
- Added support disk encryption w/o user provided service principals
- [BREAKING CHANGE] Do not use VM 'ManagedIdentityExtension' for MSI support
- Added support for eviction policy to `vmss`
- [BREAKING CHANGE] Removed `--ids` from:
 - `vm extension list`
 - `vm secret list`
 - `vm unmanaged-disk list`
 - `vmss nic list`
- Added write accelerator support
- Added `vmss perform-maintenance`

- Fixed `vm diagnostics set` to detect VM's OS type reliably
- Changed `vm resize` to check if the requested size is different than currently set and update only on change

April 10, 2018

Version 2.0.31

ACR

- Improved error handling of wincred fallback

ACS

- Changed aks created SPNs to be valid for 5 years

Appservice

- [BREAKING CHANGE]: Removed `assign-identity`
- Fixed uncaught exception for nonexistent webapp plans

BatchAI

- Added support for 2018-03-01 API
 - Job level mounting
 - Environment variables with secret values
 - Performance counters settings
 - Reporting of job specific path segment
 - Support for subfolders in list files api
 - Usage and limits reporting
 - Allow to specify caching type for NFS servers
 - Support for custom images
 - Added pyTorch toolkit support
- Added `job wait` command which allows to wait for the job completion and reports job exit code
- Added `usage show` command to list current Batch AI resources usage and limits for different regions
- National clouds are supported

- Added job command line arguments to mount filesystems on the job level in addition to config files
- Added more options to customize clusters - vm priority, subnet, initial nodes count for auto-scale clusters, specifying custom image
- Added command line option to specify caching type for Batch AI managed NFS
- Simplified specifying mount filesystem in config files. Now you can omit credentials for Azure File Share and Azure Blob Containers - CLI will populate missing credentials using storage account key provided via command line parameters or specified via environment variable or will query the key from Azure Storage (if the storage account belongs to the current subscription)
- Job file stream command now auto-completes when the job is completed (succeeded, failed, terminated or deleted)
- Improved `table` output for `show` operations
- Added `--use-auto-storage` option for cluster creation. This option make it simpler to manage storage accounts and mount Azure File Share and Azure Blob Containers to clusters
- Added `--generate-ssh-keys` option to `cluster create` and `file-server create`
- Added ability to provide node setup task via command line
- [BREAKING CHANGE] Moved `job stream-file` and `job list-files` commands under `job file` group
- [BREAKING CHANGE] Renamed `--admin-user-name` to `--user-name` in `file-server create` command to be consistent with `cluster create` command

Billing

- Added enrollment account commands

Consumption

- Added `marketplace` commands
- [BREAKING CHANGE] Renamed `reservations summaries` to `reservation summary`
- [BREAKING CHANGE] Renamed `reservations details` to `reservation detail`

- [BREAKING CHANGE] Removed `--reservation-order-id` and `--reservation-id` short options for `reservation` commands
- [BREAKING CHANGE] Removed `--grain` short options for `reservation summary` commands
- [BREAKING CHANGE] Removed `--include-meter-details` short options for `pricesheet` commands

Container

- Added git repo volume mount parameters `--gitrepo-url` `--gitrepo-dir` `--gitrepo-revision` and `--gitrepo-mount-path`
- Fixed [#5926](#): `az container exec` failing when `--container-name` specified

Extension

- Changed distribution check message to be debug-level

Interactive

- Changed to stop completions upon unrecognized commands
- Added event hooks before and after command subtree is created
- Added completion for `--ids` parameters

Network

- Fixed [#5936](#): `application-gateway create` tags could not be set
- Added argument `--auth-certs` to attach authentication certificates for `application-gateway http-settings [create|update]`. [#4910](#)
- Added `ddos-protection` commands to create DDoS protection plans
- Added support for `--ddos-protection-plan` to `vnet [create|update]` to associate a VNet to a DDoS protection plan
- Fixed issue with `--disable-bgp-route-propagation` flag in `network route-table [create|update]`
- Removed dummy arguments `--public-ip-address-type` and `--subnet-type` for `network lb [create|update]`
- Added support for TXT records with RFC 1035 escape sequences to `network dns zone [import|export]` and `network dns record-set txt add-record`

Profile

- Added support for Azure Classic accounts in `account list`
- [BREAKING CHANGE] Removed `--msi` & `--msi-port` arguments

RDBMS

- Added `georestore` command
- Removed storage size restriction from `create` command

Resource

- Added support for `--metadata` to `policy definition create`
- Added support for `--metadata`, `--set`, `--add`, `--remove` to `policy definition update`

SQL

- Added `sql elastic-pool op list` and `sql elastic-pool op cancel`

Storage

- Improved error messages for malformed connection strings

VM

- Added support to configure platform fault domain count to `vmss create`
- Changed `vmss create` to default to Standard LB for zonal, large or single-placement-group disabled scale-set
- [BREAKING CHANGE]: Removed `vm assign-identity`, `vm remove-identity` and `vm format-secret`
- Added support for Public-IP SKU to `vm create`
- Added `--keyvault` and `--resource-group` arguments to `vm secret format` to support scenarios where the command is unable to resolve the vault ID. #5718 ↗
- Better errors for `[vm|vmss create]` when a resource group's location has no zone support

March 27, 2018

Version 2.0.30

Core

- Show message for extensions marked as preview in help

ACS

- Fix SSL certificate verification error for `aks install-cli` in Cloud Shell

Appservice

- Added HTTPS-only support to `webapp update`
- Added support for slots to `az webapp identity [assign|show]` and `az functionapp identity [assign|show]`

Backup

- Added new command `az backup protection isenabled-for-vm`. This command can be used to check if a VM is backed up by any vault in the subscription
- Enabled Azure object IDs for `--resource-group` and `--vault-name` parameters for the following commands:
 - `backup container show`
 - `backup item set-policy`
 - `backup item show`
 - `backup job show`
 - `backup job stop`
 - `backup job wait`
 - `backup policy delete`
 - `backup policy get-default-for-vm`
 - `backup policy list-associated-items`
 - `backup policy set`
 - `backup policy show`
 - `backup protection backup-now`
 - `backup protection disable`
 - `backup protection enable-for-vm`
 - `backup recoverypoint show`
 - `backup restore files mount-rp`

- `backup restore files unmount-rp`
- `backup restore restore-disks`
- `backup vault delete`
- `backup vault show`
- Changed `--name` parameters to accept the output format from `backup ... show` commands

Container

- Added `container exec` command. Executes commands in a container for a running container group
- Allow table output for creating and updating a container group

Extension

- Added message for `extension add` if extension is in preview
- Changed `extension list-available` to show full extension data with `--show-details`
- [BREAKING CHANGE] Changed `extension list-available` to show simplified extension data by default

Interactive

- Changed completions to activate as soon as command table loading is done
- Fixed bug with using `--style` parameter
- Interactive lexer instantiated after command table dump if missing
- Improved completer support

Lab

- Fixed bugs with `create environment` command

Monitor

- Added support for `--top`, `--orderby` and `--namespace` to `metrics list` [#5785 ↗](#)
- Fixed [#4529 ↗](#): `metrics list` Accepts a space-separated list of metrics to retrieve
- Added support for `--namespace` to `metrics list-definitions` [#5785 ↗](#)

Network

- Added support for Private DNS zones

Profile

- Added warning for `--identity-port` and `--msi-port` to `login`

RDBMS

- Added business model GA API version 2017-12-01

Resource

- [BREAKING CHANGE]: Changed `provider operation [list|show]` to not require `--api-version`

Role

- Added support for required access configurations and native clients to `az ad app create`
- Changed `rbac` commands to return less than 1000 IDs on object resolution
- Added credential management commands `ad sp credential [reset|list|delete]`
- [BREAKING CHANGE] Removed 'properties' from `az role assignment [list|show]` output
- Added support for `dataActions` and `notDataActions` permissions to `role definition`

Storage

- Fixed issue when uploading file with size between 195GB and 200GB
- Fixed [#4049](#): Problems with append blob uploads ignoring condition parameters

VM

- Added warning to `vmss create` for upcoming breaking changes for sets with 100+ instances
- Added zone resilient support to `vm [snapshot|image]`
- Changed disk instance view to report better encryption status
- [BREAKING CHANGE] Changed `vm extension delete` to no longer return output

March 13, 2018

Version 2.0.29

ACR

- Added support for `--image` parameter to `repository delete`
- Deprecated `--manifest` and `--tag` parameters of the `repository delete` command
- Added `repository untag` command to remove a tag without deleting data

ACS

- Added `aks upgrade-connector` command to upgrade an existing connector
- Changed `kubectl` config files to use a more readable block-style YAML

Advisor

- [BREAKING CHANGE] Renamed `advisor configuration get` to `advisor configuration list`
- [BREAKING CHANGE] Renamed `advisor configuration set` to `advisor configuration update`
- [BREAKING CHANGE] Removed `advisor recommendation generate`
- Added `--refresh` parameter to `advisor recommendation list`
- Added `advisor recommendation show` command

Appservice

- Deprecated `[webapp|functionapp] assign-identity`
- Added managed identity commands `webapp identity [assign|show]` and `functionapp identity [assign|show]`

Eventhubs

- Initial release

Extension

- Added check to warn user if used distro is different than the one stored in package source file, as this may lead into errors

Interactive

- Fixed #5625 ↗: Persist history across different sessions
- Fixed #3016 ↗: History not recorded while in scope
- Fixed #5688 ↗: Completions did not appear if command table loading encountered an exception
- Fixed progress meter for long running operations

Monitor

- Deprecated the `monitor autoscale-settings` commands
- Added `monitor autoscale` commands
- Added `monitor autoscale profile` commands
- Added `monitor autoscale rule` commands

Network

- [BREAKING CHANGE] Removed `--tags` parameter from `route-filter rule create`
- Removed some erroneous default values for the following commands:
 - `network express-route update`
 - `network nsg rule update`
 - `network public-ip update`
 - `traffic-manager profile update`
 - `network vnet-gateway update`
- Added `network watcher connection-monitor` commands`
- Added `--vnet` and `--subnet` parameters to `network watcher show-topology`

Profile

- Deprecated `--msi` parameter for `az login`
- Added `--identity` parameter for `az login` to replace `--msi`

RDBMS

- [PREVIEW] Changed to use the API 2017-12-01-preview

Service Bus

- Initial release

Storage

- Fixed #4971: `storage blob copy` now supports other Azure clouds
- Fixed #5286: Batch commands `storage blob [delete-batch|download-batch|upload-batch]` no longer throw an error upon precondition failures

VM

- Added support to `[vm|vmss] create` to attach unmanaged data disks and configure caching
- Deprecated `[vm|vmss] assign-identity` and `[vm|vmss] remove-identity`
- Added `vm identity [assign|remove|show]` and `vmss identity [assign|remove|show]` commands to replace deprecated commands
- Changed default priority in `vmss create` to None

February 27, 2018

Version 2.0.28

Core

- Fixed #5184: Homebrew install issue
- Added support for extension telemetry with custom keys
- Added HTTP logging to `--debug`

ACS

- Changed to use the the `virtual-kubelet-for-aks` Helm chart for `aks install-connector` by default
- Fixed issue: Insufficient permission for service principals to create ACI container group issue
- Added `--aci-container-group`, `--location`, and `--image-tag` parameters to `aks install-connector`
- Removed deprecation notice from `aks get-versions`

Appservice

- Updates for new SDK version (azure-mgmt-web 0.35.0)
- Fixed #5538: Free reported as invalid SKU

Cognitive Services

- Updated the 'notice' when creating a new Cognitive Services account

Consumption

- Added new commands for pricesheet API
- Updated the existing Usage Details and Reservation Details formats

Container

- Added `--secrets` and `--secrets-mount-path` arguments to `container create` to use secrets in ACI

Network

- Fixed #5559: Missing client in `network vnet-gateway vpn-client generate`

Resource

- Changed `group deployment export` to display a partial template and errors on failure

Role

- Added `role assignment list-changelogs` to allow auditing of service principal roles

SQL

- Added zone redundancy support for databases and elastic pools on creation and update

Storage

- Enabled specifying destination-path/prefix for `storage blob [upload-batch|download-batch]`

VM

- Added support for attaching/detaching disks on a single VMSS instance

February 13, 2018

Version 2.0.27

Core

- Changed authentication to key on both subscription ID and name on MSI login

ACS

- [BREAKING CHANGE] Renamed `aks get-versions` to `aks get-upgrades` in the interest of accuracy
- Changed `aks get-versions` to show Kubernetes versions available for `aks create`
- Changed `aks create` defaults to letting the server choose the version of Kubernetes
- Updated help messages referring to the service principal generated by AKS
- Changed default node sizes for `aks create` from "Standard_D1_v2" to "Standard_DS1_v2"
- Improved reliability when locating the dashboard pod for `az aks browse`
- Fixed `aks get-credentials` to handle Unicode errors when loading Kubernetes configuration files
- Added a message to `az aks install-cli` to help get `kubectl` in `$PATH`

Appservice

- Fixed issue where `webapp [backup|restore]` failed because of a null reference
- Added support for default app service plans through `az configure --defaults appserviceplan=my-asp`

CDN

- Added `cdn custom-domain [enable-https|disable-https]` commands

Container

- Added `--follow` option to `az container logs` for streaming logs
- Added `container attach` command that attaches local standard output and error streams to a container in a container group

CosmosDB

- Added support for setting capabilities

Extension

- Added support for `--pip-proxy` parameter to `az extension [add|update]` commands
- Added support for `--pip-extra-index-urls` argument to `az extension [add|update]` commands

Feedback reference

- Added extension information to telemetry data

Interactive

- Fixed issue where user is prompted to login when using interactive mode in Cloud Shell
- Fixed regression with missing parameter completions

IoT

- Fixed issue where `iot dps access policy [create|update]` would return a 'not found' error on success
- Fixed issue where `iot dps linked-hub [create|update]` would return a 'not found' error on success
- Added `--no-wait` support to `iot dps access policy [create|update]` and `iot dps linked-hub [create|update]`
- Changed `iot hub create` to allow specifying the number of partitions

Monitor

- Fixed `az monitor log-profiles create` command

Network

- Fixed the `--tags` option for the following commands:
 - `network public-ip create`
 - `network lb create`
 - `network local-gateway create`
 - `network nic create`
 - `network vnet-gateway create`
 - `network vpn-connection create`

Profile

- Enabled `az login` in from interactive mode

Resource

- Added back `feature show`

Role

- Added `--available-to-other-tenants` argument to `ad app update`

SQL

- Added `sql server dns-alias` commands
- Added `sql db rename`
- Added support for the `--ids` argument to all sql commands

Storage

- Added `storage blob service-properties delete-policy` and `storage blob undelete` commands to enable soft-delete

VM

- Fixed a crash when VM encryption may not be fully initialized
- Added principal ID output on enabling MSI

- Fixed `vm boot-diagnostics get-boot-log`

January 31, 2018

Version 2.0.26

Core

- Added support raw token retrieval in MSI context
- Removed polling indicator string after finishing LRO on Windows cmd.exe
- Added a warning that appears when using a configured default has been changed to an INFO level entry. Use `--verbose` to see
- Add a progress indicator for wait commands

ACS

- Clarified `--disable-browser` argument
- Improved tab completion for `--vm-size` arguments

Appservice

- Fixed `webapp log [tail|download]`
- Removed the `kind` check on webapps and functions

CDN

- Fixed missing client issue with `cdn custom-domain create`

CosmosDB

- Fixed parameter description for failover policies

Interactive

- Fixed issue where command option completions no longer appeared

Network

- Added protection for `--cert-password` to `application-gateway create`

- Fixed issue with `application-gateway update` where `--sku` erroneously applied a default value
- Added protection for `--shared-key` and `--authorization-key` to `vpn-connection create`
- Fixed missing client issue with `asg create`
- Added `--file-name / -f` parameter for exported names to `dns zone export`
- Fixed the following issues with `dns zone export`:
 - Fixed issue where long TXT records were incorrectly exported
 - Fixed issue where quoted TXT records were incorrectly exported without escaped quotes
- Fixed issue where certain records were imported twice with `dns zone import`
- Restored `vnet-gateway root-cert` and `vnet-gateway revoked-cert` commands

Profile

- Fixed `get-access-token` to work inside a VM with identity

Resource

- Fixed bug with `deployment [create|validate]` where warning was incorrectly displayed when a template 'type' field contained uppercase values

Storage

- Fixed issue with migrating Storage V1 accounts to Storage V2
- Added progress reporting for all upload/download commands
- Fixed bug preventing "-n" arg option with `storage account check-name`
- Added 'snapshot' column to table output for `blob [list|show]`
- Fixed bugs with various parameters that needed to be parsed as ints

VM

- Added `vm image accept-terms` command to allow creating VMs from images with additional charges
- Fixed `[vm|vmss create]` to ensure commands can run under proxy with unsigned certificates
- [PREVIEW] Added support for "low" priority to VMSS
- Added protection for `--admin-password` to `[vm|vmss] create`

January 17, 2018

Version 2.0.25

ACR

- Added acr login fallback on Windows credential errors
- Enabled registry logs

ACS

- Fixed `get-credentials` command
- Removed SPN role requirement

Appservice

- Fixed bug with `config ssl upload` where `hosting_environment_profile` was null
- Added support for custom URLs to `browse`
- Fixed slot support for `log tail`

Backup

- Changed `--container-name` option of `backup item list` to be optional
- Added storage account options to `backup restore restore-disks`
- Fixed location check in `backup protection enable-for-vm` to be case insensitive
- Fixed issue where commands failed with an invalid container name
- Changed `backup item list` to include 'Health Status' by default

Batch

- Changed `batch login` to return authentication details

Cloud

- Changed to not require endpoints when setting `--profile` on a cloud

Consumption

- Added new commands for reservations: `consumption reservations summaries` and `consumption reservations details`

Event Grid

- [BREAKING CHANGE] Moved the `az eventgrid topic event-subscription` commands to `eventgrid event-subscription`
- [BREAKING CHANGE] Moved the `az eventgrid resource event-subscription` commands to `eventgrid event-subscription`
- [BREAKING CHANGE] Removed the `eventgrid event-subscription show-endpoint-url` command. Use `eventgrid event-subscription show --include-full-endpoint-url` instead
- Added command `eventgrid topic update`
- Added command `eventgrid event-subscription update`
- Added `--ids` parameter for `eventgrid topic` commands
- Added tab completion support for topic names

Interactive

- Fixed issue where interactive mode did not work with Python 2.x
- Fixed errors on startup
- Fixed issue with some commands not running in interactive mode

IoT

- Added support for device provisioning service
- Added deprecation messages in commands and command help
- Added IoT check to inform users of the IoT Extension

Monitor

- Added multi-diagnostic setting support. The `--name` parameter is now required for `az monitor diagnostic-settings create`
- Added command `monitor diagnostic-settings categories` to get diagnostic settings category

Network

- Fixed issue when trying to change to/from active-standby mode with `vnet-gateway update`
- Added support for HTTP2 to `application-gateway [create|update]`

Profile

- Added support for login with user assigned identities

Role

- Added `--assignee-object-id` argument to `role assignment create` to bypass graph query

Service Fabric

- Added detailed errors to validation response when creating cluster
- Fixed missing client issue with several commands

VM

- [PREVIEW] Cross-zone support for `vmss`
- [BREAKING CHANGE] Changed single-zone `vmss` default to "Standard" load balancer
- [BREAKING CHANGE] Changed `externalIdentities` to `userAssignedIdentities` for EMSI
- [PREVIEW] Added support for OS disk swap
- Added support for using VM images from other subscriptions
- Added `--plan-name`, `--plan-product`, `--plan-promotion-code` and `--plan-publisher` arguments to `[vm|vmss] create`
- Fixed error issues with `[vm|vmss] create`
- Fixed excessive resource usage caused by `vm image list --all`

December 19, 2017

Version 2.0.23

- Added support for login with user assigned identities

Container

- Fixed incorrect order of parameters for container logs

Network

- Added `--disable-bgp-route-propagation` argument to `route-table [create|update]`
- Added `--ip-tags` argument to `public-ip [create|update]`

Storage

- Added support for storage V2

VM

- [PREVIEW] Added support for user-assigned identities for VMs and VMSSes

December 5, 2017

Version 2.0.22

- Removed `az component` commands. Use `az extension` instead

Core

- Modified the `AZURE_US_GOV_CLOUD` AAD authority endpoint from `login.microsoftonline.com` to `login.microsoftonline.us`
- Fixed issue where telemetry would continuously resend

ACS

- Added `aks install-connector` and `aks remove-connector` commands
- Improved error reporting for `acs create`
- Fixed usage of `aks get-credentials -f` without fully-qualified path

Advisor

- Initial release

Appservice

- Fixed cert name generation with `webapp config ssl upload`
- Fixed `webapp [list|show]` and `functionapp [list|show]` to display correct apps
- Added default value for `WEBSITE_NODE_DEFAULT_VERSION`

Consumption

- Added support for API version 2017-11-30

Container

- Fixed default ports regression

Monitor

- Added multi-dimension support to metrics command

Resource

- Added `--include-response-body` argument to `resource show`

Role

- Added display of default assignments for "classic" administrators to `role assignment list`
- Added support to `ad sp reset-credentials` for adding credentials instead of overwriting
- Improved error reporting for `ad sp create-for-rbac`

SQL

- Added `sql db list-usages` and `sql db show-usage` commands
- Added `sql server conn-policy show` and `sql server conn-policy update` commands

VM

- Added zone information to `az vm list-skus`

November 14, 2017

Version 2.0.21

ACR

- Added support for creating webhooks in replication regions

ACS

- Changed all wording of "agent" to "node" in AKS
- Deprecated `--orchestrator-release` option for `acs create`
- Changed default VM size for AKS to `Standard_D1_v2`
- Fixed `az aks browse` on Windows
- Fixed `az aks get-credentials` on Windows

Appservice

- Added deployment source `config-zip` for webapps and function apps
- Added `--docker-container-logging` option to `az webapp log config`
- Removed the `storage` option from the parameter `--web-server-logging` of `az webapp log config`
- Improved error messages for `deployment user set`
- Added support for creating Linux function apps
- Fixed `list-locations`

Batch

- Fixed bug in pool create command when a resource ID was used with the `--image` flag

Batchai

- Added short option, `-s`, for `--vm-size` when providing VM size in `file-server create` command
- Added storage account name and key arguments to `cluster create` parameters
- Fixed documentation for `job list-files` and `job stream-file`
- Added short option, `-r`, for `--cluster-name` when providing cluster name in `job create` command

Cloud

- Changed `cloud [register|update]` to prevent registering clouds that have missing required endpoints

Container

- Added support to open multiple ports
- Added container group restart policy
- Added support to mount Azure File share as a volume
- Updated helper docs

Data Lake Analytics

- Changed `[job|account] list` to return more concise information

Data Lake Store

- Changed `account list` to return more concise information

Extension

- Added `extension list-available` to allow listing official Microsoft extensions
- Added `--name` to `extension [add|update]` to allow installing extensions by name

IoT

- Added support for certificate authorities (CA) and certificate chains

Monitor

- Added `activity-log alert` commands

Network

- Added support for CAA DNS records
- Fixed issue where endpoints could not be updated with `traffic-manager profile update`

- Fixed issue where `vnet update --dns-servers` didn't work depending on how the VNET was created
- Fixed issue where relative DNS names were incorrectly imported by `dns zone import`

Reservations

- Initial preview release

Resource

- Added support for resource IDs to `--resource` parameter and resource-level locks

SQL

- Added `--ignore-missing-vnet-service-endpoint` parameter to `sql server vnet-rule [create|update]`

Storage

- Changed `storage account create` to use SKU `Standard_RAGRS` as default
- Fixed bugs when dealing with file/blob names that include non-ascii chars
- Fixed bug that prevented using `--source-uri` with `storage [blob|file] copy start-batch`
- Added commands to glob and delete multiple objects with `storage [blob|file] delete-batch`
- Fixed issue when enabling metrics with `storage metrics update`
- Fixed issue with files over 200GB when using `storage blob upload-batch`
- Fixed issue where `--bypass` and `--default-action` were ignored by `storage account [create|update]`

VM

- Fixed a bug with `vmss create` that prevented using the `Basic` size tier
- Added `--plan` arguments to `[vm|vmss] create` for custom images with billing information
- Added `vm secret [add|remove|list]` commands
- Renamed `vm format-secret` to `vm secret format`
- Added `--encrypt format` argument to `vm encryption enable`

October 24, 2017

Version 2.0.20

Core

- Updated `2017-03-09-profile` to consume `MGMT_STORAGE` API version `2016-01-01`

ACR

- Updated resource management to point to `2017-10-01` API version
- Changed 'bring your own storage' SKU to Classic
- Renamed registry SKUs to Basic, Standard, and Premium

ACS

- [PREVIEW] Added `az aks` commands
- Fixed kubernetes `get-credentials`

Appservice

- Fixed issue where downloaded `webapp` logs may be invalid

Component

- Added clearer deprecation message for all installers and confirmation prompt

Monitor

- Added `action-group` commands

Resource

- Fixed incompatibility with most recent version of msrest dependency in `group export`
- Fixed `policy assignment create` to work with built in policy definitions and policy set definitions

VM

- Added `--accelerated-networking` argument to `vmss create`

October 9, 2017

Version 2.0.19

Core

- Added handling of ADFS authority URLs with a trailing slash to Azure Stack

Appservice

- Added generic update with new command `webapp update`

Batch

- Updated to Batch SDK 4.0.0
- Updated `--image` option of `VirtualMachineConfiguration` to support ARM image references in addition to `publish:offer:sku:version`
- Added support for the new CLI extension model for Batch Extensions commands
- Removed Batch support from the component model

Batchai

- Initial release of Batch AI module

Keyvault

- Fixed Key Vault authentication issue when using ADFS on Azure Stack. ([#4448](#)) ↗

Network

- Changed `--server` argument of `application-gateway address-pool create` to be optional, allowing for empty address pools
- Updated `traffic-manager` to support latest features

Resource

- Added support for `--resource-group/-g` options for resource group name to `group`
- Added commands for `account lock` to work with subscription-level locks
- Added commands for `group lock` to work with group-level locks
- Added commands for `resource lock` to work with resource-level locks

Sql

- Added support for SQL Transparent Data Encryption (TDE) and TDE with Bring Your Own Key
- Added `db list-deleted` command and `db restore --deleted-time` parameter, allowing the ability to find and restore deleted databases
- Added `db op list` and `db op cancel`, allowing the ability to list and cancel in-progress operations on database

Storage

- Added support for file share snapshot

Vm

- Fixed a bug in `vm show` where using `-d` caused a crash on missing private ip addresses
- [PREVIEW] Added support for rolling upgrade to `vmss create`
- Added support for updating encryption settings with `vm encryption enable`
- Added `--os-disk-size-gb` parameter to `vm create`
- Added `--license-type` parameter for Windows to `vmss create`

September 22, 2017

Version 2.0.18

Resource

- Added support for showing built-in policy definitions
- Added support mode parameter for creating policy definitions
- Added support for UI definitions and templates to `managedapp definition create`
- [BREAKING CHANGE] Changed `managedapp` resource type from `appliances` to `applications` and `applianceDefinitions` to `applicationDefinitions`

Network

- Added support for availability zone to `network 1b` and `network public-ip` subcommands
- Added support for IPv6 Microsoft Peering to `express-route`
- Added `asg` application security group commands
- Added `--application-security-groups` argument to `nic [create|ip-config create|ip-config update]`
- Added `--source-asgs` and `--destination-asgs` arguments to `nsg rule [create|update]`
- Added `--ddos-protection` and `--vm-protection` arguments to `vnet [create|update]`
- Added `network [vnet-gateway|vpn-client|show-url]` commands

Storage

- Fixed issue where `storage account network-rule` commands may fail after updating the SDK

Eventgrid

- Updated Azure Event Grid Python SDK to use newer API version "2017-09-15-preview"

SQL

- Changed `sql server list` argument `--resource-group` to be optional. If not specified, all sql servers in the subscription will be returned
- Added `--no-wait` param to `db [create|copy|restore|update|replica create|create|update]` and `dw [create|update]`

Keyvault

- Added support for Keyvault commands from behind a proxy

VM

- Added support for availability zone to `[vm|vmss|disk] create`
- Fixed issue where using `--app-gateway ID` with `vmss create` would cause a failure

- Added `--asgs` argument to `vm create`
- Added support for running commands on VMs with `vm run-command`
- [PREVIEW] Added support for VMSS disk encryption with `vmss encryption`
- Added support for performing maintenance on VMs with `vm perform-maintenance`

ACS

- [PREVIEW] Added `--orchestrator-release` argument to `acs create` for ACS preview regions

Appservice

- Added ability to update and show authentication settings with `webapp auth [update|show]`

Backup

- Preview release

September 11, 2017

Version 2.0.17

Core

- Enabled command module to set its own correlation ID in telemetry
- Fixed JSON dump issue when telemetry is set to diagnostics mode

Acs

- Added `acs list-locations` command
- Made `ssh-key-file` come with expected default value

Appservice

- Added ability to create a webapp in a resource group other than the active service plan's

CDN

- Fixed 'CustomDomain is not interable' bug for `cdn custom-domain create`

Extension

- Initial Release

Keyvault

- Fixed issue where permissions were case sensitive for `keyvault set-policy`

Network

- Renamed `vnet list-private-access-services` to `vnet list-endpoint-services`
- Renamed `--private-access-services` argument to `--service-endpoints` for `vnet subnet create/update`
- Added support for multiple IP ranges and port ranges to `nsg rule create/update`
- Added support for SKU to `lb create`
- Added support for SKU to `public-ip create`

Resource

- Allow passing in resource policy parameter definitions in `policy definition create`, and `policy definition update`
- Allow passing in parameter values for `policy assignment create`
- Allow for passing JSON or file for all params
- Incremented API version

SQL

- Added `sql server vnet-rule` commands

VM

- Fixed: Don't assign access unless `--scope` is provided
- Fixed: Use the same extension naming as portal does
- Removed `subscription` from the `[vm|vmss] create` output
- Fixed: `[vm|vmss] create` storage SKU is not applied on data disks with an image
- Fixed: `vm format-secret --secrets` would not accept newline separated IDs

August 31, 2017

Version 2.0.16

Keyvault

- Fixed bug when trying to automatically resolve secret encoding with `secret download`

Sf

- Deprecating all commands in favor of Service Fabric CLI (sfctl)

Storage

- Fixed issue where storage accounts could not be created in regions that don't support the NetworkACLs feature
- Determine content type and content encoding during blob and file upload if neither content type and content encoding are specified

August 28, 2017

Version 2.0.15

CLI

- Added legal note to `--version`

ACS

- Corrected preview regions
- Formatted default `dns_name_prefix` properly
- Optimized acs command output

Appservice

- [BREAKING CHANGE] Fixed inconsistencies in the output of `az webapp config appsettings [delete|set]`

- Added a new alias of `-i` for `az webapp config container set --docker-custom-image-name`
- Exposed `az webapp log show`
- Exposed new arguments from `az webapp delete` to retain app service plan, metrics or dns registration
- Fixed: Detect slot settings correctly

IoT

- Fixed #3934: Policy creation no longer clears existing policies

Network

- [BREAKING CHANGE] Renamed `vnet list-private-access-services` to `vnet list-endpoint-services`
- [BREAKING CHANGE] Renamed option `--private-access-services` to `--service-endpoints` for `vnet subnet [create|update]`
- Added support for multiple IP and port ranges to `nsg rule [create|update]`
- Added support for SKU to `lb create`
- Added support for SKU to `public-ip create`

Profile

- Exposed `--msi` and `--msi-port` to login using a virtual machine's identity

Service Fabric

- Preview release
- Simplified registry user/password rules for command
- Fixed password prompt for user even after passing in the param
- Added support for empty `registry_cred`

Storage

- Enabled setting blob tier
- Added `--bypass` and `--default-action` arguments to `storage account [create|update]` to support service tunneling
- Added commands to add VNET rules and IP based rules to `storage account network-rule`

- Enabled service encryption by customer managed key
- [BREAKING CHANGE] Renamed `--encryption` option to `--encryption-services` for `az storage account create` and `az storage account update` command
- Fixed #4220: `az storage account update encryption` - syntax mismatch

VM

- Fixed issue where extra, erroneous information was displayed for `vmss get-instance-view` when using `--instance-id *`
- Added support for `--lb-sku` to `vmss create`:
- Removed human names from the admin names disallowed for `[vm|vmss] create`
- Fixed issue where `[vm|vmss] create` would throw an error if unable to extract plan information from an image
- Fixed a crash when creating a vmms scaleset with an internal LB
- Fixed issue where `--no-wait` argument did not work wth `vm availability-set create`

August 15, 2017

Version 2.0.14

ACS

- Corrected sshMaster0 port number for kubernetes

Appservice

- Fixed an exception when creatng a new git based Linux webapp

Event Grid

- Added SDK dependencies

August 11, 2017

Version 2.0.13

ACS

- Added more preview regions

Batch

- Updated to Batch SDK 3.1.0 and Batch Management SDK 4.1.0
- Added a new command show the task counts of a job
- Fixed bug in resource file SAS URL processing
- Batch account endpoint now supports optional 'https://' prefix
- Support for adding lists of more than 100 tasks to a job
- Added debug logging for loading Extensions command module

Component

- Added deprecation warning to 'az component' commands

Container

- `create`: Fixed issue where equals sign was not allowed inside an environment variable

Data Lake Store

- Enabled progress control

Event Grid

- Initial release

Network

- `lb`: Fixed issue where the certain child resource names did not resolve correctly when omitted
- `application-gateway {subresource} delete`: Fixed issue where `--no-wait` was not honored
- `application-gateway http-settings update`: Fixed issue where `--connection-draining-timeout` could not be turned off
- Fixed error unexpected keyword argument `sa_data_size_kilobytes` with `az network vpn-connection ipsec-policy add`

Profile

- `account list`: Added `--refresh` to sync up the latest subscriptions from server

Storage

- Enable update storage account with system assigned identity

VM

- `availability-set`: Exposed fault domain count on convert
- Exposed `list-skus` command
- Support to assign identity w/o creating role assignments
- Apply storage sku on attaching data disks
- Removed default os-disk name and storage SKU when using managed disks

July 28, 2017

Version 2.0.12

- Added container commands
- Added billing and consumption modules

text

```
azure-cli (2.0.12)

acr (2.0.9)
acs (2.0.11)
appservice (0.1.11)
batch (3.0.3)
billing (0.1.3)
cdn (0.0.6)
cloud (2.0.7)
cognitiveservices (0.1.6)
command-modules-nspkg (2.0.1)
component (2.0.6)
configure (2.0.10)
consumption (0.1.3)
container (0.1.7)
core (2.0.12)
cosmosdb (0.1.11)
dla (0.0.10)
dls (0.0.11)
feedback (2.0.6)
find (0.2.6)
```

```
interactive (0.3.7)
iot (0.1.10)
keyvault (2.0.8)
lab (0.0.9)
monitor (0.0.8)
network (2.0.11)
nspkg (3.0.1)
profile (2.0.9)
rdbms (0.0.5)
redis (0.2.7)
resource (2.0.11)
role (2.0.9)
sf (1.0.5)
sql (2.0.8)
storage (2.0.11)
vm (2.0.11)
```

Core

- Output sdk auth info for service principals with certificates
- Fixed deployment progress exceptions
- Use arm endpoint from the current cloud to create subscription client
- Improved concurrent handling of clouds.config file (#3636)
- Refresh client request id for each command execution
- Create subscription clients with right SDK profile (#3635)
- Progress Reporting for template deployments (#3510)
- Added support for picking table output fields through jmespath query (#3581)
- Improved the muting of parse args and append history with gestures (#3434)
- Create subscription clients with right SDK profile
- Move all existing recording files to latest folder
- Fixed idempotency for VM/VMSS create (#3586)
- Command paths are no longer case sensitive
- Certain boolean-type parameters are no longer case sensitive
- Support login to ADFS on prem server like Azure Stack
- Fixed concurrent writes to clouds.config (#3255)

ACR

- Added `show-usage` command for managed registries
- Support SKU update for managed registries
- Added managed registries with managed SKU
- Added webhooks for managed registries with acr webhook command module
- Added AAD authentication with acr login command
- Added delete command for docker repositories, manifests, and tags

ACS

- Support for API version 2017-07-01

Appservice

- Fixed bug where listing Linux webapp would return nothing
- Support to retrieve creds from acr
- Remove all commands under `appservice web`
- Mask docker registry passwords from command output (#3656)
- Ensure default browser is used on macOS without errors (#3623)
- Improve the help of `webapp log tail` and `webapp log download` (#3624)
- Exposed `traffic-routing` command to configure static routing (#3566)
- Added reliability fixes in configuring source control (#3245)
- Removed unsupported `--node-version` argument from `webapp config update` for Windows webapps. Instead use `webapp config appsettings set --settings WEBSITE_NODE_DEFAULT_VERSION=...`

Batch

- Updated to Batch SDK 3.0.0 with support for low-priority VMs in pools
- Renamed `pool create` option `--target-dedicated` to `--target-dedicated-nodes`
- Added `pool create` options `--target-low-priority-nodes` and `--application-licenses`

CDN

- Provided a better error message for `cdn endpoint list` when the profile specified by `--profile-name` does not exist

Cloud

- Changed API version of cloud metadata endpoint to YYYY-MM-DD format
- Gallery endpoint isn't required
- Support for registering cloud just with ARM resource manager endpoint
- Provided an option for `cloud set` to choose the profile while selecting current cloud
- Exposed `endpoint_vm_image_alias_doc`

CosmosDB

- Fixed allowing creation of collection with custom partition key
- Added support for collection default TTL

Data Lake Analytics

- Added commands for compute policy management under the `dla account compute-policy` heading
- Added `dla job pipeline show`
- Added `dla job recurrence list`

Data Lake Store

- Added support for user managed key vault key rotation in `dls account update`
- Updated underlying Data Lake Store filesystem SDK version, addressing a performance issue
- Added command `dls enable-key-vault`. This command attempts to enable a user provided Key Vault for use encrypting the data in a Data Lake Store account

Interactive

- Improved the start up time by using cached commands
- Increased test coverage
- Enhanced the '?' gesture to also inject into the next command
- Fixed interactive errors with the profile 2017-03-09-profile-preview (#3587)
- Allowed `--version` as a parameter for interactive mode (#3645)
- Stop interactive mode throwing errors from validation completions (#3570)
- Progress reporting for template deployments (#3510)
- Added `--progress` flag
- Removed `--debug` and `--verbose` from completions
- Removed `interactive` from completions (#3324)

IoT

- Fixed policy creation no longer clears existing policies. (#3934)

Key vault

- Added commands for key vault recovery features:
 - `keyvault` subcommands `purge`, `recover`, `keyvault list-deleted`
 - `keyvault secret` subcommands `backup`, `restore`, `purge`, `recover`, `list-deleted`
 - `keyvault certificate` subcommands `purge`, `recover`, `list-deleted`
 - `keyvault key` subcommands `purge`, `recover`, `list-deleted`
- Added service principal key vault integration (#3133)
- Updated key vault dataplane to 0.3.2. (#3307)

Lab

- Added support for claiming any vm in the lab through `az lab vm claim`
- Added table output formatter for `az lab vm list` and `az lab vm show`

Monitor

- Fix for template file with `monitor autoscale-settings get-parameters-template` command (#3349)
- Renamed `monitor alert-rule-incidents list` to `monitor alert list-incidents`
- Renamed `monitor alert-rule-incidents show` to `monitor alert show-incident`
- Renamed `monitor metric-defintions list` to `monitor metrics list-definitions`
- Renamed `monitor alert-rules` to `monitor alert`
- Changed `monitor alert create`:
 - `condition` and `action` subcommands no longer accept JSON
 - Add numerous parameters to simplify the rule creation process
 - `location` no longer required
 - Add name and ID support for target
 - Remove `--alert-rule-resource-name`
 - Rename `is-enabled` to `enabled`, no longer required
 - `description` defaults now based on the supplied condition
 - Add examples to help clarify the new format
- Support names or IDs for `monitor metric` commands
- Added convenience arguments and examples to `monitor alert rule update`

Network

- Added `list-private-access-services` command
- Added `--private-access-services` argument to `vnet subnet create` and `vnet subnet update`

- Fixed issue where `application-gateway redirect-config create` would fail
- Fixed issue where `application-gateway redirect-config update` with `--no-wait` would not work
- Fixed bug when using `--servers` argument with `application-gateway address-pool create` and `application-gateway address-pool update`
- Added `application-gateway redirect-config` commands
- Added commands to `application-gateway ssl-policy`: `list-options`, `predefined list`, `predefined show`
- Added arguments to `application-gateway ssl-policy set`: `--name`, `--cipher-suites`, `--min-protocol-version`
- Added arguments to `application-gateway http-settings create` and `application-gateway http-settings update`: `--host-name-from-backend-pool`, `--affinity-cookie-name`, `--enable-probe`, `--path`
- Added arguments to `application-gateway url-path-map create` and `application-gateway url-path-map update`: `--default-redirect-config`, `--redirect-config`
- Added argument `--redirect-config` to `application-gateway url-path-map rule create`
- Added support for `--no-wait` to `application-gateway url-path-map rule delete`
- Added arguments to `application-gateway probe create` and `application-gateway probe update`: `--host-name-from-http-settings`, `--min-servers`, `--match-body`, `--match-status-codes`
- Added argument `--redirect-config` to `application-gateway rule create` and `application-gateway rule update`
- Added support for `--accelerated-networking` to `nic create` and `nic update`
- Removed `--internal-dns-name-suffix` argument from `nic create`
- Added support for `--dns-servers` to `nic update` and `nic create`: Add support for `--dns-servers`
- Fixed bug where `local-gateway create` ignored `--local-address-prefixes`
- Added support for `--dns-servers` to `vnet update`
- Fixed bug when creating a peering without route filtering with `express-route peering create`
- Fixed bug where `--provider` and `--bandwidth` arguments did not work with `express-route update`
- Fixed bug with `network watcher show-topology` defaulting logic
- Improved output formatting for `network list-usages`
- Use default frontend IP for `application-gateway http-listener create` if only one exists

- Use default address pool, HTTP settings, and HTTP listener for `application-gateway rule create` if only one exists
- Use default frontend IP and backend pool for `lb rule create` if only one exists
- Use default frontend IP for `lb inbound-nat-rule create` if only one exists

Profile

- Support login inside a VM with a managed identity
- Support output for `account show` in SDK auth file format
- Show deprecation warnings when using '--expanded-view'
- Added `get-access-token` command to provide raw AAD token
- Support login with a user account with no associated subscriptions

RDBMS

- Support listing servers across a subscription (#3417)
- Fixed `%s` not processed because of missing `% server_type` (#3393)
- Fixed doc source map and added CI task to verify (#3361)
- Fixed MySQL and PostgreSQL help (#3369)

Resource

- Improved prompts for missing parameters for `group deployment create`
- Improved parsing of `--parameters KEY=VALUE` syntax
- Fixed issues where `group deployment create` parameter files were no longer recognized using `@<file>` syntax
- Support `--ids` argument for `resource` and `managedapp` commands
- Fixed up some parsing and error messages (#3584)
- Fixed `--resource-type` parsing for the `lock` command to accept `<resource-namespace>` and `<resource-type>`
- Added parameter checking for template link templates (#3629)
- Added support for specifying deployment parameters using `KEY=VALUE` syntax

Role

- Support output in SDK auth file format for `create-for-rbac`
- Cleaned up role assignments and related AAD application when deleting a service principal (#3610)
- Include time format in `app create args --start-date` and `--end-date` descriptions

- Show deprecation warnings when using `--expanded-view`
- Added key vault integration to the `create-for-rbac` and `reset-credentials` commands

Service Fabric

- Fixed an issue with large files in applications being truncated on upload (#3666)
- Added tests for Service Fabric commands (#3424)
- Fixed numerous Service Fabric commands (#3234)

SQL

- Removed broken `sql server create --identity` parameter
- Removed password values from `sql server create` and `sql server update` command output
- Added commands `sql db list-editions` and `sql elastic-pool list-editions`

Storage

- Removed `--marker` option from `storage blob list`, `storage container list`, and `storage share list` commands (#3745)
- Enabled creating an https-only storage account
- Updated storage metrics, logging and cors commands (#3495)
- Rephrased exception message from CORS add (#3638) (#3362)
- Converted generator to a list in download batch command dry run mode (#3592)
- Fixed blob download batch dryrun issue (#3640) (#3592)

VM

- Support configuring nsg
- Fixed a bug where the DNS server would not be configured correctly
- Support managed service identities
- Fixed issue where `cmss create` with an existing load balancer required `--backend-pool-name`
- Make datadisks created with `vm image create lun start with 0`

May 10, 2017

Version 2.0.6

- documentdb renamed to cosmosdb
- Add rdbms (mysql, postgres)
- Include Data Lake Analytics and Data Lake Store modules
- Include Cognitive Services module
- Include Service Fabric module
- Include Interactive module (rename of az-shell)
- Add support for CDN commands
- Remove Container module
- Add 'az -v' as shortcut for 'az --version' ([#2926](#))
- Improve performance of package load and command execution ([#2819](#))

text

```
azure-cli (2.0.6)

acr (2.0.4)
acs (2.0.6)
appservice (0.1.6)
batch (2.0.4)
cdn (0.0.2)
cloud (2.0.2)
cognitiveservices (0.1.2)
command-modules-nspkg (2.0.0)
component (2.0.4)
configure (2.0.6)
core (2.0.6)
cosmosdb (0.1.6)
dla (0.0.6)
dls (0.0.6)
feedback (2.0.2)
find (0.2.2)
interactive (0.3.1)
iot (0.1.5)
keyvault (2.0.4)
lab (0.0.4)
monitor (0.0.4)
network (2.0.6)
nspkg (3.0.0)
profile (2.0.4)
rdbms (0.0.1)
redis (0.2.3)
resource (2.0.6)
role (2.0.4)
sf (1.0.1)
sql (2.0.3)
storage (2.0.6)
vm (2.0.6)
```

Core

- core: capture exceptions caused by unregistered provider and auto-register it
- perf: persist adal token cache in memory till process exits ([#2603 ↗](#))
- Fix bytes returned from hex fingerprint -o tsv ([#3053 ↗](#))
- Enhanced Key Vault Certificate Download and AAD SP Integration ([#3003 ↗](#))
- Add Python location to 'az —version' ([#2986 ↗](#))
- login: support login when there are no subscriptions ([#2929 ↗](#))
- core: fix a failure when login using a service principal twice ([#2800 ↗](#))
- core: Allow file path of accessTokens.json to be configurable through an env var ([#2605 ↗](#))
- core: Allow configured defaults to apply on optional args ([#2703 ↗](#))
- core: Improved performance
- core: Custom CA Certs - Support setting REQUESTS_CA_BUNDLE environment variable
- core: Cloud configuration - use 'resource manager' endpoint if 'management' endpoint not set

ACS

- fix the master and agent count to be integer instead of string
- expose 'az acs create --no-wait' and 'az acs wait' for async creation
- expose 'az acs create --validate' for dry-run validations
- remove windows profile before PUT call for scale command ([#2755 ↗](#))

AppService

- functionapp: add full functionapp supports, including create, show, list, delete, hostname, ssl, etc
- Adding Team Services (vsts) as a continuous delivery option to "appservice web source-control config"
- Create "az webapp" to replace "az appservice web" (for backward compat, "az appservice web" will stay for 2 releases)
- Expose arguments to configure deployment and "runtime stacks" on webapp create
- Expose "webapp list-runtimes"
- support configure connection strings ([#2647 ↗](#))
- support slot swap with preview
- Polish errors from appservice commands ([#2948 ↗](#))
- Use the app service plan's resource group for cert operations ([#2750 ↗](#))

CosmosDB

- Rename documentdb module to cosmosdb
- Added support for documentdb data-plane APIs: database and collection management
- Added support for enabling automatic failover on database accounts
- Added support for new consistency policy ConsistentPrefix

Data Lake Analytics

- Fix a bug where filtering on result and state for job lists would throw an error
- Add support for new catalog item type: package. accessed through: `az dla catalog package`
- Made it possible to list the following catalog items from within a database (no schema specification required):
 - Table
 - Table valued function
 - View
 - Table Statistics. This can also be listed with a schema, but without specifying a table name

Data Lake Store

- Update the version of the underlying filesystem SDK, which gives better support for handling server side throttling scenarios
- Improve performance of package load and command execution ([#2819](#))
- missed help for access show. adding it. ([#2743](#))

Find

- improve search results and allow for versioning of the search index

KeyVault

- BC: `az keyvault certificate download` change -e from string or binary to PEM or DER to better represent the options
- BC: Remove --expires and --not-before from `keyvault certificate create` as these parameters are not supported by the service
- Adds the --validity parameter to `keyvault certificate create` to selectively override the value in --policy

- Fixes issue in `keyvault certificate get-default-policy` where 'expires' and 'not_before' were exposed but 'validity_in_months' was not
- keyvault fix for import of pem and pfx ([#2754](#))

Lab

- Adding create, show, delete & list commands for environment in the lab
- Adding show & list commands to view ARM templates in the lab
- Adding --environment flag in `az lab vm list` to filter VMs by environment in the lab
- Add convenience command `az lab formula export-artifacts` to export artifact scaffold within a Lab's formula
- Add commands to manage secrets within a Lab

Monitor

- Bug Fix: Modeling `--actions` of `az alert-rules create` to consume JSON string ([#3009](#))
- Bug fix - diagnostic settings create does not accept logs/metrics from show commands ([#2913](#))

Network

- Add `network watcher test-connectivity` command
- Add support for `--filters` parameter for `network watcher packet-capture create`
- Add support for Application Gateway connection draining
- Add support for Application Gateway WAF rule set configuration
- Add support for ExpressRoute route filters and rules
- Add support for TrafficManager geographic routing
- Add support for VPN connection policy-based traffic selectors
- Add support for VPN connection IPSec policies
- Fix bug with `vpn-connection create` when using the `--no-wait` or `--validate` parameters
- Add support for active-active VNet gateways
- Remove nulls values from output of `network vpn-connection list/show` commands
- BC: Fix bug in the output of `vpn-connection create`
- Fix bug where '--key-length' argument of 'vpn-connection create' was not parsed correctly
- Fix bug in `dns zone import` where records were not imported correctly

- Fix bug where `traffic-manager endpoint update` did not work
- Add 'network watcher' preview commands

Profile

- Support login when there are no subscriptions found ([#2560](#))
- Support short param name in az account set --subscription ([#2980](#))

Redis

- Adding update command which also adds the ability to scale for redis cache
- Deprecates the 'update-settings' command

Resource

- Add managedapp and managedapp definition commands ([#2985](#))
- Support 'provider operation' commands ([#2908](#))
- Support generic resource create ([#2606](#))
- Fix resource parsing and api version lookup. ([#2781](#))
- Add docs for az lock update. ([#2702](#))
- Error out if you try to list resources for a group that doesn't exist. ([#2769](#))
- [Compute] Fix issues with VMSS and VM availability set update. ([#2773](#))
- Fix lock create and delete if parent-resource-path is None ([#2742](#))

Role

- create-for-rbac: ensure SP's end date will not exceed certificate's expiration date ([#2989](#))
- RBAC: add full support for 'ad group' ([#2016](#))
- role: fix issues on role definition update ([#2745](#))
- create-for-rbac: ensure user provided password is picked up

SQL

- Added az sql server list-usages and az sql db list-usages commands
- SQL - ability to connect directly to resource provider ([#2832](#))

Storage

- Default location to resource group location for `storage account create`

- Add support for incremental blob copy
- Add support for large block blob upload
- Change block size to 100MB when file to upload is larger than 200GB

VM

- avail-set: make UD&FD domain counts optional

note: VM commands in sovereign clouds Please avoid managed disk related features, including the following:

1. az disk/snapshot/image
2. az vm/vmss disk
3. Inside "az vm/vmss create", use "--use-unmanaged-disk" to avoid managed disk Other commands should work

- vm/vmss: improve the warning text when generates ssh key pairs
- vm/vmss: support create from a market place image which requires plan info ([#1209 ↗](#))

April 3, 2017

Version 2.0.2

We released the ACR, Batch, KeyVault, and SQL components in this release

text

```
azure-cli (2.0.2)

acr (2.0.0)
acs (2.0.2)
appservice (0.1.2)
batch (2.0.0)
cloud (2.0.0)
component (2.0.0)
configure (2.0.2)
container (0.1.2)
core (2.0.2)
documentdb (0.1.2)
feedback (2.0.0)
find (0.0.1b1)
iot (0.1.2)
keyvault (2.0.0)
lab (0.0.1)
monitor (0.0.1)
```

```
network (2.0.2)
nspkg (2.0.0)
profile (2.0.2)
redis (0.1.1b3)
resource (2.0.2)
role (2.0.1)
sql (2.0.0)
storage (2.0.2)
vm (2.0.2)
```

Core

- Add acr, lab, monitor, and find modules to default list
- Login: skip erroneous tenant ([#2634](#))
- login: set default subscription to one with the state of "Enabled" ([#2575](#))
- Add wait commands and --no-wait support to more commands ([#2524](#))
- core: support login using service principal with a cert ([#2457](#))
- Add prompting for missing template parameters. ([#2364](#))
- Support setting default values for common arguments like default resource group, default web, default vm
- Support login to specific tenant

ACS

- [ACS] Adding support for configuring a default ACS cluster ([#2554](#))
- Add support for ssh key password prompting. ([#2044](#))
- Add support for windows clusters. ([#2211](#))
- Switch from Owner to Contributor role. ([#2321](#))

AppService

- appservice: support to get external ip address used for DNS A records ([#2627](#))
- appservice: support binding wildcard certificates ([#2625](#))
- appservice: support list publishing profiles ([#2504](#))
- AppService - Trigger source control sync after config ([#2326](#))

DataLake

- Initial release of Data Lake Analytics module
- Initial release of Data Lake Store module

DocuemntDB

- DocumentDB: Adding support for listing connection strings ([#2580 ↗](#))

VM

- [Compute] Add AppGateway support to virtual machine scale set create ([#2570 ↗](#))
- [VM/VMSS] Improved disk caching support ([#2522 ↗](#))
- VM/VMSS: incorporate credentials validation logic used by portal ([#2537 ↗](#))
- Add wait commands and --no-wait support ([#2524 ↗](#))
- Virtual machine scale set: support * to list instance view across vms ([#2467 ↗](#))
- Add --secrets for VM and virtual machine scale set ([#2212]
(<https://github.com/Azure/azure-cli/pull/2212>))
- Allow VM creation with specialized VHD ([#2256 ↗](#))

February 27, 2017

Version 2.0.0

This release of Azure CLI 2.0 is the first "Generally Available" release General availability applies to these command modules:

- Container Service (acs)
- Compute (including Resource Manager, VM, virtual machine scale sets, Managed Disks)
- Networking
- Storage

These command modules can be used in production and are supported by standard Microsoft SLA You can open issues directly with Microsoft support or on our [github issues list](#) ↗ You can ask questions on [StackOverflow](#) using the [azure-cli tag](#) ↗ , or contact the product team at azfeedback@microsoft.com You can provide feedback from the command line with the `az feedback` command

The commands in these modules are stable and the syntax is not expected to change in upcoming releases of this version of Azure CLI

To verify the version of the CLI, use `az --version` The output lists the version of the CLI itself (2.0.0 in this release), the individual command modules, and the versions of Python and GCC that you're using

text

```
azure-cli (2.0.0)

acs (2.0.0)
appservice (0.1.1b5)
batch (0.1.1b4)
cloud (2.0.0)
component (2.0.0)
configure (2.0.0)
container (0.1.1b4)
core (2.0.0)
documentdb (0.1.1b2)
feedback (2.0.0)
iot (0.1.1b3)
keyvault (0.1.1b5)
network (2.0.0)
nspkg (2.0.0)
profile (2.0.0)
redis (0.1.1b3)
resource (2.0.0)
role (2.0.0)
sql (0.1.1b5)
storage (2.0.0)
vm (2.0.0)
```

```
Python (Darwin) 2.7.10 (default, Jul 30 2016, 19:40:32)
[GCC 4.2.1 Compatible Apple LLVM 8.0.0 (clang-800.0.34)]
```

ⓘ Note

Some of the command modules have a "bn" or "rcn" postfix. These command modules are still in preview and will become generally available in the future.

We also have nightly preview builds of the CLI. For information, see these instructions on [getting the nightly builds](#), and these instructions on [developer setup and contributing code](#).

You can report issues with nightly preview builds in the following ways:

- Report issues in our [github issues list](#)
- Contact the product team at azfeedback@microsoft.com
- Provide feedback from the command line with the `az feedback` command

Upcoming breaking changes in Azure CLI

Article • 06/19/2023

AKS

`az aks create`

- Specifying `--pod-cidr` with Azure CNI will return an error instead of logging a warning when not using overlay mode.
- Change the default value of `--enable-msi-auth-for-monitoring` to true and add check for airgap clouds.

APP Config

`az appconfig feature`

- Update feature name validation to disallow the colon character.

`az appconfig kv import`

- Update feature name validation. Invalid feature flags will be skipped during import.

`az appconfig`

- Update default connection string resolution logic.

Compute

`az vm create`

- Make the default value of `--enable-secure-boot` to `True` for Trusted Launch VM.
 - This will lower the barrier to entry even further and provide customers the full set of Trusted Launch features by default.
- Make the default value of `--public-ip-sku` from `Basic` to `Standard`.

az vmss create

- Make the default value of `--enable-secure-boot` to `True` for Trusted Launch VMSS.
 - This will lower the barrier to entry even further and provide customers the full set of Trusted Launch features by default.

Cosmos DB

az cosmosdb create/update

- Rename `--enable-public-network true/false` to `--public-network-access ENABLED/DISABLED/SECUREDBYPERIMETER`.

EventHub

az eventhubs namespace network-rule

- This command group is removed and replaced by `az eventhubs namespace network-rule-set`.

az eventhubs namespace network-rule add

- This command is removed and replaced by `az eventhubs namespace network-rule-set ip-rule/virtual-network-rule add`.

az eventhubs namespace network-rule remove

- This command is removed and replaced by `az eventhubs namespace network-rule-set ip-rule/virtual-network-rule remove`.

az eventhubs eventhub create/update

- Remove `--message-retention` parameter, it is replaced by `--retention-time-in-hours`.
- The parameter `-message-retention` will be deprecated and replaced by `-retention-time-in-hours`.

az eventhubs namespace application-group policy remove

- Rename `--throttling-policy-config` to `--policy` and remove `metric-id` and `rate-limit-threshold` properties in it.

KeyVault

az keyvault create

- `--retention-days` becomes required for MHSM creation.

az keyvault backup start

- The output will only contain `folderUrl`.

az keyvault restore start

- Nothing will return for successful run. Because according to the CLI command design specification, start commands do not need output.

az keyvault role assignment delete

- Nothing will return for successful run. Because according to the CLI command design specification, remove/delete commands do not need output.

az keyvault certificate show/set-attributes/import

- No longer return `x509CertificateProperties.basicConstraints.pending`.

az keyvault certificate contact delete

- Return an empty list instead of the deleted contact for consistency if the operation would remove the last contact.

az keyvault certificate issuer create

- `organizationDetails.zip` is no longer returned by service, use 0 as the default.

NetAppFiles

`az netappfiles vault list command`

- Remove command `vault list` as this is not longer needed.

`az netappfiles volume create/update`

- Remove optional parameter `--vault-id` as this is not longer needed.

Network

`az network application-gateway settings update`

- Use `null` instead of `""` to detach.

`az network application-gateway url-path-map update`

- Use `null` instead of `""` to detach.

`az network nic update`

- Use `null` instead of `""` to detach.

`az network nic ip-config update`

- Use `null` instead of `""` to detach.

`az network nsg rule update`

- Use `null` instead of `""` to detach.

`az network vnet update`

- Use `null` instead of `""` to detach.

`az network vnet subnet update`

- Use `null` instead of `""` to detach.

az network cross-region-lb rule

- Remove parameters `--enable-tcp-reset` and `--idle-timeout`

az network application-gateway ssl-profile remove

- Output will be deprecated. Because according to the CLI command design specification, remove/delete commands do not need output.

az network application-gateway client-cert remove

- Output will be deprecated. Because according to the CLI command design specification, remove/delete commands do not need output.

az network cross-region-lb address-pool address remove

- Output will be deprecated. Because according to the CLI command design specification, remove/delete commands do not need output.

az network lb address-pool tunnel-interface remove

- Output will be deprecated. Because according to the CLI command design specification, remove/delete commands do not need output.

az network nic ip-config address-pool remove

- Output will be deprecated. Because according to the CLI command design specification, remove/delete commands do not need output.

az network nic ip-config inbound-nat-rule remove

- Output will be deprecated. Because according to the CLI command design specification, remove/delete commands do not need output.

az network private-endpoint dns-zone-group remove

- Output will be deprecated. Because according to the CLI command design specification, remove/delete commands do not need output.

`az network private-endpoint ip-config remove`

- Output will be deprecated. Because according to the CLI command design specification, remove/delete commands do not need output.

`az network private-endpoint asg remove`

- Output will be deprecated. Because according to the CLI command design specification, remove/delete commands do not need output.

RDBMS

`az mysql flexible-server create`

- The parameter `Enabled` for `--high-availability` will be deprecated, as it's the same as `ZoneRedundant`.

`az mysql flexible-server update`

- The parameter `Enabled` for `--high-availability` will be deprecated, as it's the same as `ZoneRedundant`.

`az postgres flexible-server create`

- The parameter `Enabled` for `--high-availability` will be deprecated, as it's the same as `ZoneRedundant`.

`az postgres flexible-server update`

- The parameter `Enabled` for `--high-availability` will be deprecated, as it's the same as `ZoneRedundant`.

ServiceBus

`az servicebus georecovery-alias fail-over`

- Remove `--parameters` argument.

az servicebus namespace network-rule

- This command group is removed and replaced by `az servicebus namespace network-rule-set`.

az servicebus namespace network-rule add

- This command is removed and replaced by `az servicebus namespace network-rule-set ip-rule/virtual-network-rule add`.

az servicebus namespace network-rule remove

- This is removed and replaced by `az servicebus namespace network-rule-set ip-rule/virtual-network-rule remove`.

az servicebus queue update

- Remove deprecated parameters `--enable-partitioning`, `--enable-session` and `--duplicate-detection`.

SQL

az sql mi link create

- Remove `--replication-mode` argument.

MSAL-based Azure CLI

Article • 08/08/2023

Starting in version 2.30.0, Azure CLI uses Microsoft Authentication Library ([MSAL](#)) as the underlying authentication library. MSAL uses Azure Active Directory v2.0 authentication flow to provide more functionality and increases security for token cache.

⚠️ Warning

BREAKING CHANGES are introduced in Azure CLI 2.30.0. Carefully read document prior to installation.

accessTokens.json deprecation

Previous versions of Azure CLI saved Azure AD Authentication Library (ADAL) tokens and service principal entries to `~/.azure/accessToken.json`. The latest versions of the Azure CLI use MSAL and no longer generate `accessTokens.json`. Any existing workflow depending on `accessTokens.json` no longer works.

The MSAL token cache and service principal entries are saved as encrypted files on Windows, and plaintext files on Linux and macOS.

ⓘ Important

When using Azure CLI in a pipeline like Azure DevOps, ensure all tasks and stages are using versions of Azure CLI above v2.30.0 for MSAL-based Azure CLI. Azure CLI 2.30.0 is not backwards compatible with prior versions and throws an error when working with versions prior to 2.30.0.

Alternatives to consider

Alternatives you may consider for stability:

Calling `az account get-access-token`

You can manually call `az account get-access-token` in a terminal or use subprocess to call it from another programming language. By default, the returned access token is for

Azure Resource Manager (ARM) and the default subscription/tenant shown in [az account show](#).

Azure CLI

```
# get the active subscription  
az account show --output table  
  
# get access token for the active subscription  
az account get-access-token  
  
# get access token for a specific subscription  
az account get-access-token --subscription "<subscription ID or name>"
```

Using `AzureCliCredential`

`AzureCliCredential` is a credential type in all existing language SDKs. It uses subprocess to call `az account get-access-token` to get an access token for the current logged-in account.

See also

- MSAL
 - [Overview of the Microsoft Authentication Library \(MSAL\)](#)
 - [Migrate applications to the Microsoft Authentication Library \(MSAL\)](#)
- Python
 - [AzureCliCredential Class in Python](#)
- .NET
 - [AzureCliCredential Class in .NET](#)
- Java
 - [AzureCliCredential Class in Java](#)

Microsoft Graph migration

Article • 08/02/2023

Due to [the deprecation of Azure Active Directory \(Azure AD\) Graph](#), the underlying Active Directory Graph API replaces [Microsoft Graph API](#) in Azure CLI 2.37.0.

Breaking changes

For differences of the underlying API and output JSON breaking changes, refer to [Property differences between Azure AD Graph and Microsoft Graph](#).

For example, the most outstanding change is that `id` replaces the `objectId` property in the output JSON of a Graph object.

Command argument and behavior breaking changes are listed in the next section.

`az ad app create/update`

- Split `--reply-urls` into `--web-redirect-uris` and `--public-client-redirect-uris`
- Replace `--homepage` with `--web-home-page-url`
- Replace `--available-to-other-tenants` with `--sign-in-audience`
- Replace `--native-app` with `--is-fallback-public-client`
- Replace `--oauth2-allow-implicit-flow` with `--enable-access-token-issuance`
- Add `--enable-id-token-issuance` to set
`web/implicitGrantSettings/enableIdTokenIssuance`
- Remove `--password` and `--credential-description`. Use `az ad app credential reset` to let Graph service create a password for you (<https://github.com/Azure/azure-cli/issues/20675>)
- Add `--key-display-name` to set `keyCredential`'s `displayName`

`az ad app permission grant`

- Remove `--expires`
- `--scope` no longer defaults to `user_impersonation` and is now required

`az ad app credential reset`

- Replace `--credential-description` with `--display-name`
(<https://github.com/Azure/azure-cli/issues/20561>)

- Remove `--password`. Without specifying certificate arguments, Graph service creates a password for you (<https://github.com/Azure/azure-cli/issues/20675>)

az ad sp delete

- This command no longer deletes the corresponding application. Use `az ad app delete` to explicitly delete the application (<https://github.com/Azure/azure-cli/issues/8467>)
- This command no longer deletes corresponding role assignments of the service principal. Use `az role assignment delete` to explicitly delete role assignments (<https://github.com/Azure/azure-cli/issues/20805>)

az ad sp credential

- This command group now operates on service principal, not application (<https://github.com/Azure/azure-cli/issues/11458>)

az ad sp credential reset

- Replace `--name` with `--id`
- Remove `--password`. Without specifying certificate arguments, Graph service creates a password for you (<https://github.com/Azure/azure-cli/issues/20675>)

az ad user create

- Replace `--force-change-password-next-login` with `--force-change-password-next-sign-in`

az ad user update

- Replace `--force-change-password-next-login` with `--force-change-password-next-sign-in`

az ad group get-member-groups

- Remove `--additional-properties`

az ad group member add

- Remove `--additional-properties`

Known issues

- Regarding generic update arguments, the only supported operation is using `--set` on the root level of a Graph object. When you use `--add`, `--remove` or `--set` on sublevels currently doesn't work (due to the underlying infrastructure change). For unsupported scenarios, you may use `az rest` to directly call [Microsoft Graph API](#). Examples can be found at <https://github.com/Azure/azure-cli/issues/22580>.
- Microsoft Graph related commands like `az ad` and `az role` fail in Azure Stack environments that don't have Microsoft Graph support. Use Azure CLI 2.36.0 or earlier versions for Azure Stack environments.

Install a previous version

If you aren't ready for the migration yet, such as lacking Microsoft Graph permissions, you may keep using Azure CLI versions \leq 2.36.0. If you have already installed 2.37.0, you may roll back to a previous version following the "Install specific version" section under the [installation documents](#) (except for Homebrew, which doesn't support installing previous versions).

Troubleshooting

Graph command fails with `AADSTS50005` or `AADSTS53000`

Your tenant may have Conditional Access policies that block using device code flow to access Microsoft Graph. In such cases, use authorization code flow or a service principal to sign in instead. For more information about sign in methods, see [Sign in with Azure CLI](#).

Microsoft tenant (72f988bf-86f1-41af-91ab-2d7cd011db47) has such Conditional Access policies configured.

More information

You can find more information about the Microsoft Graph migration on <https://github.com/Azure/azure-cli/issues/22580>.

Give feedback

If you have any questions, reply to <https://github.com/Azure/azure-cli/issues/22580> or create a new issue with the `az feedback` command.

Azure CLI conceptual article list

Article • 08/02/2023

This article provides an A - Z list of published content for each Azure CLI reference group. Use these links to find tested code snippets and scripts that show the use of parameter values for different tasks. For common Azure CLI commands, like `az group`, only the most popular articles have been listed.

With over 9,000 reference commands, not every Azure CLI command has been used in Azure published content. For a complete list of Azure CLI commands, see the [A - Z reference list](#). For a list of Azure CLI samples, see [Azure CLI sample scripts](#).

If it is your first time working with the Azure CLI, see [Get started with Azure CLI](#) to learn about installation and sign in.

az account

Reference subgroup	Azure CLI article showing reference use
az account	Sign in with Azure CLI
	Get started with Azure CLI
	How to manage Azure subscriptions with the Azure CLI
	Work with Azure service principal using the Azure CLI
	Learn to use Bash with the Azure CLI
az account alias	Programmatically create Azure Enterprise Agreement subscriptions with the latest APIs
	Programmatically create Azure subscriptions for a Microsoft Customer Agreement with the latest APIs
	Programmatically create Azure subscriptions for a Microsoft Partner Agreement with the latest APIs
az account lock	How to manage Azure subscriptions with the Azure CLI
	How to manage Azure subscriptions with the Azure CLI
	Manage your Azure subscriptions at scale with management groups
	Assign Azure roles using Azure CLI

Reference subgroup	Azure CLI article showing reference use
	List Azure role assignments using Azure CLI
	Quickstart: Create a management group with the Azure CLI
az account management-group subscription	How to manage Azure subscriptions with the Azure CLI
	Manage your Azure subscriptions at scale with management groups
az account subscription	Overview: Deploy a serverless Python cloud ETL solution on Azure
	Configure your local JavaScript dev environment for Azure
	Quickstart: Create an Azure Front Door Standard/Premium - Azure CLI
	Trivia game: Create a Next.js GraphQL app with server-side rendering
az account tenant	How to manage Azure subscriptions with the Azure CLI
	How to find your Azure Active Directory tenant ID

az acr

Reference subgroup	Azure CLI article showing reference use
az acr	Create an ingress controller in Azure Kubernetes Service (AKS)
	Push your first image to your Azure container registry using the Docker CLI
	Authenticate with an Azure container registry
	Build and push Docker images to Azure Container Registry using Docker templates
	Azure Container Registry roles and permissions
	Run an ACR task on a dedicated agent pool
az acr cache	Enable Cache for ACR (Preview) - Azure CLI
	Enable Cache ACR (Preview) with authentication - Azure CLI
	Azure Container Registry (ACR) introduces the Conditional Access

Reference subgroup	Azure CLI article showing reference use
	policy
az acr config content-trust	Content trust in Azure Container Registry
	Set a retention policy for untagged manifests
	Enable soft delete policy in Azure Container Registry (Preview)
az acr connected-registry	Pull images from a connected registry on IoT Edge device
	Quickstart: Deploy a connected registry to an IoT Edge device
	Quickstart: Create a connected registry using the Azure CLI
	Tutorial: Deploy a connected registry to a nested IoT Edge hierarchy
az acr credential	Migrate custom software to Azure App Service using a custom container
	Deploy a Flask or FastAPI web app on Azure App Service
	Create your first containerized functions on Azure Container Apps
	Quickstart: Use Azure App Configuration in Azure Container Apps
	Build and deploy a Python web app with Azure Container Apps and PostgreSQL
az acr credential-set	Enable Cache ACR (Preview) with authentication - Azure CLI
az acr encryption	Enable a customer-managed key
	Rotate and revoke a customer-managed key
az acr export-pipeline	ACR Transfer with Az CLI
	Azure Container Registry webhook reference
az acr identity	Troubleshoot a customer-managed key
	ACR Transfer with Az CLI
az acr manifest	Push and pull Helm charts to an Azure container registry
	Import container images to a container registry
	Create a token with repository-scoped permissions
	About registries, repositories, and artifacts

Reference subgroup	Azure CLI article showing reference use
	Delete container images in Azure Container Registry
az acr network-rule	Fail to pull images from Azure Container Registry to Azure Kubernetes Service cluster
	Connect privately to an Azure container registry using Azure Private Link
	Configure public IP network rules
	Restrict access to a container registry using a service endpoint in an Azure virtual network
az acr pack	Build and push an image from an app using a Cloud Native Buildpack
	ACR Transfer with Az CLI
az acr private-endpoint-connection	Troubleshooting online endpoints deployment and scoring
	Connect privately to an Azure container registry using Azure Private Link
	Use network isolation with managed online endpoints
	Geo-replication in Azure Container Registry
	Enable zone redundancy in Azure Container Registry for resiliency and high availability
az acr repository	Push your first image to your Azure container registry using the Docker CLI
	Tutorial: Deploy a multi-container group using Docker Compose
	Troubleshooting online endpoints deployment and scoring
	Push and pull Helm charts to an Azure container registry
	Tutorial: Deploy and use Azure Container Registry (ACR)
	Create a token with repository-scoped permissions
	Pull images from a connected registry on IoT Edge device
az acr task	Automatically purge images from an Azure container registry
	Tutorial: Automate container image builds in the cloud when you commit source code
	ACR Tasks reference: YAML

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Run an ACR task on a defined schedule
	Tutorial: Automate container image builds when a base image is updated in an Azure container registry
az acr task credential	Use an Azure-managed identity in ACR Tasks
	Tutorial: Run a multi-step container workflow in the cloud when you commit source code
	How to consume and maintain public content with Azure Container Registry Tasks
	Cross-registry authentication in an ACR task using an Azure-managed identity
	Tutorial: Automate container image builds when a base image is updated in another private container registry
	Tutorial: Run an ACR task on a defined schedule
az acr token	Push and pull Helm charts to an Azure container registry
	Create a token with repository-scoped permissions
	Pull images from a connected registry on IoT Edge device
	How to consume and maintain public content with Azure Container Registry Tasks
az acr token credential	Create a token with repository-scoped permissions
	Pull images from a connected registry on IoT Edge device
	Migrate custom software to Azure App Service using a custom container
	Continuous deployment with custom containers in Azure App Service
	Using Azure Container Registry webhooks

az ad

Reference subgroup	Azure CLI article showing reference use
az ad app	Deploy to App Service using GitHub Actions
	Provision and publish a bot

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Authenticate and authorize users end-to-end in Azure App Service
	Configure a GitHub Action to create a container instance
	Integrate Azure Active Directory with Azure Kubernetes Service (AKS) using the Azure CLI (legacy)
az ad app credential	Provision and publish a bot
	Update or rotate the credentials for an Azure Kubernetes Service (AKS) cluster
	Use a service principal with Azure Kubernetes Service (AKS)
	Use SAP on Azure Deployment Automation Framework from Azure DevOps Services
	Rotate service principal credentials for your Azure Red Hat OpenShift (ARO) Cluster
az ad app federated-credential	Deploy to App Service using GitHub Actions
	Configure an app to trust an external identity provider
	Configure a GitHub Action to create a container instance
	Use GitHub Actions to connect to Azure
	Configure cross-tenant customer-managed keys for an existing storage account
	Integrate Azure Active Directory with Azure Kubernetes Service (AKS) using the Azure CLI (legacy)
	Use Azure RBAC on Azure Arc-enabled Kubernetes clusters (preview)
	Tutorial: Using automation to set up the Azure Active Directory admin for SQL Server
	Configure Azure Active Directory authentication for an Azure Red Hat OpenShift 4 cluster (CLI)
az ad group	Assign a Key Vault access policy (legacy)
	Tutorial: Connect to SQL Database from .NET App Service without secrets using a managed identity
	AKS-managed Azure Active Directory integration

Reference subgroup	Azure CLI article showing reference use
	Use Kubernetes role-based access control with Azure Active Directory in Azure Kubernetes Service
	Tutorial: Connect to Azure databases from App Service without secrets using a managed identity
az ad group member	Assign a Key Vault access policy (legacy)
	Tutorial: Connect to SQL Database from .NET App Service without secrets using a managed identity
	Use Kubernetes role-based access control with Azure Active Directory in Azure Kubernetes Service
	Tutorial: Connect to Azure databases from App Service without secrets using a managed identity
	Authenticate .NET apps to Azure services during local development using service principals
az ad signed-in-user	Quickstart: Create, download, and list blobs with Azure CLI
	Tutorial: Access Azure services from a .NET web app
	Integrate Azure Active Directory with Azure Kubernetes Service (AKS) using the Azure CLI (legacy)
	Create and deploy a Django web app to Azure with a user-assigned managed identity
	Add Key Management Service (KMS) etcd encryption to an Azure Kubernetes Service (AKS) cluster
	Work with Azure service principal using the Azure CLI
	Application and service principal objects in Azure Active Directory
	Assign a Key Vault access policy (legacy)
	Transfer an Azure subscription to a different Azure AD directory
	Access control lists (ACLs) in Azure Data Lake Storage Gen2
az ad sp credential	Work with Azure service principal using the Azure CLI
	Fail to pull images from Azure Container Registry to Azure Kubernetes Service cluster
	Azure Container Registry authentication with service principals

Reference subgroup	Azure CLI article showing reference use
	Pull images from an Azure container registry to a Kubernetes cluster using a pull secret
	Integrate Azure Active Directory with Azure Kubernetes Service (AKS) using the Azure CLI (legacy)
az ad user	Log in to a Windows virtual machine in Azure by using Azure AD including passwordless
	Assign a Key Vault access policy (legacy)
	Tutorial: Connect to SQL Database from .NET App Service without secrets using a managed identity
	Quickstart: Azure Cosmos DB for NoSQL client library for .NET
	Log in to a Linux virtual machine in Azure by using Azure AD and OpenSSH

az afd

Reference subgroup	Azure CLI article showing reference use
az afd endpoint	Endpoints in Azure Front Door
	Configure a Web Application Firewall rate limit rule
	Tutorial: Create a highly available multi-region app in Azure App Service
	Quickstart: Create an Azure Front Door Standard/Premium - Azure CLI
	Cache purging in Azure Front Door with Azure CLI
az afd origin	Tutorial: Create a highly available multi-region app in Azure App Service
	Quickstart: Create an Azure Front Door Standard/Premium - Azure CLI
	Connect Azure Front Door Premium to an App Service origin with Private Link using Azure CLI
	Connect Azure Front Door Premium to a Storage Account origin with Private Link with Azure CLI
	Tutorial: Add and customize delivery rules for Azure Front Door Standard/Premium (Preview) with Azure CLI
az afd origin-	Tutorial: Create a highly available multi-region app in Azure App Service

Reference subgroup	Azure CLI article showing reference use
group	Quickstart: Create an Azure Front Door Standard/Premium - Azure CLI
	Tutorial: Add and customize delivery rules for Azure Front Door Standard/Premium (Preview) with Azure CLI
az afd profile	Configure a Web Application Firewall rate limit rule
	Tutorial: Create a highly available multi-region app in Azure App Service
	Quickstart: Create an Azure Front Door Standard/Premium - Azure CLI
	Tutorial: Add and customize delivery rules for Azure Front Door Standard/Premium (Preview) with Azure CLI
az afd route	Tutorial: Create a highly available multi-region app in Azure App Service
	Quickstart: Create an Azure Front Door Standard/Premium - Azure CLI
	Tutorial: Add and customize delivery rules for Azure Front Door Standard/Premium (Preview) with Azure CLI
az afd rule	Tutorial: Add and customize delivery rules for Azure Front Door Standard/Premium (Preview) with Azure CLI
az afd rule action	Tutorial: Add and customize delivery rules for Azure Front Door Standard/Premium (Preview) with Azure CLI
az afd rule condition	Tutorial: Add and customize delivery rules for Azure Front Door Standard/Premium (Preview) with Azure CLI
az afd rule-set	Tutorial: Add and customize delivery rules for Azure Front Door Standard/Premium (Preview) with Azure CLI
az afd security-policy	Configure a Web Application Firewall rate limit rule
	Quickstart: Create an Azure Front Door Standard/Premium - Azure CLI
	Tutorial: Add and customize delivery rules for Azure Front Door Standard/Premium (Preview) with Azure CLI

az aks

Reference subgroup	Azure CLI article showing reference use
az aks	Supported Kubernetes versions in Azure Kubernetes Service (AKS)

Reference subgroup	Azure CLI article showing reference use
	Quickstart: Deploy an Azure Kubernetes Service (AKS) cluster using Azure CLI
	Use the Azure Key Vault Provider for Secrets Store CSI Driver in an AKS cluster
	Create a private Azure Kubernetes Service (AKS) cluster
	Configure Azure CNI networking in Azure Kubernetes Service (AKS)
	Use the Azure Key Vault Provider for Secrets Store CSI Driver in an AKS cluster
	Use the Web Application Routing add-on with Azure Kubernetes Service (AKS) clusters (preview)
	Confidential computing plugin for Confidential VMs
az aks command	Use command invoke to access a private Azure Kubernetes Service (AKS) cluster
az aks draft	Draft for Azure Kubernetes Service (AKS) (preview)
az aks egress-endpoints	Troubleshoot connections to endpoints outside the virtual network
	Use Planned Maintenance to schedule and control upgrades for your Azure Kubernetes Service (AKS) cluster (preview)
az aks mesh	Deploy Istio-based service mesh add-on for Azure Kubernetes Service (preview)
	Deploy external or internal ingresses for Istio service mesh add-on for Azure Kubernetes Service (preview)
az aks nodepool	Upgrade an Azure Kubernetes Service (AKS) cluster
	Use a managed identity in Azure Kubernetes Service (AKS)
	Create and manage multiple node pools for a cluster in Azure Kubernetes Service (AKS)
	Automatically scale a cluster to meet application demands on Azure Kubernetes Service (AKS)
	Configure an AKS cluster
	Azure Kubernetes Service (AKS) node pool snapshot
az aks oidc-issuer	Create an OpenID Connect provider on Azure Kubernetes Service (AKS)

Reference subgroup	Azure CLI article showing reference use
	Use Azure Active Directory pod-managed identities in Azure Kubernetes Service (Preview)
	Migrate from pod managed-identity to workload identity
	Use Azure Active Directory pod-managed identities in Azure Kubernetes Service (Preview)
	Troubleshoot Azure Kubernetes Service backup and restore (preview)
az aks trustedaccess rolebinding	Manage Azure Kubernetes Service backups using Azure Backup (preview)
	Enable Azure resources to access Azure Kubernetes Service (AKS) clusters using Trusted Access (Preview)
	Back up Azure Kubernetes Service using Azure CLI (preview)
	Restore Azure Kubernetes Service using Azure CLI (preview)

az alerts-management

Reference subgroup	Azure CLI article showing reference use
az alerts-management prometheus-rule-group	Azure Monitor managed service for Prometheus rule groups

az alias

Reference subgroup	Azure CLI article showing reference use
az alias	How to use the Azure CLI alias extension

az ams

Reference subgroup	Azure CLI article showing reference use
az ams account	Tutorial: Encode a remote file based on URL and stream the video - Azure CLI
	Tutorial: Give an Azure Function app access to a Media Services account

Reference subgroup	Azure CLI article showing reference use
az ams account sp	Azure CLI example: Reset the account credentials
az ams account-filter	Creating filters with CLI
az ams asset	Tutorial: Encode a remote file based on URL and stream the video - Azure CLI
az ams asset-filter	Creating filters with CLI
az ams job	Tutorial: Encode a remote file based on URL and stream the video - Azure CLI
	Tutorial: Give an Azure Function app access to a Media Services account
	Tutorial: Encode a remote file based on URL and stream the video - Azure CLI
az ams streaming-locator	Tutorial: Encode a remote file based on URL and stream the video - Azure CLI
	Creating filters with CLI
az ams transform	Tutorial: Encode a remote file based on URL and stream the video - Azure CLI

az apim

Reference subgroup	Azure CLI article showing reference use
az apim	Deploy an Azure API Management instance to multiple Azure regions
	Migrate an API Management instance hosted on the stv1 platform to stv2
	Quickstart: Create an Azure API Management service using Terraform
	Quickstart: Create a new Azure API Management service instance by using the Azure CLI
az apim api	Tutorial: Create and publish a product
	Import an OpenAPI specification
	Import a GraphQL API
	Import SOAP API to API Management
	Tutorial: Use revisions to make non-breaking API changes safely

Reference subgroup <code>az apim api subgroup operation</code>	Azure CLI article showing reference use Tutorial: Mock API responses
<code>az apim api release</code>	Tutorial: Use revisions to make non-breaking API changes safely
	Tutorial: Publish multiple versions of your API
<code>az apim nv</code>	Use named values in Azure API Management policies
	Tutorial: Create and publish a product
	Tutorial: Create and publish a product

az appconfig

Reference subgroup	Azure CLI article showing reference use
<code>az appconfig</code>	Quickstart: Create an Azure App Configuration store
	Disable public access in Azure App Configuration
	Tutorial: Connect a web app to Azure App Configuration with Service Connector
	Use customer-managed keys to encrypt your App Configuration data
	How to use managed identities for Azure App Configuration
<code>az appconfig credential</code>	Disable access key authentication for an Azure App Configuration instance
	Create an Azure App Configuration store with the Azure CLI
<code>az appconfig feature</code>	Quickstart: Create an Azure App Configuration store
<code>az appconfig identity</code>	Use customer-managed keys to encrypt your App Configuration data
	How to use managed identities for Azure App Configuration
<code>az appconfig kv</code>	Quickstart: Create an Azure App Configuration store
	Use content type to store JSON key-values in App Configuration
	Import or export configuration data
	Azure App Configuration support for configuration files
	Integrate with Kubernetes Deployment using Helm
	Enable geo-replication

Reference subgroup	Azure CLI article showing reference use
az appconfig revision	Point-in-time key-values

az appservice

Reference subgroup	Azure CLI article showing reference use
az appservice	Tutorial: Host a RESTful API with CORS in Azure App Service Create a PHP web app in Azure App Service Configure Premium V3 tier for Azure App Service Tutorial: Create a multi-container (preview) app in Web App for Containers Create a multi-container (preview) app using a Docker Compose configuration
az appservice ase	App Service Environment networking Use the migration feature to migrate App Service Environment v1 and v2 to App Service Environment v3 Network configuration settings Upgrade preference for App Service Environment planned maintenance
az appservice kube	Set up an Azure Arc-enabled Kubernetes cluster to run App Service, Functions, and Logic Apps (Preview)
az appservice plan	Manage your function app Tutorial: Use a managed identity to connect Key Vault to an Azure web app in .NET Tutorial: Host a RESTful API with CORS in Azure App Service Migrate custom software to Azure App Service using a custom container Create a PHP web app in Azure App Service

az arcappliance

Reference subgroup	Azure CLI article showing reference use
az arcappliance	Set up Azure Arc VM management using command line (preview) Quickstart: Using Azure CLI to deploy an AKS hybrid cluster on a Windows Server node in an Azure VM
	Troubleshoot Azure Arc resource bridge (preview) issues
	How to install Arc Resource Bridge on Windows Server using the command line
	How to install AKS service on Azure Stack HCI, along side Arc VMs
az arcappliance create	Set up Azure Arc VM management using command line (preview) Quickstart: Using Azure CLI to deploy an AKS hybrid cluster on a Windows Server node in an Azure VM
	How to install Arc Resource Bridge on Windows Server using the command line
az arcappliance delete	Set up Azure Arc VM management using command line (preview) Uninstall Azure Arc VM management (preview)
	Troubleshooting and known issues
az arcappliance deploy	Set up Azure Arc VM management using command line (preview) Quickstart: Using Azure CLI to deploy an AKS hybrid cluster on a Windows Server node in an Azure VM
	How to install Arc Resource Bridge on Windows Server using the command line
az arcappliance logs	Perform ongoing administration for Arc-enabled VMware vSphere
az arcappliance prepare	Set up Azure Arc VM management using command line (preview) Quickstart: Using Azure CLI to deploy an AKS hybrid cluster on a Windows Server node in an Azure VM
	Troubleshoot Azure Arc resource bridge (preview) issues
	How to install Arc Resource Bridge on Windows Server using the command line
az arcappliance update-infracredentials	Deploy Arc for Azure VMware Solution (Preview) Perform ongoing administration for Arc-enabled VMware vSphere

Reference subgroup	Azure CLI article showing reference use
az arcpliance validate	Set up Azure Arc VM management using command line (preview)
	Quickstart: Using Azure CLI to deploy an AKS hybrid cluster on a Windows Server node in an Azure VM
	How to install Arc Resource Bridge on Windows Server using the command line
	Tutorial: Deploy Active Directory connector using Azure CLI
az aradata dc	Uninstall Azure Arc-enabled data services
	Storage Configuration
	Create Azure Arc data controller in direct connectivity mode using CLI
	Upload logs to Azure Monitor
	Create Azure Arc data controller using the CLI
az aradata dc config	Storage Configuration
	Create Azure Arc data controller using the CLI
	Create custom configuration templates
	Upload metrics to Azure Monitor
	Tutorial: Automated validation testing
az aradata dc debug	Get logs to troubleshoot Azure Arc-enabled data services
az aradata dc status	Upgrade a directly connected Azure Arc data controller using the CLI
	Upgrade an indirectly connected Azure Arc data controller using the CLI
	Tutorial: Create an Azure Red Hat OpenShift 4 cluster
	Tutorial: Connect to an Azure Red Hat OpenShift 4 cluster
	Create an Azure Red Hat OpenShift 4 private cluster
	Configure Azure Active Directory authentication for an Azure Red Hat OpenShift 4 cluster (Portal)
	Control egress traffic for your Azure Red Hat OpenShift (ARO) cluster

az artifacts

Reference subgroup	Azure CLI article showing reference use
az artifacts universal	Publish and download universal packages in Azure Artifacts

az attestation

Reference subgroup	Azure CLI article showing reference use
az attestation	Configure an Azure Attestation provider using Terraform
	Quickstart: Set up Azure Attestation with Azure CLI
az attestation policy	Quickstart: Set up Azure Attestation with Azure CLI

az automation

Reference subgroup	Azure CLI article showing reference use
az automation hrwg	Deploy an extension-based Windows or Linux User Hybrid Runbook Worker in Azure Automation
	Migrate the existing agent-based hybrid workers to extension-based hybrid workers
az automation hrwg hrw	Deploy an extension-based Windows or Linux User Hybrid Runbook Worker in Azure Automation
	Migrate the existing agent-based hybrid workers to extension-based hybrid workers

az azurystackhci

Reference subgroup	Azure CLI article showing reference use
az azurystackhci galleryimage	Uninstall Azure Arc VM management (preview)
	Create Azure Stack HCI VM image using Azure Marketplace images (preview)
	Create Azure Stack HCI VM image using images in a local share (preview)

Reference subgroup	Azure CLI article showing reference use
	Create Azure Stack HCI VM image using image in Azure Storage account (preview)
	Sysprep Ubuntu image for Azure Stack HCI virtual machines (preview)
	Create Azure Stack HCI VM image using Azure Marketplace images (preview)
	Create Azure Stack HCI VM image using images in a local share (preview)
	Create Azure Stack HCI VM image using image in Azure Storage account (preview)
az azurestackhci networkinterface	Use VM images to create Arc virtual machines on Azure Stack HCI (preview)
az azurestackhci virtualmachine	Use VM images to create Arc virtual machines on Azure Stack HCI (preview)
az azurestackhci virtualnetwork	Create virtual networks (preview)
	Uninstall Azure Arc VM management (preview)

az backup

Reference subgroup	Azure CLI article showing reference use
az backup container	Back up SQL databases in Azure VM using Azure CLI
	Back up Azure file shares with Azure CLI
	Restore Azure file shares with the Azure CLI
	Tutorial: Back up SAP HANA databases in an Azure VM using Azure CLI
	Manage Azure file share backups with the Azure CLI
az backup item	Selective disk backup and restore for Azure virtual machines
	Back up Azure file shares with Azure CLI
	Restore Azure file shares with the Azure CLI
	Tutorial: Back up SAP HANA databases in an Azure VM using

Reference subgroup	Azure CLI article showing reference use
	Azure CLI
	Manage Azure file share backups with the Azure CLI
az backup job	Selective disk backup and restore for Azure virtual machines
	Back up and recover an Oracle Database on an Azure Linux VM using Azure Backup
	Back up a virtual machine in Azure with the Azure CLI
	Restore a VM with Azure CLI
	Back up SQL databases in Azure VM using Azure CLI
	Back up an Azure VM using Enhanced policy
	Update the existing VM backup policy using CLI
	Back up SQL databases in Azure VM using Azure CLI
	Back up Azure file shares with Azure CLI
	Tutorial: Back up SAP HANA databases in an Azure VM using Azure CLI
az backup protectable-item	Back up SQL databases in Azure VM using Azure CLI
	Tutorial: Back up SAP HANA databases in an Azure VM using Azure CLI
	Manage SQL databases in an Azure VM using Azure CLI
	Tutorial: Manage SAP HANA databases in an Azure VM using Azure CLI
	Quickstart: Back up SAP HANA System Replication on Azure VMs using Azure CLI (preview)
az backup protection	Delete an Azure Backup Recovery Services vault
	Back up an Azure VM using Enhanced policy
	Selective disk backup and restore for Azure virtual machines
	Back up and recover an Oracle Database on an Azure Linux VM using Azure Backup
	Back up a virtual machine in Azure with the Azure CLI
az backup recoveryconfig	Use Archive tier support

Reference subgroup	Azure CLI article showing reference use
	Restore SQL databases in an Azure VM using Azure CLI
	Tutorial: Restore SAP HANA databases in an Azure VM using Azure CLI
	Quickstart: Restore SAP HANA System Replication on Azure VMs using Azure CLI (preview)
	Use Archive tier support
	Selective disk backup and restore for Azure virtual machines
	Back up and recover an Oracle Database on an Azure Linux VM using Azure Backup
	Encryption of backup data using customer-managed keys
	Restore files to a virtual machine in Azure
az backup restore	Use Archive tier support
	Selective disk backup and restore for Azure virtual machines
	Back up and recover an Oracle Database on an Azure Linux VM using Azure Backup
	Encryption of backup data using customer-managed keys
	Restore a VM with Azure CLI
	Restore files to a virtual machine in Azure
az backup vault	Delete an Azure Backup Recovery Services vault
	Back up and recover an Oracle Database on an Azure Linux VM using Azure Backup
	Back up a virtual machine in Azure with the Azure CLI
	Quickstart: Create a Recovery Services vault using Bicep
	Quickstart: Create a Recovery Services vault using an ARM template
az backup vault backup-properties	Switch to Azure Monitor based alerts for Azure Backup
	Back up and recover an Oracle Database on an Azure Linux VM using Azure Backup
	Back up a virtual machine in Azure with the Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Quickstart: Create a Recovery Services vault using Bicep
	Quickstart: Create a Recovery Services vault using an ARM template
az backup vault encryption	Encryption of backup data using customer-managed keys
az backup vault identity	Encryption of backup data using customer-managed keys
az backup vault resource-guard-mapping	Configure Multi-user authorization using Resource Guard in Azure Backup

az baremetalinstance

Reference subgroup	Azure CLI article showing reference use
az baremetalinstance	Connect BareMetal Infrastructure instances in Azure

az batch

Reference subgroup	Azure CLI article showing reference use
az batch account	Quickstart: Use the Azure CLI to create a Batch account and run a job
	CLI example: Run a job and tasks with Azure Batch
	Use Azure Pipelines to build and deploy an HPC solution
	Quickstart: Create an Azure Batch account using Terraform
	Configure customer-managed keys for your Azure Batch account with Azure Key Vault and Managed Identity
az batch account keys	CLI example: Create a Batch account in Batch service mode
	Use Azure Pipelines to build and deploy an HPC solution
	CLI example: Add an application to an Azure Batch account
az batch application package	Use Azure Pipelines to build and deploy an HPC solution
	CLI example: Add an application to an Azure Batch account
az batch file	Use Azure Batch CLI templates and file transfer

Reference subgroup	Azure CLI article showing reference use
az batch job	Quickstart: Use the Azure CLI to create a Batch account and run a job
	CLI example: Run a job and tasks with Azure Batch
	Use Azure Batch CLI templates and file transfer
az batch location	Choose a VM size and image for compute nodes in an Azure Batch pool
	CLI example: Create and manage a Linux pool in Azure Batch
	az batch pool
az batch pool	Quickstart: Use the Azure CLI to create a Batch account and run a job
	CLI example: Run a job and tasks with Azure Batch
	Use the Azure Compute Gallery to create a custom image pool
az batch pool	Use Azure Pipelines to build and deploy an HPC solution
	Manage Batch resources with Azure CLI
	CLI example: Create and manage a Windows pool in Azure Batch
az batch pool supported-images	Choose a VM size and image for compute nodes in an Azure Batch pool
	Provision Linux compute nodes in Batch pools
	CLI example: Create and manage a Linux pool in Azure Batch
az batch task file	Quickstart: Use the Azure CLI to create a Batch account and run a job
	CLI example: Run a job and tasks with Azure Batch
	Manage Batch resources with Azure CLI
az billing	Quickstart: Use the Azure CLI to create a Batch account and run a job
	Install Bicep tools
	Decompiling ARM template JSON to Bicep
az bicep	Bicep CLI commands
	Create private registry for Bicep modules
	Quickstart: Publish Bicep modules to private module registry

az billing

Reference subgroup	Azure CLI article showing reference use
az billing account	Programmatically create Azure Enterprise Agreement subscriptions with the latest APIs
	Programmatically create Azure subscriptions for a Microsoft Customer Agreement with the latest APIs
	Programmatically create Azure subscriptions for a Microsoft Partner Agreement with the latest APIs
az billing customer	Programmatically create Azure subscriptions for a Microsoft Partner Agreement with the latest APIs
az billing enrollment-account	Grant access to create Azure Enterprise subscriptions (legacy)
	Programmatically create Azure subscriptions with legacy APIs
az billing profile	Programmatically create Azure subscriptions for a Microsoft Customer Agreement with the latest APIs

az blueprint

Reference subgroup	Azure CLI article showing reference use
az blueprint	Quickstart: Define and assign an Azure blueprint with the Azure CLI
az blueprint artifact policy	Quickstart: Define and assign an Azure blueprint with the Azure CLI
az blueprint artifact role	Quickstart: Define and assign an Azure blueprint with the Azure CLI
az blueprint artifact template	Quickstart: Define and assign an Azure blueprint with the Azure CLI
az blueprint assignment	Quickstart: Define and assign an Azure blueprint with the Azure CLI
az blueprint resource-group	Quickstart: Define and assign an Azure blueprint with the Azure CLI

az boards

Reference subgroup	Azure CLI article showing reference use
az boards	View, run, or email a work item query
az boards area project	Define area paths and assign to a team
	Define iteration paths (sprints) and configure team iterations
	Define area paths and assign to a team
	Define iteration paths (sprints) and configure team iterations
	Define iteration paths (sprints) and configure team iterations
	Define iteration paths (sprints) and configure team iterations
az boards work-item	Customize your pipeline
	Remove, delete, or restore work items in Azure Boards
	Add and update a work item
	View and add work items using the Work Items page
	Move work items from one team to another team
	Link user stories, issues, bugs, and other work items in Azure Boards
	Reference guide for link types used in Azure DevOps and Azure Boards

az bot

Reference subgroup	Azure CLI article showing reference use
az bot	Provision and publish a bot
	Use Azure CLI to create or update an Azure Bot resource
az bot authsetting	Identity providers
	Connect your bot to channels with Azure CLI
	Connect your bot to channels with Azure CLI
	Connect your bot to channels with Azure CLI
az bot msteams	Connect your bot to channels with Azure CLI
	Connect your bot to channels with Azure CLI
az bot slack	Connect your bot to channels with Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Connect your bot to channels with Azure CLI
az bot telegram	Connect your bot to channels with Azure CLI

az capacity

Reference subgroup	Azure CLI article showing reference use
az capacity reservation	Create a Capacity Reservation
	Modify a Capacity Reservation
	Associate a VM to a Capacity Reservation group
	Remove a Virtual Machine Scale Set association from a Capacity Reservation group
	Remove a VM association from a Capacity Reservation group
az capacity reservation group	Create a Capacity Reservation
	Modify a Capacity Reservation
	Associate a Virtual Machine Scale Set with uniform orchestration to a Capacity Reservation group

az cdn

Reference subgroup	Azure CLI article showing reference use
az cdn custom-domain	Quickstart: Create an Azure CDN profile and endpoint using Terraform
	Create an Azure CDN profile and endpoint using the Azure CLI
az cdn endpoint	Use GitHub Actions workflow to deploy your static website in Azure Storage
	Quickstart: Create an Azure CDN profile and endpoint using Terraform
	Create an Azure CDN profile and endpoint using the Azure CLI
az cdn origin	Create an Azure CDN profile and endpoint using the Azure CLI
az cdn origin-group	Create an Azure CDN profile and endpoint using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
az cdn profile	Create an Azure CDN profile and endpoint using the Azure CLI

az cloud

Reference subgroup	Azure CLI article showing reference use
az cloud	Azure CLI configuration
	Azure cloud management with the Azure CLI
	Configuring Azure Files network endpoints
	Use Azure Active Directory for authentication with PostgreSQL
	Compare Azure Government and global Azure

az cognitiveservices

Reference subgroup	Azure CLI article showing reference use
az cognitiveservices account	Configure Azure Cognitive Services virtual networks
	Tutorial: Upload and analyze a file with Azure Functions and Blob Storage
	Quickstart: Create a Cognitive Services resource using the Azure CLI
	Cognitive Services Anomaly Detector client library for Python
	Use Speech service through a private endpoint
az cognitiveservices account keys	Tutorial: Upload and analyze a file with Azure Functions and Blob Storage
	Quickstart: Create a Cognitive Services resource using the Azure CLI
	Cognitive Services Anomaly Detector client library for Python
	JavaScript Tutorial: Upload and analyze a file with Azure Functions and Blob Storage
	Express.js app converts text to speech with Cognitive Services Speech

Reference subgroup	Azure CLI article showing reference use
	Configure Azure Cognitive Services virtual networks
	Quickstart: Create and manage Communication Services resources
	Get started with the chat hero sample
az communication identity token	Quickstart: Join a room call
	Pre-Call diagnostic
	Adding visual effects to a video call

az confcom

Reference subgroup	Azure CLI article showing reference use
az confcom	Tutorial: Create an ARM template for a confidential container deployment with custom confidential computing enforcement policy

az confidentialledger

Reference subgroup	Azure CLI article showing reference use
az confidentialledger	Quickstart: Create a confidential ledger using the Azure CLI

az config

Reference subgroup	Azure CLI article showing reference use
az config param-persist	How to use variables in Azure CLI commands
	How to manage Azure resource groups with the Azure CLI
	Tutorial: Use persisted parameters to simplify sequential Azure CLI commands
	Azure CLI persisted parameter
	Quickstart: Connect and query with Azure CLI with Azure Database for

Reference subgroup	Azure CLI article showing reference use
	PostgreSQL - Flexible Server
az config	Sign in with Azure CLI
	How to update the Azure CLI
	Use and manage extensions with the Azure CLI
	Output formats for Azure CLI commands
	Azure CLI configuration
az config param-persist	How to use variables in Azure CLI commands
	How to manage Azure resource groups with the Azure CLI
	Tutorial: Use persisted parameters to simplify sequential Azure CLI commands
	Azure CLI persisted parameter

az configure

Reference subgroup	Azure CLI article showing reference use
Azure CLI	Azure CLI configuration
	Deploy and score a machine learning model by using an online endpoint
	Deploy Azure File Sync
	Troubleshooting online endpoints deployment and scoring
	Manage Azure Machine Learning environments with the CLI & SDK (v2)

az confluent

Reference subgroup	Azure CLI article showing reference use
az confluent organization	Manage the Confluent Cloud resource
	QuickStart: Get started with Apache Kafka for Confluent Cloud - Azure CLI

az connectedk8s

Reference subgroup	Azure CLI article showing reference use
az connectedk8s	Quickstart: Connect an existing Kubernetes cluster to Azure Arc Use cluster connect to securely connect to Azure Arc-enabled Kubernetes clusters
	Create and manage custom locations on Azure Arc-enabled Kubernetes
	Use Azure RBAC on Azure Arc-enabled Kubernetes clusters (preview)
	Set up an Azure Arc-enabled Kubernetes cluster to run App Service, Functions, and Logic Apps (Preview)
az edk8s	Quickstart: Connect an existing Kubernetes cluster to Azure Arc Set up an Azure Arc-enabled Kubernetes cluster to run App Service, Functions, and Logic Apps (Preview)
	Private connectivity for Arc-enabled Kubernetes clusters using private link (preview)
	Prerequisites to deploy the data controller in direct connectivity mode
	Tutorial: Enable Azure Container Apps on Azure Arc-enabled Kubernetes (Preview)

az connectedmachine

Reference subgroup	Azure CLI article showing reference use
az connectedmachine	Manage Azure Monitor Agent Install Azure Monitor Agent
	Enable Azure VM extensions using the Azure CLI
	Manage Azure Monitor Agent
	Manage SQL Server license and billing options
	Overview of change tracking and inventory using Azure Monitoring Agent (Preview)
	Automatic extension upgrade for Azure Arc-enabled servers

Reference subgroup	Azure CLI article showing reference use Install Azure Monitor Agent
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az connectedvmware

Reference subgroup	Azure CLI article showing reference use
az edvmware vcenter	Deploy Arc for Azure VMware Solution (Preview)
	Perform ongoing administration for Arc-enabled VMware vSphere

az connection

Reference subgroup	Azure CLI article showing reference use
az connection create	Use Spring Data JDBC with Azure SQL Database
	Use Spring Data JPA with Azure SQL Database
	Use Spring Data JDBC with Azure Database for PostgreSQL
	Use Spring Data JPA with Azure Database for MySQL
	Use Spring Data JPA with Azure Database for PostgreSQL
	Quickstart: Create a budget with an ARM template
	Quickstart: Create a budget with Bicep
	Quickstart: Deploy a container instance in Azure using the Azure CLI
	Mount an Azure file share in Azure Container Instances
	Deploy container instances into an Azure virtual network
	Set environment variables in container instances
	Tutorial: Build and deploy container images in the cloud with Azure Container Registry Tasks
az container app	Configure a GitHub Action to create a container instance

az containerapp

Reference subgroup	Azure CLI article showing reference use
az containerapp	Set scaling rules in Azure Container Apps Quickstart: Deploy your first container app with containerapp up
	Use storage mounts in Azure Container Apps Manage secrets in Azure Container Apps
	Tutorial: Communication between microservices in Azure Container Apps
az containerapp connection	Service Connector internals Connect a container app to a cloud service with Service Connector
	Quickstart: Create a service connection in Container Apps with the Azure CLI
az containerapp connection create	Migrate an application to use passwordless connections with Azure Blob Storage Migrate an application to use passwordless connections with Azure Database for PostgreSQL
	Connect a container app to a cloud service with Service Connector Tutorial: Connect to PostgreSQL Database from a Java Quarkus Container App without secrets using a managed identity
	Migrate a Java application to use passwordless connections with Azure SQL Database
az containerapp dapr	Deploy Azure Container Apps with the az containerapp up command
az containerapp env	Quickstart: Deploy your first application to Azure Spring Apps Provide a virtual network to an external Azure Container Apps environment
	Provide a virtual network to an internal Azure Container Apps environment
	Tutorial: Deploy a Dapr application to Azure Container Apps using the Azure CLI
	Tutorial: Build and deploy your app to Azure Container Apps
az containerapp env dapr-component	Dapr integration with Azure Container Apps

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Deploy a Dapr application to Azure Container Apps using the Azure CLI
az containerapp env logs	View log streams in Azure Container Apps
az containerapp env storage	Use storage mounts in Azure Container Apps
	Tutorial: Create an Azure Files volume mount in Azure Container Apps
	How to enable your own persistent storage in Azure Spring Apps with the Standard consumption and dedicated plan
az containerapp env workload-profile	Quickstart: Deploy your first application to Azure Spring Apps
	Manage workload profiles in a Consumption + Dedicated workload profiles plan structure (preview)
	Quickstart: Deploy an event-driven application to Azure Spring Apps
	Quickstart: Provision an Azure Spring Apps Standard consumption and dedicated plan service instance
	Quickstart: Create an Azure Spring Apps Standard consumption and dedicated plan instance in an Azure Container Apps environment with a virtual network
az containerapp github-action	Set up GitHub Actions with Azure CLI in Azure Container Apps
	Configure continuous deployment for a Python web app in Azure Container Apps
az containerapp hostname	Custom domain names and free managed certificates in Azure Container Apps (preview)
az containerapp identity	Deploy to Azure Container Apps from Azure Pipelines
	Managed identities in Azure Container Apps
	Deploy to Azure Container Apps with GitHub Actions
	Migrate an application to use passwordless connections with Azure Blob Storage
	Migrate an application to use passwordless connections with Azure Database for PostgreSQL

Reference subgroup	Azure CLI article showing reference use
az containerapp ingress	Configure Ingress for your app in Azure Container Apps Deploy Azure Container Apps with the az containerapp up command
	 Custom domain names and free managed certificates in Azure Container Apps (preview)
az containerapp ingress access-restriction	Set up IP ingress restrictions in Azure Container Apps
az containerapp ingress cors	Configure cross-origin resource sharing (CORS) for Azure Container Apps
az containerapp ingress traffic	Traffic splitting in Azure Container Apps Blue-Green Deployment in Azure Container Apps
	 Jobs in Azure Container Apps (preview)
	 Create a job with Azure Container Apps (preview)
	 Tutorial: Deploy an event-driven job with Azure Container Apps
	 Tutorial: Deploy self-hosted CI/CD runners and agents with Azure Container Apps jobs
az containerapp job execution	Jobs in Azure Container Apps (preview) Create a job with Azure Container Apps (preview)
	 Tutorial: Deploy an event-driven job with Azure Container Apps
	 Tutorial: Deploy self-hosted CI/CD runners and agents with Azure Container Apps jobs
az containerapp logs	View log streams in Azure Container Apps
	 Build and deploy a Python web app with Azure Container Apps and PostgreSQL
	 Configure continuous deployment for a Python web app in Azure Container Apps
	 Tutorial: Use a PostgreSQL service for development
	 Tutorial: Create and use an Apache Kafka service for development
az containerapp registry	Deploy to Azure Container Apps from Azure Pipelines

Reference subgroup	Azure CLI article showing reference use
	Deploy to Azure Container Apps with GitHub Actions
	Azure Container Apps image pull with managed identity
az containerapp replica	View log streams in Azure Container Apps
	Connect to a container console in Azure Container Apps
	Manage revisions in Azure Container Apps
	View log streams in Azure Container Apps
	Connect to a container console in Azure Container Apps
az containerapp revision label	Manage revisions in Azure Container Apps
	Blue-Green Deployment in Azure Container Apps
az containerapp secret	Deploy Azure Container Apps with the az containerapp up command
az containerapp service postgres	Tutorial: Use a PostgreSQL service for development
az containerapp service redis	Tutorial: Connect services in Azure Container Apps (preview)

az cosmosdb

Reference subgroup	Azure CLI article showing reference use
az cosmosdb	Quickstart: Azure Cosmos DB for NoSQL client library for .NET
	Azure role-based access control in Azure Cosmos DB
	Quickstart: Azure Cosmos DB for Table for .NET
	Azure Cosmos DB free tier
	Quickstart - Azure Cosmos DB for NoSQL client library for Node.js
az cosmosdb cassandra keyspace	Getting started with databases on Azure
	Create an Azure Cosmos DB Cassandra API account, keyspace and table using Azure CLI
	Create an Azure Cosmos DB Cassandra API serverless account,

Reference subgroup	Azure CLI article showing reference use
	keyspace and table using Azure CLI
	Throughput (RU/s) operations with Azure CLI for a keyspace or table for Azure Cosmos DB - API for Cassandra
	Use Azure CLI to create a API for Cassandra account, keyspace, and table with autoscale
	Throughput (RU/s) operations with Azure CLI for a keyspace or table for Azure Cosmos DB - API for Cassandra
az cosmosdb cassandra table	Getting started with databases on Azure
	Create an Azure Cosmos DB Cassandra API account, keyspace and table using Azure CLI
	Create an Azure Cosmos DB Cassandra API serverless account, keyspace and table using Azure CLI
	Throughput (RU/s) operations with Azure CLI for a keyspace or table for Azure Cosmos DB - API for Cassandra
	Use Azure CLI to create a API for Cassandra account, keyspace, and table with autoscale
	Throughput (RU/s) operations with Azure CLI for a keyspace or table for Azure Cosmos DB - API for Cassandra
	Create and manage intra-account container copy jobs in Azure Cosmos DB (Preview)
az cosmosdb gremlin	Get the latest restorable timestamp for continuous backup accounts
az cosmosdb gremlin database	Restore a deleted container or database into same Azure Cosmos DB account (preview)
	Create an Azure Cosmos DB for Gremlin account, database and graph using Azure CLI
	Use Azure CLI to create a Gremlin serverless account, database, and graph
	Use Azure CLI to create a API for Gremlin account, database, and graph with autoscale
	Throughput (RU/s) operations with Azure CLI for a database or graph for Azure Cosmos DB - API for Gremlin
	Throughput (RU/s) operations with Azure CLI for a database or

Reference subgroup	Azure CLI article showing reference use
	graph for Azure Cosmos DB - API for Gremlin
az cosmosdb gremlin graph	Configure and use Azure Synapse Link for Azure Cosmos DB
	Restore a deleted container or database into same Azure Cosmos DB account (preview)
	Create an Azure Cosmos DB for Gremlin account, database and graph using Azure CLI
	Use Azure CLI to create a Gremlin serverless account, database, and graph
	Use Azure CLI to create a API for Gremlin account, database, and graph with autoscale
	Throughput (RU/s) operations with Azure CLI for a database or graph for Azure Cosmos DB - API for Gremlin
az cosmosdb gremlin restorable-database	Restore an Azure Cosmos DB account that uses continuous backup mode
	Restore a deleted container or database into same Azure Cosmos DB account (preview)
az cosmosdb gremlin restorable-graph	Restore an Azure Cosmos DB account that uses continuous backup mode
	Restore a deleted container or database into same Azure Cosmos DB account (preview)
az cosmosdb gremlin restorable-resource	Restore an Azure Cosmos DB account that uses continuous backup mode
	Configure managed identities with Azure Active Directory for your Azure Cosmos DB account
	Access Azure Key Vault from Azure Cosmos DB using a managed identity
	Configure customer-managed keys for your Azure Cosmos DB account with Azure Managed HSM Key Vault
az cosmosdb keys	Quickstart: Azure Cosmos DB for NoSQL client library for .NET
	Quickstart - Azure Cosmos DB for NoSQL client library for Node.js
	Quickstart: Azure Cosmos DB for NoSQL client library for Python
	Get started with Azure Cosmos DB for NoSQL using .NET

Reference subgroup	Azure CLI article showing reference use
	Quickstart: Azure Cosmos DB for MongoDB for .NET with the MongoDB driver
az cosmosdb locations	Update periodic backup storage redundancy for Azure Cosmos DB
az cosmosdb mongodb	Get the latest restorable timestamp for continuous backup accounts
az cosmosdb mongodb collection	Merge partitions in Azure Cosmos DB (preview)
	Create a database and collection for API for MongoDB for Azure Cosmos DB using Azure CLI
	Restore a deleted container or database into same Azure Cosmos DB account (preview)
	Create a serverless database and collection for API for MongoDB for Azure Cosmos DB using Azure CLI
	Throughput (RU/s) operations with Azure CLI for a database or graph for Azure Cosmos DB for MongoDB
az cosmosdb mongodb collection throughput	Throughput (RU/s) operations with Azure CLI for a database or graph for Azure Cosmos DB for MongoDB
az cosmosdb mongodb database	Create a database and collection for API for MongoDB for Azure Cosmos DB using Azure CLI
	Restore a deleted container or database into same Azure Cosmos DB account (preview)
	Create a serverless database and collection for API for MongoDB for Azure Cosmos DB using Azure CLI
	Throughput (RU/s) operations with Azure CLI for a database or graph for Azure Cosmos DB for MongoDB
	Create a database with autoscale and shared collections for API for MongoDB for Azure Cosmos DB using Azure CLI
	Throughput (RU/s) operations with Azure CLI for a database or graph for Azure Cosmos DB for MongoDB
az cosmosdb mongodb restorable-collection	Restore an Azure Cosmos DB account that uses continuous backup mode
	Restore a deleted container or database into same Azure Cosmos DB account (preview)

Reference subgroup	Azure CLI article showing reference use
az cosmosdb mongodb restorable-database	Restore an Azure Cosmos DB account that uses continuous backup mode
	Restore a deleted container or database into same Azure Cosmos DB account (preview)
az cosmosdb mongodb restorable-resource	Restore an Azure Cosmos DB account that uses continuous backup mode
	Configure role-based access control in Azure Cosmos DB for MongoDB
	Configure role-based access control in Azure Cosmos DB for MongoDB
az cosmosdb network-rule	Configure access to Azure Cosmos DB from virtual networks (VNet)
	Connect an existing Azure Cosmos DB account with virtual network service endpoints using Azure CLI
az cosmosdb restorable-database-account	Restore an Azure Cosmos DB account that uses continuous backup mode
	Manage permissions to restore an Azure Cosmos DB account
	Restore a deleted container or database into same Azure Cosmos DB account (preview)
az cosmosdb service	Materialized views in Azure Cosmos DB for Apache Cassandra (preview)
az cosmosdb sql	Get the latest restorable timestamp for continuous backup accounts
az cosmosdb sql container	Quickstart: Azure Cosmos DB for NoSQL client library for .NET
	Quickstart - Azure Cosmos DB for NoSQL client library for Node.js
	Quickstart: Azure Cosmos DB for NoSQL client library for Python
	Migrate data to Azure Cosmos DB using the desktop data migration tool
	Quickstart: Build a Java app to manage Azure Cosmos DB for NoSQL data
az cosmosdb sql container throughput	Manage Azure Cosmos DB for NoSQL resources using Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Throughput (RU/s) operations with Azure CLI for a database or container for Azure Cosmos DB for NoSQL
az cosmosdb sql database	Quickstart: Azure Cosmos DB for NoSQL client library for .NET
	Quickstart - Azure Cosmos DB for NoSQL client library for Node.js
	Quickstart: Azure Cosmos DB for NoSQL client library for Python
	Use system-assigned managed identities to access Azure Cosmos DB data
	Migrate data to Azure Cosmos DB using the desktop data migration tool
	Manage Azure Cosmos DB for NoSQL resources using Azure CLI
	Throughput (RU/s) operations with Azure CLI for a database or container for Azure Cosmos DB for NoSQL
az cosmosdb sql restorable-container	Restore an Azure Cosmos DB account that uses continuous backup mode
	Restore a deleted container or database into same Azure Cosmos DB account (preview)
az cosmosdb sql restorable-database	Restore an Azure Cosmos DB account that uses continuous backup mode
	Restore a deleted container or database into same Azure Cosmos DB account (preview)
az cosmosdb sql restorable-resource	Restore an Azure Cosmos DB account that uses continuous backup mode
az cosmosdb sql role assignment	Quickstart: Azure Cosmos DB for NoSQL client library for .NET
	Configure role-based access control with Azure Active Directory for your Azure Cosmos DB account
	Quickstart - Azure Cosmos DB for NoSQL client library for Node.js
	Quickstart: Azure Cosmos DB for NoSQL client library for Python
	Use system-assigned managed identities to access Azure Cosmos DB data
az cosmosdb sql role definition	Quickstart: Azure Cosmos DB for NoSQL client library for .NET

Reference subgroup	Azure CLI article showing reference use
	Configure role-based access control with Azure Active Directory for your Azure Cosmos DB account
	Quickstart - Azure Cosmos DB for NoSQL client library for Node.js
	Quickstart: Azure Cosmos DB for NoSQL client library for Python
	Use system-assigned managed identities to access Azure Cosmos DB data
az cosmosdb table	Quickstart: Build an API for Table app with Python SDK and Azure Cosmos DB
	Restore a deleted container or database into same Azure Cosmos DB account (preview)
	Get the latest restorable timestamp for continuous backup accounts
	Quickstart: Build a API for Table app with Java SDK and Azure Cosmos DB
	Quickstart: Build a API for Table app with Node.js and Azure Cosmos DB
az cosmosdb table restorable-resource	Restore an Azure Cosmos DB account that uses continuous backup mode
az cosmosdb table restorable-table	Restore an Azure Cosmos DB account that uses continuous backup mode
	Restore a deleted container or database into same Azure Cosmos DB account (preview)
	Throughput (RU/s) operations with Azure CLI for a table for Azure Cosmos DB for Table
	Tutorial: Create and manage exported data
	View and download your Azure usage and charges
	Get usage data with the Azure CLI

az customlocation

Reference subgroup	Azure CLI article showing reference use
az customlocation	Set up Azure Arc VM management using command line (preview)
	Create and manage custom locations on Azure Arc-enabled Kubernetes
	Commission the AKS cluster
	Quickstart: Using Azure CLI to deploy an AKS hybrid cluster on a Windows Server node in an Azure VM
	How to install Arc Resource Bridge on Windows Server using the command line
	Quickstart: Create Azure Custom Resource Provider and deploy custom resources

az databox

Reference subgroup	Azure CLI article showing reference use
az databox job	Tutorial: Order Azure Data Box
	Quickstart: Deploy Azure Data Box Disk using the Azure portal
	Quickstart: Deploy Azure Data Box Heavy using the Azure portal

az databoxedge

Reference subgroup	Azure CLI article showing reference use
az databoxedge device	Tutorial: Prepare to deploy Azure Stack Edge Pro R
	Tutorial: Prepare to deploy Azure Stack Edge Mini R
	Tutorial: Prepare to deploy Azure Stack Edge Pro R
	Tutorial: Prepare to deploy Azure Stack Edge Mini R

az databricks

Reference subgroup	Azure CLI article showing reference use
az databricks	Get Azure AD tokens for service principals

Reference subgroup	Azure CLI article showing reference use
workspace	Get Azure AD tokens for users by using the Azure CLI
	Build a data pipeline by using Azure Data Factory, DevOps, and machine learning
	Enable customer-managed keys for managed services
	Configure customer-managed keys for Azure managed disks

az datafactory

Reference subgroup	Azure CLI article showing reference use
az datafactory	Build a data pipeline by using Azure Data Factory, DevOps, and machine learning
	Quickstart: Create an Azure Data Factory using Azure CLI
	Tutorial: Clean up resources
az datafactory dataset	Quickstart: Create an Azure Data Factory using Azure CLI
az datafactory integration-runtime	Tutorial: Clean up resources
az datafactory linked-service	Quickstart: Create an Azure Data Factory using Azure CLI
az datafactory pipeline	Quickstart: Create an Azure Data Factory using Azure CLI
az datafactory pipeline-run	Quickstart: Create an Azure Data Factory using Azure CLI
	Create a trigger that runs a pipeline on a schedule
	Create a trigger that runs a pipeline on a tumbling window
az datafactory trigger-run	Create a trigger that runs a pipeline on a schedule
	Create a trigger that runs a pipeline on a tumbling window

az datamigration

Reference subgroup	Azure CLI article showing reference use
az datamigration sql-managed-instance	Migrate databases at scale using automation (Preview)

Reference subgroup	Azure CLI article showing reference use
az datamigration sql-service	Migrate databases at scale using automation (Preview)

az dataprotection

Reference subgroup	Azure CLI article showing reference use
az dataprotection backup-instance	Back up Azure Blobs in a storage account using Azure CLI
	Back up Azure Managed Disks using Azure CLI
	Back up Azure PostgreSQL databases using Azure CLI
	Restore Azure Blobs to point-in-time using Azure CLI
	Restore Azure PostgreSQL databases using Azure CLI
	Restore Azure Blobs to point-in-time using Azure CLI
	Restore Azure PostgreSQL databases using Azure CLI
	Restore Azure Managed Disks using Azure CLI
	Restore Azure Kubernetes Service using Azure CLI (preview)
az dataprotection backup-policy	Back up Azure Blobs in a storage account using Azure CLI
	Back up Azure Managed Disks using Azure CLI
	Back up Azure PostgreSQL databases using Azure CLI
	Back up Azure Kubernetes Service using Azure CLI (preview)
az dataprotection backup-policy retention-rule	Back up Azure Managed Disks using Azure CLI
	Back up Azure PostgreSQL databases using Azure CLI
	Back up Azure Kubernetes Service using Azure CLI (preview)
	Back up Azure PostgreSQL databases using Azure CLI
az dataprotection backup-policy trigger	Back up Azure Managed Disks using Azure CLI
	Back up Azure PostgreSQL databases using Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Back up Azure Kubernetes Service using Azure CLI (preview)
az dataprotection backup-vault	Back up Azure Blobs in a storage account using Azure CLI
	Back up Azure Managed Disks using Azure CLI
	Back up Azure PostgreSQL databases using Azure CLI
	Back up Azure Kubernetes Service using Azure CLI (preview)
	Back up Azure Managed Disks using Azure CLI
	Back up Azure PostgreSQL databases using Azure CLI
	Restore Azure Blobs to point-in-time using Azure CLI
	Restore Azure PostgreSQL databases using Azure CLI
	Restore Azure Managed Disks using Azure CLI
az dataprotection recovery-point	Restore Azure PostgreSQL databases using Azure CLI
	Restore Azure Managed Disks using Azure CLI
	Restore Azure Kubernetes Service using Azure CLI (preview)
az dataprotection resource-guard	Configure Multi-user authorization using Resource Guard in Azure Backup
az dataprotection restorable-time-range	Restore Azure Blobs to point-in-time using Azure CLI

az datsahre

Reference subgroup	Azure CLI article showing reference use
az datsahre	Tutorial: Share data using Azure Data Share
	Tutorial: Share data using Azure Data Share
	Azure CLI reference commands for Azure Data Share
	Tutorial: Accept and receive data using Azure Data Share

Reference subgroup	Azure CLI article showing reference use
az datashare consumer-invitation	Tutorial: Accept and receive data using Azure Data Share
az datashare consumer-source-data-set	Tutorial: Accept and receive data using Azure Data Share
az datashare data-set-mapping	Tutorial: Accept and receive data using Azure Data Share
az datashare invitation	Tutorial: Share data using Azure Data Share
	Tutorial: Accept and receive data using Azure Data Share
az datashare trigger	Tutorial: Accept and receive data using Azure Data Share

az dedicated-hsm

Reference subgroup	Azure CLI article showing reference use
az dedicated-hsm	Troubleshooting the Azure Dedicated HSM service
	Tutorial: Deploying HSMs into an existing virtual network using the Azure CLI
	Tutorial: Create a payment HSM
	Quickstart: Create an Azure Dedicated HSM by using the Azure CLI
	Quickstart: Create an Azure Payment HSM with the Azure CLI

az deployment

Reference subgroup	Azure CLI article showing reference use
az deployment group	Create a storage account
	Manage Azure Monitor Agent
	View deployment history with Azure Resource Manager
	Create and manage multiple node pools for a cluster in Azure Kubernetes Service (AKS)

Reference subgroup	Azure CLI article showing reference use
	Configure an AKS cluster
	View deployment history with Azure Resource Manager
	How to deploy resources with Bicep and Azure CLI
	How to use Azure Resource Manager (ARM) deployment templates with Azure CLI
	Programmatically create Azure Enterprise Agreement subscriptions with the latest APIs
	Bicep deployment what-if operation
az deployment operation group	View deployment history with Azure Resource Manager
	Find error codes
	Enable debug logging
az deployment operation mg	View deployment history with Azure Resource Manager
	Find error codes
	Enable debug logging
az deployment operation sub	View deployment history with Azure Resource Manager
	Find error codes
	Enable debug logging
az deployment operation tenant	View deployment history with Azure Resource Manager
	Find error codes
	Enable debug logging
	View deployment history with Azure Resource Manager
	How to deploy resources with Bicep and Azure CLI
	How to use Azure Resource Manager (ARM) deployment templates with Azure CLI
	Onboard a customer to Azure Lighthouse
	Assign Azure roles using Azure Resource Manager templates
	View deployment history with Azure Resource Manager

Reference subgroup	Azure CLI article showing reference use
	How to deploy resources with Bicep and Azure CLI
	How to use Azure Resource Manager (ARM) deployment templates with Azure CLI
	Bicep deployment what-if operation
	ARM template deployment what-if operation
	Create an application group, a workspace, and assign users in Azure Virtual Desktop
	Use Azure CLI and Azure PowerShell with Azure Virtual Desktop
	Manage application groups using PowerShell or the Azure CLI
	Delete a host pool
az desktopvirtualization hostpool	Create a host pool in Azure Virtual Desktop
	Add session hosts to a host pool
	Create an application group, a workspace, and assign users in Azure Virtual Desktop
	Configure a host pool as a validation environment
	Use Azure CLI and Azure PowerShell with Azure Virtual Desktop
az desktopvirtualization workspace	Add session hosts to a host pool
	Create an application group, a workspace, and assign users in Azure Virtual Desktop
	Use Azure CLI and Azure PowerShell with Azure Virtual Desktop

az devcenter

Reference subgroup	Azure CLI article showing reference use
az devcenter admin catalog	Tutorial: Deploy environments in CI/CD with GitHub
	Create and configure a dev center for Azure Deployment Environments by using the Azure CLI
az devcenter admin devcenter	Tutorial: Deploy environments in CI/CD with GitHub
	Create and configure a project by using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Create and configure a dev center for Azure Deployment Environments by using the Azure CLI
az devcenter admin environment-type	Tutorial: Deploy environments in CI/CD with GitHub
	Create and configure a dev center for Azure Deployment Environments by using the Azure CLI
az devcenter admin project	Tutorial: Deploy environments in CI/CD with GitHub
	Create and configure a project by using the Azure CLI
az devcenter admin project-allowed-environment-type	Create and configure a project by using the Azure CLI
az devcenter admin project-environment-type	Tutorial: Deploy environments in CI/CD with GitHub
	Create and configure a project by using the Azure CLI
	Manage your deployment environment
	Create and access an environment by using the Azure CLI
	Add and configure an environment definition in Azure Deployment Environments
az devcenter dev environment-definition	Create and access an environment by using the Azure CLI
az devcenter dev environment-type	Create and access an environment by using the Azure CLI

az devops

Reference subgroup	Azure CLI article showing reference use
az devops	Define variables
	Azure Pipelines agents
	Create your first pipeline
	Add & use variable groups
	Branch policies and settings
	Add and manage information banners in Azure Devops

Reference subgroup	Azure CLI article showing reference use
	Install extensions
	Create a project in Azure DevOps
	Use a variable group's secret and nonsecret variables in an Azure Pipeline
	Delete a project
az devops security group	Add organization users and manage access
	Add and manage security groups
az devops security group membership	Add and manage security groups
	Manage permissions with command line tool
	Manage permissions with command line tool
az devops service-endpoint	Use a variable group's secret and nonsecret variables in an Azure Pipeline
	Azure DevOps CLI service endpoint
az devops service-endpoint azurerm	Azure DevOps CLI service endpoint
az devops service-endpoint github	Use a variable group's secret and nonsecret variables in an Azure Pipeline
	Azure DevOps CLI service endpoint
	Add users or groups to a team or project
	Create or add a team
	Rename or remove a team
	Add organization users and manage access
	Remove users from Azure DevOps
	Export a list of users and their access levels
az devops wiki	Create a wiki for your project
	Add and edit wiki pages
	Publish a Git repo to a wiki
	Manage wikis with the CLI

Reference subgroup	Azure CLI article showing reference use
az devops wiki page	Restore a deleted wiki
	Create a wiki for your project
	Add and edit wiki pages
	Manage wikis with the CLI
	Restore a deleted wiki

az disk

Reference subgroup	Azure CLI article showing reference use
az disk	How to use variables in Azure CLI commands
	Expand virtual hard disks on a Linux VM
	Create and use a volume with Azure Disks in Azure Kubernetes Service (AKS)
	Download a Windows VHD from Azure
	Create an incremental snapshot for managed disks

az disk-access

Reference subgroup	Azure CLI article showing reference use
az disk-access	Azure CLI - Restrict import/export access for managed disks with Private Links
	Use the Azure CLI to enable end-to-end encryption using encryption at host
	Bring your own keys (BYOK) with Azure disks in Azure Kubernetes Service (AKS)
	Copy managed disks to same or different subscription with CLI
	Encrypt managed disks with cross-tenant customer-managed keys
	Create a managed disk from a snapshot with CLI (Linux)
	Get started with Azure Data Lake Analytics using Azure CLI
	Manage Azure Data Lake Analytics using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
az dla account blob-storage	Manage Azure Data Lake Analytics using the Azure CLI
	Manage Azure Data Lake Analytics using the Azure CLI
az dla job	Get started with Azure Data Lake Analytics using Azure CLI
	Manage Azure Data Lake Analytics using the Azure CLI
	Manage Azure Data Lake Analytics using the Azure CLI
	Manage Azure Data Lake Analytics using the Azure CLI

az dls

Reference subgroup	Azure CLI article showing reference use
az dls account	Get started with Azure Data Lake Storage Gen1 using the Azure CLI
	Get started with Azure Data Lake Analytics using Azure CLI
	Get started with Azure Data Lake Storage Gen1 using the Azure CLI
	Get started with Azure Data Lake Analytics using Azure CLI
	Get started with Azure Data Lake Storage Gen1 using the Azure CLI

az dms

Reference subgroup	Azure CLI article showing reference use
az dms	Tutorial: Migrate PostgreSQL to Azure Database for PostgreSQL online using DMS (classic) via the Azure CLI
az dms project	Tutorial: Migrate PostgreSQL to Azure Database for PostgreSQL online using DMS (classic) via the Azure CLI
	Tutorial: Migrate PostgreSQL to Azure Database for PostgreSQL online using DMS (classic) via the Azure CLI

az dns-resolver

Reference subgroup	Azure CLI article showing reference use
az dns-resolver	Quickstart: Create an Azure DNS Private Resolver using Bicep
az dns-resolver forwarding-ruleset	Quickstart: Create an Azure DNS Private Resolver using Bicep
	Quickstart: Create an Azure DNS Private Resolver using Bicep
	Quickstart: Create an Azure DNS Private Resolver using Bicep
az dns-resolver vnet-link	Quickstart: Create an Azure DNS Private Resolver using Bicep

az dt

Reference subgroup	Azure CLI article showing reference use
az dt	Ingest IoT Hub telemetry into Azure Digital Twins
	Integrate Azure Digital Twins with Azure Time Series Insights
	Set up twin-to-twin event handling
	Create endpoints in Azure Digital Twins
	Set up an Azure Digital Twins instance and authentication (CLI)
az dt data-history connection create	Create a data history connection for Azure Digital Twins
az dt endpoint	Tutorial: Build out an end-to-end solution
	Set up twin-to-twin event handling
az dt endpoint create	Tutorial: Build out an end-to-end solution
	Integrate Azure Digital Twins with Azure Time Series Insights
	Set up twin-to-twin event handling
	Integrate Azure Digital Twins data into an Azure Maps indoor map
	Create endpoints in Azure Digital Twins
az dt identity	Set up an Azure Digital Twins instance and authentication (CLI)
az dt model	Ingest IoT Hub telemetry into Azure Digital Twins
	Automanage devices in Azure Digital Twins using Device Provisioning Service (DPS)

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Create an Azure Digital Twins graph using the Azure CLI
az dt role-assignment	Tutorial: Build out an end-to-end solution
	Troubleshoot Azure Digital Twins failed service request: Error 403 (Forbidden)
	Ingest IoT Hub telemetry into Azure Digital Twins
	Create an app registration to use with Azure Digital Twins
	Integrate Azure Digital Twins with Azure Time Series Insights
az dt route	Tutorial: Build out an end-to-end solution
	Integrate Azure Digital Twins with Azure Time Series Insights
	Set up twin-to-twin event handling
	Integrate Azure Digital Twins data into an Azure Maps indoor map
az dt twin	Ingest IoT Hub telemetry into Azure Digital Twins
	Integrate Azure Digital Twins with Azure Time Series Insights
	Automanage devices in Azure Digital Twins using Device Provisioning Service (DPS)
	Azure Digital Twins CLI command set
	Tutorial: Create an Azure Digital Twins graph using the Azure CLI
	Tutorial: Create an Azure Digital Twins graph using the Azure CLI

az elastic-san

Reference subgroup	Azure CLI article showing reference use
az elastic-san	Deploy an Elastic SAN (preview)
	Increase the size of an Elastic SAN Preview
	Delete an Elastic SAN Preview
az elastic-san volume	Deploy an Elastic SAN (preview)
	Connect to Elastic SAN Preview volumes - Linux

Reference subgroup	Azure CLI article showing reference use
	Connect Azure Elastic SAN Preview volumes to an Azure Kubernetes Service cluster
	Increase the size of an Elastic SAN Preview
	Delete an Elastic SAN Preview
az elastic-san volume-group	Deploy an Elastic SAN (preview)
	Connect to Elastic SAN Preview volumes - Windows
	Connect to Elastic SAN Preview volumes - Linux
	Configure Elastic SAN networking Preview
	Delete an Elastic SAN Preview

az eventgrid

Reference subgroup	Azure CLI article showing reference use
az eventgrid domain	Manage topics and publish events using event domains
	Assign a managed identity to an Event Grid custom topic or domain
az eventgrid domain key	Manage topics and publish events using event domains
	Get access keys for Event Grid resources (topics or domains)
az eventgrid event-subscription	Azure Service Bus to Event Grid integration overview
	Set dead-letter location and retry policy
	Use CloudEvents v1.0 schema with Event Grid
	Service Bus queues and topics as event handlers for Azure Event Grid events
	Quickstart: Route custom events to web endpoint with Azure CLI and Event Grid
az eventgrid partner topic event-subscription	Service Bus queues and topics as event handlers for Azure Event Grid events
az eventgrid system-topic	Tutorial: Route policy state change events to Event Grid

Reference subgroup	Azure CLI article showing reference use with Azure CLI
	Create, view, and manage Event Grid system topics using Azure CLI
	MQTT Clients Life Cycle Events
az eventgrid system-topic event-subscription	Deliver events to Azure Active Directory protected endpoints
	Tutorial: Route policy state change events to Event Grid with Azure CLI
	Create, view, and manage Event Grid system topics using Azure CLI
	MQTT Clients Life Cycle Events
az eventgrid topic	Route custom events to web endpoint with the Azure portal and Azure Event Grid
	Set dead-letter location and retry policy
	Use CloudEvents v1.0 schema with Event Grid
	Quickstart: Route custom events to an Azure Function with Event Grid
	Quickstart: Route custom events to web endpoint with Azure CLI and Event Grid
az eventgrid topic key	Route custom events to web endpoint with the Azure portal and Azure Event Grid
	Quickstart: Route custom events to an Azure Function with Event Grid
	Quickstart: Route custom events to web endpoint with Azure CLI and Event Grid
	Publish events to Azure Event Grid custom topics using access keys
	Filter events for Event Grid
az eventgrid topic private-endpoint-connection	Configure private endpoints for Azure Event Grid custom topics or domains

az eventhubs

Reference subgroup	Azure CLI article showing reference use
az eventhubs eventhub	Receive change notifications through Azure Event Hubs Dynamically add partitions to an event hub (Apache Kafka topic)
	Quickstart: Route custom events to Azure Event Hubs with Azure CLI and Event Grid Event delivery with a managed identity
	Quickstart: Subscribe to Azure Kubernetes Service (AKS) events with Azure Event Grid
az eventhubs eventhub authorization-rule	Receive change notifications through Azure Event Hubs Tutorial: Create a function in Java with an Event Hub trigger and an Azure Cosmos DB output binding
	Export IoT data to Event Hubs Integrate Azure Digital Twins with Azure Time Series Insights
	Create and delete routes and endpoints by using the Azure CLI
az eventhubs eventhub authorization-rule keys	Get an Event Hubs connection string Receive change notifications through Azure Event Hubs
	Tutorial: Create a function in Java with an Event Hub trigger and an Azure Cosmos DB output binding Export IoT data to Event Hubs
	Integrate Azure Digital Twins with Azure Time Series Insights
az eventhubs georecovery-alias authorization-rule keys	Get an Event Hubs connection string
az eventhubs namespace	Receive change notifications through Azure Event Hubs
	Quickstart: Route custom events to Azure Event Hubs with Azure CLI and Event Grid
	Quickstart: Subscribe to Azure Kubernetes Service (AKS) events with Azure Event Grid

Reference subgroup	Azure CLI article showing reference use
	Quickstart: Create an event hub using Azure CLI
	Grant managed identity the access to Event Grid destination
<code>az eventhubs namespace application-group</code>	Govern resources for client applications with application groups
<code>az eventhubs namespace application-group policy</code>	Govern resources for client applications with application groups
<code>az eventhubs namespace authorization-rule keys</code>	Get an Event Hubs connection string
	Use Spring Kafka with Azure Event Hubs for Kafka API
	Use and manage extensions with the Azure CLI
	Azure CLI configuration
	Overview: Azure CLI terminology and support levels
	Available Azure CLI extensions
	How to use the Azure CLI alias extension

az feature

Reference subgroup	Azure CLI article showing reference use
<code>az feature</code>	Access tiers for blob data
	Create and manage multiple node pools for a cluster in Azure Kubernetes Service (AKS)
	Use a public standard load balancer in Azure Kubernetes Service (AKS)
	Configure an AKS cluster
	Configure Azure CNI Overlay networking in Azure Kubernetes Service (AKS)
<code>az feature registration</code>	Tutorial: Create a payment HSM
	Register the Azure Payment HSM resource providers and resource provider features
	Quickstart: Create an Azure Payment HSM with the Azure CLI

Reference subgroup	Azure CLI article showing reference use Tutorial: Create a payment HSM with host and management port in different virtual networks using ARM template
	Create a payment HSM with host and management port with IP addresses in different virtual networks using ARM template

az feedback

Reference subgroup	Azure CLI article showing reference use
Azure CLI	Install Azure CLI on Windows
	Install the Azure CLI on Linux
	Get started with Azure CLI
	Install Azure CLI on macOS

az find

Reference subgroup	Azure CLI article showing reference use
Azure CLI	Get started with Azure CLI
	Manage an App Service Environment
	Tutorial: Order Azure Data Box
	Manage your Azure Cognitive Search service with the Azure CLI
	Quickstart: Create an Azure Kubernetes Fleet Manager resource and join member clusters (preview)
	Set up multi-cluster layer 4 load balancing across Azure Kubernetes Fleet Manager member clusters (preview)
	Propagate Kubernetes resource objects from an Azure Kubernetes Fleet Manager resource to member clusters (preview)
az fleet member	Quickstart: Create an Azure Kubernetes Fleet Manager resource and join member clusters (preview)
	Orchestrate updates across multiple clusters by using Azure Kubernetes Fleet Manager (Preview)
	Frequently Asked Questions - Azure Kubernetes Fleet Manager

Reference subgroup	Azure CLI article showing reference use
az fleet updaterun	Orchestrate updates across multiple clusters by using Azure Kubernetes Fleet Manager (Preview)

az functionapp

Reference subgroup	Azure CLI article showing reference use
az functionapp	Tutorial: Use persisted parameters to simplify sequential Azure CLI commands Azure CLI persisted parameter App settings reference for Azure Functions Manage your function app Azure Functions Premium plan
az functionapp config	Azure Functions Node.js developer guide Migrate apps from Azure Functions version 3.x to version 4.x How to target Azure Functions runtime versions Migrate apps from Azure Functions version 1.x to version 4.x
az functionapp config appsettings	Manage your function app How to configure monitoring for Azure Functions How to target Azure Functions runtime versions
az functionapp config apptings	Manage your function app Azure Functions Node.js developer guide How to configure monitoring for Azure Functions Migrate apps from Azure Functions version 3.x to version 4.x
	Quickstart: Create a Python function in Azure from the command line
az functionapp config container	Working with containers and Azure Functions Azure Container Apps hosting of Azure Functions

Reference subgroup	Azure CLI article showing reference use
	Deploy a machine learning model to Azure Functions with Azure Cache for Redis
	Manage your function app
az functionapp deployment container	Working with containers and Azure Functions
az functionapp deployment github-actions	Continuous delivery by using GitHub Actions
az functionapp deployment slot	Migrate apps from Azure Functions version 3.x to version 4.x
	Migrate apps from Azure Functions version 1.x to version 4.x
	Automate tasks with Azure CLI
az functionapp deployment source	Zip deployment for Azure Functions
	Tutorial Step 2: Automate resizing uploaded images using Event Grid
	Tutorial: Build out an end-to-end solution
	Tutorial: Deploy to Azure Functions using Jenkins
	Create a function app in Azure that is deployed from GitHub
az functionapp function	Tutorial: Build out an end-to-end solution
	Create your first containerized functions on Azure Container Apps
	Ingest IoT Hub telemetry into Azure Digital Twins
	Create your first containerized Azure Functions
	Set up twin-to-twin event handling
az functionapp identity	Tutorial: Build out an end-to-end solution
	Ingest IoT Hub telemetry into Azure Digital Twins
	Integrate Azure Digital Twins with Azure Time Series Insights
	Set up twin-to-twin event handling
	Manage your function app
	Azure Functions Premium plan

Reference subgroup	Azure CLI article showing reference use
	Create your first containerized Azure Functions
	Create a Function App in an App Service plan
	Create a function app in a Premium plan - Azure CLI

az grafana

Reference subgroup	Azure CLI article showing reference use
az grafana	Configure SMTP settings
	Set up Azure Managed Grafana authentication and permissions
	Set up private access (preview)
	Generate and manage Grafana API keys in Azure Managed Grafana
	Quickstart: Create an Azure Managed Grafana instance using the Azure CLI
	Generate and manage Grafana API keys in Azure Managed Grafana
	Create a dashboard in Azure Managed Grafana
	Generate and manage Grafana API keys in Azure Managed Grafana
az grafana data-source	How to configure data sources for Azure Managed Grafana
	Use deterministic outbound IPs
	How to use service accounts in Azure Managed Grafana
az grafana service-account token	How to use service accounts in Azure Managed Grafana

az graph

Reference subgroup	Azure CLI article showing reference use
az graph	Transfer an Azure subscription to a different Azure AD directory

Reference subgroup	Azure CLI article showing reference use
	Advanced Resource Graph query samples
	Starter Resource Graph query samples
	Get resource configuration changes
	Explore your Azure resources with Resource Graph
	Quickstart: Create a Resource Graph shared query using Azure CLI
	Work with Azure service principal using the Azure CLI
	Learn to use Bash with the Azure CLI
	How to use variables in Azure CLI commands
	How to manage Azure resource groups with the Azure CLI
	Tutorial: Use persisted parameters to simplify sequential Azure CLI commands

az hdinsight

Reference subgroup	Azure CLI article showing reference use
az hdinsight	Manage logs for an HDInsight cluster
	Manage Azure HDInsight clusters using Azure CLI
	Azure HDInsight double encryption for data at rest
	Tutorial: Create an Apache Kafka REST proxy enabled cluster in HDInsight using Azure CLI
	Troubleshoot a slow or failing job on a HDInsight cluster
az hdinsight application	Azure HDInsight: Azure CLI samples
	Install custom Apache Hadoop applications on Azure HDInsight
az hdinsight azure-monitor	Use Azure Monitor logs to monitor HDInsight clusters
az hdinsight monitor	Use Azure Monitor logs to monitor HDInsight clusters
az hdinsight script-	Customize Azure HDInsight clusters by using script actions

Reference subgroup	Azure CLI article showing reference use
action	Azure HDInsight: Azure CLI samples

az healthcareapis

Reference subgroup	Azure CLI article showing reference use
az healthcareapis acr	Converting your data to FHIR for Azure API for FHIR
az healthcareapis service	Configure customer-managed keys at rest Quickstart: Use an ARM template to deploy Azure API for FHIR
	Integrate Azure HPC Cache with Azure Kubernetes Service (AKS)
	Create an Azure HPC Cache
	Manage your cache
az hpc-cache blob-storage-target	Integrate Azure HPC Cache with Azure Kubernetes Service (AKS)
	Add storage targets
	Edit storage targets
az hpc-cache nfs-storage-target	Add storage targets
	Edit storage targets
az hpc-cache skus	Create an Azure HPC Cache
az hpc-cache storage-target	Add storage targets
	View and manage storage targets
az hpc-cache usage-model	Add storage targets
	Edit storage targets
	Quickstart: Using Azure CLI to deploy an AKS hybrid cluster on a Windows Server node in an Azure VM
	How to create AKS hybrid clusters using Az CLI

Reference subgroup	Azure CLI article showing reference use
	Troubleshooting and known issues
	Deploy tenant workloads
	Prerequisites for deploying tenant workloads
az hybridaks nodepool	Quickstart: Using Azure CLI to deploy an AKS hybrid cluster on a Windows Server node in an Azure VM
	Prerequisites for deploying tenant workloads
	How to manage and lifecycle the AKS-Hybrid cluster
	Quickstart: Using Azure CLI to deploy an AKS hybrid cluster on a Windows Server node in an Azure VM
	How to create AKS hybrid networks for Azure
	How to create AKS hybrid clusters using Az CLI
	Troubleshooting and known issues
	Deploy tenant workloads

az identity

Reference subgroup	Azure CLI article showing reference use
az identity	Use Key Vault references for App Service and Azure Functions
	How to use managed identities for App Service and Azure Functions
	Manage user-assigned managed identities
	Transfer an Azure subscription to a different Azure AD directory
	Use a managed identity in Azure Kubernetes Service (AKS)
az identity federated-credential	Provide an identity to access the Azure Key Vault Provider for Secrets Store CSI Driver
	Tutorial: Use a workload identity with an application on Azure Kubernetes Service (AKS)
	Deploy and configure workload identity on an Azure Kubernetes Service (AKS) cluster
	Migrate from pod managed-identity to workload identity

Reference subgroup	Azure CLI article showing reference use
	Configure a user-assigned managed identity to trust an external identity provider

az image

Reference subgroup	Azure CLI article showing reference use
az image	Azure Virtual Machine Scale Set agents
	Create a legacy managed image of a generalized VM in Azure
	Create an Azure Image Builder Bicep or ARM template JSON template
	How to use Packer to create Linux virtual machine images in Azure
	Disable or remove the Linux Agent from VMs and images
az image builder	Troubleshoot Azure VM Image Builder
	Troubleshoot Azure VM Image Builder

az import-export

Reference subgroup	Azure CLI article showing reference use
az import-export	Tutorial: Transfer data to Azure Files with Azure Import/Export
	Tutorial: Export data from Azure Blob storage with Azure Import/Export
	Tutorial: Import data to Blob Storage with Azure Import/Export service
az import-export location	Tutorial: Transfer data to Azure Files with Azure Import/Export
	Tutorial: Export data from Azure Blob storage with Azure Import/Export
	Tutorial: Import data to Blob Storage with Azure Import/Export service

az init

Reference subgroup	Azure CLI article showing reference use
Azure CLI	Azure CLI configuration

az interactive

Reference subgroup	Azure CLI article showing reference use
Azure CLI	Get started with Azure CLI
	Install Azure CLI on Azure Stack Hub
	Manage and deploy resources to Azure Stack Hub with Azure CLI - Modular Data Center (MDC)
	Manage and deploy resources to Azure Stack Hub with Azure CLI
	Create an Internet Analyzer test using CLI (Preview)
az internet-analyzer preconfigured-endpoint	Create an Internet Analyzer test using CLI (Preview)
az internet-analyzer profile	Create an Internet Analyzer test using CLI (Preview)
az internet-analyzer test	Embed the Internet Analyzer client
	Create an Internet Analyzer test using CLI (Preview)

az iot

Reference subgroup	Azure CLI article showing reference use
az iot central app	Extend Azure IoT Central with custom rules using Stream Analytics, Azure Functions, and SendGrid
	Extend Azure IoT Central with custom analytics using Azure Databricks
	Manage IoT Central from Azure CLI or PowerShell
az iot central app identity	Export IoT data to Blob Storage
	Export IoT data to Event Hubs
	Export IoT data to Azure Data Explorer

Reference subgroup	Azure CLI article showing reference use
	Extend Azure IoT Central with custom rules using Stream Analytics, Azure Functions, and SendGrid
	Export IoT data to Service Bus
az iot central device	Device authentication concepts in IoT Central
	Device implementation and best practices for IoT central
	Troubleshoot why data from your devices isn't showing up in Azure IoT Central
az iot central device twin	Monitor device connectivity using Azure CLI
	Troubleshoot why data from your devices isn't showing up in Azure IoT Central
	Monitor device connectivity using Azure CLI
az iot central export	Extend Azure IoT Central with custom rules using Stream Analytics, Azure Functions, and SendGrid
az iot central export destination	Extend Azure IoT Central with custom rules using Stream Analytics, Azure Functions, and SendGrid
az iot device	Quickstart: Send telemetry from a device to an IoT hub and monitor it with the Azure CLI
	Tutorial: Send email notifications about Azure IoT Hub events using Event Grid and Logic Apps
	Get started with device management (Azure CLI)
	Tutorial: Automate Azure Device Provisioning Service with GitHub Actions
	Get started with device twins (Azure CLI)
az iot device c2d-message	Tutorial - Use MQTT to develop an IoT device client without using a device SDK
	Quickstart: Send telemetry from a device to an IoT hub and monitor it with the Azure CLI
az iot device registration	Tutorial: Automate Azure Device Provisioning Service with GitHub Actions
az iot dps	Tutorial: Set up your environment for the IoT Plug and Play quickstarts and tutorials

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Use custom allocation policies with Device Provisioning Service (DPS)
	Quickstart: Use Terraform to create an Azure IoT Device Provisioning Service
	Automanage devices in Azure Digital Twins using Device Provisioning Service (DPS)
	Quickstart: Set up the IoT Hub Device Provisioning Service with Azure CLI
az iot dps certificate	How to use X.509 certificates over HTTPS without an SDK
az iot dps enrollment	Tutorial: Set up your environment for the IoT Plug and Play quickstarts and tutorials
	How to use allocation policies to provision devices across IoT hubs
	How to use symmetric keys over HTTPS without an SDK
	How to use X.509 certificates over HTTPS without an SDK
	Tutorial: Automate Azure Device Provisioning Service with GitHub Actions
az iot dps enrollment-group	Tutorial: Provision devices using symmetric key enrollment groups
	Symmetric key attestation
	Tutorial: Use custom allocation policies with Device Provisioning Service (DPS)
	How to use allocation policies to provision devices across IoT hubs
	How to use symmetric keys over HTTPS without an SDK
az iot dps linked-hub	Tutorial: Set up your environment for the IoT Plug and Play quickstarts and tutorials
	Tutorial: Use custom allocation policies with Device Provisioning Service (DPS)
	Quickstart: Set up the IoT Hub Device Provisioning Service with Azure CLI
	How to link and manage IoT hubs

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Automate Azure Device Provisioning Service with GitHub Actions
az iot du account	Configure access control roles for Device Update resources
	Create Device Update for IoT Hub resources
	Configure private endpoints for Device Update for IoT Hub accounts
az iot du account private-endpoint-connection	Configure private endpoints for Device Update for IoT Hub accounts
az iot du device	Find and fix devices missing from Device Update for IoT Hub using agent check
	Deploy an update by using Device Update for Azure IoT Hub
	Manage device groups in Device Update for IoT Hub
	Deploy an update by using Device Update for Azure IoT Hub
az iot du device health	Find and fix devices missing from Device Update for IoT Hub using agent check
az iot du device log	Remotely collect diagnostic logs from devices using Device Update for IoT Hub
az iot du instance	Create Device Update for IoT Hub resources
	Remotely collect diagnostic logs from devices using Device Update for IoT Hub
	Import an update to Device Update for IoT Hub
az iot du update init	Prepare an update to import into Device Update for IoT Hub
	How to understand and use delta updates in Device Update for IoT Hub (Preview)
	Use the related files feature to reference multiple update files
az iot edge	Tutorial: Develop IoT Edge modules using Visual Studio Code
	Use Visual Studio 2022 to develop and debug modules for Azure IoT Edge
	Install and run the Spatial Analysis container (Preview)
	Connect Azure IoT Edge devices to create a hierarchy

Reference subgroup	Azure CLI article showing reference use
	Quickstart: Deploy a connected registry to an IoT Edge device
	Monitor IoT Edge deployments
	Deploy and monitor IoT Edge modules at scale by using the Azure CLI
az iot edge devices	Tutorial: Create a hierarchy of IoT Edge devices
	Tutorial: Create a hierarchy of IoT Edge devices using IoT Edge for Linux on Windows
az iot hub	Overview: Azure CLI terminology and support levels
	Quickstart: Send telemetry from an IoT Plug and Play device to Azure IoT Hub
	Control access to IoT Hub using Shared Access Signatures
	Understand and invoke direct methods from IoT Hub
	Quickstart: Deploy your first IoT Edge module to a virtual Linux device
az iot hub certificate root-authority	Migrate IoT Hub resources to a new TLS certificate root
az iot hub configuration	How to automatically migrate an IoT hub using the Azure CLI
	Automatic IoT device and module management using the Azure CLI
az iot hub connection-string	Quickstart: Send telemetry from an IoT Plug and Play device to Azure IoT Hub
	Tutorial: Send device data to Azure Storage using IoT Hub message routing
	Tutorial: Visualize real-time sensor data from your Azure IoT hub in a web application
	Tutorial: Build out an end-to-end solution
	Quickstart: Connect an MXCHIP AZ3166 devkit to IoT Hub
az iot hub consumer-group	Tutorial: Visualize real-time sensor data from your Azure IoT hub in a web application
az iot hub device-identity	Quickstart: Send telemetry from an IoT Plug and Play device to Azure IoT Hub

Reference subgroup	Azure CLI article showing reference use
	Create and provision an IoT Edge device on Linux using symmetric keys
	Quickstart: Deploy your first IoT Edge module to a virtual Linux device
	Tutorial: Send device data to Azure Storage using IoT Hub message routing
	Quickstart: Deploy your first IoT Edge module to a Windows device
az iot hub device-identity connection-string	Quickstart: Send telemetry from an IoT Plug and Play device to Azure IoT Hub
	Create and provision an IoT Edge device on Linux using symmetric keys
	Quickstart: Deploy your first IoT Edge module to a virtual Linux device
	Quickstart: Deploy your first IoT Edge module to a Windows device
	Tutorial: Build out an end-to-end solution
az iot hub devicestream	IoT Hub Device Streams (preview)
	Quickstart: Send telemetry from a device to an IoT hub and monitor it with the Azure CLI
	Tutorial: Use a simulated device to test connectivity with your IoT hub
	Quickstart: Connect an MXCHIP AZ3166 devkit to IoT Hub
	Quickstart: Connect an ESPRESSIF ESP32-Azure IoT Kit to IoT Hub
	Tutorial: Use Azure IoT Hub message enrichments
az iot hub identity	Configure IoT Hub file uploads using Azure CLI
az iot hub job	Overview: Azure CLI terminology and support levels
	Schedule and broadcast jobs (Azure CLI)
az iot hub message-endpoint	Create and delete routes and endpoints by using the Azure CLI
	Create and delete routes and endpoints by using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
az iot hub message-enrichment	Tutorial: Use Azure IoT Hub message enrichments Create and delete routes and endpoints by using the Azure CLI
az iot hub message-route fallback	Create and delete routes and endpoints by using the Azure CLI
az iot hub module-identity	Deploy Azure IoT Edge modules with Azure CLI Get started with IoT Hub module identities and module twins using Azure CLI
az iot hub module-twin	Troubleshoot your IoT Edge device Tutorial: Create a hierarchy of IoT Edge devices
	Manage device groups in Device Update for IoT Hub Tutorial: Create a hierarchy of IoT Edge devices using IoT Edge for Linux on Windows
	Get started with IoT Hub module identities and module twins using Azure CLI
az iot hub policy	How to link and manage IoT hubs Use Apache Kafka on HDInsight with Azure IoT Hub
az iot hub route	Tutorial: Send device data to Azure Storage using IoT Hub message routing Tutorial: Use Azure IoT Hub message enrichments
az iot hub routing-endpoint	Tutorial: Send device data to Azure Storage using IoT Hub message routing Tutorial: Use Azure IoT Hub message enrichments
az iot hub state	How to automatically migrate an IoT hub using the Azure CLI
az iot product test	How to test IoT Plug and Play devices
az iot product test case	How to test IoT Plug and Play devices
az iot product test task	How to test IoT Plug and Play devices

az k8s-configuration

Reference subgroup	Azure CLI article showing reference use
az k8s-configuration	Tutorial: Deploy applications using GitOps with Flux v2 GitOps Flux v2 configurations with AKS and Azure Arc-enabled Kubernetes
	Tutorial: Deploy configurations using GitOps on an Azure Arc-enabled Kubernetes cluster
	Tutorial: Implement CI/CD with GitOps using Azure Arc-enabled Kubernetes clusters
	Deploy Helm Charts using GitOps on an Azure Arc-enabled Kubernetes cluster
az k8s-configuration flux	Tutorial: Deploy applications using GitOps with Flux v2 GitOps Flux v2 configurations with AKS and Azure Arc-enabled Kubernetes
	Tutorial: Implement CI/CD with GitOps (Flux v2)
az k8s-configuration flux kustomization	GitOps Flux v2 configurations with AKS and Azure Arc-enabled Kubernetes Understand Azure Policy for Kubernetes clusters
	Enable Microsoft Defender for Containers
	Tutorial: Deploy applications using GitOps with Flux v2
	GitOps Flux v2 configurations with AKS and Azure Arc-enabled Kubernetes
	Set up Azure Arc VM management using command line (preview)

az keyvault

Reference subgroup	Azure CLI article showing reference use
az keyvault	Assign a Key Vault access policy (legacy) Use the Azure Key Vault Provider for Secrets Store CSI Driver in an AKS cluster
	Azure Key Vault configuration provider in ASP.NET Core
	Transfer an Azure subscription to a different Azure AD directory

Reference subgroup	Azure CLI article showing reference use
	Use Azure Key Vault secrets in Azure Pipelines
az keyvault backup	Managed HSM disaster recovery
	Full backup and restore
az keyvault certificate	Azure Key Vault recovery management with soft delete and purge protection
	Tutorial: Import a certificate in Azure Key Vault
	Export certificates from Azure Key Vault
	Tutorial - How to use cloud-init to customize a Linux virtual machine in Azure on first boot
	Tutorial: Use TLS/SSL certificates to secure a web server
	Azure Key Vault recovery management with soft delete and purge protection
	Configure cryptographic key auto-rotation in Azure Key Vault
	Azure OpenAI Service encryption of data at rest
	Azure Key Vault backup and restore
	Configure customer-managed keys in the same tenant for an existing storage account
az keyvault key rotation-policy	Configure cryptographic key auto-rotation in Azure Key Vault
	Configure key auto-rotation in Azure Managed HSM
az keyvault network-rule	Troubleshooting online endpoints deployment and scoring
	Configure Azure Key Vault networking settings
	Use network isolation with managed online endpoints
	Integrate Key Vault with Azure Private Link
	Integrate Managed HSM with Azure Private Link
	Enable multi-region replication on Azure Managed HSM
az keyvault restore	Managed HSM disaster recovery
	Full backup and restore

Reference subgroup	Azure CLI article showing reference use
az keyvault role assignment	Use the Azure CLI to enable end-to-end encryption using encryption at host
	Managed HSM role management
	Quickstart: Deploy confidential VM with ARM template
	Configure encryption with customer-managed keys stored in Azure Key Vault Managed HSM
	Secure access to your managed HSMs
az keyvault role definition	Managed HSM role management
	Azure Managed HSM TLS Offload Library
az keyvault secret	Work with Azure service principal using the Azure CLI
	Add and manage TLS/SSL certificates in Azure App Service
	Use the Azure Key Vault Provider for Secrets Store CSI Driver in an AKS cluster
	Azure Key Vault configuration provider in ASP.NET Core
	Use Azure Key Vault secrets in Azure Pipelines
az keyvault security-domain	Quickstart: Provision and activate a Managed HSM using Azure CLI
	Managed HSM disaster recovery
az keyvault storage	Manage storage account keys with Key Vault and the Azure CLI (legacy)
	Manage storage account keys with Key Vault and the Azure CLI (legacy)

az kusto

Reference subgroup	Azure CLI article showing reference use
az kusto cluster	Ingest data from Apache Kafka into Azure Data Explorer
	Create an Azure Data Explorer cluster and database
	Create business continuity and disaster recovery solutions with

Reference subgroup	Azure CLI article showing reference use
	Azure Data Explorer
	Create a data history connection for Azure Digital Twins
	Configure customer-managed keys
az kusto database	Ingest data from Apache Kafka into Azure Data Explorer
	Create an Azure Data Explorer cluster and database
	Create a data history connection for Azure Digital Twins
az kusto database-principal-assignment	Export IoT data to Azure Data Explorer

az lab

Reference subgroup	Azure CLI article showing reference use
az lab vm	Quickstart: Create a lab in Azure DevTest Labs using Terraform
	Create and manage virtual machines with DevTest Labs using the Azure CLI
	Azure CLI Samples for Azure DevTest Labs
	Lock your resources to protect your infrastructure
	Manage Azure Resource Groups by using Azure CLI
	Apply an Azure Resource Manager lock to a storage account
	How to protect private DNS zones and records
	How to protect DNS zones and records
	Create and manage integration accounts for B2B workflows in Azure Logic Apps with the Enterprise Integration Pack
az logic workflow	Quickstart: Create and deploy a Consumption logic app workflow in multi-tenant Azure Logic Apps with an ARM template
	Quickstart: Create and manage workflows with Azure CLI in Azure Logic Apps
	Azure CLI script sample - create a logic app
	Create and deploy single-tenant based logic app workflows with Azure Arc-enabled Logic Apps (Preview)

Reference subgroup	Azure CLI article showing reference use
az logicapp config appsettings	Edit host and app settings for Standard logic apps in single-tenant Azure Logic Apps
	Create cross-environment parameters for workflow inputs in Azure Logic Apps
	Create and deploy single-tenant based logic app workflows with Azure Arc-enabled Logic Apps (Preview)
az logicapp config apptings	Edit host and app settings for Standard logic apps in single-tenant Azure Logic Apps
	Create cross-environment parameters for workflow inputs in Azure Logic Apps
	Create and deploy single-tenant based logic app workflows with Azure Arc-enabled Logic Apps (Preview)
az logicapp deployment source	Set up DevOps deployment for Standard logic app workflows in single-tenant Azure Logic Apps
	Create and deploy single-tenant based logic app workflows with Azure Arc-enabled Logic Apps (Preview)

az login

Reference subgroup	Azure CLI article showing reference use
Azure CLI	Install the Azure CLI on Linux
	Sign in with Azure CLI
	Get started with Azure CLI
	How to manage Azure subscriptions with the Azure CLI
	Work with Azure service principal using the Azure CLI

az logout

Reference subgroup	Azure CLI article showing reference use
Azure CLI	Continuous deployment to Azure App Service
	Deploy to App Service using GitHub Actions

Reference subgroup	Azure CLI article showing reference use
	Continuous deployment with custom containers in Azure App Service
	Use GitHub Actions workflow to deploy your static website in Azure Storage
	Deploy a .NET web app using GitHub Actions

az maintenance

Reference subgroup	Azure CLI article showing reference use
az maintenance applyupdate	Control updates with Maintenance Configurations and the Azure CLI
az maintenance assignment	How to programmatically manage updates for Azure VMs
	Control updates with Maintenance Configurations and the Azure CLI
	How to programmatically manage updates for Azure Arc-enabled servers
	Use Planned Maintenance pre-created configurations to schedule Azure Kubernetes Service (AKS) weekly releases (preview)
	Maintenance control for OS image upgrades on Azure Virtual Machine Scale Sets using Azure CLI
az maintenance configuration	How to programmatically manage updates for Azure VMs
	Control updates with Maintenance Configurations and the Azure CLI
	How to programmatically manage updates for Azure Arc-enabled servers
	Maintenance control for OS image upgrades on Azure Virtual Machine Scale Sets using Azure CLI
az maintenance public-configuration	Configure maintenance window
	Use Planned Maintenance pre-created configurations to schedule Azure Kubernetes Service (AKS) weekly releases (preview)
az maintenance update	Control updates with Maintenance Configurations and the Azure CLI

az managedapp

Reference subgroup	Azure CLI article showing reference use
az managedapp	Quickstart: Deploy a service catalog managed application
	Tutorial: Create managed application with custom actions and resources
	Work with resources in the managed resource group for Azure managed application
	Quickstart: Use Bicep to deploy an Azure Managed Application definition
az managedapp definition	Quickstart: Create and publish an Azure Managed Application definition
	Quickstart: Deploy a service catalog managed application
	Tutorial: Create managed application with custom actions and resources
	Quickstart: Use Bicep to create and publish an Azure Managed Application definition
	Quickstart: Use Bicep to deploy an Azure Managed Application definition

az managed-cassandra

Reference subgroup	Azure CLI article showing reference use
az managed-cassandra cluster	Quickstart: Create an Azure Managed Instance for Apache Cassandra cluster from the Azure portal
	Quickstart: Create an Azure Managed Instance for Apache Cassandra cluster using Azure CLI
	Quickstart: Configure a hybrid cluster with Azure Managed Instance for Apache Cassandra
	Quickstart: Create a multi-region cluster with Azure Managed Instance for Apache Cassandra
	How to enable LDAP authentication in Azure Managed Instance for Apache Cassandra

Reference subgroup	Azure CLI article showing reference use
	Quickstart: Create an Azure Managed Instance for Apache Cassandra cluster using Azure CLI
	Quickstart: Configure a hybrid cluster with Azure Managed Instance for Apache Cassandra
	Quickstart: Create a multi-region cluster with Azure Managed Instance for Apache Cassandra
	How to enable LDAP authentication in Azure Managed Instance for Apache Cassandra
	Customer-managed keys - overview

az managedservices

Reference subgroup	Azure CLI article showing reference use
az managedservices assignment	Onboard a customer to Azure Lighthouse
	Remove access to a delegation
az managedservices definition	Onboard a customer to Azure Lighthouse
	Link a partner ID to your account that's used to manage customers
	Link a partner ID to your Power Platform and Dynamics Customer Insights accounts

az maps

Reference subgroup	Azure CLI article showing reference use
az maps account keys	Create your Azure Maps account using an ARM template

az mariadb

Reference subgroup	Azure CLI article showing reference use
az mariadb db	Getting started with databases on Azure

Reference subgroup	Azure CLI article showing reference use
az mariadb server	<p>Configure SSL connectivity in your application to securely connect to Azure Database for MariaDB</p>
	<p>Getting started with databases on Azure</p>
	<p>Quickstart: Create an Azure Database for MariaDB server by using the Azure CLI</p>
	<p>How to back up and restore a server in Azure Database for MariaDB using the Azure CLI</p>
	<p>Create and manage Azure Database for MariaDB VNet service endpoints using Azure CLI</p>
	<p>Configure server parameters in Azure Database for MariaDB using the Azure CLI</p>
	<p>Configure and access Azure Database for MariaDB audit logs in the Azure CLI</p>
	<p>List and update configurations of an Azure Database for MariaDB server using Azure CLI</p>
	<p>Enable and download server slow query logs of an Azure Database for MariaDB server using Azure CLI</p>
	<p>Configure and access Azure Database for MariaDB slow query logs by using Azure CLI</p>
az mariadb server firewall-rule	<p>Getting started with databases on Azure</p>
	<p>Quickstart: Create an Azure Database for MariaDB server by using the Azure CLI</p>
	<p>Tutorial: Design an Azure Database for MariaDB using Azure CLI</p>
	<p>Create and manage Azure Database for MariaDB firewall rules by using the Azure CLI</p>
	<p>Create a MariaDB server and configure a firewall rule using the Azure CLI</p>
	<p>How to create and manage read replicas in Azure Database for MariaDB using the Azure CLI and REST API</p>
az mariadb server vnet-rule	<p>Create and manage Azure Database for MariaDB VNet service endpoints using Azure CLI</p>
	<p>Create a MariaDB server and configure a vNet rule using the Azure CLI</p>

Reference subgroup	Azure CLI article showing reference use
	Enable and download server slow query logs of an Azure Database for MariaDB server using Azure CLI
	Configure and access Azure Database for MariaDB slow query logs by using Azure CLI

az ml

Reference subgroup	Azure CLI article showing reference use
az ml batch-endpoint	Create jobs and input data for batch endpoints Authorization on batch endpoints Image processing with batch model deployments Using low priority VMs in batch deployments Deploy language models in batch endpoints
	Create and run machine learning pipelines using components with the Azure Machine Learning CLI
	Share models, components, and environments across workspaces with registries
az ml compute	Troubleshooting online endpoints deployment and scoring Create and manage an Azure Machine Learning compute instance Train models with Azure Machine Learning CLI, SDK, and REST API Create an Azure Machine Learning compute cluster Secure an Azure Machine Learning training environment with virtual networks
az ml connection	Set up authentication between Azure Machine Learning and other services Create connections (preview) Create and manage data assets Working with tables in Azure Machine Learning Tutorial: Train an object detection model with AutoML and Python

Reference subgroup	Azure CLI article showing reference use
	CLI (v2) mltable YAML schema
	Create jobs and input data for batch endpoints
az ml datastore	Create datastores
	How Azure Machine Learning works: resources and assets
	Create jobs and input data for batch endpoints
	Install & use the CLI (v1)
az ml environment	Deploy and score a machine learning model by using an online endpoint
	Manage Azure Machine Learning environments with the CLI & SDK (v2)
	Set up authentication between Azure Machine Learning and other services
	Share models, components, and environments across workspaces with registries
	How Azure Machine Learning works: resources and assets
az ml job	Create and manage data assets
	Access data in a job
	Work with models in Azure Machine Learning
	Train models with Azure Machine Learning CLI, SDK, and REST API
	Working with tables in Azure Machine Learning
az ml model	Deploy and score a machine learning model by using an online endpoint
	Troubleshooting online endpoints deployment and scoring
	Deploy machine learning models to Azure
	Work with models in Azure Machine Learning
	Tutorial: Train an object detection model with AutoML and Python
	Deploy and score a machine learning model by using an online endpoint
	Troubleshooting online endpoints deployment and scoring
	Tutorial: Train an object detection model with AutoML and Python
	Use network isolation with managed online endpoints

Reference subgroup	Azure CLI article showing reference use
	Share models, components, and environments across workspaces with registries
	Deploy and score a machine learning model by using an online endpoint
	Troubleshooting online endpoints deployment and scoring
	Tutorial: Train an object detection model with AutoML and Python
	Use network isolation with managed online endpoints
	Share models, components, and environments across workspaces with registries
az ml registry	Manage Azure Machine Learning registries
	Network isolation with Azure Machine Learning registries
az ml schedule	Monitor performance of models deployed to production (preview)
	Schedule data import jobs (preview)

az mobile-network

Reference subgroup	Azure CLI article showing reference use
az mobile-network	Quickstart: Deploy a private mobile network and site - Azure CLI
az mobile-network attached-data-network	Quickstart: Deploy a private mobile network and site - Azure CLI
az mobile-network data-network	Quickstart: Deploy a private mobile network and site - Azure CLI
az mobile-network pccp	Quickstart: Deploy a private mobile network and site - Azure CLI
az mobile-network pcdp	Quickstart: Deploy a private mobile network and site - Azure CLI
az mobile-network service	Quickstart: Deploy a private mobile network and site - Azure CLI
az mobile-network sim	Quickstart: Deploy a private mobile network and site - Azure CLI

Reference subgroup	Azure CLI article showing reference use
az mobile-network sim group	Quickstart: Deploy a private mobile network and site - Azure CLI
az mobile-network sim policy	Quickstart: Deploy a private mobile network and site - Azure CLI
az mobile-network site	Quickstart: Deploy a private mobile network and site - Azure CLI
az mobile-network slice	Quickstart: Deploy a private mobile network and site - Azure CLI

az monitor

Reference subgroup	Azure CLI article showing reference use
az monitor action-group	Switch to Azure Monitor based alerts for Azure Backup
	Quickstart: Create a budget with Bicep
	Create metric alert monitors in Azure CLI
az monitor activity-log	View activity logs for Azure RBAC changes
az monitor activity-log alert	Create a new alert rule
	Azure CLI reference commands for Azure Monitor
	Quickstart: Create activity log alerts on service notifications using a Bicep file
	Quickstart: Create activity log alerts on service notifications using an ARM template
	Quickstart: Create Azure Advisor alerts on new recommendations using an ARM template
az monitor alert-processing-rule	Switch to Azure Monitor based alerts for Azure Backup
	Alert processing rules
az monitor app-insights component	Workspace-based Application Insights resources
	Migrate to workspace-based Application Insights resources
	Configure a Java app for Azure App Service

Reference subgroup	Azure CLI article showing reference use
	Manage Azure Machine Learning workspaces using Azure CLI
	Create Express.js virtual machine using Azure CLI
az monitor app-insights component ed-storage	Configure BYOS for Application Insights Profiler and Snapshot Debugger
az monitor autoscale	Tutorial: Automatically scale a Virtual Machine Scale Set with the Azure CLI
	Use autoscale actions to send email and webhook alert notifications in Azure Monitor
	Configure VMware Spring Cloud Gateway
	Set up autoscale for applications
	Autoscale with multiple profiles
az monitor autoscale rule	Tutorial: Automatically scale a Virtual Machine Scale Set with the Azure CLI
	Autoscale with multiple profiles
	Configure VMware Spring Cloud Gateway
	Set up autoscale for applications
az monitor data-collection rule	Azure Monitor managed service for Prometheus remote write
	Monitor AKS-hybrid cluster
	Azure Active Directory authorization proxy
	Monitoring virtual machines (for virtualized network function)
az monitor data-collection rule association	Monitoring virtual machines (for virtualized network function)
az monitor diagnostic-settings	Azure Spring Apps FAQ
	Diagnostic settings in Azure Monitor
	Monitor Azure Firewall logs (legacy) and metrics
	Monitor Azure Cosmos DB data by using diagnostic settings in Azure
	Enable Key Vault logging

Reference subgroup	Azure CLI article showing reference use
az monitor log-analytics	Tutorial: Deploy a Dapr application to Azure Container Apps using the Azure CLI Monitor logs in Azure Container Apps with Log Analytics
	Tutorial: Deploy a background processing application with Azure Container Apps
	Tutorial: Deploy a Dapr application to Azure Container Apps with an Azure Resource Manager or Bicep template Create a job with Azure Container Apps (preview)
az monitor log-analytics cluster	Create and manage a dedicated cluster in Azure Monitor Logs Azure Monitor customer-managed key
	Bring your own Machine Learning (ML) into Microsoft Sentinel
az monitor log-analytics workspace	Create a Log Analytics workspace Enable Container insights for Azure Kubernetes Service (AKS) cluster
	Monitoring load balancer Create and manage a dedicated cluster in Azure Monitor Logs
	Log storage and monitoring options in Azure Container Apps Log Analytics workspace data export in Azure Monitor
	Managing Azure Monitor Logs in Azure CLI Bring your own Machine Learning (ML) into Microsoft Sentinel
az monitor log-analytics workspace linked-service	Create and manage a dedicated cluster in Azure Monitor Logs Managing Azure Monitor Logs in Azure CLI
	Managing Azure Monitor Logs in Azure CLI Azure Monitor customer-managed key
az monitor log-analytics workspace linked-storage	Managing Azure Monitor Logs in Azure CLI Managing Azure Monitor Logs in Azure CLI
	Managing Azure Monitor Logs in Azure CLI

Reference subgroup	Azure CLI article showing reference use
az monitor log-analytics workspace table	Configure data retention and archive policies in Azure Monitor Logs Set a table's log data plan to Basic or Analytics
	Manage tables in a Log Analytics workspace
	Run search jobs in Azure Monitor Managing Azure Monitor Logs in Azure CLI
az monitor log-analytics workspace table restore	Restore logs in Azure Monitor
az monitor log-analytics workspace table search-job	Run search jobs in Azure Monitor
az monitor log-profiles	Azure Monitor activity log
az monitor metrics	Monitoring Azure Blob Storage Monitoring Azure Files
	Monitoring Azure Functions
	Monitoring Azure Queue Storage
	Monitor container resources in Azure Container Instances
az monitor metrics alert	Create a new alert rule Manage your alert rules
	Add continuous monitoring to your release pipeline
	Create metric alert monitors in Azure CLI
az monitor metrics alert condition	Create metric alert monitors in Azure CLI
az monitor metrics alert dimension	Create metric alert monitors in Azure CLI
az monitor scheduled-query	Create a new alert rule Manage your alert rules

az mysql

Reference subgroup	Azure CLI article showing reference use
az mysql	Quickstart: Create an Azure Database for MySQL server using Azure CLI Deploy a Spring app to App Service with MySQL
	Quickstart: Create an Azure Database for MySQL using a simple Azure CLI command - az mysql up (preview)
az mysql db	Tutorial: Create a multi-container (preview) app in Web App for Containers Quickstart: Use Java and JDBC with Azure Database for MySQL
	Example: Use the Azure libraries to create a database Getting started with databases on Azure
	Manage an Azure Database for MySQL single server using the Azure CLI
az mysql flexible-server	Major version upgrade in Azure Database for MySQL - Flexible Server Tutorial: Deploy WordPress app on AKS with Azure Database for MySQL - Flexible Server
	Quickstart: Connect and query with Azure CLI with Azure Database for MySQL - Flexible Server Tutorial: Connect an App Services Web app to an Azure Database for MySQL - Flexible Server in a virtual network
	Tutorial: Deploy a Spring application to Azure Spring Apps with a passwordless connection to an Azure database Set up Azure Active Directory authentication for Azure Database for MySQL - Flexible Server
	Use Java and JDBC with Azure Database for MySQL - Flexible Server Migrate an application to use passwordless connections with Azure Database for MySQL
	Configure passwordless database connections for Java apps on Oracle WebLogic Servers
az mysql flexible-server db	Quickstart: Use Terraform to create an Azure Database for MySQL - Flexible Server Quickstart: Connect and query with Azure CLI with Azure Database for MySQL - Flexible Server

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Deploy a Spring application to Azure Spring Apps with a passwordless connection to an Azure database
	Quickstart: Create an Azure Database for MySQL - Flexible Server using Azure CLI
	Tutorial: Deploy a Spring Boot application on AKS cluster with MySQL Flexible Server in a VNet
	Quickstart: Deploy JBoss EAP on Azure Red Hat OpenShift using the Azure portal
	Tutorial: Deploy a PHP and MySQL - Flexible Server app on Azure App Service
	Use Java and JDBC with Azure Database for MySQL - Flexible Server
	Use Spring Data R2DBC with Azure Database for MySQL
	Manage firewall rules for Azure Database for MySQL - Flexible Server using Azure CLI
az mysql flexible-server gtid	How to configure Azure Database for MySQL - Flexible Server data-in replication
az mysql flexible-server identity	Use Java and JDBC with Azure Database for MySQL - Flexible Server
	Migrate an application to use passwordless connections with Azure Database for MySQL
	Configure passwordless database connections for Java apps on Oracle WebLogic Servers
az mysql flexible-server parameter	Tutorial: Query Performance Insight for Azure Database for MySQL - Flexible Server
	Tutorial: Configure audit logs by using Azure Database for MySQL - Flexible Server
	Configure server parameters in Azure Database for MySQL - Flexible Server using the Azure CLI
	List and change server parameters of an Azure Database for MySQL - Flexible Server using Azure CLI
	Configure audit logs on an Azure Database for MySQL - Flexible Server using Azure CLI

Reference subgroup	Azure CLI article showing reference use
	How to create and manage read replicas in Azure Database for MySQL - Flexible Server using the Azure CLI
	Create and manage read replicas in an Azure Database for MySQL - Flexible Server using Azure CLI
az mysql flexible-server server-logs	List and Download Server logs using Azure CLI
az mysql server	Configure SSL connectivity in your application to securely connect to Azure Database for MySQL
	Tutorial: Create a multi-container (preview) app in Web App for Containers
	Quickstart: Create an Azure Database for MySQL server using Azure CLI
	Stop/Start an Azure Database for MySQL
	Major version upgrade in Azure Database for MySQL - Flexible Server
az mysql server ad-admin	Tutorial: Connect to Azure databases from App Service without secrets using a managed identity
	Quickstart: Use Java and JDBC with Azure Database for MySQL
az mysql server configuration	Tutorial: Query Performance Insight for Azure Database for MySQL - Flexible Server
	Deploy a Spring app to App Service with MySQL
	Configure server parameters in Azure Database for MySQL using the Azure CLI
	Configure and access audit logs in the Azure CLI
	Configure and access slow query logs by using Azure CLI
az mysql server firewall-rule	Tutorial: Create a multi-container (preview) app in Web App for Containers
	Quickstart: Create an Azure Database for MySQL server using Azure CLI
	Quickstart: Use Java and JDBC with Azure Database for MySQL
	Example: Use the Azure libraries to create a database
	Getting started with databases on Azure

Reference subgroup	Azure CLI article showing reference use
az mysql server key	Validating data encryption for Azure Database for MySQL
	Data encryption for Azure Database for MySQL by using the Azure CLI
az mysql server replica	How to create and manage read replicas in Azure Database for MySQL using the Azure CLI and REST API
az mysql server vnet-rule	Create and manage Azure Database for MySQL VNet service endpoints using Azure CLI
az mysql server-logs	Configure and access slow query logs by using Azure CLI
	Enable and download server slow query logs of an Azure Database for MySQL server using Azure CLI

az netappfiles

Reference subgroup	Azure CLI article showing reference use
az netappfiles account	Quickstart: Set up Azure NetApp Files and create an NFS volume
	Configure Azure NetApp Files for Azure Kubernetes Service
	Configure customer-managed keys for Azure NetApp Files volume encryption
az netappfiles pool	Quickstart: Set up Azure NetApp Files and create an NFS volume
	Configure Azure NetApp Files for Azure Kubernetes Service
az netappfiles volume	Quickstart: Set up Azure NetApp Files and create an NFS volume
	Provision Azure NetApp Files NFS volumes for Azure Kubernetes Service
	Provision Azure NetApp Files SMB volumes for Azure Kubernetes Service
	Use Azure HPC Cache with Azure NetApp Files
	Provision Azure NetApp Files dual-protocol volumes for Azure Kubernetes Service

az network

Reference subgroup	Azure CLI article showing reference use
az network	Check resource usage against limits
	Secure an Azure Machine Learning training environment with virtual networks
	Planning for migration of IaaS resources from classic to Azure Resource Manager
az network application-gateway	Overview: Azure CLI terminology and support levels
	Tutorial: Enable application gateway ingress controller add-on for an existing AKS cluster with an existing application gateway
	Backend health and diagnostic logs for Application Gateway
	Tutorial: Enable the ingress controller add-on for a new AKS cluster with a new application gateway instance
	Overview of mutual authentication with Application Gateway
az network application-gateway address-pool	Tutorial: Create an application gateway with URL path-based redirection using the Azure CLI
	Create an application gateway that hosts multiple web sites using the Azure CLI
	Route web traffic based on the URL using the Azure CLI
	Tutorial: Manually install Oracle WebLogic Server on Azure Virtual Machines
az network application-gateway frontend-ip	Configure Azure Application Gateway Private Link
az network application-gateway frontend-port	Tutorial: Create an application gateway with URL path-based redirection using the Azure CLI
	Route web traffic based on the URL using the Azure CLI
	Create an application gateway with HTTP to HTTPS redirection using the Azure CLI
	Create an application gateway with external redirection using the Azure CLI
az network application-gateway http-listener	Tutorial: Create an application gateway with URL path-based redirection using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Create an application gateway that hosts multiple web sites using the Azure CLI
	Route web traffic based on the URL using the Azure CLI
	Create an application gateway with HTTP to HTTPS redirection using the Azure CLI
	Create an application gateway with external redirection using the Azure CLI
	Tutorial: Manually install Oracle WebLogic Server on Azure Virtual Machines
	Expose applications with end-to-end TLS in a virtual network
	Expose applications to the internet with TLS Termination at Application Gateway
	Integrate App Service with Application Gateway using CLI
	Tutorial: Manually install IBM WebSphere Application Server Network Deployment traditional on Azure Virtual Machines
	Configure Azure Application Gateway Private Link
az network application-gateway private-link ip-config	Overview: Azure CLI terminology and support levels
az network application-gateway probe	Tutorial: Manually install Oracle WebLogic Server on Azure Virtual Machines
	Tutorial: Manually install IBM WebSphere Application Server Network Deployment traditional on Azure Virtual Machines
az network application-gateway redirect-config	Tutorial: Create an application gateway with URL path-based redirection using the Azure CLI
	Create an application gateway with HTTP to HTTPS redirection using the Azure CLI
	Create an application gateway with external redirection using the Azure CLI
	Create an application gateway with internal redirection using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
az network application-gateway rewrite-rule	Tutorial: Manually install IBM WebSphere Application Server Network Deployment traditional on Azure Virtual Machines
az network application-gateway rewrite-rule condition	Tutorial: Manually install IBM WebSphere Application Server Network Deployment traditional on Azure Virtual Machines
az network application-gateway rewrite-rule set	Tutorial: Manually install IBM WebSphere Application Server Network Deployment traditional on Azure Virtual Machines
az network application-gateway root-cert	Expose applications with end-to-end TLS in a virtual network
az network application-gateway rule	Tutorial: Create an application gateway with URL path-based redirection using the Azure CLI
	Create an application gateway that hosts multiple web sites using the Azure CLI
	Route web traffic based on the URL using the Azure CLI
	Tutorial: Manually install Oracle WebLogic Server on Azure Virtual Machines
	Create an application gateway with HTTP to HTTPS redirection using the Azure CLI
az network application-gateway ssl-cert	Renew Application Gateway certificates
az network application-gateway url-path-map	Tutorial: Create an application gateway with URL path-based redirection using the Azure CLI
	Route web traffic based on the URL using the Azure CLI
	Tutorial: Manually install Oracle WebLogic Server on Azure Virtual Machines
az network application-gateway url-path-map rule	Tutorial: Create an application gateway with URL path-based redirection using the Azure CLI
	Route web traffic based on the URL using the Azure CLI
	Customize Web Application Firewall rules using the Azure CLI
	Restrict web traffic using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
az network application-gateway waf-policy	Enable Web Application Firewall using the Azure CLI
az network application-gateway waf-policy managed-rule exclusion	Web Application Firewall exclusion lists
az network application-gateway waf-policy managed-rule exclusion rule-set	Web Application Firewall exclusion lists
	Create, change, or delete a network security group
	Configure an application security group (ASG) with a private endpoint
	Filter network traffic with a network security group using the Azure CLI
az network bastion	File transfer using a native client
	Connect to a VM via specified private IP address
	Quickstart: Use Azure CLI to create a virtual network
	Quickstart: Create a private endpoint by using the Azure CLI
	Set up Oracle ASM on an Azure Linux virtual machine
az network cross-region-lb	Tutorial: Create a cross-region Azure Load Balancer using Azure CLI
az network cross-region-lb ress-pool ress	Tutorial: Create a cross-region Azure Load Balancer using Azure CLI
az network cross-region-lb rule	Tutorial: Create a cross-region Azure Load Balancer using Azure CLI
az network custom-ip prefix	Create a custom IPv4 address prefix using the Azure CLI
	Create a custom IPv6 address prefix using Azure CLI
az network ddos-protection	Quickstart: Create and configure Azure DDoS Network Protection using Terraform
	QuickStart: Create and configure Azure DDoS Network Protection using Azure CLI
	Quickstart: Create and configure Azure DDoS Network Protection using ARM template

Reference subgroup	Azure CLI article showing reference use
az network dns record-set	<p>Import and export a DNS zone file using the Azure CLI</p> <p>Host reverse DNS lookup zones in Azure DNS</p>
	<p>Manage DNS records and recordsets in Azure DNS using the Azure CLI</p> <p>Quickstart: Create an Azure DNS zone and record using Azure CLI</p>
	<p>How to manage DNS Zones in Azure DNS using the Azure CLI</p>
az network dns record-set a	<p>Use TLS with an ingress controller on Azure Kubernetes Service (AKS)</p>
	<p>Manage DNS records and recordsets in Azure DNS using the Azure CLI</p>
	<p>Quickstart: Create an Azure DNS zone and record using Azure CLI</p>
	<p>Azure Front Door: Deploy custom domain</p>
	<p>Azure CLI script example: Create a DNS zone and record</p>
az network dns record-set aaaa	<p>Manage DNS records and recordsets in Azure DNS using the Azure CLI</p>
az network dns record-set caa	<p>Manage DNS records and recordsets in Azure DNS using the Azure CLI</p>
az network dns record-set cname	<p>Disaster recovery using Azure DNS and Traffic Manager</p>
	<p>Manage DNS records and recordsets in Azure DNS using the Azure CLI</p>
	<p>Azure Front Door: Deploy custom domain</p>
az network dns record-set mx	<p>Manage DNS records and recordsets in Azure DNS using the Azure CLI</p>
az network dns record-set ns	<p>Import and export a DNS zone file using the Azure CLI</p>
	<p>Manage DNS records and recordsets in Azure DNS using the Azure CLI</p>
	<p>Quickstart: Create an Azure DNS zone and record using Azure CLI</p>

Reference subgroup	Azure CLI article showing reference use
az network dns record-set ptr	Host reverse DNS lookup zones in Azure DNS
	Manage DNS records and recordsets in Azure DNS using the Azure CLI
az network dns record-set soa	Manage DNS records and recordsets in Azure DNS using the Azure CLI
az network dns record-set srv	Manage DNS records and recordsets in Azure DNS using the Azure CLI
az network dns record-set txt	Manage DNS records and recordsets in Azure DNS using the Azure CLI
	Overview: Azure CLI terminology and support levels
	Use the Web Application Routing add-on with Azure Kubernetes Service (AKS) clusters (preview)
	Import and export a DNS zone file using the Azure CLI
	Host reverse DNS lookup zones in Azure DNS
	Quickstart: Create an Azure private DNS zone using the Azure CLI
az network express-route	Create and manage ExpressRoute public peering
	Quickstart: Create and modify an ExpressRoute circuit using Azure CLI
	Tutorial: Create and modify peering for an ExpressRoute circuit using CLI
	Tutorial: Connect a virtual network to an ExpressRoute circuit using Azure CLI
	Configure ExpressRoute Direct by using the Azure CLI
	Tutorial: Connect a virtual network to an ExpressRoute circuit using Azure CLI
	Configure ExpressRoute Global Reach by using the Azure CLI
	Create and manage ExpressRoute public peering
	Tutorial: Create and modify peering for an ExpressRoute circuit using CLI

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Configure route filters for Microsoft peering: Azure CLI
	Add IPv6 support for private peering using Azure CLI
	Configure ExpressRoute Global Reach by using the Azure CLI
	Configure ExpressRoute Direct by using the Azure CLI
	Configure ExpressRoute Direct by using the Azure CLI
az network firewall	Overview: Azure CLI terminology and support levels
	Control egress traffic using Azure Firewall in Azure Kubernetes Service (AKS)
	Azure Firewall DNS settings
	Use Azure Firewall to protect Azure Kubernetes Service (AKS) clusters
	Azure Firewall SNAT private IP address ranges
az network firewall application-rule	Control egress traffic using Azure Firewall in Azure Kubernetes Service (AKS)
	Use Azure Firewall to protect Azure Kubernetes Service (AKS) clusters
	Configure a single public IP address for outbound and inbound traffic to a container group
	Control egress traffic for your Azure Red Hat OpenShift (ARO) cluster
	Configure Azure Firewall application rules with SQL FQDNs
az network firewall ip-config	Control egress traffic using Azure Firewall in Azure Kubernetes Service (AKS)
	Use Azure Firewall to protect Azure Kubernetes Service (AKS) clusters
	Configure a single public IP address for outbound and inbound traffic to a container group
	Control egress traffic for your Azure Red Hat OpenShift (ARO) cluster

Reference subgroup	Azure CLI article showing reference use
	Deploy and configure Azure Firewall using Azure CLI
az network firewall nat-rule	Control egress traffic using Azure Firewall in Azure Kubernetes Service (AKS)
	Use Azure Firewall to protect Azure Kubernetes Service (AKS) clusters
	Configure a single public IP address for outbound and inbound traffic to a container group
az network firewall network-rule	Control egress traffic using Azure Firewall in Azure Kubernetes Service (AKS)
	Use Azure Firewall to protect Azure Kubernetes Service (AKS) clusters
	Deploy and configure Azure Firewall using Azure CLI
	Control egress traffic for an Azure Spring Apps instance
	Restrict egress traffic from big data clusters in Azure Kubernetes Service (AKS) private cluster
az network firewall policy	Secure traffic destined to private endpoints in Azure Virtual WAN
az network front-door	Configure an IP restriction rule with a Web Application Firewall for Azure Front Door
	Tutorial: Quickly scale and protect a web application by using Azure Front Door and Azure Web Application Firewall (WAF)
	Azure Front Door: Deploy custom domain
	Quickstart: Create a Front Door for a highly available global web application using Azure CLI
az network front-door frontend-endpoint	Azure Front Door: Deploy custom domain
az network front-door routing-rule	Tutorial: Configure your rules engine
	Azure Front Door: Deploy custom domain
	Tutorial: Configure your rules engine
	Tutorial: Configure your rules engine

Reference subgroup	Azure CLI article showing reference use
az network front-door waf-policy	Configure an IP restriction rule with a Web Application Firewall for Azure Front Door Configure a Web Application Firewall rate limit rule
	Tutorial: Quickly scale and protect a web application by using Azure Front Door and Azure Web Application Firewall (WAF)
	Quickstart: Create an Azure Front Door Standard/Premium - Azure CLI
az network front-door waf-policy managed-rules	Tutorial: Add and customize delivery rules for Azure Front Door Standard/Premium (Preview) with Azure CLI
az network front-door waf-policy managed-rules exclusion	Configure bot protection for Web Application Firewall Tutorial: Quickly scale and protect a web application by using Azure Front Door and Azure Web Application Firewall (WAF)
	Quickstart: Create an Azure Front Door Standard/Premium - Azure CLI
az network front-door waf-policy managed-rules exclusion	Configure Web Application Firewall exclusion lists
az network front-door waf-policy rule	Configure an IP restriction rule with a Web Application Firewall for Azure Front Door Configure a Web Application Firewall rate limit rule
az network front-door waf-policy rule match-condition	Configure an IP restriction rule with a Web Application Firewall for Azure Front Door Configure a Web Application Firewall rate limit rule
az network ip-group	Create IP Groups
az network lb	Monitoring load balancer
	Quickstart: Create a public load balancer to load balance VMs using the Azure CLI
	Manage Upgrade Policies for Virtual Machine Scale Sets
	Quickstart: Create a Private Link service using Azure CLI Tutorial: Configure dual stack outbound connectivity

Reference subgroup	Azure CLI article showing reference use
	with a NAT gateway and a public load balancer
az network lb address-pool	Backend pool management
	Add IPv6 to an IPv4 application in Azure virtual network using Azure CLI
	Deploy an IPv6 dual stack application in Azure virtual network using Azure CLI
	Create a public load balancer with IPv6 using Azure CLI
	Load balancing on multiple IP configurations using Azure CLI
az network lb frontend-ip	Add IPv6 to an IPv4 application in Azure virtual network using Azure CLI
	Access your application in a private network
	Work with a virtual network TAP using the Azure CLI
	Deploy an IPv6 dual stack application in Azure virtual network using Azure CLI
	Tutorial: Create a gateway load balancer using the Azure CLI
	Manage inbound NAT rules for Azure Load Balancer
	Configure inbound NAT Rules for Virtual Machine Scale Sets
	Create a public load balancer with IPv6 using Azure CLI
az network lb outbound-rule	Use a public standard load balancer in Azure Kubernetes Service (AKS)
	Tutorial: Configure dual stack outbound connectivity with a NAT gateway and a public load balancer
az network lb probe	Quickstart: Create a public load balancer to load balance VMs using the Azure CLI
	Manage Upgrade Policies for Virtual Machine Scale Sets
	Quickstart: Create a Private Link service using Azure CLI
	Quickstart: Create an internal load balancer to load balance VMs using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Deploy an IPv6 dual stack application in Azure virtual network using Azure CLI
az network lb rress-pool tunnel-interface	Tutorial: Create a gateway load balancer using the Azure CLI
az network lb rule	Configure TCP reset and idle timeout for Azure Load Balancer
	Configure the distribution mode for Azure Load Balancer
	Tutorial: Install applications in Virtual Machine Scale Sets with the Azure CLI
	Quickstart: Create a public load balancer to load balance VMs using the Azure CLI
	Manage Upgrade Policies for Virtual Machine Scale Sets
	Create a virtual network with a site-to-site VPN connection using CLI
	How to configure BGP for Azure VPN Gateway: CLI
az network manager	Configure a cross-tenant connection in Azure Virtual Network Manager Preview - CLI
	Quickstart: Create a mesh network topology with Azure Virtual Network Manager by using the Azure CLI
	Quickstart: Create a mesh network topology with Azure Virtual Network Manager using Terraform
	Quickstart: Create a mesh network topology with Azure Virtual Network Manager by using the Azure CLI
	Configure a cross-tenant connection in Azure Virtual Network Manager Preview - CLI
az network manager group	Quickstart: Create a mesh network topology with Azure Virtual Network Manager by using the Azure CLI
	Configure a cross-tenant connection in Azure Virtual Network Manager Preview - CLI
	Quickstart: Create a mesh network topology with Azure Virtual Network Manager by using the Azure CLI
az network manager scope-connection	Configure a cross-tenant connection in Azure Virtual Network Manager Preview - CLI

Reference subgroup	Azure CLI article showing reference use
az network nat gateway	Azure NAT Gateway integration Create a managed or user-assigned NAT gateway for your Azure Kubernetes Service (AKS) cluster
	Scale SNAT ports with Azure NAT Gateway
	Quickstart: Create a public load balancer to load balance VMs using the Azure CLI
	Manage NAT gateway
az network nic	5 - Set shell variables from CLI output Create, change, or delete a network interface
	Connect privately to an Azure container registry using Azure Private Link
	Integrate Key Vault with Azure Private Link
	Configuring Azure Files network endpoints
	Associate a public IP address to a virtual machine
	Create, change, or delete a network interface
	Configure IP addresses for an Azure network interface
	Dissociate a public IP address from an Azure VM
	How to create a Linux virtual machine in Azure with multiple network interface cards
az network nic ip-config ress-pool	Quickstart: Create a public load balancer to load balance VMs using the Azure CLI
	Tutorial: Configure dual stack outbound connectivity with a NAT gateway and a public load balancer
	Quickstart: Create an internal load balancer to load balance VMs using the Azure CLI
	Tutorial: Create a gateway load balancer using the Azure CLI
	Quickstart: Create an internal basic load balancer to load balance VMs by using the Azure CLI
	Work with a virtual network TAP using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Create, change, or delete a network security group
	Use Azure CLI to create a Windows or Linux VM with Accelerated Networking
	Create an Oracle Database in an Azure VM
	Resource logging for a network security group
	Test private endpoints by deploying Azure Load Testing in an Azure virtual network
	Create, change, or delete a network security group
	How to connect using Secure Shell (SSH) and sign on to an Azure virtual machine running Windows
	Use Azure CLI to create a Windows or Linux VM with Accelerated Networking
	Create an Oracle Database in an Azure VM
	Use service tags with Power BI
az network private-dns link vnet	Connect privately to an Azure container registry using Azure Private Link
	Integrate Key Vault with Azure Private Link
	Configuring Azure Files network endpoints
	Configure Azure Private Link for an Azure Cosmos DB account
	Provide a virtual network to an external Azure Container Apps environment
az network private-dns record-set	Troubleshooting online endpoints deployment and scoring
	Integrate Key Vault with Azure Private Link
	Use network isolation with managed online endpoints
	Quickstart: Create an Azure private DNS zone using the Azure CLI
	Import and export a private DNS zone file for Azure private DNS

Reference subgroup	Azure CLI article showing reference use
	Connect privately to an Azure container registry using Azure Private Link
	Integrate Key Vault with Azure Private Link
	Configuring Azure Files network endpoints
	Provide a virtual network to an external Azure Container Apps environment
	Provide a virtual network to an internal Azure Container Apps environment
az network private-dns zone	Connect privately to an Azure container registry using Azure Private Link
	Integrate Key Vault with Azure Private Link
	Configuring Azure Files network endpoints
	Configure Azure Private Link for an Azure Cosmos DB account
	Provide a virtual network to an external Azure Container Apps environment
az network private-endpoint	Use an internal load balancer with Azure Kubernetes Service (AKS)
	Connect privately to an Azure container registry using Azure Private Link
	Integrate Key Vault with Azure Private Link
	Manage Azure Private Endpoints
	Configuring Azure Files network endpoints
az network private-endpoint asg	Configure an application security group (ASG) with a private endpoint
az network private-endpoint dns-zone-group	Configure Azure Private Link for an Azure Cosmos DB account
	Configure a private endpoint for an Azure Machine Learning workspace
	Quickstart: Create a private endpoint by using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Isolate back-end communication in Azure App Service with Virtual Network integration
	Tutorial: Create a secure n-tier app in Azure App Service
az network private-endpoint-connection	Troubleshooting online endpoints deployment and scoring
	Manage Azure Private Endpoints
	Use network isolation with managed online endpoints
	Set up private access (preview)
	Set up private access in Azure App Configuration
az network private-link-resource	Manage Azure Private Endpoints
	Create and manage Private Link for Azure Database for MySQL - Flexible Server using CLI (Preview)
az network private-link-service	Use an internal load balancer with Azure Kubernetes Service (AKS)
	Quickstart: Create a Private Link service using Azure CLI
az network profile	Deploy container instances into an Azure virtual network
	Create and configure an Azure Kubernetes Services (AKS) cluster to use virtual nodes using the Azure CLI
az network public-ip	5 - Set shell variables from CLI output
	Use TLS with an ingress controller on Azure Kubernetes Service (AKS)
	Associate a public IP address to a virtual machine
	Use a public standard load balancer in Azure Kubernetes Service (AKS)
	Control egress traffic using Azure Firewall in Azure Kubernetes Service (AKS)
az network public-ip prefix	Use a public standard load balancer in Azure Kubernetes Service (AKS)
	Use instance-level public IPs in Azure Kubernetes Service (AKS)
	Manage NAT gateway

Reference subgroup	Azure CLI article showing reference use
	Quickstart: Create a public IP address prefix using the Azure CLI
	Tutorial: Configure route filters for Microsoft peering: Azure CLI
	Tutorial: Configure route filters for Microsoft peering: Azure CLI
	Quickstart: Create and configure Route Server using Azure CLI
	Quickstart: Create and configure Route Server using Azure CLI
az network route-table	Control egress traffic using Azure Firewall in Azure Kubernetes Service (AKS)
	Use Azure Firewall to protect Azure Kubernetes Service (AKS) clusters
	Test private endpoints by deploying Azure Load Testing in an Azure virtual network
	Configure a single public IP address for outbound and inbound traffic to a container group
	Control egress traffic for your Azure Red Hat OpenShift (ARO) cluster
az network route-table route	Virtual network traffic routing
	Control egress traffic using Azure Firewall in Azure Kubernetes Service (AKS)
	Configure inbound and outbound network traffic
	Use Azure Firewall to protect Azure Kubernetes Service (AKS) clusters
	Configure a single public IP address for outbound and inbound traffic to a container group
az network service-endpoint policy	Manage data exfiltration to Azure Storage accounts with virtual network service endpoint policies using the Azure CLI
	Configure virtual network service endpoint policies for Azure HDInsight

Reference subgroup	Azure CLI article showing reference use
az network service-endpoint policy-definition	Manage data exfiltration to Azure Storage accounts with virtual network service endpoint policies using the Azure CLI
	Configure virtual network service endpoint policies for Azure HDInsight
az network traffic-manager endpoint	Quickstart: Create a Traffic Manager profile using Bicep
	Quickstart: Create a Traffic Manager profile for a highly available web application using Azure CLI
	Route traffic for high availability of applications using Azure CLI
	Run an N-tier application in multiple Azure Stack Hub regions for high availability
	Scale an App Service app worldwide with a high-availability architecture using Azure CLI
az network traffic-manager profile	Quickstart: Create an Azure Traffic Manager profile using Terraform
	Quickstart: Create a Traffic Manager profile using Bicep
	Quickstart: Create a Traffic Manager profile for a highly available web application using Azure CLI
	Route traffic for high availability of applications using Azure CLI
	Scale an App Service app worldwide with a high-availability architecture using Azure CLI
	Overview: Azure CLI terminology and support levels
az network virtual-appliance	About NVAs in a Virtual WAN hub
az network vnet	2 - Create a virtual network
	Use kubenet networking with your own IP address ranges in Azure Kubernetes Service (AKS)
	Control egress traffic using Azure Firewall in Azure Kubernetes Service (AKS)
	Tutorial: Enable application gateway ingress controller add-on for an existing AKS cluster with an existing application gateway

Reference subgroup	Azure CLI article showing reference use
	Integrate Key Vault with Azure Private Link
az network vnet peering	Tutorial: Enable application gateway ingress controller add-on for an existing AKS cluster with an existing application gateway
	Create, change, or delete a virtual network peering
	Fail to pull images from Azure Container Registry to Azure Kubernetes Service cluster
	Create a virtual network peering - Resource Manager, different subscriptions and Azure Active Directory tenants
	Create a virtual network peering - different deployment models and subscriptions
	Configure Azure Storage firewalls and virtual networks
	Configure Azure CNI networking in Azure Kubernetes Service (AKS)
	Configure Azure Cognitive Services virtual networks
	Use an internal load balancer with Azure Kubernetes Service (AKS)
	Create, change, or delete a network security group
	Work with a virtual network TAP using the Azure CLI
az network vnet-gateway	About VPN Gateway configuration settings
	Reset a VPN gateway or a connection
	Configure a Point-to-Site (P2S) VPN on Linux for use with Azure Files
	Create a virtual network with a site-to-site VPN connection using CLI
	Configure a VNet-to-VNet VPN gateway connection using Azure CLI
az network vnet-gateway root-cert	Configure a Point-to-Site (P2S) VPN on Linux for use with Azure Files
az network vnet-gateway vpn-client	Configure a Point-to-Site (P2S) VPN on Linux for use with Azure Files

Reference subgroup	Azure CLI article showing reference use
	Create a virtual network with a site-to-site VPN connection using CLI
	Configure a VNet-to-VNet VPN gateway connection using Azure CLI
	How to configure BGP for Azure VPN Gateway: CLI
	Tutorial: Connect a virtual network to an ExpressRoute circuit using Azure CLI
	Troubleshoot virtual network gateway and connections with Azure Network Watcher using Azure CLI
az network vpn-connection shared-key	Create a virtual network with a site-to-site VPN connection using CLI
	View the topology of an Azure virtual network
	Enable or disable Azure Network Watcher
	Troubleshoot connections with Azure Network Watcher using the Azure CLI
	Diagnose network security rules
	Quickstart: Diagnose a virtual machine network traffic filter problem using the Azure CLI
	Manage NSG flow logs using the Azure CLI
az network watcher packet-capture	Manage packet captures with Azure Network Watcher using the Azure CLI
az network watcher troubleshooting	Troubleshoot virtual network gateway and connections with Azure Network Watcher using Azure CLI
	Manage lifecycle of Bare Metal Machines
	Troubleshoot BMM issues using the az networkcloud baremetalmachine run-read-command
	Troubleshoot bare metal machine issues using the az networkcloud baremetalmachine run-data-extract command
	Deploy tenant workloads
	Sample: CNF deployment script
	Sample: VNF deployment script

Reference subgroup az networkcloud cluster	Azure CLI article showing reference use Prerequisites for deploying tenant workloads
	Create and provision a Cluster using Azure CLI
	Upgrading cluster runtime from Azure CLI
	Manage emergency access to a bare metal machine using the az networkcloud cluster baremetalmachinekeyset
	Manage emergency access to a bare metal machine using the az networkcloud cluster bmckeyset
az networkcloud cluster metricsconfiguration	Cluster metrics configuration
	Cluster Manager: How to manage the Cluster Manager in Operator Nexus
	Deploy tenant workloads
	Sample: CNF deployment script
az networkcloud kubernetescluster	Quickstart: Deploy an Azure Nexus Kubernetes cluster using Bicep
	Quickstart: Create an Azure Nexus Kubernetes cluster by using Azure CLI
	Quickstart: Deploy an Azure Nexus Kubernetes cluster by using Azure Resource Manager template (ARM template)
az networkcloud kubernetescluster agentpool	Quickstart: Deploy an Azure Nexus Kubernetes cluster using Bicep
	Quickstart: Create an Azure Nexus Kubernetes cluster by using Azure CLI
	Quickstart: Deploy an Azure Nexus Kubernetes cluster by using Azure Resource Manager template (ARM template)
	Deploy tenant workloads
	Sample: VNF deployment script
az networkcloud l3network	Deploy tenant workloads
	Sample: VNF deployment script
az networkcloud trunkednetwork	Deploy tenant workloads
az networkcloud virtualmachine	Deploy tenant workloads

Reference subgroup	Azure CLI article showing reference use
	Prerequisites for deploying tenant workloads
	Sample: VNF deployment script

az notification-hub

Reference subgroup	Azure CLI article showing reference use
az notification-hub	Quickstart: Set up push notifications in a notification hub
	Quickstart: Create a notification hub using a Resource Manager template
	Quickstart: Create an Azure notification hub using the Azure CLI
	Quickstart: Create an Azure notification hub using Terraform
	Quickstart: Set up push notifications in a notification hub
	Quickstart: Create an Azure notification hub using the Azure CLI
az notification-hub credential gcm	Quickstart: Set up push notifications in a notification hub
az notification-hub namespace	Quickstart: Create a notification hub using a Resource Manager template
	Quickstart: Create an Azure notification hub using the Azure CLI

az peering

Reference subgroup	Azure CLI article showing reference use
az peering service	Create, change, or delete a Peering Service connection using the Azure CLI
az peering service country	Create, change, or delete a Peering Service connection using the Azure CLI
az peering service location	Create, change, or delete a Peering Service connection using the Azure CLI
	Create, change, or delete a Peering Service connection using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
az peering service provider	Create, change, or delete a Peering Service connection using the Azure CLI
	Create your first pipeline
	Use a variable group's secret and nonsecret variables in an Azure Pipeline
	Manage your pipeline with Azure CLI
az pipelines agent	Overview: Azure CLI terminology and support levels
	Azure Pipelines agents
az pipelines build	Azure DevOps CLI in Azure Pipeline YAML
	Azure Pipelines agents
	Create and manage agent pools
az pipelines queue	Create and manage agent pools
	Pipeline run sequence
az pipelines runs artifact	Publish and download pipeline Artifacts
	Publish Pipeline Artifacts
	Pipeline run sequence
	Define variables
	Add & use variable groups
	Task types & usage
	Use a variable group's secret and nonsecret variables in an Azure Pipeline
	Azure DevOps CLI in Azure Pipeline YAML
	Build a data pipeline by using Azure Data Factory, DevOps, and machine learning
	Add & use variable groups
	Use a variable group's secret and nonsecret variables in an Azure Pipeline
	Azure DevOps CLI in Azure Pipeline YAML

az policy

Reference subgroup	Azure CLI article showing reference use
az policy assignment	Remediate non-compliant resources with Azure Policy
	Export Azure Policy resources
	Resolve errors for request disallowed by policy
	Quickstart: Create a policy assignment to identify non-compliant resources using Terraform
	Programmatically create policies
	Tutorial: Create and manage policies to enforce compliance
	Remediate non-compliant resources with Azure Policy
	Export Azure Policy resources
	Subscription deployments with ARM templates
	Resolve errors for request disallowed by policy
az policy identity	Remediate non-compliant resources with Azure Policy
	Built-in policies for Azure Monitor
az policy remediation	Remediate non-compliant resources with Azure Policy
	Built-in policies for Azure Monitor
az policy set-definition	Tutorial: Create and manage policies to enforce compliance
	Export Azure Policy resources
	Built-in policies for Azure Monitor
az policy state	Get compliance data of Azure resources
	Built-in policies for Azure Monitor
	Audit compliance of Azure container registries using Azure Policy
	Audit compliance of Azure Web PubSub Service resources using Azure Policy

Reference subgroup	Azure CLI article showing reference use
	Audit compliance of Azure SignalR Service resources using Azure Policy
	Programmatically create Azure dashboards
	Quickstart: Create an Azure portal dashboard with Azure CLI

az postgres

Reference subgroup	Azure CLI article showing reference use
az postgres	Quickstart: Create an Azure Database for PostgreSQL server by using the Azure CLI
	Build a Ruby and Postgres app in Azure App Service on Linux
	Tutorial: Using Service Connector to build a Django app with Postgres on Azure App Service
	Quickstart: Use the az postgres up command to create an Azure Database for PostgreSQL - Single Server
az postgres db	Quickstart: Use Java and JDBC with Azure Database for PostgreSQL
	Tutorial: Connect to a PostgreSQL Database from Java Tomcat App Service without secrets using a managed identity
	Tutorial: Connect to PostgreSQL Database from a Java Quarkus Container App without secrets using a managed identity
	Getting started with databases on Azure
	Manage an Azure Database for PostgreSQL Single server using the Azure CLI
az postgres flexible-server	Tutorial: Deploy Django app with App Service and Azure Database for PostgreSQL - Flexible Server
	Create and deploy a Django web app to Azure with a user-assigned managed identity
	Quickstart: Connect and query with Azure CLI with Azure Database for PostgreSQL - Flexible Server
	Azure Pipelines task for Azure Database for PostgreSQL Flexible Server

Reference subgroup	Azure CLI article showing reference use
	Build and deploy a Python web app with Azure Container Apps and PostgreSQL
az postgres flexible-server ad-admin	Create and deploy a Django web app to Azure with a user-assigned managed identity
az postgres flexible-server db	Deploy a PostgreSQL Flexible Server Database using Terraform
	Build and deploy a Python web app with Azure Container Apps and PostgreSQL
	Quickstart: Use Java and JDBC with Azure Database for PostgreSQL Flexible Server
	Tutorial: Deploy a Spring application to Azure Spring Apps with a passwordless connection to an Azure database
	Tutorial: Connect to a PostgreSQL Database from Java Tomcat App Service without secrets using a managed identity
az postgres flexible-server firewall-rule	Create and deploy a Django web app to Azure with a user-assigned managed identity
	Build and deploy a Python web app with Azure Container Apps and PostgreSQL
	Quickstart: Use Java and JDBC with Azure Database for PostgreSQL Flexible Server
	Migrate an application to use passwordless connections with Azure Database for PostgreSQL
	Use Spring Data R2DBC with Azure Database for PostgreSQL
	Tutorial: Migrate Azure Database for PostgreSQL - Single Server to Flexible Server by using the Azure CLI
az postgres flexible-server parameter	PostgreSQL extensions in Azure Database for PostgreSQL - Flexible Server
	Audit logging in Azure Database for PostgreSQL - Flexible Server
	Customize server parameters for Azure Database for PostgreSQL - Flexible Server using Azure CLI
	Quickstart: Integrate with Azure Database for PostgreSQL and Azure Cache for Redis

Reference subgroup	Azure CLI article showing reference use
	Configure intelligent tuning for Azure Database for PostgreSQL - Flexible Server by using the Azure CLI
az postgres server	Configure TLS connectivity in Azure Database for PostgreSQL - Single Server
	Quickstart: Use Java and JDBC with Azure Database for PostgreSQL
	Quickstart: Create an Azure Database for PostgreSQL server by using the Azure CLI
	Logical decoding
	Tutorial: Connect to a PostgreSQL Database from Java Tomcat App Service without secrets using a managed identity
az postgres server ad-admin	Tutorial: Connect to Azure databases from App Service without secrets using a managed identity
	Quickstart: Use Java and JDBC with Azure Database for PostgreSQL
az postgres server configuration	Monitor performance with the Query Store
	Logical decoding
	Customize server configuration parameters for Azure Database for PostgreSQL - Single Server using Azure CLI
	Create and manage read replicas from the Azure CLI, REST API
	List and update configurations of an Azure Database for PostgreSQL server using Azure CLI
az postgres server firewall-rule	Quickstart: Use Java and JDBC with Azure Database for PostgreSQL
	Quickstart: Create an Azure Database for PostgreSQL server by using the Azure CLI
	Logical decoding
	Getting started with databases on Azure
	Tutorial: Build a Quarkus web app with Azure App Service on Linux and PostgreSQL
	Data encryption for Azure Database for PostgreSQL Single server by using the Azure CLI
	Validating data encryption for Azure Database for PostgreSQL

Reference subgroup	Azure CLI article showing reference use
az postgres server vnet-rule	Create and manage VNet service endpoints for Azure Database for PostgreSQL - Single Server using Azure CLI
	Create a PostgreSQL server and configure a vNet rule using the Azure CLI
az postgres server-arc	Storage Configuration
	Scale up and down an Azure Database for PostgreSQL server using CLI (az or kubectl)
	Create an Azure Arc-enabled PostgreSQL server from CLI
	Use PostgreSQL extensions in your Azure Arc-enabled PostgreSQL server
	Change the port on which the server group is listening
az postgres server-arc endpoint	Create an Azure Arc-enabled PostgreSQL server from CLI
	View logs and metrics using Kibana and Grafana
	Get connection endpoints & create the connection strings for your Azure Arc-enabled PostgreSQL server
	Migrate PostgreSQL database to Azure Arc-enabled PostgreSQL server
az postgres server-logs	Configure and access server logs by using Azure CLI
	Enable and download server slow query logs of an Azure Database for PostgreSQL server using Azure CLI

az powerbi

Reference subgroup	Azure CLI article showing reference use
az powerbi embedded-capacity	Create Power BI Embedded capacity in the Azure portal

az ppg

Reference subgroup	Azure CLI article showing reference use
az ppg	Use proximity placement groups to reduce latency for Azure Kubernetes Service (AKS) clusters
	Deploy VMs to proximity placement groups using Azure CLI

az private-link

Reference subgroup	Azure CLI article showing reference use
az private-link association	Use APIs to create a private link for managing Azure resources
	Manage resource management private links
	Move resources to a new resource group or subscription
	Quickstart: Deploy your first application to Azure Spring Apps
	Azure resource providers and types
	Quickstart: Deploy an Azure Kubernetes Service (AKS) cluster using Azure CLI
	Azure Policy definition structure
az provider operation	Azure Container Registry roles and permissions
	Resource functions for ARM templates
	Resource functions for Bicep
	Manage access to an Azure Machine Learning workspace
	Authorizing access to Event Grid resources

az purview

Reference subgroup	Azure CLI article showing reference use
az purview account	Access control in the Microsoft Purview governance portal
	Quickstart: Create a Microsoft Purview (formerly Azure Purview) account using Azure PowerShell/Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Set up a data product batch
	Integrated hybrid computing ↗
az quantum offerings	Manage quantum workspaces with the Azure CLI ↗
	Integrated hybrid computing ↗
	Azure Quantum Credits ↗
	Azure Quantum quotas ↗
	Manage quantum workspaces with the Azure CLI ↗

az redis

Reference subgroup	Azure CLI article showing reference use
az redis	How to upgrade an existing Redis 4 cache to Redis 6
	Configure data persistence for an Azure Cache for Redis instance
	Scale an Azure Cache for Redis instance
	Set Redis version for Azure Cache for Redis
	Managed identity for storage
az redis firewall-rules	Getting started with databases on Azure
az redis identity	Managed identity for storage

az redisenterprise

Reference subgroup	Azure CLI article showing reference use
az redisenterprise	Configure data persistence for an Azure Cache for Redis instance
	Scale an Azure Cache for Redis instance
	Configure active geo-replication for Enterprise Azure Cache for Redis instances
az redisenterprise	Configure data persistence for an Azure Cache for Redis instance

Reference subgroup	Azure CLI article showing reference use
database	Configure active geo-replication for Enterprise Azure Cache for Redis instances

az repos

Reference subgroup	Azure CLI article showing reference use
az repos	Branch policies and settings
	Get started with Git from the command line
	Set Git repository settings and policies
	Delete a Git repo from your project
	Auto detect configuration and git aliases
az repos import	Import a Git repo
az repos policy	Branch policies and settings
	Set Git repository settings and policies
az repos policy approver-count	Branch policies and settings
az repos policy build	Branch policies and settings
az repos policy case-enforcement	Set Git repository settings and policies
az repos policy comment-required	Branch policies and settings
	Set Git repository settings and policies
	Branch policies and settings
az repos policy required-reviewer	Branch policies and settings
	Branch policies and settings
az repos pr	Create pull requests
	Complete, abandon, or revert pull requests
	Review pull requests
	View, filter, and open pull requests
	Auto detect configuration and git aliases

Reference subgroup	Azure CLI article showing reference use
<code>az repos pr policy</code>	Complete, abandon, or revert pull requests
	Create pull requests
	Create pull requests

az resource

Reference subgroup	Azure CLI article showing reference use
<code>az resource</code>	Add and manage TLS/SSL certificates in Azure App Service
	Configure an App Service app
	Move resources to a new resource group or subscription
	Set up Azure App Service access restrictions
	Azure Functions networking options

az resourcemanagement

Reference subgroup	Azure CLI article showing reference use
<code>az resourcemanagement private-link</code>	Use APIs to create a private link for managing Azure resources
	Manage resource management private links

az rest

Reference subgroup	Azure CLI article showing reference use
<code>Azure CLI</code>	Elevate access to manage all Azure subscriptions and management groups
	Manage your function app
	Use Key Vault references for App Service and Azure Functions
	High availability for Azure SQL Database
	Managing and maintaining the Connected Machine agent
	Work with Azure service principal using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Log in to a Windows virtual machine in Azure by using Azure AD including passwordless
	Provide access to Key Vault keys, certificates, and secrets with an Azure role-based access control
	Elevate access to manage all Azure subscriptions and management groups
	Assign an Azure role for access to blob data
az role definition	Provide access to Key Vault keys, certificates, and secrets with an Azure role-based access control
	Transfer an Azure subscription to a different Azure AD directory
	List Azure role definitions
	Quickstart: Azure Cosmos DB for NoSQL client library for .NET
	Remediate non-compliant resources with Azure Policy

az search

Reference subgroup	Azure CLI article showing reference use
az search admin-key	Connect to Cognitive Search using key authentication
	Manage your Azure Cognitive Search service with the Azure CLI
az search private-endpoint-connection	Manage your Azure Cognitive Search service with the Azure CLI
az search query-key	Connect to Cognitive Search using key authentication
	Manage your Azure Cognitive Search service with the Azure CLI
az search service	Quickstart: Deploy Cognitive Search service using Terraform
	Manage your Azure Cognitive Search service with the Azure CLI
az search shared-private-link-resource	Make outbound connections through a private link

Reference subgroup	Azure CLI article showing reference use
	Manage your Azure Cognitive Search service with the Azure CLI

az security

Reference subgroup	Azure CLI article showing reference use
az security atm storage	Enable Microsoft Defender for Storage (classic)
	Enable Microsoft Defender for Storage (classic)
	Connect Azure Arc-enabled servers to Microsoft Defender for Cloud
az security workspace-setting	Connect Azure Arc-enabled servers to Microsoft Defender for Cloud
	Migrate existing Azure Service Bus standard namespaces to the premium tier
az servicebus namespace	Quickstart: Send events to and receive events from Azure Event Hubs using .NET
	Send events to or receive events from event hubs by using Python
	Use Java to send events to or receive events from Azure Event Hubs
	Send events to or receive events from event hubs by using JavaScript
	Azure Service Bus client library for Python - version 7.10.0b1
az servicebus namespace authorization-rule keys	Use the Azure CLI to create a Service Bus namespace and a queue
	Quickstart: Deploy an event-driven application to Azure Spring Apps
	Use Azure CLI to create a Service Bus topic and subscriptions to the topic
az servicebus queue	Get message counters
	Enable dead lettering on message expiration for Azure Service Bus queues and subscriptions

Reference subgroup	Azure CLI article showing reference use
	Enable duplicate message detection for an Azure Service Bus queue or a topic
	Enable message sessions for an Azure Service Bus queue or a subscription
	Enable auto forwarding for Azure Service Bus queues and subscriptions
az servicebus queue authorization-rule	Create and delete routes and endpoints by using the Azure CLI
	Export IoT data to Service Bus
az servicebus queue authorization-rule keys	Create and delete routes and endpoints by using the Azure CLI
	Export IoT data to Service Bus
az servicebus topic	Enable duplicate message detection for an Azure Service Bus queue or a topic
	Enable partitioning in Azure Service Bus basic or standard
	Grant managed identity the access to Event Grid destination
	Use Azure CLI to create a Service Bus topic and subscriptions to the topic
az servicebus topic authorization-rule keys	Create and delete routes and endpoints by using the Azure CLI
az servicebus topic subscription	Get message counters
	Enable dead lettering on message expiration for Azure Service Bus queues and subscriptions
	Enable message sessions for an Azure Service Bus queue or a subscription
	Enable auto forwarding for Azure Service Bus queues and subscriptions
	Use Azure CLI to create a Service Bus topic and subscriptions to the topic
az servicebus topic subscription rule	Message replication and cross-region federation
	Use Azure CLI to create a Service Bus topic and subscriptions

Reference subgroup	Azure CLI article showing reference use to the topic
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az sf

Reference subgroup	Azure CLI article showing reference use
az sf cluster	Quickstart: Deploy Linux containers to Service Fabric Create a Service Fabric cluster using Azure Resource Manager
	Deploy a Linux Service Fabric cluster into an Azure virtual network
	Tutorial: Package and deploy containers as a Service Fabric application using Yeoman
	Tutorial: Deploy a Java application to a Service Fabric cluster in Azure

az sig

Reference subgroup	Azure CLI article showing reference use
az sig	Store and share images in an Azure Compute Gallery Create a VM from a generalized image version
	Create a gallery for storing and sharing resources
	Share a gallery with subscriptions or tenants (preview)
	Tutorial: Create and use a custom image for Virtual Machine Scale Sets with the Azure CLI
az sig gallery-application	Create and deploy VM Applications
az sig gallery-application version	Create and deploy VM Applications
az sig image-definition	Create an image definition and an image version Deploy a VM with trusted launch enabled
	Create a VM from a generalized image version
	Tutorial: Create and use a custom image for Virtual Machine Scale Sets with the Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Create a custom image of an Azure VM with the Azure CLI
<code>az sig image-version</code>	Store and share images in an Azure Compute Gallery
	Create an image definition and an image version
	Deploy a VM with trusted launch enabled
	Create a VM from a generalized image version
	Create an Azure Image Builder Bicep or ARM template JSON template
<code>az sig share</code>	Share a gallery with subscriptions or tenants (preview)
	List, update, and delete gallery resources
	Share images using a community gallery (preview)

az signalr

Reference subgroup	Azure CLI article showing reference use
<code>az signalr</code>	Use private endpoints for Azure SignalR Service
	How to scale an Azure SignalR Service instance?
	Quickstart: Use an ARM template to deploy Azure SignalR Service
	Integrate Azure Digital Twins with Azure SignalR Service
	How to send events from Azure SignalR Service to Event Grid
<code>az signalr key</code>	Connection string in Azure SignalR Service
	Azure SignalR Service authentication
	Create a SignalR Service
	Create a SignalR Service with an App Service
	Create a web app that uses SignalR Service and GitHub authentication
	Create a snapshot of a virtual hard disk
	Create an incremental snapshot for managed disks

Reference subgroup	Azure CLI article showing reference use
	Migrate from in-tree storage class to CSI drivers on Azure Kubernetes Service (AKS)
	Copy an incremental snapshot to a new region
	Tutorial - Manage Azure disks with the Azure CLI

az spatial-anchors-account

Reference subgroup	Azure CLI article showing reference use
az spatial-anchors-account	Run the sample app: Android - Android Studio (Java or C++/NDK)
	Tutorial: Step-by-step instructions to create a new Android app using Azure Spatial Anchors
	Run the sample app: iOS - Xcode (Swift or Objective-C)
az spatial-anchors-account key	Run the sample app: Android - Android Studio (Java or C++/NDK)
	Tutorial: Step-by-step instructions to create a new Android app using Azure Spatial Anchors
	Run the sample app: iOS - Xcode (Swift or Objective-C)

az spring

Reference subgroup	Azure CLI article showing reference use
az spring	Quickstart: Deploy your first application to Azure Spring Apps
	Enable redundancy and disaster recovery for Azure Spring Apps
	Tutorial: Use a managed identity to invoke Azure Functions from an Azure Spring Apps app
	Deploy Azure Spring Apps in a virtual network
	Tutorial: Connect Azure Spring Apps to Key Vault using managed identities

Reference subgroup	Azure CLI article showing reference use
az spring api-portal	Quickstart: Build and deploy apps to Azure Spring Apps using the Enterprise plan
	Quickstart: Configure single sign-on for applications using the Azure Spring Apps Enterprise plan
	Use API portal for VMware Tanzu
	How to configure APM integration and CA certificates
az spring app	Azure Spring Apps API breaking changes
	Troubleshoot common Azure Spring Apps issues
	Quickstart: Deploy your first application to Azure Spring Apps
	Tutorial: Use a managed identity to invoke Azure Functions from an Azure Spring Apps app
	Tutorial: Connect Azure Spring Apps to Key Vault using managed identities
az spring app custom-domain	Map an existing custom domain to Azure Spring Apps
	Expose applications with end-to-end TLS in a virtual network
	Enable ingress-to-app TLS for an application
	Expose applications to the internet with TLS Termination at Application Gateway
	Quickstart: Map a custom domain to Azure Spring Apps with the Standard consumption and dedicated plan
	Set up a staging environment in Azure Spring Apps
	How to Deploy Spring Boot applications from Azure CLI
	Deploy an application with a custom container image
	Capture heap dump and thread dump manually and use Java Flight Recorder in Azure Spring Apps
	Connect Azure Cache for Redis to your application in Azure Spring Apps
	Enable system-assigned managed identity for an application in Azure Spring Apps

Reference subgroup	Azure CLI article showing reference use
	Migrate an application to use passwordless connections with Azure Blob Storage
	Migrate an application to use passwordless connections with Azure Database for PostgreSQL
	Migrate a Java application to use passwordless connections with Azure SQL Database
	Migrate an application to use passwordless connections with Azure Event Hubs for Kafka
az spring app-insights	Use Application Insights Java In-Process Agent in Azure Spring Apps
	Use VMware Tanzu Application Accelerator with the Azure Spring Apps Enterprise plan
az spring application-accelerator customized-accelerator	Use VMware Tanzu Application Accelerator with the Azure Spring Apps Enterprise plan
	Use VMware Tanzu Application Accelerator with the Azure Spring Apps Enterprise plan
az spring application-configuration-service	Quickstart: Build and deploy apps to Azure Spring Apps using the Enterprise plan
	Use Application Configuration Service for Tanzu
	Quickstart: Configure single sign-on for applications using the Azure Spring Apps Enterprise plan
	Migrate an Azure Spring Apps Basic or Standard plan instance to the Enterprise plan
az spring application-configuration-service git repo	Quickstart: Build and deploy apps to Azure Spring Apps using the Enterprise plan
	Use Application Configuration Service for Tanzu
	Migrate an Azure Spring Apps Basic or Standard plan instance to the Enterprise plan
	Use Application Live View with the Azure Spring Apps Enterprise plan
	How to deploy polyglot apps in the Azure Spring Apps Enterprise plan
	Deploy web static files

Reference subgroup	Azure CLI article showing reference use
az spring build-service builder	Quickstart: Build and deploy apps to Azure Spring Apps using the Enterprise plan
	Use Application Insights Java In-Process Agent in Azure Spring Apps
	How to configure APM integration and CA certificates
	Quickstart: Monitor applications end-to-end
	Migrate an Azure Spring Apps Basic or Standard plan instance to the Enterprise plan
	Map an existing custom domain to Azure Spring Apps
	Expose applications with end-to-end TLS in a virtual network
az spring config-server	Quickstart: Enable and disable Spring Cloud Config Server in Azure Spring Apps
az spring config-server git	Quickstart: Set up Spring Cloud Config Server for Azure Spring Apps
	Use Azure Spring Apps CI/CD with GitHub Actions
	Tutorial: Deploy apps to Azure Spring Apps using Jenkins and the Azure CLI
	Quickstart: Enable and disable Spring Cloud Config Server in Azure Spring Apps
az spring connection	Service Connector internals
	Use a managed identity to connect Azure SQL Database to an app deployed to Azure Spring Apps
	Quickstart: Deploy your first web application to Azure Spring Apps
	Connect Azure Cache for Redis to your application in Azure Spring Apps
	Connect an Azure Cosmos DB database to your application in Azure Spring Apps
az spring connection create	Use a managed identity to connect Azure SQL Database to an app deployed to Azure Spring Apps
	Quickstart: Deploy your first web application to Azure Spring Apps

Reference subgroup	Azure CLI article showing reference use
	Tutorial: Deploy a Spring application to Azure Spring Apps with a passwordless connection to an Azure database
	Migrate an application to use passwordless connections with Azure Database for PostgreSQL
	Migrate a Java application to use passwordless connections with Azure SQL Database
	How to deploy polyglot apps in the Azure Spring Apps Enterprise plan
az spring dev-tool	Use VMware Tanzu Application Accelerator with the Azure Spring Apps Enterprise plan
	Configure Tanzu Dev Tools in the Azure Spring Apps Enterprise plan
	Use Application Live View with the Azure Spring Apps Enterprise plan
az spring eureka-server	Quickstart: Enable and disable Eureka Server in Azure Spring Apps
az spring gateway	Use Spring Cloud Gateway
	Quickstart: Build and deploy apps to Azure Spring Apps using the Enterprise plan
	Configure VMware Spring Cloud Gateway
	Quickstart: Configure single sign-on for applications using the Azure Spring Apps Enterprise plan
	Use API portal for VMware Tanzu
az spring gateway route-config	Use Spring Cloud Gateway
	Quickstart: Build and deploy apps to Azure Spring Apps using the Enterprise plan
	Configure VMware Spring Cloud Gateway
	Quickstart: Configure single sign-on for applications using the Azure Spring Apps Enterprise plan
	Use API portal for VMware Tanzu
az spring service-registry	Quickstart: Build and deploy apps to Azure Spring Apps using the Enterprise plan

Reference subgroup	Azure CLI article showing reference use
	Use Tanzu Service Registry
	Quickstart: Configure single sign-on for applications using the Azure Spring Apps Enterprise plan
	Migrate an Azure Spring Apps Basic or Standard plan instance to the Enterprise plan
	How to enable your own persistent storage in Azure Spring Apps

az spring-cloud

Reference subgroup	Azure CLI article showing reference use
az spring-cloud app	Tutorial: Deploy a Spring Boot app connected to Apache Kafka on Confluent Cloud with Service Connector in Azure Spring Apps
az spring-cloud connection create	Migrate an application to use passwordless connections with Azure Blob Storage
	Tutorial: Deploy a Spring Boot app connected to Apache Kafka on Confluent Cloud with Service Connector in Azure Spring Apps
	Migrate a .NET application to use passwordless connections with Azure SQL Database
	Migrate an application to use passwordless connections with Azure Event Hubs
	Migrate an application to use passwordless connections with Azure Queue Storage

az sql

Reference subgroup	Azure CLI article showing reference use
az sql	Quickstart: Create a single database - Azure SQL Database
az sql db	Quickstart: Create a single database - Azure SQL Database
	Serverless compute tier for Azure SQL Database
	High availability for Azure SQL Database

Reference subgroup	Azure CLI article showing reference use
	Copy a transactionally consistent copy of a database in Azure SQL Database
	Quickstart: Import a .bacpac file to a database in Azure SQL Database or Azure SQL Managed Instance
<code>az sql db geo-backup</code>	Configure geo replication and backup restore for transparent data encryption with database level customer-managed keys
<code>az sql db ledger-digest-uploads</code>	Enable automatic digest storage
	Quickstart: Create a database in Azure SQL Database with ledger enabled
<code>az sql db ltr-backup</code>	Manage Azure SQL Database long-term backup retention
	Manage Azure SQL Managed Instance long-term backup retention
<code>az sql db ltr-policy</code>	Manage Azure SQL Database long-term backup retention
<code>az sql db op</code>	Scale single database resources in Azure SQL Database
	How to manage a Hyperscale database
	Monitor and scale a single database in Azure SQL Database using the Azure CLI
	Tutorial: Configure active geo-replication and failover (Azure SQL Database)
	Hyperscale secondary replicas
	Configure isolated access to a Hyperscale named replica
	Create a zone-redundant Hyperscale database
	Configure geo replication and backup restore for transparent data encryption with database level customer-managed keys
<code>az sql db str-policy</code>	Change automated backup settings for Azure SQL Database
<code>az sql db tde</code>	PowerShell and Azure CLI: Enable Transparent Data Encryption with customer-managed key from Azure Key Vault
<code>az sql db tde key</code>	Identity and key management for TDE with database level customer-managed keys
	Configure maintenance window
	Tutorial: Add an Azure SQL Database elastic pool to a failover group

Reference subgroup	Azure CLI article showing reference use
	Move a database in SQL Database in a SQL elastic pool using the Azure CLI
	Scale an elastic pool in Azure SQL Database using the Azure CLI
	Working with Hyperscale elastic pools using command-line tools
	Tutorial: Add an Azure SQL Database to an auto-failover group
	Tutorial: Add an Azure SQL Database elastic pool to a failover group
	Tutorial: Implement a geo-distributed database (Azure SQL Database)
	Configure a failover group for a group of databases in Azure SQL Database using the Azure CLI
	Add a database to a failover group using the Azure CLI
az sql instance-failover-group-arc	Azure Arc-enabled SQL Managed Instance - disaster recovery
	Deploy Azure SQL Managed Instance to an instance pool
	Managed identities in Azure AD for Azure SQL
	Configure public endpoints in Azure SQL Managed Instance
	vCore purchasing model - Azure SQL Managed Instance
	Configure minimal TLS version in Azure SQL Managed Instance
	Configure maintenance window
az sql mi ad-only-auth	Azure AD-only authentication with Azure SQL
	Tutorial: Enable Azure Active Directory only authentication with Azure SQL
az sql mi dtc	Distributed Transaction Coordinator (DTC) for Azure SQL Managed Instance (preview)
az sql mi endpoint-cert	Replicate a database with the link via T-SQL and PowerShell or Azure CLI scripts - Azure SQL Managed Instance
az sql mi key	Rotate the Transparent data encryption (TDE) protector
	Azure CLI script to enable transparent data encryption using your own key
	Replicate a database with the link via T-SQL and PowerShell or Azure CLI scripts - Azure SQL Managed Instance

Reference subgroup	Azure CLI article showing reference use
	Failover (migrate) a database with a link via T-SQL and PowerShell or Azure CLI scripts - Azure SQL Managed Instance
az sql mi op	Move Azure SQL Managed Instance across subnets
	Monitoring Azure SQL Managed Instance management operations
	Canceling Azure SQL Managed Instance management operations
	Replicate a database with the link via T-SQL and PowerShell or Azure CLI scripts - Azure SQL Managed Instance
az sql mi server-configuration-option	CREATE EXTERNAL TABLE AS SELECT (CETAS) (Transact-SQL)
az sql mi tde-key	Rotate the Transparent data encryption (TDE) protector
	Azure CLI script to enable transparent data encryption using your own key
	Create an Azure Arc-enabled SQL Managed Instance
	Storage Configuration
	High Availability with Azure Arc-enabled SQL Managed Instance
	Azure Arc-enabled SQL Managed Instance - disaster recovery
	Perform a point-in-time Restore
az sql mi-arc endpoint	View logs and metrics using Kibana and Grafana
	Restore a database in Azure SQL Managed Instance to a previous point in time
	Manage Azure SQL Managed Instance long-term backup retention
	Configure a ledger database
az sql midb ledger-digest-uploads	Enable automatic digest storage
	Migrate databases from SQL Server by using Log Replay Service - Azure SQL Managed Instance
	Manage Azure SQL Managed Instance long-term backup retention
az sql midb ltr-policy	Manage Azure SQL Managed Instance long-term backup retention
az sql midb short-term-retention-policy	Change automated backup settings for Azure SQL Managed Instance

Reference subgroup	Azure CLI article showing reference use
az sql midb-arc	Perform a point-in-time Restore
az sql server	Quickstart: Create a single database - Azure SQL Database Azure SQL connectivity settings
	Managed identities in Azure AD for Azure SQL
	Use Java and JDBC with Azure SQL Database
	sp_invoke_external_rest_endpoint (Transact-SQL) (Preview)
az sql server ad-admin	Transfer an Azure subscription to a different Azure AD directory Tutorial: Connect to SQL Database from .NET App Service without secrets using a managed identity
	Tutorial: Connect a function app to Azure SQL with managed identity and SQL bindings
	Tutorial: Connect to Azure databases from App Service without secrets using a managed identity
	Tutorial: Connect an App Service app to SQL Database on behalf of the signed-in user
az sql server ad-only-auth	Azure AD-only authentication with Azure SQL Tutorial: Enable Azure Active Directory only authentication with Azure SQL
	Tutorial: Connect an App Service app to SQL Database on behalf of the signed-in user
az sql server audit-policy	Auditing using managed identity PowerShell for DNS Alias to Azure SQL Database
	Azure SQL Database and Azure Synapse IP firewall rules
	Quickstart: Create a single database - Azure SQL Database
	Use Java and JDBC with Azure SQL Database
	Tutorial: Add an Azure SQL Database to an auto-failover group
	Create a single database and configure a firewall rule using the Azure CLI

Reference subgroup	Azure CLI article showing reference use
az sql server key	PowerShell and Azure CLI: Enable Transparent Data Encryption with customer-managed key from Azure Key Vault Rotate the Transparent data encryption (TDE) protector
	Remove a Transparent Data Encryption (TDE) protector using PowerShell
	Outbound firewall rules for Azure SQL Database and Azure Synapse Analytics
az sql server tde-key	PowerShell and Azure CLI: Enable Transparent Data Encryption with customer-managed key from Azure Key Vault Rotate the Transparent data encryption (TDE) protector
	Remove a Transparent Data Encryption (TDE) protector using PowerShell
	Configure automatic backups
az sql virtual-cluster	Resolve private domain names in Azure SQL Managed Instance
az sql vm	Automate management with the Windows SQL Server IaaS Agent extension Register Windows SQL Server VM with SQL IaaS Agent extension
	Change the license model for a SQL virtual machine in Azure
	SQL best practices assessment for SQL Server on Azure VMs
	Enable Azure AD authentication for SQL Server on Azure VMs
az sql vm group	Use the Azure portal to configure a multiple-subnet availability group (preview) for SQL Server on Azure VMs Use PowerShell or Az CLI to configure an availability group for SQL Server on Azure VM
	Use PowerShell or Az CLI to configure an availability group for SQL Server on Azure VM
	Log in to a Linux virtual machine in Azure by using Azure AD and OpenSSH
	How to connect using Secure Shell (SSH) and sign on to an Azure virtual machine running Windows
	Deploy tenant workloads

az sshkey

Reference subgroup	Azure CLI article showing reference use
az sshkey	How to use SSH keys with Windows on Azure
	Quick steps: Create and use an SSH public-private key pair for Linux VMs in Azure
	Quickstart: Deploy an Azure Kubernetes Service (AKS) cluster using Bicep
	Generate and store SSH keys with the Azure CLI
	Quickstart: Building your first static site using the Azure CLI
	Tutorial: Create a serverless chat app with Azure Web PubSub service and Azure Static Web Apps
	Automate tasks with Azure CLI
	Configure application settings for Azure Static Web Apps
az staticwebapp apptings	Configure application settings for Azure Static Web Apps
	Tutorial: Create a serverless chat app with Azure Web PubSub service and Azure Static Web Apps
az staticwebapp enterprise-edge	Tutorial: Configure Azure Front Door for Azure Static Web Apps
	Enterprise-grade edge
az staticwebapp secrets	Deploy a static web app with Azure Static Web Apps CLI

az storage

Reference subgroup	Azure CLI article showing reference use
az storage account	Work with Azure service principal using the Azure CLI
	Learn to use Bash with the Azure CLI
	How to use variables in Azure CLI commands
	How to manage Azure resource groups with the Azure CLI
	Tutorial: Use persisted parameters to simplify sequential Azure CLI commands

Reference subgroup	Azure CLI article showing reference use
az storage account blob-inventory-policy	Enable Azure Storage blob inventory reports
az storage account blob-service-properties	Configure a lifecycle management policy
	Change feed support in Azure Blob Storage
	Configure object replication for block blobs
	Enable and manage blob versioning
	Enable and manage soft delete for containers
	Create and manage encryption scopes
az storage account file-service-properties	SMB file shares in Azure Files
	Enable soft delete on Azure file shares
az storage account hns-migration	Upgrade Azure Blob Storage with Azure Data Lake Storage Gen2 capabilities
az storage account keys	Work with Azure service principal using the Azure CLI
	Learn to use Bash with the Azure CLI
	Manage storage account access keys
	Store Terraform state in Azure Storage
	Create and use a volume with Azure Files in Azure Kubernetes Service (AKS)
az storage account local-user	Connect to Azure Blob Storage by using the SSH File Transfer Protocol (SFTP)
az storage account management-policy	Configure a lifecycle management policy
az storage account network-rule	Configure Azure Storage firewalls and virtual networks
	Configuring Azure Files network endpoints
	Configure Azure storage firewalls to allow access from serverless SQL warehouses
	Configuring Azure File Sync network endpoints

Reference subgroup	Azure CLI article showing reference use
	Restrict network access to PaaS resources with virtual network service endpoints using the Azure CLI
	Configure object replication for block blobs
<code>az storage account or-policy rule</code>	Configure object replication for block blobs
	Learn to use Bash with the Azure CLI
	Deploy and score a machine learning model by using an online endpoint
	Troubleshooting online endpoints deployment and scoring
	Quickstart: Create, download, and list blobs with Azure CLI
	Download a Windows VHD from Azure
<code>az storage blob copy</code>	Set a blob's access tier
	Archive a blob
	Rehydrate an archived blob to an online tier
	Export/Copy a managed disk to a storage account using the Azure CLI
	Export/Copy a snapshot to a storage account in different region with CLI
<code>az storage blob directory</code>	Enable and manage blob versioning
<code>az storage blob immutability-policy</code>	Configure immutability policies for blob versions
	Manage block blobs with Azure CLI
<code>az storage blob service-properties</code>	Host a static website in Azure Storage
	Azure Front Door: Deploy custom domain
	Use blob index tags to manage and find data on Azure Blob Storage
	Manage block blobs with Azure CLI
<code>az storage container</code>	Azure CLI configuration
	Learn to use Bash with the Azure CLI

Reference subgroup	Azure CLI article showing reference use
	Configure anonymous public read access for containers and blobs
	Store Terraform state in Azure Storage
	Prevent Shared Key authorization for an Azure Storage account
az storage container immutability-policy	Configure immutability policies for blob versions
	Configure immutability policies for containers
	Quickstart: Create a database in Azure SQL Database with ledger enabled
az storage container legal-hold	Configure immutability policies for containers
	Learn to use Bash with the Azure CLI
	Manage blob containers using Azure CLI
az storage container policy	Use Azure Blob storage Shared Access Signatures to restrict access to data in HDInsight
	Configure immutability policies for blob versions
az storage cors	Quickstart - Get started with 3D Scenes Studio (preview) for Azure Digital Twins
	Build 3D scenes with 3D Scenes Studio (preview) for Azure Digital Twins
az storage directory	Quickstart: Create and use an Azure file share
	Transactional replication with Azure SQL Managed Instance
	Access Azure file shares using Azure Active Directory with Azure Files OAuth over REST (preview)
	Mount a file share to a Python function app using Azure CLI
az storage entity	Measure Azure Cosmos DB for NoSQL performance with a benchmarking framework
	Quickstart: Create and use an Azure file share
	Transactional replication with Azure SQL Managed Instance
	Access Azure file shares using Azure Active Directory with Azure Files OAuth over REST (preview)

Reference subgroup	Azure CLI article showing reference use
	Restore Azure file shares with the Azure CLI
	Manage and restore soft-deleted blobs
	Manage directories and files in Azure Data Lake Storage Gen2 via the Azure CLI
	Use Azure CLI to manage ACLs in Azure Data Lake Storage Gen2
	403 Access Denied authorization error when the sticky bit is enabled in ADLS Gen2
	Manage directories and files in Azure Data Lake Storage Gen2 via the Azure CLI
az storage fs file	Manage directories and files in Azure Data Lake Storage Gen2 via the Azure CLI
az storage fs service-properties	Enable soft delete for blobs
az storage message	Connect Azure Functions to Azure Storage using command line tools
	Tutorial: Deploy a background processing application with Azure Container Apps
	Tutorial: Deploy an event-driven job with Azure Container Apps
	Connect your Java function to Azure Storage
az storage queue	Connect Azure Functions to Azure Storage using command line tools
	Tutorial: Deploy a background processing application with Azure Container Apps
	Quickstart: Route custom events to Azure Queue storage via Event Grid using Azure CLI
	Tutorial: Deploy an event-driven job with Azure Container Apps
	Connect your Java function to Azure Storage
az storage share	Create an SMB Azure file share
	Create and use a volume with Azure Files in Azure Kubernetes Service (AKS)
	Mount an Azure file share in Azure Container Instances

Reference subgroup	Azure CLI article showing reference use
	Access Azure file shares using Azure Active Directory with Azure Files OAuth over REST (preview)
	Back up and recover an Oracle Database on an Azure Linux VM using Azure Files
	Create an SMB Azure file share
	Quickstart: Create and use an Azure file share
	Enable soft delete on Azure file shares
	Tutorial: Create an Azure Files volume mount in Azure Container Apps
	How to enable your own persistent storage in Azure Spring Apps with the Standard consumption and dedicated plan
az storage table	How to use the Azure SDK for Go with Azure Table

az storage sync

Reference subgroup	Azure CLI article showing reference use
az storage sync sync-group	Deploy Azure File Sync
az storage sync sync-group cloud-endpoint	Deploy Azure File Sync
az storage sync sync-group server-endpoint	Deploy Azure File Sync

az stream-analytics

Reference subgroup	Azure CLI article showing reference use
az stream-analytics input	Quickstart: Create an Azure Stream Analytics job using the Azure CLI
az stream-analytics job	Quickstart: Create an Azure Stream Analytics job by using an ARM template
	Extend Azure IoT Central with custom rules using Stream Analytics, Azure Functions, and SendGrid
	Quickstart: Create an Azure Stream Analytics job using Terraform

Reference subgroup	Azure CLI article showing reference use
	Quickstart: Create an Azure Stream Analytics job using the Azure CLI
<code>az stream-analytics output</code>	Quickstart: Create an Azure Stream Analytics job using the Azure CLI
<code>az stream-analytics transformation</code>	Quickstart: Create an Azure Stream Analytics job using the Azure CLI

az support

Reference subgroup	Azure CLI article showing reference use
<code>az support services</code>	Create an Azure support ticket in Azure CLI
<code>az support services problem-classifications</code>	Create an Azure support ticket in Azure CLI
	Create an Azure support ticket in Azure CLI
<code>az support tickets communications</code>	Create an Azure support ticket in Azure CLI

az synapse

Reference subgroup	Azure CLI article showing reference use
<code>az synapse role assignment</code>	Move an Azure Synapse Analytics workspace from one region to another
<code>az synapse spark pool</code>	Move an Azure Synapse Analytics workspace from one region to another
	Quickstart: Create a Synapse SQL pool with Azure CLI
<code>az synapse workspace</code>	Move an Azure Synapse Analytics workspace from one region to another
	Quickstart: Create an Azure synapse workspace with Azure CLI
<code>az synapse workspace firewall-rule</code>	Move an Azure Synapse Analytics workspace from one region to another
	Quickstart: Create an Azure synapse workspace with Azure CLI

Reference subgroup	Azure CLI article showing reference use
az synapse workspace managed-identity	Move an Azure Synapse Analytics workspace from one region to another

az tag

Reference subgroup	Azure CLI article showing reference use
az tag	Enable Microsoft Defender for Storage (classic)
	Apply tags with Azure CLI
	Tutorial: Route policy state change events to Event Grid with Azure CLI
	Apply inventory tagging to Azure Arc-enabled servers
	How to peer payment HSM virtual networks

az term

Reference subgroup	Azure CLI article showing reference use
az term	Troubleshoot common Azure Spring Apps issues
	Quickstart: Deploy your first application to Azure Spring Apps
	Quickstart: Build and deploy apps to Azure Spring Apps using the Enterprise plan
	Use Tanzu Build Service
	Enterprise plan in Azure Marketplace

az ts

Reference subgroup	Azure CLI article showing reference use
az ts	How to use Azure Resource Manager (ARM) deployment templates with Azure CLI
	Azure Resource Manager template specs
	Azure Resource Manager template specs in Bicep

Reference subgroup	Azure CLI article showing reference use Quickstart: Create and deploy template spec
	Quickstart: Create and deploy a template spec with Bicep

az tsi

Reference subgroup	Azure CLI article showing reference use
az tsi access-policy	Authentication and authorization for Azure Time Series Insights API
az tsi environment	Create an Azure Time Series Insights Gen2 environment using the Azure CLI
az tsi environment gen2	Create an Azure Time Series Insights Gen2 environment using the Azure CLI

az upgrade

Reference subgroup	Azure CLI article showing reference use
Azure CLI	Install Azure CLI on Windows
	Install the Azure CLI on Linux
	Install Azure CLI on macOS
	How to update the Azure CLI
	How to use variables in Azure CLI commands

az version

Reference subgroup	Azure CLI article showing reference use
Azure CLI	Install Azure CLI on Windows
	Install the Azure CLI on Linux
	Install Azure CLI on macOS
	How to use variables in Azure CLI commands
	Tutorial: Use persisted parameters to simplify sequential Azure CLI commands

az vm

Reference subgroup	Azure CLI article showing reference use
az vm	Output formats for Azure CLI commands How to use variables in Azure CLI commands 4 - Get VM information with queries 3 - Create a virtual machine on a virtual network Log in to a Windows virtual machine in Azure by using Azure AD including passwordless New Version of Azure VM extension for SAP solutions Standard Version of Azure VM extension for SAP solutions
az vm application	Create and deploy VM Applications
az vm availability-set	Implement Oracle Data Guard on a Linux-based Azure virtual machine Create a complete Linux virtual machine with the Azure CLI Deploy VMs to proximity placement groups using Azure CLI Migrate a Linux virtual machine from unmanaged disks to managed disks Tutorial: Manually install Oracle WebLogic Server on Azure Virtual Machines
az vm boot-diagnostics	Repair a Windows VM by using the Azure Virtual Machine repair commands Repair a Linux VM by using the Azure Virtual Machine repair commands Troubleshoot Resource Manager deployment issues with creating a new Linux virtual machine in Azure
	Troubleshoot a Linux VM by attaching the OS disk to a recovery VM with the Azure CLI
az vm disk	Using Azure ultra disks Create an Oracle Database in an Azure VM Add a disk to a Linux VM Azure Disk Encryption scenarios on Linux VMs

Reference subgroup	Azure CLI article showing reference use
	Preview - Increase IOPS and throughput limits for Azure Premium SSDs and Standard SSD/HDDs
az vm encryption	Move virtual machines to resource group or subscription
	Azure Disk Encryption scenarios on Windows VMs
	Create and configure a key vault for Azure Disk Encryption on a Windows VM
	Azure Disk Encryption scenarios on Linux VMs
	Unlocking an encrypted disk for offline repair
az vm extension	Log in to a Windows virtual machine in Azure by using Azure AD including passwordless
	Manage Azure Monitor Agent
	Log in to a Linux virtual machine in Azure by using Azure AD and OpenSSH
	Troubleshoot SSH connections to an Azure Linux VM that fails, errors out, or is refused
	How to connect using Secure Shell (SSH) and sign on to an Azure virtual machine running Windows
az vm extension image	Virtual machine extensions and features for Linux
	Enable Azure VM extensions using the Azure CLI
	New Version of Azure VM extension for SAP solutions
	Develop ARM templates for cloud consistency
	Update Azure Network Watcher extension to the latest version
az vm host	Deploy VMs and scale sets to dedicated hosts
	Add Azure Dedicated Host to an Azure Kubernetes Service (AKS) cluster
az vm host group	Deploy VMs and scale sets to dedicated hosts
	Add Azure Dedicated Host to an Azure Kubernetes Service (AKS) cluster
az vm identity	Log in to a Linux virtual machine in Azure by using Azure AD and OpenSSH
	Provide an identity to access the Azure Key Vault Provider for Secrets Store CSI Driver

Reference subgroup	Azure CLI article showing reference use
	Use an Azure managed identity to authenticate to an Azure container registry
	Use the Linux diagnostic extension 4.0 to monitor metrics and logs
	Tutorial: Use Azure Key Vault with a virtual machine in .NET
az vm image	Support for generation 2 VMs on Azure
	Azure VM Image Builder overview
	Move virtual machines to resource group or subscription
	Azure Virtual Machine Scale Set automatic OS image upgrades
	Find Azure Marketplace image information using the Azure CLI
az vm image terms	Move virtual machines to resource group or subscription
	Find Azure Marketplace image information using the Azure CLI
	Use dashboards to visualize Azure Databricks metrics
	Red Hat Enterprise Linux bring-your-own-subscription Gold Images in Azure
	Move a Marketplace Azure Virtual Machine to another subscription
az vm nic	Azure Instance Metadata Service
	Associate a public IP address to a virtual machine
	Dissociate a public IP address from an Azure VM
	Back up and recover an Oracle Database on an Azure Linux VM using Azure Backup
	How to create a Linux virtual machine in Azure with multiple network interface cards
az vm repair	Repair a Windows VM by using the Azure Virtual Machine repair commands
	Azure Linux virtual machine fails to boot after applying kernel changes
	Troubleshoot Linux VM boot issues due to fstab errors
	Repair a Linux VM by using the Azure Virtual Machine repair commands
	Troubleshoot Resource Manager deployment issues with creating a new Linux virtual machine in Azure

Reference subgroup	Azure CLI article showing reference use
az vm run-command	Run scripts in your Windows VM by using action Run Commands
	How to use SSH keys with Windows on Azure
	Quick steps: Create and use an SSH public-private key pair for Linux VMs in Azure
	How to connect using Secure Shell (SSH) and sign on to an Azure virtual machine running Windows
	Quickstart: Create a Linux virtual machine with the Azure CLI
az vm secret	Tutorial - How to use cloud-init to customize a Linux virtual machine in Azure on first boot
	Tutorial: Use TLS/SSL certificates to secure a web server
az vm unmanaged-disk	Attach an unmanaged disk to a VM for offline repair
az vm user	Troubleshoot SSH connections to an Azure Linux VM that fails, errors out, or is refused
	Manage administrative users, SSH, and check or repair disks on Linux VMs by using the VMAccess extension with the Azure CLI
	Use Azure Policy to restrict extensions installation on Linux VMs

az vmss

Reference subgroup	Azure CLI article showing reference use
az vmss	Connect to Azure Kubernetes Service (AKS) cluster nodes for maintenance or troubleshooting
	Azure Virtual Machine Scale Set agents
	Troubleshoot Azure Kubernetes Service cluter/node in a failed state
	Explore Azure Hybrid Benefit for Windows VMs
	Troubleshoot issues with the Log Analytics agent for Windows
az vmss application	Create and deploy VM Applications
	Tutorial: Create and use disks with Virtual Machine Scale Set with the

Reference subgroup	Azure CLI article showing reference use
	Azure CLI
	Encrypt OS and attached data disks in a Virtual Machine Scale Set with the Azure CLI
	Enable disk encryption for Azure Service Fabric cluster nodes in Linux
	Enable disk encryption for Azure Service Fabric cluster nodes in Windows
az vmss extension	Azure Virtual Machine Scale Set agents
	Log in to a Linux virtual machine in Azure by using Azure AD and OpenSSH
	Troubleshoot issues with the Log Analytics agent for Windows
	Automatic Extension Upgrade for VMs and Scale Sets in Azure
	Use the Linux diagnostic extension 4.0 to monitor metrics and logs
az vmss identity	Log in to a Linux virtual machine in Azure by using Azure AD and OpenSSH
	Provide an identity to access the Azure Key Vault Provider for Secrets Store CSI Driver
	Use the Linux diagnostic extension 4.0 to monitor metrics and logs
	Configure remote write for Azure Monitor managed service for Prometheus using managed identity authentication
	Configure managed identities for Azure resources on a virtual machine scale set using Azure CLI
az vmss rolling-upgrade	Azure Virtual Machine Scale Set automatic OS image upgrades
az vmss run-command	Troubleshoot issues with the Log Analytics agent for Windows
	Certificate rotation in Azure Kubernetes Service (AKS)
	Tunnel connectivity issues
	Troubleshoot Node Not Ready failures if there are expired certificates
	Troubleshoot node not ready failures caused by CSE errors
	Attach Azure NetApp Files datastores to Azure VMware Solution hosts
az vmware datastore netapp-volume	Attach Azure NetApp Files datastores to Azure VMware Solution hosts

Reference subgroup	Azure CLI article showing reference use
	Configure customer-managed key encryption at rest in Azure VMware Solution

az webapp

Reference subgroup	Azure CLI article showing reference use
az webapp	Quickstart: Deploy an ASP.NET web app Quickstart: Deploy a Python (Django or Flask) web app to Azure App Service Deploy a Node.js web app in Azure Use Key Vault references for App Service and Azure Functions Deploy files to App Service Tutorial: Authenticate and authorize users end-to-end in Azure App Service Work with OAuth tokens in Azure App Service authentication Customize sign-in and sign-out in Azure App Service authentication Tutorial: Connect an App Service app to SQL Database on behalf of the signed-in user Manage the API and runtime versions of App Service authentication
az webapp config	Configure an App Service app Use Key Vault references for App Service and Azure Functions Configure a custom container for Azure App Service Configure a Node.js app for Azure App Service Configure a Linux Python app for Azure App Service
az webapp config access-restriction	Set up Azure App Service access restrictions Application Gateway integration Tutorial: Create a highly available multi-region app in Azure App Service Integrate App Service with Application Gateway using CLI

Reference subgroup	Azure CLI article showing reference use
<code>az webapp config appsettings</code>	Configure an App Service app
	Configure a Node.js app for Azure App Service
	OS and runtime patching in Azure App Service
	Tutorial: Using Service Connector to build a Django app with Postgres on Azure App Service
<code>az webapp config apptings</code>	Configure an App Service app
	Quickstart: Deploy a Python (Django or Flask) web app to Azure App Service
	Deploy files to App Service
	Configure a custom container for Azure App Service
	Configure a Node.js app for Azure App Service
	Back up and restore your app in Azure App Service
	Backup and restore a web app from a backup using CLI
	Configure an App Service app
	Tutorial: Connect to SQL Database from .NET App Service without secrets using a managed identity
	Tutorial: Connect an App Service app to SQL Database on behalf of the signed-in user
	Tutorial: Connect a Node.js web app with Azure Cosmos DB for MongoDB vCore
<code>az webapp config container</code>	Deployment Best Practices
	Configure a custom container for Azure App Service
	Migrate custom software to Azure App Service using a custom container
	Tutorial: Create a multi-container (preview) app in Web App for Containers
	Continuous deployment with custom containers in Azure App Service
<code>az webapp config hostname</code>	Bind a custom TLS/SSL certificate to an App Service app using CLI

Reference subgroup	Azure CLI article showing reference use
	Map a custom domain to an App Service app using CLI
	How-to: build a real-time collaborative whiteboard using Azure Web PubSub and deploy it to Azure App Service
az webapp config snapshot	Back up and restore your app in Azure App Service
az webapp config ssl	Bind a custom TLS/SSL certificate to an App Service app using CLI
az webapp config storage-account	Mount Azure Storage as a local share in App Service
	Bring dependencies or third party library to Azure Functions
	Mount a file share to a Python function app using Azure CLI
az webapp connection	Service Connector internals
	Quickstart: Create a service connection in App Service with the Azure CLI
az webapp connection create	Connect to and query Azure SQL Database using .NET and Entity Framework Core
	Connect to and query Azure SQL Database using .NET and the Microsoft.Data.SqlClient library
	Tutorial: Deploy a web application connected to Azure Blob Storage with Service Connector
	Tutorial: Connect a web app to Azure App Configuration with Service Connector
	Connect to and query Azure SQL Database using Node.js and mssql npm package
az webapp cors	Tutorial: Host a RESTful API with CORS in Azure App Service
az webapp deployment	Quickstart: Deploy a Python (Django or Flask) web app to Azure App Service
	Deploy your app to Azure App Service using FTP/S
	Configure deployment credentials for Azure App Service
	Create an App Service app and deploy files with FTP using Azure CLI
az webapp deployment container	Migrate custom software to Azure App Service using a custom container

Reference subgroup	Azure CLI article showing reference use
	Continuous deployment with custom containers in Azure App Service
az webapp deployment github-actions	Use CI/CD with GitHub Actions to deploy a Python web app to Azure App Service on Linux
az webapp deployment slot	Deploy a .NET web app using GitHub Actions
	Tutorial: Create a highly available multi-region app in Azure App Service
	Deploy an app to App Service
	Create an App Service app and deploy code to a staging environment using Azure CLI
az webapp deployment source	Quickstart: Deploy a Python (Django or Flask) web app to Azure App Service
	Provision and publish a bot
	Local Git deployment to Azure App Service
	Run your app in Azure App Service directly from a ZIP package
	Step 1: Upload image data in the cloud with Azure Storage
az webapp deployment user	Tutorial: Use a managed identity to connect Key Vault to an Azure web app in .NET
	Tutorial: Host a RESTful API with CORS in Azure App Service
	Create a PHP web app in Azure App Service
	Configure deployment credentials for Azure App Service
	Tutorial: Visualize real-time sensor data from your Azure IoT hub in a web application
az webapp identity	How to use managed identities for App Service and Azure Functions
	Tutorial: Connect to SQL Database from .NET App Service without secrets using a managed identity
	Configure a custom container for Azure App Service
	Tutorial: Use a managed identity to connect Key Vault to an Azure web app in .NET
	Migrate custom software to Azure App Service using a custom container

Reference subgroup	Azure CLI article showing reference use
az webapp log	Quickstart: Deploy a Python (Django or Flask) web app to Azure App Service Enable diagnostics logging for apps in Azure App Service
	Deploy a Node.js web app in Azure
	Configure a custom container for Azure App Service
	Configure a Node.js app for Azure App Service
az webapp vnet-integration	Enable virtual network integration in Azure App Service Tutorial: Deploy Django app with App Service and Azure Database for PostgreSQL - Flexible Server
	Tutorial: Isolate back-end communication in Azure App Service with Virtual Network integration
	Tutorial: Create a secure n-tier app in Azure App Service
	Tutorial: Connect an App Services Web app to an Azure Database for MySQL - Flexible Server in a virtual network

az webpubsub

Reference subgroup	Azure CLI article showing reference use
az webpubsub	Tutorial: Publish and subscribe messages using WebSocket API and Azure Web PubSub service SDK Tutorial: Create a chat app with Azure Web PubSub service
	Tutorial: Publish and subscribe messages between WebSocket clients using subprotocol
	Create a Web PubSub resource
	Tutorial: Create a serverless chat app with Azure Web PubSub service and Azure Static Web Apps
az webpubsub client	Quickstart: Publish messages using the Azure Web PubSub service SDK
az webpubsub hub	Tutorial: Create a chat app with Azure Web PubSub service

Reference subgroup	Azure CLI article showing reference use
	Event handler in Azure Web PubSub service
	Event notifications from clients
	Tutorial: Create a serverless chat app with Azure Web PubSub service and Azure Static Web Apps
	How-to: build a real-time collaborative whiteboard using Azure Web PubSub and deploy it to Azure App Service
az webpubsub key	Tutorial: Publish and subscribe messages using WebSocket API and Azure Web PubSub service SDK
	Tutorial: Create a chat app with Azure Web PubSub service
	Tutorial: Publish and subscribe messages between WebSocket clients using subprotocol
	Tutorial: Create a serverless chat app with Azure Web PubSub service and Azure Static Web Apps
	Tutorial: Visualize IoT device data from IoT Hub using Azure Web PubSub service and Azure Functions

az workloads

Reference subgroup	Azure CLI article showing reference use
az workloads	Tutorial: Use Azure CLI to create infrastructure for a distributed highly available (HA) SAP system with <i>Azure Center for SAP solutions</i> with customized resource names
	Quickstart: Use Azure CLI to create infrastructure for a distributed highly available (HA) SAP system with Azure Center for SAP solutions with customized resource names
az workloads sap-virtual-instance	Tutorial: Use Azure CLI to create infrastructure for a distributed highly available (HA) SAP system with <i>Azure Center for SAP solutions</i> with customized resource names
	Quickstart: Install software for a Distributed High-Availability (HA) SAP system and customized resource names with Azure Center for SAP solutions using Azure CLI
	Quickstart: Use Azure CLI to create infrastructure for a distributed highly available (HA) SAP system with Azure Center for SAP solutions with

Reference subgroup	Azure CLI article showing reference use
	customized resource names
	Quickstart: Register an existing SAP system with Azure Center for SAP solutions with CLI
	Quickstart: Start and stop SAP systems from Azure Center for SAP solutions with CLI

Learn to use Bash with the Azure CLI

Article • 08/02/2023

Azure CLI reference commands can execute in several different [shell environments](#), but Microsoft Docs primarily use the Bash environment. If you're new to Bash and also the Azure CLI, this article is a great place to begin your learning journey. Work through this article much like you would a tutorial to learn how to use the Azure CLI in a Bash environment with ease.

In this article, you learn how to:

- ✓ Query results as JSON dictionaries or arrays
- ✓ Format output as JSON, table, or TSV
- ✓ Query, filter, and format single and multiple values
- ✓ Use if/exists/then and case syntax
- ✓ Use for loops
- ✓ Use grep, sed, paste, and bc commands
- ✓ Populate and use shell and environment variables

If you don't have an Azure subscription, create an [Azure free account](#) before you begin.

Starting Bash

Start Bash using [Azure Cloud Shell](#) or a [local install of the Azure CLI](#). This article assumes that you're running Bash either using Azure Cloud Shell or running Azure CLI locally in a docker container.

Querying dictionary results

A command that always returns only a single object returns a JSON dictionary. Dictionaries are unordered objects accessed with keys. For this article, we're going to start by querying the [Account](#) object using the [Account Show](#) command.

Azure CLI

```
az account show  
az account show --output json # JSON is the default format
```

The following JSON dictionary output has some fields omitted for brevity, and identifying information has been removed or genericized.

JSON

```
bash-5.1# az account show
{
  "environmentName": "AzureCloud",
  "isDefault": true,
  "managedByTenants": [],
  "name": "My test subscription",
  "state": "Enabled",
  "user": {
    "name": "user@contoso.com",
    "type": "user"
  }
}
```

Formatting the output as YAML

Use the `--output yaml` argument (or `-o yaml`) to format the output in [yaml](#) format, a plain-text data serialization format. YAML tends to be easier to read than JSON, and easily maps to that format. Some applications and CLI commands take YAML as configuration input, instead of JSON.

Azure CLI

```
az account show --output yaml
```

For more information about formatting the output as yaml, see [YAML output format](#).

Formatting the output as a table

Use the `--output table` argument (or `-o table`) to format the output as an ASCII table. Nested objects aren't included in table output, but can still be filtered as part of a query.

Azure CLI

```
az account show --output table
```

For more information about formatting the output as a table, see [Table output format](#).

Querying and formatting single values and nested values

The following queries demonstrate querying single values, including nested values in a JSON dictionary output. The final query in this set demonstrates formatting the output

using the `-o tsv` argument. This argument returns the results as tab- and newline-separated values. This action is useful for removing quotation marks in the value returned - which is useful to consume the output into other commands and tools that need to process the text in some form (as is demonstrated later in this article).

Azure CLI

```
az account show --query name # Querying a single value
az account show --query name -o tsv # Removes quotation marks from the
output

az account show --query user.name # Querying a nested value
az account show --query user.name -o tsv # Removes quotation marks from the
output
```

Querying and formatting properties from arrays

The following query demonstrates getting properties in a JSON array. Get subscription properties, displayed as a table of subscriptions.

Azure CLI

```
az account list --query "[].{subscription_id:id, name:name,
isDefault:isDefault}" -o table
```

This query returns results similar to:

JSON

Subscription_id	Name
IsDefault	
-----	-----
11111111-3ddc-45ce-8334-c7b28a9e1c3a	C & L Azure developer experience
content projects	False
22222222-8f1c-409b-af1e-8e2e65d9b90a	DevCenter - Infrastructure - Dogfood
False	
33333333-c080-42a7-8973-1aa853ab4df3	Babel
False	

Querying and formatting multiple values, including nested values

To get more than one property, put expressions in square brackets [] (a multiselect list) as a comma-separated list. The following queries demonstrate querying multiple values

in a JSON dictionary output, using multiple output formats.

Azure CLI

```
az account show --query [name,id,user.name] # return multiple values  
az account show --query [name,id,user.name] -o table # return multiple  
values as a table
```

For more information about returning multiple values, see [Get multiple values](#).

Renaming properties in a query

The following queries demonstrate the use of the {} (multiselect hash) operator to get a dictionary instead of an array when querying for multiple values. It also demonstrates renaming properties in the query result.

Azure CLI

```
az account show --query "{SubscriptionName: name, SubscriptionId: id,  
UserName: user.name}" # Rename the values returned  
az account show --query "{SubscriptionName: name, SubscriptionId: id,  
UserName: user.name}" -o table # Rename the values returned in a table
```

For more information on renaming properties in a query, see [Rename properties in a query](#).

Querying boolean values

Boolean values are assumed to be true, so the "[?isDefault]" query syntax for the `az account list` command returns the current default subscription. To get the false values, you must use an escape character, such as \.

The following queries demonstrate querying all accounts in a subscription, potentially returning a JSON array if there are multiple subscriptions for a given account, and then querying for which account is the default subscription. It also demonstrates querying for the accounts that aren't the default subscription. These queries build on what you learned previously to filter and format the results. Finally, the final query demonstrates storing the query results in a variable.

Azure CLI

```
az account list  
az account list --query "[?isDefault]" # Returns the default subscription  
az account list --query "[?isDefault]" -o table # Returns the default
```

```

subscription as a table
az account list --query "[?isDefault].[name,id]" # Returns the name and id
of the default subscription
az account list --query "[?isDefault].[name,id]" -o table # Returns the name
and id of the default subscription as a table
az account list --query "[?isDefault].{SubscriptionName: name,
SubscriptionId: id}" -o table # Returns the name and id of the default
subscription as a table with friendly names

az account list --query "[?isDefault == \`false\`]" # Returns all non-
default subscriptions, if any
az account list --query "[?isDefault == \`false\`].name" -o table # Returns
all non-default subscriptions, if any, as a table

az account list --query "[?isDefault].id" -o tsv # Returns the subscription
id without quotation marks
subscriptionId="$(az account list --query "[?isDefault].id" -o tsv)" #
Captures the subscription id as a variable.
echo $subscriptionId # Returns the contents of the variable.
az account list --query "[? contains(name, 'Test')].id" -o tsv # Returns the
subscription id of a non-default subscription containing the substring
'Test'
subscriptionId="$(az account list --query "[? contains(name, 'Test')].id" -o
tsv)" # Captures the subscription id as a variable.
az account set -s $subscriptionId # Sets the current active subscription

```

- For more information about filtering arrays and querying boolean values, see [Filter arrays with boolean expressions](#).
- For more information about using variables, see [How to use variables](#).
- For more information on working with subscriptions, see [Managing subscriptions](#).

Creating objects using variables and randomization

Setting a random value for use in subsequent commands

Setting and using a random value for use in variables allows you to run scripts multiple times without naming conflicts. Naming conflicts can occur because a value must be unique across the service, or because an object you have deleted still exists within Azure until the deletion process is complete.

`$RANDOM` is a bash function (not a constant) that returns a random signed 16-bit integer (from 0 through 32767). The `let` command is a built-in Bash command to evaluate arithmetic expressions. Using the following command creates a sufficiently unique value for most purposes.

Azure CLI

```
let "randomIdentifier=$RANDOM*$RANDOM"
```

Working with spaces and quotation marks

Spaces are used for separating commands, options, and arguments. Use quote marks to tell the Bash shell to ignore all special characters, of which a white space is a special character. When the Bash shell sees the first quote mark, it ignores special characters until the closing quote mark. However, sometimes you want the Bash shell to parse certain special characters, such as dollar signs, back quotes, and backslashes. For this scenario, use double quotes.

The following commands use the `az group create` command to illustrate the use of single and double quote marks. These commands are used to handle spaces and evaluate special characters when working with variables and creating an object.

Azure CLI

```
resourceGroup='msdocs-learn-bash-$randomIdentifier'
echo $resourceGroup # The $ is ignored in the creation of the $resourceGroup
variable
resourceGroup="msdocs-learn-bash-$randomIdentifier"
echo $resourceGroup # The $randomIdentifier is evaluated when defining the
$resourceGroup variable
location="East US" # The space is ignored when defining the $location
variable
echo The value of the location variable is $location # The value of the
$location variable is evaluated
echo "The value of the location variable is $location" # The value of the
$location variable is evaluated
echo "The value of the location variable is \$location" # The value of the
$location variable is not evaluated
echo 'The value of the location variable is $location' # The value of the
$location variable is not evaluated
az group create --name $resourceGroup --location $location # Notice that the
space in the $location variable is not ignored and the command fails as it
treats the value after the space as a new command
az group create --name $resourceGroup --location "$location" # Notice that
the space in the $location variable is ignored and the location argument
accepts the entire string as the value
```

In the JSON dictionary output, review the properties of the resource group that was created.

Using If Then Else to determine if variable is null

To evaluate strings, use `!=` and to evaluate numbers use `-ne`. The following If Then Else statement evaluates whether the `$resourceGroup` variable has been set. If yes, it returns the value of the variable. If no, it sets the variable.

Azure CLI

```
if [ $resourceGroup != '' ]; then
    echo $resourceGroup
else
    resourceGroup="msdocs-learn-bash-$randomIdentifier"
fi
```

Using If Then to create or delete a resource group

The following script creates a new resource group only if one with the specified name doesn't already exist.

Azure CLI

```
if [ $(az group exists --name $resourceGroup) = false ]; then
    az group create --name $resourceGroup --location "$location"
else
    echo $resourceGroup
fi
```

The following script deletes an existing new resource group if one with the specified name already exists. You could use the `--no-wait` argument to return control without waiting for the command to complete. However, for this article, we want to wait for the resource group to be deleted before continuing. For more information on asynchronous operations, see [Asynchronous operations](#). We demonstrate the use of the `--no-wait` argument at the end of this article.

Azure CLI

```
if [ $(az group exists --name $resourceGroup) = true ]; then
    az group delete --name $resourceGroup -y # --no-wait
else
    echo The $resourceGroup resource group does not exist
fi
```

Using Grep to determine if a resource group exists, and create the resource group if it doesn't

The following command pipes the output of the `az group list` command to the `grep` command. If the specified resource group doesn't exist, the command creates the resource group using the previously defined variables.

Azure CLI

```
az group list --output tsv | grep $resourceGroup -q || az group create --name $resourceGroup --location "$location"
```

Using CASE statement to determine if a resource group exists, and create the resource group if it doesn't

The following CASE statement creates a new resource group only if one with the specified name doesn't already exist. If one with the specified name exists, the CASE statement echoes that the resource group exists.

Azure CLI

```
var=$(az group list --query "[? contains(name, '$resourceGroup')].name" --output tsv)
case $resourceGroup in
$var)
echo The $resourceGroup resource group already exists.;;
*)
az group create --name $resourceGroup --location "$location";;
esac
```

Using for loops and querying arrays

In this section of the article, we create a storage account and then use for loops to create blobs and containers. We also demonstrate querying JSON arrays and working with environment variables.

Create storage account

The following command uses the `az storage account create` command to create a storage account that we use when creating storage containers.

Azure CLI

```
storageAccount="learnbash$randomIdentifier"
az storage account create --name $storageAccount --location "$location" --
```

```
resource-group $resourceGroup --sku Standard_LRS --encryption-services blob
```

Get the storage account keys

The following commands use the [az storage account keys list](#) command to return storage account key values. We then store a key value in a variable for use when creating storage containers.

Azure CLI

```
az storage account keys list --resource-group $resourceGroup --account-name $storageAccount --query "[].value" -o tsv # returns both storage account key values

az storage account keys list --resource-group $resourceGroup --account-name $storageAccount --query "[0].value" -o tsv # returns a single storage account key value

accountKey=$(az storage account keys list --resource-group $resourceGroup --account-name $storageAccount --query "[0].value" -o tsv)

echo $accountKey
```

Create storage container

We start by using the [az storage container create](#) to create a single storage container and then use the [az storage container list](#) to query the name of the created container.

Azure CLI

```
container="learningbash"
az storage container create --account-name $storageAccount --account-key $accountKey --name $container

az storage container list --account-name $storageAccount --account-key $accountKey --query [].name
```

Upload data to container

The following script creates three sample files using a for loop.

Azure CLI

```
for i in `seq 1 3`; do
    echo $randomIdentifier > container_size_sample_file_$i.txt
```

done

The following script uses the [az storage blob upload-batch](#) command to upload the blobs to the storage container.

Azure CLI

```
az storage blob upload-batch \
--pattern "container_size_sample_file_*.txt" \
--source . \
--destination $container \
--account-key $accountKey \
--account-name $storageAccount
```

The following script uses the [az storage blob list](#) command to list the blobs in the container.

Azure CLI

```
az storage blob list \
--container-name $container \
--account-key $accountKey \
--account-name $storageAccount \
--query "[].name"
```

The following script displays the total bytes in the storage container.

Azure CLI

```
bytes=`az storage blob list \
--container-name $container \
--account-key $accountKey \
--account-name $storageAccount \
--query "[*].[properties.contentLength]" \
--output tsv | paste -s -d+ | bc` 

echo "Total bytes in container: $bytes"
echo $bytes
```

Create many containers using loops

Next, we create multiple containers using a loop demonstrating a couple of ways to write the loop.

Azure CLI

```
for i in `seq 1 4`; do
az storage container create --account-name $storageAccount --account-key
$accountKey --name learnbash-$i
done

for value in {5..8}
for (( i=5; i<10; i++));
do
az storage container create --account-name $storageAccount --account-key
$accountKey --name learnbash-$i
done

az storage container list --account-name $storageAccount --account-key
$accountKey --query [].name
```

Use EXPORT to define environment variables

In the preceding storage container scripts, we specified the account name and account key with every command. Instead, you can store your authentication credentials using the corresponding environment variables: `AZURE_STORAGE_ACCOUNT` and `AZURE_STORAGE_KEY`. To perform this action, use `EXPORT`.

Azure CLI

```
export AZURE_STORAGE_ACCOUNT=$storageAccount
export AZURE_STORAGE_KEY=$accountKey
az storage container list # Uses the environment variables to display the
list of containers.
```

The following script creates a metadata string and then uses the `az storage container metadata update` command to update a container with that string, again using the environment variables.

Azure CLI

```
metadata="key=value pie=delicious" # Define metadata
az storage container metadata update \
    --name $container \
    --metadata $metadata # Update the metadata
az storage container metadata show \
    --name $containerName # Show the metadata
```

The following command uses the `az storage container delete` command to delete a single named container and then delete multiple containers in a loop.

Azure CLI

```
az storage container delete \
--name $container
```

Get list of containers containing a specific prefix and store results into a variable.

Azure CLI

```
containerPrefix="learnbash"
containerList=$(az storage container list \
--query "[].name" \
--prefix $containerPrefix \
--output tsv)
```

Delete the list of containers in a loop using the `--prefix` argument.

Azure CLI

```
for row in $containerList
do
    tmpName=$(echo $row | sed -e 's/\r//g')
    az storage container delete \
    --name $tmpName
done
```

Error handling

To exit a script immediately if a command returns a nonzero status, run the following command:

Azure CLI

```
set -e
```

For more information about setting shell options and other help, run the following commands:

Azure CLI

```
help set
help help
```

Clean up resources

When you're finished this article, delete the resource group and all resources within it.

Use the `--no-wait` argument.

Azure CLI

```
if [ $(az group exists --name $resourceGroup) = true ]; then
    az group delete --name $resourceGroup -y --no-wait
else
    echo The $resourceGroup resource group does not exist
fi
```

See also

- [How to use the Azure CLI successfully](#)
- [How to query Azure CLI command output](#)
- [Find Azure CLI samples](#)

Tips for using the Azure CLI successfully

Article • 09/14/2023

Azure CLI is a command-line tool that allows you to configure and manage Azure resources from many shell environments. First [choose the right command-line tool](#) and [install](#) the Azure CLI. Then use this article to discover useful tips on how to avoid common pitfalls and use the Azure CLI successfully.

To learn more about specific Azure CLI commands, see the [Azure CLI Reference list](#).

Output formatting

Three common output formats are used with Azure CLI commands:

1. The `json` format shows information as a JSON string.
 - JSON gives you the most comprehensive information.
 - This format is the default but you can use the `--output` parameter to specify a different option.
 - Change the global default format to one of your personal preferences by using `az config` such as `az config set core.output=table`.
 - JSON format preserves the double quotes, generally making it unsuitable for scripting purposes.
2. The `table` format presents output as a readable table. You can specify which values appear in the table and use queries to customize the output as shown here:

```
Azure CLI

# command
az vm show --resource-group myResourceGroup --name myVMname --query "
{name: name, os:storageProfile.imageReference.offer}" --output table

# output
Name      Os
-----
myVMname  UbuntuServer
```

3. The `tsv` format returns tab-separated and newline-separated values without extra formatting, keys, or other symbols.
 - The TSV format is useful for concise output and scripting purposes.
 - The TSV strips double quotes that the JSON format preserves.

- To specify the format you want for TSV, use the `--query` parameter.

Bash

```
export vm_ids=$(az vm list --show-details --resource-group
myResourceGroup --query "[?powerState=='VM running'].id" --output tsv)
az vm stop --ids $vm_ids
```

For more information about these and other formats, see [Output formats for Azure CLI commands](#).

Pass values to another command

If the value is used more than once, assign it to a variable. Variables allow you to use values more than once or to create more general scripts. This example assigns an ID found by the `az vm list` command to a variable.

Bash

```
# assign the list of running VMs to a variable
running_vm_ids=$(az vm list --resource-group MyResourceGroup --show-details
\
--query "[?powerState=='VM running'].id" --output tsv)

# verify the value of the variable
echo $running_vm_ids
```

If the value is used only once, consider piping.

Azure CLI

```
az vm list --query "[?powerState=='VM running'].name" --output tsv | grep
my_vm
```

For multi-value lists, consider the following options:

1. If you need more controls on the result, use a "for" loop:

Bash

```
#!/usr/bin/env bash
for vmList in $(az vm list --resource-group MyResourceGroup --show-
details --query "[?powerState=='VM running'].id" --output tsv); do
    echo stopping $vmList
    az vm stop --ids $vmList
    if [ $? -ne 0 ]; then
```

```
        echo "Failed to stop $vmList"
        exit 1
    fi
    echo $vmList stopped
done
```

2. Alternatively, use `xargs` and consider using the `-P` flag to run the operations in parallel for improved performance:

Azure CLI

```
az vm list --resource-group MyResourceGroup --show-details \
--query "[?powerState=='VM stopped'].id" \
--output tsv | xargs -I {} -P 10 az vm start --ids "{}"
```

3. Finally, Azure CLI has built-in support to process commands with multiple `--ids` in parallel to achieve the same effect of `xargs`. `@-` is used to get values from the pipe:

Azure CLI

```
az vm list --resource-group MyResourceGroup --show-details \
--query "[?powerState=='VM stopped'].id" \
--output tsv | az vm start --ids @-
```

For more information on using Bash constructs with the Azure CLI including loops, case statements, if..then..else, and error handling, see [Learn to use Bash with the Azure CLI](#).

Use quotation marks in parameters

When you work with Azure CLI commands, be aware of how your shell uses quotation marks and escapes characters. If you support scripts used in different shells, you need to understand how they differ.

- Bash. [Quoting ↗](#)
- PowerShell. [About Quoting Rules](#)
- Windows Command Prompt. [How-to: Escape Characters, Delimiters and Quotes at the Windows command line ↗](#)

ⓘ Note

Due to a known issue in PowerShell, some extra escaping rules apply. For more information, see [Quoting issues with PowerShell ↗](#).

To avoid unanticipated results, here are a few suggestions:

- If you provide a parameter that contains whitespace, wrap it in quotation marks.
- In Bash or PowerShell, both single and double quotes are interpreted correctly. In Windows Command Prompt, only double quotes are interpreted correctly -- single quotes are treated as part of the value.
- If your command is only going to run on Bash (or Zsh), use single quotes to preserve the content inside the JSON string. Single quotes are necessary when supplying inline JSON values. For example, this JSON is correct in Bash: `'{"key": "value"}'`.
- If your command runs at a Windows Command Prompt, you must use double quotes. If the value contains double quotes, you must escape it. The equivalent of the above JSON string is `"{\"key\": \"value\"}"`.
- In PowerShell, if your value is an empty string, use `''`.
- In Bash or PowerShell, if your value is an empty quotes string `' '`, use `""`.
- Use Azure CLI's `@<file>` convention to load from a file and bypass the shell's interpretation mechanisms.

Azure CLI

```
az ad app create --display-name myName --native-app --required-resource-accesses @manifest.json
```

- Bash evaluates double quotes in exported variables. If this behavior isn't what you want, escape the variable: `"\$variable"`.
- Some Azure CLI commands take a list of space separated values.
 - If the key name or value contains spaces, wrap the whole pair: `"my key=my value"`. For example:

Azure CLI

```
az web app config app settings set --resource-group myResourceGroup --name myWebAppName --settings "client id=id1" "my name=john"
```

- When a CLI parameter states that it accepts a space-separated list, one of two formats is expected:

1. Unquoted, space-separated list `--parameterName firstValue secondValue`
2. Quoted space-separated list `--parameterName "firstValue" "secondValue"`

This example is a string with a space in it. It isn't a space-separated list: `--parameterName "firstValue secondValue"`

- There are special characters of PowerShell, such as at `@`. To run Azure CLI in PowerShell, add `\`` before the special character to escape it. You can also enclose the value in single or double quotes `" / "`.

PowerShell

```
# The following three examples will work in PowerShell
--parameterName `@parameters.json
--parameterName '@parameters.json'
--parameterName "@parameters.json"

# This example will not work in PowerShell
--parameterName @parameters.json
```

- When you use the `--query` parameter with a command, some characters of [JMESPath](#) need to be escaped in the shell.

Bash

These three commands are correct and equivalent in Bash:

Azure CLI

```
az version --query '"azure-cli"'
az version --query \"azure-cli\
az version --query "\\"azure-cli\\\""
```

Here are two examples of incorrect commands in Bash:

Azure CLI

```
# Wrong, as the dash needs to be quoted in a JMESPath query
az version --query azure-cli
az version: error: argument --query: invalid jmespath_type value:
'azure-cli'

# Wrong, as the dash needs to be quoted in a JMESPath query, but
# quotes are interpreted by Bash
az version --query "azure-cli"
```

```
az version: error: argument --query: invalid jmespath_type value:  
'azure-cli'
```

For more example comparisons between Bash, PowerShell and Cmd, see
[Query Azure CLI command output](#)

- The best way to troubleshoot a quoting issue is to run the command with the `--debug` flag. This flag reveals the actual arguments received by the Azure CLI in [Python's syntax ↗](#).

Bash

```
# Correct  
$ az '{"key":"value"}' --debug  
Command arguments: ['{"key":"value"}', '--debug']  
  
# Correct  
$ az "{\"key\":\"value\"}" --debug  
Command arguments: ['{"key":"value"}', '--debug']  
  
# Wrong, as quotes and spaces are interpreted by Bash  
$ az {"key": "value"} --debug  
Command arguments: ['{key:', 'value}', '--debug']  
  
# Wrong, as quotes are interpreted by Bash  
$ az {"key":"value"} --debug  
Command arguments: ['{key:value}', '--debug']
```

Use hyphen characters in parameters

If a parameter's value begins with a hyphen, Azure CLI tries to parse it as a parameter name. To parse it as value, use `=` to concatenate the parameter name and value: `--password="-VerySecret"`.

Asynchronous operations

Operations in Azure can take a noticeable amount of time. For instance, configuring a virtual machine at a data center isn't instantaneous. Azure CLI waits until the command has finished to accept other commands. Many commands therefore offer a `--no-wait` parameter as shown here:

```
az group delete --name MyResourceGroup --no-wait
```

When you delete a resource group, all the resources that belong to it are also removed. Removing these resources can take a long time. When you run the command with the `--no-wait` parameter, the console accepts new commands without interrupting the removal.

Many commands offer a wait option, pausing the console until some condition is met. The following example uses the `az vm wait` command to support creating independent resources in parallel:

Azure CLI

```
az vm create --resource-group VMResources --name virtual-machine-01 --image centos --no-wait
az vm create --resource-group VMResources --name virtual-machine-02 --image centos --no-wait

subscription=$(az account show --query "id" -o tsv)
vm1_id="/subscriptions/$subscription/resourceGroups/VMResources/providers/Microsoft.Compute/virtualMachines/virtual-machine-01"
vm2_id="/subscriptions/$subscription/resourceGroups/VMResources/providers/Microsoft.Compute/virtualMachines/virtual-machine-02"
az vm wait --created --ids $vm1_id $vm2_id
```

After both IDs are created, you can use the console again.

Work behind a proxy

If you're using Azure CLI over a proxy server that uses self-signed certificates, the Python [requests library](#) used by the Azure CLI may cause the following error: `SSLError("bad handshake: Error([('SSL routines', 'tls_process_server_certificate', 'certificate verify failed')],))`. To address this error, set the environment variable `REQUESTS_CA_BUNDLE` to the path of CA bundle certificate file in PEM format.

OS	Default certificate authority bundle
Windows	<code>C:\Program Files (x86)\Microsoft SDKs\Azure\CLI2\Lib\site-packages\certifi\cacert.pem</code>
Ubuntu/Debian Linux	<code>/opt/az/lib/python<version>/site-packages/certifi/cacert.pem</code>
CentOS/RHEL/SUSE Linux	<code>/usr/lib64/az/lib/python<version>/site-packages/certifi/cacert.pem</code>

OS	Default certificate authority bundle
macOS	/usr/local/Cellar/azure- cli/<cliversion>/libexec/lib/python<version>/site- packages/certifi/cacert.pem

Append the proxy server's certificate to the CA bundle certificate file, or copy the contents to another certificate file. Then set `REQUESTS_CA_BUNDLE` to the new file location. Here's an example:

Console

```
<Original cacert.pem>

-----BEGIN CERTIFICATE-----
<Your proxy's certificate here>
-----END CERTIFICATE-----
```

Some proxies require authentication. The format of the `HTTP_PROXY` or `HTTPS_PROXY` environment variables should include the authentication, such as `HTTPS_PROXY="https://username:password@proxy-server:port"`. For details, see [How to configure proxies for the Azure libraries](#).

Concurrent execution

If you run Azure CLI commands concurrently on the same machine, write conflicts can happen if multiple Azure CLI commands write to the same MSAL token cache.

To avoid potential failures, you may isolate the Azure CLI configuration folder for each script by setting environment variable `AZURE_CONFIG_DIR` for each script to a separate directory. Azure CLI commands in that script save the configuration and token cache to the configured location instead of the default `~/.azure` folder.

Bash

```
Bash

export AZURE_CONFIG_DIR=/my/config/dir
```

Generic update parameters

Azure CLI command groups often feature an update command. For instance, [Azure Virtual Machines](#) includes the `az vm update` command. Most update commands offer the three generic parameters: `--add`, `--set`, and `--remove`.

The `--set` and `--add` parameters take a list of space-separated key-value pairs: `key1=value1 key2=value2`. To see what properties you can update, use a show command, such as [az vm show](#).

```
Azure CLI
```

```
az vm show --resource-group VMResources --name virtual-machine-01
```

To simplify the command, consider using a JSON string. For example, to attach a new data disk to a virtual machine, use the following value:

```
Azure CLI
```

```
az vm update --resource-group VMResources --name virtual-machine-01 \
--add storageProfile.dataDisks "{\"createOption\": \"Attach\",
\"managedDisk\": {
  \"id\": \"/subscriptions/00000000-0000-0000-0000-
0000000000/resourceGroups/yg/providers/Microsoft.Compute/disks/yg-disk\"},
  \"lun\": 1}"
```

Generic resource commands (az resource)

A service you want to work with may not have Azure CLI support. You can use the [az resource](#) commands to work with these resources.

If you only need create or update commands, use the [az deployment group create](#). For working examples, see [Azure Quickstart Templates](#).

REST API commands (az rest)

If generic update parameters and [az resource](#) don't meet your needs, you can use the [az rest](#) command to call the REST API. The command automatically authenticates using the logged-in credential and sets header `Content-Type: application/json`. For more information, see [Azure REST API reference](#).

This example works with the [Microsoft Graph API](#). To update redirect URIs for an [Application](#), call the [Update application](#) REST API, as in this code:

Azure CLI

```
# Get the application
az rest --method GET \
    --uri 'https://graph.microsoft.com/v1.0/applications/b4e4d2ab-e2cb-45d5-
a31a-98eb3f364001'

# Update `redirectUris` for `web` property
az rest --method PATCH \
    --uri 'https://graph.microsoft.com/v1.0/applications/b4e4d2ab-e2cb-45d5-
a31a-98eb3f364001' \
    --body '{"web":{"redirectUris":["https://myapp.com"]}}'
```

When using `--uri-parameters` for requests in the form of OData, make sure to escape `$` in different environments: in `Bash`, escape `$` as `\$` and in `PowerShell`, escape `$` as ``$`

Script examples

Here are examples for using variables and looping through a list when working with Azure Virtual Machines. For in-depth examples on using Bash constructs with the Azure CLI including loops, case statements, if..then..else, and error handling, see [Learn to use Bash with the Azure CLI](#).

Use these scripts to save IDs to variables:

Bash

Console

```
ECHO OFF
SETLOCAL
FOR /F "tokens=*" USEBACKQ" %%F IN (
    `az vm list --resource-group VMResources --show-details --query "[?
powerState=='VM running'].id" --output tsv`
) DO (
    SET "vm_ids=%F %vm_ids%" :: construct the id list
)
az vm stop --ids %vm_ids% :: CLI stops all VMs in parallel
```

Use these scripts to loop through a list:

Bash

Console

```
ECHO OFF
SETLOCAL
FOR /F "tokens=* USEBACKQ" %%F IN (
    `az vm list --resource-group VMResources --show-details --query "[? powerState=='VM running'].id" --output tsv` ) DO (
    ECHO Stopping %%F
    az vm stop --ids %%F
)
```

Enable Tab Completion in PowerShell

Tab completion, also known as "Azure CLI completers", provides completion on inputs to provide hints, enable discovery and speed up input entry. Command names, command group names, parameters and certain parameter values can be automatically inserted into the command line by pressing the `Tab` key.

Tab completion is enabled by default in Azure Cloud Shell and in most Linux distributions. Starting in Azure CLI version 2.49, you can enable tab completion for the Azure CLI in PowerShell. Follow these steps:

1. Create or edit the profile stored in the variable `$PROFILE`. The simplest way is to run `notepad $PROFILE` in PowerShell. For more information, see [How to create your profile](#) and [Profiles and execution policy](#).
2. Add the following code to your PowerShell profile:

```
PowerShell

Register-ArgumentCompleter -Native -CommandName az -ScriptBlock {
    param($commandName, $wordToComplete, $cursorPosition)
    $completion_file = New-TemporaryFile
    $env:ARGCOMPLETE_USE_TEMPFILES = 1
    $env:_ARGCOMPLETE_STDOUT_FILENAME = $completion_file
    $env:COMP_LINE = $wordToComplete
    $env:COMP_POINT = $cursorPosition
    $env:_ARGCOMPLETE = 1
    $env:_ARGCOMPLETE_SUPPRESS_SPACE = 0
    $env:_ARGCOMPLETE_IFS = "`n"
    $env:_ARGCOMPLETE_SHELL = 'powershell'
    az 2>&1 | Out-Null
    Get-Content $completion_file | Sort-Object | ForEach-Object {
        [System.Management.Automation.CompletionResult]:::new($_, $_,
        "ParameterValue", $_)
    }
    Remove-Item $completion_file, Env:\_ARGCOMPLETE_STDOUT_FILENAME,
    Env:\ARGCOMPLETE_USE_TEMPFILES, Env:\COMP_LINE, Env:\COMP_POINT,
```

```
Env:\_ARGCOMPLETE, Env:\_ARGCOMPLETE_SUPPRESS_SPACE,
Env:\_ARGCOMPLETE_IFS, Env:\_ARGCOMPLETE_SHELL
}
```

3. To display all available options in the menu, add `Set-PSReadlineKeyHandler -Key Tab -Function MenuComplete` to your PowerShell profile.

Error handling for Azure CLI in PowerShell

You can run Azure CLI commands in PowerShell, as described in [Choose the right Azure command-line tool](#). If you do, be sure you understand Azure CLI error handling in PowerShell. In particular, Azure CLI doesn't create exceptions for PowerShell to catch.

An alternative is to use the `$?` automatic variable. This variable contains the status of the most recent command. If the previous command fails, `$?` has the value of `$False`. For more information, see [about_Automatic_Variables](#).

The following example shows how this automatic variable can work for error handling:

```
PowerShell
```

```
az group create --name MyResourceGroup
if ($? -eq $false) {
    Write-Error "Error creating resource group."
}
```

The `az` command fails because it's missing the required `--location` parameter. The conditional statement finds that `$?` is false and writes an error.

If you want to use the `try` and `catch` keywords, you can use `throw` to create an exception for the `try` block to catch:

```
PowerShell
```

```
$ErrorActionPreference = "Stop"
try {
    az group create --name MyResourceGroup
    if ($? -eq $false) {
        throw 'Group create failed.'
    }
}
catch {
    Write-Error "Error creating the resource group."
}
$ErrorActionPreference = "Continue"
```

By default, PowerShell catches only terminating errors. This example sets the `$ErrorActionPreference` global variable to `Stop` so PowerShell can handle the error.

The conditional statement tests the `$?` variable to see if the previous command failed. If so, the `throw` keyword creates an exception to catch. The `catch` block can be used to write an error message or handle the error.

The example restores `$ErrorActionPreference` to its default value.

For more information about PowerShell error handling, see [Everything you wanted to know about exceptions](#).

See also

- [Configure the Azure CLI](#)
- [Learn to use Bash with Azure CLI](#)
- [Query Azure CLI command output](#)
- [Use variables in Azure CLI commands](#)
- [Find Azure CLI samples](#)

Create an Azure support ticket in Azure CLI

Article • 07/13/2023

The Azure CLI enables you to create and manage Azure support tickets.

- Open a technical, billing, subscription management, or subscription and service limits (quota) support ticket.
- Get a list of support tickets and detailed information about each ticket. Narrow your search for support tickets by status or created date.
- Update severity, ticket status, and contact information for a support ticket.
- Add a new communication to a support ticket or get a list of all communications for a support ticket. Narrow your search of communication lists by created date or communication type.

To create a support request, you must be an [Owner](#) or [Contributor](#), or be assigned to the [Support Request Contributor](#) role at the subscription level. To create a support request without a subscription, such as an Azure Active Directory scenario, you must be an [Admin](#).

Prerequisites

- Use the Bash environment in [Azure Cloud Shell](#). For more information, see [Quickstart for Bash in Azure Cloud Shell](#).
A blue rectangular button with a white 'A' icon and the text 'Launch Cloud Shell'. To the right of the text is a small blue square containing a white right-pointing arrow.
 - If you prefer to run CLI reference commands locally, [install](#) the Azure CLI. If you're running on Windows or macOS, consider running Azure CLI in a Docker container. For more information, see [How to run the Azure CLI in a Docker container](#).
 - If you're using a local installation, sign in to the Azure CLI by using the [az login](#) command. To finish the authentication process, follow the steps displayed in your terminal. For other sign-in options, see [Sign in with the Azure CLI](#).
 - When you're prompted, install the Azure CLI extension on first use. For more information about extensions, see [Use extensions with the Azure CLI](#).
 - Run [az version](#) to find the version and dependent libraries that are installed. To upgrade to the latest version, run [az upgrade](#).

Create a support ticket

1. To obtain a list of services, use the [az support services list](#) command:

```
Azure CLI
```

```
az support services list --output table
```

For this example, find the value for **Virtual Machine running Windows**, which is **6f16735c-b0ae-b275-ad3a-03479cfa1396**.

2. To get the problem type and problem subtype that describes your problem, run the [az support services problem-classifications list](#) command:

```
Azure CLI
```

```
az support services problem-classifications list --service-name  
6f16735c-b0ae-b275-ad3a-03479cfa1396 --output table
```

For this example, find **Cannot connect to my VM / I have an issue with my public IP**. That type has a value of **e5c307e3-50ff-5dc9-c8ae-7d35051f88c9**.

3. Create a ticket by using the [az support tickets create](#) command:

```
Azure CLI
```

```
az support tickets create --ticket-name "VM012" --title "Issue with  
public IP" \  
    --description "This ticket involves a public IP address of a VM." \  
    --problem-classification e5c307e3-50ff-5dc9-c8ae-7d35051f88c9 \  
    --severity minimal --contact-first-name Kenneth --contact-last-name  
Liew \  
    --contact-method email --contact-email Kenneth.Liew@Contoso.com \  
    --contact-country US --contact-language English --contact-timezone  
"Pacific Standard Time"
```

A support engineer will contact you using the method you indicated. For information about initial response times, see [Support scope and responsiveness](#).

Manage support tickets

The Azure CLI enables you to perform support ticket management using various commands. To see your Azure support tickets for your current subscription, run the [az support tickets list](#) command:

```
Azure CLI
```

```
az support tickets list
```

To see Azure support tickets in another subscription, run the [az account set](#) command to change your current subscription, and then run the command.

You can also update a ticket by using the [az support tickets update](#) command:

```
Azure CLI
```

```
az support tickets update --ticket-name VM012 --severity moderate
```

Communicate about your ticket

You can't delete a support ticket created by using Azure CLI. Instead, send a message to close a ticket. If you need to reopen a closed support request, create a new message, which automatically reopens the request.

To communicate about your ticket, run the [az support tickets communications create](#) command:

```
Azure CLI
```

```
az support tickets communications create --ticket-name VM012 \
    --communication-name "VM Delay" \
    --communication-body "Delaying VM fixes due to scheduling on our end." \
    --communication-subject "Delaying VM fixes due to scheduling on our
end."
```

To see all the communications for a ticket, use the [az support tickets communications list](#) command:

```
Azure CLI
```

```
az support tickets communications list --ticket-name VM012
```

This command offers a `--filters` parameter to narrow your responses.

```
Azure CLI
```

```
az support tickets communications list --ticket-name VM012 \
    --filters "communicationType eq 'Web'"
```

Next steps

- [Azure Support FAQs ↗](#)
- [Azure support scope and responsiveness ↗](#)
- [How to create a support ticket via Azure portal](#)

Choose the right Azure command-line tool

Article • 06/19/2023

When it comes to managing Azure, you have many options. This article compares the Azure CLI and Azure PowerShell language and gives a comparison of the shell environments on which they run.

Azure CLI, Azure PowerShell, and Azure Cloud Shell have overlapping functionality. Each operates differently, and the language is sometimes confused with the environment. Use this guide to determine which is the right tool for you.

What's the advantage of using an Azure command-line tool?

Azure runs on automation. Every action you take inside the portal translates somewhere to code being executed to read, create, modify, or delete resources.

Moving your workload to Azure lifts some of the administrative burden but not all. As your rate of adoption with Azure increases so will the overhead. Even though you don't have to worry about the data center, you still have to patch and troubleshoot Azure VMs, failover databases, and configure virtual networks.

By using the existing automation that runs Azure, command-line tools reduce that overhead.

What are Azure command-line tools?

Azure command-line tools automate routine operations, standardize database failovers, and pull data that provide powerful insight. Command-line tools not only give you the ability to scale your tasks in Azure, but they also make much easier to share. Sharing a script is much easier than a lengthy wiki page with time consuming screenshots.

Using an Azure command-line tool isn't always necessary, but it's a useful skill to have.

Azure CLI vs Azure PowerShell

Azure CLI and Azure PowerShell are command-line tools that enable you to create and manage Azure resources. Both are cross-platform, installable on Windows, macOS, and

Linux.

Azure CLI

- Cross-platform command-line interface, installable on Windows, macOS, Linux
- Runs in Windows PowerShell, Cmd, or Bash and other Unix shells.

Azure PowerShell

- Cross-platform PowerShell module, runs on Windows, macOS, Linux
- Requires Windows PowerShell or PowerShell

Different shell environments

Shell Environment	Azure CLI	Azure PowerShell
Cmd	Yes	
Bash	Yes	
Windows PowerShell	Yes	Yes
PowerShell	Yes	Yes

Windows PowerShell, PowerShell, Cmd, and Bash are shell environments. Your shell environment not only determines which tools you can use but also changes your command-line experience.

For example, for the line continuation character, Bash uses the backslash `\` while Windows PowerShell uses the backtick ```. The differences in the shell environment doesn't change how Azure CLI and Azure PowerShell operate. However, they do change your command-line experience.

Azure CLI has an installer that makes its commands executable in all four shell environments.

Azure PowerShell is set of cmdlets packaged as a PowerShell module named `Az`; not an executable. Windows PowerShell or PowerShell must be used to install the `Az` module.

Windows PowerShell is the standard scripting shell that comes preinstalled with most Windows operating systems. PowerShell is a stand-alone installation that uses .NET Core as its run time, allowing it to be installed on macOS, Linux, and Windows.

Key points:

- AzureRM is a PowerShell module that is still referenced for Azure administration with PowerShell. However, it has been replaced by Azure PowerShell and has an official retirement date of February 29 2024.

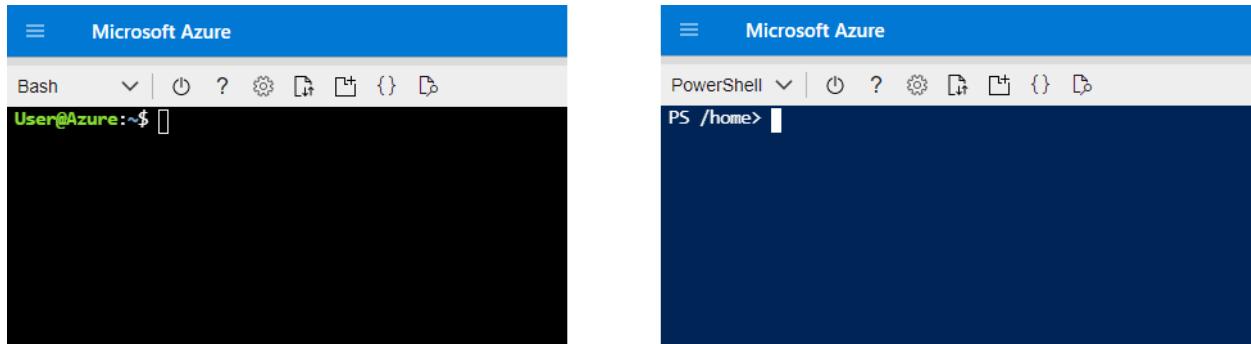
If you're using AzureRM, you can [migrate Azure PowerShell from AzureRM to Az.](#)

What about Azure Cloud Shell?

Azure Cloud Shell is a hosted shell environment that runs on an Ubuntu container.

Cloud Shell provides two shell environments: Bash (with Azure CLI preinstalled) and PowerShell (with Azure PowerShell preinstalled). A dropdown list at the top of the Cloud Shell window allows you to easily switch between the two environments.

Cloud Shell is accessible in a web browser and has integrations for [Windows Terminal](#) and [Visual Studio Code ↗](#).



ⓘ Note

Azure Cloud Shell may not always *immediately reflect* the most recent Azure PowerShell and Azure CLI releases as the publishing schedule for all three tools is different. However, Azure Cloud Shell is generally thought to always contain the most recent versions of both tools.

Which Azure command-line tool is right for you?

When picking the right tool, consider your past experience and current work environment.

Azure CLI syntax is similar to that of Bash scripting. If you work primarily with Linux systems, Azure CLI feels more natural.

Azure PowerShell is a PowerShell module. If you work primarily with Windows systems, Azure PowerShell is a natural fit. Commands follow a verb-noun naming scheme and data is returned as objects.

Choose the tool that uses your experience and shortens your learning curve. Take advantage of [Microsoft learning](#) to become proficient at managing Azure at the command line.

With that said, being open-minded will only improve your abilities. Use a different tool when it makes sense.

Key points:

- Feature parity for Azure services doesn't always exist between Azure CLI and Azure PowerShell.

Azure CLI vs Azure PowerShell: Side-by-side Command Comparison

Sign in, Subscription, and Location Commands:

Command	Azure CLI	Azure PowerShell
Sign in with Web Browser	az login	Connect-AzAccount
Get available subscriptions	az account list	Get-AzSubscription
Set Subscription	az account set --subscription <SubscriptionId>	Set-AzContext -Subscription <SubscriptionID>
List Azure Locations	az account list-locations	Get-AzLocation

Find Versions, Get Help, and View Command Help:

Command	Azure CLI	Azure PowerShell
Find Version	az --version	Get-InstalledModule -Name Az
Get Help	az --help	Get-Help
View Command Help	az vm --help	Get-Help -Name New-AzVM

Create a Resource Group, VM, and Storage Account:

Command	Azure CLI	Azure PowerShell
Create Resource Group	az group create --name <ResourceGroupName> --location eastus	New-AzResourceGroup -Name <ResourceGroupName> -Location eastus
Create Azure Virtual Machine	az vm create --resource-group myResourceGroup --name myVM --image UbuntuLTS --admin-username azureuser --admin-password '<Password>'	New-AzVM -ResourceGroupName <ResourceGroupName> -Name myVM -Image UbuntuLTS -Credential (Get-Credential)
Create Azure Storage Account	az storage account create --name <StorageAccountName> --resource-group <ResourceGroupName> --location eastus --sku Standard_LRS --kind StorageV2	New-AzStorageAccount -Name <StorageAccountName> -ResourceGroupName <ResourceGroupName> -Location eastus -SkuName Standard_LRS -Kind StorageV2

Manage Azure Virtual Machines:

Command	Azure CLI	Azure PowerShell
List VM	az vm list	Get-AzVM
Restart VM	az vm restart --name myVM --resource-group <ResourceGroupName>	Restart-AzVM -Name myVM -ResourceGroupName <ResourceGroupName>
Stop VM	az vm stop --name myVM --resource-group <ResourceGroupName>	Stop-AzVM -Name myVM -ResourceGroupName <ResourceGroupName>
Stop & Deallocate VM	az vm deallocate --name myVM --resource-group <ResourceGroupName>	Stop-AzVM -Name myVM -ResourceGroupName <ResourceGroupName>
Start VM	az vm start --name myVM --resource-group <ResourceGroupName>	Start-AzVM -Name myVM -ResourceGroupName <ResourceGroupName>
Delete VM	az vm delete --name myVM --resource-group <ResourceGroupName>	Remove-AzVM -Name myVM -ResourceGroupName <ResourceGroupName>

Select Properties and Change Output Formats:

Command	Azure CLI	Azure PowerShell
Show all subscription information	az account list --all	Get-AzSubscription Select-Object -Property *
Output as a Table	az account list -o table	Get-AzSubscription Format-Table
Output as JSON	az account show	Get-AzSubscription ConvertTo-Json

Key points:

- Azure CLI defaults to outputting a JSON string. Other format options can be found on the [Output formats for Azure CLI commands](#).
- Azure PowerShell defaults to outputting objects. To learn more about formatting in PowerShell, read the [Using Format Commands to Change Output View](#).

Next steps

Azure CLI:

- [Install the Azure CLI](#)

Azure PowerShell:

- [Install Azure PowerShell](#)

Azure CLI configuration

Article • 08/02/2023

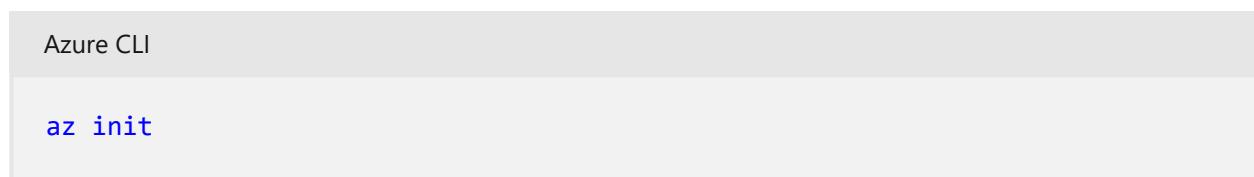
The Azure CLI allows for user configuration for settings such as logging, data collection, and default argument values. The CLI offers a convenience command for managing some defaults, `az config`, and an interactive option through `az init`. Other values can be set in a configuration file or with environment variables. This article provides further information on these user configuration settings and how to configure the Azure CLI.

Configuration values used by the CLI are evaluated in the following precedence, with items higher on the list taking priority.

1. Command-line parameters
2. Parameter persisted values set with `az config param-persist`
3. Environment variables
4. Values in the configuration file set with `az config` or `az init`

Configure settings using az init

The easiest way to set Azure CLI configurations is to use the interactive `az init` command. Choose a common configuration like "interaction" or "automation," or opt to walk through individual configurations. What is especially helpful with this approach is `az init` provides reasons why you might want to choose one configuration option over another.



Configure settings using az config

You can set defaults for the CLI with the `az config set` command. This command takes a space-separated list of `key=value` pairs as an argument. The provided values are used by the Azure CLI in place of required arguments.

The following table contains a list of available configuration keys.

Name	Description
defaults.group	The default resource group to use for all commands.

Name	Description
defaults.location	The default location to use for all commands.
defaults.web	The default app name to use for <code>az webapp</code> commands.
defaults.vm	The default VM name to use for <code>az vm</code> commands.
defaults.vmss	The default virtual machine scale set (VMSS) name to use for <code>az vmss</code> commands.
defaults.acr	The default container registry name to use for <code>az acr</code> commands.

As an example, here's how you would set the default resource group and location for all commands.

Azure CLI

```
az config set defaults.location=westus2 defaults.group=MyResourceGroup
```

The following command turns off the survey links while executing the Azure CLI commands:

Azure CLI

```
az config set output.show_survey_link=no
```

CLI configuration file

The CLI configuration file contains other settings that are used for managing CLI behavior. The configuration file itself is located at `$AZURE_CONFIG_DIR/config`. The default value of `AZURE_CONFIG_DIR` is `$HOME/.azure` on Linux and macOS, and `%USERPROFILE%\.azure` on Windows.

Configuration files are written in the INI file format. Section headers define the file format, followed by a list of key-value entries.

- Section headers are written as `[section-name]`. Section names are case-sensitive.
- Entries are written as `key=value`. Key names aren't case-sensitive.
- Comments are any line that begins with a `#` or `;`. Inline comments aren't allowed.

Booleans are case-insensitive. The following values represent booleans:

- True: `1`, `yes`, `true`, `on`

- False: `0`, `no`, `false`, `off`

Here's an example of a CLI configuration file that disables any confirmation prompts and sets up logging to the `/var/log/azure` directory.

```
ini

[core]
disable_confirm_prompt=Yes

[logging]
enable_log_file=yes
log_dir=/var/log/azure
```

See the next section for details on all of the available configuration values and what they mean. For the full details on the INI file format, see the [Python documentation on INI](#).

CLI configuration values and environment variables

The following table contains all of the sections and option names that can be placed in a configuration file. Their corresponding environment variables are set as

`AZURE_{section}_{name}`, in all caps. For example, `output` default for `core` is set in the `AZURE_CORE_OUTPUT` variable, the `storage_account` default for `batchai` is set in the `AZURE_BATCHAI_STORAGE_ACCOUNT` variable, and the default `location` is set in the `AZURE_DEFAULTS_LOCATION` variable.

When you provide a default value, that argument is no longer required by any command. Instead, the default value is used.

Section	Name	Type	Description
<code>core</code>	<code>output</code>	string	The default output format. Can be one of <code>json</code> , <code>jsonc</code> , <code>tsv</code> , or <code>table</code> .
	<code>disable_confirm_prompt</code>	boolean	Turn confirmation prompts on/off.
	<code>display_region_identified</code>	boolean	Azure customers can choose to deploy resources in many different regions. In some cases, customers may be able to reduce costs by selecting nearby regions offering the same services. If a nearby region is identified, a message will display the region to select for

Section	Name	Type	Description
			future deployments. This setting controls if the message is displayed.
	collect telemetry	boolean	Allow Microsoft to collect anonymous data on the usage of the CLI. For privacy information, see the Azure CLI MIT license .
	only_show_errors	boolean	Only show errors during command invocation. In other words, only errors are written to <code>stderr</code> . It suppresses warnings from preview, deprecated and experimental commands. It's also available for individual commands with the <code>--only-show-errors</code> parameter.
	no_color	boolean	Disable color. Originally colored messages are prefixed with <code>DEBUG</code> , <code>INFO</code> , <code>WARNING</code> and <code>ERROR</code> . This boolean bypasses the issue of a third-party library where the terminal's color can't revert back after a <code>stdout</code> redirection.
logging	enable_log_file	boolean	Turn logging on/off.
	log_dir	string	The directory to write logs to. By default this value is <code> \${AZURE_CONFIG_DIR}/logs*</code> .
defaults	group	string	The default resource group to use for all commands.
	location	string	The default location to use for all commands.
	web	string	The default app name to use for <code>az webapp</code> commands.
	vm	string	The default VM name to use for <code>az vm</code> commands.
	vmss	string	The default virtual machine scale set (VMSS) name to use for <code>az vmss</code> commands.
	acr	string	The default container registry name to use for <code>az acr</code> commands.
	account	string	The default storage account name (for example, <code>mystorageaccount</code> in <code>https://mystorageaccount.blob.core.windows.net</code>) to use for <code>az storage</code> data-plane commands (for example, <code>az storage container list</code>).

Section	Name	Type	Description
	key	string	The default access key to use for <code>az storage</code> data-plane commands.
	sas_token	string	The default SAS token to use for <code>az storage</code> data-plane commands.
	connection_string	string	The default connection string to use for <code>az storage</code> data-plane commands.
<code>batchai</code>	storage_account	string	The default storage account to use for <code>az batchai</code> commands.
	storage_key	string	The default storage key to use for <code>az batchai</code> commands.
<code>batch</code>	account	string	The default Azure Batch account name to use for <code>az batch</code> commands.
	access_key	string	The default access key to use for <code>az batch</code> commands. Only used with <code>aad</code> authorization.
	endpoint	string	The default endpoint to connect to for <code>az batch</code> commands.
	auth_mode	string	The authorization mode to use for <code>az batch</code> commands. Can be <code>shared_key</code> or <code>aad</code> .
<code>cloud</code>	name	string	The default cloud for all <code>az</code> commands. The possible values are <code>AzureCloud</code> (default), <code>AzureChinaCloud</code> , <code>AzureUSGovernment</code> . To change clouds, you can use the <code>az cloud set -name</code> command. For an example, see Manage Clouds with the Azure CLI .
<code>extension</code>	use_dynamic_install	string	Install an extension if it's not added yet when running a command from it. The possible values are <code>no</code> (default), <code>yes_prompt</code> , <code>yes_without_prompt</code> .
	run_after_dynamic_install	boolean	Continue to run the command when an extension is dynamically installed for it. Default is <code>False</code> .
	index_url	string	URL of private extension index file following the format in index.json . Once specified, executing <code>az extension add --name <extension-name></code> uses that file to find the extension to add.

 **Note**

You may see other values in your configuration file, but these are managed directly through CLI commands, including `az config`. The ones listed in the table previously are the only values you should change yourself.

See also

- [How-to work with Azure CLI persisted parameters](#)
- [Tutorial: Use persisted parameters with sequential Azure CLI commands](#)

Azure CLI persisted parameter

Article • 08/08/2023

The Azure CLI [az config param-persist](#) reference allows you to retain local persisted parameter values for Azure CLI commands. This command removes the need to continually retype common parameters. For example, location and resource-group are required parameters in many CLI commands, but they don't contribute to the *intent* of the command. When you store parameter values with persisted parameter, you reduce redundancy and can significantly shorten CLI command syntax.

Configuration values used by the CLI are evaluated in the following precedence, with items higher on the list taking priority.

1. Command-line parameters
2. Values in the local working directory set by `az config param-persist`
3. Environment variables
4. Values in the configuration file or set with `az config`

Install the Azure CLI or open [Azure Cloud Shell](#) to run the scripts in this article. If you're using a local install of the Azure CLI, version 2.12.0 or later is needed to run `az config param-persist` commands. Run `az version` to find the version and dependent libraries that are installed. To upgrade to the latest version, run `az upgrade`. Azure Cloud Shell always has the latest version of the Azure CLI.

Persisted parameter data file

Persisted parameter values are kept in a file named `.param_persist` that is stored in your working directory. If you're using [Azure Cloud Shell](#) to execute Azure CLI commands, your working directory is in the storage account being used by the Azure CLI. If you're using a [local install](#) of the Azure CLI, your working directory is on your local machine. In either location, the `.param_persist` file is hidden and shouldn't be manually updated.

Persisted parameter storage and support

Only certain Azure CLI parameters can become persisted parameters. For example, the `resource_group_name` and `location` parameters are stored differently so that you can add them to a persisted parameter without executing a create command.

Persisted parameter	Storage action	Supported by
location	Execute any command	All Azure CLI references
resource_group_name	Execute any command	All Azure CLI references
vnet_name	Execute a create command	Azure Web Apps only
storage_account_name	Execute a create command	Azure Web Apps only
webapp_name	Execute a create command	Azure Web Apps only
function_app_name	Execute a create command	Azure Functions only

Sample script using persisted parameters

Without persisted parameters, sequential CLI commands must repeat the same parameter values. With persisted parameters enabled, your stored parameter values can be omitted from sequential commands. In this example, the `location`, `resource group name` or `storage account name` are repeated in subsequent commands.

Azure CLI

```
# Reminder: function app and storage account names must be unique.

# turn persisted parameters on
az config param-persist on

# Create a resource group which will store "resource group" and "location" in persisted parameter.
az group create --name RGlocalContext --location westeurope

# Create an Azure storage account omitting location and resource group.
az storage account create \
    --name sa1localcontext \
    --sku Standard_LRS

# Create a serverless function app in the resource group omitting storage account and resource group.
az functionapp create \
    --name FAlocalContext \
    --consumption-plan-location westeurope \
    --functions-version 2

# See the stored parameter values
az config param-persist show
```

Persisted parameter and global variable comparison

There are two Azure CLI commands that can be used to default parameter values: `az config set defaults` and `az config param-persist`. Use the `az config set defaults <option>=<value>` command to specify *global variables* such as group, location, or web. Use `az param-persist` to specify *local default values* unique to your workload. Stored values are used by the CLI in place of required arguments.

ⓘ Important

Persisted parameters override global context values.

Reference	Scope	Set	Use
<code>az config set defaults <option>=<value></code>	Scoped globally across the CLI	Set explicitly using <code>az config set defaults <option>=<value></code>	Use for settings such as logging, data collection, and default argument values
<code>az config param-persist</code>	Scoped locally to a specific working directory	Set automatically once persisted parameters are turned on	Use for individual workload sequential commands.

Command examples

Use `az config param-persist` to set a global variable used in the creation of an Azure storage account.

Azure CLI

```
# set the global variable for resource group
az config set defaults.group=myGlobalVariableRG

# Create an Azure storage account omitting the resource group relying on the
# global variable value
# Substitute the storage account name parameter with a unique value
az storage account create \
    --name mystorageaccount1 \
    --location westeurope \
    --sku Standard_LRS
```

CLI command output shows that a new storage account was created in the resource group found in the global variable, `myGlobalVariableRG`.

Output

```
...
},
  "primaryLocation": "westeurope",
  "privateEndpointConnections": [],
  "provisioningState": "Succeeded",
  "resourceGroup": "myGlobalVariableRG",
  "routingPreference": null,
  "secondaryEndpoints": null,
  "secondaryLocation": null,
  "sku": {
    "name": "Standard_LRS",
    "tier": "Standard"
},
...
...
```

Use `az config param-persist` to set persisted parameters used in the creation of an Azure storage account. If a global variable is set for the same object, the persisted parameter overrides the global variable.

Azure CLI

```
# turn persisted parameter on
az config param-persist on

# Create a resource group in order to write to persisted parameter
az group create --name myParamPersistRG --location westeurope

# Create an Azure storage account omitting the resource group relying on the
# persisted parameter value
# Substitute the storage account name parameter with a unique value
az storage account create \
  --name mystorageaccount2 \
  --location westeurope \
  --sku Standard_LRS
```

Even with a global variable set for resource group with a value of `myGlobalVariableRG`, with persisted parameters turned on, the new storage account was created with `myParamPersistRG`.

Output

```
...
},
  "primaryLocation": "westeurope",
```

```
"privateEndpointConnections": [],
"provisioningState": "Succeeded",
"resourceGroup": "myParamPersistRG",
"routingPreference": null,
"secondaryEndpoints": null,
"secondaryLocation": null,
"sku": {
    "name": "Standard_LRS",
    "tier": "Standard"
},
...
...
```

See also

- [Tutorial: Use persisted parameter with sequential Azure CLI commands](#)
- [Azure CLI Configuration using az config](#)

How to query Azure CLI command output using a JMESPath query

Article • 08/02/2023

The Azure CLI uses the `--query` parameter to execute a [JMESPath query](#) on the results of commands. JMESPath is a query language for JSON, giving you the ability to select and modify data from CLI output.

All commands in Azure CLI support the `--query` parameter. This article covers how to use the features of JMESPath and gives examples of queries. Learn about JMESPath concepts that are useful for querying under the concepts tab. See examples of JMESPath queries under the examples tab.

Concepts

Azure CLI uses queries to select and modify the output of Azure CLI commands. Queries are executed client-side on the Azure CLI command's returned JSON object before any display formatting.

The escape characters needed in queries differ for different environments. It's recommended to run queries in Azure Cloud Shell or cmd because these shells require fewer escape characters. To ensure the query examples are syntactically correct, select the tab for the shell you're using.

Dictionary and list CLI results

CLI command results are first treated as JSON for queries, even when the output format is something other than JSON. CLI results are either a JSON array or dictionary. Arrays are sequences of objects that can be indexed, and dictionaries are unordered objects accessed with keys.

This is an example of an array:

JSON

```
[  
  1,  
  2,  
  3  
]
```

This is an example of a dictionary:

JSON

```
{  
  "isRunning": false,  
  "time": "12:00",  
  "number": 1  
}
```

Commands that *could* return more than one object return an array, and commands that *always* return *only* a single object return a dictionary.

Get properties in a dictionary

Working with dictionary results, you can access properties from the top level with just the key. The `.` (subexpression) character is used to access properties of nested dictionaries. Before introducing queries, take a look at the unmodified output of the [az vm show](#) command:

Bash

Azure CLI

```
az vm show --resource-group QueryDemo --name TestVM
```

The command outputs a dictionary. Some content has been omitted.

JSON

```
{  
  "additionalCapabilities": null,  
  "availabilitySet": null,  
  "diagnosticsProfile": {  
    "bootDiagnostics": {  
      "enabled": true,  
      "storageUri": "https://xxxxxx.blob.core.windows.net/"  
    }  
  },  
  ...  
  "osProfile": {  
    "adminPassword": null,  
    "adminUsername": "azureuser",  
    "allowExtensionOperations": true,  
    "computerName": "TestVM",  
    "customData": null,  
    "imageReference": {  
      "id": "https://xxxxxxxxxxxxxx.vhdsuffix",  
      "label": "Windows Server 2016 Datacenter",  
      "publisher": "Microsoft",  
      "version": "latest"  
    },  
    "osDisk": {  
      "cache": "None",  
      "createOption": "FromImage",  
      "managedDisk": {  
        "id": "https://xxxxxxxxxxxxxx.vhdsuffix",  
        "lifecycleState": "Active",  
        "storageAccountType": "Standard_LRS"  
      },  
      "name": "osdisk",  
      "osType": "Windows",  
      "type": "OSDisk"  
    },  
    "secrets": [{}],  
    "storageAccounts": [{}]  
  }  
}
```

```

    "linuxConfiguration": {
        "disablePasswordAuthentication": true,
        "provisionVmAgent": true,
        "ssh": [
            {
                "publicKeys": [
                    {
                        "keyData": "ssh-rsa
AAAAB3NzaC1yc2EAAAQABAAQDMobZNJTqgjWn/IB5xli1vE4Y+BMYpqkDnGRUcA0g9
BYPgrGSQquCES37v2e3JmpfDPHFsaR+CPK1Vr2GoVJMMHeRcMJhj50ZWq0hAnkJBh1ZVWy8S
7dwdGAqPyPmWM2iJDCVMVrLITAJCno4704Ees7RCH6ku7kU86b1NOanvrNwqTHr14wtnLhgZ
0gQ5GV1oLWvMEVg1YFMIgPRkTsSQKWC51LqQ45aU/4NMJoUxGyJTL9i8YxMavaB1Z2npfTQ
DQo9+womZ7SXzHaIWC858gWN19e5UFyHDnTEDc14hKkf1CqnGJVcCJkmSfmrrHk/CkmF0ZT3
whTH01DhJTtV stramer@contoso",
                        "path": "/home/azureuser/.ssh/authorized_keys"
                    }
                ]
            },
            "secrets": [],
            "windowsConfiguration": null
        ],
        ....
    }
}

```

The following command gets the SSH public keys authorized to connect to the VM by adding a query:

Bash

Azure CLI

```
az vm show --resource-group QueryDemo --name TestVM --query
"osProfile.linuxConfiguration.ssh.publicKeys"
```

JSON

```
[
{
    "keyData": "ssh-rsa
AAAAB3NzaC1yc2EAAAQABAAQDMobZNJTqgjWn/IB5xli1vE4Y+BMYpqkDnGRUcA0g9
BYPgrGSQquCES37v2e3JmpfDPHFsaR+CPK1Vr2GoVJMMHeRcMJhj50ZWq0hAnkJBh1ZVWy8S
7dwdGAqPyPmWM2iJDCVMVrLITAJCno4704Ees7RCH6ku7kU86b1NOanvrNwqTHr14wtnLhgZ
0gQ5GV1oLWvMEVg1YFMIgPRkTsSQKWC51LqQ45aU/4NMJoUxGyJTL9i8YxMavaB1Z2npfTQ
DQo9+womZ7SXzHaIWC858gWN19e5UFyHDnTEDc14hKkf1CqnGJVcCJkmSfmrrHk/CkmF0ZT3
whTH01DhJTtV stramer@contoso",
    "path": "/home/azureuser/.ssh/authorized_keys"
}]
```

Query strings are case sensitive. For example, changing 'osProfile' to 'OsProfile' in the previous query doesn't return the correct results.

Get multiple values

To get more than one property, put expressions separated by commas in square brackets [] (a **multiselect list**). The following command gets the VM name, admin user, and SSH key all at once:

Bash

Azure CLI

```
az vm show --resource-group QueryDemo --name TestVM --query "[name,  
osProfile.adminUsername,  
osProfile.linuxConfiguration.ssh.publicKeys[0].keyData]"
```

JSON

```
[  
  "TestVM",  
  "azureuser",  
  "ssh-rsa  
AAAAB3NzaC1yc2EAAAQABAAQDMobZNJTqgjWn/IB5x1l1vE4Y+BMYpqkDnGRUcA0g9  
BYPgrGSQuCES37v2e3JmpfDPHFsaR+CPK1Vr2GoVJMMHeRcMJhj50ZWq0hAnkJBh1ZVWy8S  
7dwdGAqPyPmWM2iJDCVMvrlITAJCno4704Ees7RCH6ku7kU86b1N0anvrNwqTHr14wtnLhgZ  
0gQ5GV1oLWvMEVg1YFMIgPRkTsSQKWC51LqQ45aU/4NMJoUxGyJTL9i8YxMavaB1Z2npFTQ  
DQo9+womZ7SXzHaIWC858gWN19e5UFyHDnTEDc14hKkf1CqnGJVcCJkmSfmrrHk/CkmF0ZT3  
whTH01DhJTtV stramer@contoso"  
]
```

These values are listed in the result array in the order they were given in the query. Since the result is an array, there are no keys associated with the results. To get a dictionary instead of an array, see the next section.

Rename properties in a query

To get a dictionary instead of an array when querying for multiple values, use the { } (multiselect hash) operator. The format for a multiselect hash is {`displayName:JMESPathExpression, ...`}. `displayName` is the string shown in output, and `JMESPathExpression` is the JMESPath expression to evaluate. Modifying the example from the last section by changing the multiselect list to a hash:

Bash

Azure CLI

```
az vm show --resource-group QueryDemo --name TestVM --query "
{VMName:name, admin:osProfile.adminUsername,
sshKey:osProfile.linuxConfiguration.ssh.publicKeys[0].keyData}"
```

JSON

```
{
  "VMName": "TestVM",
  "admin": "azureuser",
  "ssh-key": "ssh-rsa
AAAAB3NzaC1yc2EAAAQABAAQDMobZNJTqgjWn/IB5xliIvE4Y+BMYpqkDnGRUcA0g9
BYPgrGSQquCES37v2e3JmpfDPHFsaR+CPK1Vr2GoVJMMHeRcMJhj50ZWq0hAnkJBh1ZVWy8S
7dwdGAqPyPmWM2iJDCVMVrLITAJCno4704Ees7RCH6ku7kU86b1N0anvrNwqTHr14wtnLhgZ
0gQ5GV1oLWvMEVg1YFMIgPRkTsSQKWC51LqQ45aU/4NMJoUxGyJTL9i8YxMavaB1Z2npfTQ
DQo9+womZ7SXzHaIWC858gWNl9e5UFyHDnTEDc14hKkf1CqnGJVcCJkmSfmrrHk/CkmF0ZT3
whTH01DhJTtV stramer@contoso"
}
```

Get properties in an array

An array has no properties of its own, but it can be indexed. This feature is shown in the last example with the expression `publicKeys[0]`, which gets the first element of the `publicKeys` array. There's no guarantee CLI output is ordered, so avoid using indexing unless you're sure of the order or don't care which element you get. To access the properties of elements in an array, you do one of two operations: *flattening* or *filtering*. This section covers how to flatten an array.

Flattening an array is done with the `[]` JMESPath operator. All expressions after the `[]` operator are applied to each element in the current array. If `[]` appears at the start of the query, it flattens the CLI command result. The results of `az vm list` can be inspected with this feature. The following query gets the name, OS, and administrator name for each VM in a resource group:

Bash

Azure CLI

```
az vm list --resource-group QueryDemo --query "[].{Name:name,
```

```
OS:storageProfile.osDisk.osType, admin:osProfile.adminUsername}"
```

JSON

```
[  
  {  
    "Name": "Test-2",  
    "OS": "Linux",  
    "admin": "sttramer"  
  },  
  {  
    "Name": "TestVM",  
    "OS": "Linux",  
    "admin": "azureuser"  
  },  
  {  
    "Name": "WinTest",  
    "OS": "Windows",  
    "admin": "winadmin"  
  }]
```

Any array can be flattened, not just the top-level result returned by the command.

In the last section, the expression

`osProfile.linuxConfiguration.ssh.publicKeys[0].keyData` was used to get the SSH public key for sign-in. To get *every* SSH public key, the expression could instead be written as `osProfile.linuxConfiguration.ssh.publicKeys[].keyData`. This query expression flattens the `osProfile.linuxConfiguration.ssh.publicKeys` array, and then runs the `keyData` expression on each element:

Bash

Azure CLI

```
az vm show --resource-group QueryDemo --name TestVM --query "  
{VMName:name, admin:osProfile.adminUsername,  
sshKeys:osProfile.linuxConfiguration.ssh.publicKeys[].keyData }"
```

JSON

```
{  
  "VMName": "TestVM",  
  "admin": "azureuser",  
  "sshKeys": [  
    "ssh-rsa
```

```
AAAAB3NzaC1yc2EAAAQABAAQDMobZNJTqgjWn/IB5xli1vE4Y+BMYp0kDnGRUcA0g9
BYPgrGSQquCES37v2e3JmpfDPHFsaR+CPK1Vr2GoVJMMHeRcMJhj50ZWq0hAnkJBh1ZVWy8S
7dwdGAqPyPmWM2iJDCVMvrlITAJCno4704Ees7RCH6ku7kU86b1NOanvrNwqTHr14wtnLhgZ
0gQ5GV1oLWvMEVg1YFMIgPRkTsSQKWCG51LqQ45aU/4NMJoUxGyJTL9i8YxMavaB1Z2npfTQ
DQo9+womZ7SXzHaIWC858gWN19e5UFyHDnTEDc14hKkf1CqnGJVcCJkmSfmrrHk/CkmF0ZT3
whTH01DhJTtV stramer@contoso\n"
]
}
```

Filter arrays with boolean expressions

The other operation used to get data from an array is *filtering*. Filtering is done with the `[?...]` JMESPath operator. This operator takes a predicate as its contents. A predicate is any statement (including Boolean properties) that can be evaluated to either `true` or `false`. Expressions where the predicate evaluates to `true` are included in the output.

The first query demonstrates how to list the names of all Azure subscriptions connected to your account whose `isDefault` property is true. The second and third queries show two different ways to list all subscriptions whose `isDefault` property is false.

Bash

Azure CLI

```
# Boolean values are assumed to be true, so you can directly
evaluate the isDefault property to return the default subscription.
az account list --query "[?isDefault].name"

# To check if a Boolean property is false, you can use the
comparison operator == or the logical operator !.
az account list --query '[?!isDefault].name'
az account list --query "[?isDefault == \`false\`].name"
```

JMESPath offers the standard comparison and logical operators. These include `<`, `<=`, `>`, `>=`, `==`, and `!=`. JMESPath also supports logical and (`&&`), or (`||`), and not (`!`). Expressions can be grouped within parenthesis, allowing for more complex predicate expressions. For the full details on predicates and logical operations, see the [JMESPath specification](#).

In the last section, you flattened an array to get the complete list of all VMs in a resource group. With the use of filters, this output can be restricted to only Linux

VMs:

Bash

Azure CLI

```
az vm list --resource-group QueryDemo --query "[?storageProfile.osDisk.osType=='Linux'].{Name:name,admin:osProfile.adminUsername}" --output table
```

JSON

Name	Admin
-----	-----
Test-2	sttramer
TestVM	azureuser

You can also filter numerical values such as the OS disk size. The following example demonstrates how to filter the list of VMs to display ones with a disk size larger than or equal to 50 GB.

Bash

Azure CLI

```
az vm list --resource-group QueryDemo --query "[?storageProfile.osDisk.diskSizeGb >=\`50\`].{Name:name,admin:osProfile.adminUsername,DiskSize:storageProfile.osDisk.diskSizeGb }" --output table
```

JSON

Name	Admin	DiskSize
-----	-----	-----
WinTest	winadmin	127

For large arrays, it may be faster to apply the filter before selecting data.

 **Important**

In JMESPath, strings are always surrounded by single quotes (') or escape characters (`). If you use double quotes as part of a string in a filter predicate,

you'll get empty output.

JMESPath functions

JMESPath also has built-in functions that allow for more complex queries and for modifying query output. This section focuses on using JMESPath functions to create queries while the [Manipulating output with functions](#) section demonstrates how to use functions to modify the output.

Expressions are evaluated before calling the function, so arguments themselves can be JMESPath expressions. The following examples demonstrate this concept by using `contains(string, substring)`, which checks to see if a string contains a substring. This command finds all VMs using SSD storage for their OS disk:

Bash

Azure CLI

```
az vm list --resource-group QueryDemo --query "[?contains(storageProfile.osDisk.managedDisk.storageAccountType, 'SSD')].[{Name:name, Storage:storageProfile.osDisk.managedDisk.storageAccountType}]"
```

JSON

```
[  
  {  
    "Name": "TestVM",  
    "Storage": "StandardSSD_LRS"  
  },  
  {  
    "Name": "WinTest",  
    "Storage": "StandardSSD_LRS"  
  }]
```

Pipe expressions

Similar to how `|` is used in the command line, `|` can be used in JMESPath queries to apply expressions to intermediate query results. We can also use `|` to break

down complex queries into simpler subexpressions. To shorten the query from the previous section, use `|` to apply the filter after flattening and selecting data.

Bash

Azure CLI

```
az vm list --resource-group QueryDemo --query "[].{Name:name, Storage:storageProfile.osDisk.managedDisk.storageAccountType} | [? contains(Storage, 'SSD')]"
```

JSON

```
[  
 {  
   "Name": "TestVM",  
   "Storage": "StandardSSD_LRS"  
 },  
 {  
   "Name": "WinTest",  
   "Storage": "StandardSSD_LRS"  
 }  
]
```

See the [JMESPath specification - Built-in Functions](#) for the full list of functions.

Manipulating output with functions

JMESPath functions also have another purpose, which is to operate on the results of a query. Any function that returns a nonboolean value changes the result of an expression. For example, you can sort data by a property value with `sort_by(array, &sort_expression)`. JMESPath uses a special operator, `&`, for expressions that should be evaluated later as part of a function. The next example shows how to sort a VM list by OS disk size:

Bash

Azure CLI

```
az vm list --resource-group QueryDemo --query "sort_by([].{Name:name, Size:storageProfile.osDisk.diskSizeGb}, &Size)" --output table
```

JSON

Name	Size
Test-2	30
TestVM	32
WinTest	127

See the [JMESPath specification - Built-in Functions](#) for the full list of functions.

Formatting query results

The Azure CLI uses JSON as its default output format, however different output formats may better suit a query depending on its purpose and results. Queries are always run on the `JSON` output first and then formatted.

This section will go over `tsv` and `table` formatting and some use cases for each format. For more information about output formats, see [Output formats for Azure CLI commands](#).

TSV output format

The `tsv` output format returns tab- and newline-separated values without extra formatting, keys, or other symbols. This format is useful when the output is stored in a parameter and used in another command.

One use case for `tsv` formatting is queries that retrieve a value out of a CLI command, such as an Azure resource ID or resource name, and store the value in a local environment variable. By default the results are returned in JSON format, which may be an issue when dealing with JSON strings that are enclosed in `"` characters. The quotes may **not** be interpreted by the shell if the command output is directly assigned to the environment variable. This issue can be seen in the following example that assigns a query result to an environment variable:

Bash

Azure CLI

```
USER=$(az vm show --resource-group QueryDemo --name TestVM --query "osProfile.adminUsername")
echo $USER
```

JSON

```
"azureuser"
```

Use `tsv` formatting, as demonstrated in the following query, to prevent enclosing return values with type information:

Bash

Azure CLI

```
USER=$(az vm show --resource-group QueryDemo --name TestVM --query "osProfile.adminUsername" --output tsv)
echo $USER
```

JSON

```
azureuser
```

Table output format

The `table` format prints output as an ASCII table, making it easy to read and scan. Not all fields are included in the table so this format is best used as a human-searchable overview of data. Fields that aren't included in the table can still be filtered for as part of a query.

⚠ Note

Certain keys are filtered out and not printed in the table view. These keys are `id`, `type`, and `etag`. To see these values, you can change the key name in a multiselect hash.

Azure CLI

```
az vm show --resource-group QueryDemo --name TestVM --query "{objectID:id}" --output table
```

We can use a previous query to demonstrate this concept. The original query returned a JSON object containing the name, OS, and administrator name for each VM in the resource group:

Bash

Azure CLI

```
az vm list --resource-group QueryDemo --query "[].{Name:name,  
OS:storageProfile.osDisk.osType, Admin:osProfile.adminUsername}"
```

JSON

```
[  
  {  
    "Name": "Test-2",  
    "OS": "Linux",  
    "admin": "sttramer"  
  },  
  {  
    "Name": "TestVM",  
    "OS": "Linux",  
    "admin": "azureuser"  
  },  
  {  
    "Name": "WinTest",  
    "OS": "Windows",  
    "admin": "winadmin"  
  }  
]
```

When combined with the `--output table` output format, the column names match up with the `displayKey` value of the multiselect hash making it easier to skim the information:

Bash

Azure CLI

```
az vm list --resource-group QueryDemo --query "[].{Name:name,  
OS:storageProfile.osDisk.osType, Admin:osProfile.adminUsername}" --  
output table
```

JSON

Name	OS	Admin
Test-2	Linux	sttramer

```
TestVM  Linux  azureuser
WinTest  Windows  winadmin
```

Next steps

To learn more about JMESPath queries, see [JMESPath Tutorial](#).

To learn more about other Azure CLI concepts mentioned in this article see:

- [Output formats for Azure CLI commands](#)
- [How to use Azure CLI effectively](#)
- [Learn to use Bash with Azure CLI](#)

How to use variables in Azure CLI commands

Article • 06/26/2023

In addition to specifying values directly in a command, you can provide values in several ways:

- Use shell variables
- Set a subscription for use in multiple commands
- Create default values for some parameters
- Use persistent values for some parameters

This article discusses various ways to specify values in Azure CLI commands.

Prerequisites

- Use the Bash environment in [Azure Cloud Shell](#). For more information, see [Quickstart for Bash in Azure Cloud Shell](#).
A blue rectangular button with a white 'A' icon and the text 'Launch Cloud Shell'. To the right of the button is a small blue square with a white arrow pointing outwards.
 - If you prefer to run CLI reference commands locally, [install](#) the Azure CLI. If you're running on Windows or macOS, consider running Azure CLI in a Docker container. For more information, see [How to run the Azure CLI in a Docker container](#).
 - If you're using a local installation, sign in to the Azure CLI by using the [az login](#) command. To finish the authentication process, follow the steps displayed in your terminal. For other sign-in options, see [Sign in with the Azure CLI](#).
 - When you're prompted, install the Azure CLI extension on first use. For more information about extensions, see [Use extensions with the Azure CLI](#).
 - Run [az version](#) to find the version and dependent libraries that are installed. To upgrade to the latest version, run [az upgrade](#).

Use shell variables

Azure CLI runs in a shell. This article uses Bash. For information about other shells, see [Use Azure CLI effectively](#). You can use variables in Bash to pass values for parameters to

commands. Using variables with the Azure CLI also allows reuse of commands, either piecemeal or in scripts.

This example creates a new storage disk of the same type as the storage disk on an existing virtual machine.

```
Azure CLI

# Assign values to variables
MyResourceGroup=ContosoRGforVM
MySubscription="Contoso subscription"
vmName=VM01

# Get a value for a variable based on an existing virtual machine
osType=$(az vm get-instance-view --resource-group $MyResourceGroup \
    --name $vmName --subscription "$MySubscription" \
    --query 'storageProfile.osDisk.osType' --output tsv)

# Create a disk of the same type by using the variable value
az disk create --resource-group $MyResourceGroup --name DestinationDisk --
    size-gb 20 --os-type $osType
```

This example shows how to assign values to variables that are reused, like **MyResourceGroup** and **osType**. The command `az vm get-instance-view` combined with the query `storageProfile.osDisk.osType` returns the disk's OS type. Wrapping the command with `$(())` assigns the command's return value to `osType`. To learn more about `--query` and JMESPath queries see [How to query Azure CLI command output using a JMESPath query](#).

When you assign a value to a variable from another command, be sure that the command uses a compatible output format. The `az vm get-instance-view` command uses the `tsv` output format. This option returns values without extra formatting, keys, or other symbols. Some output formats include structure or characters like quotation marks. For more information, see [Output formats for Azure CLI commands](#).

In this example, the **MySubscription** variable must be in quotation marks. The value of the variable contains spaces, which the command can't parse. If you work only with subscription IDs, you don't need to use quotation marks.

Set a subscription

Many commands require a specific subscription. Azure resources exist in resource groups, which exist in subscriptions. Azure CLI uses a default subscription when you are in a session. To see your current subscription value, run the `az account show` command:

Azure CLI

```
az account show --output table
```

You might have access to only one subscription. For more information, see [Use Azure subscriptions with Azure CLI](#). You can use the `az account set` command to set your current subscription:

Azure CLI

```
az account set --subscription "My Demos"
```

After you set your subscription, you can omit `--Subscription` parameter. For more information, see [Use Azure subscriptions with Azure CLI](#).

Create default values

You can set values for some parameters by using the `az config set` command. This example sets a default resource group:

Azure CLI

```
az config set defaults.group=ContosoRGforVM
```

After running this command, you can run the following command to create a storage account in the ContosoRGforVM resource group:

Azure CLI

```
az storage account create --name storage135 --location eastus --sku Standard_LRS
```

Notice that there's no resource group specified in the command. For more information, see [Set a default resource group](#).

Tip

Commands getting values for parameters in different ways can be confusing. If a command gives an unexpected result, such as not being able to find a resource group, there may be a default value.

If you encounter an error, run the command again with the parameter and value specified. An explicit value for a parameter always takes precedence over other options.

You can specify values for several parameters this way. For more information, see [Azure CLI configuration](#).

Use persistent values

Persisted parameter values allow you to specify a value only once. If you're doing several related actions in a resource group, you don't have to specify that group repeatedly.

Run this command to persist a parameter value:

Azure CLI

```
az config param-persist on
```

After turning on persistence, create a resource group:

Azure CLI

```
az group create --name ContosoStorageRG --location eastus
```

As long as persistence is on, you can leave the `--resource-group` parameter out of future commands. The following command creates a storage account in the ContosoStorageRG resource group:

Azure CLI

```
az storage account create --name storage135 --location eastus --sku Standard_LRS
```

For more information, see [Azure CLI persisted parameter](#).

Clean up resources

If you created resources to try any of the commands in this article, you can remove them by using the `az group delete` command:

Azure CLI

```
az group delete --name ContosoRGforVM  
az group delete --name ContosoStorageRG
```

This command removes the group and all the resources that it contains at once.

You can remove the persistent parameters by running the [az config param-persist delete](#) command:

Azure CLI

```
az config param-persist delete --all
```

See also

- [Learn to use Bash with the Azure CLI](#)
- [How to use the Azure CLI effectively](#)
- [How to query Azure CLI command output](#)

Output formats for Azure CLI commands

Article • 10/18/2023

The Azure CLI uses JSON as its default output format, but offers other formats. Use the `--output` (`--out` or `-o`) parameter to format CLI output. The argument values and types of output are:

--output	Description
<code>json</code>	JSON string. This setting is the default
<code>jsonc</code>	Colorized JSON
<code>table</code>	ASCII table with keys as column headings
<code>tsv</code>	Tab-separated values, with no keys
<code>yaml</code>	YAML, a human-readable alternative to JSON
<code>yamlc</code>	Colorized YAML
<code>none</code>	No output other than errors and warnings

⚠ Warning

The output you choose can be written to your log file. Use an output format of `none` or store command output in a variable to avoid exposing secrets such as API keys and credentials. For more information, see [None output format](#).

JSON output format (default)

The following example displays the list of virtual machines in your subscriptions in the default JSON format.

Azure CLI

```
az vm list --output json
```

The following output has some fields omitted for brevity, and identifying information replaced.

JSON

```
[  
  {  
    "availabilitySet": null,  
    "diagnosticsProfile": null,  
    "hardwareProfile": {  
      "vmSize": "Standard_DS1"  
    },  
    "id":  
      "/subscriptions/.../resourceGroups/DEMORG1/providers/Microsoft.Compute/virtualMachines/DemoVM010",  
    "instanceView": null,  
    "licenseType": null,  
    "location": "westus",  
    "name": "DemoVM010",  
    "networkProfile": {  
      "networkInterfaces": [  
        {  
          "id":  
            "/subscriptions/.../resourceGroups/demorg1/providers/Microsoft.Network/networkInterfaces/DemoVM010VMNic",  
          "primary": null,  
          "resourceGroup": "demorg1"  
        }  
      ]  
    },  
    ...  
    ...  
    ...  
  }  
]
```

YAML output format

The `yaml` format prints output as [YAML](#), a plain-text data serialization format. YAML tends to be easier to read than JSON, and easily maps to that format. Some applications and CLI commands take YAML as configuration input, instead of JSON.

Azure CLI

```
az vm list --output yaml
```

The following output has some fields omitted for brevity, and identifying information replaced.

YAML

```
- availabilitySet: null
  diagnosticsProfile: null
  hardwareProfile:
    vmSize: Standard_DS1_v2
  id:
/subscriptions/.../resourceGroups/DEMORG1/providers/Microsoft.Compute/virtualMachines/DemoVM010
  identity: null
  instanceView: null
  licenseType: null
  location: westus
  name: ExampleVM1
  networkProfile:
    networkInterfaces:
      - id:
/subscriptions/.../resourceGroups/DemoRG1/providers/Microsoft.Network/networkInterfaces/DemoVM010Nic
      primary: null
      resourceGroup: DemoRG1
...
...
...
```

Table output format

The `table` format prints output as an ASCII table, making it easy to read and scan.

Nested objects aren't included in table output, but can still be filtered as part of a query. Some fields aren't included in the table, so this format is best when you want a quick, human-searchable overview of data.

Azure CLI

```
az vm list --output table
```

Output

Name	ResourceGroup	Location
DemoVM010	DEMORG1	westus
demovm212	DEMORG1	westus
demovm213	DEMORG1	westus
KBDemo001VM	RGDEMO001	westus
KBDemo020	RGDEMO001	westus

You can use the `--query` parameter to customize the properties and columns you want to show in the list output. The following example shows how to select just the VM Name and the Resource Group Name in the `list` command.

Azure CLI

```
az vm list --query "[].{resource:resourceGroup, name:name}" --output table
```

Output

Resource	Name
DEMORG1	DemoVM010
DEMORG1	demovm212
DEMORG1	demovm213
RGDEMO001	KBDemo001VM
RGDEMO001	KBDemo020

ⓘ Note

Some keys are not printed in the table view by default. These are `id`, `type`, and `etag`. If you need to see these in your output, you can use the JMESPath re-keying feature to change the key name and avoid filtering.

Azure CLI

```
az vm list --query "[].{objectId:id}" --output table
```

For more about using queries to filter data, see [Use JMESPath queries with Azure CLI](#).

TSV output format

The `tsv` output format returns tab- and newline-separated values without extra formatting, keys, or other symbols. This format makes it easy to consume the output into other commands and tools that need to process the text in some form. Like the `table` format, `tsv` doesn't print nested objects.

Using the preceding example with the `tsv` option outputs the tab-separated result.

Azure CLI

```
az vm list --output tsv
```

Output

```
None    None
/subscriptions/.../resourceGroups/DEMORG1/providers/Microsoft.Compute/virtua
lMachines/DemoVM010    None    None    westus    DemoVM010        None
Succeeded    DEMORG1    None            Microsoft.Compute/virtualMachines
cbd56d9b-9340-44bc-a722-25f15b578444
None    None
/subscriptions/.../resourceGroups/DEMORG1/providers/Microsoft.Compute/virtua
lMachines/demovm212    None    None    westus    demovm212        None
Succeeded    DEMORG1    None            Microsoft.Compute/virtualMachines
4bdac85d-c2f7-410f-9907-ca7921d930b4
None    None
/subscriptions/.../resourceGroups/DEMORG1/providers/Microsoft.Compute/virtua
lMachines/demovm213    None    None    westus    demovm213        None
Succeeded    DEMORG1    None            Microsoft.Compute/virtualMachines
2131c664-221a-4b7f-9653-f6d542fbfa34
None    None
/subscriptions/.../resourceGroups/RGDEM0001/providers/Microsoft.Compute/virt
ualMachines/KBDemo001VM    None    None    westus    KBDemo001VM
None    Succeeded    RGDEM0001    None
Microsoft.Compute/virtualMachines    14e74761-c17e-4530-a7be-9e4ff06ea74b
None    None
/subscriptions/.../resourceGroups/RGDEM0001/providers/Microsoft.Compute/virt
ualMachines/KBDemo020    None    None    westus    KBDemo020        None
Succeeded    RGDEM0001    None            Microsoft.Compute/virtualMachines
36baa9-9b80-48a8-b4a9-854c7a858ece
```

One restriction of the TSV output format is that there isn't a guarantee on output ordering. The CLI makes a best effort to preserve ordering by sorting keys in the response JSON alphabetically, and then printing their values in order for TSV output. There is no guarantee that the order is always identical, since the Azure service response format can change.

In order to enforce consistent ordering, you'll need to use the `--query` parameter and the [multiselect list](#) format. When a CLI command returns a single JSON dictionary, use the general format `[key1, key2, ..., keyN]` to force a key order. For CLI commands that return an array, use the general format `[].[key1, key2, ..., keyN]` to order column values.

For example, to order the information displayed above by ID, location, resource group, and VM name:

Azure CLI

```
az vm list --output tsv --query '[].[id, location, resourceGroup, name]'
```

Output

```
/subscriptions/.../resourceGroups/DEMORG1/providers/Microsoft.Compute/virtualMachines/DemoVM010    westus    DEMORG1    DemoVM010
/subscriptions/.../resourceGroups/DEMORG1/providers/Microsoft.Compute/virtualMachines/demovm212    westus    DEMORG1    demovm212
/subscriptions/.../resourceGroups/DEMORG1/providers/Microsoft.Compute/virtualMachines/demovm213    westus    DEMORG1    demovm213
/subscriptions/.../resourceGroups/RGDEMO001/providers/Microsoft.Compute/virtualMachines/KBDemo001VM    westus    RGDEMO001    KBDemo001VM
/subscriptions/.../resourceGroups/RGDEMO001/providers/Microsoft.Compute/virtualMachines/KBDemo020        westus    RGDEMO001    KBDemo020
```

The next example shows how `tsv` output can be piped to other commands in bash. The query is used to filter output and force ordering, `grep` selects items that have text "RGD" in them, then the `cut` command selects the fourth field to show the name of the VM in output.

Azure CLI

```
az vm list --output tsv --query '[][id, location, resourceGroup, name]' |
grep RGD | cut -f4
```

Output

```
KBDemo001VM
KBDemo020
```

The `tsv` output format is often used when assigning values to variables. This example gets the active subscription ID and stores it into a variable for use in a script.

Azure CLI

```
subscriptionID=$(az account show --query id --output tsv)
echo "Using subscription ID $subscriptionID"
```

For more `--query` parameter examples, see [How to query Azure CLI command output](#).

None output format

Some Azure CLI commands output information you must protect. Here are four examples:

- passwords
- connection strings

- secrets
- keys

To avoid command output being written to your log, use one of these options:

Option	Benefit	Use case
--output none output format	Keeps security information from displaying in your console <i>and from being written to your log</i> . If your command fails, you'll still receive error messages.	1. Use when command output <i>can be retrieved at a later time</i> .
--query parameter	Stores output in a variable. Doesn't store command output in the log.	1. Use when command output <i>can't be retrieved at a later time</i> .

Use `none` and retrieve security information at a later time

Some Azure secrets can be retrieved at a later time. A good example is secrets stored in Azure Key Vault. In this example, create an Azure Key Vault secret using [az keyvault secret set](#) with the `--output none` option. You can retrieve the secret later using the [az keyvault secret show](#) command.

Azure CLI

```
az keyvault secret set --name MySecretName \
    --vault-name MyKeyVaultName \
    --value MySecretValue \
    --output none
```

Use `--query` and return security information to a variable

The use of `--query` to store output in a variable is technically not an output format. It is a solution to protect secrets, and is an alternative to using `--output none`. For example,

when you reset a service principal credential, the password can't be retrieved again.

Reset a service principal credential returning output in the default json format:

Azure CLI

```
# reset service principal credentials returning results to the console and  
# the log  
az ad sp credential reset --id myServicePrincipalID --output json
```

Console output showing the new password in the console. This information is also written in the log.

Output

```
{  
  "appId": "myServicePrincipalID",  
  "password": "myServicePrincipalNewPassword",  
  "tenant": "myTenantID"  
}
```

A better solution is to return security information to a variable. This example *doesn't* write the service principal password to the log. When testing, use the `echo` command to see the value of your variable, but understand that `echo` writes to the log.

Azure CLI

```
# reset service principal credentials returning results to a variable  
myNewPassword=$(az ad sp credential reset --id myServicePrincipalID --query  
password --output tsv)
```

For more examples on storing output to a variable, see [Use the Azure CLI successfully - pass values to another command](#). To learn more about `--query` parameter syntax, see [How to query Azure CLI command output](#).

Set the default output format

Azure CLI commands provide output that can be controlled in two ways:

Output control	Benefit	How-to
Global setting	Select a default output value that you use the most so you don't have to continually provide an	Specify a default output format using <code>az config set</code> .

Output control	Benefit	How-to
	--output parameter for each reference command.	
Command parameter	Specify output at the command level and give your scripts maximum flexibility. You control console output, logging and variable input for each reference command.	Override the default setting using a reference command's --output parameter.

The default output for the Azure CLI is `json`. Set the default output to `none` when console output and logging isn't needed.

Azure CLI

```
az config set core.output=none
```

You can overwrite the default output of any Azure CLI reference command by using the `--output` parameter. Here's a script of commands that alter and test command output:

Azure CLI

```
# set your default output to table
az config set core.output=table

# show your active subscription in table format
# notice how only a subset of properties are returned in the table
az account show

# override your table default and show your active subscription in jsonc
# format
az account show --output jsonc

# reset your default output to json
az config set core.output=json
```

See also

- [Azure CLI configuration](#)
- [How to query Azure CLI command output](#)
- [Use the Azure CLI successfully](#)

How to manage Azure subscriptions with the Azure CLI

Article • 10/16/2023

The Azure CLI helps you manage your Azure subscription, create management groups, and lock subscriptions. You might have multiple subscriptions within Azure. You can be part of more than one organization or your organization might divide access to certain resources across groupings. The Azure CLI supports selecting a subscription both globally and per command.

For detailed information on subscriptions, billing, and cost management, see the [billing and cost management documentation](#).

Terminology

A *tenant* is an instance of Microsoft Entra ID in which information about a single organization resides. A *multi-tenant organization* is an organization that has more than one instance of Microsoft Entra ID. A tenant has one or more *subscriptions* and *users*.

Users are those accounts that sign in to Azure to create, manage, and use resources. A user may have access to multiple *tenants* and *subscriptions*.

Subscriptions are the agreements with Microsoft to use cloud services, including Azure. Every resource is associated with a subscription. Subscriptions contain resource groups.

An Azure *resource group* is a container that holds related resources for an Azure solution. To learn how to manage resource groups within your subscription, see [How to manage Azure resource groups with the Azure CLI](#)

Get the active tenant

Use [az account tenant list](#) or [az account show](#) to get the active tenant ID.

Azure CLI

```
az account tenant list
```

```
az account show
```

Change the active tenant

To switch tenants, you have two options.

- [Change the active subscription.](#)
- Sign in as a user within the desired tenant. Use [az login](#) to change the active tenant and update the subscription list to which you belong.

Azure CLI

```
# sign in as a different user
az login --user <myAlias@myCompany.com> --password <myPassword>

# sign in with a different tenant
az login --tenant <myTenantID>
```

If your organization requires multi-factor authentication, you may receive this error when using `az login --user`:

Output

```
Due to a configuration change made by your administrator, or because
you moved to a new location, you must use multi-factor authentication
to access...
```

Using the alternative `az login --tenant` command prompts you to open an HTTPS page and enter the code provided. You can then use multi-factor authentication and successfully sign in. To learn more about sign in options with the Azure CLI, see [Sign in with the Azure CLI](#).

Get subscription information

Most Azure CLI commands act within a subscription. You can specify which subscription to work in by using the `--subscription` parameter in your command. If you don't specify a subscription, the command uses your current, active subscription.

To see the subscription you're currently using or to get a list of available subscriptions, run the [az account show](#) or [az account list](#) command. Go to [Learn to use Bash with the Azure CLI](#) to see more examples of ways to use these commands.

Here are examples showing how to get subscription information.

Azure CLI

```
# get the current default subscription using show
az account show --output table

# get the current default subscription using list
az account list --query "[?isDefault]"

# get a subscription that contains search words or phrases
az account list --query "[?contains(name,'search phrase')].
{SubscriptionName:name, SubscriptionID:id, TenantID:tenantId}" --output
table

# store the default subscription in a variable
subscriptionId=$(az account list --query "[?isDefault].id" --output tsv)"
echo $subscriptionId

# store a subscription of certain name in a variable
subscriptionId=$(az account list --query "[?name=='my case sensitive
subscription full name'].id" --output tsv)"
echo $subscriptionId
```

💡 Tip

The `--output` parameter is a global parameter, available for all commands. The **table** value presents output in a friendly format. For more information, see [Output formats for Azure CLI commands](#).

Change the active subscription

Azure subscriptions have both a name and an ID. You can switch to a different subscription using `az account set` specifying the desired subscription ID or name.

Azure CLI

```
# change the active subscription using the subscription name
az account set --subscription "My Demos"

# change the active subscription using the subscription ID
az account set --subscription "xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx"

# change the active subscription using a variable
subscriptionId=$(az account list --query "[?name=='my case sensitive
subscription full name'].id" --output tsv)"
az account set --subscription $subscriptionId
```

If you change to a subscription that is in a different tenant, you will also be changing the active tenant. To learn how to add a new subscription to your Microsoft Entra tenant,

see [Associate or add an Azure subscription to your Microsoft Entra tenant](#).

If you received a "The subscription of ... doesn't exist..." error, see [Troubleshooting](#) for possible solutions.

Create Azure management groups

Azure management groups contain subscriptions. Management groups provide a way to manage access, policies, and compliance for those subscriptions. For more information, see [What are Azure management groups](#).

Use the [az account management-group](#) commands to create and manage Azure Management Groups.

You can create a management group for several of your subscriptions by using the [az account management-group create](#) command:

Azure CLI

```
az account management-group create --name Contoso01
```

To see all your management groups, use the [az account management-group list](#) command:

Azure CLI

```
az account management-group list
```

Add subscriptions to your new group by using the [az account management-group subscription add](#) command:

Azure CLI

```
az account management-group subscription add --name Contoso01 --subscription "My Demos"  
az account management-group subscription add --name Contoso01 --subscription "My Second Demos"
```

To remove a subscription, use the [az account management-group subscription remove](#) command:

Azure CLI

```
az account management-group subscription remove --name Contoso01 --  
subscription "My Demos"
```

To remove a management group, run the [az account management-group delete](#) command:

Azure CLI

```
az account management-group delete --name Contoso01
```

Removing a subscription or deleting a management group doesn't delete or deactivate a subscription.

Set an Azure subscription lock

As an administrator, you may need to lock a subscription to prevent users from deleting or modifying it. For more information, see [Lock resources to prevent unexpected changes](#).

In Azure CLI, use the [az account lock](#) commands. For instance, the [az account lock create](#) command can prevent users from deleting a subscription:

Azure CLI

```
az account lock create --name "Cannot delete subscription" --lock-type  
CanNotDelete
```

ⓘ Note

You need to have appropriate permissions to create or change locks.

To see the current locks on your subscription, use the [az account lock list](#) command:

Azure CLI

```
az account lock list --output table
```

If you make an account read-only, the result resembles assigning permissions of the Reader role to all users. To learn about setting permissions for individual users and roles, see [Add or remove Azure role assignments using Azure CLI](#).

To see details for a lock, use the `az account lock show` command:

```
Azure CLI
```

```
az account lock show --name "Cannot delete subscription"
```

You can remove a lock by using the `az account lock delete` command:

```
Azure CLI
```

```
az account lock delete --name "Cannot delete subscription"
```

Troubleshooting

The subscription doesn't exist

In addition to a typographical error, you can receive this error when there is a permissions timing issue. For example, if you have been given permissions to a new subscriptions *while your current terminal window is open*, this error can occur. The solution is to either close and reopen your terminal window, or use `az logout` then `az login` to refresh your available subscriptions list.

Here is a script to help you find and change a subscription.

```
Azure CLI
```

```
# See what subscription you are currently using.  
az account show  
  
# Get a list of available subscriptions.  
az account list --output table  
  
# If the subscription you are seeking is not in the list  
#   close and reopen your terminal window,  
#   or logout and then sign in again.  
az logout  
az login  
  
# Did your available subscription list change?  
az account list --output table  
  
# If the subscription you are seeking is still not in the list,  
#   contact your system administrator. You cannot change your  
#   subscription to an ID that is not in the list.  
  
# If the subscription you are seeking is now in the list,
```

```
# change your subscription.  
az account set --subscription 00000000-0000-0000-0000-000000000000
```

See also

- Associate or add an Azure subscription to your Microsoft Entra tenant
- Manage Azure resource groups

How to manage Azure resource groups with the Azure CLI

Article • 08/02/2023

An Azure resource group is a container that holds related resources for an Azure solution. A resource group might contain storage, virtual machines, apps, dashboards, services, or almost anything you deal with in Azure.

The Azure Command-Line Interface (CLI) allows you to create, persist, and set default Azure resource groups. The CLI will also allow you to clean up resources after creating them.

Azure Region Identification

Azure customers can choose to deploy resources in many different regions. In some cases, customers may be able to reduce costs by selecting nearby regions offering the same services. If a nearby region is identified, a message will display the region to select for future deployments.

In the following example, the `az config` command is used to disable the region recommendation message:

Azure CLI

```
az config set core.display_region_identified=no
```

For more information about Azure regions, see [Choose the right Azure region for you](#).

Create a resource group

To create a resource group, use the `az group create` command:

Azure CLI

```
az group create --name MyResourceGroup --location eastus
```

A resource group belongs to a single location. To see all the locations supported in your current subscription, run the `az account list-locations` command:

Azure CLI

```
az account list-locations
```

To see all the resource groups for your current subscription, use the [az group list](#) command:

Azure CLI

```
az group list --output table
```

💡 Tip

The `--output` parameter is a global parameter, available for all commands. The `table` value presents output in a friendly format. For more information, see [Output formats for Azure CLI commands](#).

When you create a resource, you create it in a resource group. The following example shows a storage account created by using the [az storage account create](#) command:

Azure CLI

```
az storage account create --resource-group MyResourceGroup --name storage134  
--location eastus --sku Standard_LRS
```

To remove a resource group, run the [az group delete](#) command:

Azure CLI

```
az group delete --name MyResourceGroup
```

When you remove a resource group, you delete all the resources that belong to it. You can't undo this action. If you try any of the commands in this article, deleting the resource groups you create cleans up your account.

Persist a resource group

Parameter persistence allows you to reuse values for certain parameters, including resource groups.

First, turn on the persistence feature by using the [az config param-persist on](#) command:

Azure CLI

```
az config param-persist on
```

After turning on persistence, create another resource group:

Azure CLI

```
az group create --name OtherResourceGroup --location eastus
```

As long as persistence is on, you can leave the `--resource-group` parameter out of future commands. The following command creates a storage account in the **OtherResourceGroup** group:

Azure CLI

```
az storage account create --name storage135 --location eastus --sku Standard_LRS
```

Specifying a resource group in the command takes precedence. The following command creates a storage group in a resource group called **StorageGroups**:

Azure CLI

```
az storage account create --resource-group StorageGroups --name storage136 --location eastus --sku Standard_LRS
```

Once you specify another resource group as a value, however, Azure CLI resets the persisted value. New commands use **StorageGroups** as the resource group. You can see the persisted values by using the `az config param-persist show` command:

Azure CLI

```
az config param-persist show
```

This command shows you the current persisted values. These values are stored in a file called *local_context_<username>* in a hidden directory called *.azure*. Azure CLI creates the directory in your current location when you first create a persistent value.

When you're done using persisted parameters, run the `az config param-persist off` command:

Azure CLI

```
az config param-persist off
```

Azure CLI saves your persisted values. You can see them in the local context file. If you turn on parameter persistence again, those values are already set.

For more information about using the `az config param-persist` commands, see [Use persisted parameters to simplify sequential Azure CLI commands](#).

Set a default resource group

You can set a default resource group for all the commands that you run from your local Azure CLI or from Azure Cloud Shell. Azure CLI stores this configuration locally in a *config* file. To see your current configuration, run the `az config get` command:

Azure CLI

```
az config get
```

The result shows default resource groups and other default values. If you're using Azure CLI for the first time, the results might be empty.

To set a default resource group for your Azure CLI installation, run the `az config set` command:

Azure CLI

```
az config set defaults.group=MyResourceGroup
```

The command sets a value for a specified key, in this case `defaults.group`. For available configuration options, see [Azure CLI configuration](#).

ⓘ Note

The `az config set` command does not validate the existence of the resource group you enter. The command simply stores the key-value pair.

After you run the command, the following two commands would give you the same result:

Azure CLI

```
az storage account create --resource-group MyResourceGroup --name storage01  
--location eastus --sku Standard_LRS  
az storage account create --name storage01 --location eastus --sku  
Standard_LRS
```

A resource group belongs to a subscription. If your organization has more than one subscription, you need to set that subscription before working with a resource group in the subscription. If the default value of a resource group doesn't belong to your current subscription, an error results. For more information about multiple subscriptions, see [Use multiple Azure subscriptions](#).

You don't have to reset the default to use other resource groups. Instead, specify the resource group:

Azure CLI

```
az group create --name OtherResourceGroup --location eastus  
az storage account create --resource-group StorageGroups --name storage03 -  
-location westus --sku Standard_LRS
```

The default value is for you only. It doesn't affect other users or changes you make through the Azure portal.

If you're using persisted parameter values, as described in this article, those values take precedence over defaults set in the *config* file.

Clean up resources

If you tried any of the commands in this article, you can remove any resources you created by using the [az group delete](#) command:

Azure CLI

```
az group delete --name MyResourceGroup  
az group delete --name OtherResourceGroup  
az group delete --name StorageGroups
```

This command removes the group and all the resources that it contains at once.

You can remove the persistent parameters by running the [az config param-persist delete](#) command:

Azure CLI

```
az config param-persist delete --all
```

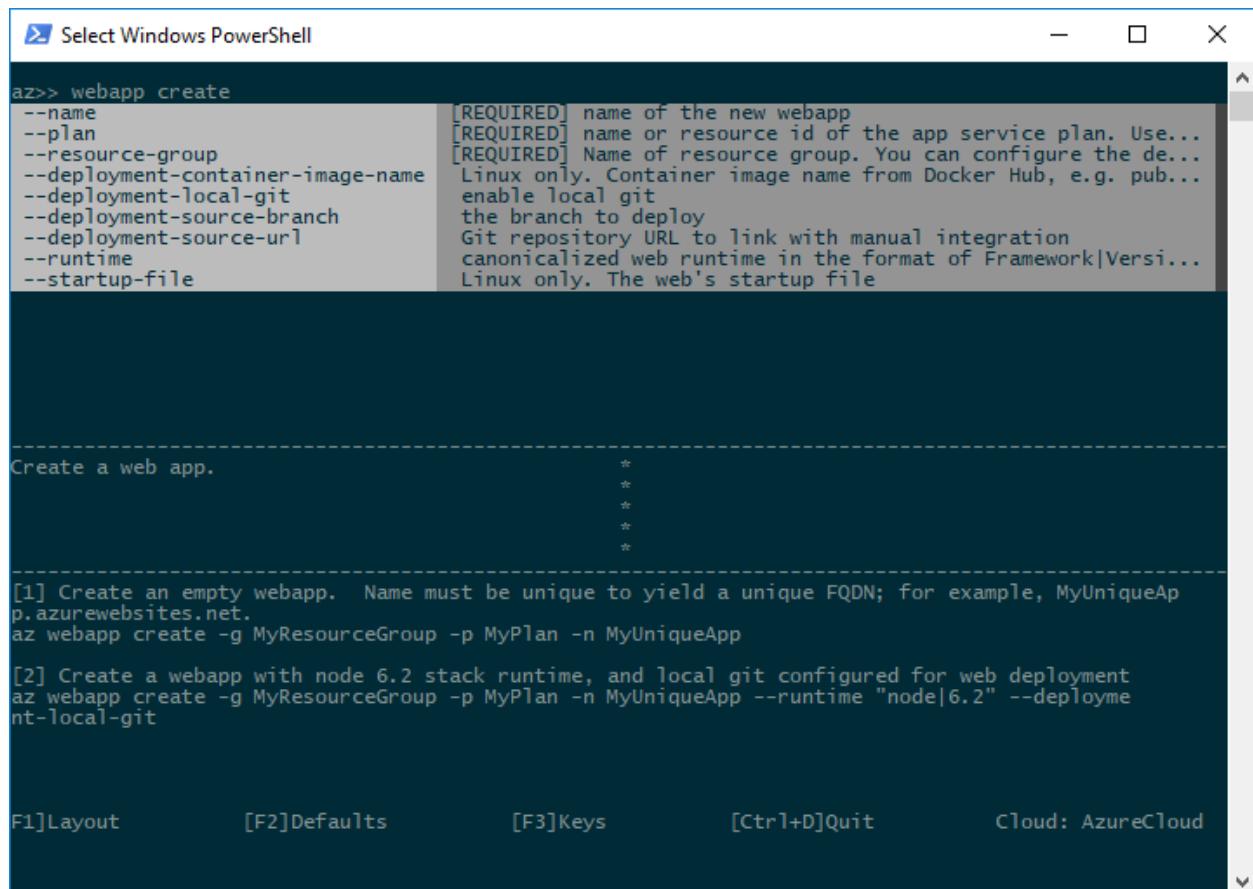
See also

- [Azure CLI configuration](#)
- [Tutorial: Use persisted parameters to simplify sequential Azure CLI commands](#)
- [Use multiple Azure subscriptions](#)

Azure CLI interactive mode

Article • 08/02/2023

You can use Azure CLI in interactive mode by running the `az interactive` command. The Azure CLI interactive mode places you in an interactive shell with autocompletion, command descriptions, and examples.



The screenshot shows a Windows PowerShell window titled "Select Windows PowerShell". Inside, the command `az webapp create` is being run. A detailed help documentation for the command is displayed in a dropdown. The command itself is followed by several examples of how to use it to create web apps.

```
az>> webapp create
--name          [REQUIRED] name of the new webapp
--plan          [REQUIRED] name or resource id of the app service plan. Use...
--resource-group [REQUIRED] Name of resource group. You can configure the de...
--deployment-container-image-name Linux only. Container image name from Docker Hub, e.g. pub...
--deployment-local-git    enable local git
--deployment-source-branch the branch to deploy
--deployment-source-url   Git repository URL to link with manual integration
--runtime        canonicalized web runtime in the format of Framework|Versi...
--startup-file   Linux only. The web's startup file

Create a web app.
[1] Create an empty webapp. Name must be unique to yield a unique FQDN; for example, MyUniqueAp
p.azurewebsites.net.
az webapp create -g MyResourceGroup -p MyPlan -n MyUniqueApp

[2] Create a webapp with node 6.2 stack runtime, and local git configured for web deployment
az webapp create -g MyResourceGroup -p MyPlan -n MyUniqueApp --runtime "node|6.2" --deplome
nt-local-git

F1]Layout      [F2]Defaults      [F3]Keys      [Ctrl+D]Quit      Cloud: AzureCloud
```

Note

We're not using the default style here, which doesn't read as well on a black background.

If you're not already signed in to your account, use the `login` command.

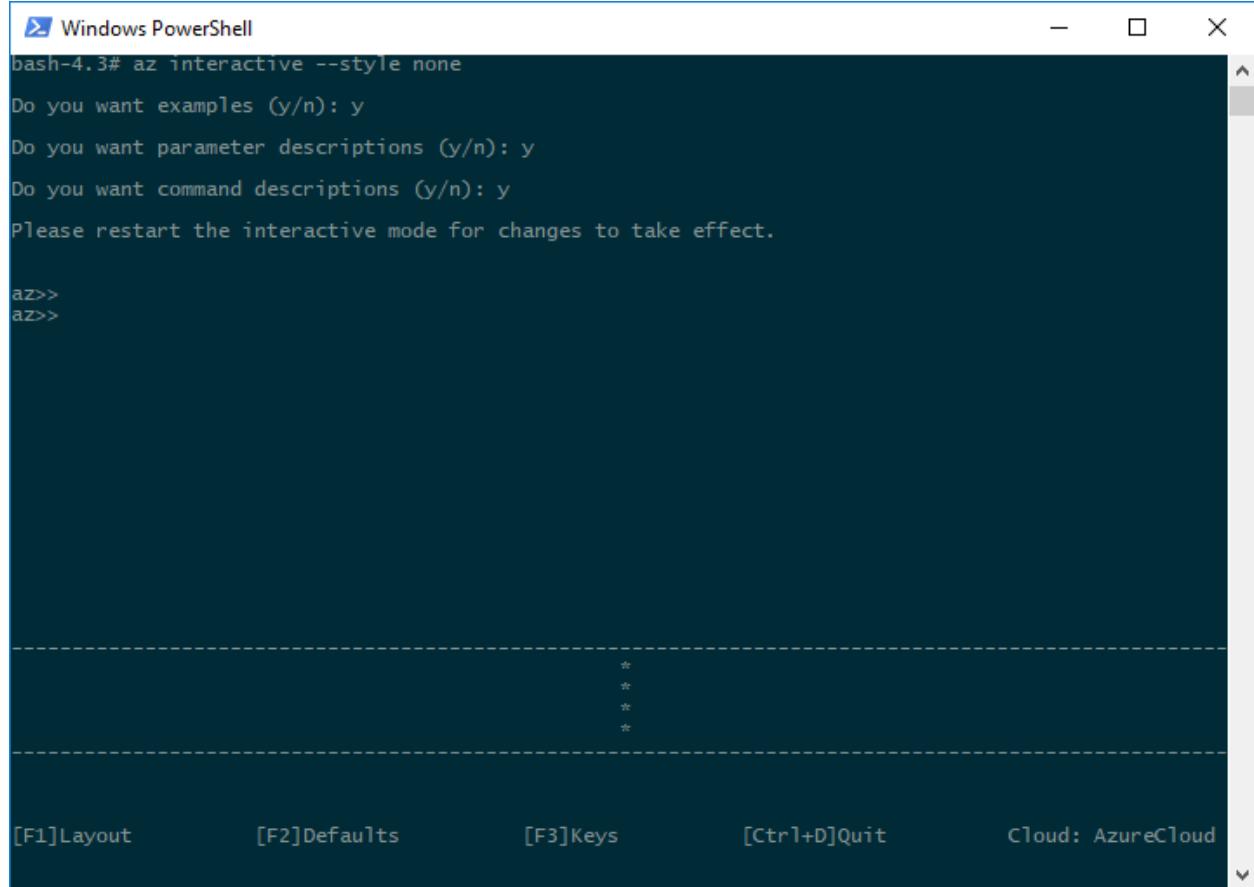
What is the Azure CLI interactive mode?

Azure CLI Interactive Mode (`az interactive`) provides users an interactive environment to run Azure CLI commands. The interactive mode makes it easier for you to learn the Azure CLI's capabilities, command syntax, and output formats. It provides autocompletion dropdowns, autocached suggestions combined with runtime documentation, and includes examples about how each command is used. Azure CLI

Interactive Mode aims to provide an ideal experience for users learning to use Azure CLI commands.

Configure

Interactive mode optionally displays command descriptions, parameter descriptions, and command examples. Turn descriptions and examples on or off using **F1**.



```
bash-4.3# az interactive --style none
Do you want examples (y/n): y
Do you want parameter descriptions (y/n): y
Do you want command descriptions (y/n): y
Please restart the interactive mode for changes to take effect.

az>>
az>>

-----
* *
* *
* *

[F1]Layout [F2]Defaults [F3]Keys [Ctrl+D]Quit Cloud: AzureCloud
```

You can turn the display of parameter defaults on or off using **F2**.

```
bash-4.3# az interactive --style none
az>>

-----
* *
* *
* *

No Default Values
```

[F1]Layout [F2]Defaults [F3]Keys [Ctrl+D]Quit Cloud: AzureCloud

F3 toggles the display of some key gestures.

```
bash-4.3# az interactive --style none
az>>

-----
* *
* *
* *

Ctrl+Y      : Scroll up the documentation
"?[query]"  : Jmespath query of the previous command
#[cmd]      : use commands outside the application
%% .        : go back a scope
%%[cmd]     : set a scope, and scopes can be chained with spaces
Ctrl+N      : Scroll down the documentation
[cmd] + [param] +"?*[query]" : Inject jmespath query from previous command
$           : get the exit code of the previous command
[cmd] :: [num]   : do a step by step tutorial of example
```

[F1]Layout [F2]Defaults [F3]Keys [Ctrl+D]Quit Cloud: AzureCloud

Scope

You can scope your interactive mode to a specific command group like `vm` or `vm image`. When you do, all commands are interpreted in that scope. It's a great shorthand if you're doing all your work in that command group.

Instead of typing these commands:

```
Azure CLI  
  
az>> vm create -n myVM -g myRG --image UbuntuLTS  
az>> vm list -o table
```

You can scope to the `vm` command group and type these commands:

```
Azure CLI  
  
az>> %%vm  
az vm>> create -n myVM -g myRG --image UbuntuLTS  
az vm>>list -o table
```

You can scope to lower-level command groups as well. You could scope to `vm image` using `%%vm image`. In this case, since we're already scoped to `vm`, we would use `%%image`.

```
Azure CLI  
  
az vm>> %%image  
az vm image>>
```

At that point, we can pop the scope back up to `vm` using `%%..`, or we can scope to the root with just `%%`.

```
Azure CLI  
  
az vm image>> %%  
az>>
```

Query

You can execute a JMESPath query on the results of the last command that you executed by using `??` followed by a JMESPath query. For example, after you created a group, you can retrieve the id of the new group.

```
Azure CLI
```

```
az>> group create -n myRG -l westEurope  
az>> ?? id
```

You can also use this syntax to use the result of the previous command as an argument for your next command.* For instance after having listed all groups, list all the resources of type `virtualMachine` on the first group whose location is `westeurope`.

Azure CLI

```
az>> vm create --name myVM --resource-group myRG --image UbuntuLTS --no-wait  
-o json  
az>> group list -o json  
az>> resource list -g "?? [?location=='westeurope'].name | [0]" --query "[?  
type=='Microsoft.Compute/virtualMachines'].name
```

To learn more about querying the results of your commands, see [Query command results with the Azure CLI](#).

Bash commands

You can run shell commands without leaving interactive mode using `#[cmd]`.

Azure CLI

```
az>> #dir
```

Examples

Some commands have lots of examples. You can scroll to the next page of examples using `CTRL-N` and the previous page using `CTRL-Y`.

A screenshot of a Windows PowerShell window titled "Windows PowerShell". The command entered is "az vm create". A detailed help menu is displayed, listing various parameters with their descriptions. The descriptions include:

- name [REQUIRED] Name of the virtual machine.
- resource-group [REQUIRED] Name of resource group. You can configure the default...
- admin-password Password for the VM if authentication type is 'Password'.
- admin-username Username for the VM.
- attach-data-disks Attach existing data disks to the VM. Can use the name or ID of...
- attach-os-disk Attach an existing OS disk to the VM. Can use the name or ID of...
- authentication-type Type of authentication to use with the VM. Defaults to password...
- availability-set Name or ID of an existing availability set to add the VM to. No...
- custom-data Custom init script file or text (cloud-init, cloud-config, etc.).
- data-disk-caching Storage caching type for the VM data disk(s).
- data-disk-sizes-gb space separated empty managed data disk sizes in GB to create
- generate-ssh-keys Generate SSH public and private key files if missing
- image The name of the operating system image (URN alias, URN, Custom ...)

The command "Create an Azure Virtual Machine." is followed by four asterisks (*). Below this is a dashed line separator, and then the command "[7] Create a simple Ubuntu Linux VM with a public IP address, DNS entry, 2 data disk(10GB, 20GB), and then generate ssh key pairs under ~/.ssh." is shown. The command "az vm create -n MyVm -g MyResourceGroup --public-ip-address-dns-name MyUniqueDnsName --image ubuntults --data-disk-sizes-gb 10 20 --size Standard_DS2_v2 --generate-ssh-keys" is also present. Below this, the note "[8] Create an Debian VM and with Key Vault secrets. The secrets are placed in /var/lib/waagent and each certificate file is named with the hex thumbprint." is shown. At the bottom left, it says "3/5". At the bottom right, there are keyboard shortcuts: [F1]Layout, [F2]Defaults, [F3]Keys, [Ctrl]+D]Quit, and Cloud: AzureCloud.

You can also look at a specific example using `::#`.

A screenshot of the Azure CLI interface. The title bar says "Azure CLI". In the main area, the command "az vm create ::8" is typed. The interface has a light gray background with a white input field.

Azure cloud management with the Azure CLI

Article • 06/26/2023

If you work across different regions or use [Azure Stack](#), you may need to use more than one cloud. Microsoft provides clouds for compliance with regional laws, which are available for your use. This article shows you how to get information on clouds, change the current cloud, and register or unregister new clouds.

List available clouds

You can list available clouds with the `az cloud list` command. This command shows which cloud is currently active, what its current profile is, and information on regional suffixes and host names.

To get the active cloud and a list of all the available clouds:

```
Azure CLI
az cloud list --output table

Output
+-----+-----+-----+
| IsActive | Name | Profile |
+-----+-----+-----+
| True | AzureCloud | latest |
| | AzureChinaCloud | latest |
| | AzureUSGovernment | latest |
| | AzureGermanCloud | latest |
```

The currently active cloud has `True` in the `IsActive` column. Only one cloud can be active at any time. To get more detailed information on a cloud, including the endpoints that it uses for Azure services, use the `cloud show` command:

```
Azure CLI
az cloud show --name AzureChinaCloud --output json

JSON
```

```
{  
  "endpoints": {  
    "activeDirectory": "https://login.chinacloudapi.cn",  
    "activeDirectoryDataLakeResourceId": null,  
    "activeDirectoryGraphResourceId": "https://graph.chinacloudapi.cn/",  
    "activeDirectoryResourceId":  
      "https://management.core.chinacloudapi.cn/",  
      "batchResourceId": "https://batch.chinacloudapi.cn/",  
      "gallery": "https://gallery.chinacloudapi.cn/",  
      "management": "https://management.core.chinacloudapi.cn/",  
      "resourceManager": "https://management.chinacloudapi.cn",  
      "sqlManagement": "https://management.core.chinacloudapi.cn:8443/",  
      "vmImageAliasDoc": "https://raw.githubusercontent.com/Azure/azure-rest-api-specs/master/arm-compute/quickstart-templates/aliases.json"  
    },  
    "isActive": false,  
    "name": "AzureChinaCloud",  
    "profile": "latest",  
    "suffixes": {  
      "azureDatalakeAnalyticsCatalogAndJobEndpoint": null,  
      "azureDatalakeStoreFileSystemEndpoint": null,  
      "keyvaultDns": ".vault.azure.cn",  
      "sqlServerHostname": ".database.chinacloudapi.cn",  
      "storageEndpoint": "core.chinacloudapi.cn"  
    }  
}
```

Switch the active cloud

To set the default cloud using a configuration file, see [CLI configuration values and environment variables](#). To switch the active cloud, run the `az cloud set` command. This command takes one required argument, the name of the cloud.

Azure CLI

```
az cloud set --name AzureChinaCloud
```

Important

If your authentication for the activated cloud has expired, you need to re-authenticate before performing any other CLI tasks. If this is your first time switching to the new cloud, you also need to set the active subscription. For instructions on authenticating, see [Sign in with Azure CLI](#). For information on subscription management, see [Manage Azure subscriptions with Azure CLI](#)

Register a new cloud

Register a new cloud if you have your own endpoints for Azure Stack. Creating a cloud is done with the [az cloud register](#) command. This command requires a name and a set of service endpoints. To learn how to register a cloud for use with Azure Stack, see [Use API version profiles with Azure CLI in Azure Stack](#).

You don't need to register information for the China, US Government, or German regions. These clouds are managed by Microsoft and available by default. For more information on all of the available endpoint settings, see the [documentation for az cloud register](#).

Registering a cloud doesn't automatically switch to it. Use the `az cloud set` command to select the newly created cloud.

Update an existing cloud

If you have permissions, you can also update an existing cloud. Updating a cloud switches to a different Azure services profile or modifies the connection endpoints. Update a cloud with the [az cloud update](#) command, which takes the same arguments as `az cloud register`.

Unregister a cloud

If you no longer need a created cloud, it can be unregistered with the [az cloud unregister](#) command:

Azure CLI

```
az cloud unregister --name MyCloud
```

How to use Azure Resource Manager (ARM) deployment templates with Azure CLI

Article • 10/12/2023

This article explains how to use Azure CLI with Azure Resource Manager templates (ARM templates) to deploy your resources to Azure. If you aren't familiar with the concepts of deploying and managing your Azure solutions, see [template deployment overview](#).

The deployment commands changed in Azure CLI version 2.2.0. The examples in this article require [Azure CLI version 2.20.0 or later](#).

To run this sample, install the latest version of the [Azure CLI](#). To start, run `az login` to create a connection with Azure.

Samples for the Azure CLI are written for the `bash` shell. To run this sample in Windows PowerShell or Command Prompt, you may need to change elements of the script.

If you don't have Azure CLI installed, you can use Azure Cloud Shell. For more information, see [Deploy ARM templates from Azure Cloud Shell](#).

Tip

We recommend [Bicep](#) because it offers the same capabilities as ARM templates and the syntax is easier to use. To learn more, see [How to deploy resources with Bicep and Azure CLI](#).

Required permissions

To deploy a Bicep file or ARM template, you need write access on the resources you're deploying and access to all operations on the Microsoft.Resources/deployments resource type. For example, to deploy a virtual machine, you need `Microsoft.Compute/virtualMachines/write` and `Microsoft.Resources/deployments/*` permissions. The what-if operation has the same permission requirements.

For a list of roles and permissions, see [Azure built-in roles](#).

Deployment scope

You can target your Azure deployment template to a resource group, subscription, management group, or tenant. Depending on the scope of the deployment, you use different commands.

- To deploy to a **resource group**, use [az deployment group create](#):

Azure CLI

```
az deployment group create --resource-group <resource-group-name> --  
template-file <path-to-template>
```

- To deploy to a **subscription**, use [az deployment sub create](#):

Azure CLI

```
az deployment sub create --location <location> --template-file <path-  
to-template>
```

For more information about subscription level deployments, see [Create resource groups and resources at the subscription level](#).

- To deploy to a **management group**, use [az deployment mg create](#):

Azure CLI

```
az deployment mg create --location <location> --template-file <path-to-  
template>
```

For more information about management group level deployments, see [Create resources at the management group level](#).

- To deploy to a **tenant**, use [az deployment tenant create](#):

Azure CLI

```
az deployment tenant create --location <location> --template-file  
<path-to-template>
```

For more information about tenant level deployments, see [Create resources at the tenant level](#).

For every scope, the user deploying the template must have the required permissions to create resources.

Deploy local template

You can deploy an ARM template from your local machine or one that is stored externally. This section describes deploying a local template.

If you're deploying to a resource group that doesn't exist, create the resource group. The name of the resource group can only include alphanumeric characters, periods, underscores, hyphens, and parenthesis. It can be up to 90 characters. The name can't end in a period.

Azure CLI

```
az group create --name ExampleGroup --location "Central US"
```

To deploy a local template, use the `--template-file` parameter in the deployment command. The following example also shows how to set a parameter value.

Azure CLI

```
az deployment group create \
--name ExampleDeployment \
--resource-group ExampleGroup \
--template-file <path-to-template> \
--parameters storageAccountType=Standard_GRS
```

The value of the `--template-file` parameter must be a Bicep file or a `.json` or `.jsonc` file. The `.jsonc` file extension indicates the file can contain `//` style comments. The ARM system accepts `//` comments in `.json` files. It does not care about the file extension. For more details about comments and metadata see [Understand the structure and syntax of ARM templates](#).

The Azure deployment template can take a few minutes to complete. When it finishes, you see a message that includes the result:

Output

```
"provisioningState": "Succeeded",
```

Deploy remote template

Instead of storing ARM templates on your local machine, you might prefer to store them in an external location. You can store templates in a source control repository (such as

GitHub). Or, you can store them in an Azure storage account for shared access in your organization.

ⓘ Note

To deploy a template or reference a linked template that is stored in a private GitHub repo, see a custom solution documented in [Creating a Custom and Secure Azure Portal Offering](#). You can create an **Azure function** that pulls the GitHub token out of Azure Key Vault.

If you're deploying to a resource group that doesn't exist, create the resource group. The name of the resource group can only include alphanumeric characters, periods, underscores, hyphens, and parenthesis. It can be up to 90 characters. The name can't end in a period.

Azure CLI

```
az group create --name ExampleGroup --location "Central US"
```

To deploy an external template, use the `template-uri` parameter.

Azure CLI

```
az deployment group create \
--name ExampleDeployment \
--resource-group ExampleGroup \
--template-uri "https://raw.githubusercontent.com/Azure/azure-quickstart-templates/master/quickstarts/microsoft.storage/storage-account-create/azuredeploy.json" \
--parameters storageAccountType=Standard_GRS
```

The preceding example requires a publicly accessible URI for the template, which works for most scenarios because your template shouldn't include sensitive data. If you need to specify sensitive data (like an admin password), pass that value as a secure parameter. However, if you want to manage access to the template, consider using [template specs](#).

To deploy remote linked templates with relative path that are stored in a storage account, use `query-string` to specify the SAS token:

Azure CLI

```
az deployment group create \
--name linkedTemplateWithRelativePath \
--resource-group myResourceGroup \
```

```
--template-uri "https://stage20210126.blob.core.windows.net/template-staging/mainTemplate.json" \
--query-string $sasToken
```

For more information, see [Use relative path for linked templates](#).

Azure deployment template name

When deploying an ARM template, you can give the Azure deployment template a name. This name can help you retrieve the deployment from the deployment history. If you don't provide a name for the deployment, the name of the template file is used. For example, if you deploy a template named `azuredeploy.json` and don't specify a deployment name, the deployment is named `azuredeploy`.

Every time you run a deployment, an entry is added to the resource group's deployment history with the deployment name. If you run another deployment and give it the same name, the earlier entry is replaced with the current deployment. If you want to maintain unique entries in the deployment history, give each deployment a unique name.

To create a unique name, you can assign a random number.

```
Azure CLI  
  
deploymentName='ExampleDeployment'$RANDOM
```

Or, add a date value.

```
Azure CLI  
  
deploymentName='ExampleDeployment'$(date +"%d-%b-%Y")
```

If you run concurrent deployments to the same resource group with the same deployment name, only the last deployment is completed. Any deployments with the same name that haven't finished are replaced by the last deployment. For example, if you run a deployment named `newStorage` that deploys a storage account named `storage1`, and at the same time run another deployment named `newStorage` that deploys a storage account named `storage2`, you deploy only one storage account. The resulting storage account is named `storage2`.

However, if you run a deployment named `newStorage` that deploys a storage account named `storage1`, and immediately after it completes you run another deployment named `newStorage` that deploys a storage account named `storage2`, then you have two

storage accounts. One is named `storage1`, and the other is named `storage2`. But, you only have one entry in the deployment history.

When you specify a unique name for each deployment, you can run them concurrently without conflict. If you run a deployment named `newStorage1` that deploys a storage account named `storage1`, and at the same time run another deployment named `newStorage2` that deploys a storage account named `storage2`, then you have two storage accounts and two entries in the deployment history.

To avoid conflicts with concurrent deployments and to ensure unique entries in the deployment history, give each deployment a unique name.

Deploy template spec

Instead of deploying a local or remote template, you can create a [template spec](#). The template spec is a resource in your Azure subscription that contains an ARM template. It makes it easy to securely share the template with users in your organization. You use Azure role-based access control (Azure RBAC) to grant access to the template spec. This feature is currently in preview.

The following examples show how to create and deploy a template spec.

First, create the template spec by providing the ARM template.

Azure CLI

```
az ts create \
--name storageSpec \
--version "1.0" \
--resource-group templateSpecRG \
--location "westus2" \
--template-file "./mainTemplate.json"
```

Then, get the ID for template spec and deploy it.

Azure CLI

```
id = $(az ts show --name storageSpec --resource-group templateSpecRG -- \
version "1.0" --query "id")

az deployment group create \
--resource-group demoRG \
--template-spec $id
```

For more information, see [Azure Resource Manager template specs](#).

Preview changes

Before deploying your ARM template, you can preview the changes the template will make to your environment. Use the [what-if operation](#) to verify that the template makes the changes that you expect. What-if also validates the template for errors.

Parameters

To pass parameter values, you can use either inline parameters or a parameters file. The parameter file can be either a [Bicep parameters file](#) or a [JSON parameters file](#).

Inline parameters

To pass inline parameters, provide the values in `parameters`. For example, to pass a string and array to a template in a Bash shell, use:

Azure CLI

```
az deployment group create \
--resource-group testgroup \
--template-file <path-to-template> \
--parameters exampleString='inline string' exampleArray='("value1",
"value2")'
```

If you're using Azure CLI with Windows Command Prompt (CMD) or PowerShell, pass the array in the format: `exampleArray="['value1', 'value2']"`.

You can also get the contents of file and provide that content as an inline parameter.

Azure CLI

```
az deployment group create \
--resource-group testgroup \
--template-file <path-to-template> \
--parameters exampleString=@stringContent.txt
exampleArray=@arrayContent.json
```

Getting a parameter value from a file is helpful when you need to provide configuration values. For example, you can provide [cloud-init values for a Linux virtual machine](#).

The `arrayContent.json` format is:

JSON

```
[  
    "value1",  
    "value2"  
]
```

To pass in an object, for example, to set tags, use JSON. For example, your template might include a parameter like this one:

JSON

```
"resourceTags": {  
    "type": "object",  
    "defaultValue": {  
        "Cost Center": "IT Department"  
    }  
}
```

In this case, you can pass in a JSON string to set the parameter as shown in the following Bash script:

Azure CLI

```
tags='{"Owner": "Contoso", "Cost Center": "2345-324"}'  
az deployment group create --name addstorage --resource-group  
myResourceGroup \  
--template-file $templateFile \  
--parameters resourceName=abcdef4556 resourceTags="$tags"
```

Use double quotes around the JSON that you want to pass into the object.

You can use a variable to contain the parameter values. In Bash, set the variable to all of the parameter values and add it to the deployment command.

Azure CLI

```
params="prefix=start suffix=end"  
  
az deployment group create \  
--resource-group testgroup \  
--template-file <path-to-template> \  
--parameters $params
```

However, if you're using Azure CLI with Windows Command Prompt (CMD) or PowerShell, set the variable to a JSON string. Escape the quotation marks: `$params = '{"prefix": {"value": "start"}, "suffix": {"value": "end"} }'`.

JSON parameter files

Rather than passing parameters as inline values in your script, you might find it easier to use a parameters file, either a `.bicepparam` file or a JSON parameters file, that contains the parameter values. The parameters file must be a local file. External parameters files aren't supported with Azure CLI.

To pass a local parameter file, use `@` to specify a local file named `storage.parameters.json`.

Azure CLI

```
az deployment group create \
--name ExampleDeployment \
--resource-group ExampleGroup \
--template-file storage.json \
--parameters '@storage.parameters.json'
```

For more information about the parameter file, see [Create Resource Manager parameter file](#).

Bicep parameter files

With Azure CLI version 2.53.0 or later, and Bicep CLI version 0.22.6 or later, you can deploy a Bicep file by utilizing a Bicep parameter file. With the `using` statement within the Bicep parameters file, there is no need to provide the `--template-file` switch when specifying a Bicep parameter file for the `--parameters` switch. Including the `--template-file` switch will result in an "Only a .bicep template is allowed with a .bicepparam file" error.

Azure CLI

```
az deployment group create \
--name ExampleDeployment \
--resource-group ExampleGroup \
--parameters storage.bicepparam
```

The parameters file must be a local file. External parameters files aren't supported with Azure CLI. For more information about the parameters file, see [Create Resource Manager parameters file](#).

Comments and the extended JSON format

You can include `//` style comments in your parameter file, but you must name the file with a `.jsonc` extension.

Azure CLI

```
az deployment group create \
--name ExampleDeployment \
--resource-group ExampleGroup \
--template-file storage.json \
--parameters '@storage.parameters.jsonc'
```

For more details about comments and metadata see [Understand the structure and syntax of ARM templates](#).

If you are using Azure CLI with version 2.3.0 or older, you can deploy a template with multi-line strings or comments using the `--handle-extended-json-format` switch. For example:

JSON

```
{
  "type": "Microsoft.Compute/virtualMachines",
  "apiVersion": "2018-10-01",
  "name": "[variables('vmName')]", // to customize name, change it in
variables
  "location": "[
    parameters('location')
  ]", //defaults to resource group location
/*
  storage account and network interface
  must be deployed first
*/
  "dependsOn": [
    "[resourceId('Microsoft.Storage/storageAccounts/',
variables('storageAccountName'))]",
    "[resourceId('Microsoft.Network/networkInterfaces/',
variables('nicName'))]"
  ],
}
```

Next steps

- To roll back to a successful deployment when you get an error, see [Rollback on error to successful deployment](#).
- To specify how to handle resources that exist in the resource group but aren't defined in the template, see [Azure Resource Manager deployment modes](#).

- To understand how to define parameters in your template, see [Understand the structure and syntax of ARM templates](#).
- For tips on resolving common deployment errors, see [Troubleshoot common Azure deployment errors with Azure Resource Manager](#).

How to deploy private ARM template with SAS token

Article • 05/23/2023

When your Azure Resource Manager template (ARM template) is located in a storage account, you can restrict access to the template to avoid exposing it publicly. You access a secured template by creating a shared access signature (SAS) token for the template, and providing that token during deployment. This article explains how to use Azure PowerShell or Azure CLI to securely deploy an ARM template with a SAS token.

You will find information on how to protect and manage access to your private ARM templates with directions on how to do the following:

- Create storage account with secured container
- Upload template to storage account
- Provide SAS token during deployment

ⓘ Important

Instead of securing your private template with a SAS token, consider using [template specs](#). With template specs, you can share your templates with other users in your organization and manage access to the templates through Azure RBAC.

Create storage account with secured container

The following script creates a storage account and container with public access turned off for template security.

PowerShell

Azure PowerShell

```
New-AzResourceGroup  
  -Name ExampleGroup  
  -Location "Central US"  
New-AzStorageAccount  
  -ResourceGroupName ExampleGroup  
  -Name {your-unique-name}  
  -Type Standard_LRS  
  -Location "Central US"
```

```
Set-AzCurrentStorageAccount ` 
-ResourceGroupName ExampleGroup ` 
-Name {your-unique-name} 
New-AzStorageContainer ` 
-Name templates ` 
-Permission Off
```

Upload private template to storage account

Now, you're ready to upload your template to the storage account. Provide the path to the template you want to use.

PowerShell

Azure PowerShell

```
Set-AzStorageBlobContent ` 
-Container templates ` 
-File c:\Templates\azuredeploy.json
```

Provide SAS token during deployment

To deploy a private template in a storage account, generate a SAS token and include it in the URI for the template. Set the expiry time to allow enough time to complete the deployment.

i Important

The blob containing the private template is accessible to only the account owner. However, when you create a SAS token for the blob, the blob is accessible to anyone with that URI. If another user intercepts the URI, that user is able to access the template. A SAS token is a good way of limiting access to your templates, but you should not include sensitive data like passwords directly in the template.

PowerShell

Azure PowerShell

```
# get the URI with the SAS token 
$templateuri = New-AzStorageBlobSASToken `
```

```
-Container templates `
-Blob azuredeploy.json `
-Permission r `
-ExpiryTime (Get-Date).AddHours(2.0) -FullUri

# provide URI with SAS token during deployment
New-AzResourceGroupDeployment `
-ResourceGroupName ExampleGroup `
-TemplateUri $templateuri
```

For an example of using a SAS token with linked templates, see [Using linked templates with Azure Resource Manager](#).

Next steps

- For an introduction to deploying templates, see [Deploy resources with ARM templates and Azure PowerShell](#).
- To define parameters in template, see [Authoring templates](#).

How to deploy resources with Bicep and Azure CLI

Article • 10/12/2023

This article explains how to use Azure CLI with Bicep files to deploy your resources to Azure. If you aren't familiar with the concepts of deploying and managing your Azure solutions, see [Bicep overview](#).

Prerequisites

You need a Bicep file to deploy. The file must be local.

You need Azure CLI and to be connected to Azure:

- **Install Azure CLI commands on your local computer.** To deploy Bicep files, you need [Azure CLI](#) version 2.20.0 or later.
- **Connect to Azure by using az login.** If you have multiple Azure subscriptions, you might also need to run [az account set](#).

Samples for the Azure CLI are written for the `bash` shell. To run this sample in Windows PowerShell or Command Prompt, you might need to change elements of the script.

If you don't have Azure CLI installed, you can use Azure Cloud Shell. For more information, see [Deploy Bicep files from Azure Cloud Shell](#).

Required permissions

To deploy a Bicep file or ARM template, you need write access on the resources you're deploying and access to all operations on the Microsoft.Resources/deployments resource type. For example, to deploy a virtual machine, you need

`Microsoft.Compute/virtualMachines/write` and `Microsoft.Resources/deployments/*` permissions. The what-if operation has the same permission requirements.

For a list of roles and permissions, see [Azure built-in roles](#).

Deployment scope

You can target your deployment to a resource group, subscription, management group, or tenant. Depending on the scope of the deployment, you use different commands.

- To deploy to a **resource group**, use `az deployment group create`:

```
Azure CLI
```

```
az deployment group create --resource-group <resource-group-name> --  
template-file <path-to-bicep>
```

- To deploy to a **subscription**, use `az deployment sub create`:

```
Azure CLI
```

```
az deployment sub create --location <location> --template-file <path-  
to-bicep>
```

For more information about subscription level deployments, see [Create resource groups and resources at the subscription level](#).

- To deploy to a **management group**, use `az deployment mg create`:

```
Azure CLI
```

```
az deployment mg create --location <location> --template-file <path-to-  
bicep>
```

For more information about management group level deployments, see [Create resources at the management group level](#).

- To deploy to a **tenant**, use `az deployment tenant create`:

```
Azure CLI
```

```
az deployment tenant create --location <location> --template-file  
<path-to-bicep>
```

For more information about tenant level deployments, see [Create resources at the tenant level](#).

For every scope, the user deploying the Bicep file must have the required permissions to create resources.

Deploy local Bicep file

You can deploy a Bicep file from your local machine or one that is stored externally. This section describes deploying a local Bicep file.

If you're deploying to a resource group that doesn't exist, create the resource group. The name of the resource group can only include alphanumeric characters, periods, underscores, hyphens, and parenthesis. It can be up to 90 characters. The name can't end in a period.

Azure CLI

```
az group create --name ExampleGroup --location "Central US"
```

To deploy a local Bicep file, use the `--template-file` switch in the deployment command. The following example also shows how to set a parameter value.

Azure CLI

```
az deployment group create \
  --name ExampleDeployment \
  --resource-group ExampleGroup \
  --template-file <path-to-bicep> \
  --parameters storageAccountType=Standard_GRS
```

The deployment can take a few minutes to complete. When it finishes, you see a message that includes the result:

Output

```
"provisioningState": "Succeeded",
```

Deploy remote Bicep file

Currently, Azure CLI doesn't support deploying remote Bicep files. You can use [Bicep CLI](#) to [build](#) the Bicep file to a JSON template, and then load the JSON file to the remote location.

Parameters

To pass parameter values, you can use either inline parameters or a parameters file. The parameter file can be either a [Bicep parameters file](#) or a [JSON parameters file](#).

Inline parameters

To pass inline parameters, provide the values in `parameters`. For example, to pass a string and array to a Bicep file in a Bash shell, use:

Azure CLI

```
az deployment group create \
--resource-group testgroup \
--template-file <path-to-bicep> \
--parameters exampleString='inline string' exampleArray='["value1",
"value2"]'
```

If you're using Azure CLI with Windows Command Prompt (CMD) or PowerShell, pass the array in the format: `exampleArray="['value1','value2']"`.

You can also get the contents of file and provide that content as an inline parameter. Preface the file name with `@`.

Azure CLI

```
az deployment group create \
--resource-group testgroup \
--template-file <path-to-bicep> \
--parameters exampleString=@stringContent.txt
exampleArray=@arrayContent.json
```

Getting a parameter value from a file is helpful when you need to provide configuration values. For example, you can provide [cloud-init values for a Linux virtual machine](#).

The `arrayContent.json` format is:

JSON

```
[  
    "value1",  
    "value2"  
]
```

To pass in an object, for example, to set tags, use JSON. For example, your Bicep file might include a parameter like this one:

JSON

```
"resourceTags": {  
    "type": "object",  
    "defaultValue": {  
        "Cost Center": "IT Department"
```

```
}
```

In this case, you can pass in a JSON string to set the parameter as shown in the following Bash script:

Azure CLI

```
tags='{"Owner":"Contoso","Cost Center":"2345-324"}'  
az deployment group create --name addstorage --resource-group  
myResourceGroup \  
--template-file $bicepFile \  
--parameters resourceName=abcdef4556 resourceTags="$tags"
```

Use double quotes around the JSON that you want to pass into the object.

If you're using Azure CLI with Windows Command Prompt (CMD) or PowerShell, pass the object in the following format:

Azure CLI

```
$tags="{'Owner':'Contoso','Cost Center':'2345-324'}"  
az deployment group create --name addstorage --resource-group  
myResourceGroup \  
--template-file $bicepFile \  
--parameters resourceName=abcdef4556 resourceTags=$tags
```

You can use a variable to contain the parameter values. In Bash, set the variable to all of the parameter values and add it to the deployment command.

Azure CLI

```
params="prefix=start suffix=end"  
  
az deployment group create \  
--resource-group testgroup \  
--template-file <path-to-bicep> \  
--parameters $params
```

However, if you're using Azure CLI with Windows Command Prompt (CMD) or PowerShell, set the variable to a JSON string. Escape the quotation marks: `$params = '{"prefix": {"value": "start"}, "suffix": {"value": "end"} }'`.

The evaluation of parameters follows a sequential order, meaning that if a value is assigned multiple times, only the last assigned value is used. To ensure proper parameter assignment, it is advised to provide your parameters file initially and

selectively override specific parameters using the *KEY=VALUE* syntax. It's important to mention that if you are supplying a `.bicepparam` parameters file, you can use this argument only once.

JSON parameter files

Rather than passing parameters as inline values in your script, you might find it easier to use a parameters file, either a `.bicepparam` file or a JSON parameters file, that contains the parameter values. The parameters file must be a local file. External parameters files aren't supported with Azure CLI.

The following example shows a parameters file named `storage.parameters.json`. The file is in the same directory where the command is run.

Azure CLI

```
az deployment group create \
--name ExampleDeployment \
--resource-group ExampleGroup \
--template-file storage.bicep \
--parameters '@storage.parameters.json'
```

For more information about the parameters file, see [Create Resource Manager parameters file](#).

Bicep parameter files

With Azure CLI version 2.53.0 or later, and Bicep CLI version 0.22.6 or later, you can deploy a Bicep file by utilizing a Bicep parameter file. With the `using` statement within the Bicep parameters file, there is no need to provide the `--template-file` switch when specifying a Bicep parameter file for the `--parameters` switch. Including the `--template-file` switch will result in an "Only a .bicep template is allowed with a .bicepparam file" error.

The following example shows a parameters file named `storage.bicepparam`. The file is in the same directory where the command is run.

Azure CLI

```
az deployment group create \
--name ExampleDeployment \
--resource-group ExampleGroup \
--parameters storage.bicepparam
```

The parameters file must be a local file. External parameters files aren't supported with Azure CLI. For more information about the parameters file, see [Create Resource Manager parameters file](#).

Preview changes

Before deploying your Bicep file, you can preview the changes the Bicep file will make to your environment. Use the [what-if operation](#) to verify that the Bicep file makes the changes that you expect. What-if also validates the Bicep file for errors.

Deploy template specs

Currently, Azure CLI doesn't support creating template specs by providing Bicep files. However you can create a Bicep file with the [Microsoft.Resources/templateSpecs](#) resource to deploy a template spec. The [Create template spec sample](#) shows how to create a template spec in a Bicep file. You can also build your Bicep file to JSON by using the Bicep CLI, and then create a template spec with the JSON template.

Deployment name

When deploying a Bicep file, you can give the deployment a name. This name can help you retrieve the deployment from the deployment history. If you don't provide a name for the deployment, the name of the Bicep file is used. For example, if you deploy a Bicep file named `main.bicep` and don't specify a deployment name, the deployment is named `main`.

Every time you run a deployment, an entry is added to the resource group's deployment history with the deployment name. If you run another deployment and give it the same name, the earlier entry is replaced with the current deployment. If you want to maintain unique entries in the deployment history, give each deployment a unique name.

To create a unique name, you can assign a random number.

Azure CLI

```
deploymentName='ExampleDeployment'$RANDOM
```

Or, add a date value.

Azure CLI

```
deploymentName='ExampleDeployment'$(date +"%d-%b-%Y")
```

If you run concurrent deployments to the same resource group with the same deployment name, only the last deployment is completed. Any deployments with the same name that haven't finished are replaced by the last deployment. For example, if you run a deployment named `newStorage` that deploys a storage account named `storage1`, and at the same time run another deployment named `newStorage` that deploys a storage account named `storage2`, you deploy only one storage account. The resulting storage account is named `storage2`.

However, if you run a deployment named `newStorage` that deploys a storage account named `storage1`, and immediately after it completes you run another deployment named `newStorage` that deploys a storage account named `storage2`, then you have two storage accounts. One is named `storage1`, and the other is named `storage2`. But, you only have one entry in the deployment history.

When you specify a unique name for each deployment, you can run them concurrently without conflict. If you run a deployment named `newStorage1` that deploys a storage account named `storage1`, and at the same time run another deployment named `newStorage2` that deploys a storage account named `storage2`, then you have two storage accounts and two entries in the deployment history.

To avoid conflicts with concurrent deployments and to ensure unique entries in the deployment history, give each deployment a unique name.

Next steps

- To understand how to define parameters in your file, see [Understand the structure and syntax of Bicep files](#).

Use Azure Key Vault to pass secure parameter value during Bicep deployment

Article • 06/23/2023

Instead of putting a secure value (like a password) directly in your Bicep file or parameters file, you can retrieve the value from an [Azure Key Vault](#) during a deployment. When a `module` expects a `string` parameter with `secure:true` modifier, you can use the [getSecret function](#) to obtain a key vault secret. The value is never exposed because you only reference its key vault ID.

ⓘ Important

This article focuses on how to pass a sensitive value as a template parameter. When the secret is passed as a parameter, the key vault can exist in a different subscription than the resource group you're deploying to.

This article doesn't cover how to set a virtual machine property to a certificate's URL in a key vault. For a quickstart template of that scenario, see [Install a certificate from Azure Key Vault on a Virtual Machine ↗](#).

Deploy key vaults and secrets

To access a key vault during Bicep deployment, set `enabledForTemplateDeployment` on the key vault to `true`.

If you already have a key vault, make sure it allows template deployments.

Azure CLI

Azure CLI

```
az keyvault update --name ExampleVault --enabled-for-template-deployment true
```

To create a new key vault and add a secret, use:

Azure CLI

```
az group create --name ExampleGroup --location centralus
az keyvault create \
    --name ExampleVault \
    --resource-group ExampleGroup \
    --location centralus \
    --enabled-for-template-deployment true
az keyvault secret set --vault-name ExampleVault --name
"ExamplePassword" --value "hVFkk965BuUv"
```

As the owner of the key vault, you automatically have access to create secrets. If the user working with secrets isn't the owner of the key vault, grant access with:

Azure CLI

```
az keyvault set-policy \
    --upn <user-principal-name> \
    --name ExampleVault \
    --secret-permissions set delete get list
```

For more information about creating key vaults and adding secrets, see:

- [Set and retrieve a secret by using CLI](#)
- [Set and retrieve a secret by using PowerShell](#)
- [Set and retrieve a secret by using the portal](#)
- [Set and retrieve a secret by using .NET](#)
- [Set and retrieve a secret by using Node.js](#)

Grant access to the secrets

The user who deploys the Bicep file must have the

`Microsoft.KeyVault/vaults/deploy/action` permission for the scope of the resource group and key vault. The [Owner](#) and [Contributor](#) roles both grant this access. If you created the key vault, you're the owner and have the permission.

The following procedure shows how to create a role with the minimum permission, and how to assign the user.

1. Create a custom role definition JSON file:

```
JSON

{
  "Name": "Key Vault Bicep deployment operator",
  "IsCustom": true,
  "Description": "Lets you deploy a Bicep file with the access to the secrets in the Key Vault.",
  "Actions": [
    "Microsoft.KeyVault/vaults/deploy/action"
  ],
  "NotActions": [],
  "DataActions": [],
  "NotDataActions": [],
  "AssignableScopes": [
    "/subscriptions/00000000-0000-0000-0000-000000000000"
  ]
}
```

Replace "00000000-0000-0000-0000-000000000000" with the subscription ID.

2. Create the new role using the JSON file:

```
Azure CLI

az role definition create --role-definition "<path-to-role-file>"
```

```
Azure CLI

az role assignment create \
  --role "Key Vault Bicep deployment operator" \
  --scope /subscriptions/<Subscription-id>/resourceGroups/<resource-group-name> \
  --assignee <user-principal-name>
```

The samples assign the custom role to the user on the resource group level.

When using a key vault with the Bicep file for a [Managed Application](#), you must grant access to the **Appliance Resource Provider** service principal. For more information, see [Access Key Vault secret when deploying Azure Managed Applications](#).

Use getSecret function

You can use the [getSecret function](#) to obtain a key vault secret and pass the value to a `string` parameter of a module. The `getSecret` function can only be called on a

`Microsoft.KeyVault/vaults` resource and can be used only with parameter with `@secure()` decorator.

The following Bicep file creates an Azure SQL server. The `adminPassword` parameter has a `@secure()` decorator.

```
Bicep

param sqlServerName string
param adminLogin string

@secure()
param adminPassword string

resource sqlServer 'Microsoft.Sql/servers@2020-11-01-preview' = {
    name: sqlServerName
    location: resourceGroup().location
    properties: {
        administratorLogin: adminLogin
        administratorLoginPassword: adminPassword
        version: '12.0'
    }
}
```

Let's use the preceding Bicep file as a module given the file name is `sql.bicep` in the same directory as the main Bicep file.

The following Bicep file consumes the `sql.bicep` as a module. The Bicep file references an existing key vault, and calls the `getSecret` function to retrieve the key vault secret, and then passes the value as a parameter to the module.

```
Bicep

param sqlServerName string
param adminLogin string

param subscriptionId string
param kvResourceGroup string
param kvName string

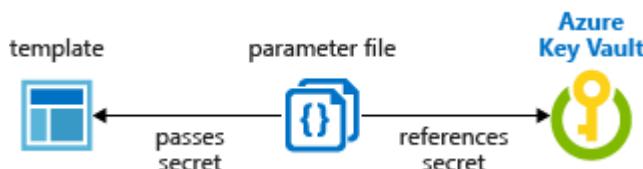
resource kv 'Microsoft.KeyVault/vaults@2023-02-01' existing = {
    name: kvName
    scope: resourceGroup(subscriptionId, kvResourceGroup )
}

module sql './sql.bicep' = {
    name: 'deploySQL'
    params: {
        sqlServerName: sqlServerName
        adminLogin: adminLogin
    }
}
```

```
    adminPassword: kv.getSecret('vmAdminPassword')
  }
}
```

Reference secrets in parameters file

If you don't want to use a module, you can reference the key vault directly in the parameters file. The following image shows how the parameters file references the secret and passes that value to the Bicep file.



ⓘ Note

Currently you can only reference the key vault in JSON parameters files. You can't reference key vault in Bicep parameters file.

The following Bicep file deploys a SQL server that includes an administrator password. The password parameter is set to a secure string. But the Bicep doesn't specify where that value comes from.

Bicep

```
param location string = resourceGroup().location
param adminLogin string

@secure()
param adminPassword string

param sqlServerName string

resource sqlServer 'Microsoft.Sql/servers@2022-11-01-preview' = {
  name: sqlServerName
  location: location
  properties: {
    administratorLogin: adminLogin
    administratorLoginPassword: adminPassword
    version: '12.0'
  }
}
```

Now, create a parameters file for the preceding Bicep file. In the parameters file, specify a parameter that matches the name of the parameter in the Bicep file. For the parameter value, reference the secret from the key vault. You reference the secret by passing the resource identifier of the key vault and the name of the secret:

In the following parameters file, the key vault secret must already exist, and you provide a static value for its resource ID.

JSON

```
{  
  "$schema": "https://schema.management.azure.com/schemas/2019-04-  
01/deploymentParameters.json#",  
  "contentVersion": "1.0.0.0",  
  "parameters": {  
    "adminLogin": {  
      "value": "exampleadmin"  
    },  
    "adminPassword": {  
      "reference": {  
        "keyVault": {  
          "id": "/subscriptions/<subscription-id>/resourceGroups/<rg-  
name>/providers/Microsoft.KeyVault/vaults/<vault-name>"  
        },  
        "secretName": "ExamplePassword"  
      }  
    },  
    "sqlServerName": {  
      "value": "<your-server-name>"  
    }  
  }  
}
```

If you need to use a version of the secret other than the current version, include the `secretVersion` property.

JSON

```
"secretName": "ExamplePassword",  
"secretVersion": "cd91b2b7e10e492ebb870a6ee0591b68"
```

Deploy the template and pass in the parameters file:

Azure CLI

Azure CLI

```
az group create --name SqlGroup --location westus2
az deployment group create \
--resource-group SqlGroup \
--template-file <Bicep-file> \
--parameters <parameters-file>
```

Next steps

- For general information about key vaults, see [What is Azure Key Vault?](#)
- For complete examples of referencing key secrets, see [key vault examples](#) on GitHub.
- For a Learn module that covers passing a secure value from a key vault, see [Manage complex cloud deployments by using advanced ARM template features](#).

View deployment history with Azure Resource Manager

Article • 05/22/2023

Azure Resource Manager enables you to view your deployment history. You can examine specific operations in past deployments and see which resources were deployed. This history contains information about any errors.

The deployment history for a resource group is limited to 800 deployments. As you near the limit, deployments are automatically deleted from the history. For more information, see [Automatic deletions from deployment history](#).

For help with resolving particular deployment errors, see [Troubleshoot common Azure deployment errors](#).

Correlation ID and support

Each deployment has a correlation ID, which is used to track related events. If you [create an Azure support request](#), support may ask you for the correlation ID. Support uses the correlation ID to identify the operations for the failed deployment.

The examples in this article show how to retrieve the correlation ID.

Resource group deployments

You can view details about a resource group deployment through the Azure portal, PowerShell, Azure CLI, or REST API.

Portal

1. Select the **resource group** you want to examine.

The screenshot shows the Microsoft Azure Resource Groups page. At the top, there's a search bar and navigation links for 'Create', 'Manage view', 'Refresh', 'Export to CSV', 'Open query', 'Assign tags', and 'Filter'. Below the header, there are filters for 'Subscription' (set to '2 of 55 selected') and 'Location' (set to 'all'). A table lists one record: 'ExampleGroup' under 'Name', 'Subscription Testing 1' under 'Subscription', and 'Documentation Testing 1' under 'Documentation'. The 'ExampleGroup' row is highlighted with a red box.

2. Select the link under Deployments.

The screenshot shows the Microsoft Azure Resource Group details page for 'ExampleGroup'. The left sidebar includes 'Overview', 'Activity log', 'Access control (IAM)', and 'Tags'. The main area shows 'Essentials' with 'Subscription (Move)' and 'Documentation' links, and 'Deployment' information: '1 Succeeded'. The 'Deployments' section is highlighted with a red box.

3. Select one of the deployments from the deployment history.

The screenshot shows the Microsoft Azure Resource Group Deployments page for 'ExampleGroup'. The left sidebar includes 'Deployments', 'Security', and 'Policies'. The main area shows a table of deployments with columns for 'Deployment name' and 'Status'. One deployment, 'ExampleDeployment', is highlighted with a red box.

4. A summary of the deployment is displayed, including the correlation ID.

The screenshot shows the 'ExampleDeployment | Overview' page. At the top, there's a deployment status message: 'Your deployment is complete'. Below it, deployment details are listed: 'Deployment name: ExampleDeployment', 'Subscription: Documentation', and 'Resource group: ExampleGroup'. To the right, 'Start time: 11/9/2021, 1:56:14 PM' and 'Correlation ID: 11111111-1111-1111-1111-111111111111' are shown, with the correlation ID highlighted by a red box. A table titled 'Deployment details' shows one resource: 'storage' (Type: Microsoft.Storage/storageAccounts) with status 'OK'. Below the table, a section for 'Next steps' includes a 'Go to resource' button.

Subscription deployments

You can view the history of deployments to a subscription.

The screenshot shows the 'Subscriptions' page in the Microsoft Azure portal. It lists 2 of 55 subscriptions. The 'Documentation Testing 1' subscription is highlighted with a red box. Other visible columns include 'Subscription name' and 'Subscription ID'.

Subscription name	Subscription ID
Documentation Cross Sub Tests	
Documentation Testing 1	

2. In the left pane, select **Deployments**.

Microsoft Azure

Home > Documentation Testing 1

Subscription

Search (Ctrl+ /)

Billing

- Invoices

Settings

- Programmatic deployment
- Billing properties
- Resource groups
- Resources
- Preview features
- Usage + quotas
- Policies
- Management certificates
- My permissions
- Resource providers
- Deployments**
- Resource locks

Cancel subscription Rename Change directory Feedback

Essentials

Subscription ID : Microsoft (microsoft.onmicrosoft.com)

Directory : Microsoft (microsoft.onmicrosoft.com)

Status : Active

Parent management group :

Costs by resource [View details >](#)

Resource	Cost
dsqldbtest	\$0.44
arm	\$0.01
dscloudshellstg	\$0.01

3. Select one of the deployments from the deployment history.

Home > Documentation Testing 1

Documentation Testing 1 | Deployments

Subscription

Search (Ctrl+ /)

Billing

- Invoices

Settings

- Programmatic deployment
- Billing properties
- Resource groups
- Resources
- Preview features
- Usage + quotas
- Policies

Refresh | Cancel | Delete | View template

Filter by deployment name or resources in the deployment...

Deployment name	Status	Last modified
parent2	Succeeded	9/14/2021, 9:24:33 AM
testrg1	Succeeded	7/19/2021, 12:18:20 PM
newRG1	Succeeded	5/4/2021, 11:09:27 AM
subsub2	Succeeded	11/23/2020, 1:33:32 PM
subsub	Succeeded	11/23/2020, 1:26:11 PM
environment	Succeeded	4/27/2020, 3:56:41 PM
deployment	Succeeded	4/27/2020, 12:55:54 PM
tag1	Succeeded	2/14/2020, 6:38:08 AM

4. A summary of the deployment is displayed, including the correlation ID.

The screenshot shows the Azure portal interface for a deployment named 'newRG1'. The main message is 'Your deployment is complete'. Deployment details include the name 'newRG1', subscription 'Documentation Testing 1', start time '5/4/2021, 11:09:24 AM', and correlation ID '53a4fa47-6f54-41fe-823c-e991b1c6db8c'. A red box highlights the Correlation ID.

Management group deployments

You can view the history of deployments to a management group.

Portal

1. Select the **management group** you want to examine. If you don't have sufficient permissions to view details about the management group, you won't be able to select it.

The screenshot shows the 'Management groups' page in the Azure portal. It displays a list of management groups, with 'Tenant Root Group' highlighted by a red box. The page includes a search bar, creation options, and a note about using management groups to group subscriptions.

2. In the left pane, select **Deployments**.

Home > Management groups >

Tenant Root Group

Management group

Search (Ctrl+ /) <> + Create + Add subscription ⌂ Refresh ⌂ Rename ⌂

Overview

Subscriptions Name : Tenant Root Group
Resource Groups ID :
Resources Access Level : Owner
Activity Log Path : / Tenant Root Group
Access control (IAM)

Search by name or ID

Governance

Get started
Security
Policy
Deployments

Showing 2 subscriptions in 3 groups

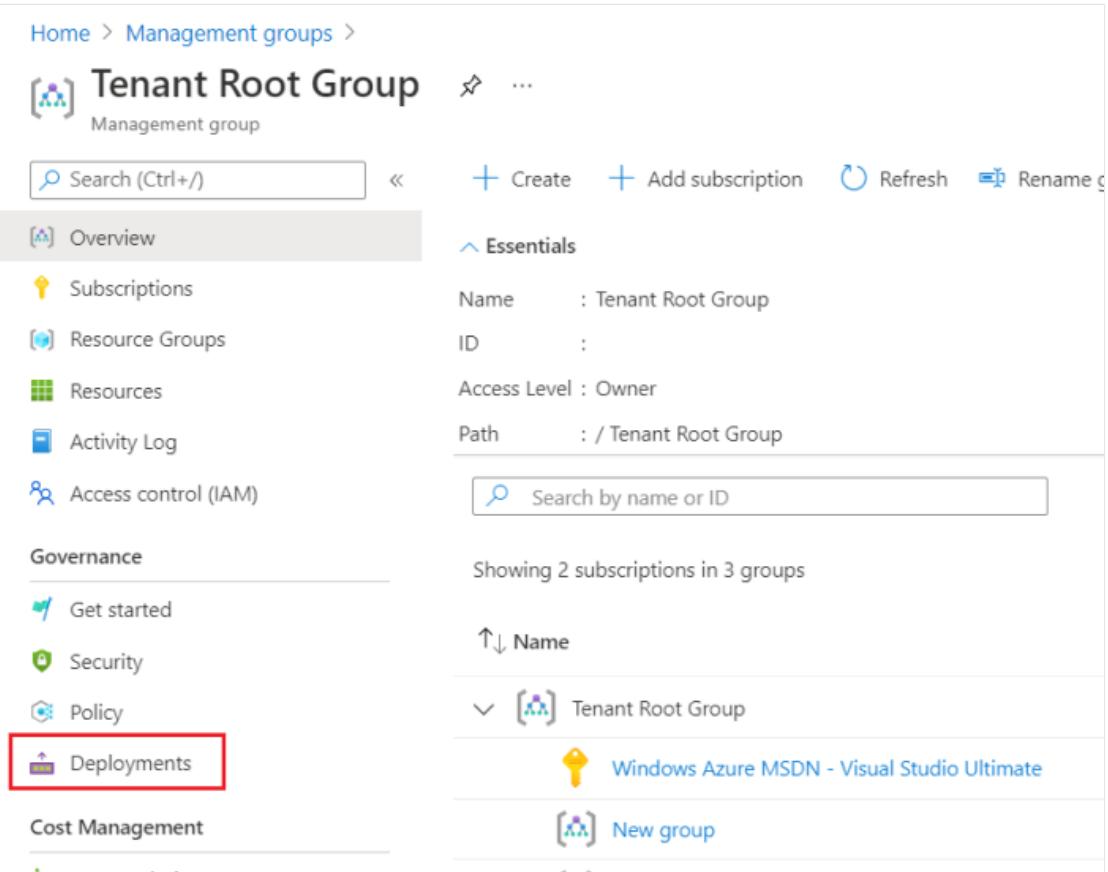
↑↓ Name

▼ [Azure] Tenant Root Group

Windows Azure MSDN - Visual Studio Ultimate

[Azure] New group

Cost Management



3. Select one of the deployments from the deployment history.

Home > Management groups > Tenant Root Group

Tenant Root Group | Deployments

Management group

Search (Ctrl+ /) <> ⌂ Refresh | ⌂ Cancel | ⌂ Delete ⌂ View template

Filter by deployment name or resources in the deployment...

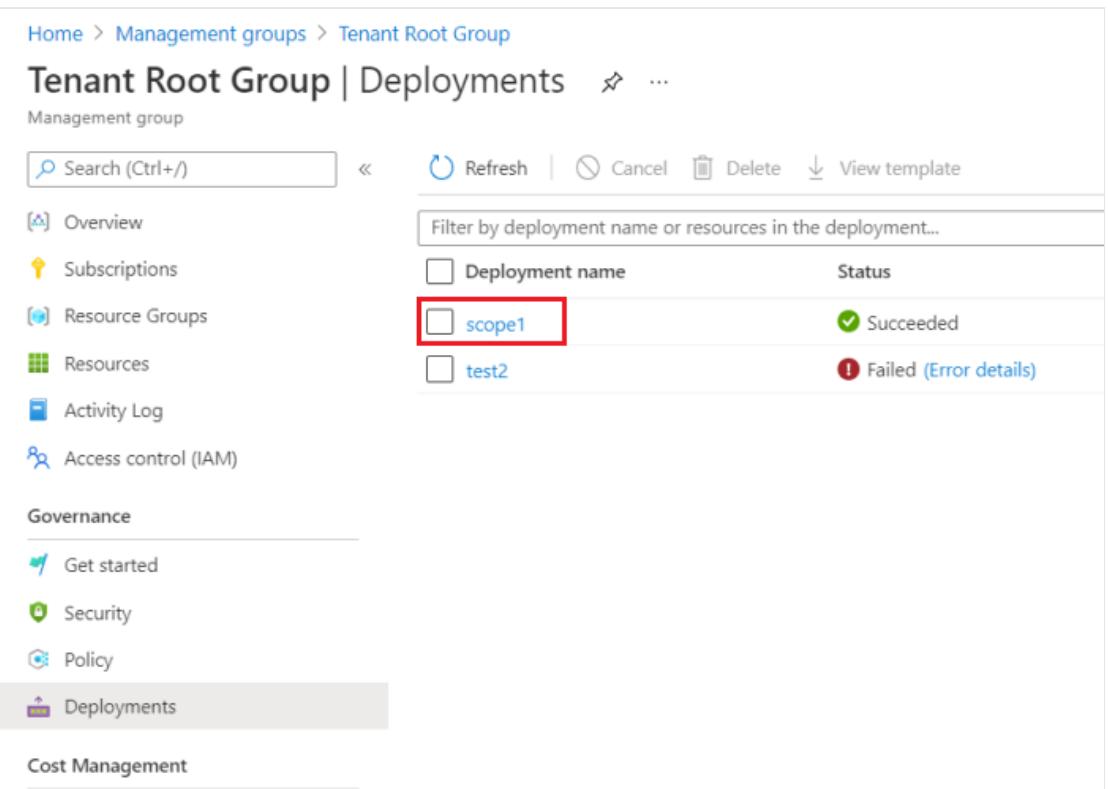
Deployment name	Status
<input type="checkbox"/> scope1	✓ Succeeded
<input type="checkbox"/> test2	! Failed (Error details)

Overview
Subscriptions
Resource Groups
Resources
Activity Log
Access control (IAM)

Governance

Get started
Security
Policy
Deployments

Cost Management



4. A summary of the deployment is displayed, including the correlation ID.

The screenshot shows the Microsoft Azure Deployment Overview page. At the top, it displays the deployment name 'scope1'. Below this, a green checkmark indicates 'Your deployment is complete'. To the right, there is a red box highlighting the 'Correlation ID: 11111111-1111-1111-1111-111111111111' field. A table below shows deployment details:

Resource	Type	Status
nested	Microsoft.Resources/deployments	OK

Tenant deployments

You can view the history of deployments to a tenant.

Portal

The portal doesn't currently show tenant deployments.

Deployment operations and error message

Each deployment can include multiple operations. To see more details about a deployment, view the deployment operations. When a deployment fails, the deployment operations include an error message.

Portal

1. On the summary for a deployment, select **Operation details**.

The screenshot shows the Microsoft Azure Deployment Overview page for 'ExampleDeployment'. A red box highlights the 'Deployment failed. Click here for details →' link. Below this, the deployment status is shown as 'Your deployment failed'. Deployment details include:

Resource	Type	Status	Operation details
storage	Microsoft.Storage/storageAccounts	BadRequest	Operation details

2. You see the details for that step of the deployment. When an error occurs, the details include the error message.

Operation details

Operation ID
/subscriptions/11111111-1111-1111-1111-111111111111/resourceGroups/Example... [Copy](#)

Operation name
1234567890ABCDEF [Copy](#)

Provisioning operation
Create [Copy](#)

Provisioning state
Failed [Copy](#)

Timestamp
11/9/2021, 2:29:20 PM [Copy](#)

Duration
1 second [Copy](#)

Tracking ID
11111111-1111-1111-1111-111111111111 [Copy](#)

serviceRequestId
11111111-1111-1111-1111-111111111111 [Copy](#)

Status
BadRequest [Copy](#)

Status message

```
1 {
2     "status": "Failed",
3     "error": {
4         "code": "NoRegisteredProviderFound",
5         "message": "No registered resource provider found fo
6     }
7 }
```

Next steps

- For help resolve specific deployment errors, see [Troubleshoot common Azure deployment errors](#).
- To learn about how deployments are managed in the history, see [Automatic deletions from deployment history](#).

- To preview changes a template will make before you deploy, see [ARM template deployment what-if operation](#).

Use and manage extensions with the Azure CLI

Article • 08/08/2023

The Azure CLI offers the capability to load extensions. Extensions for the Azure CLI are characterized as Python wheels that aren't shipped as part of the CLI but run as CLI commands. With extensions, you gain access to experimental and prerelease commands along with the ability to write your own CLI interfaces. This article covers how to manage extensions and answers common questions about their use.

How to find extensions

To see the Azure CLI extensions provided and maintained by Microsoft, use the [az extension list-available](#) command.

```
Azure CLI  
az extension list-available --output table
```

We also host a [list of extensions](#) on the documentation site.

How to install extensions

Install extensions manually

Once you have found an extension to install, use [az extension add](#) to get it. If the extension is listed in `az extension list-available`, you can install the extension by name.

```
Azure CLI  
az extension add --name <extension-name>
```

If the extension is from an external resource or you have a direct link to it, provide the source URL or local path. The extension *must* be a compiled Python wheel file.

```
Azure CLI
```

```
az extension add --source <URL-or-path>
```

You can also build a private extension index following the format in [index.json](#), then set the extension index URL used by Azure CLI to it starting from version 2.20.0. After that, you can install the extension by name from the private extension index.

Azure CLI

```
az config set extension.index_url=<URL>
az extension add --name <extension-name>
```

Once an extension is installed, it's found under the value of the `$AZURE_EXTENSION_DIR` shell variable. If this variable is unset, by default the value is `$HOME/.azure/cliextensions` on Linux and macOS, and `%USERPROFILE%\.azure\cliextensions` on Windows.

Install extensions automatically

When you run an extension command that isn't installed, the Azure CLI can recognize the command you run, and automatically install the extension for you starting from version 2.10.0. This feature, referred to as **dynamic install**, is enabled by default since 2.12.0. You can also enable it through configuration for previous supported versions.

Azure CLI

```
az config set extension.use_dynamic_install=yes_prompt
```

Use the following configuration command to enable dynamic install without a prompt.

Azure CLI

```
az config set extension.use_dynamic_install=yes_without_prompt
```

Use the following configuration command to turn off the dynamic install feature to revert to the default behavior. The extension command returns a command-not-found error if the extension isn't installed.

Azure CLI

```
az config set extension.use_dynamic_install=no
```

By default, an extension command that prompts dynamic install will continue to run after the extension is installed. You can change the default behavior and make the command exit without a rerun by setting the `run_after_dynamic_install` property to `no`.

```
Azure CLI
```

```
az config set extension.run_after_dynamic_install=no
```

How to update extensions

If you install an extension by name, update it using [az extension update](#).

```
Azure CLI
```

```
az extension update --name <extension-name>
```

Otherwise, an extension can be updated from source by following the [Install extensions](#) instructions.

If you can't use CLI to resolve an extension name, uninstall it and attempt to reinstall. The extension could also have become part of the base CLI. Try updating the CLI as described in [Install the Azure CLI](#) and see if the extension's commands were added.

How to uninstall extensions

If you no longer need an extension, remove it with [az extension remove](#).

```
Azure CLI
```

```
az extension remove --name <extension-name>
```

You can also remove an extension manually by deleting it from the location where it was installed. The `$AZURE_EXTENSION_DIR` shell variable defines where modules are installed. If this variable is unset, by default the value is `$HOME/.azure/cliextensions` on Linux and macOS, and `%USERPROFILE%\.azure\cliextensions` on Windows.

```
Bash
```

```
rm -rf $AZURE_EXTENSION_DIR/<extension-name>
```

FAQ

Here are some answers to other common questions about CLI extensions.

What file formats are allowed for installation?

Currently, only compiled Python wheels can be installed as extensions.

Can extensions replace existing commands?

Yes. Extensions may replace existing commands, but before running a command that has been replaced the CLI issues a warning.

How can I tell if an extension is in prerelease?

An extension's documentation and versioning shows if it's in prerelease. Microsoft often releases preview commands as CLI extensions, with the option of moving them into the main CLI product later. When commands are moved out of extensions, the old extension should be uninstalled.

Can extensions depend upon each other?

No. Since the CLI doesn't guarantee a load order, dependencies might not be satisfied. Removing an extension doesn't affect any others.

Are extensions updated along with the CLI?

No. Extensions must be updated separately, as described in [Update extensions](#).

How to develop our own extension?

Refer to the official repository for more help. [Azure/azure-cli-extensions ↗](#)

Available Azure CLI extensions

Article • 10/18/2023

This article is a complete list of the available extensions for the Azure CLI which are supported by Microsoft. The list of extensions is also available from the CLI. To get it, run [az extension list-available](#):

```
Azure CLI  
  
az extension list-available --output table
```

You will be prompted to install an extension on first use.

Extension	Required Minimum CLI Version	Description	Status	Release Notes
account ↗	2.38.0	Microsoft Azure Command-Line Tools SubscriptionClient Extension	GA	0.2.5 ↗
acrquery ↗	2.48.0	Microsoft Azure Command-Line Tools AcrQuery Extension	Preview	1.0.1 ↗
acrtransfer ↗	2.0.67	Microsoft Azure Command-Line Tools Acrtransfer Extension	Preview	1.1.0 ↗
ad ↗	2.15.0	Microsoft Azure Command-Line Tools DomainServicesResourceProvider Extension	GA	0.1.0 ↗
adp ↗	2.40.0	Microsoft Azure Command-Line Tools Adp Extension.	Experimental	0.1.0 ↗
aem ↗	2.19.1	Manage Azure Enhanced Monitoring Extensions for SAP	GA	0.3.0 ↗
ai-examples ↗	2.2.0	Add AI powered examples to help content.	Preview	0.2.5 ↗
aks-preview ↗	2.49.0	Provides a preview for upcoming AKS features	Preview	0.5.163 ↗
alb ↗	2.48.0	Microsoft Azure Command-Line Tools ALB Extension.	Preview	0.2.0 ↗
alertsmanagement ↗	2.45.0	Microsoft Azure Command-Line Tools AlertsManagementClient Extension	Preview	0.2.3 ↗
alias ↗	2.0.50.dev0	Support for command aliases	Preview	0.5.2 ↗

Extension	Required Minimum CLI Version	Description	Status	Release Notes
amg	2.38.0	Microsoft Azure Command-Line Tools Azure Managed Grafana Extension	GA	1.2.7
amlfs	2.49.0	Microsoft Azure Command-Line Tools Amlfs Extension.	GA	1.0.0
application-insights	2.50.0	Support for managing Application Insights components and querying metrics, events, and logs from such components.	GA	1.0.0
appservice-kube	2.34.1	Microsoft Azure Command-Line Tools App Service on Kubernetes Extension	Preview	0.1.9
arcappliance	2.51.0	Microsoft Azure Command-Line Tools Arcappliance Extension	GA	1.0.0
arCDATA	2.3.1	Tools for managing ArcData.	GA	1.5.6
attestation	2.11.0	Microsoft Azure Command-Line Tools AttestationManagementClient Extension	Preview	0.2.1
authV2	2.23.0	Microsoft Azure Command-Line Tools Authv2 Extension	GA	0.1.2
automanage	2.44.1	Microsoft Azure Command-Line Tools Automanage Extension.	Preview	0.1.2
automation	2.40.0	Microsoft Azure Command-Line Tools AutomationClient Extension	Experimental	0.2.2
azure-batch-cli-extensions	2.30.0	Additional commands for working with Azure Batch service	GA	7.0.0
azure-cli-ml	2.3.1	Microsoft Azure Command-Line Tools AzureML Command Module	GA	1.41.0
azure-devops	2.30.0	Tools for managing Azure DevOps.	GA	0.26.0
azure-firewall	2.50.0	Manage Azure Firewall resources.	GA	1.0.0
azure-iot	2.37.0	The Azure IoT extension for Azure CLI.	GA	0.22.0
azuresphere	2.45.0	Microsoft Azure Command-Line Tools Azure Sphere Extension	Preview	0.1.4
azurestackhci	2.15.0	Microsoft Azure Command-Line Tools AzureStackHCI Extension	Experimental	0.2.9

Extension	Required Minimum CLI Version	Description	Status	Release Notes
baremetal-infrastructure ↗	2.12.0	Additional commands for working with BareMetal instances.	GA	1.0.0 ↗
bastion ↗	2.43.0	Microsoft Azure Command-Line Tools Bastion Extension.	Preview	0.2.5 ↗
billing-benefits ↗	2.43.0	Microsoft Azure Command-Line Tools BillingBenefits Extension.	Preview	0.1.0 ↗
blockchain ↗	2.3.1	Microsoft Azure Command-Line Tools BlockchainManagementClient Extension	Experimental	0.1.1 ↗
blueprint ↗	2.50.0	Microsoft Azure Command-Line Tools Blueprint Extension	Experimental	0.3.2 ↗
change-analysis ↗	2.37.0	Microsoft Azure Command-Line Tools ChangeAnalysis Extension.	Preview	0.1.0 ↗
cli-translator ↗	2.13.0	Translate ARM template to executable Azure CLI scripts.	Experimental	0.3.0 ↗
cloud-service ↗	2.15.0	Microsoft Azure Command-Line Tools ComputeManagementClient Extension	Experimental	0.2.0 ↗
command-change ↗	2.19.0	Microsoft Azure Command-Line Tools CommandChange Extension.	Preview	1.0.0b1 ↗
communication ↗	2.49.0	Microsoft Azure Command-Line Tools CommunicationServiceManagementClient Extension	GA	1.7.2b1 ↗
confcom ↗	2.26.2	Microsoft Azure Command-Line Tools Confidential Container Security Policy Generator Extension	GA	0.2.16 ↗
confidentialledger ↗	2.15.0	Microsoft Azure Command-Line Tools ConfidentialLedger Extension	GA	1.0.0 ↗
confluent ↗	2.25.0	Microsoft Azure Command-Line Tools ConfluentManagementClient Extension	Experimental	0.4.0 ↗
connectedk8s ↗	2.38.0	Microsoft Azure Command-Line Tools Connectedk8s Extension	GA	1.5.2 ↗
connectedmachine ↗	2.49.0	Microsoft Azure Command-Line Tools ConnectedMachine Extension	Preview	0.6.0 ↗
connectedvmware ↗	2.0.67	Microsoft Azure Command-Line Tools Connectedvmware Extension	Preview	0.2.1 ↗

Extension	Required Minimum CLI Version	Description	Status	Release Notes
connection-monitor-preview	2.0.80	Microsoft Azure Command-Line Connection Monitor V2 Extension	Preview	0.1.0
containerapp	2.45.0	Microsoft Azure Command-Line Tools Containerapp Extension	Preview	0.3.41
cosmosdb-preview	2.17.1	Microsoft Azure Command-Line Tools Cosmosdb-preview Extension	Preview	0.26.0
costmanagement	2.3.1	Microsoft Azure Command-Line Tools CostManagementClient Extension	GA	0.2.1
csvmware	2.0.67	Manage Azure VMware Solution by CloudSimple.	Preview	0.3.0
custom-providers	2.3.1	Microsoft Azure Command-Line Tools Custom Providers Extension	Experimental	0.2.1
customlocation	2.0.67	Microsoft Azure Command-Line Tools Customlocation Extension	GA	0.1.3
databox	2.48.0	Microsoft Azure Command-Line Tools Databox Extension.	GA	1.1.0
databricks	2.45.0	Microsoft Azure Command-Line Tools DatabricksClient Extension	GA	0.10.2
datadog	2.17.0	Microsoft Azure Command-Line Tools MicrosoftDatadogClient Extension	Experimental	0.1.1
datafactory	2.15.0	Microsoft Azure Command-Line Tools DataFactoryManagementClient Extension	GA	0.7.0
datamigration	2.15.0	Microsoft Azure Command-Line Tools DataMigrationManagementClient Extension	Experimental	0.6.1
dataprotection	2.51.0	Microsoft Azure Command-Line Tools DataProtectionClient Extension	Experimental	0.11.0
datashare	2.15.0	Microsoft Azure Command-Line Tools DataShareManagementClient Extension	Experimental	0.2.0
db-up	2.0.46	Additional commands to simplify Azure Database workflows.	Preview	0.2.9
deploy-to-azure	2.0.60	Deploy to Azure using Github Actions.	Preview	0.2.0
desktopvirtualization	2.15.0	Microsoft Azure Command-Line Tools	GA	0.2.0

Extension	Required Minimum CLI Version	Description	Status	Release Notes
DesktopVirtualizationAPIClient Extension				
dev-spaces ↗	2.1.0	Dev Spaces provides a rapid, iterative Kubernetes development experience for teams.	GA	1.0.6 ↗
devcenter ↗	2.51.0	Microsoft Azure Command-Line Tools DevCenter Extension	GA	3.0.0 ↗
diskpool ↗	2.15.0	Microsoft Azure Command-Line Tools StoragePoolManagement Extension	Experimental	0.2.0 ↗
dms-preview ↗	2.27.0	Support for new Database Migration Service scenarios.	Preview	0.15.0 ↗
dnc ↗	2.51.0	Microsoft Azure Command-Line Tools Dnc Extension.	Preview	0.2.1 ↗
dns-resolver ↗	2.39.0	Microsoft Azure Command-Line Tools DnsResolverManagementClient Extension	GA	0.2.0 ↗
dynatrace ↗	2.41.0	Microsoft Azure Command-Line Tools Dynatrace Extension.	Preview	0.1.0 ↗
edgeorder ↗	2.15.0	Microsoft Azure Command-Line Tools EdgeOrderManagementClient Extension	Experimental	0.1.0 ↗
elastic ↗	2.49.0	Microsoft Azure Command-Line Tools MicrosoftElastic Extension	Experimental	1.0.0b1 ↗
elastic-san ↗	2.51.0	Microsoft Azure Command-Line Tools ElasticSan Extension.	Preview	1.0.0b2 ↗
eventgrid ↗	2.0.49	Microsoft Azure Command-Line Tools EventGrid Command Module.	Preview	0.4.9 ↗
express-route-cross-connection ↗	2.0.41	Manage customer ExpressRoute circuits using an ExpressRoute cross-connection.	GA	0.1.1 ↗
fleet ↗	2.48.0	Microsoft Azure Command-Line Tools Fleet Extension	Preview	0.3.0 ↗
fluid-relay ↗	2.39.0	Microsoft Azure Command-Line Tools FluidRelay Extension.	GA	0.1.0 ↗
footprint ↗	2.11.0	Microsoft Azure Command-Line Tools FootprintMonitoringManagementClient Extension	Experimental	1.0.0 ↗
front-door ↗	2.0.68	Manage networking Front Doors.	GA	1.0.17 ↗

Extension	Required Minimum CLI Version	Description	Status	Release Notes
functionapp ↗	2.0.46	Additional commands for Azure Functions.	Preview	0.1.1 ↗
fzf ↗	2.9.0	Microsoft Azure Command-Line Tools fzf Extension	Experimental	1.0.2 ↗
graphservices ↗	2.49.0	Microsoft Azure Command-Line Tools Graphservices Extension.	Preview	1.0.0b1 ↗
guestconfig ↗	2.3.1	Microsoft Azure Command-Line Tools GuestConfigurationClient Extension	Experimental	0.1.1 ↗
hack ↗	2.0.67	Microsoft Azure Command-Line Tools Hack Extension	Preview	0.4.3 ↗
hardware-security-modules ↗	2.15.0	Microsoft Azure Command-Line Tools AzureDedicatedHSMResourceProvider Extension	Experimental	0.2.0 ↗
healthbot ↗	2.15.0	Microsoft Azure Command-Line Tools HealthbotClient Extension	Experimental	0.1.0 ↗
healthcareapis ↗	2.15.0	Microsoft Azure Command-Line Tools HealthcareApisManagementClient Extension	GA	0.4.0 ↗
hpc-cache ↗	2.3.0	Microsoft Azure Command-Line Tools StorageCache Extension	GA	0.1.5 ↗
hybridaks ↗	2.32.0	Microsoft Azure Command-Line Tools HybridContainerService Extension	Experimental	0.2.4 ↗
image-copy-extension ↗	2.0.24	Support for copying managed vm images between regions	GA	0.2.13 ↗
image-gallery ↗	2.3.0	Support for Azure Image Gallery	Experimental	0.1.3 ↗
import-export ↗	2.3.1	Microsoft Azure Command-Line Tools StorageImportExport Extension	Experimental	0.1.1 ↗
init ↗	2.0.67	Microsoft Azure Command-Line Tools Init Extension	Preview	0.1.0 ↗
interactive ↗	2.0.62	Microsoft Azure Command-Line Interactive Shell	Preview	0.5.3 ↗
internet-analyzer ↗	2.0.67	Microsoft Azure Command-Line Tools Internet Analyzer Extension	Preview	0.1.0rc6 ↗

Extension	Required Minimum CLI Version	Description	Status	Release Notes
ip-group ↗	2.0.67	Microsoft Azure Command-Line Tools IpGroup Extension	Preview	0.1.2 ↗
k8s-configuration ↗	2.15.0	Microsoft Azure Command-Line Tools K8s-configuration Extension	GA	1.7.0 ↗
k8s-extension ↗	2.51.0	Microsoft Azure Command-Line Tools K8s-extension Extension	GA	1.5.0 ↗
k8sconfiguration ↗	2.15.0	Microsoft Azure Command-Line Tools K8sconfiguration Extension	Preview	0.2.4 ↗
kusto ↗	2.15.0	Microsoft Azure Command-Line Tools KustoManagementClient Extension	GA	0.5.0 ↗
load ↗	2.41.0	Microsoft Azure Command-Line Tools Load Testing Extension.	GA	0.3.1 ↗
log-analytics ↗	2.0.0	Support for Azure Log Analytics query capabilities.	Preview	0.2.2 ↗
log-analytics-solution ↗	2.50.0	Support for Azure Log Analytics Solution	GA	1.0.0 ↗
logic ↗	2.48.0	Microsoft Azure Command-Line Tools LogicManagementClient Extension	Preview	0.1.7 ↗
logz ↗	2.15.0	Microsoft Azure Command-Line Tools MicrosoftLogz Extension	Experimental	0.1.0 ↗
maintenance ↗	2.50.0	Microsoft Azure Command-Line Tools MaintenanceManagementClient Extension	Experimental	1.4.0 ↗
managedccfs ↗	2.45.0	Microsoft Azure Command-Line Tools Managedccfs Extension.	Preview	0.2.0 ↗
managednetworkfabric ↗	2.45.0	Support for managednetworkfabric commands based on 2023-06-15 API version.	Preview	3.2.0 ↗
managementpartner ↗	2.0.67	Support for Management Partner preview	GA	0.1.3 ↗
mesh ↗	2.50.0	Support for Microsoft Azure Service Fabric Mesh - Public Preview	Preview	1.0.0a1 ↗
mixed-reality ↗	2.49.0	Mixed Reality Azure CLI Extension.	Preview	0.0.5 ↗
ml ↗	2.15.0	Microsoft Azure Command-Line Tools AzureMachineLearningWorkspaces	GA	2.21.0 ↗

Extension	Required Minimum CLI Version	Description	Status	Release Notes
Extension				
mobile-network ↗	2.49.0	Microsoft Azure Command-Line Tools MobileNetwork Extension.	Preview	0.2.1 ↗
monitor-control-service ↗	2.15.0	Microsoft Azure Command-Line Tools MonitorClient Extension	GA	0.3.1 ↗
netappfiles-preview ↗	2.51.0	Provides a preview for upcoming Azure NetApp Files (ANF) features.	Preview	1.0.0b1 ↗
networkcloud ↗	2.49.0	Support for Azure Operator Nexus network cloud commands based on 2023-07-01 API version.	GA	1.1.0 ↗
new-relic ↗	2.49.0	Microsoft Azure Command-Line Tools NewRelic Extension.	Preview	1.0.0b1 ↗
next ↗	2.20.0	Microsoft Azure Command-Line Tools Next Extension	Experimental	0.1.3 ↗
nginx ↗	2.40.0	Microsoft Azure Command-Line Tools Nginx Extension	GA	0.1.1 ↗
notification-hub ↗	2.49.0	Microsoft Azure Command-Line Tools Notification Hub Extension	GA	1.0.0a1 ↗
nsp ↗	2.45.0	Microsoft Azure Command-Line Tools Nsp Extension.	Experimental	0.2.1 ↗
offazure ↗	2.15.0	Microsoft Azure Command-Line Tools AzureMigrateV2 Extension	Experimental	0.1.0 ↗
orbital ↗	2.39.0	Microsoft Azure Command-Line Tools Orbital Extension.	GA	0.1.0 ↗
palo-alto-networks ↗	2.51.0	Microsoft Azure Command-Line Tools PaloAltoNetworks Extension.	Preview	1.1.1b1 ↗
partnercenter ↗	2.0.67	Microsoft Azure CLI Extension for Partner Center	Preview	0.2.4 ↗
peering ↗	2.3.1	Microsoft Azure Command-Line Tools PeeringManagementClient Extension	GA	0.2.1 ↗
portal ↗	2.3.1	Microsoft Azure Command-Line Tools Portal Extension	Experimental	0.1.3 ↗
powerbidedicated ↗	2.49.0	Microsoft Azure Command-Line Tools PowerBIDedicated Extension	Preview	0.2.2 ↗

Extension	Required Minimum CLI Version	Description	Status	Release Notes
providerhub ↗	2.15.0	Microsoft Azure Command-Line Tools ProviderHub Extension	Experimental	0.2.0 ↗
purview ↗	2.15.0	Microsoft Azure Command-Line Tools PurviewManagementClient Extension	Preview	0.1.0 ↗
quantum ↗	2.41.0	Microsoft Azure Command-Line Tools Quantum Extension	Preview	0.19.0 ↗
qumulo ↗	2.48.0	Microsoft Azure Command-Line Tools Qumulo Extension.	GA	1.0.0 ↗
quota ↗	2.15.0	Microsoft Azure Command-Line Tools AzureQuotaExtensionAPI Extension	Experimental	0.1.0 ↗
rdbms-connect ↗	2.19.0	Support for testing connection to Azure Database for MySQL & PostgreSQL servers.	GA	1.0.4 ↗
redisenterprise ↗	2.45.0	Microsoft Azure Command-Line Tools RedisEnterprise Extension.	GA	0.1.4 ↗
reservation ↗	2.50.0	Microsoft Azure Command-Line Tools Reservation Extension	GA	0.3.1 ↗
resource-graph ↗	2.22.0	Support for querying Azure resources with Resource Graph.	GA	2.1.0 ↗
resource-mover ↗	2.50.0	Microsoft Azure Command-Line Tools ResourceMoverServiceAPI Extension	Preview	1.0.0b1 ↗
sap-hana ↗	2.0.46	Additional commands for working with SAP HanaOnAzure instances.	GA	0.6.5 ↗
scenario-guide ↗	2.20.0	Microsoft Azure Command-Line Tools Scenario Guidance Extension	Experimental	0.1.1 ↗
scheduled-query ↗	2.38.0	Microsoft Azure Command-Line Tools Scheduled_query Extension	Preview	0.5.2 ↗
scvmm ↗	2.15.0	Microsoft Azure Command-Line Tools SCVMM Extension	Preview	0.2.0 ↗
self-help ↗	2.45.0	Microsoft Azure Command-Line Tools SelfHelp Extension.	Preview	0.1.0 ↗
sentinel ↗	2.37.0	Microsoft Azure Command-Line Tools Sentinel Extension.	Experimental	0.2.0 ↗

Extension	Required Minimum CLI Version	Description	Status	Release Notes
serial-console ↗	2.15.0	Microsoft Azure Command-Line Tools for Serial Console Extension	Preview	0.1.6 ↗
serviceconnector-passwordless ↗	2.53.0	Microsoft Azure Command-Line Tools Serviceconnector-passwordless Extension	Preview	0.3.12 ↗
site-recovery ↗	2.51.0	Microsoft Azure Command-Line Tools SiteRecovery Extension.	Experimental	1.0.0 ↗
spring ↗	2.45.0	Microsoft Azure Command-Line Tools spring Extension	GA	1.15.0 ↗
spring-cloud ↗	2.45.0	Microsoft Azure Command-Line Tools spring-cloud Extension	GA	3.1.8 ↗
ssh ↗	2.45.0	SSH into Azure VMs using RBAC and AAD OpenSSH Certificates	GA	2.0.2 ↗
stack-hci ↗	2.50.0	Microsoft Azure Command-Line Tools AzureStackHCIClient Extension	GA	1.0.0 ↗
stack-hci-vm ↗	2.15.0	Microsoft Azure Command-Line Tools AzureStackHCIClient Extension	Preview	0.1.2 ↗
staticwebapp ↗	2.39.0	Microsoft Azure Command-Line Tools Staticwebapp Extension	Preview	1.0.0 ↗
storage-blob-preview ↗	2.27.0	Microsoft Azure Command-Line Tools Storage-blob-preview Extension	Preview	0.7.2 ↗
storage-mover ↗	2.50.0	Microsoft Azure Command-Line Tools StorageMover Extension.	Experimental	1.0.0b1 ↗
storage-preview ↗	2.50.0	Provides a preview for upcoming storage features.	Preview	1.0.0b1 ↗
storagesync ↗	2.3.1	Microsoft Azure Command-Line Tools MicrosoftStorageSync Extension	GA	0.1.2 ↗
stream-analytics ↗	2.15.0	Microsoft Azure Command-Line Tools StreamAnalyticsManagementClient Extension	Experimental	0.1.2 ↗
subscription ↗	2.0.30	Support for subscription management preview.	Preview	0.1.5 ↗
support ↗	2.0.81	Microsoft Azure Command-Line Tools Support Extension	GA	1.0.3 ↗

Extension	Required Minimum CLI Version	Description	Status	Release Notes
timeseriesinsights ↗	2.50.0	Microsoft Azure Command-Line Tools TimeSeriesInsightsClient Extension	GA	1.0.0b1 ↗
traffic-collector ↗	2.40.0	Microsoft Azure Command-Line Tools TrafficCollector Extension.	GA	0.1.2 ↗
virtual-network-manager ↗	2.51.0	Microsoft Azure Command-Line Tools NetworkManagementClient Extension	GA	1.0.0 ↗
virtual-network-tap ↗	2.0.46	Manage virtual network taps (VTAP).	Preview	0.1.0 ↗
virtual-wan ↗	2.50.0	Manage virtual WAN, hubs, VPN gateways and VPN sites.	Preview	0.3.0 ↗
vm-repair ↗	2.0.67	Auto repair commands to fix VMs.	GA	0.5.6 ↗
vmware ↗	2.51.0	Azure VMware Solution commands.	GA	6.0.0 ↗
webapp ↗	2.23.0	Additional commands for Azure AppService.	Preview	0.4.0 ↗
webpubsub ↗	2.39.0	Microsoft Azure Command-Line Tools Webpubsub Extension	GA	1.3.0 ↗
workloads ↗	2.45.0	Microsoft Azure Command-Line Tools Workloads Extension.	Preview	0.1.0a1 ↗

How to use the Azure CLI alias extension

Article • 09/15/2023

The alias extension allows users to define custom commands for the Azure CLI by using existing commands. Aliases help keep your workflow simple by allowing shortcuts. The Jinja2 template engine powers Azure CLI aliases and offers advanced argument processing.

ⓘ Note

The Alias Extension is in public preview. The features and configuration file format may change.

Install the alias extension

The minimum required Azure CLI version to use the alias extension is **2.0.28**. To check your CLI version, run `az --version`. If you need to update your installation, follow the instructions in [Install the Azure CLI](#).

Install the alias extension with the [az extension add](#) command.

Azure CLI

```
az extension add --name alias
```

Verify the installation of the extension with [az extension list](#). If the alias extension was installed properly, it's listed in the command output.

Azure CLI

```
az extension list --output table --query '[].{Name:name}'
```

Output

Name

alias

Keep the alias extension up-to-date

The alias extension is under active development and new versions are released regularly. New versions aren't installed when you update the CLI. Install the updates for the extension with [az extension update](#).

```
Azure CLI
```

```
az extension update --name alias
```

Manage aliases for the Azure CLI

The alias extension lets you create and manage aliases for other CLI commands. To view all the available commands and parameter details, run the alias command with `--help`.

```
Azure CLI
```

```
az alias --help
```

Create simple alias commands

One use of aliases is for shortening existing command groups or command names. For example, you can shorten the `group` command group to `rg` and the `list` command to `ls`.

```
Azure CLI
```

```
az alias create --name rg --command group  
az alias create --name ls --command list
```

These newly defined aliases can now be used anywhere that their definition would be.

```
Azure CLI
```

```
az rg list  
az rg ls  
az vm ls
```

Don't include `az` as part of the alias command.

Aliases can also be shortcuts for complete commands. The next example lists available resource groups and their locations in table output:

```
Azure CLI
```

```
az alias create --name ls-groups --command "group list --query '[].  
{Name:name, Location:location}' --output table"
```

Now `ls-groups` can be run like any other CLI command.

Azure CLI

```
az ls-groups
```

Create an alias command with arguments

You can also add positional arguments to an alias command by including them as `{}{{ arg_name }}` in the alias name. The whitespace inside the braces is required.

Azure CLI

```
az alias create --name "alias_name {{ arg1 }} {{ arg2 }} ..." --command  
"invoke_including_args"
```

The next example alias shows how to use positional arguments to get the public IP address for a VM.

Azure CLI

```
az alias create \  
  --name "get-vm-ip {{ resourceGroup }} {{ vmName }}" \  
  --command "vm list-ip-addresses --resource-group {{ resourceGroup }} --  
  name {{ vmName }}  
  --query [0].virtualMachine.network.publicIpAddresses[0].ipAddress"
```

When running this command, you give values to the positional arguments.

Azure CLI

```
az get-vm-ip MyResourceGroup MyVM
```

You can also use environment variables in aliased commands, which are evaluated at runtime. The next example adds the `create-rg` alias, which creates a resource group in `eastus` and adds an `owner` tag. This tag is assigned the value of the local environment variable `USER`.

Azure CLI

```
az alias create \
    --name "create-rg {{ groupName }}" \
    --command "group create --name {{ groupName }} --location eastus --tags
owner=\$USER"
```

To register the environment variables inside the command of the alias, the dollar sign \$ must be escaped.

Process arguments using Jinja2 templates

Jinja2 [↗](#) performs the argument substitution in the alias extension. Jinja2 templates allow for manipulating the arguments.

With Jinja2 templates, you can write aliases that take different types of arguments than the underlying command. For example, you can make an alias that takes a storage URL. Then this URL is parsed to pass the account and container names to the storage command.

```
Azure CLI

az alias create \
    --name 'storage-ls {{ url }}' \
    --command "storage blob list
        --account-name {{ url.replace('https://', '').split('.')[0] }}
        --container-name {{ url.replace('https://', '').split('/')[1] }}"
```

To learn about the Jinja2 template engine, see [the Jinja2 documentation](#) [↗](#).

Alias configuration file

Another way to create and modify aliases is to alter the alias configuration file. Alias command definitions are written into a configuration file, located at

`$AZURE_CONFIG_DIR/alias`. The default value of `AZURE_CONFIG_DIR` is `$HOME/.azure` on macOS and Linux, and `%USERPROFILE%\.azure` on Windows. The alias configuration file is written in the INI configuration file format. The format for alias commands is:

```
ini

[alias_name]
command = invoked_commands
```

For aliases that have positional arguments, the format for alias commands is:

```
ini
```

```
[alias_name {{ arg1 }} {{ arg2 }} ...]  
command = invoked_commands_including_args
```

Create an alias command with arguments via the alias configuration file

The next example shows an alias for a command with arguments. This command gets the public IP address for a VM. Aliased commands must all be on a single line, and use all of the arguments in the alias name.

```
ini
```

```
[get-vm-ip {{ resourceGroup }} {{ vmName }}]  
command = vm list-ip-addresses --resource-group {{ resourceGroup }} --name  
{{ vmName }} --query  
[0].virtualMachine.network.publicIpAddresses[0].ipAddress
```

Uninstall the alias extension

To uninstall the extension, use the [az extension remove](#) command.

```
Azure CLI
```

```
az extension remove --name alias
```

If you uninstalled because a bug or other problem with the extension, [file a GitHub issue](#) so that we can provide a fix.

Create an Azure service principal with Azure CLI

Article • 10/13/2023

Automated tools that use Azure services should always have restricted permissions to ensure that Azure resources are secure. Therefore, instead of having applications sign in as a fully privileged user, Azure offers service principals. An Azure service principal is an identity created for use with applications, hosted services, and automated tools. This identity is used to access resources.

In this tutorial, you learn how to:

- ✓ Create a service principal
- ✓ Sign in using a service principal and password
- ✓ Sign in using a service principal and certificate
- ✓ Manage service principal roles
- ✓ Create an Azure resource using a service principal
- ✓ Reset service principal credentials

Prerequisites

- In a subscription, you must have `User Access Administrator` or `Role Based Access Control Administrator` permissions, or higher, to create a service principal. For a list of roles available for Azure role-based access control (Azure RBAC), see [Azure built-in roles](#).
- Use the Bash environment in [Azure Cloud Shell](#). For more information, see [Quickstart for Bash in Azure Cloud Shell](#).

 Launch Cloud Shell 

- If you prefer to run CLI reference commands locally, [install](#) the Azure CLI. If you're running on Windows or macOS, consider running Azure CLI in a Docker container. For more information, see [How to run the Azure CLI in a Docker container](#).
 - If you're using a local installation, sign in to the Azure CLI by using the `az login` command. To finish the authentication process, follow the steps displayed in your terminal. For other sign-in options, see [Sign in with the Azure CLI](#).
 - When you're prompted, install the Azure CLI extension on first use. For more information about extensions, see [Use extensions with the Azure CLI](#).
 - Run `az version` to find the version and dependent libraries that are installed. To upgrade to the latest version, run `az upgrade`.

Create a service principal

Use the `az ad sp create-for-rbac` Azure CLI reference command to create a service principal. This example doesn't specify a `--name` parameter, so a name containing a time stamp is automatically created.

Azure CLI

```
az ad sp create-for-rbac
```

Output console:

Output

```
{
  "appId": "myAppId",
  "displayName": "myServicePrincipalName",
  "password": "myServicePrincipalPassword",
  "tenant": "myTenantId"
}
```

If you aren't adhering to resource naming conventions and plan to create a role and scope for your new service principal later, the `az ad sp create-for-rbac` command without parameters is an acceptable solution. However, without a role and scope, the new service principal doesn't have access to resources. It just exists.

When you create a service principal without parameters, also complete these steps:

- Record your system-assigned password as you can't retrieve it again. If you lose the password, reset it using `az ad sp credential reset` as explained in [Reset service principal credentials](#).

- Set the role assignment for your new service principal by using `az role assignment create` as explained in [Manage service principal roles](#).

Create a service principal with role and scope

As a best practice, always assign a specific `--role` and `--scopes` when you create a service principal. Follow these steps:

- Determine the correct role.

When determining role, always use the principle of least privilege. For example, don't give your service principal `contributor` permissions to a subscription if the service principal only needs to access Azure storage within a resource group. Consider a specialize role like `storage blob data contributor`. For a complete list of available roles in Azure RBAC, see [Azure built-in roles](#).

- Get a value for the scopes parameter.

Find and copy the **Resource ID** of the Azure resource the new service principal needs to access. This information is usually found in the Azure portal's **Properties** or **Endpoints** page of each resource. Here are common `--scopes` examples, but *rely on your Resource ID for an actual format and value*.

Scope	Example
Subscription	<code>/subscriptions/mySubscriptionID</code>
Resource group	<code>/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName</code>
Virtual machine	<code>/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName/providers/Microsoft.Compute/virtualMachines/myVMname</code>
Storage account file service	<code>/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName/providers/Microsoft.Storage/storageAccounts/myStorageAccountName/file</code>
Data factory	<code>/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName/providers/Microsoft.DataFactory/factories/myDataFactoryName</code>

For more scope examples, see [Understand scope for Azure RBAC](#).

- Create the service principal.

In this example, a new service principal named `myServicePrincipalName1` is created with `reader` permissions to all resources in resource group `RG1`.

Bash

Azure CLI

```
# Bash script
az ad sp create-for-rbac --name myServicePrincipalName1 \
    --role reader \
    --scopes /subscriptions/00000000-0000-0000-0000-000000000000/resourceGroups/myRG1
```

The `--scopes` parameter accepts a space-delimited list of scopes. In this example, a new service principal named `myServicePrincipalName2` is created with `reader` permissions to all resources in resource group `myRG1`. This service principal is also given `reader` permissions to `myVM` located in `myRG2`.

Azure CLI

```
# Bash script
az ad sp create-for-rbac --name myServicePrincipalName2 \
    --role reader \
    --scopes /subscriptions/00000000-0000-0000-0000-000000000000/resourceGroups/myRG1
    /subscriptions/00000000-0000-0000-0000-000000000000/resourceGroups/myRG2/providers/Microsoft.Compute/virtualMachines/myVM
```

If you decide that you granted too few or too many permissions to your new service principal, alter the permissions by [managing service principal roles](#).

Create a service principal using variables

You can also create a service principal using variables:

Bash

Azure CLI

```
# Bash script
let "randomIdentifier=$RANDOM*$RANDOM"
servicePrincipalName="msdocs-sp-$randomIdentifier"
roleName="azureRoleName"
subscriptionID=$(az account show --query id --output tsv)
# Verify the ID of the active subscription
echo "Using subscription ID $subscriptionID"
resourceGroup="myResourceGroupName"

echo "Creating SP for RBAC with name $servicePrincipalName, with role $roleName and in scopes
/subscriptions/$subscriptionID/resourceGroups/$resourceGroup"
az ad sp create-for-rbac --name $servicePrincipalName \
--role $roleName \
--scopes /subscriptions/$subscriptionID/resourceGroups/$resourceGroup
```

For a complete list of service principal properties, use `az ad sp list` and see [Get an existing service principal](#).

 **Warning**

When you create an Azure service principal using the `az ad sp create-for-rbac` command, the output includes credentials that you must protect. Be sure that you do not include these credentials in your code or check the credentials into your source control. As an alternative, consider using [managed identities](#) if available to avoid the need to use credentials.

Next Steps

Now that you've learned how to create an Azure service principal, proceed to the next step to learn how to use service principals with password-based authentication.

[Use password-based authentication](#)

Use an Azure service principal with password-based authentication

Article • 10/09/2023

When creating a service principal, you choose the type of sign-in authentication it uses. There are two types of authentication available for Azure service principals: **password-based authentication** and **certificate-based authentication**. Password-based authentication is good to use when learning about service principals, but we recommend using [certificate-based authentication](#) for applications.

This step in the tutorial explains how to use a service principal password to access an Azure resource.

Create a service principal containing a password

The default behavior of [az ad sp create-for-rbac](#) is to create a service principal with a random password.

Azure CLI

```
az ad sp create-for-rbac --name myServicePrincipalName \
    --role reader \
    --scopes
    /subscriptions/mySubscriptionId/resourceGroups/myResourceGroupName
```

Output Console:

```
{
  "appId": "myServicePrincipalId",
  "displayName": "myServicePrincipalName",
  "password": "myServicePrincipalPassword",
  "tenant": "myOrganizationTenantId"
}
```

The output for a service principal with password authentication includes the `password` key. **Make sure you copy this value** - it can't be retrieved. If you lose the password, [reset the service principal credentials](#).

Sign in using a service principal using a password

Test the new service principal's credentials and permissions by signing in. To sign in with a service principal, you need the `appId` (also known as "service principal ID", "username" or "assignee"), `tenant`, and `password`. Here's an example:

Azure CLI

```
az login --service-principal \
--username myServicePrincipalId \
--password myServicePrincipalPassword \
--tenant myOrganizationTenantID
```

If you don't know your `appId` or `--tenant`, retrieve it by using the `az ad sp list` command.

Azure CLI

```
spID=$(az ad sp list --display-name myServicePrincipalName --query "[].{spID:appId}" --output tsv)
tenantID=$(az ad sp list --display-name myServicePrincipalName --query "[].{tenant:appOwnerOrganizationId}" --output tsv)
echo "Using appId $spID in tenant $tenantID"

az login --service-principal \
--username $spID \
--password {paste your password here} \
--tenant $tenantID
```

If you're testing in an organization that requires two-factor authentication, error message "...Interactive authentication is needed..." is displayed. As an alternative, use a certificate or [managed identities](#).

ⓘ Important

If you want to avoid displaying your password on console and are using `az login` interactively, use the `read -s` command in `bash`.

Bash

```
read -sp "Azure password: " AZ_PASS && echo && az login --service-principal -u <app-id> -p $AZ_PASS --tenant <tenant>
```

In PowerShell, use the `Get-Credential` cmdlet.

PowerShell

```
$AzCred = Get-Credential -UserName <app-id>
az login --service-principal -u $AzCred.UserName -p
$AzCred.GetNetworkCredential().Password --tenant <tenant>
```

Next Steps

Now that you've learned how to work with service principals using a password, proceed to the next step to learn how to use service principals with certificate-based authentication.

[Use certificate-based authentication](#)

Use an Azure service principal with certificate-based authentication

Article • 10/13/2023

When creating a service principal, you choose the type of sign-in authentication it uses. There are two types of authentication available for Azure service principals: **password-based authentication** and **certificate-based authentication**.

We recommend using certificate-based authentication due to the security restrictions of password-based authentication. Certificate-based authentication enables you to adopt a phishing resistant authentication by using [conditional access policies](#), which better protects Azure resources. To learn more about why certificate-based authentication is more secure, see [Microsoft Entra certificate-based authentication](#).

This step in the tutorial explains how to use a service principal certificate to access an Azure resource.

Create a service principal containing a new certificate

To create a *self-signed* certificate for authentication, use the `--create-cert` parameter:

Azure CLI

```
az ad sp create-for-rbac --name myServicePrincipalName \
    --role roleName \
    --scopes
/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName \
    --create-cert
```

Console output:

Output

```
{
  "appId": "myServicePrincipalID",
  "displayName": "myServicePrincipalName",
  "fileWithCertAndPrivateKey": "certFilePath\certFileName.pem",
  "password": null,
  "tenant": "myOrganizationTenantID"
}
```

Unless you store the certificate in Key Vault, the output includes the `fileWithCertAndPrivateKey` key. This key's value tells you where the generated certificate is stored. Copy the certificate to a secure location. If you lose access to a certificate's private key, [reset the service principal credentials](#).

The contents of a PEM file can be viewed with a text editor. Here's a PEM file example:

-----BEGIN PRIVATE KEY-----
MIIEvQIBADANBgkqhkiG9w0BAQEFAASCBKcwgqSjAgEAAoIBAQDLhs+mr3SAkR9r
dGh8nPh3AJ/jynWNMQRaeCPhUH99eQiYI1DK7f6AjwFB9z+57W6HoPeFHFNt0/v
1BmCOCdwxptlV3W48V2hAKZRwmhtxyo3RjJhsqw6mltpdtHv3zYbLpquQsyspRi3
uVGrt8UW2jV3e8py4Vz0hqHy+enE4xHLSdtpmG401XWNUv3YcET/qSutYieM12JV
'LXdZS...07...b...axUS3... dt...ai8...
-----END PRIVATE KEY-----
-----BEGIN CERTIFICATE-----
MIICoTCCAYkCAgPoMA0GCSqGSIb3DQEBBQUAMQxEjAQBgNVBAMMCUNMSS1Mb2dp
bjAiGA8yMDIzMDkyOTIxMjkyMVoYDzIwMjQwOTI5MjEyOTIzWjAUMRIwEAYDVQQD
DA1DTEktTG9naW4wggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQDLhs+mr3SAkR9rdGh8nPh3AJ/jynWNMQRaeCPhUH99eQiYI1DK7f6AjwFB9z+57W6HoPeFHFNt0/v
uyQSJaXt0kjItim3XA5ml08NNaCo791ko5Ikx+P1s/MX+6R8qrrUV7G9mTYsQxbY
/liytK5oSkCvDz8qnbeXx9YPLCpliz93af6pxdZqPeWnK5a0vZ022q6+q412Z1z1
RoKXKkQ=

-----END CERTIFICATE-----

Create a service principal using an existing certificate

Create a service principal with an existing certificate by using the `--cert` parameter. Any tool that uses this service principal must have access to the certificate's private key. Certificates should be in an ASCII format such as PEM, CER, or DER. Pass the `certificate` as a string, or use the `@path` format to load the certificate from a file.

When you use a PEM file, the **CERTIFICATE** must be appended to the **PRIVATE KEY** within the file.

```
...
-----END CERTIFICATE-----"
```

Azure CLI

```
# create a service principal with the certificate file location
az ad sp create-for-rbac --name myServicePrincipalName \
    --role roleName \
    --scopes
/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName \
    --cert @/path/to/cert.pem
```

Work with Azure Key Vault

The `--keyvault` parameter can be added to create or retrieve certificates in Azure Key Vault. When you use the `--keyvault` parameter, the `--cert` parameter is also required. In this example, the `--cert` value is the name of the certificate.

Azure CLI

```
# Create a service principal storing the certificate in Azure Key Vault
az ad sp create-for-rbac --name myServicePrincipalName \
    --role roleName \
    --scopes
/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName \
    --create-cert \
    --cert myCertificateName \
    --keyvault myVaultName
```

Azure CLI

```
# Create a service principal using an existing certificate in Azure Key Vault
az ad sp create-for-rbac --name myServicePrincipalName \
    --role roleName \
    --scopes
/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName \
    --cert myCertificateName \
    --keyvault myVaultName
```

Retrieve a certificate from Azure Key Vault

For a certificate stored in Azure Key Vault, retrieve the certificate with its private key with [az keyvault secret show](#) and convert it to a PEM file. In Azure Key Vault, the name of the certificate's secret is the same as the certificate name.

Azure CLI

```
az keyvault secret download --file /path/to/cert.pfx \
    --vault-name VaultName \
    --name CertName \
    --encoding base64
openssl pkcs12 -in cert.pfx -passin pass: -out cert.pem -nodes
```

Convert an existing PKCS12 file

If you already have a PKCS#12 file, you can convert it to PEM format using OpenSSL. If you have a password, change the `passin` argument.

Console

```
openssl pkcs12 -in fileName.p12 -clcerts -nodes -out fileName.pem -passin
pass:
```

Append a certificate to a service principal

Use the `--append` parameter in [az ad sp credential reset](#) to append a certificate to an existing service principal. By default, this command clears all passwords and keys so use carefully.

Azure CLI

```
az ad sp credential reset --id myServicePrincipalID \
    --append \
    --cert @/path/to/cert.pem
```

Console output:

Output

Certificate expires yyyy-mm-dd hh:mm:ss+00:00. Adjusting key credential end date to match.

The output includes credentials that you must protect. Be sure that you do not include these credentials in your code or check the credentials into your source control. For more information, see <https://aka.ms/azadsp-cli>

```
{
    "appId": "myServicePrincipalID",
    "password": null,
    "tenant": "myOrganizationTenantID"
}
```

Sign in with a service principal using a certificate

To sign in with a certificate, the certificate must be available locally as a PEM or DER file in ASCII format. PKCS#12 files (.p12/.pfx) don't work. When you use a PEM file, the **PRIVATE KEY** and **CERTIFICATE** must be appended together within the file. You don't need to prefix the path with an @ like you do with other az commands.

Azure CLI

```
az login --service-principal \
    --username myServicePrincipalID \
    --tenant myOwnerOrganizationId \
    --password /path/to/cert
```

Next Steps

Now that you've learned how to work with service principals using a certificate, proceed to the next step to learn how to retrieve an existing service principal.

[Get an existing service principal](#)

Get an existing service principal

Article • 10/10/2023

List service principals

If you already have an existing service principal that you wish to use, this step explains how to retrieve your existing service principal.

A list of the service principals in a tenant can be retrieved with `az ad sp list`. By default this command returns the first 100 service principals for your tenant. To get all of a tenant's service principals, use the `--all` parameter. Getting this list can take a long time, so it's recommended that you filter the list with one of the following parameters:

- `--display-name` requests service principals that have a *prefix* that match the provided name. The display name of a service principal is the value set with the `--name` parameter during creation. If you didn't set `--name` during service principal creation, the name prefix is `azure-cli-`.
- `--spn` filters on exact service principal name matching. The service principal name always starts with `https://`. if the value you used for `--name` wasn't a URI, this value is `https://` followed by the display name.
- `--show-mine` requests only service principals created by the signed-in user.
- `--filter` takes an OData filter, and performs *server-side* filtering. This method is recommended over filtering client-side with the CLI's `--query` parameter. To learn about OData filters, see [OData expression syntax for filters](#).

The information returned for service principal objects is verbose. To get only the information necessary for sign-in, use the query string `[].{id:appId, tenant:appOwnerOrganizationId}`. Here is an example that gets the sign-in information for all service principals created by the currently logged in user:

Azure CLI

```
az ad sp list --show-mine --query "[].{SPname:displayName, SPid:appId, tenant:appOwnerOrganizationId}" --output table
```

If you're working in a large organization with many service principals, try these command examples:

Azure CLI

```
# get service principals containing a keyword
az ad sp list --display-name mySearchWord --output table

# get service principals using an OData filter
az ad sp list --filter "displayname eq 'myExactServicePrincipalName'" --
output json

# get a service principal having a certain servicePrincipalNames property
value
az ad sp list --spn https://spURL.com
```

ⓘ Important

The user and tenant can both be retrieved with `az ad sp list` and `az ad sp show`, but authentication secrets or the authentication method is not available. Secrets for certificates in Azure Key Vault can be retrieved with `az keyvault secret show`, but no other secrets are stored by default. If you forget an authentication method or secret, [reset the service principal credentials](#).

Service principal properties

When you get a list of service principals using `az ad sp list`, there are many output properties you can reference in your script.

Output

```
[  
 {  
   "accountEnabled": true,  
   "addIns": [],  
   "alternativeNames": [],  
   "appDescription": null,  
   "appDisplayName": "myServicePrincipalName",  
   "appId": "00000000-0000-0000-0000-000000000000",  
   "appOwnerOrganizationId": "00000000-0000-0000-0000-000000000000",  
   "appRoleAssignmentRequired": false,  
   "appRoles": [],  
   "applicationTemplateId": null,  
   "createdDateTime": null,  
   "deletedDateTime": null,  
   "description": null,  
   "disabledByMicrosoftStatus": null,  
   "displayName": "myServicePrincipalName",  
   "homepage": "https://myURL.com",  
   "id": "00000000-0000-0000-000000000000",  
   "info": {  
     "logoUrl": null,
```

```
        "marketingUrl": null,
        "privacyStatementUrl": null,
        "supportUrl": null,
        "termsOfServiceUrl": null
    },
    "keyCredentials": [],
    "loginUrl": null,
    "logoutUrl": null,
    "notes": null,
    "notificationEmailAddresses": [],
    "oauth2PermissionScopes": [
        {
            "adminConsentDescription": "my admin description",
            "adminConsentDisplayName": "my admin display name",
            "id": "00000000-0000-0000-0000-000000000000",
            "isEnabled": true,
            "type": "User",
            "userConsentDescription": "my user description",
            "userConsentDisplayName": "my user display name",
            "value": "user_impersonation"
        }
    ],
    "passwordCredentials": [],
    "preferredSingleSignOnMode": null,
    "preferredTokenSigningKeyThumbprint": null,
    "replyUrls": [],
    "resourceSpecificApplicationPermissions": [],
    "samlSingleSignOnSettings": null,
    "servicePrincipalNames": [
        "00000000-0000-0000-000000000000",
        "https://myURL.com"
    ],
    "servicePrincipalType": "Application",
    "signInAudience": null,
    "tags": [
        "WindowsAzureActiveDirectoryIntegratedApp"
    ],
    "tokenEncryptionKeyId": null,
    "verifiedPublisher": {
        "addedDateTime": null,
        "displayName": null,
        "verifiedPublisherId": null
    }
}
]
```

Use the `--query` parameter to retrieve and store service principal properties in variables.

Bash

Azure CLI

```
# Bash script
spID=$(az ad sp list --display-name myServicePrincipalName --query "[].{spID:appId}" --output tsv)
tenantID=$(az ad sp list --display-name myServicePrincipalName --query "[].{tenant:appOwnerOrganizationId}" --output tsv)
userConsentDescr=$(az ad sp list --display-name myServicePrincipalName --query "[].{ucs:oauth2PermissionScopes.userConsentDescription[0]}" --output tsv)
echo "Using appId $spID in tenant $tenantID for $userConsentDescr"
```

Next Steps

Now that you've learned how to retrieve your existing service principal, proceed to the next step to learn how to manage your service principal roles.

[Manage service principal roles](#)

Manage service principal roles

Article • 10/13/2023

In order to restrict access to your Azure resources, you can use a service principal to manage role assignments. Each role provides different permissions allowed by the user when accessing Azure resources. This step in the tutorial explains how to create and remove service principal roles.

The Azure CLI has the following commands to manage role assignments:

- [az role assignment list](#)
- [az role assignment create](#)
- [az role assignment delete](#)

Create or remove a role assignment

The **Contributor** role has full permissions to read and write to an Azure account. The **Reader** role is more restrictive with read-only access. Always use the principle of least privilege. For a complete list of available roles in Azure RBAC, see [Azure built-in roles](#).

Adding a role *doesn't* restrict previously assigned permissions. This example adds the **Reader** role and removes the **Contributor** role:

```
Azure CLI

az role assignment create --assignee myServicePrincipalID \
    --role Reader \
    --scope /subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName

az role assignment delete --assignee myServicePrincipalID \
    --role Contributor \
    --scope /subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName
```

Output Console:

```
Output

{
  "condition": null,
  "conditionVersion": null,
  "createdBy": null,
  "createdOn": "yyyy-mm-ddT00:00:00.000000+00:00",
  "delegatedManagedIdentityResourceId": null,
  "description": null,
  "id": "/subscriptions/00000000-0000-0000-0000-000000000000/providers/Microsoft.Authorization/roleAssignments/00000000-
0000-0000-000000000000",
  "name": "00000000-0000-0000-000000000000",
  "principalId": "00000000-0000-0000-000000000000",
  "principalType": "ServicePrincipal",
  "roleDefinitionId": "/subscriptions/00000000-0000-0000-0000-
000000000000/providers/Microsoft.Authorization/roleDefinitions/00000000-0000-0000-0000-000000000000",
  "scope": "/subscriptions/00000000-0000-0000-000000000000/resourceGroups/myResourceGroupName",
  "type": "Microsoft.Authorization/roleAssignments",
  "updatedBy": "00000000-0000-0000-000000000000",
  "updatedOn": "yyyy-mm-ddT00:00:00.000000+00:00"
}
```

How to get a value for the scope parameter

One question you might have is "How do I know the `--scope` parameter value?" The answer is to find and copy the Resource ID of the Azure resource your service principal needs to access. This information is usually found in the Azure portal's **Properties** or **Endpoints** page of each resource. Here are common `--scope` examples, but *rely on your Resource ID for an actual format and value*.

Scope	Example
Subscription	/subscriptions/mySubscriptionID
Resource group	/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName
Virtual machine	/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName/providers/Microsoft.Compute/virtualMachines/myVMname

Scope	Example
Storage account file service	/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName/providers/Microsoft.Storage/storageAccounts/myStorageAccountName/fileService
Data factory	/subscriptions/mySubscriptionID/resourceGroups/myResourceGroupName/providers/Microsoft.DataFactory/factories/myDataFactoryName

For more scope examples, see [Understand scope for Azure RBAC](#).

Verify changes

The changes can be verified by listing the assigned roles:

Azure CLI

```
# list all role assignments for the current subscription
az role assignment list --output table

# list role assignments for a user
az role assignment list --assignee myUserName@contoso.com

# list role assignments for a subscription
az role assignment list --subscription mySubscriptionID
```

You can also go into the [Azure portal](#) and manually assign the role to the service principal from the Access control (IAM) menu. For more examples on listing role assignments, see [List Azure role assignments using Azure CLI](#).

Next Steps

Now that you've learned how to manage your service principal roles, proceed to the next step to learn how to use service principals to create a resource.

[Create a resource using service principal](#)

Create a resource using a service principal

Article • 10/13/2023

If given the necessary permissions, a service principal can create and manage Azure resources just like an account. This tutorial step provides an example of how to create a resource for [Azure Storage](#) using a service principal and the following commands:

- [az login](#)
- [az group create](#)
- [az storage account create](#)
- [az storage account keys list](#)

To sign in with a service principal, you need the `appID`, `tenantID`, and `password` returned in the console output when you [created a service principal](#).

1. Sign in as the service principal.

Azure CLI

```
az login --service-principal \
    --username myServicePrincipalID \
    --password myServicePrincipalPassword \
    --tenant myOrganizationTenantID
```

Output console:

Output

```
[  
 {  
     "cloudName": "AzureCloud",  
     "homeTenantId": "tenantID",  
     "id": "mySubscriptionId",  
     "isDefault": true,  
     "managedByTenants": [],  
     "name": "mySubscriptionName",  
     "state": "Enabled",  
     "tenantId": "tenantID",  
     "user": {  
         "name": "myServicePrincipalID",  
         "type": "servicePrincipal"  
     }  
 }  
 ]
```

2. Create a resource group to hold all resources for the same project.

Azure CLI

```
az group create --location westus --name myResourceGroupName
```

3. Create a storage account.

For Azure Storage, valid values for the <KIND> parameter are:

- BlobStorage
- BlockBlobStorage
- FileStorage
- Storage
- StorageV2

Azure CLI

```
az storage account create --name myStorageAccountName \
--resource-group myResourceGroupName \
--kind <KIND> \
--sku F0 \
--location westus \
--yes
```

4. Get resource keys, which you use in your code to authenticate to the Azure storage account.

Azure CLI

```
az storage account keys list --resource-group myResourceGroupName \
--account-name myStorageAccountName
```

Output Console:

Output

```
[  
 {  
 "creationTime": "2023-09-15T17:29:49.554030+00:00",  
 "keyName": "key1",  
 "permissions": "FULL",  
 "value": "myKeyValue1"  
 },  
 {  
 "creationTime": "2023-09-15T17:29:49.554030+00:00",  
 "keyName": "key2",  
 "permissions": "FULL",  
 "value": "myKeyValue2"  
 }
```

```
        "permissions": "FULL",
        "value": "myKeyValue2"
    }
]
```

Next Steps

Now that you've learned how to create a resource using service principal, proceed to the next step to learn how to reset your service principal credentials.

[Reset service principal credentials](#)

Reset service principal credentials

Article • 10/18/2023

If you lose your service principal credentials, reset the credentials using [az ad sp credential reset](#). This step details how to reset your service principal password or certificate.

⚠️ Warning

While learning to manage Azure service principals, returning passwords and credential locations in your terminal, and consequently in your log file, is common. However, when outside of a testing environment, **store credential output in a variable**.

Reset credentials returning output to the console and log file

Use [az ad sp credential reset](#) command to create a new password or certificate for your service principal. If you don't know the ID associated with your service principal, use the `az ad sp list` command as explained in [Get an existing service principal](#).

Reset a service principal password.

Azure CLI

```
az ad sp credential reset --id myServicePrincipalID
```

Console output showing the new password in the console. This information is also written in the log.

Output

```
{
  "appId": "myServicePrincipalID",
  "password": "myServicePrincipalNewPassword",
  "tenant": "myTenantID"
}
```

Reset a service principal credential with a new self-signed certificate.

Azure CLI

```
az ad sp credential reset --id myServicePrincipalID --create-cert
```

Console output showing the new certificate location in the console. This information is also written in the log.

Output

```
{  
  "appId": "myServicePrincipalID",  
  "fileWithCertAndPrivateKey": "myLocation/myPemFileName.pem",  
  "password": null,  
  "tenant": "myTenantID"  
}
```

Reset credentials storing output in a variable

To avoid storing credentials in your log file, use the `--query` parameter to store output in a variable. When testing, use the `echo` command to see the value of your variable, but understand that `echo` writes to the log.

Reset a service principal credential with a password.

Azure CLI

```
myNewPassword=$(az ad sp credential reset --id myServicePrincipalID --query  
password --output tsv)  
  
# the echo command writes to the log file  
# only use it when testing  
echo $myNewPassword
```

Next Steps

Now that you've learned how to reset your service principal credentials, proceed to the next step to see how to clean up tutorial resources.

[Cleanup & troubleshoot service principals](#)

Cleanup & troubleshoot service principals

Article • 10/16/2023

Congratulations! You learned how to create, retrieve, and work with service principals! Now that you have completed the tutorial, it's time to clean up the created service principal resources.

Cleanup service principal resources

The safest way to remove all resources used in this tutorial is to use [az group delete](#). The `--no-wait` parameter keeps the CLI from blocking while the deletion takes place.

Azure CLI

```
az group delete --name myResourceGroup --no-wait
```

If you prefer, delete individual service principals with the [az ad sp delete](#) command.

Azure CLI

```
az ad sp delete --id myServicePrincipalID
```

Troubleshoot service principals

Although you have completed the tutorial, you may still have questions regarding service principals that can be answered in this section.

Insufficient privileges

If your account doesn't have permission to create a service principal, `az ad sp create-for-rbac` returns an error message containing "Insufficient privileges to complete the operation." Contact your Microsoft Entra administrator to obtain `User Access Administrator` or `Role Based Access Control Administrator` permissions.

Invalid tenant

If you have specified an invalid subscription ID, you see the error message "The request didn't have a subscription or a valid tenant level resource provider." If using variables, use the Bash `echo` command to see the value being passed to the reference command. Use `az account set` to change your subscription or learn [How to manage Azure subscriptions with the Azure CLI](#).

Resource group not found

If you have specified an invalid resource group name, you see the error message "Resource group 'name' couldn't be found." If using variables, use the Bash `echo` command to see the value being passed to both the subscription and reference commands. Use `az group list` to see the resource groups for the current subscription, or learn [How to manage Azure resource groups with the Azure CLI](#).

Authorization to perform action

If your account doesn't have permission to assign a role, you see an error message that your account "does not have authorization to perform action 'Microsoft.Authorization/roleAssignments/write'." Contact your Microsoft Entra administrator to manage roles.

Interactive authentication is needed

When signing in with password authentication, error message "...Interactive authentication is needed..." occurs if your organization requires multifactor authentication. Switch to certificate-based authentication, or consider using [managed identities](#).

Compliant device required

If you try to create a service principal using a device that is not compliant with your organizations access policies, you will receive message "...Conditional Access policy requires a compliant device...". Switch to a computer that meets your organization's access policies.

See also

- [Application and service principal objects in Microsoft Entra ID](#)
- [Create a service principal using the Azure portal](#)
- [Create an Azure service principal with Azure PowerShell](#)

1 - Overview and Prerequisites

Article • 08/02/2023

In this tutorial, you learn how to create a virtual network (VNet) and deploy a virtual machine (VM) to the VNet with the Azure CLI. This tutorial also covers Azure CLI specific concepts such as shell variables and output queries.

This tutorial can be completed with the interactive experience offered through Azure Cloud Shell, or you may [install the CLI](#) locally.

Use **ctrl-shift-v** (**cmd-shift-v** on macOS) to paste tutorial text into Azure Cloud Shell.

Prerequisites

- Use the Bash environment in [Azure Cloud Shell](#). For more information, see [Quickstart for Bash in Azure Cloud Shell](#).
A blue rectangular button with a white 'A' icon on the left, the text 'Launch Cloud Shell' in the center, and a small blue square with a white right-pointing arrow icon on the right.
- If you prefer to run CLI reference commands locally, [install](#) the Azure CLI. If you're running on Windows or macOS, consider running Azure CLI in a Docker container. For more information, see [How to run the Azure CLI in a Docker container](#).
 - If you're using a local installation, sign in to the Azure CLI by using the `az login` command. To finish the authentication process, follow the steps displayed in your terminal. For other sign-in options, see [Sign in with the Azure CLI](#).
 - When you're prompted, install the Azure CLI extension on first use. For more information about extensions, see [Use extensions with the Azure CLI](#).
 - Run `az version` to find the version and dependent libraries that are installed. To upgrade to the latest version, run `az upgrade`.

Shell variables

Shell variables store values for future use and can be used to pass values to command parameters. Shell variables allow for the reuse of commands, both on their own and in scripts. This tutorial uses shell variables for easier customization of command parameters. To use your own parameter values instead of using the provided values, change the values assigned to the shell variables. For more information about shell variables, see [Use shell variables](#).

Create a resource group

In Azure, all resources are allocated in a resource management group. Resource groups provide logical groupings of resources that make them easier to work with as a collection. Use the [az group create](#) command to create a resource group named `VMTutorialResources`.

Azure CLI

```
# create shell variables
resourceGroup=VMTutorialResources
location=eastus

az group create --name $resourceGroup --location $location
```

2- Create a virtual network

Article • 08/02/2023

Virtual networks (VNets) allow virtual machines (VMs) and other Azure resources to communicate securely with each other, the internet, and on-premises networks. VNets can also be connected to other VNets if their address ranges don't overlap. In this section, you learn how to create a virtual network with a subnet.

Subnets allow you to segment the VNet address space into subnetworks for organization purposes. Azure deploys resources to subnets within a virtual network, so you need to create a subnet.

Use the [az network vnet create](#) command to create a virtual network named `TutorialVNet1` with address prefix of `10.0.0.0/16` and a subnet named `TutorialSubnet1` with address prefix of `10.0.0.0/24`.

Azure CLI

```
# create shell variables
vnetName=TutorialVNet1
subnetName=TutorialSubnet1
vnetAddressPrefix=10.0.0.0/16
subnetAddressPrefix=10.0.0.0/24

az network vnet create \
--name $vnetName \
--resource-group $resourceGroup \
--address-prefixes $vnetAddressPrefix \
--subnet-name $subnetName \
--subnet-prefixes $subnetAddressPrefix
```

3 - Create a virtual machine on a virtual network

Article • 08/02/2023

Virtual machines (VM) in Azure have a large number of dependencies. The CLI creates these resources for you based on the command-line arguments you specify. In this section, you learn how to deploy a VM to a VNet.

To deploy a VM on a VNet, they must have the same Azure location. Once a VM is created, you can't change the VNet to which it's connected.

Create a VM

Use the [az vm create](#) command to create a new virtual machine running Ubuntu. This virtual machine uses SSH authentication for sign in, and is connected to the subnet and VNet you created in the previous section.

Azure CLI

```
# create shell variables
vmName=TutorialVM1

az vm create \
--resource-group $resourceGroup \
--name $vmName \
--image UbuntuLTS \
--vnet-name $vnetName \
--subnet $subnetName \
--generate-ssh-keys \
--output json \
--verbose
```

ⓘ Note

If you have an SSH key named `id_rsa` already available, this key is used for authentication rather than having a new key generated.

As the VM is created, you see the local values used and Azure resources being created due to the `--verbose` option. Once the VM is ready, a JSON is returned from the Azure service including the public IP address.

JSON

```
{  
  "fqdns": "",  
  "id": "...",  
  "location": "eastus",  
  "macAddress": "...",  
  "powerState": "VM running",  
  "privateIpAddress": "...",  
  "publicIpAddress": "<PUBLIC_IP_ADDRESS>",  
  "resourceGroup": "TutorialResources",  
  "zones": ""  
}
```

Confirm that the VM is running by connecting over SSH.

Bash

```
ssh <PUBLIC_IP_ADDRESS>
```

Go ahead and sign out from the VM by typing `exit`.

There are other ways to get this IP address after the VM has started. In the next section, you'll see how to get detailed information on the VM, and how to filter it.

4 - Get VM information with queries

Article • 08/02/2023

Now that a VM has been created, detailed information about it can be retrieved. The common command for getting information from a resource is `show`.

Azure CLI

```
az vm show --name $vmName --resource-group $resourceGroup
```

A Virtual Machine has many properties that can be difficult to parse visually. The returned JSON contains information on authentication, network interface storage, and more. Most importantly, it contains the Azure object IDs for resources that the VM is connected to. Object IDs allow accessing these resources directly to get more information about the VM's configuration and capabilities.

In order to extract the object ID, the `--query` argument is used. Queries are written in the [JMESPath query language](#). Start with getting the network interface controller (NIC) object ID.

Azure CLI

```
az vm show --name $vmName \
--resource-group $resourceGroup \
--query 'networkProfile.networkInterfaces[].id' \
--output tsv
```

There's a lot going on here, just by adding the query. Each part of it references a key in the output JSON, or is a JMESPath operator.

- `networkProfile` is a key of the top-level JSON, which has `networkInterfaces` as a subkey. If a JSON value is a dictionary, its keys are referenced from the parent key with the `.` operator.
- The `networkInterfaces` value is an array, so it's flattened with the `[]` operator. This operator runs the remainder of the query on each array element. In this case, it gets the `id` value of every array element.

The output format `tsv` (tab-separated values) is guaranteed to only include the result data and whitespace consisting of tabs and newlines. Since the returned value is a single bare string, it's safe to assign directly to a shell variable.

For more information about querying Azure CLI output, see [How to query Azure CLI command output using a JMESPath query](#)

Go ahead and assign the NIC object ID to a shell variable now.

Azure CLI

```
nicId=$(az vm show \
-n $vmName \
-g $resourceGroup \
--query 'networkProfile.networkInterfaces[].id' \
-o tsv)
```

This example also demonstrates the use of short arguments. You may use `-g` instead of `--resource-group`, `-n` instead of `--name`, and `-o` instead of `--output`.

5 - Set shell variables from CLI output

Article • 08/08/2023

Now that you have the NIC ID, run `az network nic show` to get its information. You don't need a resource group here, since the resource group name is contained within the Azure resource ID.

Azure CLI

```
az network nic show --ids $nicId
```

This command shows all of the information for the network interface of the VM. This data includes DNS settings, IP information, security settings, and the MAC address. The following query shows how to obtain the public IP address and subnet object IDs.

Azure CLI

```
az network nic show --ids $nicId \
    --query '{IP:ipConfigurations[].publicIpAddress.id,
    Subnet:ipConfigurations[].subnet.id}' \
    -o json
```

JSON

```
{
  "IP": [
    "/subscriptions/.../resourceGroups/TutorialResources/providers/Microsoft.Network/publicIPAddresses/TutorialVM1PublicIP"
  ],
  "Subnet": [
    "/subscriptions/.../resourceGroups/TutorialResources/providers/Microsoft.Network/virtualNetworks/TutorialVM1VNET/subnets/TutorialVM1Subnet"
  ]
}
```

This command displays a JSON object that has custom keys ('IP' and 'Subnet') for the extracted values. While this style of output might not be useful for command-line tools, it helps with human readability and can be used with custom scripts.

In order to use command-line tools, change the command to remove the custom JSON keys and output as `tsv`. The `read` command processes this style of output by loading results into multiple variables. Since two values are displayed on separate lines, the `read`

command delimiter must be set to the empty string rather than the default of non-newline whitespace.

Azure CLI

```
read -d '' ipId subnetId <<< $(az network nic show \
--ids $nicId \
--query '[ipConfigurations[].publicIpAddress.id,
ipConfigurations[].subnet.id]' \
-o tsv)
```

Use the public IP object ID to look up the public IP address and store it in a shell variable. The subnet ID was used to demonstrate how to query and store multiple values in the Azure CLI. Therefore, it isn't be needed for the rest of the tutorial.

Azure CLI

```
vmIpAddress=$(az network public-ip show --ids $ipId \
--query ipAddress \
-o tsv)
```

Now you have the IP address of the VM stored in a shell variable. Go ahead and check that it's the same value that you used to initially connect to the VM.

Bash

```
echo $vmIpAddress
```

6 - Cleanup

Article • 06/26/2023

Now that the tutorial is complete, it's time to clean up the created resources. You can delete individual resources with the `delete` command, but the safest way to remove all resources in a resource group is with `group delete`.

Azure CLI

```
az group delete --name $resourceGroup --no-wait
```

This command deletes the resources created during the tutorial, and is guaranteed to deallocate them in the correct order. The `--no-wait` parameter keeps the CLI from blocking while the deletion takes place. If you want to wait until the deletion is complete or watch it progress, use the `group wait` command.

Azure CLI

```
az group wait --name $resourceGroup --deleted
```

With cleanup completed, the tutorial is finished. Continue on for a summary of everything you learned and links to resources that will help you with your next steps.

7 - Summary

Article • 08/08/2023

Congratulations! You learned how to create a VM that's connected to a VNet, used the `-query` and `--output` arguments to capture data to be stored in shell variables, and looked at some of the resources that get created for Azure VMs.

Where you go from here depends on what you plan to use the CLI for. There are various materials that go further in depth on the features covered in this tutorial.

Samples

If you want to get started right away with specific tasks, look at some sample scripts.

- [A - Z list of Azure CLI samples](#)
- [Azure CLI samples GitHub repository - VMs ↗](#)

Get support

If you'd like to give feedback, suggestions, or ask questions about the CLI, there are many ways for you to get in touch.

- `az feedback` is a built-in command for the CLI that allows providing free-form feedback to the team.
- For personalized support, see [Create an Azure support ticket in Azure CLI](#)
- File a feature request or a bug report with the CLI in the [Azure CLI repository ↗](#).
- Ask a question or get clarification by filing an issue in the [Azure CLI documentation repository ↗](#).

See also

For more information on the CLI features that were shown in the tutorial, see:

- [Output formats for Azure CLI commands](#)
- [How to query Azure CLI command output](#)
- [How to use variables in Azure CLI commands](#)

For more information on virtual networks and virtual machines, see:

- [Virtual networks and virtual machines in Azure](#)
- [Linux virtual machines in Azure](#)

- Bringing and creating Linux images in Azure

Tutorial: Use persisted parameters to simplify sequential Azure CLI commands

Article • 08/02/2023

Azure CLI offers persisted parameters that enable you to store parameter values for continued use. In this tutorial, you learn how to work with persisted values, and use these local values to efficiently execute sequential commands.

In this tutorial, you learn to:

- ✓ Use `az config param-persist` reference commands
- ✓ Execute sequential commands using persisted parameters

This tutorial uses the following Azure CLI commands

- `az config param-persist delete`
- `az config param-persist off`
- `az config param-persist on`
- `az config param-persist show`
- `az function app create`
- `az group create`
- `az storage account create`

If you don't have an Azure subscription, create a [free account](#) before you begin.

Prerequisites

1. Install the Azure CLI

If you prefer, you can also use Azure Cloud Shell to complete the steps in this tutorial. Azure Cloud Shell is an interactive shell environment that you use through your browser. Start Cloud Shell by using one of these methods:

- Open Cloud Shell by going to <https://shell.azure.com>
- Select the **Cloud Shell** button on the menu bar at the upper right corner in the [Azure portal](#)

2. If you're using a local install of the Azure CLI, complete these steps:

- Sign in using the `az login` command, then follow the steps displayed in your terminal to complete the authentication process.

```
Azure CLI
```

```
az login
```

- This tutorial requires version 2.12.0 or later of the Azure CLI. Run [az version](#) to find the version and dependent libraries that are installed. To upgrade to the latest version, run [az upgrade](#).

1. Determine your local directory

Persisted parameter values are stored in the working directory of the Azure storage account used by Azure Cloud Shell. If you're using a local install of the Azure CLI, values are stored in the working directory on your machine.

To find, create or change the working directory being used by the Azure CLI, use these familiar CLI commands.

```
Azure CLI
```

```
# List directories
dir

# Make directory
mkdir azCLI

# Change directory
cd azCLI
```

2. Turn on Persisted parameters

[Persisted parameters](#) must be turned on before parameter values can be stored. You receive a warning until `az config param-persist` moves out of the experimental stage.

See [Overview: Azure CLI reference types and status](#) to learn about the Azure CLI reference types, status, and support levels.

```
Azure CLI
```

```
az config param-persist on
```

3. Create persisted parameters

To store values for persisted parameters, execute an Azure CLI command of your choice that contains the parameters you want to store. For example, create a resource group and the `--location` and `--name` parameters are stored for future use.

1. Store the location and resource group name.

Azure CLI

```
# With persisted parameters turned on, create a resource group
az group create --name RG1forTutorial --location eastus2

# See new persisted parameters
az config param-persist show
```

Output

```
{
  "all": {
    "location": "eastus2",
    "resource_group_name": "RG1forTutorial"
  }
}
```

2. Using the new persisted parameters, create a storage account.

Azure CLI

```
# Create a storage account
az storage account create --name sa1fortutorial

# See that storage_account_name has been added to persisted parameters
az config param-persist show
```

Output

```
{
  "all": {
    "location": "eastus2",
    "resource_group_name": "RG1forTutorial",
    "storage_account_name": "sa1fortutorial"
  }
}
```

3. Create a persisted parameter without creating a new resource.

If you don't want to create a new Azure resource, `resource_group_name` and `location` parameters can be stored by using noncreate commands like `show` or

`list`. See [Azure CLI persisted parameters](#) for a full list of supported parameters, and the action needed to retain values. This example also removes all parameter values by using the `az config param-persist delete` command.

Azure CLI

```
# Clear all persisted parameters for demonstration.  
az config param-persist delete --all  
  
# List all storage accounts which will create the `resource_group_name`  
# stored parameter value.  
az storage account show --resource-group RG1forTutorial --name  
sa1fortutorial  
  
# See the new stored value created for resource group. The storage  
# account name is only stored with a 'create' command.  
az config param-persist show
```

Output

```
{  
  "all": {  
    "resource_group_name": "RG1forTutorial"  
  }  
}
```

4. Replace persisted parameters

Replacing a stored parameter value is as simple as executing a command containing a different value.

1. Create new persisted parameters.

Azure CLI

```
# Clear all persisted parameters for demonstration  
az config param-persist delete --all  
  
# Create a storage account placing "location", "resource_group_name",  
# and "storage_account_name" into persisted parameters  
az storage account create --name sa1fortutorial --resource-group  
RG1forTutorial --location eastus2  
  
# See persisted parameters entries  
az config param-persist show
```

Output

```
{  
  "all": {  
    "location": "eastus2",  
    "resource_group_name": "RG1forTutorial",  
    "storage_account_name": "sa1fortutorial"  
  }  
}
```

2. Replace the newly stored values.

Azure CLI

```
# Create a second storage account while changing both the  
"storage_account_name" and "location" persisted parameters  
az storage account create --name sa2fortutorial --location westeurope  
  
# See new persisted parameters  
az config param-persist show
```

Output

```
{  
  "all": {  
    "location": "westeurope",  
    "resource_group_name": "RG1forTutorial",  
    "storage_account_name": "sa2fortutorial"  
  }  
}
```

ⓘ Note

Even if persisted parameters are turned on, you don't have to use them. You can still execute commands with all parameter values specified. However, be aware that with persisted parameters turned on, *you will be creating new persisted parameters, or overwriting existing ones.*

5. Execute sequential commands

These scripts create an Azure Function app using the Consumption plan.

Using persisted parameters

Azure CLI

```
# Reminder: function app and storage account names must be unique.

# Turn persisted parameters on.
az config param-persist on

# Create a resource group.
az group create --name RG2forTutorial --location westeurope

# Create an Azure storage account in the resource group omitting "--location" and "--resource-group" parameters.
az storage account create \
--name sa3fortutorial \
--sku Standard_LRS

# Create a serverless function app in the resource group omitting "--storage-account" and "--resource-group" parameters.
az functionapp create \
--name FAforTutorial \
--consumption-plan-location westeurope \
--functions-version 2

# See the stored parameter values.
az config param-persist show
```

6. Delete persisted parameters

Use the `az config param-persist delete` command to remove entries.

Azure CLI

```
# Remove a single persisted parameters entry by specifying the name, not the value
az config param-persist delete resource_group_name

# Remove all persisted parameters entries and do not prompt for confirmation
az config param-persist delete --all --yes
```

ⓘ Important

Persisted parameters do not get updated when an Azure resource is deleted.

Azure CLI

```
# delete a resource group
az group delete --name RG1forTutorial

# verify that the resource group no longer exists
```

```
az group list --output table  
  
# See that the resource group name remains in persisted parameters  
az config param-persist show
```

7. Turn off persisted parameters

You can turn off persisted parameters by using the `az config param-persist off` command, but your saved persisted parameters data aren't be deleted.

Azure CLI

```
# Turn persisted parameters off  
az config param-persist off  
  
# See that your persisted parameters still exist  
az config param-persist show  
  
# Try to create a new resource relying on persisted parameters and receive  
error "...the following arguments are required:..."  
az storage account create --name SA4inAzCLI --sku Standard_LRS
```

8. Clean up resources

When no longer needed, use the `az group delete` command to remove the resource group, and all related resources.

Azure CLI

```
az group delete --name RG1forTutorial
```

See also

- [\(How to work with Azure CLI persisted parameters](#)
- [Azure CLI configuration options](#)

Azure CLI sample scripts

Article • 08/11/2023

Azure CLI samples provide end-to-end scenarios for jobs to be done. This article provides an A - Z list of Azure CLI samples written for Bash environments.

Not every Azure CLI reference command has been used in a sample script. For a complete list of Azure CLI commands, see the [A - Z reference list](#). For a list of popular conceptual content for each reference group, see [Azure CLI conceptual article list](#).

If this is your first time working with the Azure CLI, see [Get started with Azure CLI](#) and [Onboarding cheat sheet](#) to learn about installation and login.

List of samples

List by subject area

Use this list of Azure CLI samples to find samples for the subject area that has *published* the script. (Many Azure CLI scripts use reference commands from more than one Azure service.)

Subject area	Sample name
application-gateway	Manage web traffic using the Azure CLI Restrict web traffic using the Azure CLI
app-service	Backup and restore a web app from a backup using CLI Bind a custom TLS/SSL certificate to an App Service app using CLI Connect an App Service app to a storage account using CLI Connect an App Service app to an Azure Cache for Redis using CLI Connect an App Service app to Azure Cosmos DB via the Azure CLI Connect an App Service app to SQL Database using CLI
	Create an App Service app and deploy code into a local Git repository using Azure CLI Create an App Service app and deploy code to a staging environment using Azure CLI

Subject area	Sample name
	Create an App Service app and deploy files with FTP using Azure CLI
	Create an App Service app and deploy Private Endpoint using Azure CLI
	Create an App Service app with continuous deployment from an Azure DevOps repository using Azure CLI
	Create an App Service app with continuous deployment from GitHub using CLI
	Create an App Service app with deployment from GitHub using Azure CLI
	Create an ASP.NET Core app in a Docker container from Docker Hub using Azure CLI
	Create an ASP.NET Core app in a Docker container in App Service from Azure Container Registry
	Integrate App Service with Application Gateway using CLI
	Map a custom domain to an App Service app using CLI
	Monitor an App Service app with web server logs using Azure CLI
	Scale an App Service app manually using Azure CLI
	Scale an App Service app worldwide with a high-availability architecture using Azure CLI
automation	Automate operational tasks
	Configure infrastructure
azure-app-configuration	Create an Azure App Configuration store with the Azure CLI
	Delete an Azure App Configuration store with the Azure CLI
	Export from an Azure App Configuration store
	Import to an Azure App Configuration store
	Work with key-values in an Azure App Configuration store
azure-cache-for-redis	Create a Premium Azure Cache for Redis with clustering
	Create an Azure Cache for Redis using the Azure CLI

Subject area	Sample name
azure-devops	Use a variable group's secret and nonsecret variables in an Azure Pipeline
azure-functions	Create a function app for serverless code execution
	Create a function app in a Premium plan - Azure CLI
	Create a Function App in an App Service plan
	Create a function app in Azure that is deployed from GitHub
	Create a function app with a named Storage account connection
	Create a serverless Python function app using Azure CLI
	Create an Azure Function that connects to an Azure Cosmos DB
	Mount a file share to a Python function app using Azure CLI
azure-monitor	Create metric alert monitors in Azure CLI
	Managing Azure Monitor Logs in Azure CLI
azure-signalr	Create a SignalR Service
	Create a SignalR Service with an App Service
	Create a web app that uses SignalR Service and GitHub authentication
azure-sql-edge	Install software and set up resources for the tutorial
batch	CLI example: Add an application to an Azure Batch account
	CLI example: Create a Batch account in Batch service mode
	CLI example: Create a Batch account in user subscription mode
	CLI example: Create and manage a Linux pool in Azure Batch
	CLI example: Create and manage a Windows pool in Azure Batch
	CLI example: Run a job and tasks with Azure Batch
cdn	Create an Azure CDN profile and endpoint using the Azure CLI
cosmos-db	Add regions, change failover priority, trigger failover for an Azure Cosmos DB account using Azure CLI
	Connect an existing Azure Cosmos DB account with virtual network service endpoints using Azure CLI

Subject area	Sample name
	Create a database and collection for API for MongoDB for Azure Cosmos DB using Azure CLI
	Create a database with autoscale and shared collections for API for MongoDB for Azure Cosmos DB using Azure CLI
	Create a resource lock for Azure Cosmos DB Cassandra API keyspace and table using Azure CLI
	Create a resource lock for Azure Cosmos DB for Gremlin database and graph using Azure CLI
	Create a resource lock for Azure Cosmos DB's API for MongoDB using Azure CLI
	Create a serverless database and collection for API for MongoDB for Azure Cosmos DB using Azure CLI
	Create an Azure Cosmos DB account with IP firewall using Azure CLI
	Create an Azure Cosmos DB account with virtual network service endpoints using Azure CLI
	Create an Azure Cosmos DB Cassandra API account, keyspace and table using Azure CLI
	Create an Azure Cosmos DB Cassandra API serverless account, keyspace and table using Azure CLI
	Create an Azure Cosmos DB for Gremlin account, database and graph using Azure CLI
	Create an Azure Cosmos DB for NoSQL account, database and container using Azure CLI
	Create an Azure Cosmos DB for NoSQL account, database, and container with autoscale
	Create an Azure Cosmos DB for NoSQL serverless account, database and container using Azure CLI
	Create an Azure Cosmos DB Table API account and table using Azure CLI
	Create resource lock for an Azure Cosmos DB for NoSQL database and container using Azure CLI
	Find an existing Azure Cosmos DB free-tier account in a subscription using Azure CLI

Subject area	Sample name
	How to use the Azure SDK for Go with Azure Table
	Quickstart: Build an API for Table app with Python SDK and Azure Cosmos DB
	Throughput (RU/s) operations with Azure CLI for a database or container for Azure Cosmos DB for NoSQL
	Throughput (RU/s) operations with Azure CLI for a database or graph for Azure Cosmos DB - API for Gremlin
	Throughput (RU/s) operations with Azure CLI for a database or graph for Azure Cosmos DB for MongoDB
	Throughput (RU/s) operations with Azure CLI for a keyspace or table for Azure Cosmos DB - API for Cassandra
	Throughput (RU/s) operations with Azure CLI for a table for Azure Cosmos DB for Table
	Use Azure CLI for resource lock operations on Azure Cosmos DB for Table tables
	Use Azure CLI to create a API for Cassandra account, keyspace, and table with autoscale
	Use Azure CLI to create a API for Gremlin account, database, and graph with autoscale
	Use Azure CLI to create a Gremlin serverless account, database, and graph
	Use Azure CLI to create an Azure Cosmos DB for Table account and table with autoscale
	Use Azure CLI to create an Azure Cosmos DB for Table serverless account and table
	Work with account keys and connection strings for an Azure Cosmos DB account using Azure CLI
devtest-labs	Azure CLI Samples for Azure DevTest Labs
dns	Azure CLI script example: Create a DNS zone and record
event-grid	Create custom topic and subscribe to events for an Azure subscription with Azure CLI
frontdoor	Azure Front Door: Deploy custom domain

Subject area	Sample name
hdinsight	Azure HDInsight: Azure CLI samples
logic-apps	Azure CLI script sample - create a logic app
mariadb	<p>Create a MariaDB server and configure a firewall rule using the Azure CLI</p> <p>Create a MariaDB server and configure a vNet rule using the Azure CLI</p>
	<p>Enable and download server slow query logs of an Azure Database for MariaDB server using Azure CLI</p>
	<p>List and update configurations of an Azure Database for MariaDB server using Azure CLI</p>
	<p>Monitor and scale an Azure Database for MariaDB server using Azure CLI</p>
	<p>Restore an Azure Database for MariaDB server using Azure CLI</p>
mysql	<p>Configure audit logs on an Azure Database for MySQL - Flexible Server using Azure CLI</p>
	<p>Configure same-zone high availability in an Azure Database for MySQL - Flexible Server using Azure CLI</p>
	<p>Configure slow query logs on an Azure Database for MySQL - Flexible Server using Azure CLI</p>
	<p>Configure zone-redundant high availability in an Azure Database for MySQL - Flexible Server using Azure CLI</p>
	<p>Create a MySQL server and configure a firewall rule using the Azure CLI</p>
	<p>Create an Azure Database for MySQL - Flexible Server and enable public access connectivity using Azure CLI</p>
	<p>Create an Azure Database for MySQL - Flexible Server in a VNet using Azure CLI</p>
	<p>Create and manage read replicas in an Azure Database for MySQL - Flexible Server using Azure CLI</p>
	<p>Enable and download server slow query logs of an Azure Database for MySQL server using Azure CLI</p>
	<p>List and change server parameters of an Azure Database for MySQL - Flexible Server using Azure CLI</p>

Subject area	Sample name
	List and update configurations of an Azure Database for MySQL server using Azure CLI
	Monitor and scale an Azure Database for MySQL - Flexible Server using Azure CLI
	Monitor and scale an Azure Database for MySQL server using Azure CLI
	Restart/stop/start an Azure Database for MySQL - Flexible Server using Azure CLI
	Restore an Azure Database for MySQL - Flexible Server using Azure CLI
	Restore an Azure Database for MySQL server using Azure CLI
networking	Load balance multiple websites
	Route traffic for high availability of applications - Azure CLI
postgresql	Create a PostgreSQL server and configure a vNet rule using the Azure CLI
	Create an Azure Database for PostgreSQL server and configure a firewall rule using the Azure CLI
	Enable and download server slow query logs of an Azure Database for PostgreSQL server using Azure CLI
	List and update configurations of an Azure Database for PostgreSQL server using Azure CLI
	Monitor and scale a single PostgreSQL server using Azure CLI
	Restore an Azure Database for PostgreSQL server using Azure CLI
service-fabric	Create a secure Service Fabric Linux cluster via the Azure CLI
sql-server	Add a database to a failover group using the Azure CLI
	Add an Azure SQL Database elastic pool to a failover group using the Azure CLI
	Azure CLI script to enable transparent data encryption using your own key
	Backup an Azure SQL single database to an Azure storage container using the Azure CLI

Subject area	Sample name
	Configure a failover group for a group of databases in Azure SQL Database using the Azure CLI
	Configure active geo-replication for a pooled database in Azure SQL Database using the Azure CLI
	Configure active geo-replication for a single database in Azure SQL Database using the Azure CLI
	Copy a database in Azure SQL Database to a new server using the Azure CLI
	Create a single database and configure a firewall rule using the Azure CLI
	Create an Azure SQL Managed Instance using the Azure CLI
	Import a BACPAC file into a database in SQL Database using the Azure CLI
	Monitor and scale a single database in Azure SQL Database using the Azure CLI
	Move a database in SQL Database in a SQL elastic pool using the Azure CLI
	Restore a single database in Azure SQL Database to an earlier point in time using the Azure CLI
	Scale an elastic pool in Azure SQL Database using the Azure CLI
storage	Calculate the size of a Blob storage container
	Create a storage account and rotate its account access keys
	Use an Azure CLI script to delete containers based on container name prefix
traffic-manager	Route traffic for high availability of applications using Azure CLI
virtual-machines	Copy managed disks to same or different subscription with CLI
	Copy snapshot of a managed disk to same or different subscription with CLI
	Create a managed disk from a snapshot with CLI (Linux)
	Create a managed disk from a VHD file in a storage account in the same subscription with CLI (Linux)
	Create a virtual machine from a snapshot with CLI

Subject area	Sample name
	Create a virtual machine using an existing managed OS disk with CLI
	Export/Copy a managed disk to a storage account using the Azure CLI
	Export/Copy a snapshot to a storage account in different region with CLI
	Move a Marketplace Azure Virtual Machine to another subscription
virtual-network	Peer two virtual networks with an Azure CLI script sample

Azure CLI samples for Azure Blob storage

Article • 11/18/2022

The following table includes links to Bash scripts built using the Azure CLI that create and manage Azure Storage.

Script	Description
Storage accounts	
Create a storage account and retrieve/rotate the access keys	Creates an Azure Storage account and retrieves and rotates its access keys.
Blob storage	
Calculate the total size of a Blob storage container	Calculates the total size of all the blobs in a container.
Delete containers with a specific prefix	Deletes containers starting with a specified string.

Manage Azure Cache for Redis with Azure CLI

Article • 03/24/2022

The following table includes links to bash scripts built using the Azure CLI.

Create cache	Description
Create and manage a cache	Creates a resource group and a basic tier Azure Cache for Redis. It then gets details of an Azure Cache for Redis instance, including provisioning status, the hostname, ports, and keys for an Azure Cache for Redis instance. Finally, it deletes the cache.
Create and manage a premium cache with clustering	Creates a resource group and a premium tier cache with clustering enabled. It then gets details of an Azure Cache for Redis instance, including provisioning status, the hostname, ports, and keys for an Azure Cache for Redis instance. Finally, it deletes the cache.

For more information about the Azure CLI, see [Install the Azure CLI](#) and [Get started with Azure CLI](#).

Azure CLI samples for Azure Cosmos DB for NoSQL

Article • 10/12/2022

APPLIES TO:  NoSQL

The following tables include links to sample Azure CLI scripts for the Azure Cosmos DB for NoSQL and to sample Azure CLI scripts that apply to all Azure Cosmos DB APIs. Common samples are the same across all APIs.

These samples require Azure CLI version 2.30 or later. Run `az --version` to find the version. If you need to install or upgrade, see [Install Azure CLI](#). If using Azure Cloud Shell, the latest version is already installed.

API for NoSQL Samples

Task	Description
Create an Azure Cosmos DB account, database, and container	Creates an Azure Cosmos DB account, database, and container for API for NoSQL.
Create a serverless Azure Cosmos DB account, database, and container	Creates a serverless Azure Cosmos DB account, database, and container for API for NoSQL.
Create an Azure Cosmos DB account, database, and container with autoscale	Creates an Azure Cosmos DB account, database, and container with autoscale for API for NoSQL.
Perform throughput operations	Read, update, and migrate between autoscale and standard throughput on a database and container.
Lock resources from deletion	Prevent resources from being deleted with resource locks.

Common API Samples

These samples apply to all Azure Cosmos DB APIs. These samples use a API for NoSQL account, but these operations are identical across all database APIs in Azure Cosmos DB.

Task	Description
Add or fail over regions	Add a region, change failover priority, trigger a manual failover.

Task	Description
Perform account key operations	List account keys, read-only keys, regenerate keys and list connection strings.
Secure with IP firewall	Create an Azure Cosmos DB account with IP firewall configured.
Secure new account with service endpoints	Create an Azure Cosmos DB account and secure with service-endpoints.
Secure existing account with service endpoints	Update an Azure Cosmos DB account to secure with service-endpoints when the subnet is eventually configured.
Find existing free-tier account	Find whether there is an existing free-tier account in your subscription.

Next steps

Reference pages for all Azure Cosmos DB CLI commands are available in the [Azure CLI Reference](#).

For Azure CLI samples for other APIs see:

- [CLI Samples for Cassandra](#)
- [CLI Samples for Gremlin](#)
- [CLI Samples for API for MongoDB](#)
- [CLI Samples for Table](#)

Azure CLI samples for Azure Database for MariaDB

Article • 09/19/2023

ⓘ Important

Azure Database for MariaDB is on the retirement path. We strongly recommend for you to migrate to Azure Database for MySQL. For more information about migrating to Azure Database for MySQL, see [What's happening to Azure Database for MariaDB](#)?

You can configure Azure SQL Database for MariaDB by using the [Azure CLI](#).

If you don't have an [Azure subscription](#), create an [Azure free account](#) before you begin.

Prerequisites

- Use the Bash environment in [Azure Cloud Shell](#). For more information, see [Quickstart for Bash in Azure Cloud Shell](#).
A blue rectangular button with a white 'A' icon and the text 'Launch Cloud Shell' next to it, followed by a small copy icon.
- If you prefer to run CLI reference commands locally, [install](#) the Azure CLI. If you're running on Windows or macOS, consider running Azure CLI in a Docker container. For more information, see [How to run the Azure CLI in a Docker container](#).
 - If you're using a local installation, sign in to the Azure CLI by using the `az login` command. To finish the authentication process, follow the steps displayed in your terminal. For other sign-in options, see [Sign in with the Azure CLI](#).
 - When you're prompted, install the Azure CLI extension on first use. For more information about extensions, see [Use extensions with the Azure CLI](#).
 - Run `az version` to find the version and dependent libraries that are installed. To upgrade to the latest version, run `az upgrade`.

Samples

The following table includes links to sample Azure CLI scripts for Azure Database for MariaDB.

Sample link	Description
Create a server with firewall rule	Azure CLI script that creates a single Azure Database for MariaDB server and configures a server-level firewall rule.
Create a server and firewall rule	Azure CLI that creates an Azure Database for MariaDB server with a service endpoint on a virtual network and configures a vNet rule.
Scale a server	Azure CLI script that scales a single Azure Database for MariaDB server up or down to allow for changing performance needs.
Change server configurations	Azure CLI script that change configurations of a single Azure Database for MariaDB server.
Restore a server	Azure CLI script that restores a single Azure Database for MariaDB server to a previous point in time.
Manipulate with server logs	Azure CLI script that enables server logs of a single Azure Database for MariaDB server.
Enable server logs	

Azure CLI samples for Azure Database for MySQL - Flexible Server

Article • 03/14/2023

APPLIES TO:  Azure Database for MySQL - Flexible Server

The following table includes links to sample Azure CLI scripts for Azure Database for MySQL - Flexible Server.

Sample link	Description
Create and connect to a server	
Create a server and enable public access connectivity	Creates a Azure Database for MySQL - Flexible Server, configures a server-level firewall rule (public access connectivity method) and connects to the server.
Create a server and enable private access connectivity (VNet Integration)	Creates an Azure Database for MySQL - Flexible Server in a VNet (private access connectivity method) and connects to the server through a VM within the VNet.
Monitor and scale	
Monitor metrics and scale a server	Monitors and scales a single Azure Database for MySQL - Flexible server up or down to allow for changing performance needs.
Backup and restore	
Restore a server	Restores a single Azure Database for MySQL - Flexible Server to a previous point in time.
High Availability	
Configure zone-redundant high availability	Enables Zone-Redundant high availability while creating an Azure Database for MySQL - Flexible Server.
Configure same-zone high availability	Enables Same-Zone high availability while creating an Azure Database for MySQL - Flexible Server.
Manage server	
Restart, Stop, Start a Server	Performs restart, stop and start operations on a single Azure Database for MySQL - Flexible Server.
Change server parameters	Changes server parameters of a single Azure Database for MySQL - Flexible Server.

Sample link	Description
Replication	
Create read replicas	Creates and manages read replicas in a single Azure Database for MySQL - Flexible Server.
Configure logs	
Configure audit logs	Configures audit logs on a single Azure Database for MySQL - Flexible Server.
Configure slow-query logs	Configures slow-query logs on a single Azure Database for MySQL - Flexible Server.

Azure CLI samples for Azure Database for PostgreSQL - Single Server

Article • 03/29/2023

APPLIES TO:  Azure Database for PostgreSQL - Single Server

Important

Azure Database for PostgreSQL - Single Server is on the retirement path. We strongly recommend for you to upgrade to Azure Database for PostgreSQL - Flexible Server. For more information about migrating to Azure Database for PostgreSQL - Flexible Server, see [What's happening to Azure Database for PostgreSQL Single Server?](#)

The following table includes links to sample Azure CLI scripts for Azure Database for PostgreSQL.

Sample link	Description
Create a server	
Create a server and firewall rule	Azure CLI script that creates an Azure Database for PostgreSQL server and configures a server-level firewall rule.
Create server with vNet rules	
Create a server with vNet rules	Azure CLI that creates an Azure Database for PostgreSQL server with a service endpoint on a virtual network and configures a vNet rule.
Scale a server	
Scale a server	Azure CLI script that scales an Azure Database for PostgreSQL server up or down to allow for changing performance needs.
Change server configurations	
Change server configurations	Azure CLI script that change configurations options of an Azure Database for PostgreSQL server.
Restore a server	
Restore a server	Azure CLI script that restores an Azure Database for PostgreSQL server to a previous point in time.

Sample link	Description
Download server logs	
Enable and download server logs	Azure CLI script that enables and downloads server logs of an Azure Database for PostgreSQL server.

Azure CLI samples for Azure SQL Database and SQL Managed Instance

Article • 03/03/2023

Applies to: Azure SQL Database Azure SQL Managed Instance

You can configure Azure SQL Database and SQL Managed Instance by using the [Azure CLI](#).

If you don't have an [Azure subscription](#), create an [Azure free account](#) before you begin.

Prerequisites

- Use the Bash environment in [Azure Cloud Shell](#). For more information, see [Quickstart for Bash in Azure Cloud Shell](#).

- If you prefer to run CLI reference commands locally, [install](#) the Azure CLI. If you're running on Windows or macOS, consider running Azure CLI in a Docker container. For more information, see [How to run the Azure CLI in a Docker container](#).
 - If you're using a local installation, sign in to the Azure CLI by using the [az login](#) command. To finish the authentication process, follow the steps displayed in your terminal. For other sign-in options, see [Sign in with the Azure CLI](#).
 - When you're prompted, install the Azure CLI extension on first use. For more information about extensions, see [Use extensions with the Azure CLI](#).
 - Run [az version](#) to find the version and dependent libraries that are installed. To upgrade to the latest version, run [az upgrade](#).

Samples

Azure SQL Database

The following table includes links to Azure CLI script examples to manage single and pooled databases in Azure SQL Database.

Area	Description
Create databases	
Create a single database	Creates an SQL Database and configures a server-level firewall rule.
Create pooled databases	Creates elastic pools, moves pooled databases, and changes compute sizes.
Scale databases	
Scale a single database	Scales single database.
Scale pooled database	Scales a SQL elastic pool to a different compute size.
Configure geo-replication	
Single database	Configures active geo-replication for a database in Azure SQL Database and fails it over to the secondary replica.
Pooled database	Configures active geo-replication for a database in an elastic pool, then fails it over to the secondary replica.
Configure failover group	
Configure failover group	Configures a failover group for a group of databases and failover over databases to the secondary server.
Single database	Creates a database and a failover group, adds the database to the failover group, then tests failover to the secondary server.
Pooled database	Creates a database, adds it to an elastic pool, adds the elastic pool to the failover group, then tests failover to the secondary server.
Back up, restore, copy, and import a database	
Back up a database	Backs up a database in SQL Database to an Azure storage backup.
Restore a database	Restores a database in SQL Database to a specific point in time.
Copy a database to a new server	Creates a copy of an existing database in SQL Database in a new server.
Import a database from a BACPAC file	Imports a database to SQL Database from a BACPAC file.

Learn more about the [single-database Azure CLI API](#).

Azure CLI Samples

Article • 10/12/2022

The following table includes links to bash scripts for Azure Functions that use the Azure CLI.

Create app	Description
Create a function app for serverless execution	Create a function app in a Consumption plan.
Create a serverless Python function app	Create a Python function app in a Consumption plan.
Create a function app in a scalable Premium plan	Create a function app in a Premium plan.
Create a function app in a dedicated (App Service) plan	Create a function app in a dedicated App Service plan.

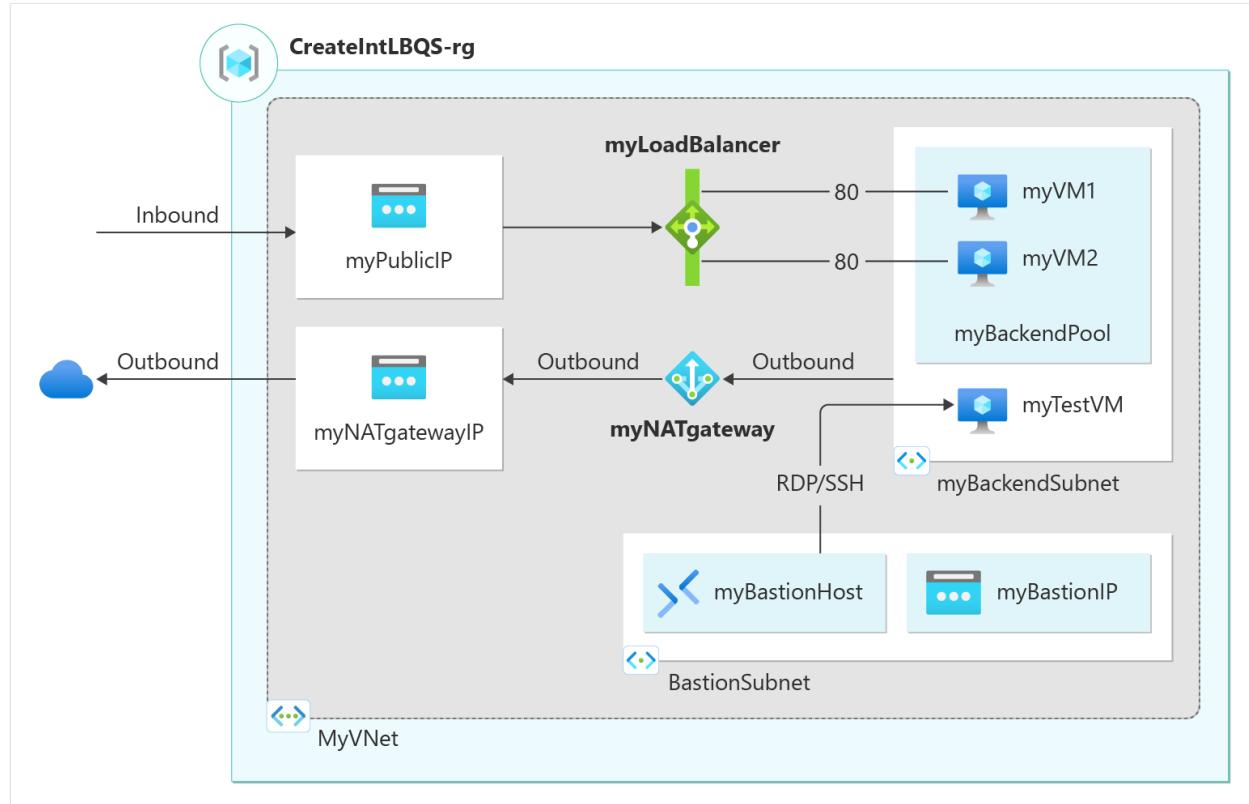
Integrate	Description
Create a function app and connect to a storage account	Create a function app and connect it to a storage account.
Create a function app and connect to an Azure Cosmos DB	Create a function app and connect it to an Azure Cosmos DB instance.
Create a Python function app and mount an Azure Files share	By mounting a share to your Linux function app, you can leverage existing machine learning models or other data in your functions.

Continuous deployment	Description
Deploy from GitHub	Create a function app that deploys from a GitHub repository.

Quickstart: Create a public load balancer to load balance VMs using the Azure CLI

Article • 09/28/2023

Get started with Azure Load Balancer by using the Azure CLI to create a public load balancer and two virtual machines. Along with these resources, you deploy Azure Bastion, NAT Gateway, a virtual network, and the required subnets.



If you don't have an [Azure subscription](#), create an [Azure free account](#) before you begin.

Prerequisites

- Use the Bash environment in [Azure Cloud Shell](#). For more information, see [Quickstart for Bash in Azure Cloud Shell](#).
[Launch Cloud Shell](#)
- If you prefer to run CLI reference commands locally, [install](#) the Azure CLI. If you're running on Windows or macOS, consider running Azure CLI in a Docker container. For more information, see [How to run the Azure CLI in a Docker container](#).

- If you're using a local installation, sign in to the Azure CLI by using the [az login](#) command. To finish the authentication process, follow the steps displayed in your terminal. For other sign-in options, see [Sign in with the Azure CLI](#).
 - When you're prompted, install the Azure CLI extension on first use. For more information about extensions, see [Use extensions with the Azure CLI](#).
 - Run [az version](#) to find the version and dependent libraries that are installed. To upgrade to the latest version, run [az upgrade](#).
- This quickstart requires version 2.0.28 or later of the Azure CLI. If using Azure Cloud Shell, the latest version is already installed.

Create a resource group

An Azure resource group is a logical container into which Azure resources are deployed and managed.

Create a resource group with [az group create](#):

Azure CLI

```
az group create \
  --name CreatePubLBQS-rg \
  --location eastus
```

Create a virtual network

Before you deploy VMs and test your load balancer, create the supporting virtual network and subnet.

Create a virtual network using [az network vnet create](#). The virtual network and subnet contain the resources deployed later in this article.

Azure CLI

```
az network vnet create \
  --resource-group CreatePubLBQS-rg \
  --location eastus \
  --name myVNet \
  --address-prefixes 10.1.0.0/16 \
  --subnet-name myBackendSubnet \
  --subnet-prefixes 10.1.0.0/24
```

Create a public IP address

To access your web app on the Internet, you need a public IP address for the load balancer.

Use [az network public-ip create](#) to create the public IP for the load balancer frontend.

Azure CLI

```
az network public-ip create \
--resource-group CreatePubLBQS-rg \
--name myPublicIP \
--sku Standard \
--zone 1 2 3
```

To create a zonal public IP address in Zone 1 instead, use the following command:

Azure CLI

```
az network public-ip create \
--resource-group CreatePubLBQS-rg \
--name myPublicIP \
--sku Standard \
--zone 1
```

Create a load balancer

This section details how you can create and configure the following components of the load balancer:

- A frontend IP pool that receives the incoming network traffic on the load balancer
- A backend IP pool where the frontend pool sends the load balanced network traffic
- A health probe that determines health of the backend VM instances
- A load balancer rule that defines how traffic is distributed to the VMs

Create the load balancer resource

Create a public load balancer with [az network lb create](#):

Azure CLI

```
az network lb create \
--resource-group CreatePubLBQS-rg \
--name myLoadBalancer \
--sku Standard \
--public-ip-address myPublicIP \
--frontend-ip-name myFrontEnd \
--backend-pool-name myBackEndPool
```

Create the health probe

A health probe checks all virtual machine instances to ensure they can send network traffic.

A virtual machine with a failed probe check is removed from the load balancer. The virtual machine is added back into the load balancer when the failure is resolved.

Create a health probe with [az network lb probe create](#):

Azure CLI

```
az network lb probe create \
--resource-group CreatePubLBQS-rg \
--lb-name myLoadBalancer \
--name myHealthProbe \
--protocol tcp \
--port 80
```

Create the load balancer rule

A load balancer rule defines:

- Frontend IP configuration for the incoming traffic
- The backend IP pool to receive the traffic
- The required source and destination port

Create a load balancer rule with [az network lb rule create](#):

Azure CLI

```
az network lb rule create \
--resource-group CreatePubLBQS-rg \
--lb-name myLoadBalancer \
--name myHTTPRule \
--protocol tcp \
```

```
--frontend-port 80 \
--backend-port 80 \
--frontend-ip-name myFrontEnd \
--backend-pool-name myBackEndPool \
--probe-name myHealthProbe \
--disable-outbound-snat true \
--idle-timeout 15 \
--enable-tcp-reset true
```

Create a network security group

For a standard load balancer, the VMs in the backend pool are required to have network interfaces that belong to a network security group.

Use [az network nsg create](#) to create the network security group:

Azure CLI

```
az network nsg create \
--resource-group CreatePubLBQS-rg \
--name myNSG
```

Create a network security group rule

Create a network security group rule using [az network nsg rule create](#):

Azure CLI

```
az network nsg rule create \
--resource-group CreatePubLBQS-rg \
--nsg-name myNSG \
--name myNSGRuleHTTP \
--protocol '*' \
--direction inbound \
--source-address-prefix '*' \
--source-port-range '*' \
--destination-address-prefix '*' \
--destination-port-range 80 \
--access allow \
--priority 200
```

Create a bastion host

In this section, you create the resources for Azure Bastion. Azure Bastion is used to securely manage the virtual machines in the backend pool of the load balancer.

Important

Hourly pricing starts from the moment Bastion is deployed, regardless of outbound data usage. For more information, see [Pricing](#) and [SKUs](#). If you're deploying Bastion as part of a tutorial or test, we recommend that you delete this resource once you've finished using it.

Create a public IP address

Use [az network public-ip create](#) to create a public ip address for the bastion host. The public IP is used by the bastion host for secure access to the virtual machine resources.

Azure CLI

```
az network public-ip create \
--resource-group CreatePubLBQS-rg \
--name myBastionIP \
--sku Standard \
--zone 1 2 3
```

Create a bastion subnet

Use [az network vnet subnet create](#) to create a bastion subnet. The bastion subnet is used by the bastion host to access the virtual network.

Azure CLI

```
az network vnet subnet create \
--resource-group CreatePubLBQS-rg \
--name AzureBastionSubnet \
--vnet-name myVNet \
--address-prefixes 10.1.1.0/27
```

Create bastion host

Use [az network bastion create](#) to create a bastion host. The bastion host is used to connect securely to the virtual machine resources created later in this article.

Azure CLI

```
az network bastion create \
--resource-group CreatePubLBQS-rg \
--name myBastionHost \
```

```
--public-ip-address myBastionIP \
--vnet-name myVNet \
--location eastus
```

It can take a few minutes for the Azure Bastion host to deploy.

Create backend servers

In this section, you create:

- Two network interfaces for the virtual machines
- Two virtual machines to be used as backend servers for the load balancer

Create network interfaces for the virtual machines

Create two network interfaces with [az network nic create](#):

Azure CLI

```
array=(myNicVM1 myNicVM2)
for vmnic in "${array[@]}"
do
    az network nic create \
        --resource-group CreatePubLBQS-rg \
        --name $vmnic \
        --vnet-name myVNet \
        --subnet myBackEndSubnet \
        --network-security-group myNSG
done
```

Create virtual machines

Create the virtual machines with [az vm create](#):

Azure CLI

```
az vm create \
    --resource-group CreatePubLBQS-rg \
    --name myVM1 \
    --nics myNicVM1 \
    --image win2019datacenter \
    --admin-username azureuser \
    --zone 1 \
    --no-wait
```

```
az vm create \
    --resource-group CreatePubLBQS-rg \
    --name myVM2 \
    --nics myNicVM2 \
    --image win2019datacenter \
    --admin-username azureuser \
    --zone 2 \
    --no-wait
```

It may take a few minutes for the VMs to deploy. You can continue to the next steps while the VMs are creating.

ⓘ Note

Azure provides a default outbound access IP for VMs that either aren't assigned a public IP address or are in the back-end pool of an internal basic Azure load balancer. The default outbound access IP mechanism provides an outbound IP address that isn't configurable.

The default outbound access IP is disabled when one of the following events happens:

- A public IP address is assigned to the VM.
- The VM is placed in the back-end pool of a standard load balancer, with or without outbound rules.
- An **Azure Virtual Network NAT gateway** resource is assigned to the subnet of the VM.

VMs that you create by using virtual machine scale sets in flexible orchestration mode don't have default outbound access.

For more information about outbound connections in Azure, see **Default outbound access in Azure** and **Use Source Network Address Translation (SNAT) for outbound connections**.

Add virtual machines to load balancer backend pool

Add the virtual machines to the backend pool with [az network nic ip-config address-pool add](#):

```
array=(myNicVM1 myNicVM2)
for vmnic in "${array[@]}"
do
    az network nic ip-config address-pool add \
        --address-pool myBackendPool \
        --ip-config-name ipconfig1 \
        --nic-name $vmnic \
        --resource-group CreatePubLBQS-rg \
        --lb-name myLoadBalancer
done
```

Create NAT gateway

To provide outbound internet access for resources in the backend pool, create a NAT gateway.

Create public IP

Use [az network public-ip create](#) to create a single IP for the outbound connectivity.

Azure CLI

```
az network public-ip create \
--resource-group CreatePubLBQS-rg \
--name myNATgatewayIP \
--sku Standard \
--zone 1 2 3
```

To create a zonal redundant public IP address in Zone 1 instead, use the following command:

Azure CLI

```
az network public-ip create \
--resource-group CreatePubLBQS-rg \
--name myNATgatewayIP \
--sku Standard \
--zone 1
```

Create NAT gateway resource

Use [az network nat gateway create](#) to create the NAT gateway resource. The public IP created in the previous step is associated with the NAT gateway.

Azure CLI

```
az network nat gateway create \
--resource-group CreatePubLBQS-rg \
--name myNATgateway \
--public-ip-addresses myNATgatewayIP \
--idle-timeout 10
```

Associate NAT gateway with subnet

Configure the source subnet in virtual network to use a specific NAT gateway resource with [az network vnet subnet update](#).

Azure CLI

```
az network vnet subnet update \
--resource-group CreatePubLBQS-rg \
--vnet-name myVNet \
--name myBackendSubnet \
--nat-gateway myNATgateway
```

Install IIS

Use [az vm extension set](#) to install IIS on the virtual machines and set the default website to the computer name.

Azure CLI

```
array=(myVM1 myVM2)
for vm in "${array[@]}"
do
    az vm extension set \
        --publisher Microsoft.Compute \
        --version 1.8 \
        --name CustomScriptExtension \
        --vm-name $vm \
        --resource-group CreatePubLBQS-rg \
        --settings '{"commandToExecute":"powershell Add-WindowsFeature Web-Server; powershell Add-Content -Path \"C:\\inetpub\\wwwroot\\Default.htm\" -Value $($env:computername)"}'
done
```

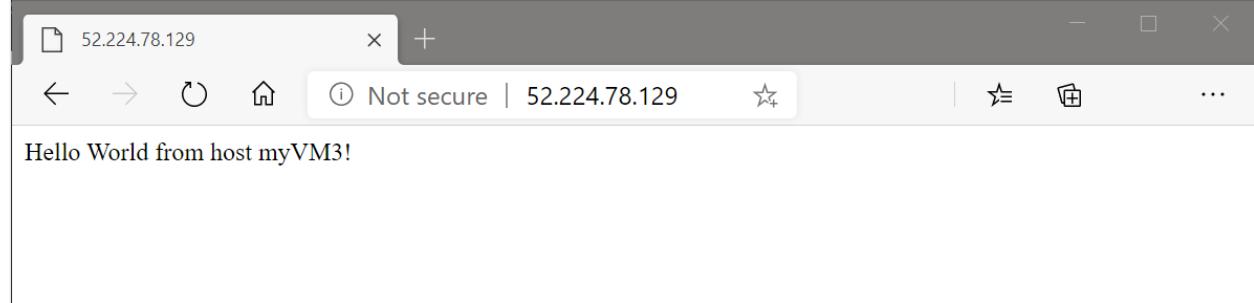
Test the load balancer

To get the public IP address of the load balancer, use [az network public-ip show](#).

Copy the public IP address, and then paste it into the address bar of your browser.

```
Azure CLI

az network public-ip show \
--resource-group CreatePubLBQS-rg \
--name myPublicIP \
--query ipAddress \
--output tsv
```



Clean up resources

When no longer needed, use the [az group delete](#) command to remove the resource group, load balancer, and all related resources.

```
Azure CLI

az group delete \
--name CreatePubLBQS-rg
```

Next steps

In this quickstart:

- You created a standard public load balancer
- Attached two virtual machines
- Configured the load balancer traffic rule and health probe
- Tested the load balancer

To learn more about Azure Load Balancer, continue to:

[What is Azure Load Balancer?](#)

Quickstart: Create and publish an Azure Managed Application definition

Article • 10/12/2023

This quickstart provides an introduction to working with [Azure Managed Applications](#). You create and publish a managed application definition that's stored in your service catalog and is intended for members of your organization.

To publish a managed application to your service catalog, do the following tasks:

- Create an Azure Resource Manager template (ARM template) that defines the resources to deploy with the managed application.
- Define the user interface elements for the portal when deploying the managed application.
- Create a *.zip* package that contains the required JSON files. The *.zip* package file has a 120-MB limit for a service catalog's managed application definition.
- Publish the managed application definition so it's available in your service catalog.

If your managed application definition is more than 120 MB or if you want to use your own storage account for your organization's compliance reasons, go to [Quickstart: Bring your own storage to create and publish an Azure Managed Application definition](#).

You can use Bicep to develop a managed application definition but it must be converted to ARM template JSON before you can publish the definition in Azure. For more information, go to [Quickstart: Use Bicep to create and publish an Azure Managed Application definition](#).

You can also use Bicep to deploy a managed application definition from your service catalog. For more information, go to [Quickstart: Use Bicep to deploy an Azure Managed Application definition](#).

Prerequisites

To complete this quickstart, you need the following items:

- An Azure account with an active subscription and permissions to Microsoft Entra resources like users, groups, or service principals. If you don't have an account, [create a free account](#) before you begin.
- [Visual Studio Code](#) with the latest [Azure Resource Manager Tools extension](#). For Bicep files, install the [Bicep extension for Visual Studio Code](#).
- Install the latest version of [Azure PowerShell](#) or [Azure CLI](#).

Create the ARM template

Every managed application definition includes a file named *mainTemplate.json*. The template defines the Azure resources to deploy and is no different than a regular ARM template.

Open Visual Studio Code, create a file with the case-sensitive name *mainTemplate.json* and save it.

Add the following JSON and save the file. It defines the resources to deploy an App Service, App Service plan, and storage account for the application. This storage account isn't used to store the managed application definition.

JSON

```
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
  "contentVersion": "1.0.0.0",
  "parameters": {
    "location": {
      "type": "string",
      "defaultValue": "[resourceGroup().location]"
    },
    "appServicePlanName": {
      "type": "string",
      "maxLength": 40,
      "metadata": {
        "description": "App Service plan name."
      }
    },
    "appServiceNamePrefix": {
      "type": "string",
      "maxLength": 47,
      "metadata": {
        "description": "App Service name prefix."
      }
    },
    "storageAccountNamePrefix": {
      "type": "string",
      "maxLength": 11,
      "metadata": {
        "description": "Storage account name prefix."
      }
    },
    "storageAccountType": {
      "type": "string",
      "allowedValues": [
        "Premium_LRS",
        "Standard_LRS",
        "Standard_GRS"
      ]
    }
}
```

```

],
"metadata": {
    "description": "Storage account type allowed values"
}
},
"variables": {
    "appServicePlanSku": "F1",
    "appServicePlanCapacity": 1,
    "appServiceName": "[format('{0}{1}', parameters('appServiceNamePrefix'), uniqueString(resourceGroup().id))]",
    "storageAccountName": "[format('{0}{1}', parameters('storageAccountNamePrefix'), uniqueString(resourceGroup().id))]"
},
"resources": [
{
    "type": "Microsoft.Web/serverfarms",
    "apiVersion": "2022-03-01",
    "name": "[parameters('appServicePlanName')]",
    "location": "[parameters('location')]",
    "sku": {
        "name": "[variables('appServicePlanSku')]",
        "capacity": "[variables('appServicePlanCapacity')]"
    }
},
{
    "type": "Microsoft.Web/sites",
    "apiVersion": "2022-03-01",
    "name": "[variables('appServiceName')]",
    "location": "[parameters('location')]",
    "properties": {
        "serverFarmId": "[resourceId('Microsoft.Web/serverfarms', parameters('appServicePlanName'))]",
        "httpsOnly": true,
        "siteConfig": {
            "appSettings": [
                {
                    "name": "AppServiceStorageConnectionString",
                    "value": "[format('DefaultEndpointsProtocol=https;AccountName={0};EndpointSuffix={1};Key={2}', variables('storageAccountName'), environment().suffixes.storage, listKeys(resourceId('Microsoft.Storage/storageAccounts', variables('storageAccountName')), '2022-09-01').keys[0].value)]"
                }
            ]
        }
    },
    "dependsOn": [
        "[resourceId('Microsoft.Web/serverfarms', parameters('appServicePlanName'))]",
        "[resourceId('Microsoft.Storage/storageAccounts', variables('storageAccountName'))]"
    ]
},
{

```

```
        "type": "Microsoft.Storage/storageAccounts",
        "apiVersion": "2022-09-01",
        "name": "[variables('storageAccountName')]",
        "location": "[parameters('location')]",
        "sku": {
            "name": "[parameters('storageAccountType')]"
        },
        "kind": "StorageV2",
        "properties": {
            "accessTier": "Hot"
        }
    },
],
"outputs": {
    "appServicePlan": {
        "type": "string",
        "value": "[parameters('appServicePlanName')]"
    },
    "appServiceApp": {
        "type": "string",
        "value": "[reference(resourceId('Microsoft.Web/sites',
variables('appServiceName')), '2022-03-01').defaultHostName]"
    },
    "storageAccount": {
        "type": "string",
        "value": "[reference(resourceId('Microsoft.Storage/storageAccounts',
variables('storageAccountName')), '2022-09-01').primaryEndpoints.blob]"
    }
}
}
```

Define your portal experience

As a publisher, you define the portal experience to create the managed application. The *createUiDefinition.json* file generates the portal's user interface. You define how users provide input for each parameter using [control elements](#) like drop-downs and text boxes.

In this example, the user interface prompts you to input the App Service name prefix, App Service plan's name, storage account prefix, and storage account type. During deployment, the variables in *mainTemplate.json* use the `uniqueString` function to append a 13-character string to the name prefixes so the names are globally unique across Azure.

Open Visual Studio Code, create a file with the case-sensitive name *createUiDefinition.json* and save it.

Add the following JSON code to the file and save it.

JSON

```
{
    "$schema": "https://schema.management.azure.com/schemas/0.1.2-preview/CreateUIDefinition.MultiVm.json#",
    "handler": "Microsoft.Azure.CreateUIDef",
    "version": "0.1.2-preview",
    "parameters": {
        "basics": [
            {}
        ],
        "steps": [
            {
                "name": "webAppSettings",
                "label": "Web App settings",
                "subLabel": {
                    "preValidation": "Configure the web app settings",
                    "postValidation": "Completed"
                },
                "elements": [
                    {
                        "name": "appServicePlanName",
                        "type": "Microsoft.Common.TextBox",
                        "label": "App Service plan name",
                        "placeholder": "App Service plan name",
                        "defaultValue": "",
                        "toolTip": "Use alphanumeric characters or hyphens with a maximum of 40 characters.",
                        "constraints": {
                            "required": true,
                            "regex": "^[a-zA-Z0-9-]{1,40}$",
                            "validationMessage": "Only alphanumeric characters or hyphens are allowed, with a maximum of 40 characters."
                        },
                        "visible": true
                    },
                    {
                        "name": "appServiceName",
                        "type": "Microsoft.Common.TextBox",
                        "label": "App Service name prefix",
                        "placeholder": "App Service name prefix",
                        "defaultValue": "",
                        "toolTip": "Use alphanumeric characters or hyphens with minimum of 2 characters and maximum of 47 characters.",
                        "constraints": {
                            "required": true,
                            "regex": "^[a-zA-Z0-9-]{2,47}$",
                            "validationMessage": "Only alphanumeric characters or hyphens are allowed, with a minimum of 2 characters and maximum of 47 characters."
                        },
                        "visible": true
                    }
                ]
            },
        ]
    },
}
```

```

{
  "name": "storageConfig",
  "label": "Storage settings",
  "subLabel": {
    "preValidation": "Configure the storage settings",
    "postValidation": "Completed"
  },
  "elements": [
    {
      "name": "storageAccounts",
      "type": "Microsoft.Storage.MultiStorageAccountCombo",
      "label": {
        "prefix": "Storage account name prefix",
        "type": "Storage account type"
      },
      "toolTip": {
        "prefix": "Enter maximum of 11 lowercase letters or numbers.",
        "type": "Available choices are Standard_LRS, Standard_GRS, and Premium_LRS."
      },
      "defaultValue": {
        "type": "Standard_LRS"
      },
      "constraints": {
        "allowedTypes": [
          "Premium_LRS",
          "Standard_LRS",
          "Standard_GRS"
        ]
      },
      "visible": true
    }
  ]
},
"outputs": {
  "location": "[location()]",
  "appServicePlanName": "[steps('webAppSettings').appServicePlanName]",
  "appServiceNamePrefix": "[steps('webAppSettings').appServiceName]",
  "storageAccountNamePrefix": "[steps('storageConfig').storageAccounts.prefix]",
  "storageAccountType": "[steps('storageConfig').storageAccounts.type]"
}
}
}

```

To learn more, see [Get started with CreateUiDefinition](#).

Package the files

Add the two files to a package file named *app.zip*. The two files must be at the root level of the *.zip* file. If the files are in a folder, when you create the managed application definition, you receive an error that states the required files aren't present.

Upload *app.zip* to an Azure storage account so you can use it when you deploy the managed application's definition. The storage account name must be globally unique across Azure and the length must be 3-24 characters with only lowercase letters and numbers. In the command, replace the placeholder <demostorageaccount> including the angle brackets (<>), with your unique storage account name.

PowerShell

In Visual Studio Code, open a new PowerShell terminal and sign in to your Azure subscription.

Azure PowerShell

Connect-AzAccount

The command opens your default browser and prompts you to sign in to Azure. For more information, go to [Sign in with Azure PowerShell](#).

Azure PowerShell

```
New-AzResourceGroup -Name packageStorageGroup -Location westus3

$storageAccount = New-AzStorageAccount ` 
    -ResourceGroupName packageStorageGroup ` 
    -Name "<demostorageaccount>" ` 
    -Location westus3 ` 
    -SkuName Standard_LRS ` 
    -Kind StorageV2

$cxt = $storageAccount.Context

New-AzStorageContainer -Name appcontainer -Context $cxt -Permission blob

Set-AzStorageBlobContent ` 
    -File "app.zip" ` 
    -Container appcontainer ` 
    -Blob "app.zip" ` 
    -Context $cxt
```

Create the managed application definition

In this section, you get identity information from Microsoft Entra ID, create a resource group, and deploy the managed application definition.

Get group ID and role definition ID

The next step is to select a user, security group, or application for managing the resources for the customer. This identity has permissions on the managed resource group according to the assigned role. The role can be any Azure built-in role like Owner or Contributor.

PowerShell

This example uses a security group, and your Microsoft Entra account should be a member of the group. To get the group's object ID, replace the placeholder `<managedAppDemo>` including the angle brackets (`<>`), with your group's name. You use this variable's value when you deploy the managed application definition.

To create a new Microsoft Entra group, go to [Manage Microsoft Entra groups and group membership](#).

Azure PowerShell

```
$principalid=(Get-AzADGroup -DisplayName <managedAppDemo>).Id
```

Next, get the role definition ID of the Azure built-in role you want to grant access to the user, group, or application. You use this variable's value when you deploy the managed application definition.

Azure PowerShell

```
$roleid=(Get-AzRoleDefinition -Name Owner).Id
```

Publish the managed application definition

PowerShell

Create a resource group for your managed application definition.

Azure PowerShell

```
New-AzResourceGroup -Name appDefinitionGroup -Location westus3
```

The `blob` command creates a variable to store the URL for the package `.zip` file. That variable is used in the command that creates the managed application definition.

Azure PowerShell

```
$blob = Get-AzStorageBlob -Container appcontainer -Blob app.zip -Context  
$ctx  
  
New-AzManagedApplicationDefinition `  
    -Name "sampleManagedApplication" `  
    -Location "westus3" `  
    -ResourceGroupName appDefinitionGroup `  
    -LockLevel ReadOnly `  
    -DisplayName "Sample managed application" `  
    -Description "Sample managed application that deploys web resources" `  
    -Authorization "${principalid}:$roleid" `  
    -PackageFileUri $blob.ICloudBlob.StorageUri.PrimaryUri.AbsoluteUri
```

When the command completes, you have a managed application definition in your resource group.

Some of the parameters used in the preceding example are:

- `ResourceGroupName`: The name of the resource group where the managed application definition is created.
- `LockLevel`: The `lockLevel` on the managed resource group prevents the customer from performing undesirable operations on this resource group. Currently, `ReadOnly` is the only supported lock level. `ReadOnly` specifies that the customer can only read the resources present in the managed resource group. The publisher identities that are granted access to the managed resource group are exempt from the lock level.
- `Authorization`: Describes the principal ID and the role definition ID that are used to grant permission to the managed resource group.
 - `"${principalid}:$roleid"` or you can use curly braces for each variable `"${principalid}:${roleid}"`.
 - Use a comma to separate multiple values: `"${principalid1}:$roleid1", "${principalid2}:$roleid2"`.
- `PackageFileUri`: The location of a `.zip` package file that contains the required files.

Make sure users can see your definition

You have access to the managed application definition, but you want to make sure other users in your organization can access it. Grant them at least the Reader role on the definition. They may have inherited this level of access from the subscription or resource group. To check who has access to the definition and add users or groups, see [Assign Azure roles using the Azure portal](#).

Clean up resources

If you're going to deploy the definition, continue with the **Next steps** section that links to the article to deploy the definition.

If you're finished with the managed application definition, you can delete the resource groups you created named *packageStorageGroup* and *appDefinitionGroup*.

PowerShell

The command prompts you to confirm that you want to remove the resource group.

Azure PowerShell

```
Remove-AzResourceGroup -Name packageStorageGroup  
Remove-AzResourceGroup -Name appDefinitionGroup
```

Next steps

You've published the managed application definition. The next step is to learn how to deploy an instance of that definition.

[Quickstart: Deploy a service catalog managed application](#)

Azure CLI samples for Azure Monitor

Article • 06/20/2023

Prerequisites

- Use the Bash environment in [Azure Cloud Shell](#). For more information, see [Quickstart for Bash in Azure Cloud Shell](#).

 [Launch Cloud Shell](#) 

- If you prefer to run CLI reference commands locally, [install](#) the Azure CLI. If you're running on Windows or macOS, consider running Azure CLI in a Docker container. For more information, see [How to run the Azure CLI in a Docker container](#).
 - If you're using a local installation, sign in to the Azure CLI by using the `az login` command. To finish the authentication process, follow the steps displayed in your terminal. For other sign-in options, see [Sign in with the Azure CLI](#).
 - When you're prompted, install the Azure CLI extension on first use. For more information about extensions, see [Use extensions with the Azure CLI](#).
 - Run `az version` to find the version and dependent libraries that are installed. To upgrade to the latest version, run `az upgrade`.

Samples

The following table includes links to Azure CLI scripts written for a Bash environment that manage Azure Monitor.

Script	Description
Create metric alert monitors in Azure CLI	Create an alert for a virtual machine or create an alert that includes a dimension for an App Service Plan.
Managing Azure Monitor Logs in Azure CLI	Manage your log analytics workspace. Use these scripts to manage linked services, linked storage, intelligence packs, and saved searches.

Azure CLI samples for Traffic Manager

Article • 03/27/2023

The following table includes links to bash scripts for Traffic Manager built using the Azure CLI.

Title	Description
Direct traffic across multiple regions for high application availability	Creates two app service plans, two web apps, a traffic manager profile, and two traffic manager endpoints.

Azure CLI reference

Article • 04/09/2023

The following table includes links to bash scripts for the Azure SignalR Service using the Azure CLI.

Script	Descriptions
Create	
Create a new SignalR Service and resource group	Creates a new Azure SignalR Service resource in a new resource group with a random name.
Integrate	
Create a new SignalR Service and Web App configured to use SignalR	Creates a new Azure SignalR Service resource in a new resource group with a random name. Also adds a new Web App and App Service plan to host an ASP.NET Core Web App that uses the SignalR Service. The web app is configured with an App Setting to connect to the new SignalR service resource.
Create a new SignalR Service and Web App configured to use SignalR, and GitHub OAuth	Creates a new Azure SignalR Service resource in a new resource group with a random name. Also adds a new Azure Web App and hosting plan to host an ASP.NET Core Web App that uses the SignalR Service. The web app is configured with app settings for the connection string to the new SignalR service resource, and client secrets to support GitHub authentication as demonstrated in the authentication tutorial . The web app is also configured to use a local git repository deployment source.

Azure networking services overview

Article • 07/28/2023

The networking services in Azure provide various networking capabilities that can be used together or separately. Select any of the following key capabilities to learn more about them:

- **Connectivity services:** Connect Azure resources and on-premises resources using any or a combination of these networking services in Azure - Virtual Network (VNet), Virtual WAN, ExpressRoute, VPN Gateway, Virtual network NAT Gateway, Azure DNS, Peering service, Azure Virtual Network Manager, Route Server, and Azure Bastion.
- **Application protection services:** Protect your applications using any or a combination of these networking services in Azure - Load Balancer, Private Link, DDoS protection, Firewall, Network Security Groups, Web Application Firewall, and Virtual Network Endpoints.
- **Application delivery services:** Deliver applications in the Azure network using any or a combination of these networking services in Azure - Content Delivery Network (CDN), Azure Front Door Service, Traffic Manager, Application Gateway, Internet Analyzer, and Load Balancer.
- **Network monitoring:** Monitor your network resources using any or a combination of these networking services in Azure - Network Watcher, ExpressRoute Monitor, Azure Monitor, or VNet Terminal Access Point (TAP).

Connectivity services

This section describes services that provide connectivity between Azure resources, connectivity from an on-premises network to Azure resources, and branch to branch connectivity in Azure - Virtual Network (VNet), ExpressRoute, VPN Gateway, Virtual WAN, Virtual network NAT Gateway, Azure DNS, Peering service, Route Server, and Azure Bastion.

Virtual network

[Azure Virtual Network \(VNet\)](#) is the fundamental building block for your private network in Azure. You can use VNets to:

- **Communicate between Azure resources:** You can deploy virtual machines, and several other types of Azure resources to a virtual network, such as Azure App Service Environments, the Azure Kubernetes Service (AKS), and Azure Virtual

Machine Scale Sets. To view a complete list of Azure resources that you can deploy into a virtual network, see [Virtual network service integration](#).

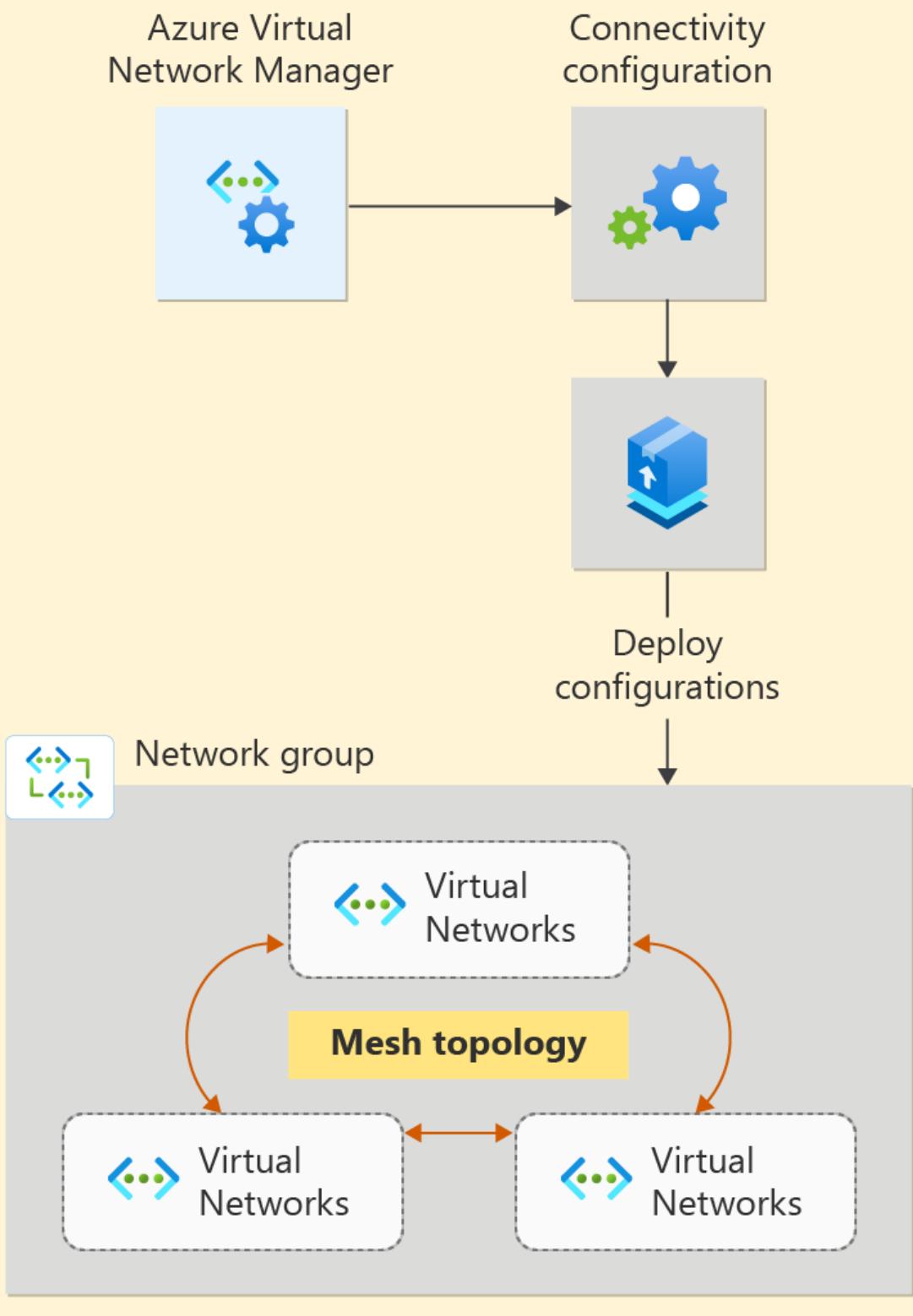
- **Communicate between each other:** You can connect virtual networks to each other, enabling resources in either virtual network to communicate with each other, using virtual network peering or Azure Virtual Network Manager. The virtual networks you connect can be in the same, or different, Azure regions. For more information, see [Virtual network peering](#) and [Azure Virtual Network Manager](#).
- **Communicate to the internet:** All resources in a VNet can communicate outbound to the internet, by default. You can communicate inbound to a resource by assigning a public IP address or a public Load Balancer. You can also use [Public IP addresses](#) or public [Load Balancer](#) to manage your outbound connections.
- **Communicate with on-premises networks:** You can connect your on-premises computers and networks to a virtual network using [VPN Gateway](#) or [ExpressRoute](#).

Azure Virtual Network Manager

[Azure Virtual Network Manager](#) is a management service that enables you to group, configure, deploy, and manage virtual networks globally across subscriptions. With Virtual Network Manager, you can define [network groups](#) to identify and logically segment your virtual networks. Then you can determine the [connectivity](#) and [security configurations](#) you want and apply them across all the selected virtual networks in network groups at once.



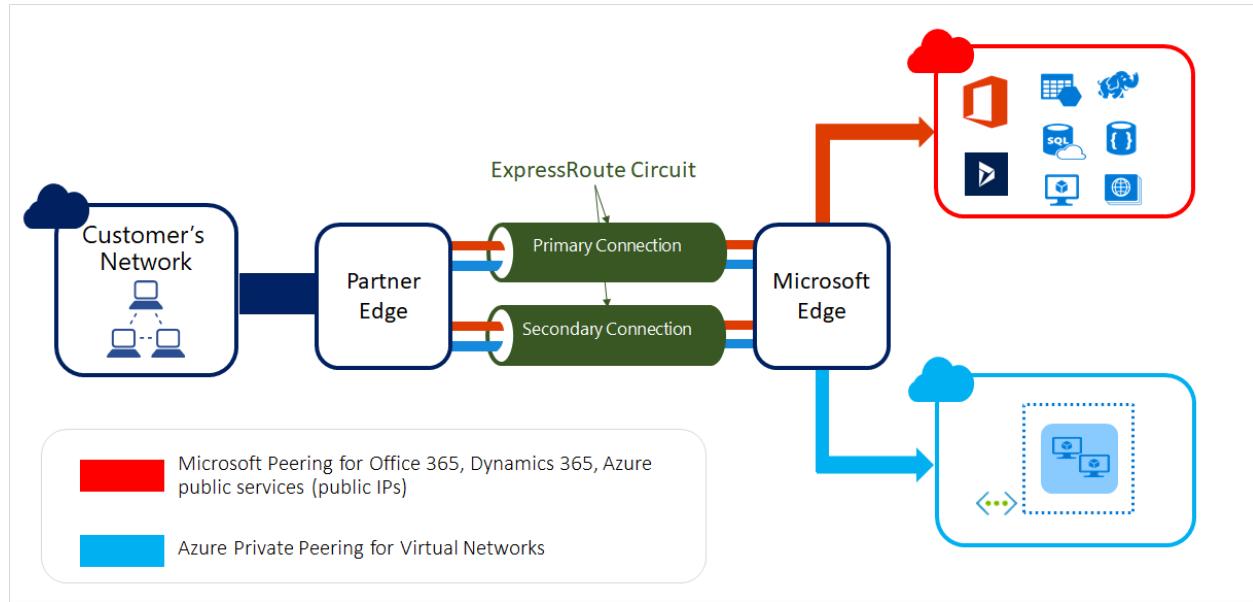
Subscription-level Scope



ExpressRoute

[ExpressRoute](#) enables you to extend your on-premises networks into the Microsoft cloud over a private connection facilitated by a connectivity provider. This connection is private. Traffic doesn't go over the internet. With ExpressRoute, you can establish

connections to Microsoft cloud services, such as Microsoft Azure, Microsoft 365, and Dynamics 365.

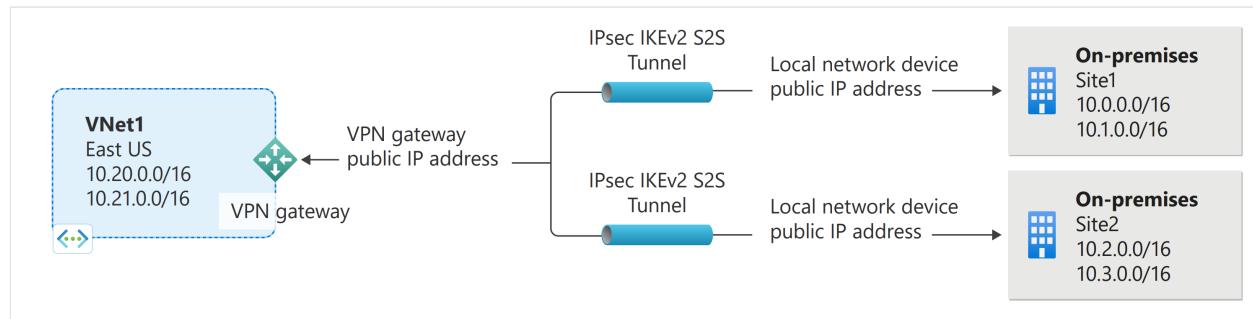


VPN Gateway

[VPN Gateway](#) helps you create encrypted cross-premises connections to your virtual network from on-premises locations, or create encrypted connections between VNets. There are different configurations available for VPN Gateway connections. Some of the main features include:

- Site-to-site VPN connectivity
- Point-to-site VPN connectivity
- VNet-to-VNet VPN connectivity

The following diagram illustrates multiple site-to-site VPN connections to the same virtual network. To view more connection diagrams, see [VPN Gateway - design](#).

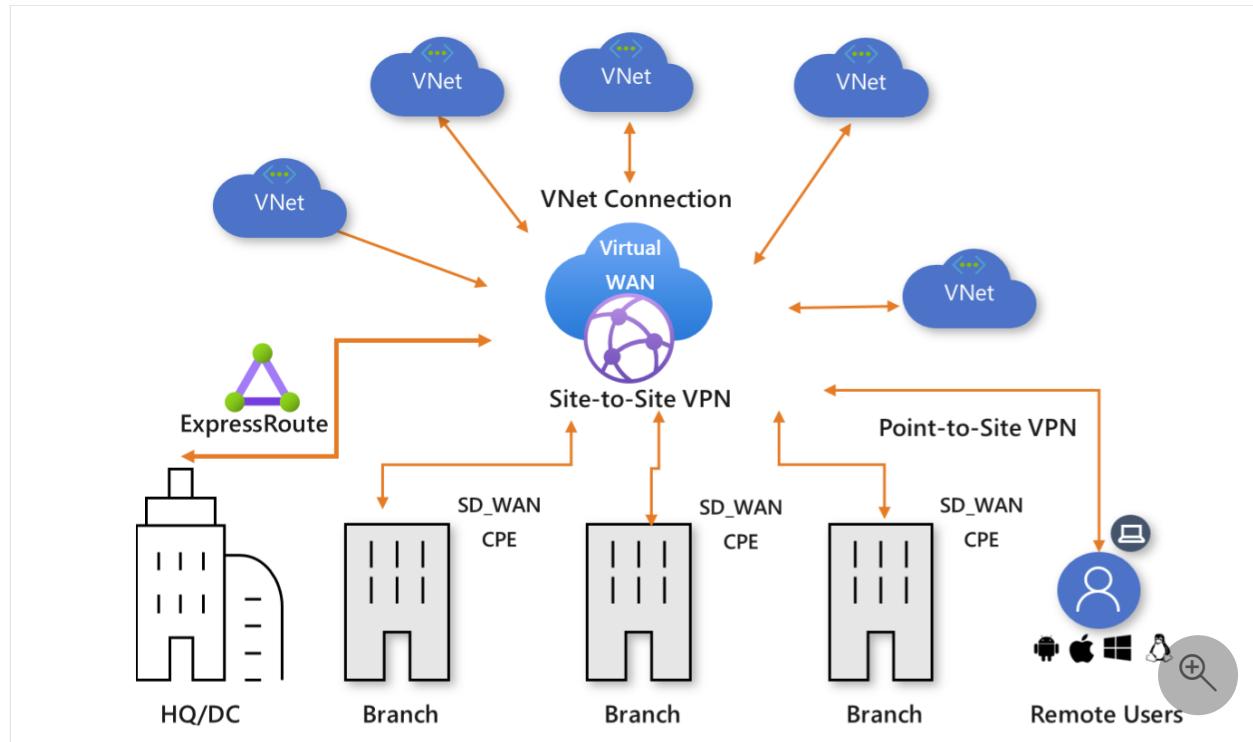


Virtual WAN

[Azure Virtual WAN](#) is a networking service that brings many networking, security, and routing functionalities together to provide a single operational interface. Connectivity to

Azure VNets is established by using virtual network connections. Some of the main features include:

- Branch connectivity (via connectivity automation from Virtual WAN Partner devices such as SD-WAN or VPN CPE)
- Site-to-site VPN connectivity
- Remote user VPN connectivity (point-to-site)
- Private connectivity (ExpressRoute)
- Intra-cloud connectivity (transitive connectivity for virtual networks)
- VPN ExpressRoute inter-connectivity
- Routing, Azure Firewall, and encryption for private connectivity



Azure DNS

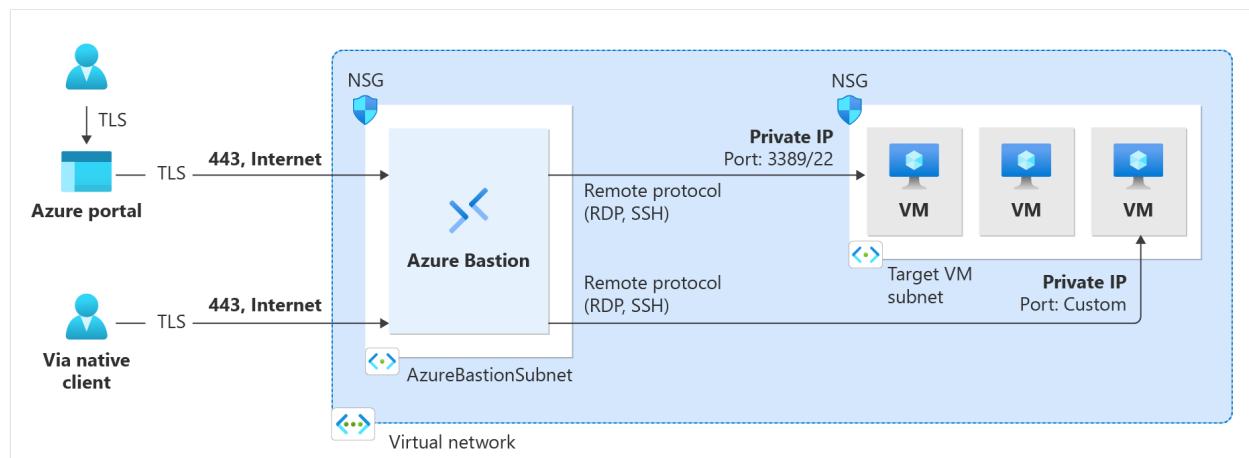
Azure DNS provides DNS hosting and resolution using the Microsoft Azure infrastructure. Azure DNS consists of three services:

- **Azure Public DNS** is a hosting service for DNS domains. By hosting your domains in Azure, you can manage your DNS records by using the same credentials, APIs, tools, and billing as your other Azure services.
- **Azure Private DNS** is a DNS service for your virtual networks. Azure Private DNS manages and resolves domain names in the virtual network without the need to configure a custom DNS solution.
- **Azure DNS Private Resolver** is a service that enables you to query Azure DNS private zones from an on-premises environment and vice versa without deploying VM based DNS servers.

Using Azure DNS, you can host and resolve public domains, manage DNS resolution in your virtual networks, and enable name resolution between Azure and your on-premises resources.

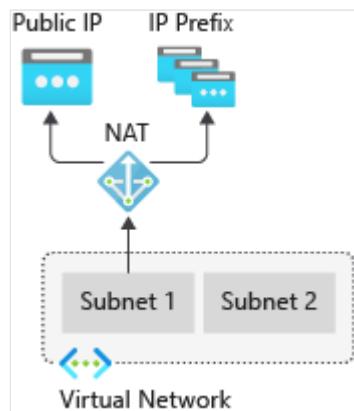
Azure Bastion

[Azure Bastion](#) is a service that you can deploy to let you connect to a virtual machine using your browser and the Azure portal, or via the native SSH or RDP client already installed on your local computer. The Azure Bastion service is a fully platform-managed PaaS service that you deploy inside your virtual network. It provides secure and seamless RDP/SSH connectivity to your virtual machines directly from the Azure portal over TLS. When you connect via Azure Bastion, your virtual machines don't need a public IP address, agent, or special client software.



Virtual network NAT Gateway

Virtual Network NAT(network address translation) simplifies outbound-only Internet connectivity for virtual networks. When configured on a subnet, all outbound connectivity uses your specified static public IP addresses. Outbound connectivity is possible without load balancer or public IP addresses directly attached to virtual machines. For more information, see [What is virtual network NAT gateway?](#)



Route Server

Azure Route Server simplifies dynamic routing between your network virtual appliance (NVA) and your virtual network. It allows you to exchange routing information directly through Border Gateway Protocol (BGP) routing protocol between any NVA that supports the BGP routing protocol and the Azure Software Defined Network (SDN) in the Azure Virtual Network (VNet) without the need to manually configure or maintain route tables.

Peering Service

Azure Peering Service enhances customer connectivity to Microsoft cloud services such as Microsoft 365, Dynamics 365, software as a service (SaaS) services, Azure, or any Microsoft services accessible via the public internet.

Application protection services

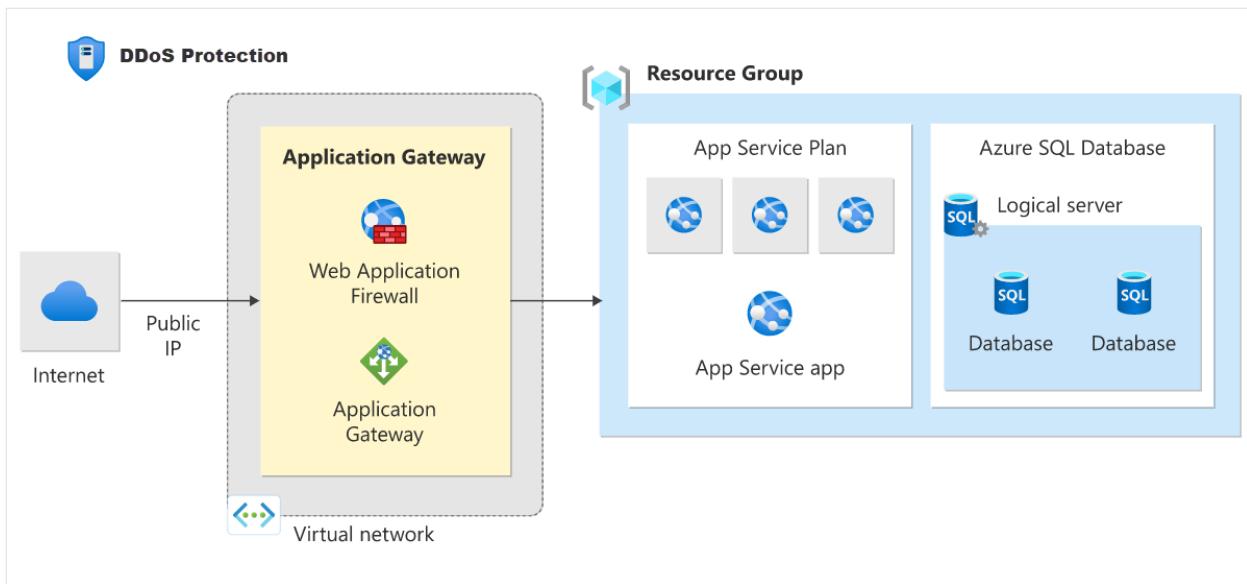
This section describes networking services in Azure that help protect your network resources - Protect your applications using any or a combination of these networking services in Azure - DDoS protection, Private Link, Firewall, Web Application Firewall, Network Security Groups, and Virtual Network Service Endpoints.

DDoS Protection

Azure DDoS Protection provides countermeasures against the most sophisticated DDoS threats. The service provides enhanced DDoS mitigation capabilities for your application and resources deployed in your virtual networks. Additionally, customers using Azure DDoS Protection have access to DDoS Rapid Response support to engage DDoS experts during an active attack.

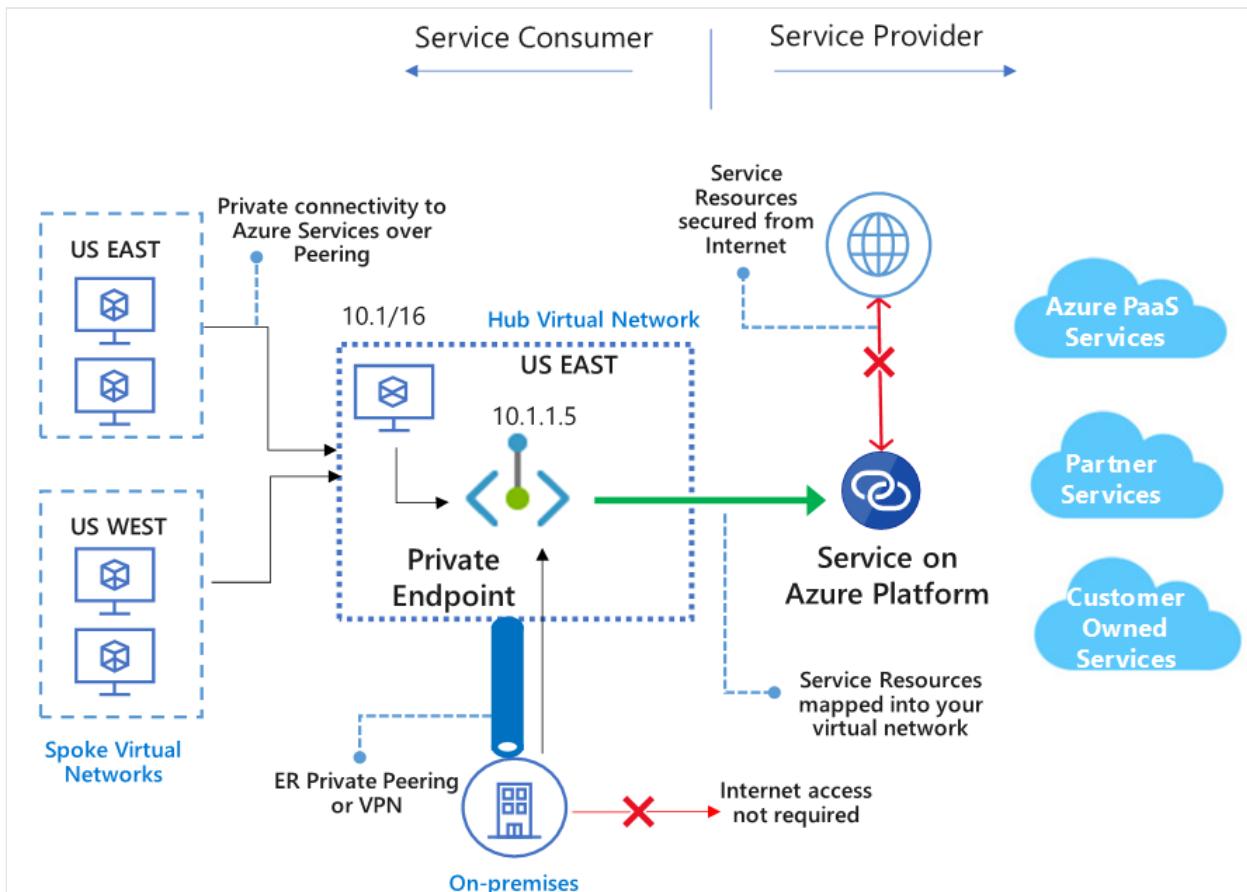
Azure DDoS Protection consists of two tiers:

- [DDoS Network Protection](#), combined with application design best practices, provides enhanced DDoS mitigation features to defend against DDoS attacks. It's automatically tuned to help protect your specific Azure resources in a virtual network.
- [DDoS IP Protection](#) is a pay-per-protected IP model. DDoS IP Protection contains the same core engineering features as DDoS Network Protection, but will differ in the following value-added services: DDoS rapid response support, cost protection, and discounts on WAF.



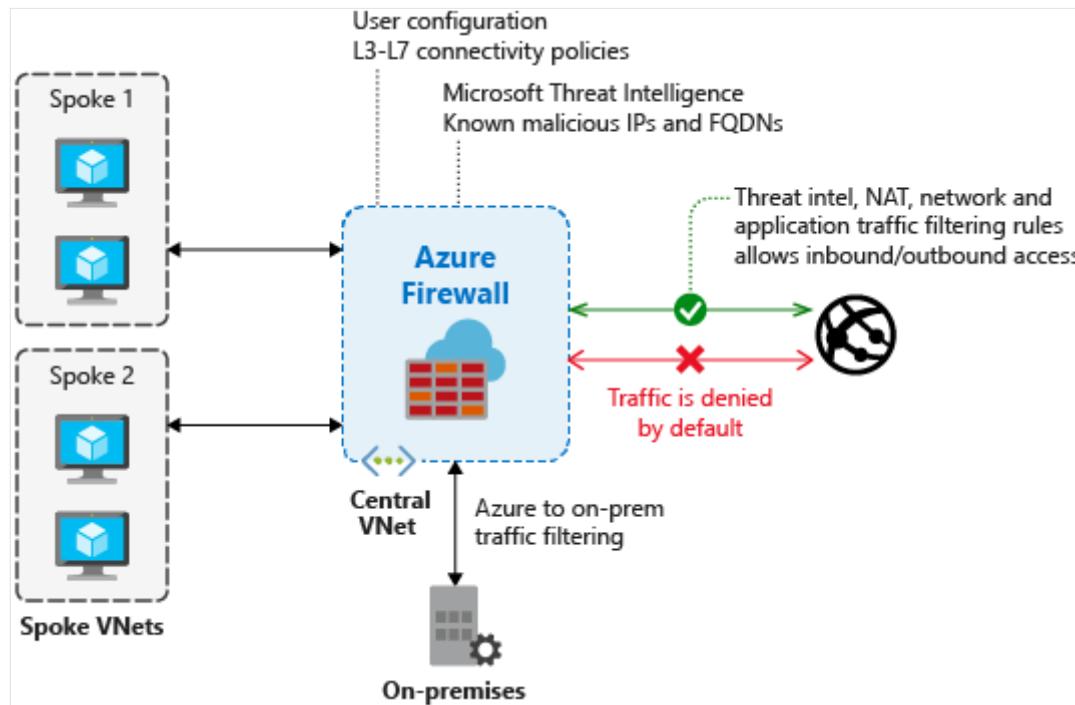
Azure Private Link

Azure Private Link enables you to access Azure PaaS Services (for example, Azure Storage and SQL Database) and Azure hosted customer-owned/partner services over a private endpoint in your virtual network. Traffic between your virtual network and the service travels through the Microsoft backbone network. Exposing your service to the public internet is no longer necessary. You can create your own private link service in your virtual network and deliver it to your customers.



Azure Firewall

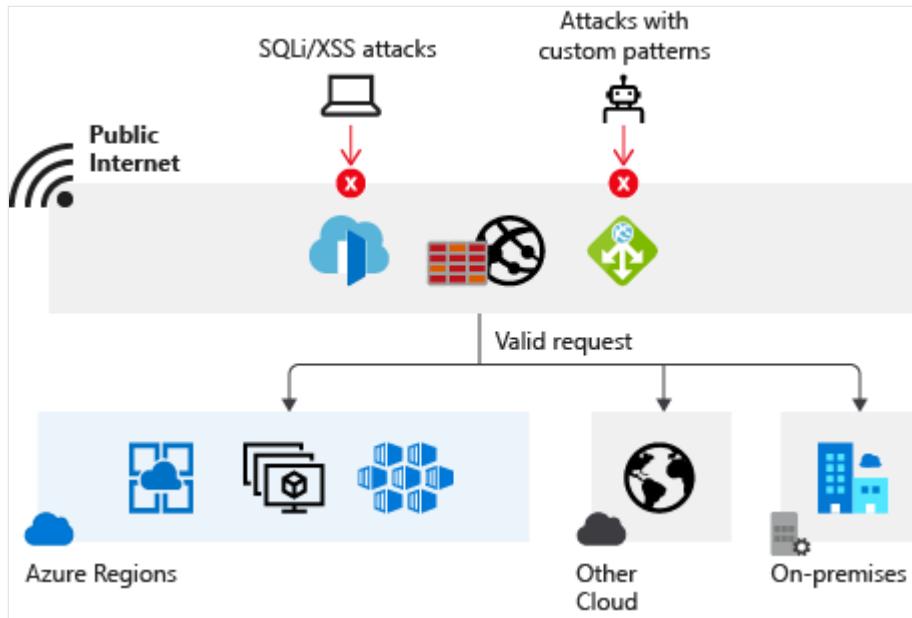
Azure Firewall is a managed, cloud-based network security service that protects your Azure Virtual Network resources. Using Azure Firewall, you can centrally create, enforce, and log application and network connectivity policies across subscriptions and virtual networks. Azure Firewall uses a static public IP address for your virtual network resources allowing outside firewalls to identify traffic originating from your virtual network.



Web Application Firewall

Azure Web Application Firewall (WAF) provides protection to your web applications from common web exploits and vulnerabilities such as SQL injection, and cross site scripting. Azure WAF provides out of box protection from OWASP top 10 vulnerabilities via managed rules. Additionally customers can also configure custom rules, which are customer managed rules to provide extra protection based on source IP range, and request attributes such as headers, cookies, form data fields or query string parameters.

Customers can choose to deploy [Azure WAF with Application Gateway](#), which provides regional protection to entities in public and private address space. Customers can also choose to deploy [Azure WAF with Front Door](#) which provides protection at the network edge to public endpoints.

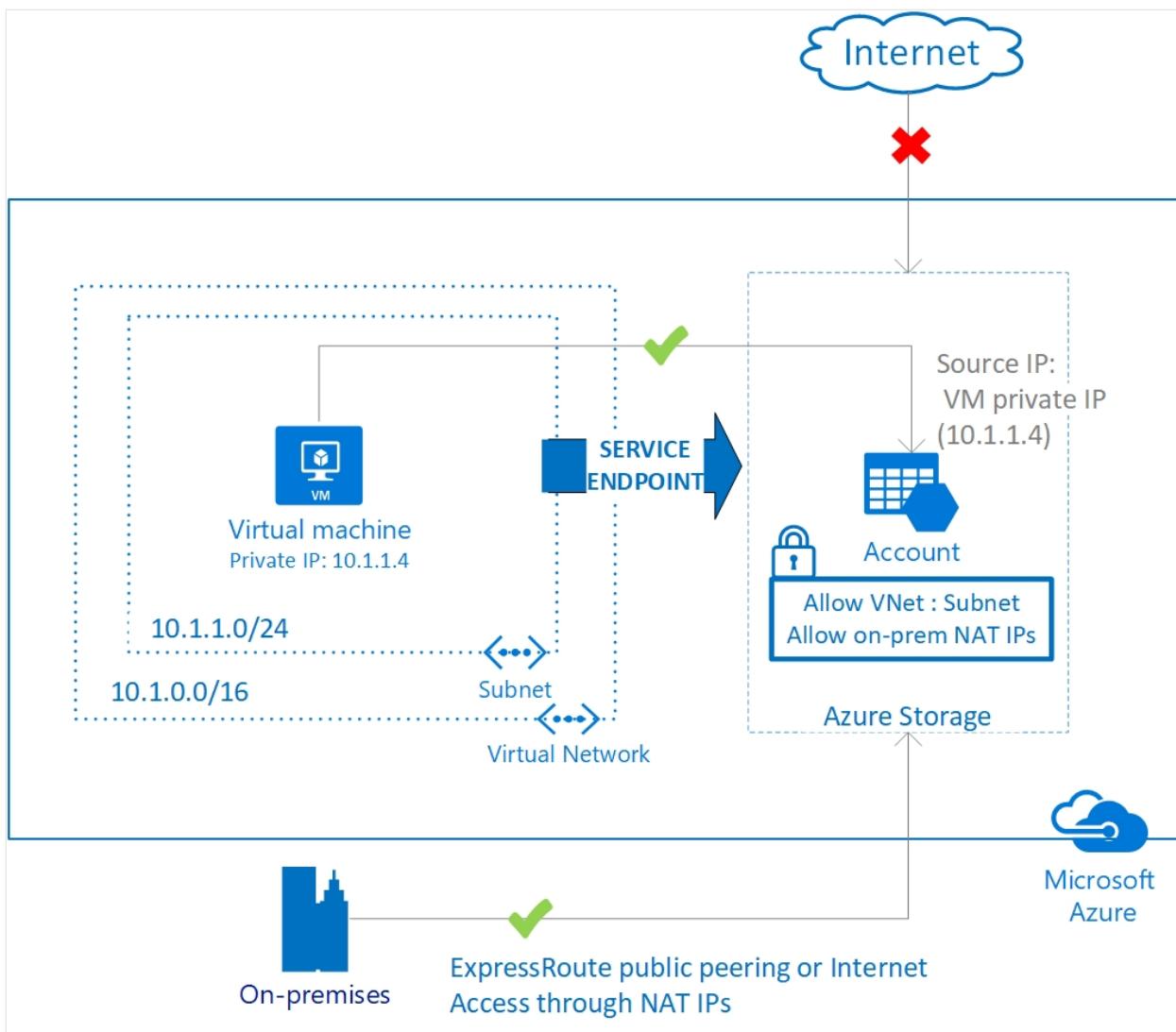


Network security groups

You can filter network traffic to and from Azure resources in an Azure virtual network with a network security group. For more information, see [Network security groups](#).

Service endpoints

[Virtual Network \(VNet\) service endpoints](#) extend your virtual network private address space and the identity of your VNet to the Azure services, over a direct connection. Endpoints allow you to secure your critical Azure service resources to only your virtual networks. Traffic from your VNet to the Azure service always remains on the Microsoft Azure backbone network.

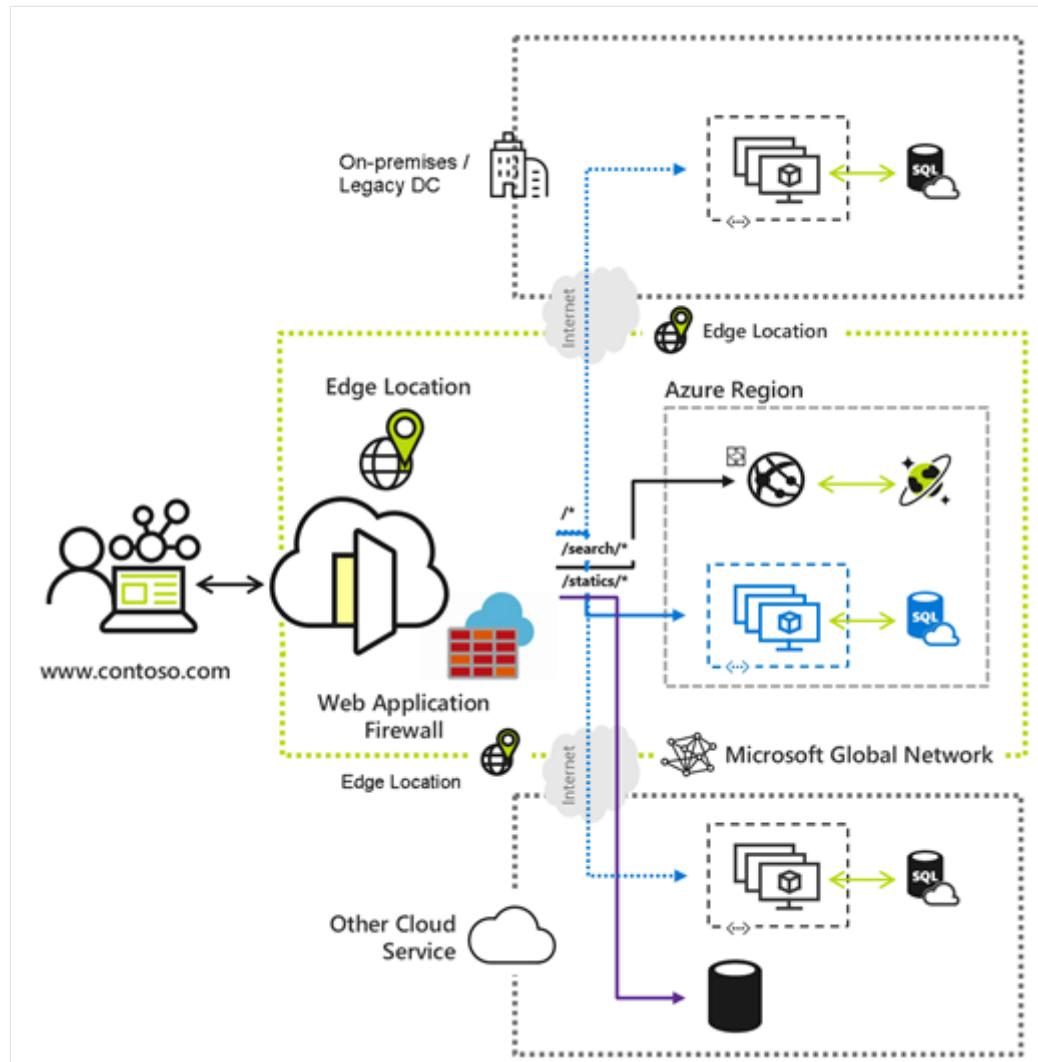


Application delivery services

This section describes networking services in Azure that help deliver applications - Content Delivery Network, Azure Front Door Service, Traffic Manager, Load Balancer, and Application Gateway.

Azure Front Door

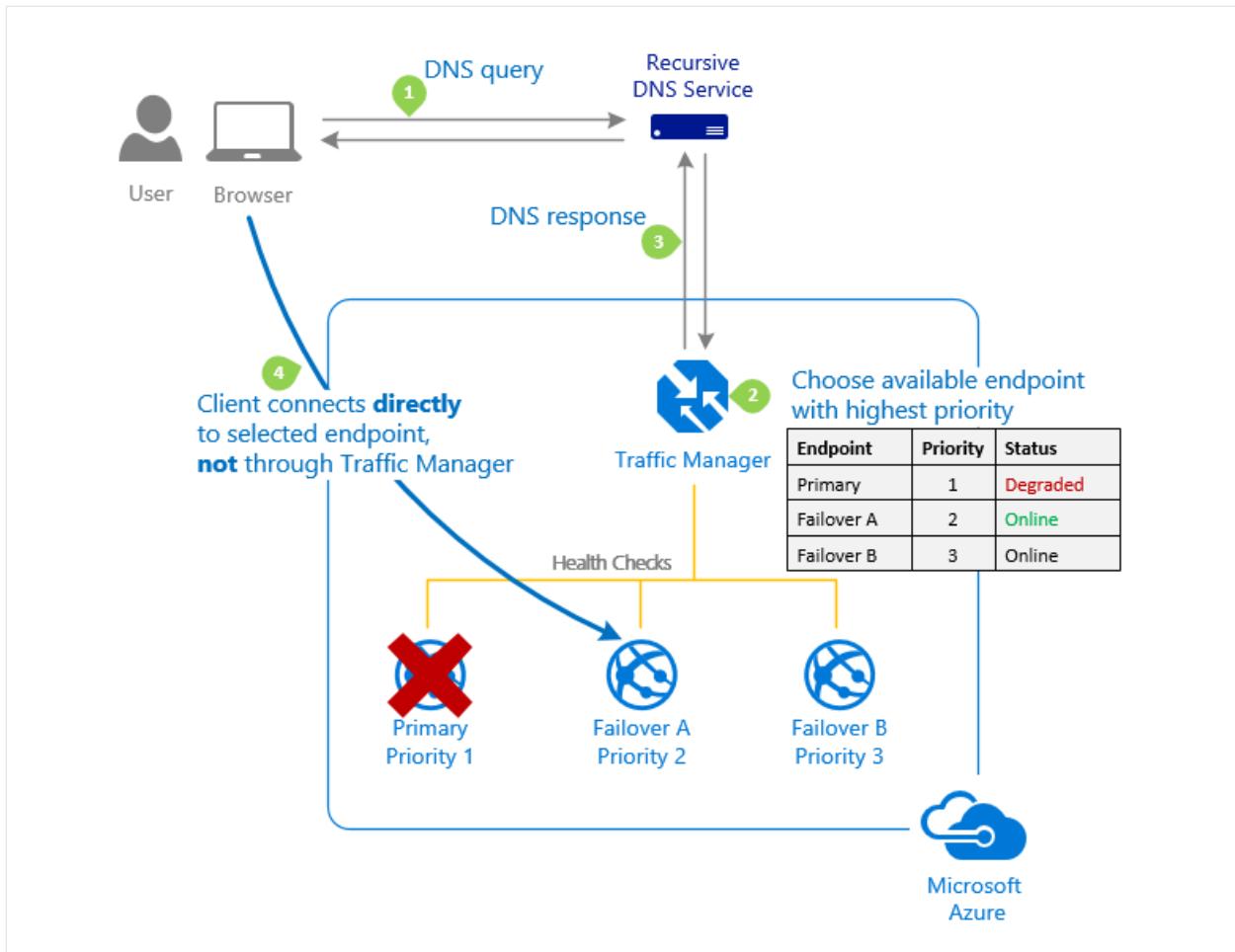
[Azure Front Door](#) enables you to define, manage, and monitor the global routing for your web traffic by optimizing for best performance and instant global failover for high availability. With Front Door, you can transform your global (multi-region) consumer and enterprise applications into robust, high-performance personalized modern applications, APIs, and content that reach a global audience with Azure.



Traffic Manager

[Azure Traffic Manager](#) is a DNS-based traffic load balancer that enables you to distribute traffic optimally to services across global Azure regions, while providing high availability and responsiveness. Traffic Manager provides a range of traffic-routing methods to distribute traffic such as priority, weighted, performance, geographic, multi-value, or subnet.

The following diagram shows endpoint priority-based routing with Traffic Manager:



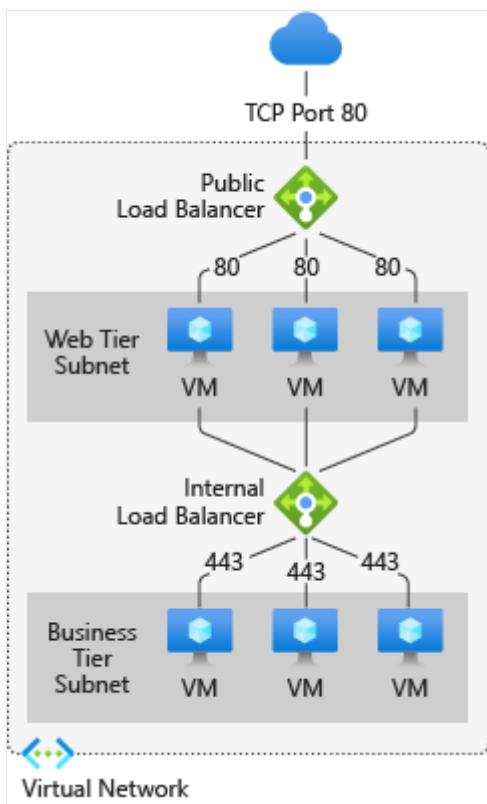
For more information about Traffic Manager, see [What is Azure Traffic Manager?](#)

Load Balancer

Azure Load Balancer provides high-performance, low-latency Layer 4 load-balancing for all UDP and TCP protocols. It manages inbound and outbound connections. You can configure public and internal load-balanced endpoints. You can define rules to map inbound connections to back-end pool destinations by using TCP and HTTP health-probing options to manage service availability.

Azure Load Balancer is available in Standard, Regional, and Gateway SKUs.

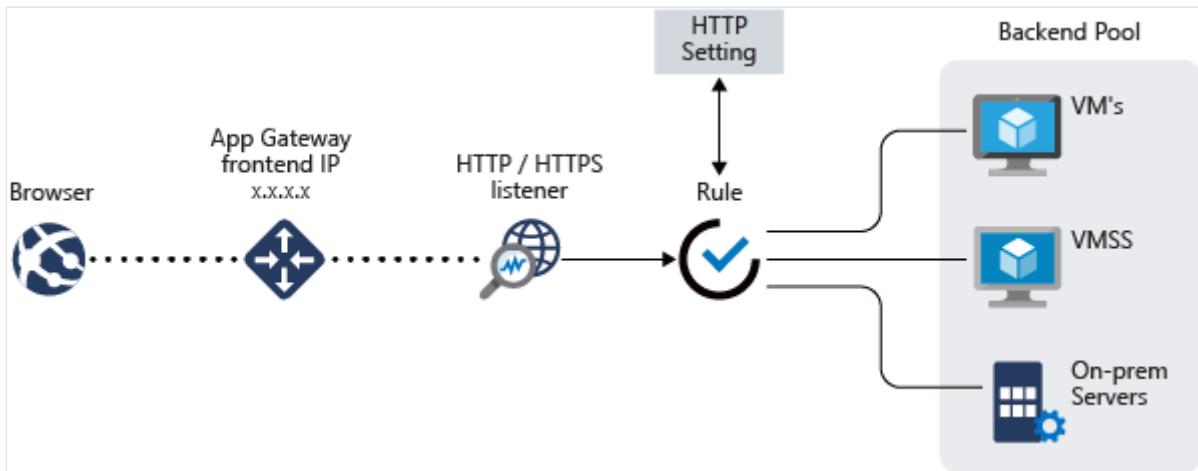
The following picture shows an Internet-facing multi-tier application that utilizes both external and internal load balancers:



Application Gateway

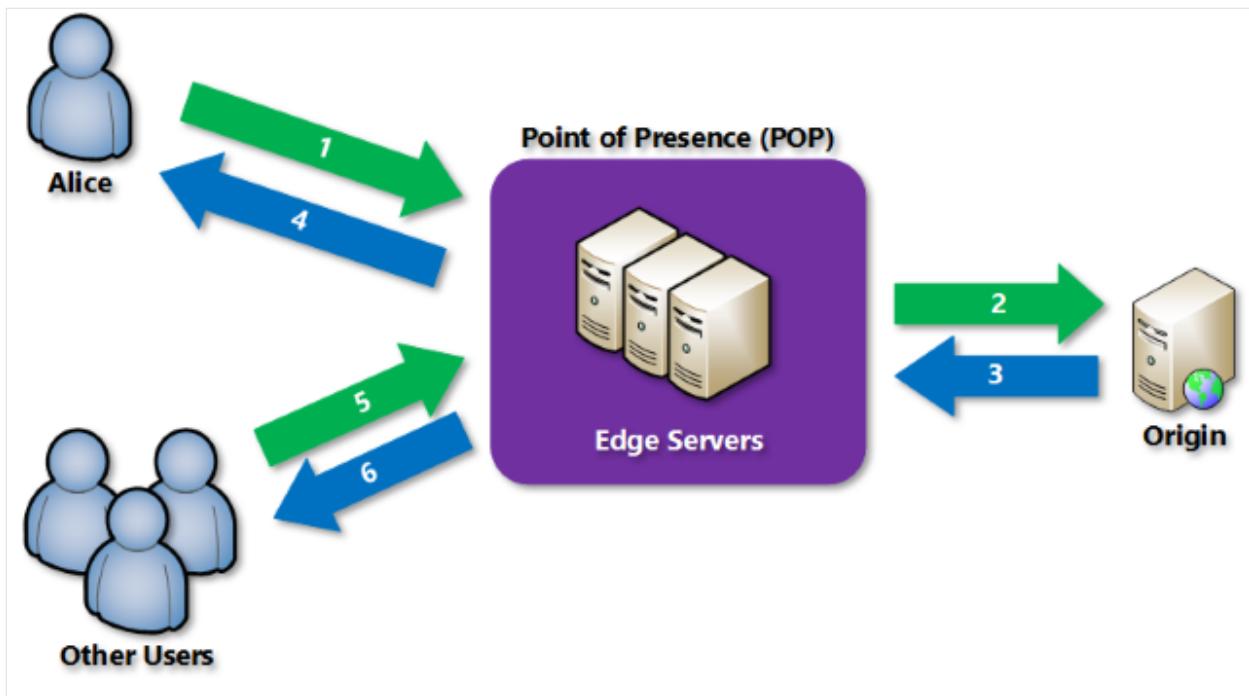
[Azure Application Gateway](#) is a web traffic load balancer that enables you to manage traffic to your web applications. It's an Application Delivery Controller (ADC) as a service, offering various layer 7 load-balancing capabilities for your applications.

The following diagram shows url path-based routing with Application Gateway.



Content Delivery Network

[Azure Content Delivery Network \(CDN\)](#) offers developers a global solution for rapidly delivering high-bandwidth content to users by caching their content at strategically placed physical nodes across the world.



Network monitoring services

This section describes networking services in Azure that help monitor your network resources - Azure Network Watcher, Azure Monitor Network Insights, Azure Monitor, and ExpressRoute Monitor.

Azure Network Watcher

[Azure Network Watcher](#) provides tools to monitor, diagnose, view metrics, and enable or disable logs for resources in an Azure virtual network. For more information, see [\[What is Network Watcher?\]](#)

Azure Monitor

[Azure Monitor](#) maximizes the availability and performance of your applications by delivering a comprehensive solution for collecting, analyzing, and acting on telemetry from your cloud and on-premises environments. It helps you understand how your applications are performing and proactively identifies issues affecting them and the resources they depend on. For more information, see [\[Azure Monitor Overview\]](#)

ExpressRoute Monitor

To learn about how to view ExpressRoute circuit metrics, resource logs and alerts, see [ExpressRoute monitoring, metrics, and alerts](#).

Network Insights

Azure Monitor for Networks ([Network Insights](#)) provides a comprehensive view of health and metrics for all deployed network resources, without requiring any configuration.

Next steps

- Create your first virtual network, and connect a few virtual machines to it, by completing the steps in the [Create your first virtual network](#) article.
- Connect your computer to a virtual network by completing the steps in the [Configure a point-to-site connection](#) article.
- Load balance Internet traffic to public servers by completing the steps in the [Create an Internet-facing load balancer](#) article.

CLI samples for Azure App Service

Article • 10/12/2022

The following table includes links to bash scripts built using the Azure CLI.

Script	Description
Create app	
Create an app and deploy files with FTP	Creates an App Service app and deploys a file to it using FTP.
Create an app and deploy code from GitHub	Creates an App Service app and deploys code from a public GitHub repository.
Create an app with continuous deployment from GitHub	Creates an App Service app with continuous publishing from a GitHub repository you own.
Create an app and deploy code into a local Git repository	Creates an App Service app and configures code push into a local Git repository.
Create an app and deploy code to a staging environment	Creates an App Service app with a deployment slot for staging code changes.
Create an ASP.NET Core app in a Docker container	Creates an App Service app on Linux and loads a Docker image from Docker Hub.
Create an app with a Private Endpoint	Creates an App Service app and a Private Endpoint
Configure app	
Map a custom domain to an app	Creates an App Service app and maps a custom domain name to it.
Bind a custom TLS/SSL certificate to an app	Creates an App Service app and binds the TLS/SSL certificate of a custom domain name to it.
Scale app	
Scale an app manually	Creates an App Service app and scales it across 2 instances.
Scale an app worldwide with a high-availability architecture	Creates two App Service apps in two different geographical regions and makes them available through a single endpoint using Azure Traffic Manager.
Protect app	

Script	Description
Integrate with Azure Application Gateway	Creates an App Service app and integrates it with Application Gateway using service endpoint and access restrictions.
Connect app to resources	
Connect an app to a SQL Database	Creates an App Service app and a database in Azure SQL Database, then adds the database connection string to the app settings.
Connect an app to a storage account	Creates an App Service app and a storage account, then adds the storage connection string to the app settings.
Connect an app to an Azure Cache for Redis	Creates an App Service app and an Azure Cache for Redis, then adds the redis connection details to the app settings.)
Connect an app to Azure Cosmos DB	Creates an App Service app and an Azure Cosmos DB, then adds the Azure Cosmos DB connection details to the app settings.
Backup and restore app	
Backup and restore app	Creates an App Service app and creates a one-time backup for it, creates a backup schedule for it, and then restores an App Service app from a backup.
Monitor app	
Monitor an app with web server logs	Creates an App Service app, enables logging for it, and downloads the logs to your local machine.