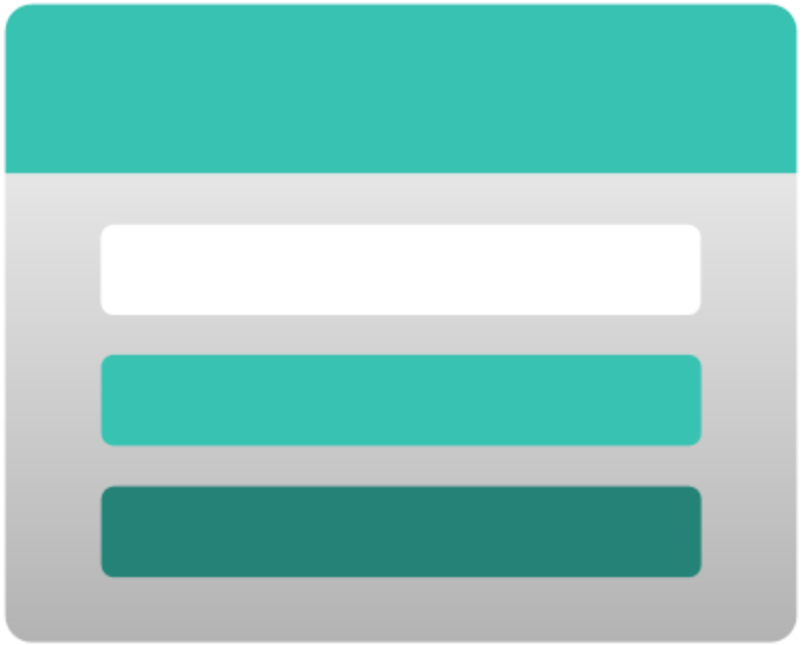
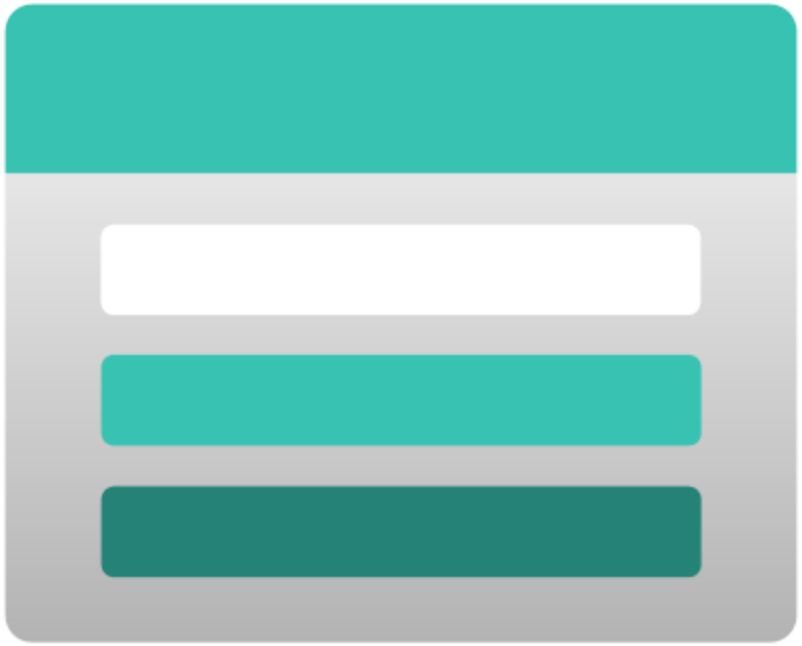
Розподілені системи та хмарні технології

Сервіси зберігання даних в Azure

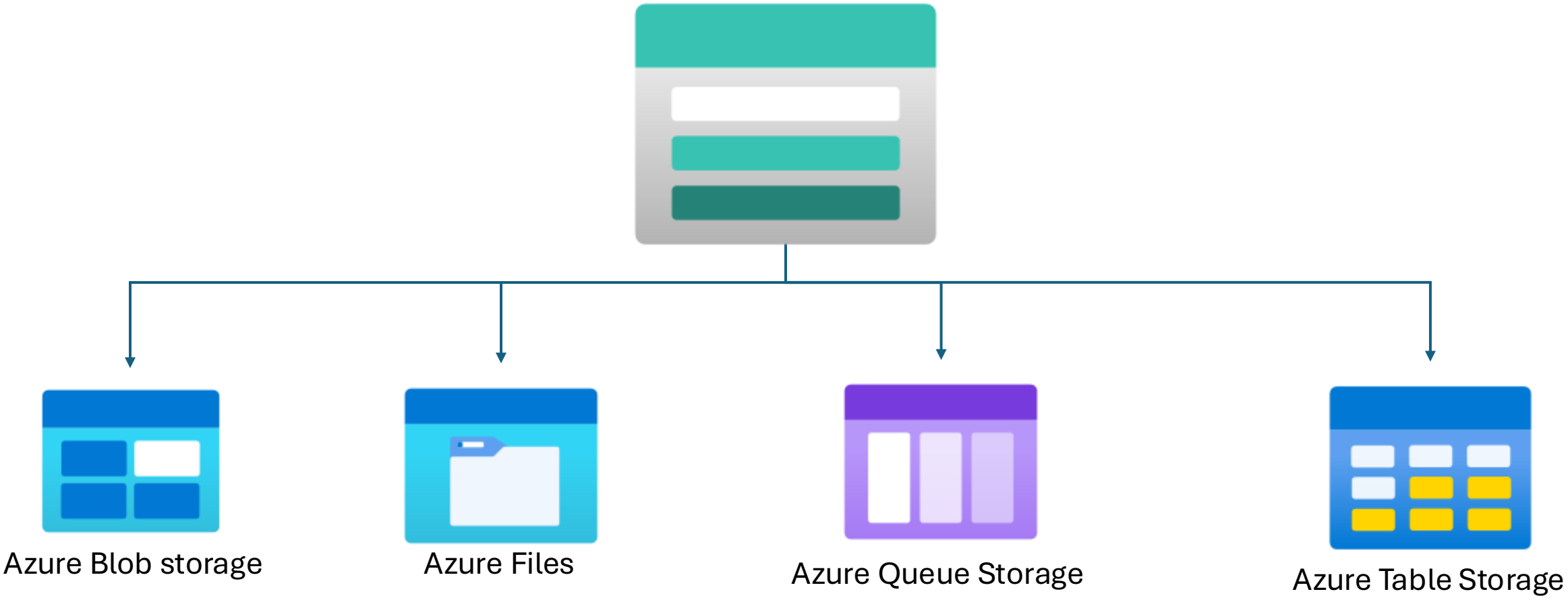
Azure Storage



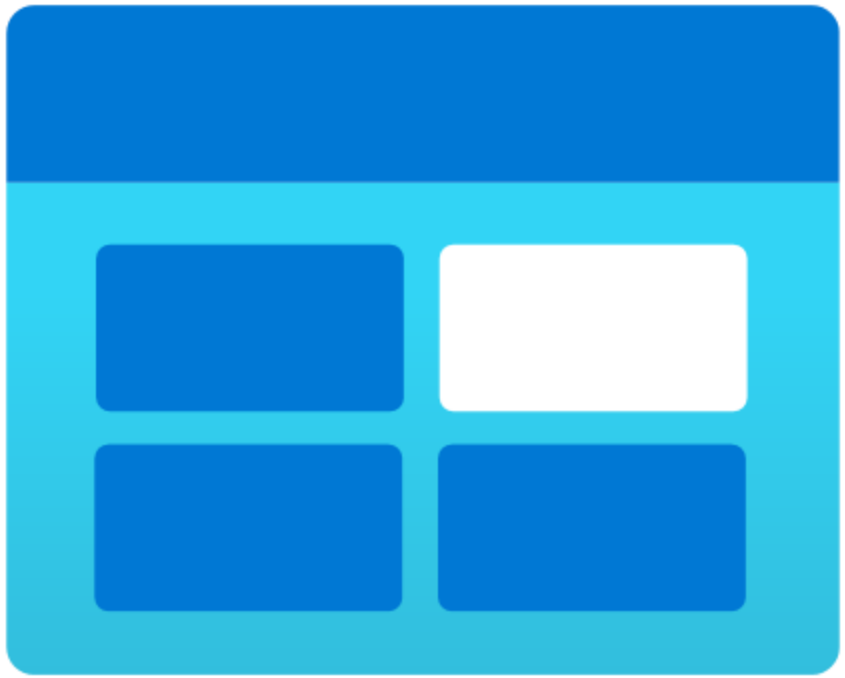
Azure Account Storage



Azure Account Storage

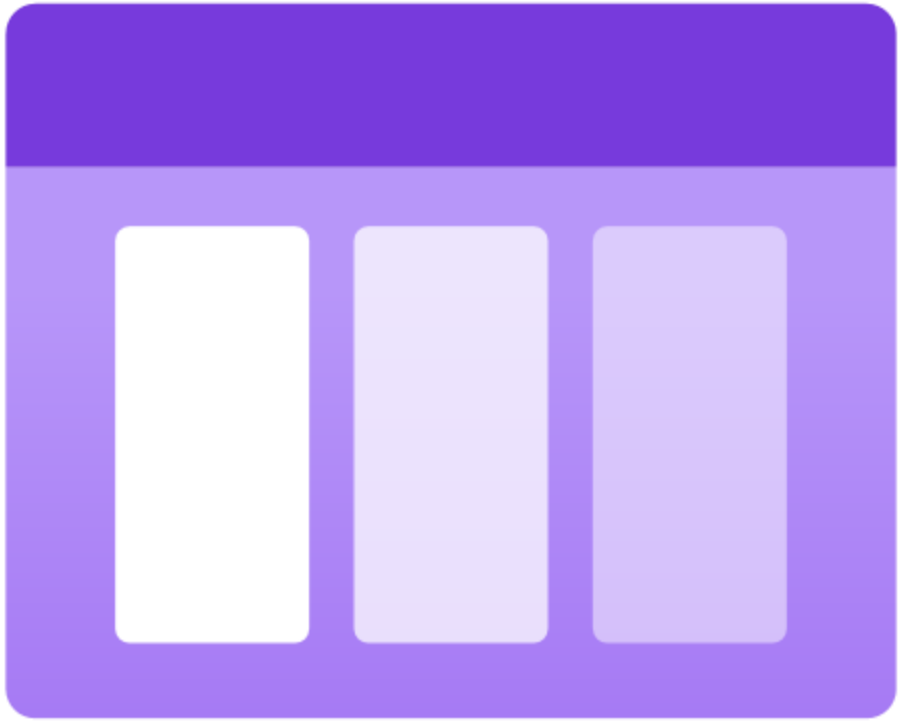


Azure Blob Storage

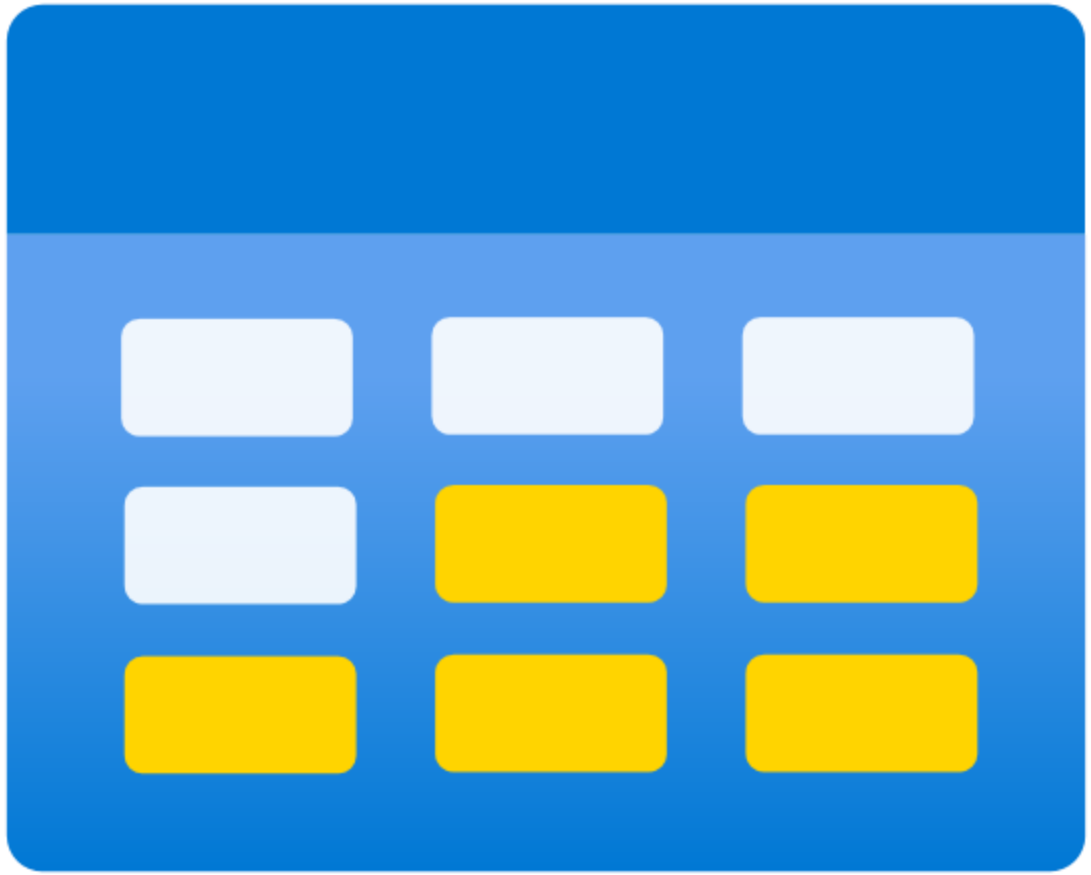


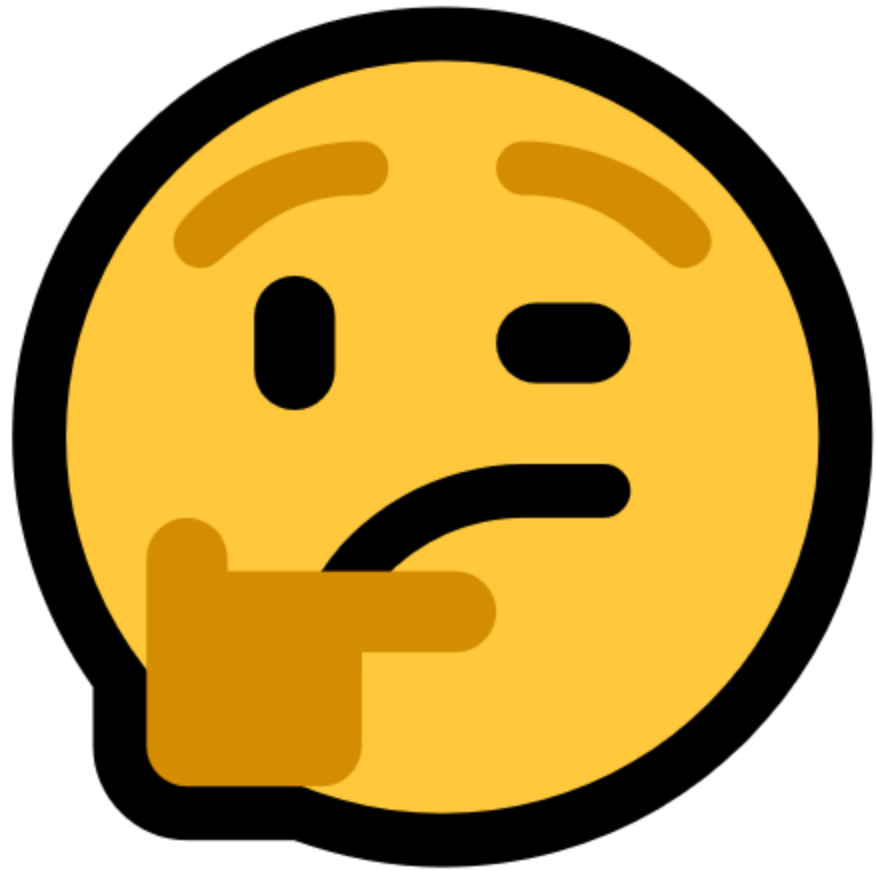
Azure Files

Azure Queue Storage



Azure Table storage





mystorageaccount

Service	Default endpoint
Container service	**mystorageaccount**.blob.core.windows.net
Table service	**mystorageaccount**.table.core.windows.net
Queue service	**mystorageaccount**.queue.core.windows.net
File service	**mystorageaccount**.file.core.windows.net

Microsoft Installer (MSI) | Microsoft Installer (MSI) with PowerShell | Windows Package Manager | ZIP Package

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 MSI of the Azure CLI (32-bit)

Latest MSI 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`.

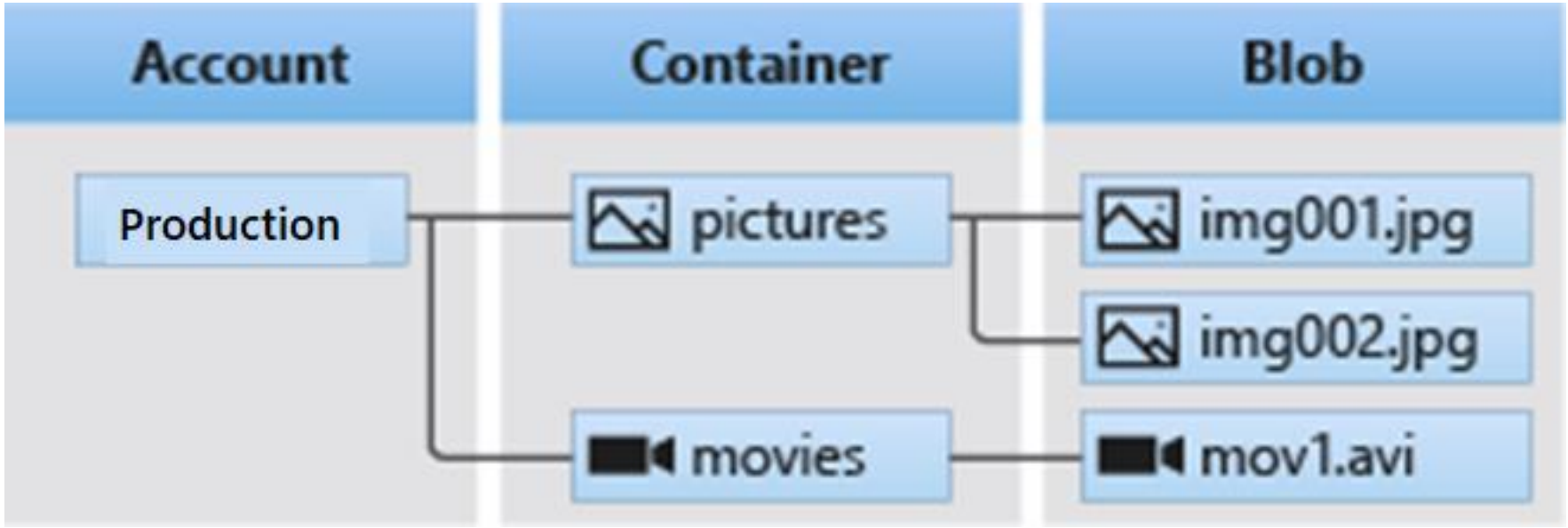
Available Azure CLI versions can be found at Azure CLI release notes. The 64-bit MSI is available from version 2.51.0.

curl https://azcliprod.blob.core.windows.net/msi/azure-cli-2.64.0-x64.msi -O -v

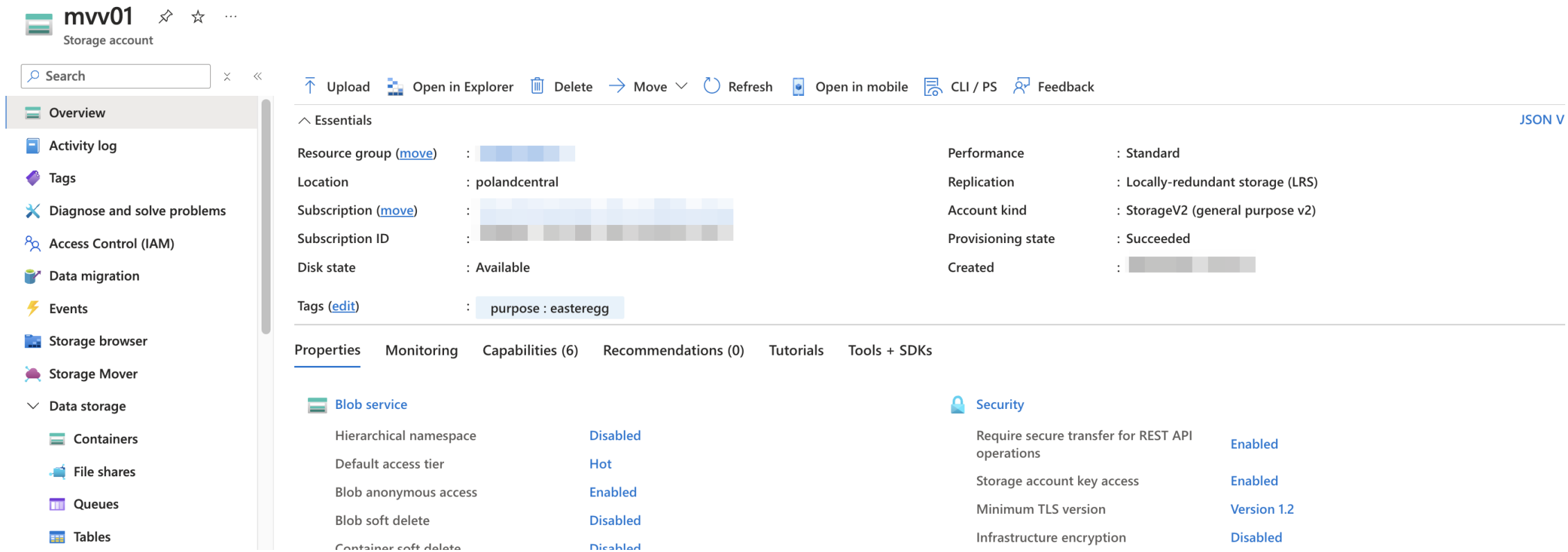
HTTP/1.1 200 OK
Content-Length: 72142848
Content-Type: application/octet-stream
Content-MD5: 8kgmWXTNFTprygnr++u0LA==
Last-Modified: Wed, 28 Aug 2024 07:37:59 GMT
ETag: 0x8DCC7345704E3E7
Server: Windows-Azure-Blob/1.0 Microsoft-HTTPAPI/2.0
x-ms-request-id: 441b99f5-001e-0044-6175-13d666000000
x-ms-version: 2009-09-19
x-ms-lease-status: unlocked
x-ms-blob-type: BlockBlob
< Date: Mon, 30 Sep 2024 20:11:59

azcliprod – назва Storage Account
blob – піддомен для ідентифікації сервісу, що використовується
msi – назва blob-контейнеру
azure-cli-2.64.0-x64.msi – назва blob-об’єкту

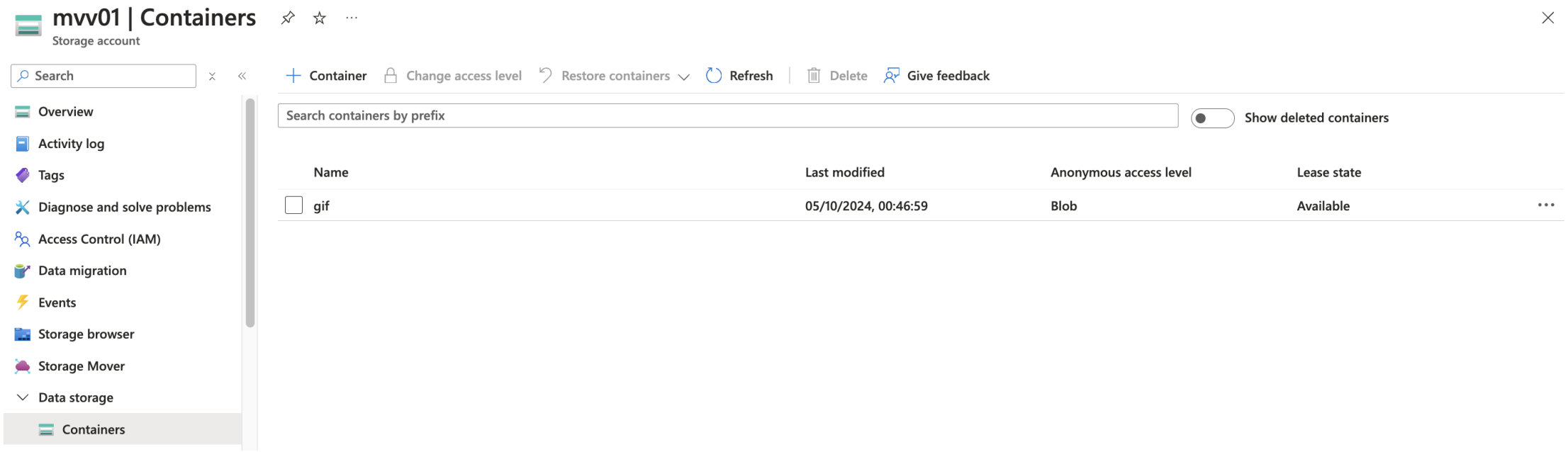
Azure Blob Storage



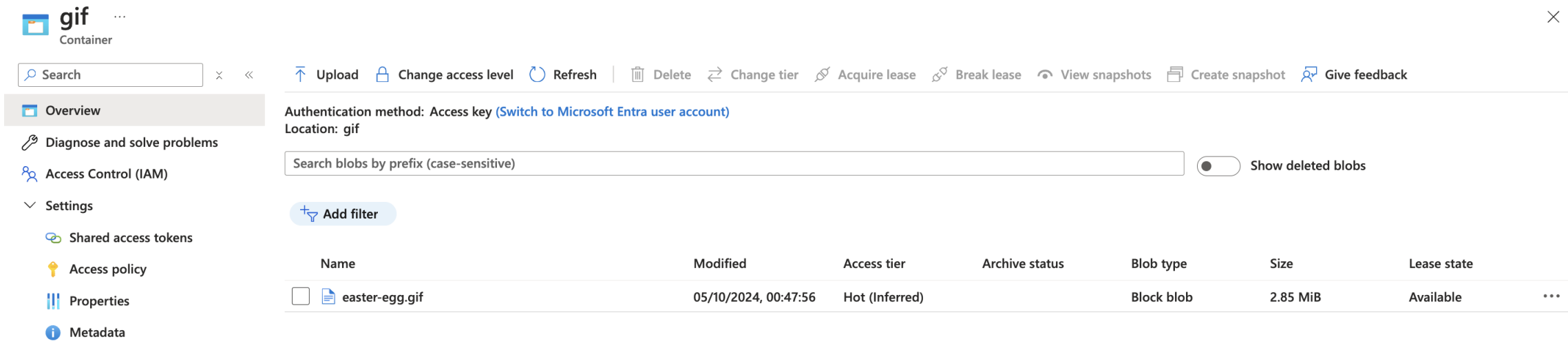
Azure Blob Storage



Azure Blob Storage



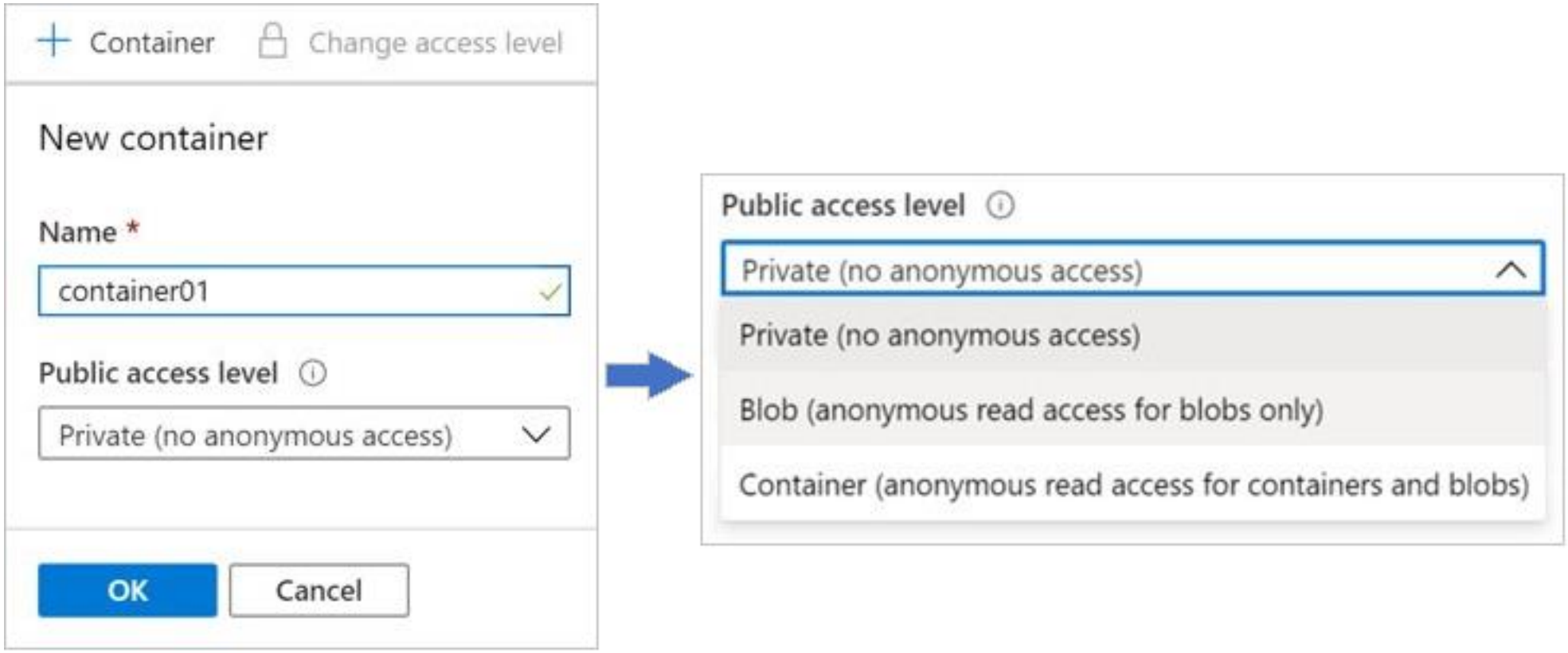
Azure Blob Storage



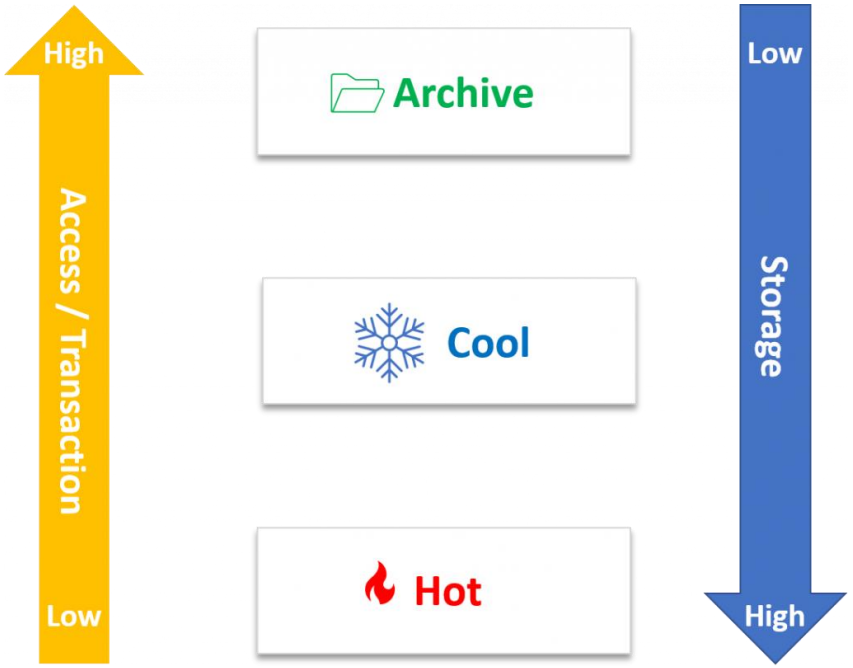
Blob Storage Configuration

- Blob container options
- Blob types and upload options
- Blob Storage access tiers
- Blob lifecycle rules
- Blob object replication options

Blob Storage Configuration



Blob Access Tiers



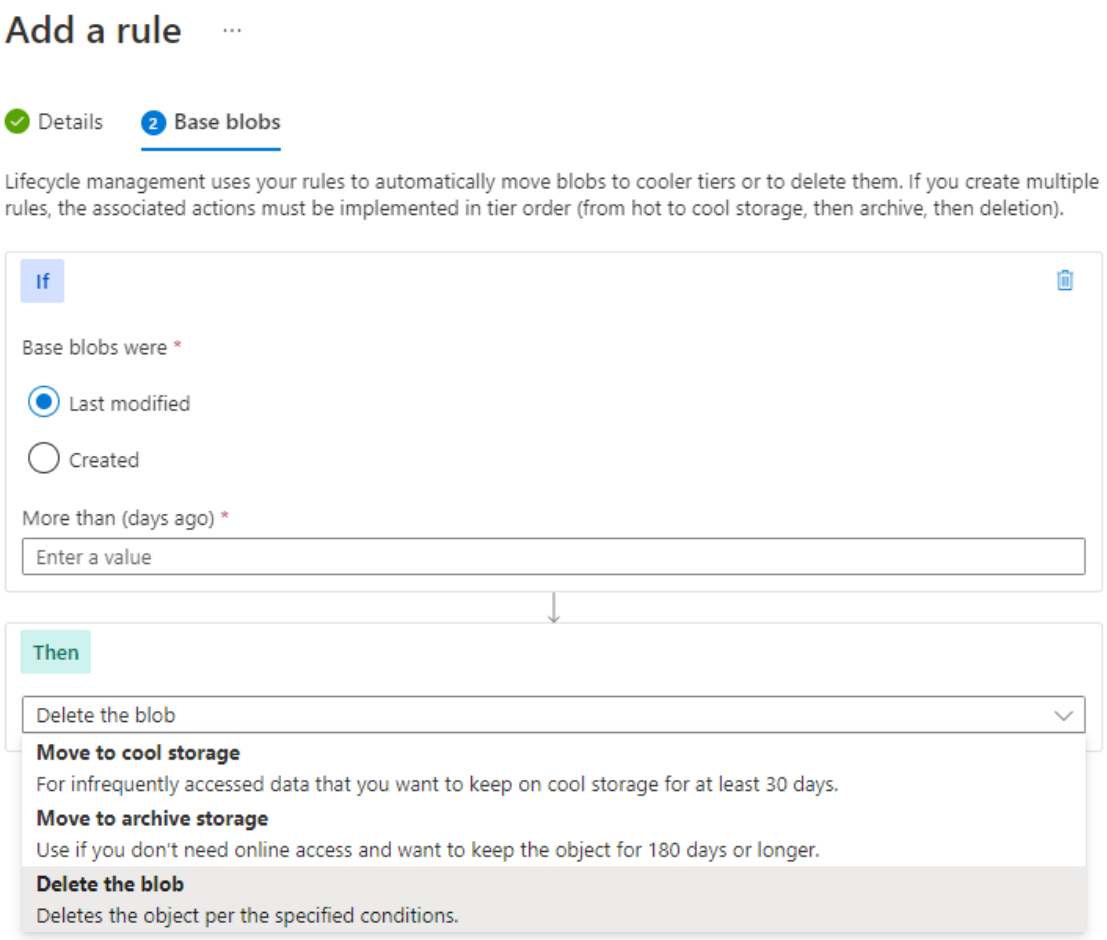
Hot

Cool

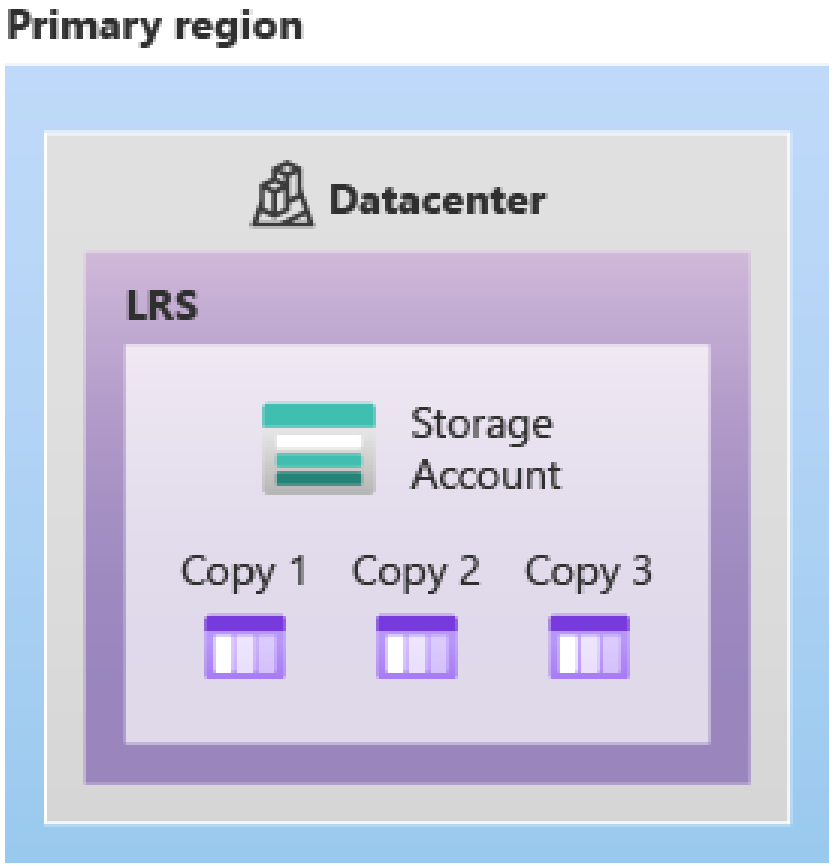
Cold

Archive

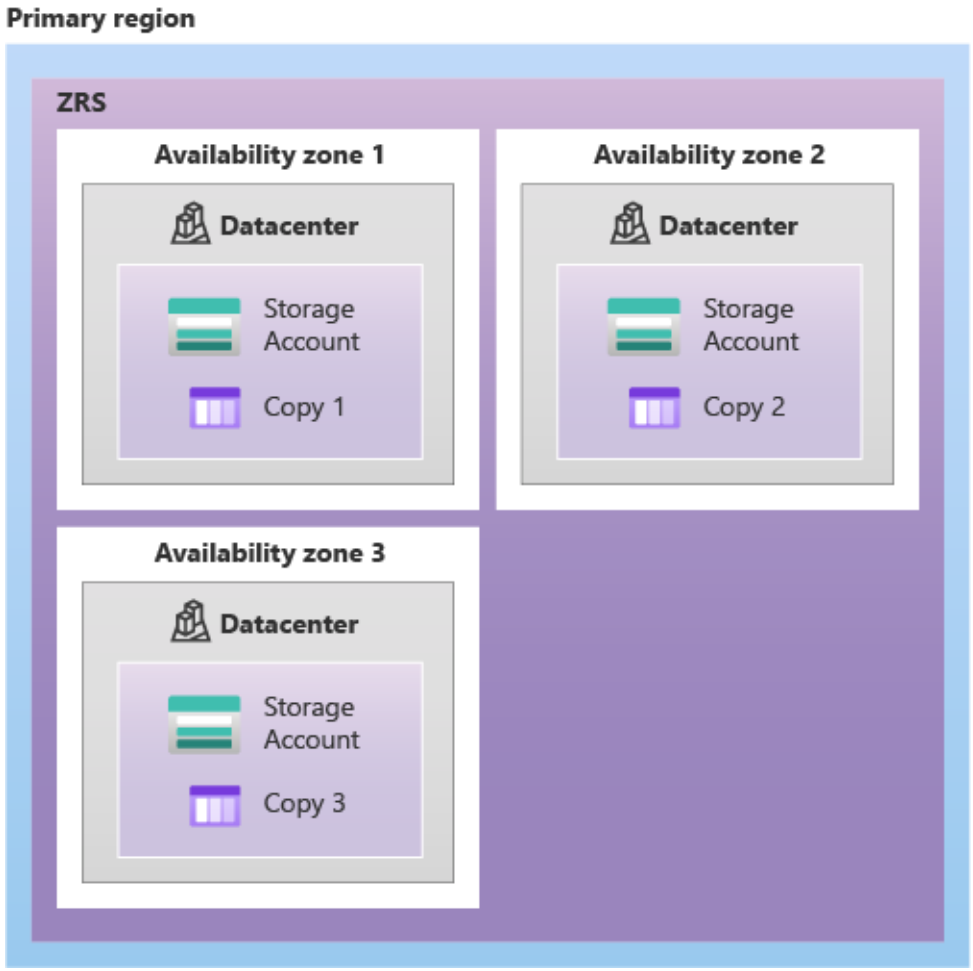
Blob Lifecycle management rules



Data redundancy -
Locally Redundant Storage



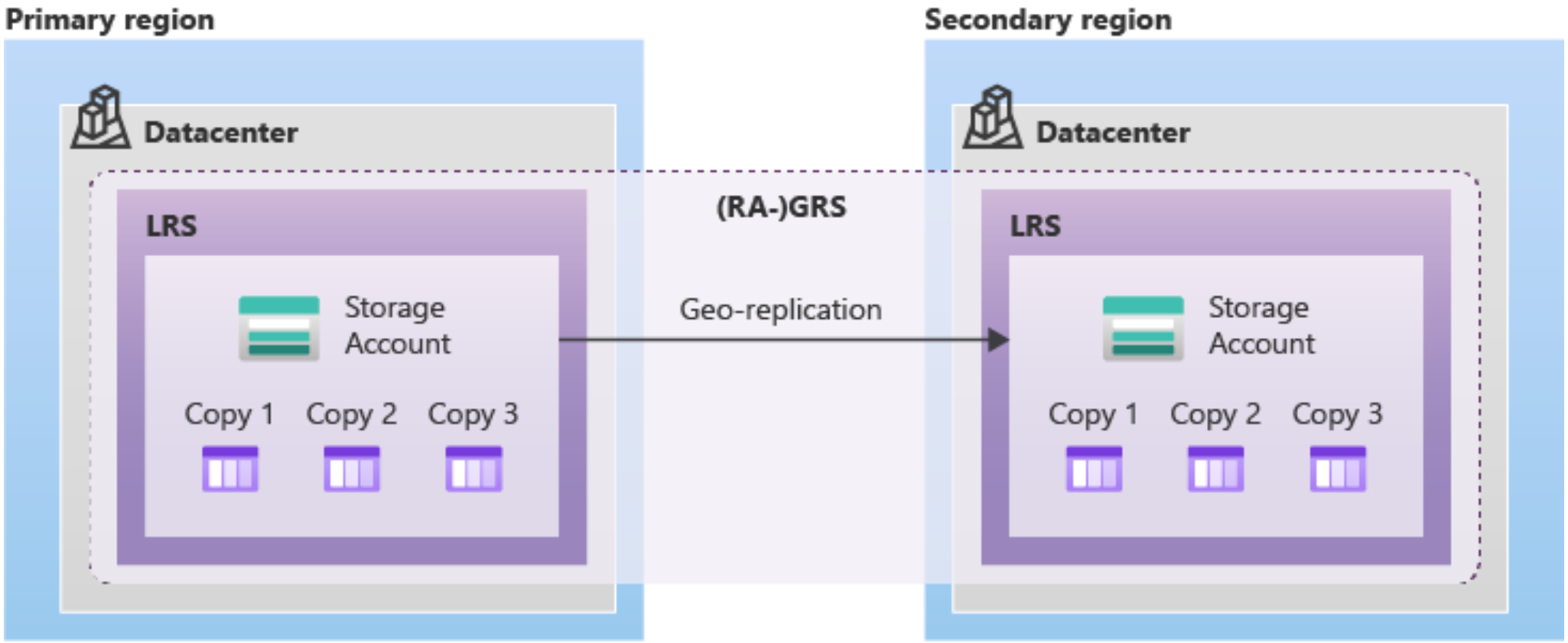
Data redundancy -
Zone Redundant Storage



Data redundancy -
Zone Redundant Storage

Americas	Europe	Middle East	Africa	Asia Pacific
Brazil South	France Central	Qatar Central	South Africa North	Australia East
Canada Central	Italy North	UAE North		Central India
Central US	Germany West Central	Israel Central		Japan East
East US	Norway East			*Japan West
East US 2	North Europe			Southeast Asia
South Central US	UK South			East Asia
US Gov Virginia	West Europe			China North 3
West US 2	Sweden Central			Korea Central
West US 3	Switzerland North			*New Zealand North
Mexico Central	Poland Central			
	Spain Central			

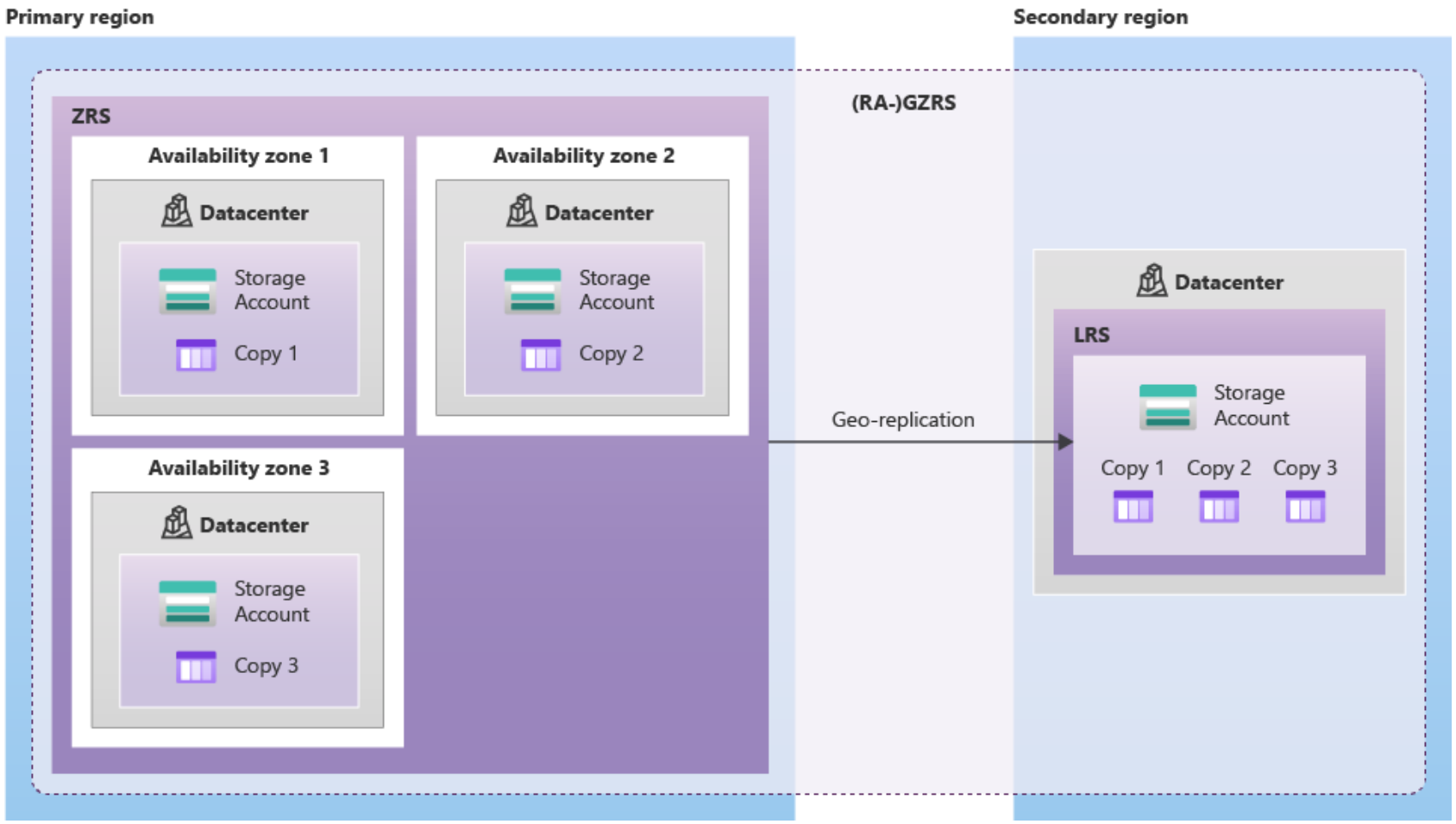
Data redundancy -
Geo Redundant Storage



Data redundancy -
Geo Redundant Storage

Geography	Regional pair A	Regional pair B
Asia-Pacific	East Asia (Hong Kong Special Administrative Region)	Southeast Asia (Singapore)
Australia	Australia East	Australia Southeast
	Australia Central	Australia Central 2*
Brazil	Brazil South	South Central US
	Brazil Southeast*	Brazil South
Canada	Canada Central	Canada East
China	China North	China East
	China North 2	China East 2
	China North 3	China East 3*
Europe	North Europe (Ireland)	West Europe (Netherlands)
France	France Central	France South*
Germany	Germany West Central	Germany North*
India	Central India	South India
	Central India	West India
	West India	South India
Japan	Japan East	Japan West
Korea	Korea Central	Korea South*
Norway	Norway East	Norway West*
South Africa	South Africa North	South Africa West*
Sweden	Sweden Central	Sweden South*
Switzerland	Switzerland North	Switzerland West*
United Kingdom	UK West	UK South
United States	East US	West US
	East US 2	Central US
	North Central US	South Central US
	West US 2	West Central US
	West US 3	East US
United Arab Emirates	UAE North	UAE Central*
US Department of Defense	US DoD East*	US DoD Central*
US Government	US Gov Arizona*	US Gov Texas*
	US Gov Virginia*	US Gov Texas*
	US Gov Texas*	US Gov Virginia*

Data redundancy -
Geo Zone Redundant Storage



Data redundancy -
Geo Zone Redundant Storage

(Africa) South Africa North
(Asia Pacific) Australia East
(Asia Pacific) East Asia
(Asia Pacific) Japan East
(Asia Pacific) Korea Central
(Asia Pacific) Southeast Asia
(Asia Pacific) Central India
(Europe) France Central
(Europe) Germany West Central
(Europe) North Europe
(Europe) Norway East
(Europe) Sweden Central
(Europe) Switzerland North
(Europe) UK South
(Europe) West Europe
(Middle East) UAE North
(North America) Canada Central
(North America) Central US
(North America) East US
(North America) East US 2
(North America) South Central US
(North America) West US 2
(North America) West US 3
(North America) US Gov Virginia
(South America) Brazil South

Типи Blob

Types of Blobs

Block Blobs

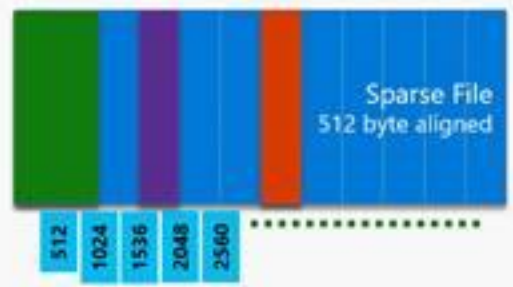
Most object storage scenarios
Documents, images, video, etc.

Append Blobs

Multi-writer append only scenarios
Logging, Big Data Analytics output

Page Blobs

Page aligned random reads and writes
IaaS Disks, Event Hub, Block level backup



Block blob

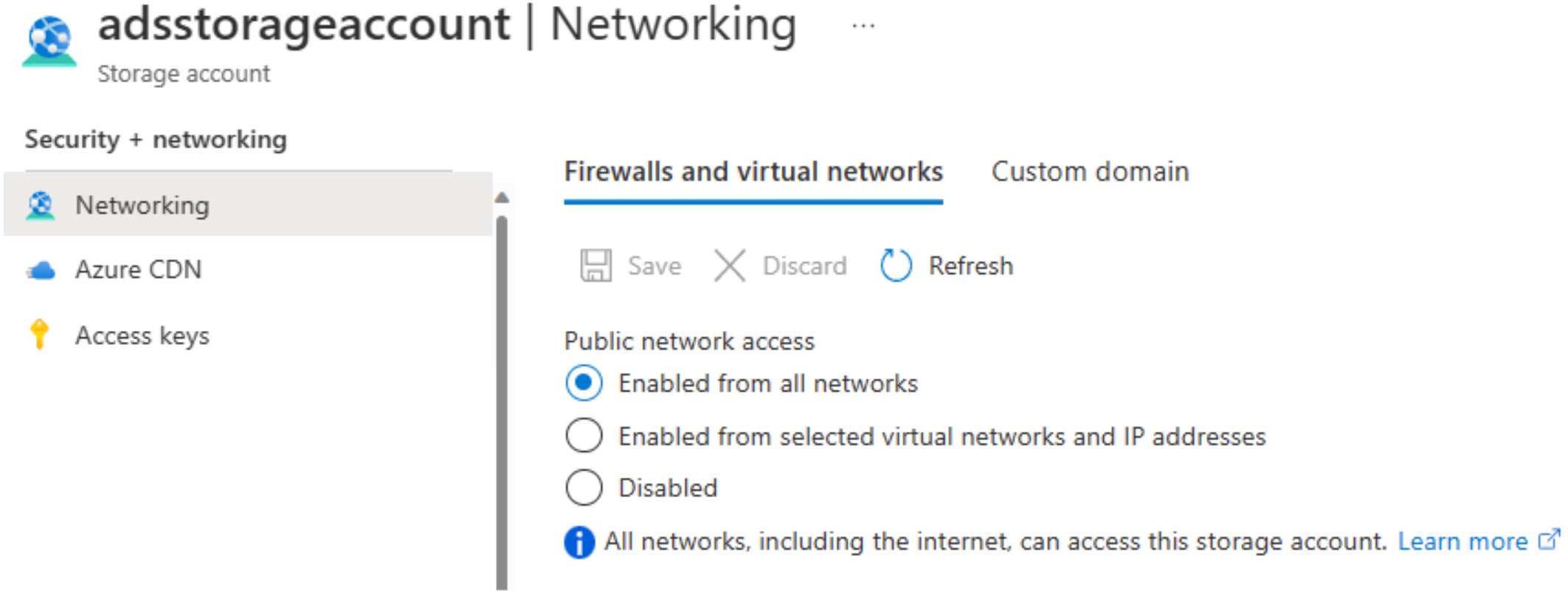
Service version	Maximum block size (via Put Block)	Maximum blob size (via Put Block List)	Maximum blob size via single write operation (via Put Blob)
Version 2019-12-12 and later	4000 MiB	Approximately 190.7 TiB (4000 MiB X 50,000 blocks)	5000 MiB
Version 2016-05-31 through version 2019-07-07	100 MiB	Approximately 4.75 TiB (100 MiB X 50,000 blocks)	256 MiB
Versions prior to 2016-05-31	4 MiB	Approximately 195 GiB (4 MiB X 50,000 blocks)	64 MiB

Page blob

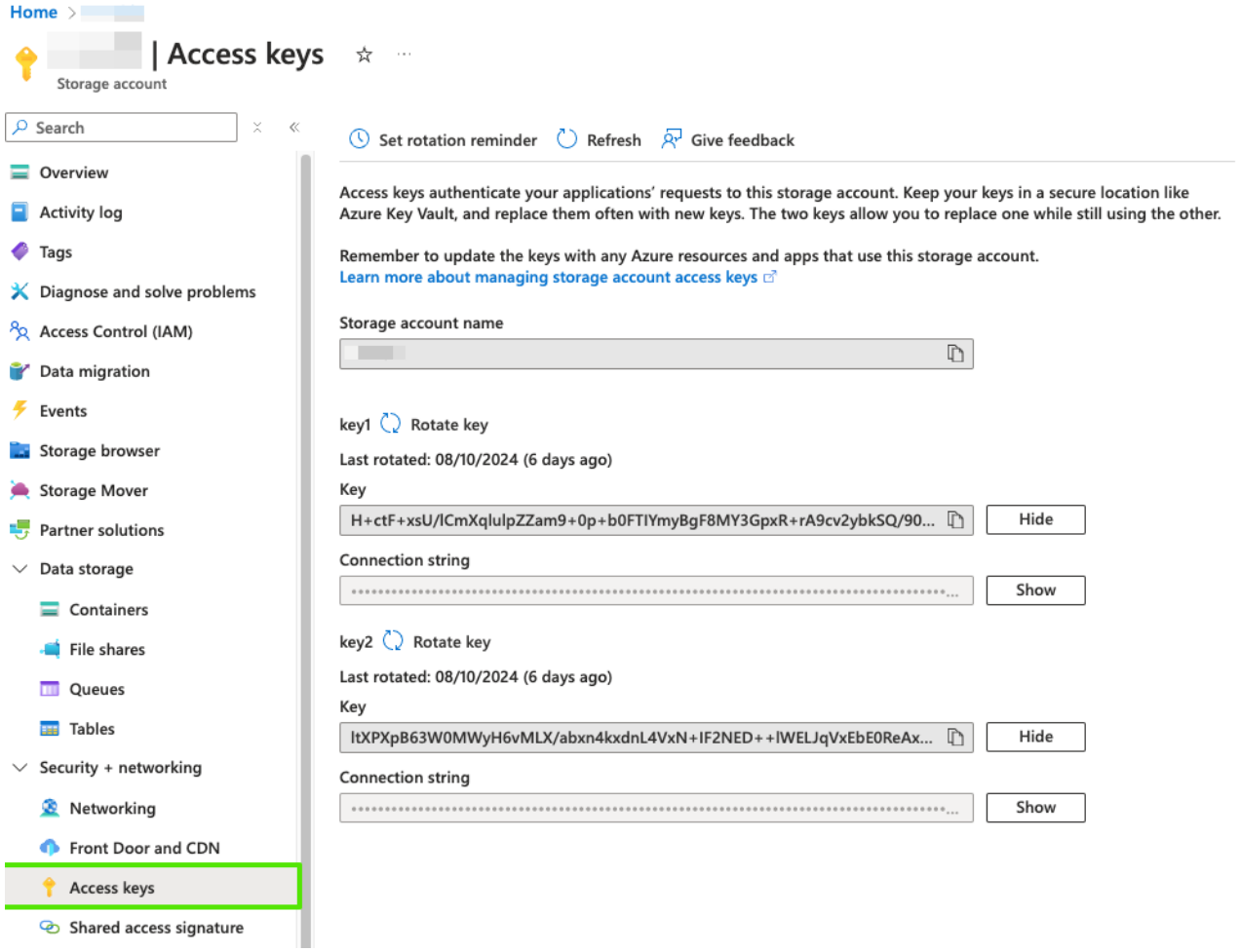
Append blob

Конфігурація Storage Account

Secure Access



Storage Account Access Keys



Managed Idententies

ⓘ Important

For optimal security, Microsoft recommends using Microsoft Entra ID with managed identities to authorize requests against blob, queue, and table data, whenever possible. Authorization with Microsoft Entra ID and managed identities provides superior security and ease of use over Shared Key authorization. To learn more about managed identities, see What are managed identities for Azure resources. For an example of how to enable and use a managed identity for a .NET application, see Authenticating Azure-hosted apps to Azure resources with .NET.

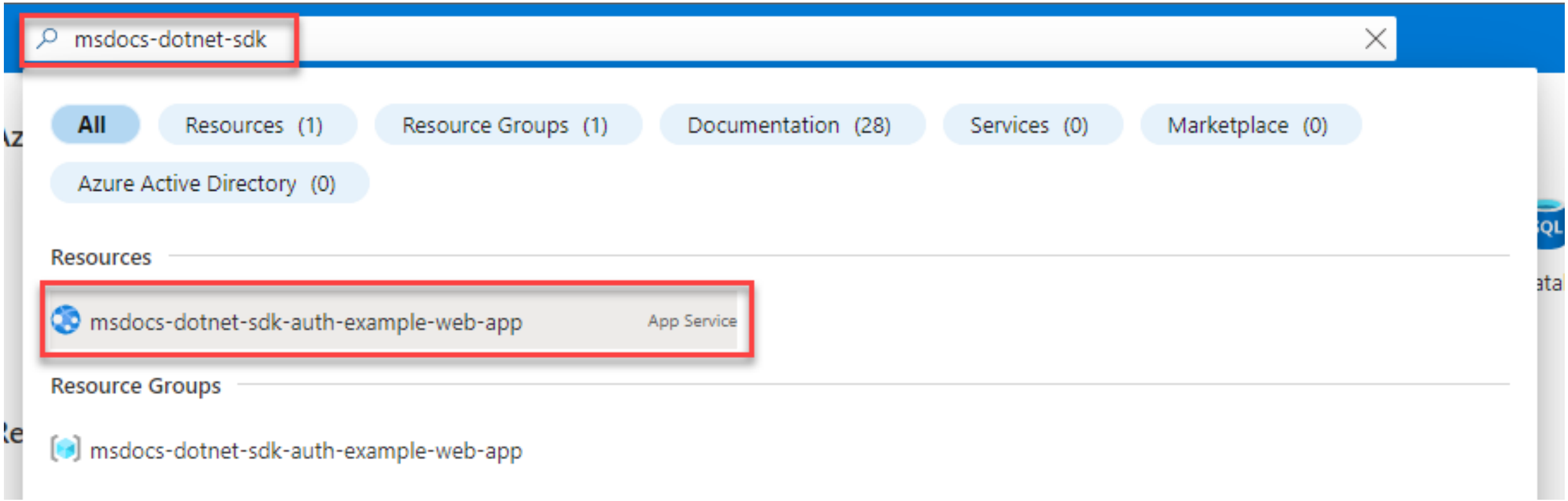
For resources hosted outside of Azure, such as on-premises applications, you can use managed identities through Azure Arc. For example, apps running on Azure Arc-enabled servers can use managed identities to connect to Azure services. To learn more, see Authenticate against Azure resources with Azure Arc-enabled servers.

For scenarios where shared access signatures (SAS) are used, Microsoft recommends using a user delegation SAS. A user delegation SAS is secured with Microsoft Entra credentials instead of the account key. To learn about shared access signatures, see Grant limited access to data with shared access signatures. For an example of how to create and use a user delegation SAS with .NET, see Create a user delegation SAS for a blob with .NET.

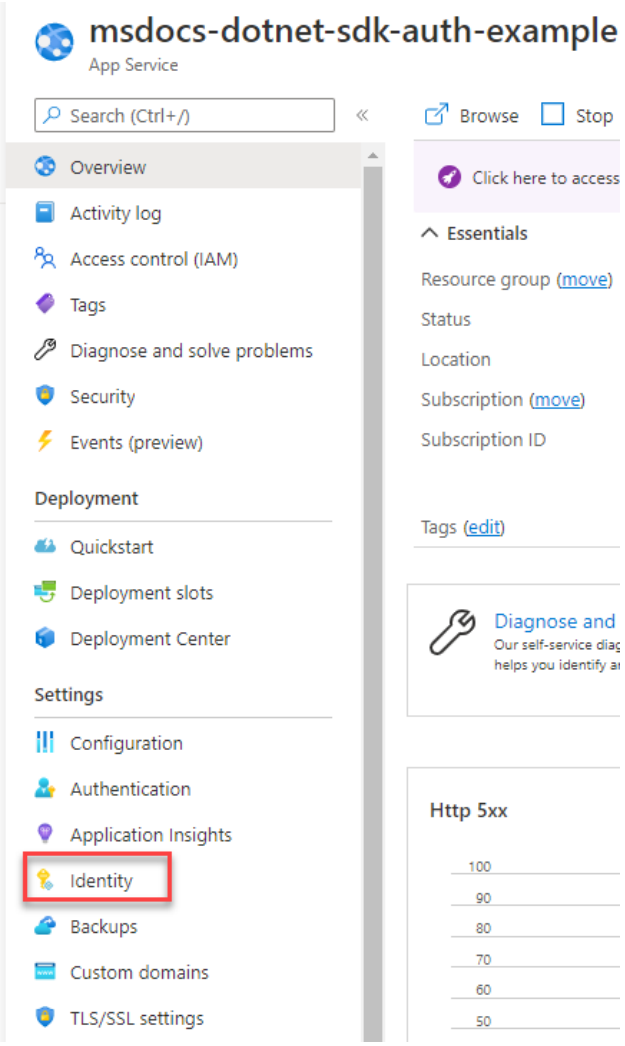
Managed Idententies

1. Увімкніть managed identity на вашому ресурсів в Azure

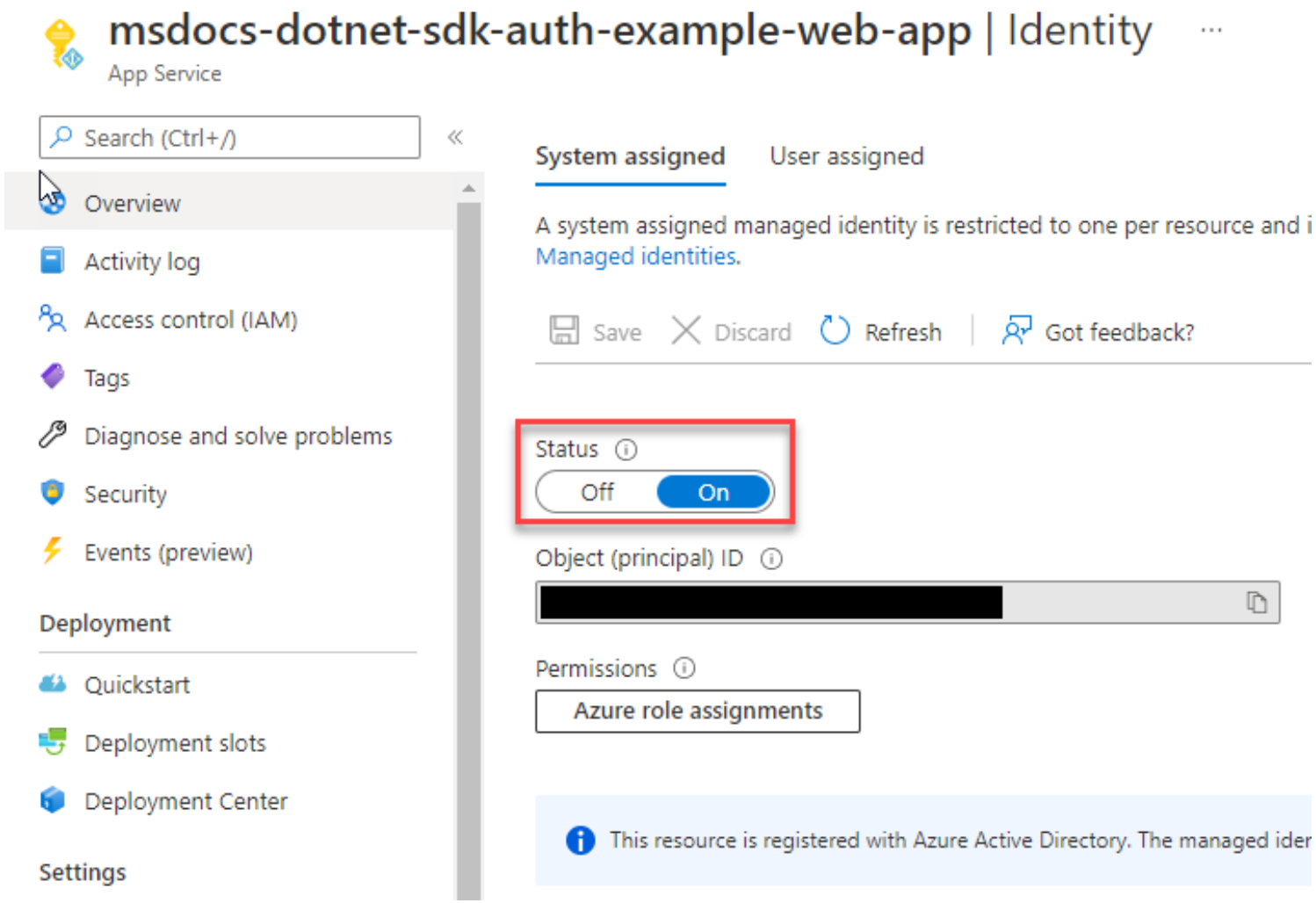
Managed Idententies



Managed Idententies



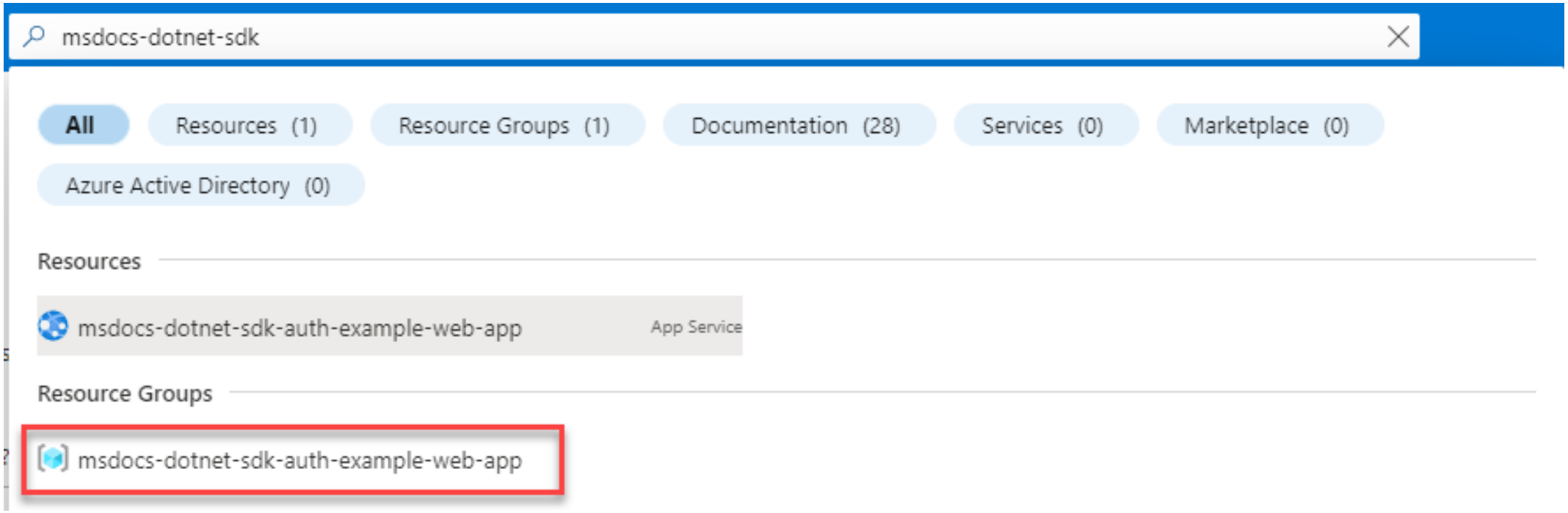
Managed Idententies



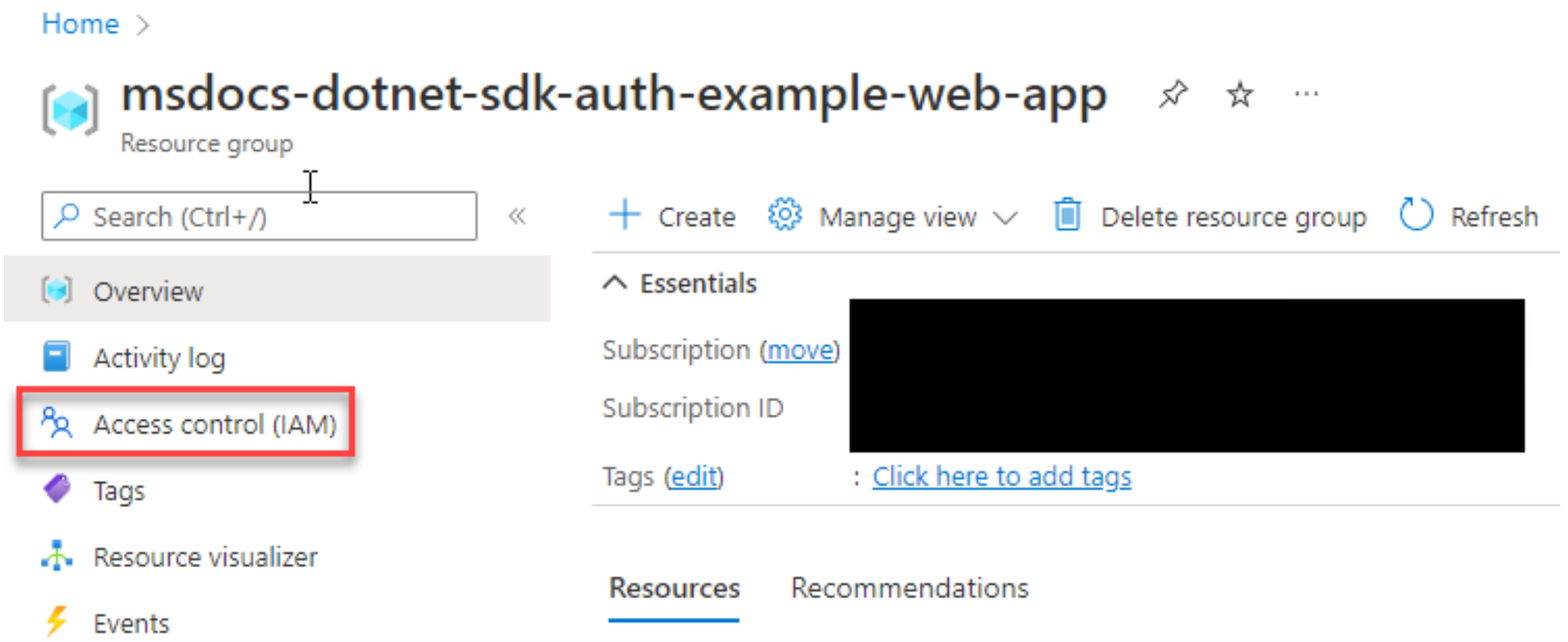
Managed Idententies

2. Назначте необхідну роль цій identity для вашого Storage Account

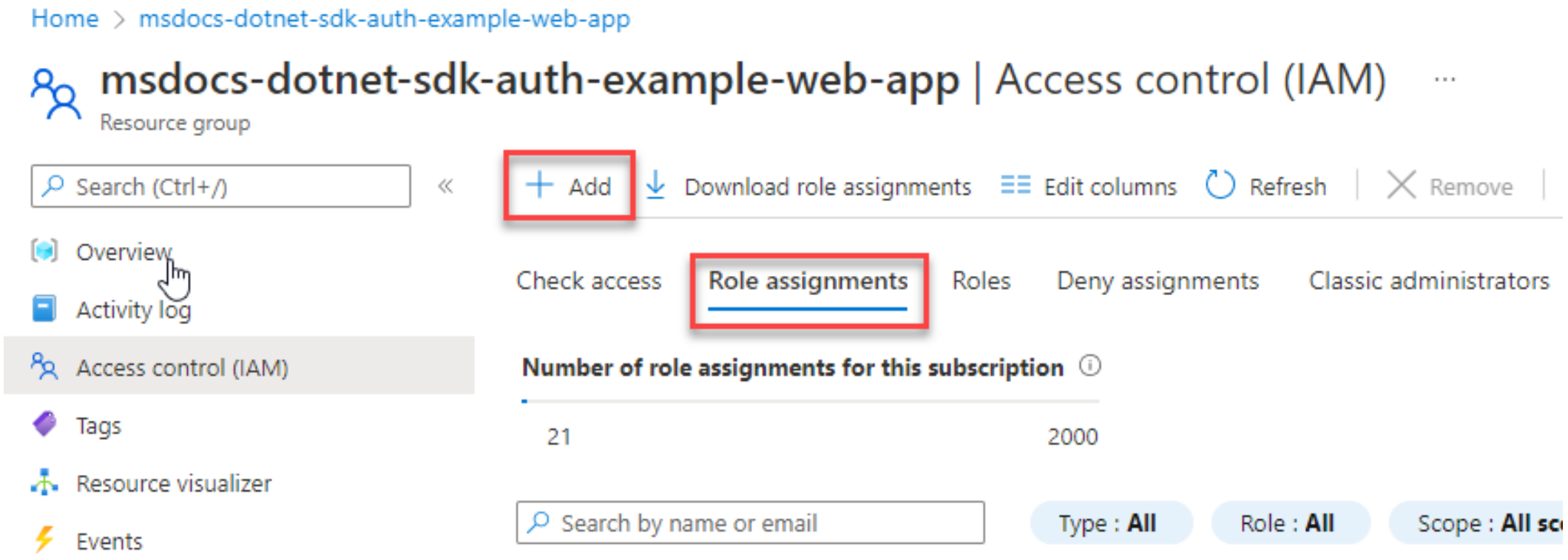
Managed Idententies



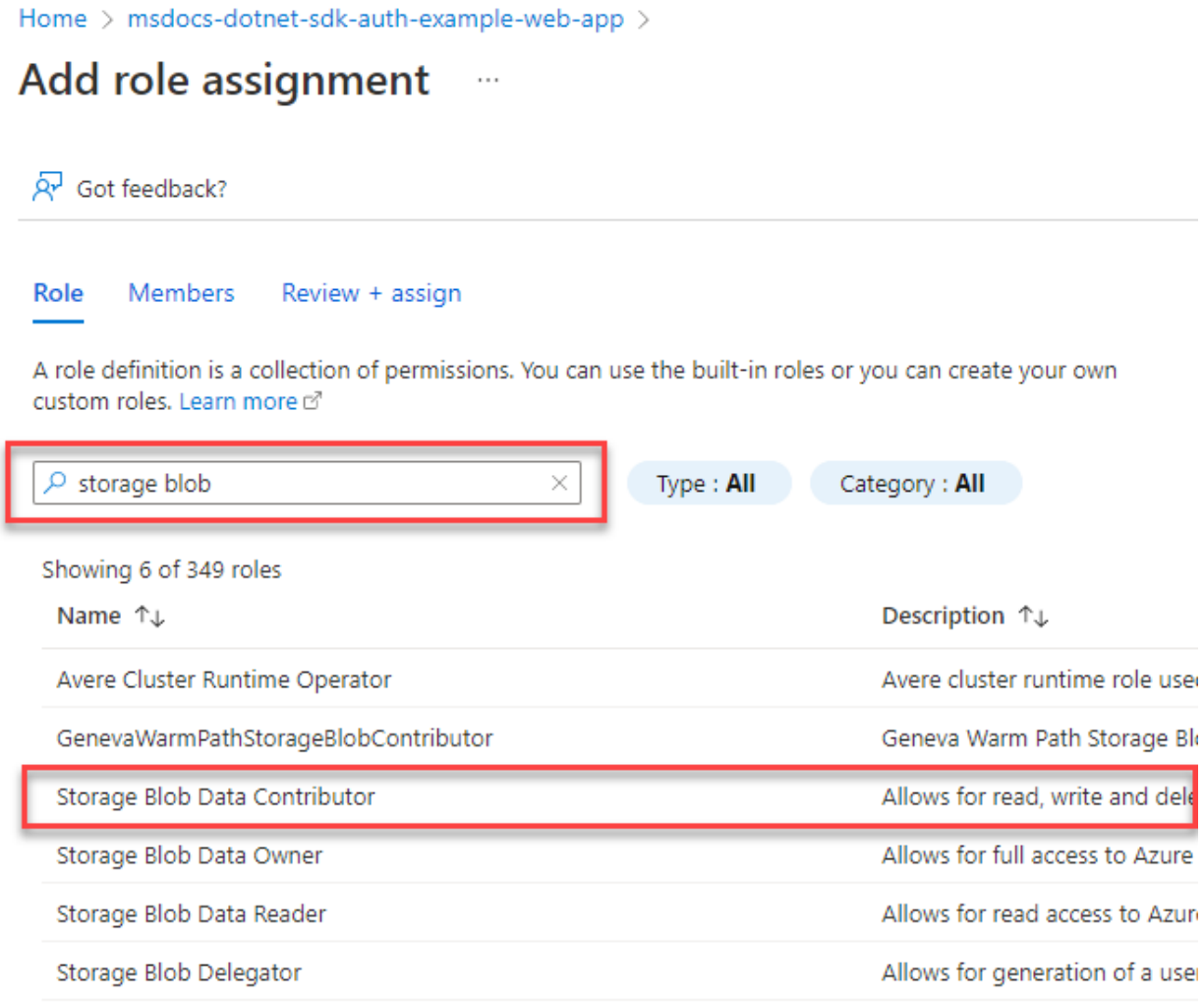
Managed Idententies



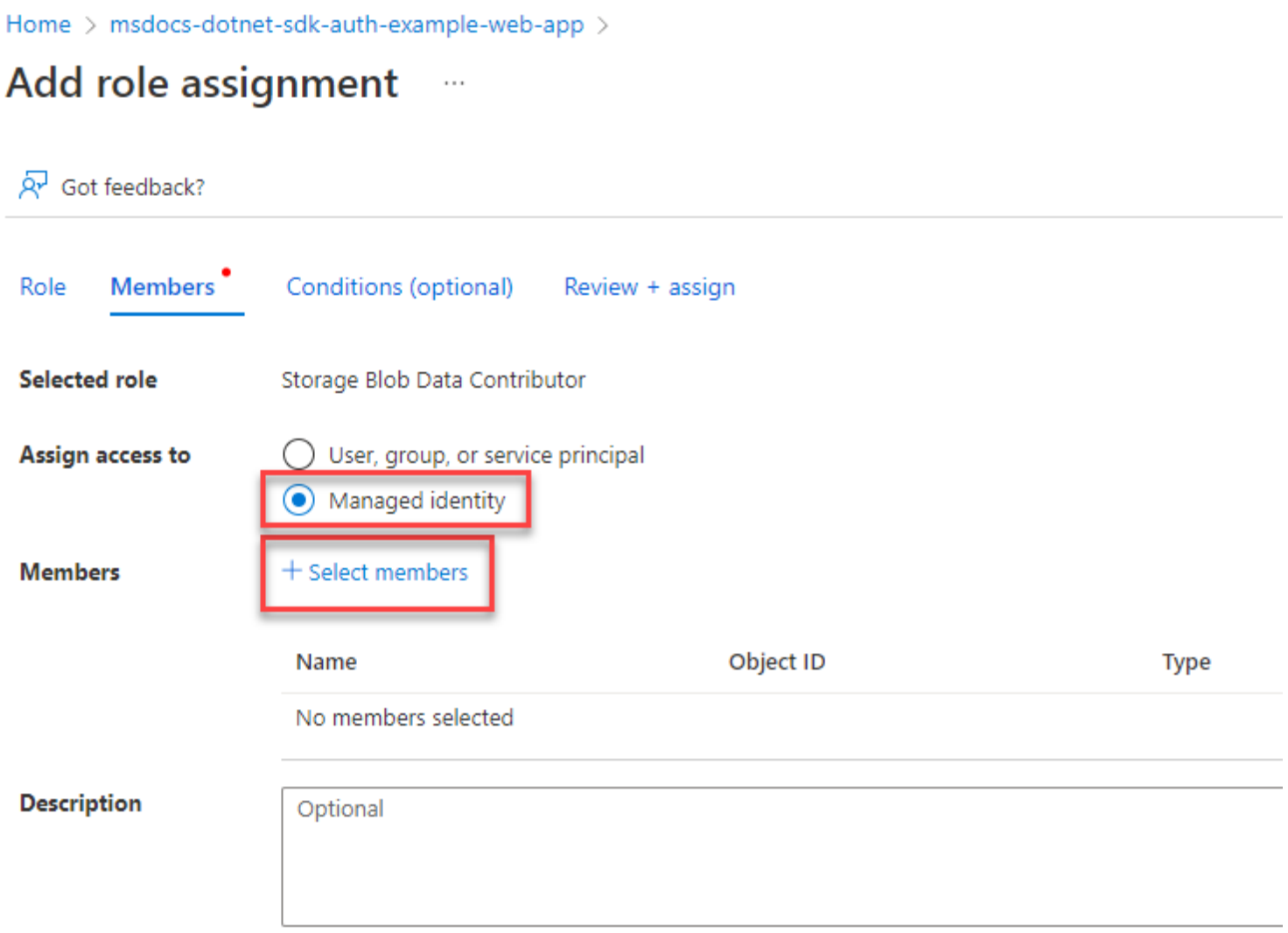
Managed Idententies



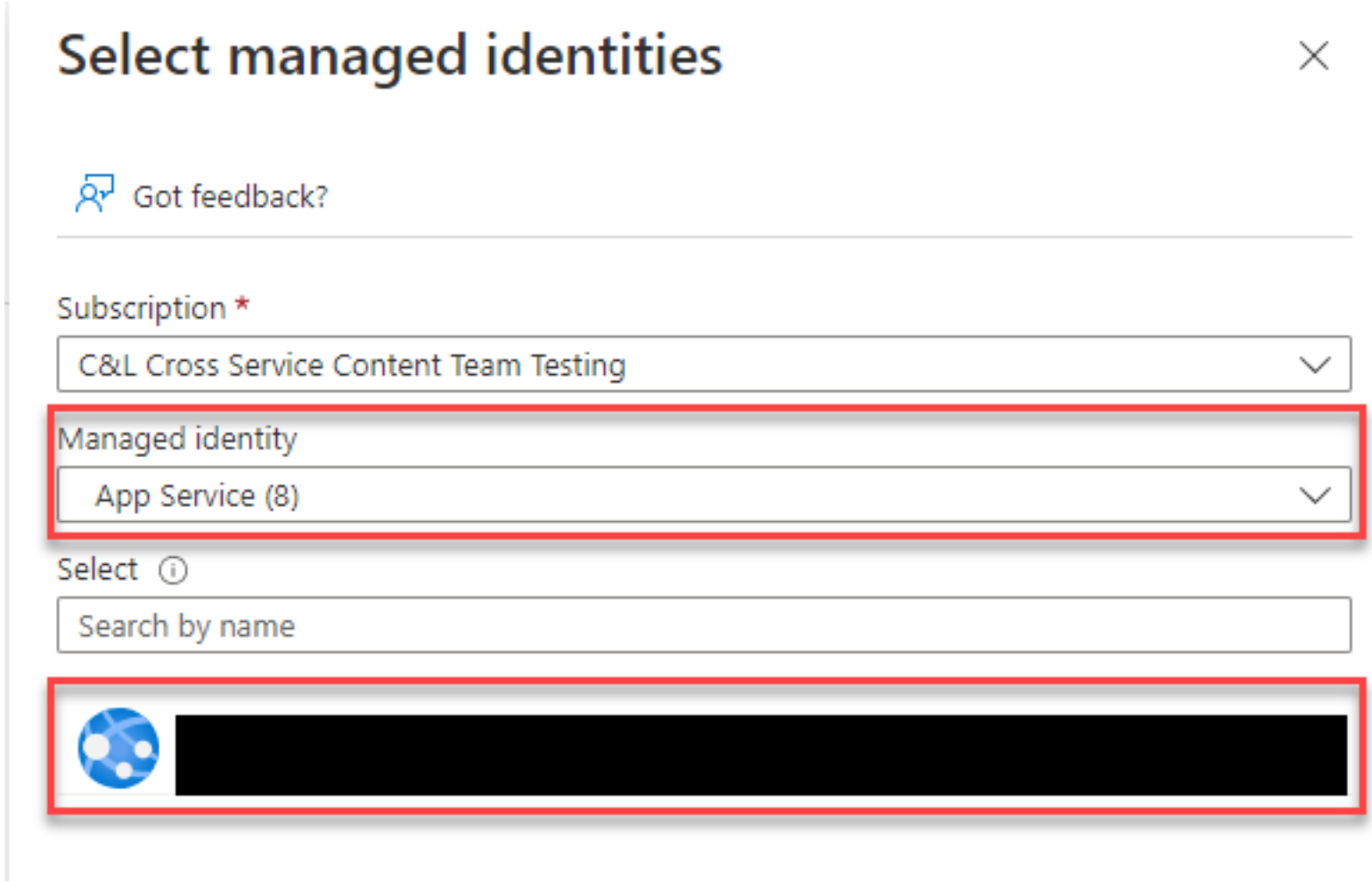
Managed Idententies



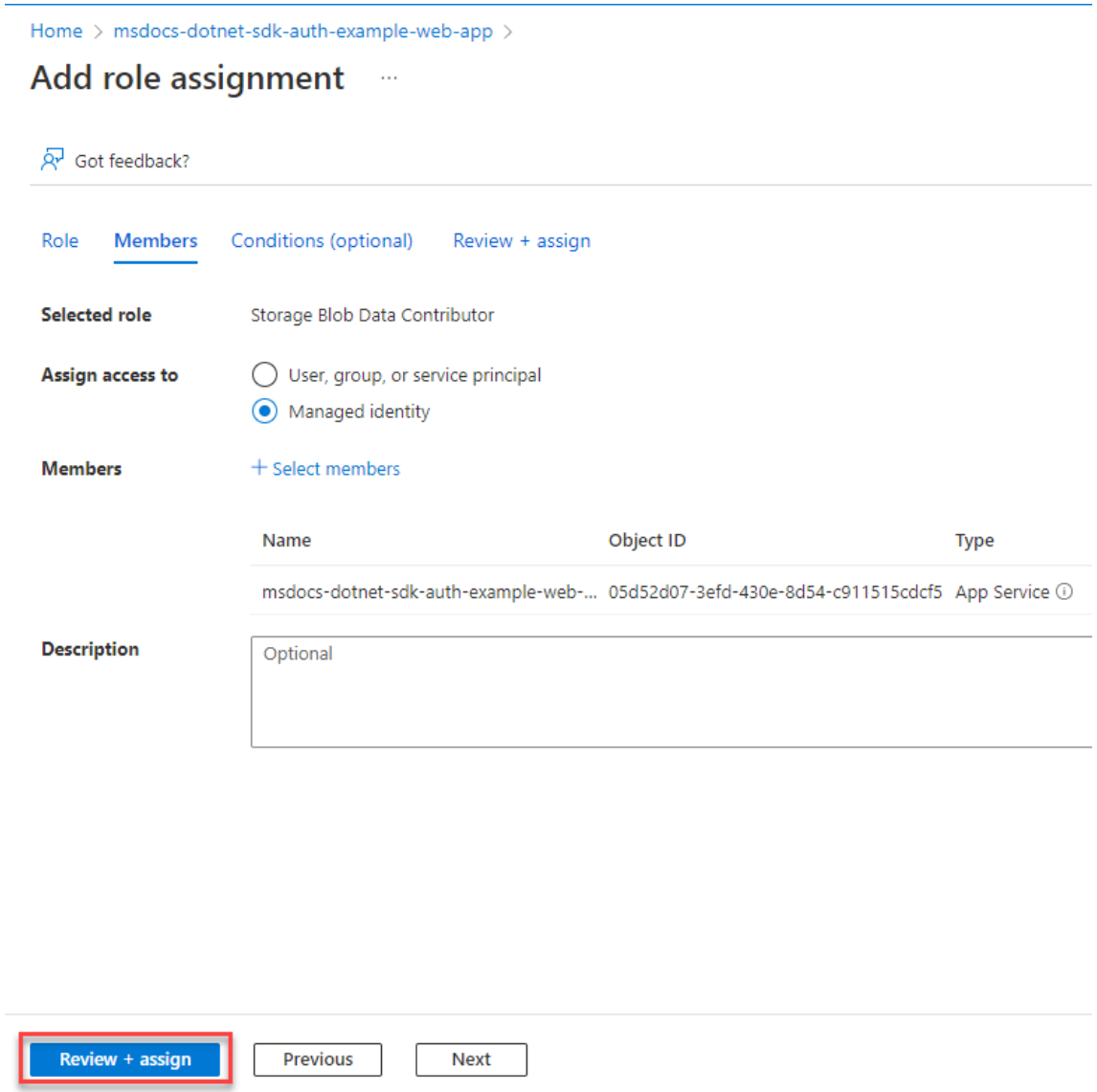
Managed Idententies



Managed Idententies



Managed Idententies



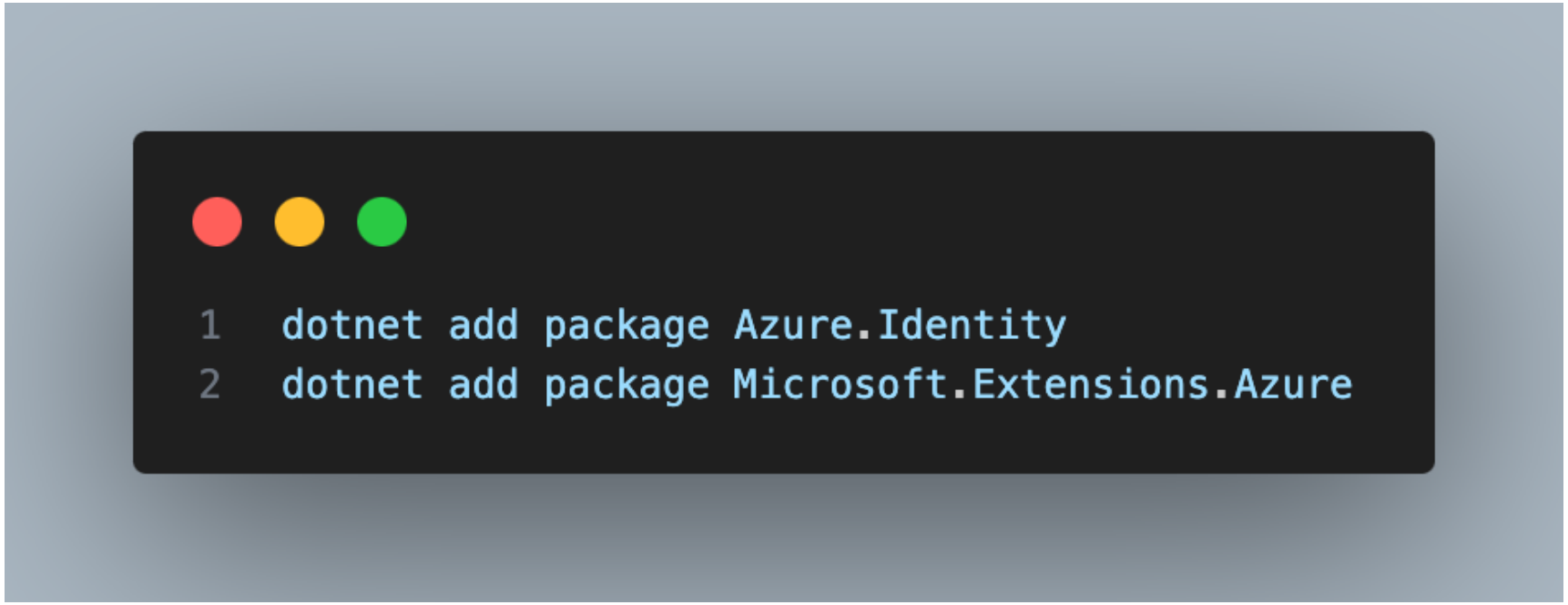
Managed Idententies

3. Використайте **`DefaultAzureCredential`** у вашому додатку

Managed Idententies

DefaultAzureCredential is an opinionated, ordered sequence of mechanisms for authenticating to Microsoft Entra ID. Each authentication mechanism is a class derived from the TokenCredential class and is known as a *credential*. At runtime, `DefaultAzureCredential` attempts to authenticate using the first credential. If that credential fails to acquire an access token, the next credential in the sequence is attempted, and so on, until an access token is successfully obtained. In this way, your app can use different credentials in different environments without writing environment-specific code.

Managed Idententies



Managed Idententies

Azure services are accessed using specialized client classes from the various Azure SDK client libraries. These classes and your own custom services should be registered so they can be accessed via dependency injection throughout your app. In `Program.cs`, complete the following steps to register a client class and `DefaultAzureCredential`:

1. Include the `Azure.Identity` and `Microsoft.Extensions.Azure` namespaces via `using` directives.
2. Register the Azure service client using the corresponding `Add`-prefixed extension method.
3. Pass an instance of `DefaultAzureCredential` to the `UseCredential` method.

Managed Idententies

```
using Microsoft.Extensions.Azure;
using Azure.Identity;

builder.Services.AddAzureClients(clientBuilder =>
{
    clientBuilder.AddBlobServiceClient(
        new Uri("https://<account-name>.blob.core.windows.net"));
    clientBuilder.UseCredential(new DefaultAzureCredential());
});
```

Managed Idententies

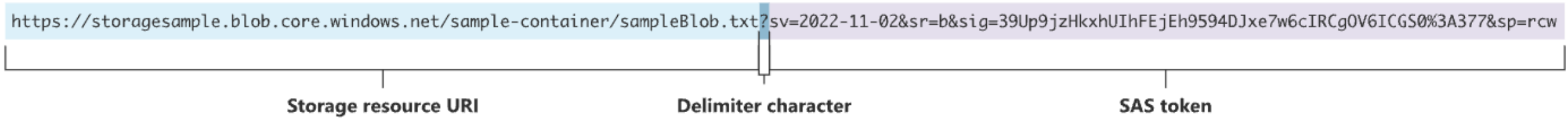
```
using Azure.Identity;

builder.Services.AddSingleton<BlobServiceClient>(_ =>
    new BlobServiceClient(
        new Uri("https://<account-name>.blob.core.windows.net"),
        new DefaultAzureCredential()));
```

SAS token

- User delegation SAS
- Service SAS
- Account SAS

SAS token


https://storagesample.blob.core.windows.net/sample-container/sampleBlob.txt?sv=2022-11-02&sr=b&sig=39Up9jzHkxhUIhFEjEh9594DJxe7w6cIRCgOV6ICGS0%3A377&sp=rcw
Storage resource URI
Delimiter character
SAS token

User delegation SAS

- User delegation SAS
- Service SAS
- Account SAS

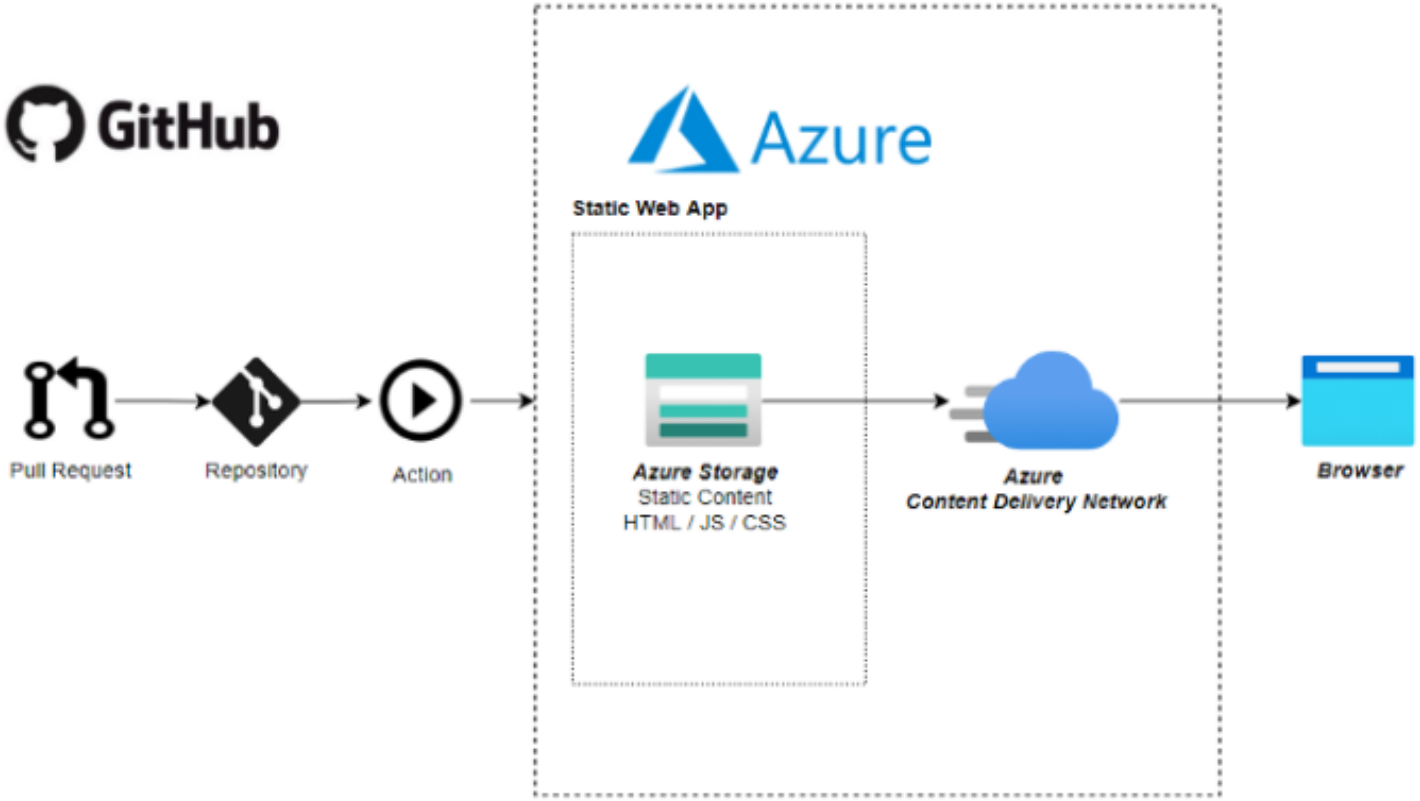
Service SAS

- User delegation SAS
- Service SAS
- Account SAS

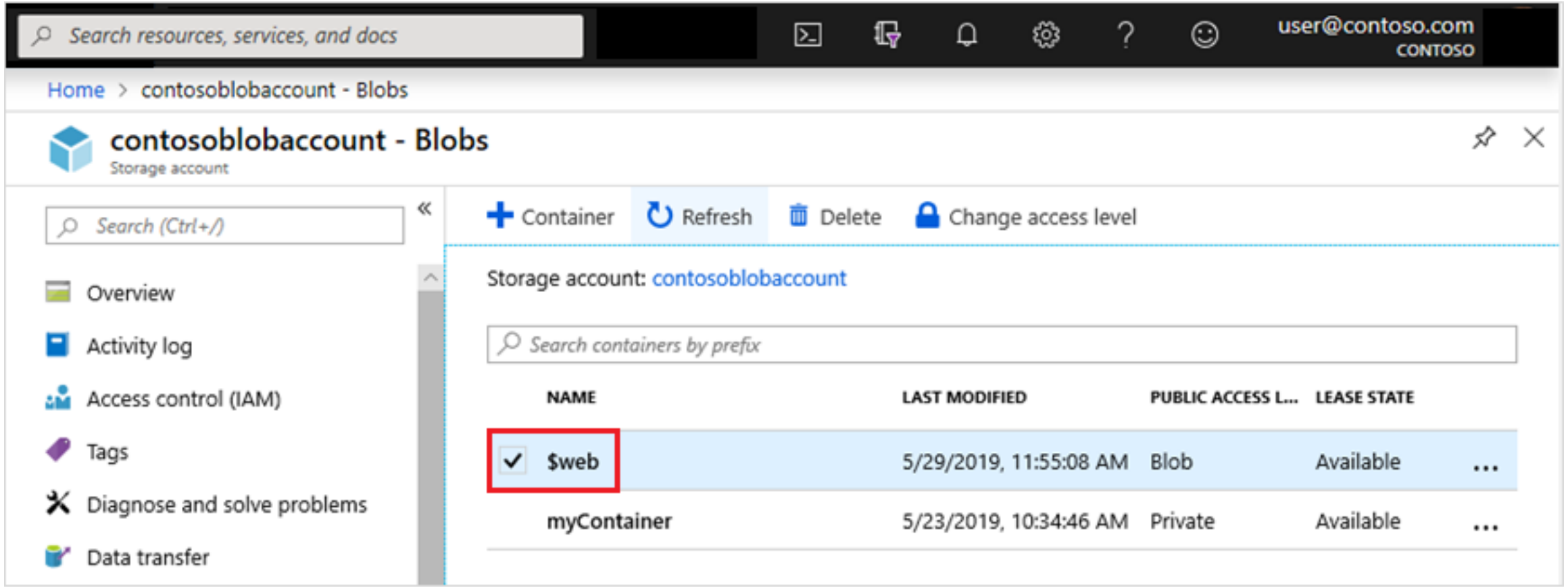
Account SAS

- User delegation SAS
- Service SAS
- Account SAS

Static website hosting in Azure Storage



Setting up a static website

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