



Azure Storage Part I

CSCI E-94

Fundamentals of Cloud Computing - Azure

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Agenda

- Overview
- Azure Storage Provisioning
- Azure Block Blob Storage
 - Implementation



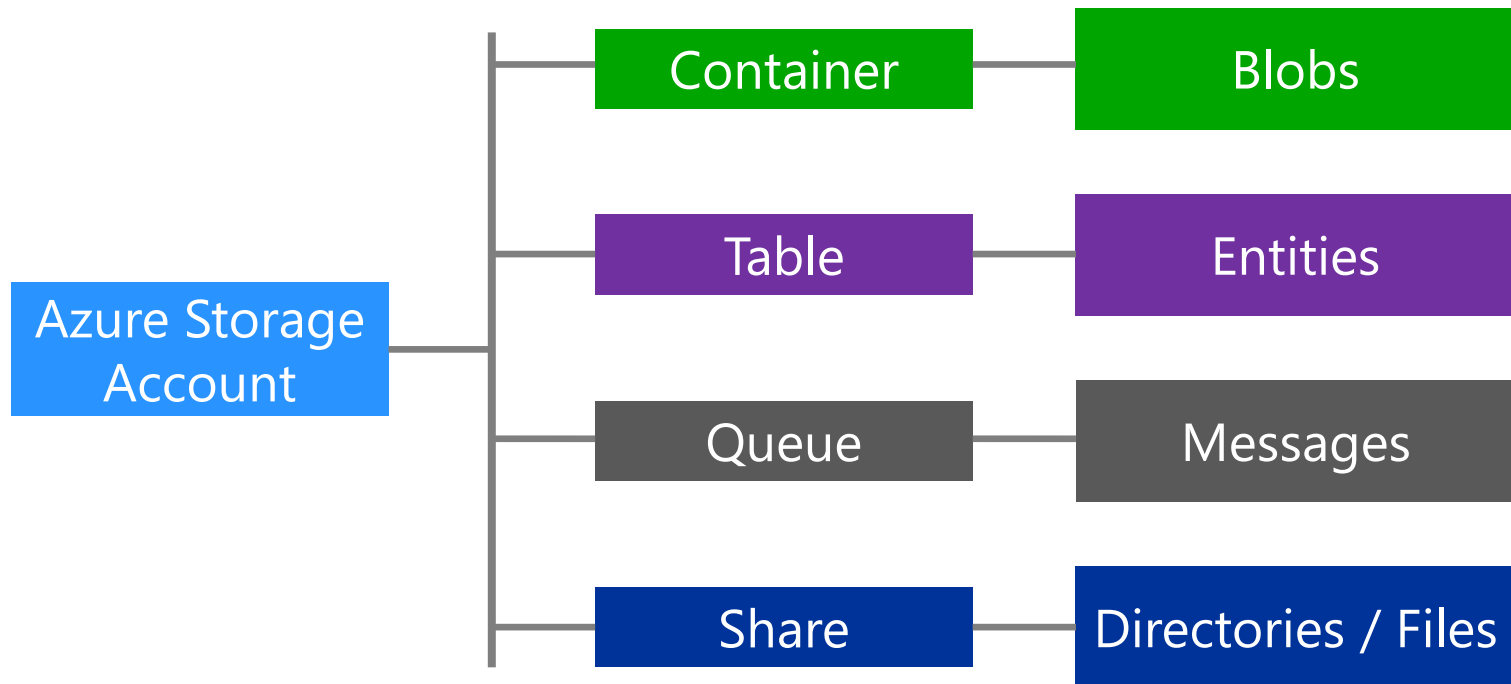
Overview

- *"Azure Storage"* has 4 storage facilities
 - Blobs
 - Queues
 - Tables
 - Files



Azure Storage

- Azure Storage resources relationships



See: Azure Storage Concepts: <http://bit.ly/3twKleu>



Overview

Azure Blob Storage

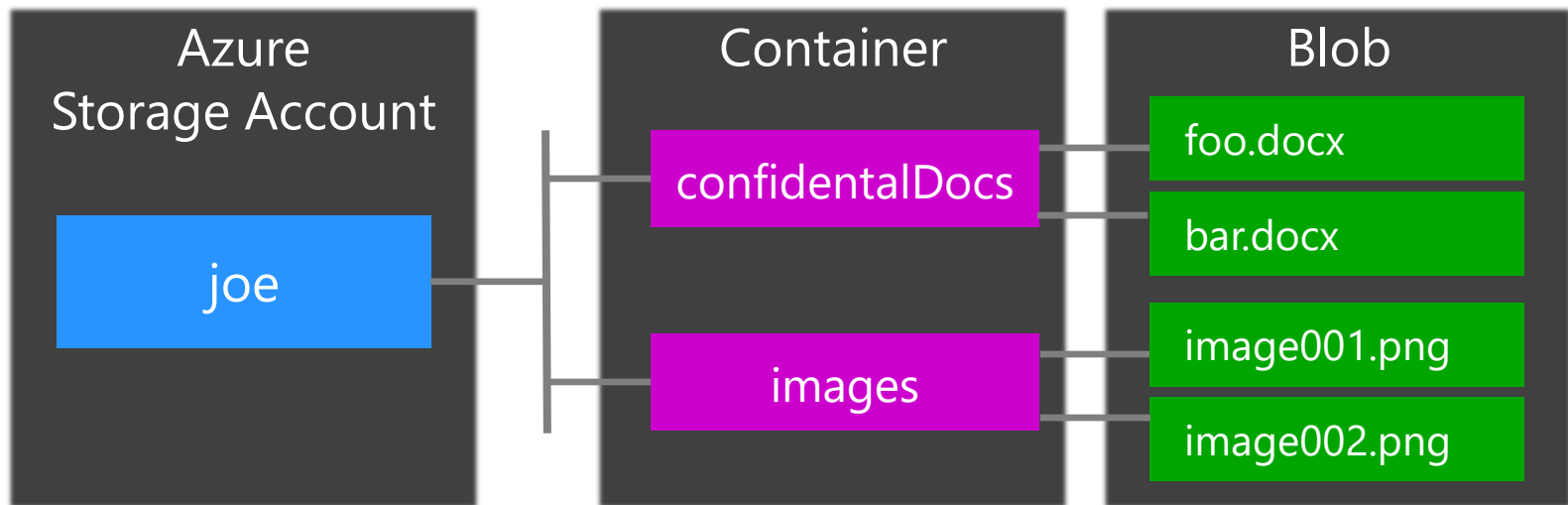
- What is it?
 - Highly scalable storage of unstructured data
- Common uses
 - Serving images/documents direct to browser
 - Storing files for distributed access
 - Streaming video & audio
 - Secure backup and recovery
 - Offloading data
 - For large scale processing in Azure



Overview

Azure Blob Storage

■ Blob Service Concepts



URL to access blob:

`http://<storage account>.blob.core.windows.net/<container>/<blob>`

Adapted from: [Link](#)



Overview

Azure Blob Storage

■ General Features

■ Low storage cost

- East US as of 2/15/2025
 - 1000 GB Locally Redundant \$20.80 USD
 - 10 Million Write Storage Operations: \$5.00
 - 1000 GB Geo Redundant \$45.80 USD
 - 10 Million Write Storage Operations: \$10.00
- See Azure Calculator: <http://bit.ly/1cMjBOY>



Overview

Azure Blob Storage

■ Options

■ Locally-redundant storage LRS

- 99.9999999999% (11 9's)
 - durability of objects over a give year.

■ Zone-redundant storage (ZRS)

- 99.99999999999% (12 9's)
 - durability of objects over a given year

■ Geo-redundant storage (GRS)

- 99.999999999999999% (16 9's)
 - durability of objects over a given year



Overview

Azure Blob Storage

■ Options ...

■ Hot storage (default)

■ Frequent read/write data

- Staged for processing and migrated to cool tier

■ Cool tier

■ Infrequently accessed and stored for 30+ days

- Short-term backup and disaster recovery
- Logs for periodic analysis
- Minimum retention of 30 days.
- Available with low latency (milliseconds)



Overview

Azure Blob Storage

■ Options ...

■ Cold tier

- Infrequently accessed and stored for 90+ days
 - Rarely access data where some latency is tolerable
 - Medium term compliance & regulatory storage
 - Older analytics data sets
 - Minimum retention of 90 days.
 - Available with low latency (milliseconds)



Overview

Azure Blob Storage

■ Options ...

■ Archive storage

- Rarely accessed and stored for 180+ days
 - Regulatory or legal hold files
 - Must be kept for years
 - Compliance and archival data
 - Security camera footage, X-Rays/MRIs,
 - Audio Recordings
 - Transcripts of calls for financial service
 - Any data you do not anticipate needing to retrieve quickly
 - Latency in the order of hours



Overview

Azure Blob Storage

- Options ...
 - Premium storage
 - High performance hardware
 - SSD vs Disk
 - Encryption at rest
 - Highly scalable
 - As of February 15, 2025
 - 5 PiB for US and Europe, can request increases
 - See Azure Limits: <http://bit.ly/2HcRdpt>



Overview

Azure Blob Storage

■ Azure Block Blobs

- Optimized for streaming & storing objects
 - Maximum size of a block in a blob
 - 4000 MiB = **4000 x (20²⁰)**
 - Maximum number of blocks in a blob
 - 50,000 blocks



Overview

Azure Blob Storage

- Azure Block Blobs
 - Storage of unstructured data
 - Documents, Backups
 - Media, Images, Audio, Streaming
 - Big data
 - Logs & Large Datasets



Overview

Azure Blob Storage

■ Azure Page Blobs

- Optimized for representing IaaS disks
 - Up to 8 TiB = $8 \times (20^{40})$ in size per page blob
 - Azure virtual machine network attached disk
 - VHD stored as a page blob
- Supports random writes

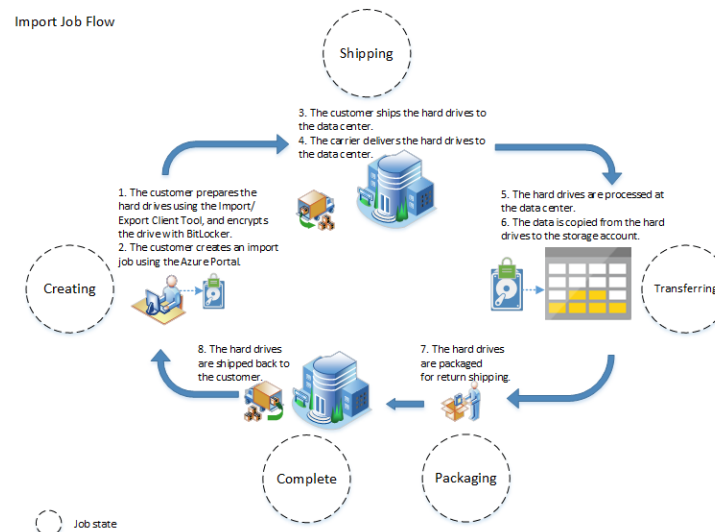
■ Azure Append Blobs

- Optimized for append operations
 - Update and delete are not supported
 - 195 GiB = $195 \times (20^{30})$ in size per appended block blob



Overview

- Azure Import/Export Service
 - Import or Export data directly
 - 3.5-inch SATA II/III drives
 - Multiple drive import/export supported

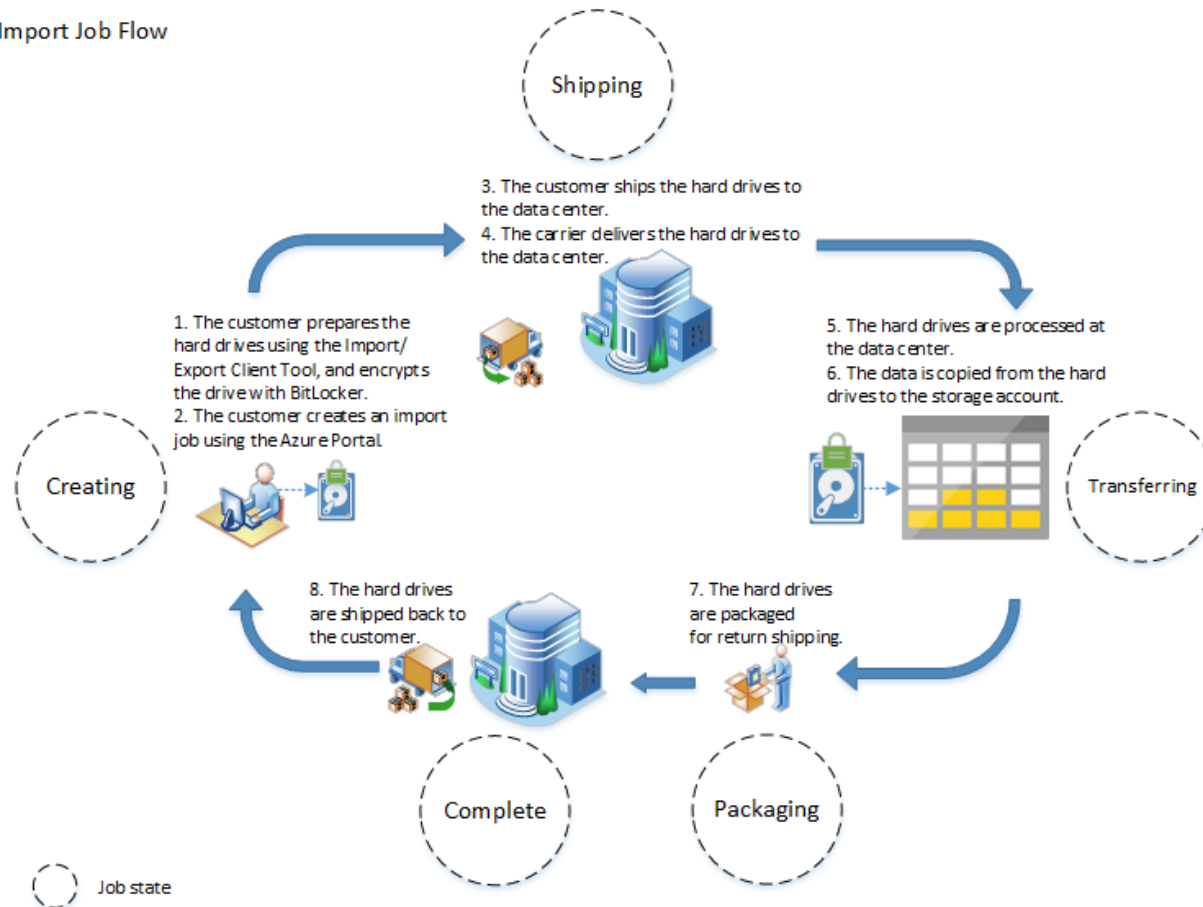


Courtesy Microsoft documentation: [Using Azure Import/Export to transfer data to and from Azure Storage](#)



Overview

Import Job Flow



Courtesy Microsoft documentation: <http://bit.ly/2BYtLgc>



Overview

Azure Blob Storage

- Rich tooling support
 - PowerShell
 - Automate tasks
 - Create Containers, Upload, Download, Etc...
 - AzCopy
 - Bulk load & download
 - Cross-Platform CLI
 - Command line interface
 - Node.js
- Accessible via REST API



Overview

Azure Blob Storage

- Rich client libraries
 - .NET
 - Java
 - C++
 - Go
 - Node.js
- Accessible via REST for everyone else
 - PHP
 - Python



Overview

Azure Blob Storage





Azure Storage Provisioning

Home > New










New

Search the Marketplace

Azure Marketplace [See all](#)

- Get started
- Recently created
- AI + Machine Learning
- Analytics
- Blockchain
- Compute
- Containers
- Databases
- Developer Tools
- DevOps
- Identity
- Integration
- Internet of Things
- Media
- Mixed Reality
- IT & Management Tools
- Networking
- Software as a Service (SaaS)
- Security
- Storage
- Web

Popular

-  Windows Server 2016 Datacenter
[Quickstarts + tutorials](#)
-  Ubuntu Server 18.04 LTS
[Learn more](#)
-  Web App
[Quickstarts + tutorials](#)
-  SQL Database
[Quickstarts + tutorials](#)
-  Function App
[Quickstarts + tutorials](#)
-  Azure Cosmos DB
[Quickstarts + tutorials](#)
-  Kubernetes Service
[Quickstarts + tutorials](#)
-  DevOps Project
[Quickstarts + tutorials](#)
-  Storage account - blob, file, table, queue
[Quickstarts + tutorials](#)

[Show recently created items](#)



Azure Storage Provisioning

Basics Advanced Networking Data protection Encryption Tags Review + create

Azure Storage is a Microsoft-managed service providing cloud storage that is highly available, secure, durable, scalable, and redundant. Azure Storage includes Azure Blobs (objects), Azure Data Lake Storage Gen2, Azure Files, Azure Queues, and Azure Tables. The cost of your storage account depends on the usage and the options you choose below. [Learn more about Azure storage accounts](#)

Project details

Select the subscription in which to create the new storage account. Choose a new or existing resource group to organize and manage your storage account together with other resources.

Subscription *

Resource group *
[Create new](#)

Instance details

If you need to create a legacy storage account type, please click [here](#).

Storage account name ⓘ *

Region ⓘ *

Performance ⓘ *
☒ **Standard:** Recommended for most scenarios (general-purpose v2 account)
☐ **Premium:** Recommended for scenarios that require low latency.

Redundancy ⓘ *

Locally-redundant storage (LRS):

Lowest-cost option with basic protection against server rack and drive failures. Recommended for non-critical scenarios.

Geo-redundant storage (GRS):

Intermediate option with failover capabilities in a secondary region. Recommended for backup scenarios.

Zone-redundant storage (ZRS):

Intermediate option with protection against datacenter-level failures. Recommended for high availability scenarios.

Geo-zone-redundant storage (GZRS):

Optimal data protection solution that includes the offerings of both GRS and ZRS. Recommended for critical data scenarios.

[Review + create](#)

[< Previous](#)

[Next : Advanced >](#)



Azure Storage Provisioning

Create a storage account ...

Basics Advanced Networking Data protection Encryption Tags Review + create

Security

Configure security settings that impact your storage account.

Require secure transfer for REST API operations ☒

Allow enabling anonymous access on individual containers ☒

Enable storage account key access ☒

Default to Microsoft Entra authorization in the Azure portal ☐

Minimum TLS version

Permitted scope for copy operations (preview)

Hierarchical Namespace

Hierarchical namespace, complemented by Data Lake Storage Gen2 endpoint, enables file and directory semantics, accelerates big data analytics workloads, and enables access control lists (ACLs) [Learn more](#)

Enable hierarchical namespace ☐

Access protocols

Blob and Data Lake Gen2 endpoints are provisioned by default [Learn more](#)

Enable SFTP ☐
 SFTP can only be enabled for hierarchical namespace accounts

Enable network file system v3 ☐
 To enable NFS v3 'hierarchical namespace' must be enabled. [Learn more about NFS v3](#)

Blob storage

Allow cross-tenant replication ☐

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[Review + create](#)



Azure Storage Provisioning

Create a storage account ...

Basics Advanced Networking Data protection Encryption Tags Review + create

Network connectivity

You can connect to your storage account either publicly, via public IP addresses or service endpoints, or privately, using a private endpoint.

Network access *



Enable public access from all networks



Enable public access from selected virtual networks and IP addresses



Disable public access and use private access



Enabling public access from all networks might make this resource available publicly. Unless public access is required, we recommend using a more restricted access type. [Learn more](#)

Private endpoint

Create a private endpoint to allow a private connection to this resource. Additional private endpoint connections can be created within the storage account or private link center.

+ Add private endpoint

Name	Subscription	Resource g...	Region	Target sub-...	Subnet	Private DN...
------	--------------	---------------	--------	----------------	--------	---------------

Click on add to create a private endpoint



Network routing

Determine how to route your traffic as it travels from the source to its Azure endpoint. Microsoft network routing is recommended for most customers.

Routing preference * ⓘ



Microsoft network routing



Internet routing

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Review + create



Azure Storage Provisioning

Create a storage account

Basics Advanced Networking **Data protection** Encryption Tags Review + create

Recovery

Protect your data from accidental or erroneous deletion or modification.

- ☐ Enable point-in-time restore for containers
Use point-in-time restore to restore one or more containers to an earlier state. If point-in-time restore is enabled, then versioning, change feed, and blob soft delete must also be enabled. [Learn more](#)
- ☒ Enable soft delete for blobs
Soft delete enables you to recover blobs that were previously marked for deletion, including blobs that were overwritten. [Learn more](#)
Days to retain deleted blobs
- ☒ Enable soft delete for containers
Soft delete enables you to recover containers that were previously marked for deletion. [Learn more](#)
Days to retain deleted containers
- ☒ Enable soft delete for file shares
Soft delete enables you to recover file shares that were previously marked for deletion. [Learn more](#)
Days to retain deleted file shares

Tracking

Manage versions and keep track of changes made to your blob data.

- ☐ Enable versioning for blobs
Use versioning to automatically maintain previous versions of your blobs. [Learn more](#)
Consider your workloads, their impact on the number of versions created, and the resulting costs. Optimize costs by automatically managing the data lifecycle. [Learn more](#)
- ☒ Enable blob change feed
Keep track of create, modification, and delete changes to blobs in your account. [Learn more](#)
 - ☒ Keep all logs
 - ☐ Delete change feed logs after (in days)

Access control

- ☐ Enable version-level immutability support
Allows you to set time-based retention policy on the account-level that will apply to all blob versions. Enable this feature to set a default policy at the account level. Without enabling this, you can still set a default policy at the container level or set policies for specific blob versions. Versioning is required for this property to be enabled. [Learn more](#)

Previous Next **Review + create**

Create a storage account

Basics Advanced Networking Data protection **Encryption** Tags Review + create

- Encryption type ^ ⓘ
- ☒ Microsoft-managed keys (MMK)
 - ☐ Customer-managed keys (CMK)
- Enable support for customer-managed keys ⓘ
- ☒ Blobs and files only
 - ☐ All service types (blobs, files, tables, and queues)
- This option cannot be changed after this storage account is created.
- Enable infrastructure encryption ⓘ ☐
- Previous Next **Review + create** [Give feedback](#)



Azure Storage Provisioning

Create a storage account

Basics Advanced Networking Data protection Encryption Tags

[View automation template](#)

Basics

Subscription	01-Lab_Joe_Ficara Student
Resource group	rg_shreddemoresources
Location	East US
Storage account name	stcsie94demo
Primary service	
Performance	Standard
Replication	Locally-redundant storage (LRS)

Advanced

Enable hierarchical namespace	Disabled
Enable SFTP	Disabled
Enable network file system v3	Disabled
Allow cross-tenant replication	Disabled
Access tier	Hot
Enable large file shares	Enabled

Review + create

Security

Secure transfer	Enabled
Blob anonymous access	Enabled
Allow storage account key access	Enabled
Default to Microsoft Entra authorization in the Azure portal	Disabled
Minimum TLS version	Version 1.2
Permitted scope for copy operations (preview)	From storage accounts in the same Microsoft Entra tenant

Networking

Network connectivity	Public endpoint (all networks)
Default routing tier	Microsoft network routing

Data protection

Point-in-time restore	Disabled
Blob soft delete	Enabled
Blob retainment period in days	7
Container soft delete	Enabled
Container retainment period in days	7

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Create



Azure Storage Provisioning

- There are several redundancy options
 - See: [Link](#) & for a summary see: [Link](#)
- When developing locally:
 - LRS: Use local redundancy -> Lowest cost
 - 3 Copies of data
 - Same facility
 - Does not protect against facility failure
 - Protects against limited hardware failures



Azure Storage Provisioning

- Production-> Meet business requirements
 - ZRS: Zone Redundancy
 - Same region or two regions
 - Only available for block blobs
 - Isolated infrastructure
 - 3 Copies of data
 - GRS: Geo Redundancy
 - Protects against catastrophic failure
 - Within a geographic location
 - Two locations
 - 6 copies of data



Azure Storage Provisioning

- Production-> Meet business requirements
 - RA-GRS: Read Access Geo Redundancy
 - Protects against catastrophic failure
 - Within a geographic location
 - Two locations
 - 6 copies of data
 - Read access from both locations



Azure Storage Provisioning

- Production-> Meet business requirements
 - Geo Zone Redundant (GZRS)
V2 Storage Accounts Only
 - RA-GZRS, RA-GRZ, & GZRS
 - 99.999999999999999% (16 9's)
 - Durability of objects over a given year
 - Included
 - Block blobs
 - Page Blobs (Except VHD disks)
 - Files
 - Tables
 - Queues



Azure Storage Provisioning

- How do you access the storage account?
 - Storage Explorers
 - Recommended:
 - Microsoft's Storage Explorer:
 - [Azure Storage Explorer](#)
 - A list of others:
 - [Microsoft client tools for working with Azure Storage](#)
 - Note:
 - Azure Portal includes a full featured GUI
 - Block, Page Blob, Append Blob, Table, Queue, Files



Azure Storage Provisioning

- How do you access the storage account?
 - `Azure.Storage.Blobs` Nuget Package
 - The SDK
 - Using the storage connection string
 - `DefaultEndpointsProtocol=https;`
`AccountName=[accountname];`
`AccountKey=[accesskey]`



Azure Storage Provisioning

- Where do you get the connection string?
 - In the new dashboard -> Keys

The screenshot shows the 'Access keys' page for the storage account 'stcscie94demo'. The left sidebar contains navigation links: Overview, Activity log, Tags, Diagnose and solve problems, Access Control (IAM), Data migration, Events, Storage browser (preview), Data storage (Containers, File shares, Queues, Tables), Security + networking (Networking, Azure CDN, Access keys, Shared access signature). The 'Access keys' link is highlighted with a red arrow. The main content area shows two keys, 'key1' and 'key2'. For 'key1', the 'Connection string' field is highlighted with a red arrow, showing the value 'DefaultEndpointsProtocol=https;AccountName=stcscie94demo;AccountKey=...'. Another red arrow points to the copy icon next to the connection string. The 'Access keys' link in the sidebar is also highlighted with a red arrow.



Azure Storage Provisioning

- Do store the connection string
 - Dashboard config
- Don't put the connection string in code
 - Or in your client/mobile app
 - Or in your JSON config file
- The SDK is available via Nuget
 - `Azure.Storage.Blobs`
- Can also access via REST API
 - Use the SDK when you can though



Demo

Azure Storage Provisioning

Azure Dashboard Demo



Azure Storage Provisioning

- If you forget to allow anonymous access

Home > stcsie94demo

stcsie94demo | Configuration ☆ ☆ ...

Storage account

Search Save Discard Refresh Give feedback

Overview
Activity log
Tags
Diagnose and solve problems
Access Control (IAM)
Data migration
Events
Storage browser
Storage Mover
Partner solutions
Data storage
Security + networking
Data management
Settings
Configuration
Data Lake Gen2 upgrade
Resource sharing (CORS)
Advisor recommendations
Endpoints
Locks
Monitoring
Monitoring (classic)
Automation
Help

The cost of your storage account depends on the usage and the options you choose below. [Learn more about storage pricing](#)

Account kind
StorageV2 (general purpose v2)

Performance ⓘ
☒ Standard ☐ Premium
This setting cannot be changed after the storage account is created.

Secure transfer required ⓘ
☐ Disabled ☒ Enabled

Allow Blob anonymous access ⓘ
☐ Disabled ☒ Enabled

Allow storage account key access ⓘ
☐ Disabled ☒ Enabled

Allow recommended upper limit for shared access signature (SAS) expiry interval ⓘ
☒ Disabled ☐ Enabled

Default to Microsoft Entra authorization in the Azure portal ⓘ
☒ Disabled ☐ Enabled

Minimum TLS version ⓘ
Version 1.2

Permitted scope for copy operations (preview) ⓘ
From storage accounts in the same Microsoft Entra tenant

Blob access tier (default) ⓘ
☒ Hot ☐ Cool ☐ Cold

Large file shares ⓘ
☐ Disabled ☒ Enabled



Azure Block Blob Storage

Implementation

- Adding a Block Blob requires 4 steps
 - 1. Create a `BlobContainerClient`
 - Using the cloud storage connection string
 - 2. Create a `BlobClient`
 - Using passing in the blob Name
 - 2a. Optionally set the access policy
 - On the container
 - Using the `BlobContainerClient`
 - `SetAccessPolicyAsync`



Azure Block Blob Storage

Implementation

- Adding a Block Blob requires 4 steps ...
 - 3. Open a read stream
 - `OpenReadStream`
 - 4. Upload data to the blob
 - Using the `BlobClient`
 - 4a. Optionally set metadata on the blob
 - Using `SetMetadataAsync`
 - Done!



Azure Block Blob Storage

Implementation

- Notes:
 - Blobs support
 - Leases
 - Metadata
 - Etags
 - Updating and more ...
 - Nested containers, not supported by default
[unless hierarchy is enabled on the storage account]
 - Do support pseudo directories
 - Using a forward slash in the blob name
 - directory/blobname



Demo

Azure Block Blob Storage Implementation

AzureBlobSolution



Azure Block Blob Storage





Azure Block Blob Storage

Implementation 2

- Two changes:
 - Let's use a business layer
 - Via dependency injection
 - Makes the code cleaner
 - Easier to unit test
 - Managed Identities to access storage
 - Removes secrets from callers
 - Developers in Visual Studio
 - Azure App Services
 - Etc...



Azure Storage

Managed Identities

- Azure Storage Supports Managed Identity
- Requires caller to have
 - A Microsoft Entra ID Account
 - Role(s) assigned to grant access
 - Some of the common roles
 - [Storage Blob Data Contributor](#)
 - [Storage Blob Data Owner](#)
 - [Storage Blob Data Reader](#)
 - See: [Built-in-roles](#)



Azure Storage

Managed Identities

- Requires assignment
 - Account level
 - Storage Blob Data Owner
 - At the container
 - Storage Blob Data Contributor, Reader



Azure Storage

Managed Identities

- Add a role assignment at the container
 - Here the pictures container

The screenshot shows the Microsoft Azure portal interface. At the top, the navigation bar includes the Microsoft Azure logo and a search bar. Below the navigation bar, the breadcrumb trail is 'Home > stcsie94demoad > pictures', with a red arrow pointing to 'pictures'. The main heading is 'pictures | Access Control (IAM)', with a red arrow pointing to 'Container' below it. The left sidebar contains a search bar and a list of options: Overview, Diagnose and solve problems, Access Control (IAM) (selected), Settings, Shared access tokens, Access policy, Properties, and Metadata. The main content area has tabs for 'Check access' (selected), 'Role assignments', 'Roles', 'Deny assignments', and 'Classic administrators'. Under 'Check access', there is a 'My access' section with a 'View my access' button, and a 'Check access' section with a description and a 'Learn more' link. Below these is a 'Find' section with a dropdown menu for 'User, group, or service principal' and a search box for 'Search by name or email address'. On the right, there is a 'Grant access to this resource' section with a description and an 'Add role assignment' button (highlighted with a red arrow), and a 'View access to this resource' section with a description.



Azure Storage

Managed Identities

- Add a role assignment at the container
 - Add the "Storage Blob Data Contributor" role

Microsoft Azure | Search resources, services, and docs (G+)

Dashboard > stcsie94demo | Containers > pictures | Access Control (IAM) >

Add role assignment

Role Members Conditions (optional) Review + assign

A role definition is a collection of permissions. You can use the built-in roles or you can create your own custom roles. [Learn more](#)

Assignment type

Job function roles Privileged administrator roles

Grant access to Azure resources based on job function, such as the ability to create virtual machines.

storage blob Type: All Category: All

Name ↑↓	Description ↑↓	Type ↑↓	Category ↑↓	Details
Defender for Storage Data Scanner	Grants access to read blobs and update in...	BuiltInRole	None	View
Storage Blob Data Contributor	Allows for read, write and delete access to...	BuiltInRole	Storage	View
Storage Blob Data Owner	Allows for full access to Azure Storage blo...	BuiltInRole	Storage	View
Storage Blob Data Reader	Allows for read access to Azure Storage bl...	BuiltInRole	Storage	View
Storage Blob Delegator	Allows for generation of a user delegation...	BuiltInRole	Storage	View

[Review + assign](#) [Previous](#) [Next](#) [Feedback](#)



Azure Storage

Managed Identities

- Storage Blob Data Contributor
 - Permissions – Actions (control plane)

Storage Blob Data Contributor

BuiltinRole

Permissions JSON Assignments

Description: Allows for read, write and delete access to Azure Storage blob containers and data

Type : All

☒ Actions ☐ DataActions

Showing 6 of 6 permissions

Type	Permissions	Description
▼ Microsoft.Storage		
Other	Generate a user delegation key ⓘ	Returns a user delegation key for the blob service
Write	Patch blob container ⓘ	Returns the result of patch blob container
Delete	Delete blob container ⓘ	Returns the result of deleting a container
Read	Get blob container ⓘ	Returns a container
Read	List of blob containers ⓘ	Returns list of containers
Write	Put blob container ⓘ	Returns the result of put blob container



Azure Storage

Managed Identities

- Storage Blob Data Contributor
 - Permissions – Data Actions (data plane)

Storage Blob Data Contributor

BuiltInRole

Permissions JSON Assignments

Description: Allows for read, write and delete access to Azure Storage blob containers and data

Type : All

☐ Actions ☒ DataActions

Showing 5 of 5 permissions

Type	Permissions	Description
▼ Microsoft.Storage		
Read	Read Blob ⓘ	Returns a blob or a list of blobs
Write	Write Blob ⓘ	Returns the result of writing a blob
Delete	Delete blob ⓘ	Returns the result of deleting a blob
Other	Add blob content ⓘ	Returns the result of adding blob content
Other	Move blobs ⓘ	Moves the blob from one path to another



Azure Storage

Managed Identities

- Pick the user group or service principal

Home > stcsie94demo > pictures >

Add role assignment

Got feedback?

Role **Members** Conditions (optional) Review + assign

Selected role Storage Blob Data Contributor

Assign access to ☒ User, group, or service principal ☐ Managed identity

Members + Select members

Name	Object ID	Type
No members selected		

Description Optional

Review + assign Previous Next

Select members

Select

Search by name or email address

- Ficara, Joseph (Guest)
jficara@fas.harvard.edu
- DB Admin
jficaradbadmin@jficaraharvardoutlook.onmicrosoft.com
- Joe Hotmail Ficara (Guest)
josephficara@hotmail.com
- myAzureSQLDBAccessGroup
- Supergirl
KaraDanvars@jficaraharvardoutlook.onmicrosoft.com

Selected members:

- Joe Ficara
jficara.harvard_outlook.com#EXT#@jfi... Remove

Select Close



Azure Storage

Managed Identities

- Pick the user group or service principal

Dashboard > stcsie94demoad > pictures >

Add role assignment ...

Got feedback?

Role Members Conditions (optional) Review + assign

Role
Storage Blob Data Contributor

Scope
/subscriptions/08da0306-afdd-48de-8fec-b48554665efe/resourcegroups/rg-classdemo/providers/Microsoft.Storage/storageAccounts/stcsie94demoad/blobServices/default/containers/pictures

Members

Name	Object ID	Type
Joe Ficara	1691f5b4-3b55-48ec-a78b-b5bb7ce06a59	User

Description
No description

Condition
None

Review + assign Previous



Azure Storage

Managed Identities

- Can also assign roles at the App Service

Dashboard > app-blobaddemo-cscie94

app-blobaddemo-cscie94 | Identity ...
App Service

ide x <<

Settings

- Identity

Support + troubleshooting

- New Support Request

System assigned User assigned

A system assigned managed identity is restricted to one per resource and is tied to the lifecycle of this resource. You can grant permissions to the managed identity by using Azure role-based access control (Azure RBAC). The managed identity is authenticated with Azure AD, so you don't have to store any credentials in code. [Learn more about Managed identities.](#)

Save Discard Refresh | Got feedback?

Status ⓘ

Off **On**

Object (principal) ID ⓘ

836f4824-0722-4960-97ad-2873c4228065

Permissions ⓘ

Azure role assignments

This resource is registered with Azure Active Directory. The managed identity can be configured to allow access to other resources. Be careful when making changes to the access settings for the managed identity because it can result in failures. [Learn more](#)



Azure Storage

Managed Identities

- Can also assign roles at the App Service

Add role assignment (Preview)



Scope ⓘ

Storage



Subscription

Staff Labs for jficara.harvard



Resource ⓘ

stcscie94demoad ⓘ



Role ⓘ

Storage Blob Data Contributor ⓘ



[Learn more about RBAC](#)



Save

Discard



Azure Storage

Managed Identities

- Some code changes are needed
 - Use `DefaultAzureCredential`
 - To gain access to the host assigned AD credentials
 - Use `DefaultAzureCredentialOptions`
 - To specify the `TenantId`
 - Obtained from the Azure AD Overview Page
 - Create a `BlobContainerClient`
 - Singleton using the `DefaultAzureCredential`



Demo

Azure Block Blob Storage

Managed Identity

AzureBlobManagedIdentitySolution.sln

Managed Identity Configuration: Lines 49 – 60 Program.cs

Implementation of Azure Storage Access: StorageRepository.cs



Azure Storage

Managed Identities





Links & Resources

- Introduction to Azure Storage
 - [Introduction to Azure Storage - Cloud storage on Azure](#)
- Azure Import/Export service
 - [Using Azure Import/Export to transfer data to and from Azure Storage](#)
- Azure Storage Scalability & Performance
 - [Scalability and performance targets for standard storage accounts - Azure Storage](#)
- Azure subscription & service limits, quotas, & constraints
 - [Azure subscription and service limits, quotas, and constraints - Azure Resource Manager](#)



Links & Resources

- How to use:
 - Azure Blob Storage
 - [Azure Blob Storage | Microsoft Azure](#)
 - Azure Table Storage
 - [Table storage | Microsoft Azure](#)
 - Azure Queues
 - [Queue Storage | Microsoft Azure](#)
 - Azure File Storage
 - [Azure Files | Microsoft Azure](#)



Links & Resources

- How to use:
 - Storage Service REST APIs
 - [Azure Storage REST API Reference | Microsoft Docs](#)
 - Azure Storage PowerShell Cmdlets
 - [Install Azure PowerShell with PowerShellGet | Microsoft Docs](#)



Links & Resources

- SDKs
 - .NET
 - Java
 - Go
 - Python
 - Node.JS
 - REST APIs
 - [Azure documentation | Microsoft Docs](#)
 - [Azure SDK Latest Releases | Azure SDKs](#)



Links & Resources

- Azure Storage & Managed Identities
 - Control Plan vs Data Plane
 - Authorize access to blob or queue data from a native or web application
 - Authorize access to blob data with managed identities for Azure Resources
 - Blob service error codes