Azure Software Development Kit (SDK) for .NET

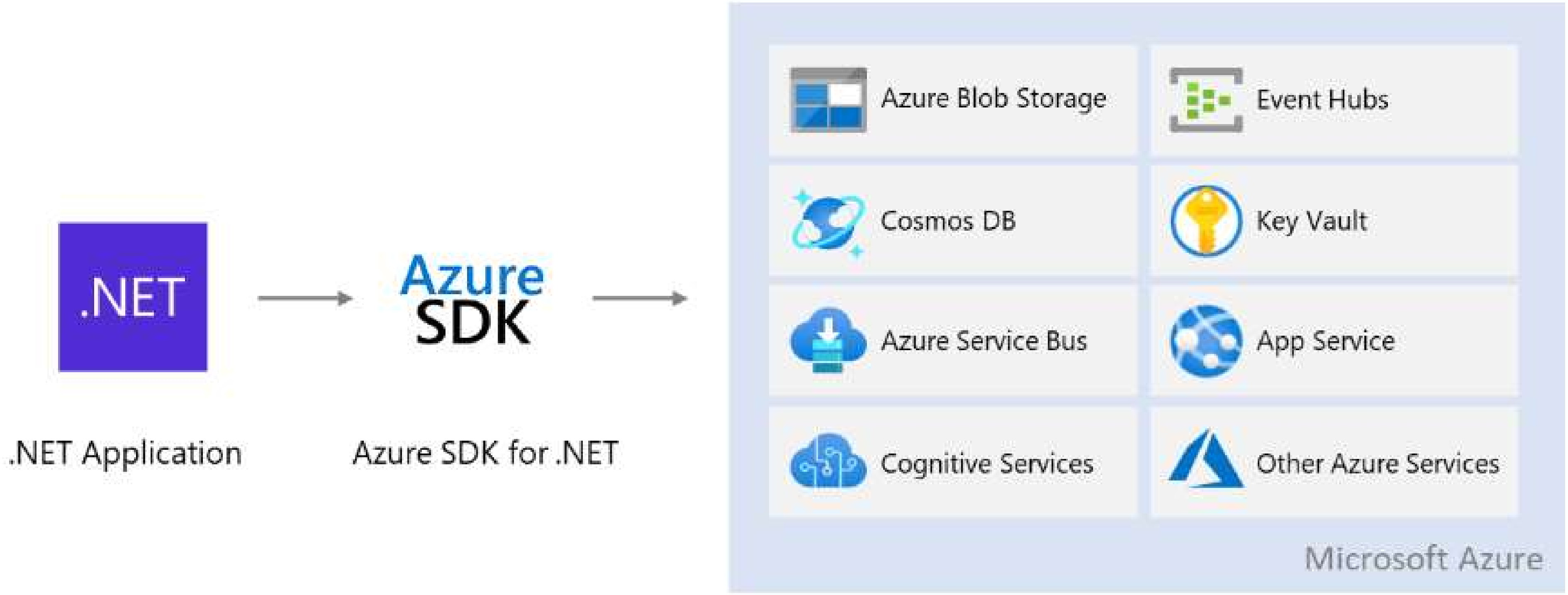
Author: Luis Coco Enríquez

Agenda

Topic
What is Azure SDK for .NET?
How to set up your environment
API Reference
GitHub repositories
C# code samples with Azure SDK for .NET

What is Azure SDK for .NET?

Azure SDK libraries allow us to programmatically manage the Azure services from C#



[Azure for .NET developers | Microsoft Learn]

How to setup your environment

Follow these steps to install and run the Azure SDK for .NET:

1. Create an **Azure free account**. See video: How to Create a Free Azure Account in Few Minutes

2. Install **Azure CLI**: How to install Azure CLI

3. Login in Azure account with the command: **az login**

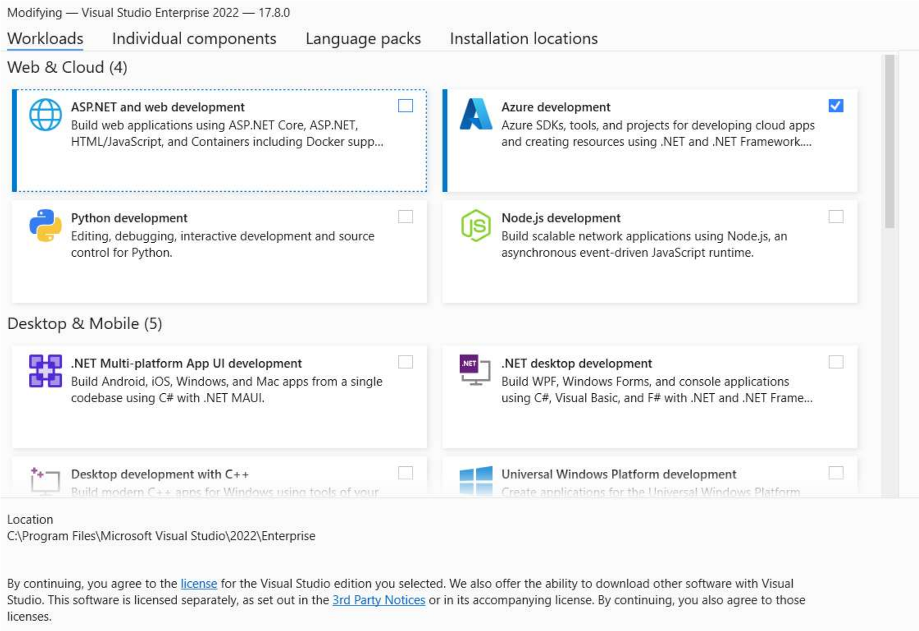
4. See your Azure account details with the command: **az account show**

5. Install **IDEs** with Azure extensions: Visual Studio, VSCode, IntelliJ, Eclipse

6. Install **Docker Desktop** if you are gong to manage Azure Container Instances or Azure Kubernetes

Azure for Visual Studio 2022

Azure SDK



Modifying — Visual Studio Enterprise 2022 — 17.8.0

Web & Cloud (4)

□ **ASP.NET and web development**
Build web applications using ASP.NET Core, ASP.NET, HTML/JavaScript, and Containers including Docker supp...

☑ **Azure development**
Azure SDKs, tools, and projects for developing cloud apps and creating resources using .NET and .NET Framework....

□ **Python development**
Editing, debugging, interactive development and source control for Python.

□ **Node.js development**
Build scalable network applications using Node.js, an asynchronous event-driven JavaScript runtime.

Desktop & Mobile (5)

□ **.NET Multi-platform App UI development**
Build Android, iOS, Windows, and Mac apps from a single codebase using C# with .NET MAUI.

□ **.NET desktop development**
Build WPF, Windows Forms, and console applications using C#, Visual Basic, and F# with .NET and .NET Frame...

□ **Desktop development with C++**
Build modern C++ apps for Windows using tools of your

□ **Universal Windows Platform development**
Create applications for the Universal Windows Platform

Location
C:\Program Files\Microsoft Visual Studio\2022\Enterprise

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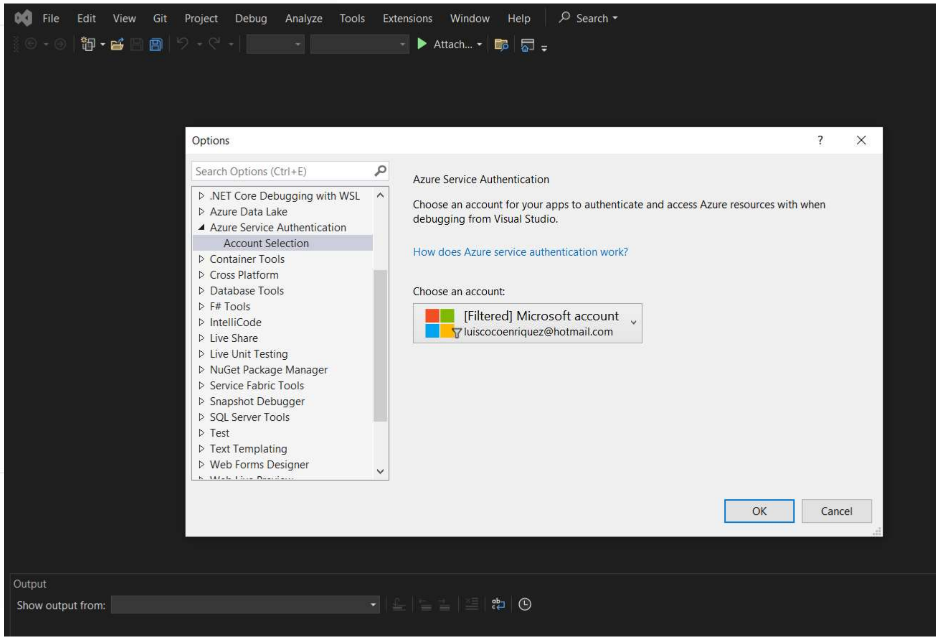

Options

Search Options (Ctrl+E)

- .NET Core Debugging with WSL
- Azure Data Lake
- Azure Service Authentication
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- Container Tools
- Cross Platform
- Database Tools
- F# Tools
- IntelliCode
- Live Share
- Live Unit Testing
- NuGet Package Manager
- Service Fabric Tools
- Snapshot Debugger
- SQL Server Tools
- Test
- Text Templating
- Web Forms Designer

Azure Service Authentication

Choose an account for your apps to authenticate and access Azure resources with when debugging from Visual Studio.

How does Azure service authentication work?

Choose an account:
[Filtered] Microsoft account
luiscocoenriquez@hotmail.com

https://visualstudio.microsoft.com/vs/community/

https://learn.microsoft.com/en-us/dotnet/azure/configure-visual-studio

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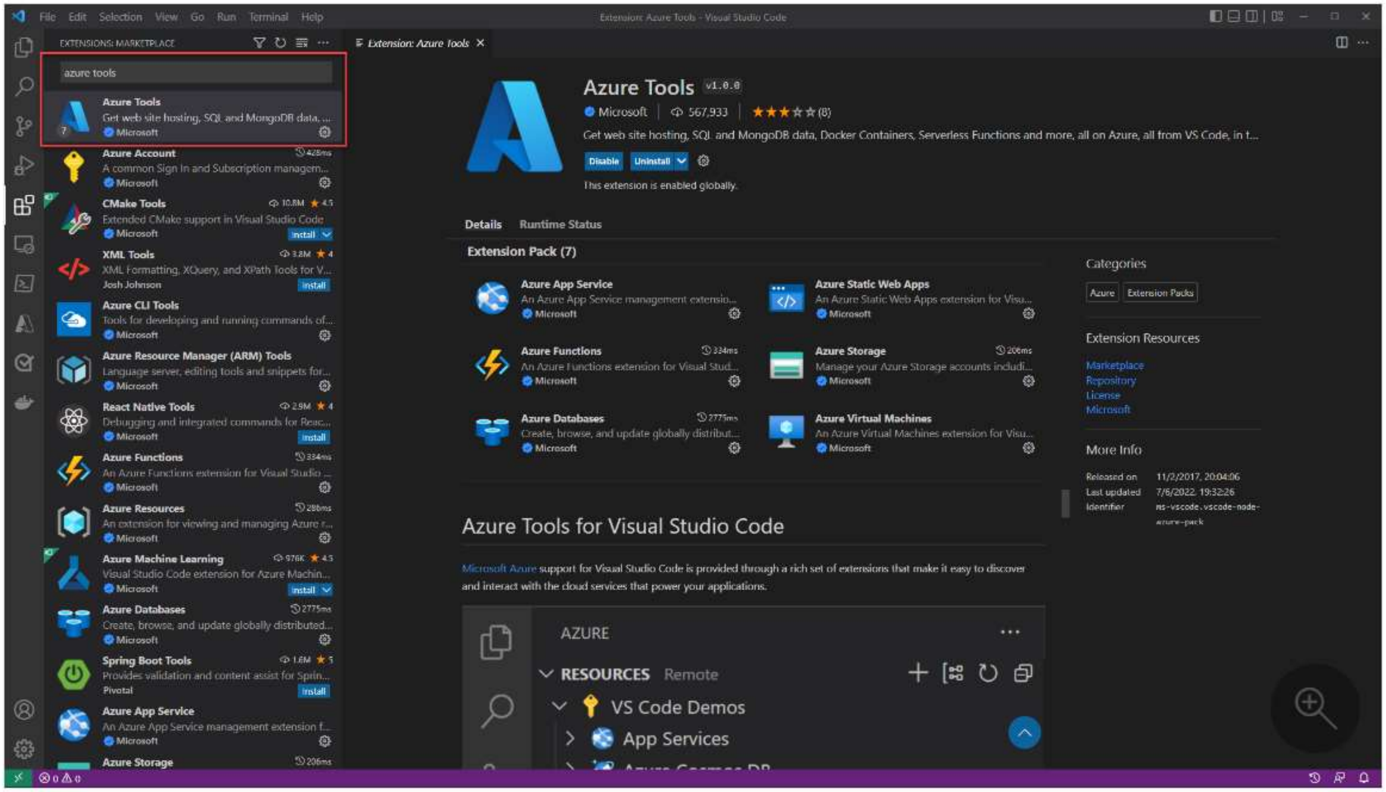
Azure extension for Visual Studio Code

Azure SDK



azure tools

Azure Tools — Get web site hosting, SQL and MongoDB data, ... — Microsoft

Azure Account 428ms — A common Sign In and Subscription managem... — Microsoft

CMake Tools 10.8M ★ 4.5 — Extended CMake support in Visual Studio Code — Microsoft — Install

XML Tools 3.8M ★ 4 — XML Formatting, XQuery, and XPath Tools for V... — Josh Johnson — Install

Azure CLI Tools — Tools for developing and running commands of... — Microsoft

Azure Resource Manager (ARM) Tools — Language server, editing tools and snippets for... — Microsoft

React Native Tools 2.9M ★ 4 — Debugging and integrated commands for Reac... — Microsoft — Install

Azure Functions 334ms — An Azure Functions extension for Visual Studio ... — Microsoft

Azure Resources 286ms — An extension for viewing and managing Azure r... — Microsoft

Azure Machine Learning 976K ★ 4.5 — Visual Studio Code extension for Azure Machin... — Microsoft — Install

Azure Databases 2775ms — Create, browse, and update globally distributed... — Microsoft

Spring Boot Tools 1.6M ★ 5 — Provides validation and content assist for Sprin... — Pivotal — Install

Azure App Service — An Azure App Service management extension f... — Microsoft

Azure Storage 206ms

Azure Tools v1.0.0

Microsoft | 567,933 | ★★★☆☆ (8)

Get web site hosting, SQL and MongoDB data, Docker Containers, Serverless Functions and more, all on Azure, all from VS Code, in t...

This extension is enabled globally.

Extension Pack (7)

Azure App Service — An Azure App Service management extensio... — Microsoft

Azure Static Web Apps — An Azure Static Web Apps extension for Visu... — Microsoft

Azure Functions 334ms — An Azure Functions extension for Visual Stud... — Microsoft

Azure Storage 206ms — Manage your Azure Storage accounts includi... — Microsoft

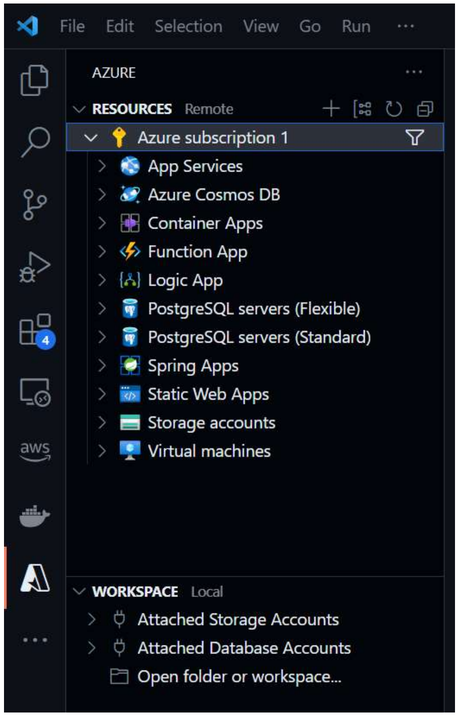
Azure Databases 2775ms — Create, browse, and update globally distribut... — Microsoft

Azure Virtual Machines — An Azure Virtual Machines extension for Visu... — Microsoft

Released on 11/2/2017, 20:04:06
Last updated 7/6/2022, 19:32:26
Identifier ms-vscode.vscode-node-azure-pack

Azure Tools for Visual Studio Code

Microsoft Azure support for Visual Studio Code is provided through a rich set of extensions that make it easy to discover and interact with the cloud services that power your applications.



https://learn.microsoft.com/en-us/dotnet/azure/configure-vs-code

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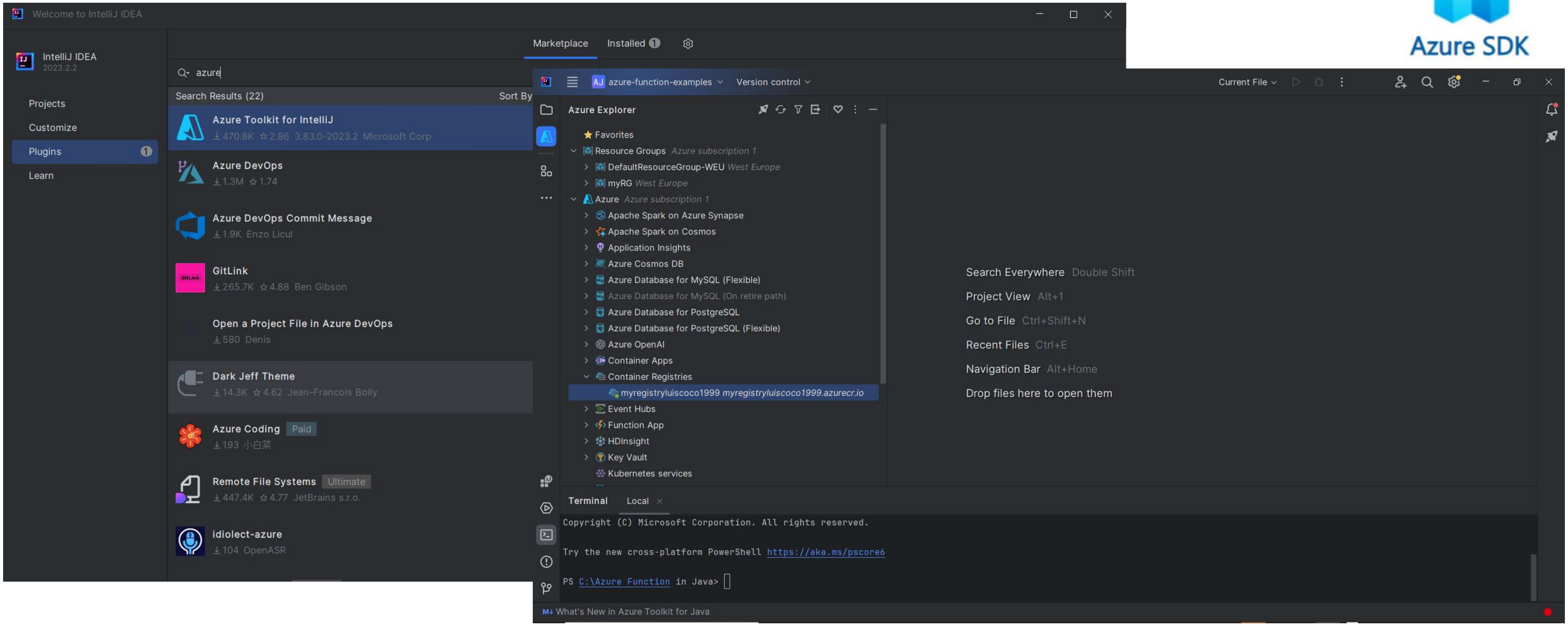
Azure plugin for IntelliJ Community



Azure Toolkit for IntelliJ ⤓470.8K ☆2.86 3.83.0-2023.2 Microsoft Corp

Azure DevOps ⤓1.3M ☆1.74

Azure DevOps Commit Message ⤓1.9K Enzo Licul

GitLink ⤓265.7K ☆4.88 Ben Gibson

Open a Project File in Azure DevOps ⤓580 Denis

Dark Jeff Theme ⤓14.3K ☆4.62 Jean-Francois Boily

Azure Coding Paid ⤓193 小白菜

Remote File Systems Ultimate ⤓447.4K ☆4.77 JetBrains s.r.o.

idiolect-azure ⤓104 OpenASR

- Favorites
- Resource Groups *Azure subscription 1*
  - DefaultResourceGroup-WEU *West Europe*
  - myRG *West Europe*
- Azure *Azure subscription 1*
  - Apache Spark on Azure Synapse
  - Apache Spark on Cosmos
  - Application Insights
  - Azure Cosmos DB
  - Azure Database for MySQL (Flexible)
  - Azure Database for MySQL (On retire path)
  - Azure Database for PostgreSQL
  - Azure Database for PostgreSQL (Flexible)
  - Azure OpenAI
  - Container Apps
  - Container Registries
    - myregistryluiscoco1999 *myregistryluiscoco1999.azurecr.io*
  - Event Hubs
  - Function App
  - HDInsight
  - Key Vault
  - Kubernetes services

Search Everywhere Double Shift

Project View Alt+1

Go to File Ctrl+Shift+N

Recent Files Ctrl+E

Navigation Bar Alt+Home

Drop files here to open them

```
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Azure Function in Java>
```

What's New in Azure Toolkit for Java

https://www.jetbrains.com/idea/download/?section=windows

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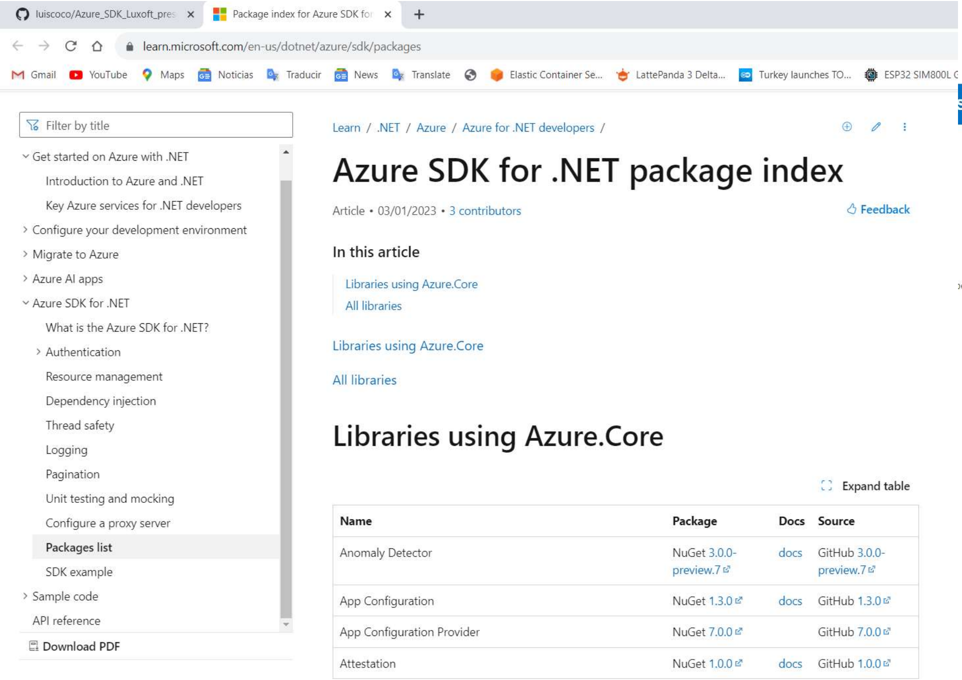
Azure SDK for .NET package index

https://learn.microsoft.com/en-us/dotnet/azure/sdk/packages

Azure SDK releases

https://azure.github.io/azure-sdk/releases/latest/index.html#net



- Get started on Azure with .NET
  - Introduction to Azure and .NET
  - Key Azure services for .NET developers
- Configure your development environment
- Migrate to Azure
- Azure AI apps
- Azure SDK for .NET
  - What is the Azure SDK for .NET?
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  - SDK example
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- API reference

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Azure SDK for .NET package index

Article • 03/01/2023 • 3 contributors

Feedback

In this article

Libraries using Azure.Core
All libraries

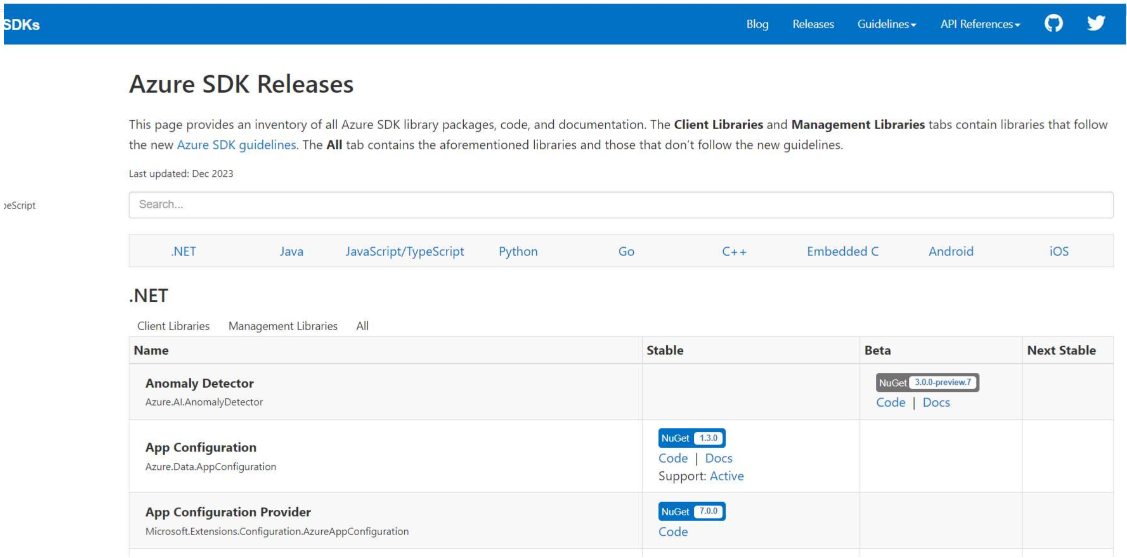
Libraries using Azure.Core

All libraries

Libraries using Azure.Core

Expand table

Name	Package	Docs	Source
Anomaly Detector	NuGet 3.0.0-preview.7	docs	GitHub 3.0.0-preview.7
App Configuration	NuGet 1.3.0	docs	GitHub 1.3.0
App Configuration Provider	NuGet 7.0.0		GitHub 7.0.0
Attestation	NuGet 1.0.0	docs	GitHub 1.0.0



Azure SDK Releases

This page provides an inventory of all Azure SDK library packages, code, and documentation. The **Client Libraries** and **Management Libraries** tabs contain libraries that follow the new Azure SDK guidelines. The **All** tab contains the aforementioned libraries and those that don't follow the new guidelines.

Last updated: Dec 2023

Search...

.NET Java JavaScript/TypeScript Python Go C++ Embedded C Android iOS

.NET

Client Libraries Management Libraries All

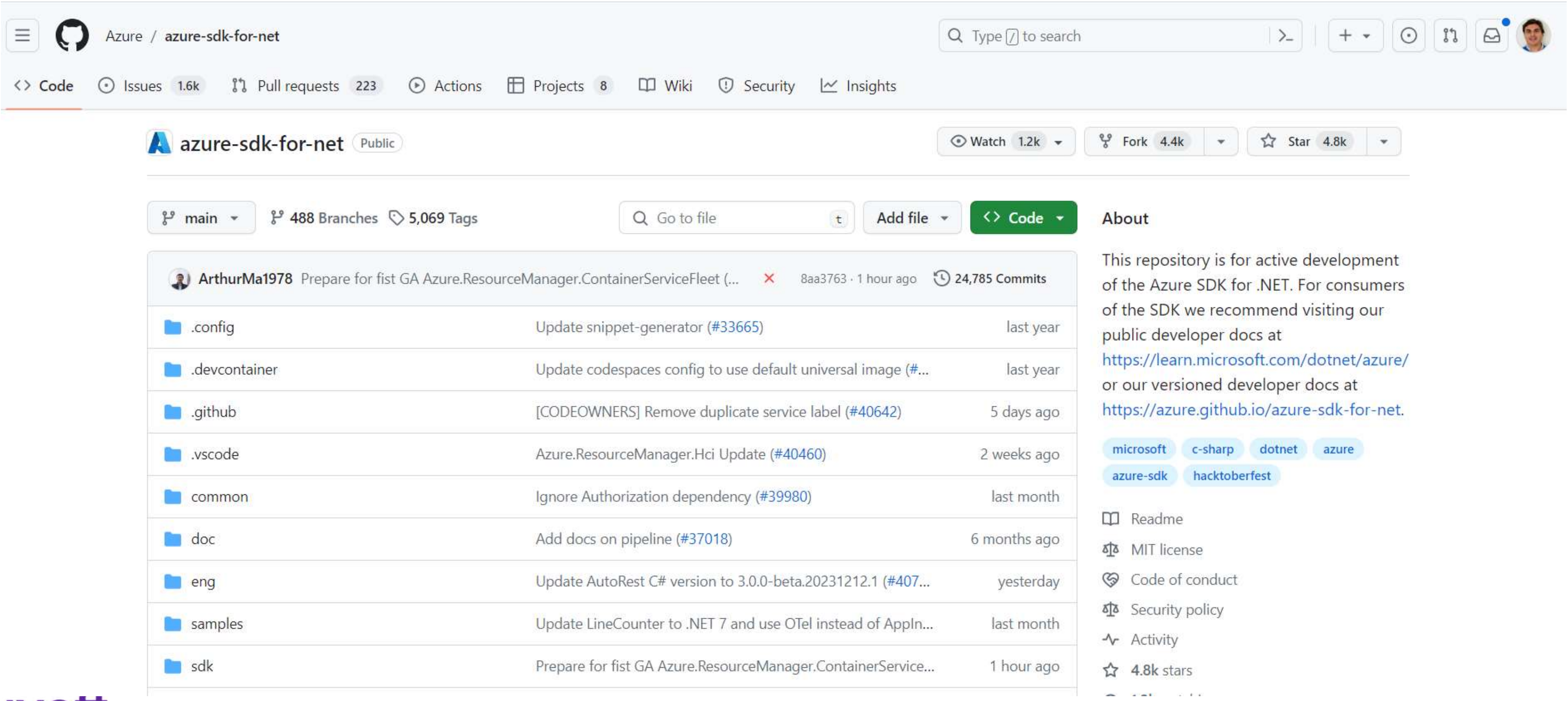
Name	Stable	Beta	Next Stable
Anomaly Detector Azure.AI.AnomalyDetector		NuGet 3.0.0-preview.7 Code | Docs	
App Configuration Azure.Data.AppConfiguration	NuGet 1.3.0 Code | Docs Support: Active		
App Configuration Provider Microsoft.Extensions.Configuration.AzureAppConfiguration	NuGet 7.0.0 Code		

GitHub repositories

The Developer guide for the Azure SDK for .NET

https://github.com/Azure/azure-sdk-for-net

Azure SDK



ArthurMa1978 Prepare for fist GA Azure.ResourceManager.ContainerServiceFleet (... ✕ 8aa3763 · 1 hour ago 24,785 Commits

.config	Update snippet-generator (#33665)	last year
.devcontainer	Update codespaces config to use default universal image (#...	last year
.github	[CODEOWNERS] Remove duplicate service label (#40642)	5 days ago
.vscode	Azure.ResourceManager.Hci Update (#40460)	2 weeks ago
common	Ignore Authorization dependency (#39980)	last month
doc	Add docs on pipeline (#37018)	6 months ago
eng	Update AutoRest C# version to 3.0.0-beta.20231212.1 (#407...	yesterday
samples	Update LineCounter to .NET 7 and use OTel instead of AppIn...	last month
sdk	Prepare for fist GA Azure.ResourceManager.ContainerService...	1 hour ago

About

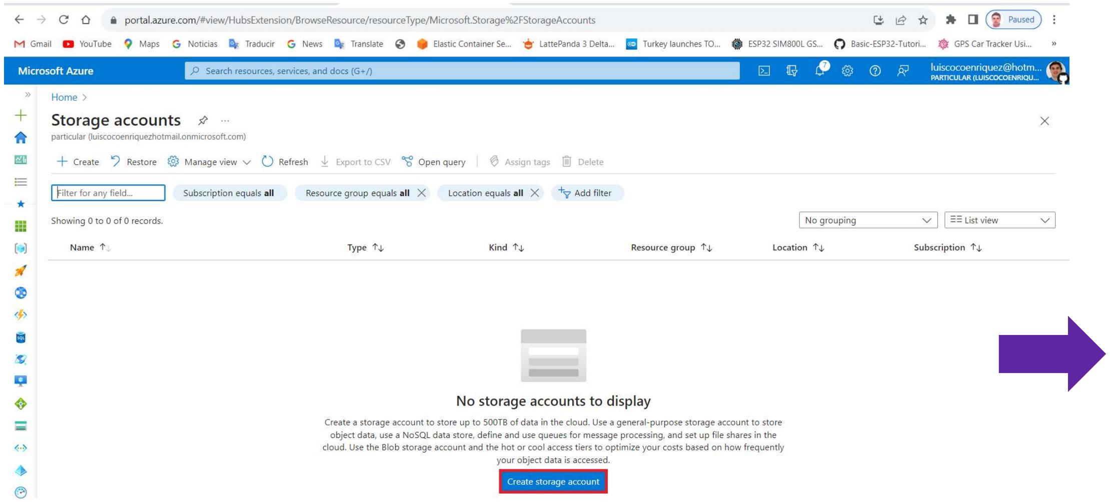
This repository is for active development of the Azure SDK for .NET. For consumers of the SDK we recommend visiting our public developer docs at https://learn.microsoft.com/dotnet/azure/ or our versioned developer docs at https://azure.github.io/azure-sdk-for-net.

microsoft c-sharp dotnet azure azure-sdk hacktoberfest

- Readme
- MIT license
- Code of conduct
- Security policy
- Activity
- 4.8k stars

How to create a console application with VSCode

1. Create an Azure Storage account: Input data: resource group, storage account name, region, redundancy.



Storage accounts

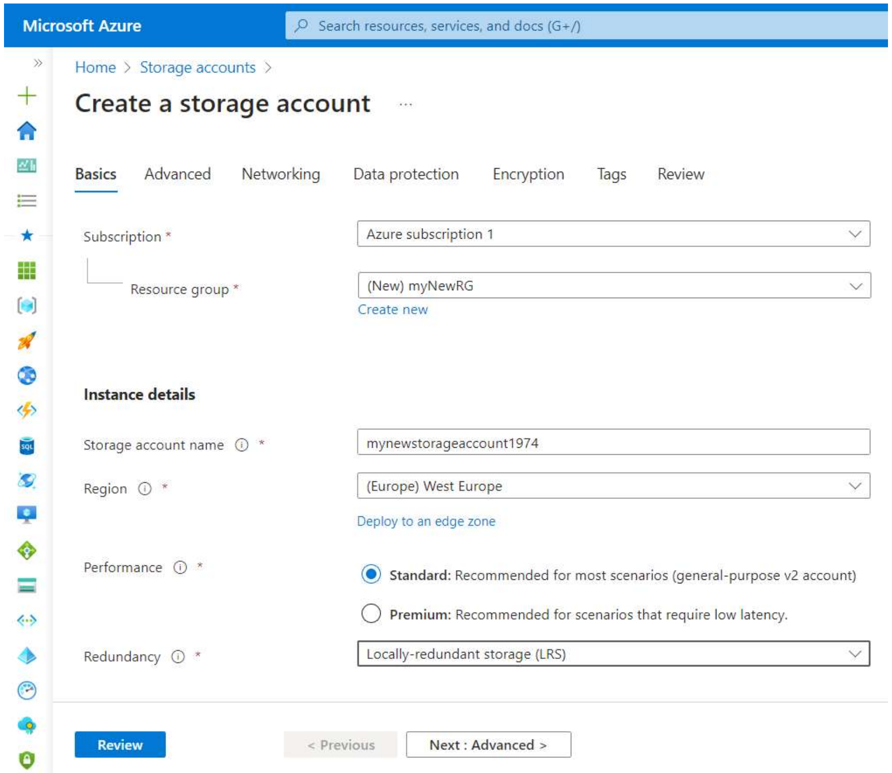
particular (luiscocoenriquezhotmail.onmicrosoft.com)

Subscription equals **all** | Resource group equals **all** | Location equals **all**

Showing 0 to 0 of 0 records.

No storage accounts to display

Create a storage account to store up to 500TB of data in the cloud. Use a general-purpose storage account to store object data, use a NoSQL data store, define and use queues for message processing, and set up file shares in the cloud. Use the Blob storage account and the hot or cool access tiers to optimize your costs based on how frequently your object data is accessed.



Create a storage account

Subscription * : Azure subscription 1

Resource group * : (New) myNewRG

Instance details

Storage account name * : mynewstorageaccount1974

Region * : (Europe) West Europe

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

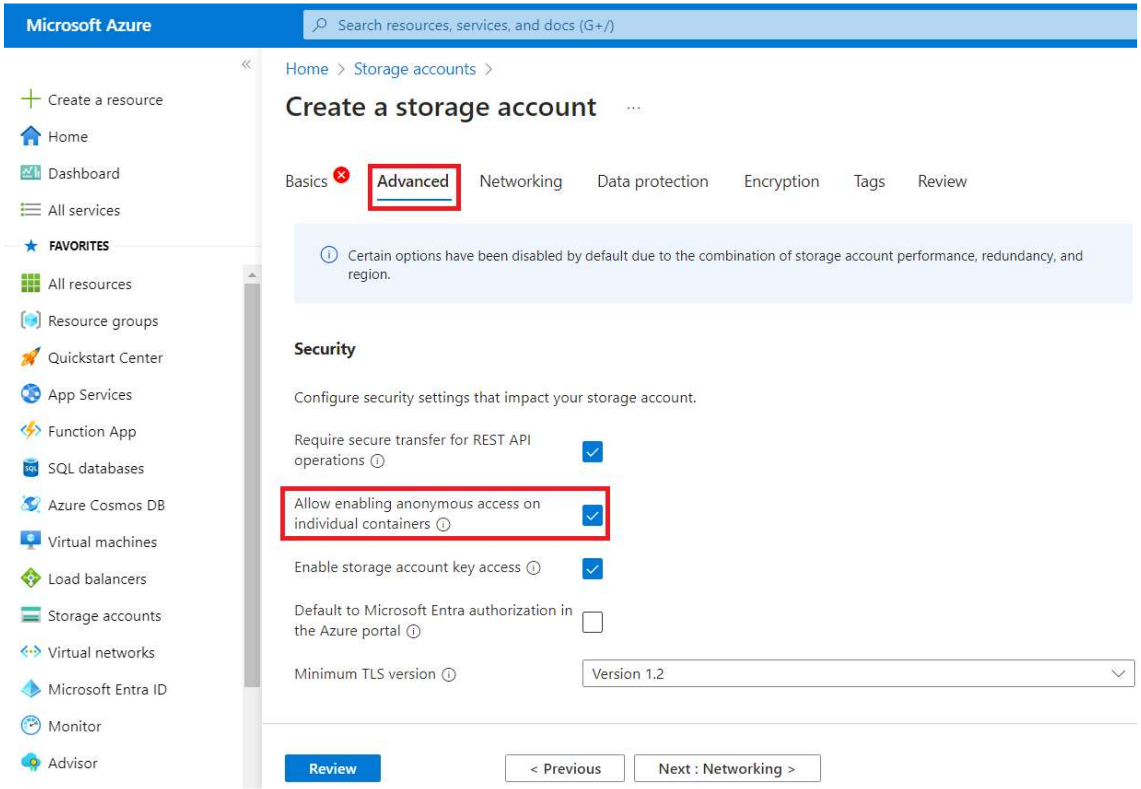
Redundancy * : Locally-redundant storage (LRS)

https://learn.microsoft.com/en-us/azure/storage/blobs/storage-quickstart-blobs-dotnet

How to create a console application with VSCode

Azure SDK

Allow enabling anonymous access on individual containers:



Create a storage account ...

Certain options have been disabled by default due to the combination of storage account performance, redundancy, and region.

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 ⓘ	Version 1.2

https://learn.microsoft.com/en-us/azure/storage/blobs/storage-quickstart-blobs-dotnet

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How to create a console application with VSCode

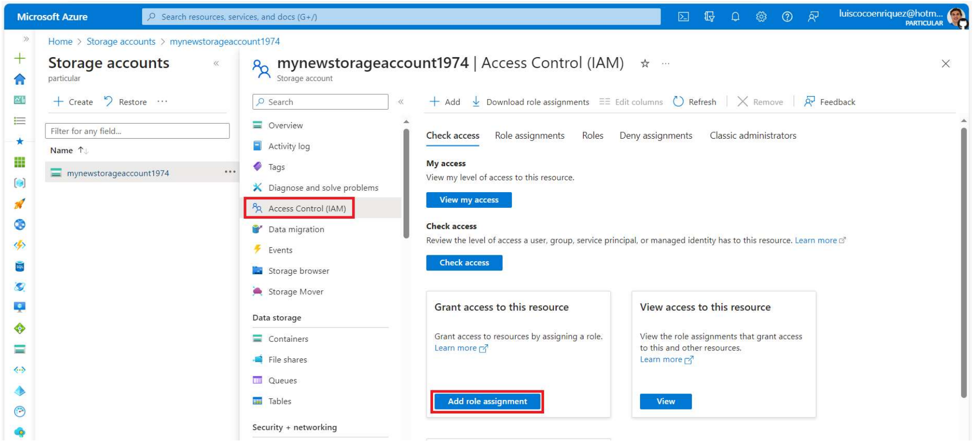
2. Grant permission for creating a Blob container:

Press the Access Control (IAM)

Press the “Add role assignment” button

Add Role: **Storage Blob Data Contributor**

Add Member: press select member and add the user



Storage accounts
particular

mynewstorageaccount1974

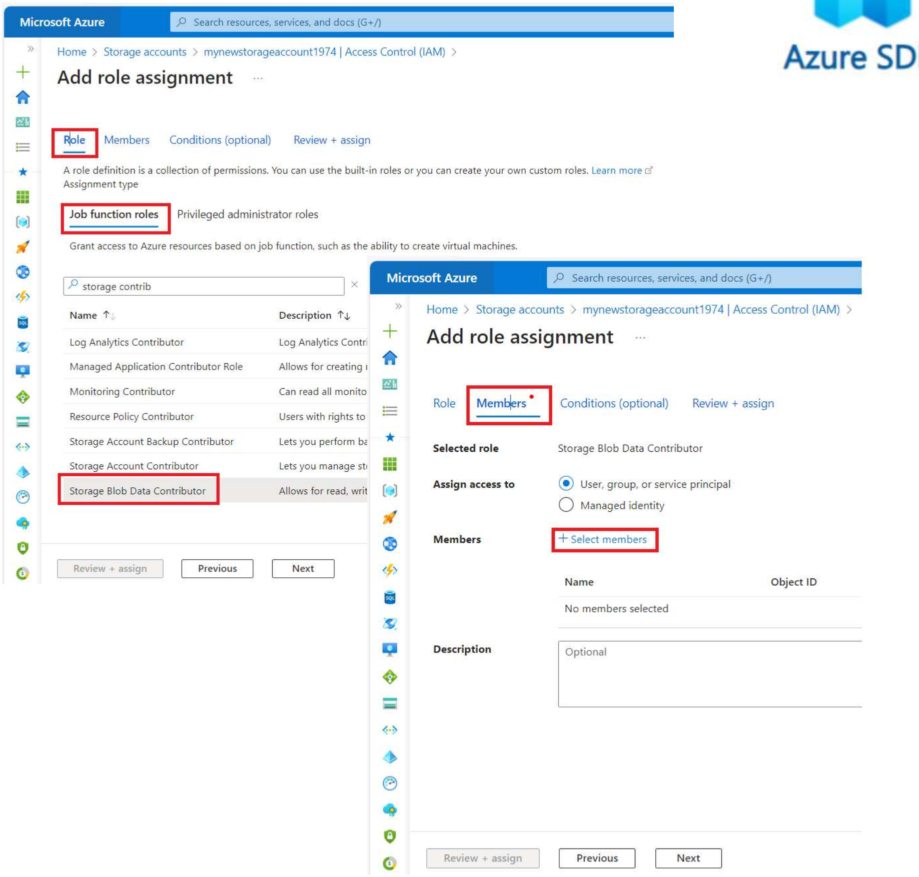
mynewstorageaccount1974 | Access Control (IAM)
Storage account

My access
View my level of access to this resource.

Check access
Review the level of access a user, group, service principal, or managed identity has to this resource. Learn more

Grant access to this resource
Grant access to resources by assigning a role.
Learn more

View access to this resource
View the role assignments that grant access to this and other resources.
Learn more


Microsoft Azure
Search resources, services, and docs (G+/)
Home > Storage accounts > mynewstorageaccount1974 | Access Control (IAM) >
Role
Members
Conditions (optional)
Review + assign
Job function roles
Privileged administrator roles
Review + assign
Previous
Next
Microsoft Azure
Search resources, services, and docs (G+/)
Home > Storage accounts > mynewstorageaccount1974 | Access Control (IAM) >
Role
Members
Conditions (optional)
Review + assign
+ Select members
Review + assign
Previous
Next

Add role assignment

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

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

storage contrib

Name	Description
Log Analytics Contributor	Log Analytics Contri
Managed Application Contributor Role	Allows for creating r
Monitoring Contributor	Can read all monito
Resource Policy Contributor	Users with rights to
Storage Account Backup Contributor	Lets you perform ba
Storage Account Contributor	Lets you manage st
Storage Blob Data Contributor	Allows for read, writ

Add role assignment

Selected role Storage Blob Data Contributor

Assign access to
● User, group, or service principal
○ Managed identity

Members

Name	Object ID
No members selected	

Description Optional

Azure SDK

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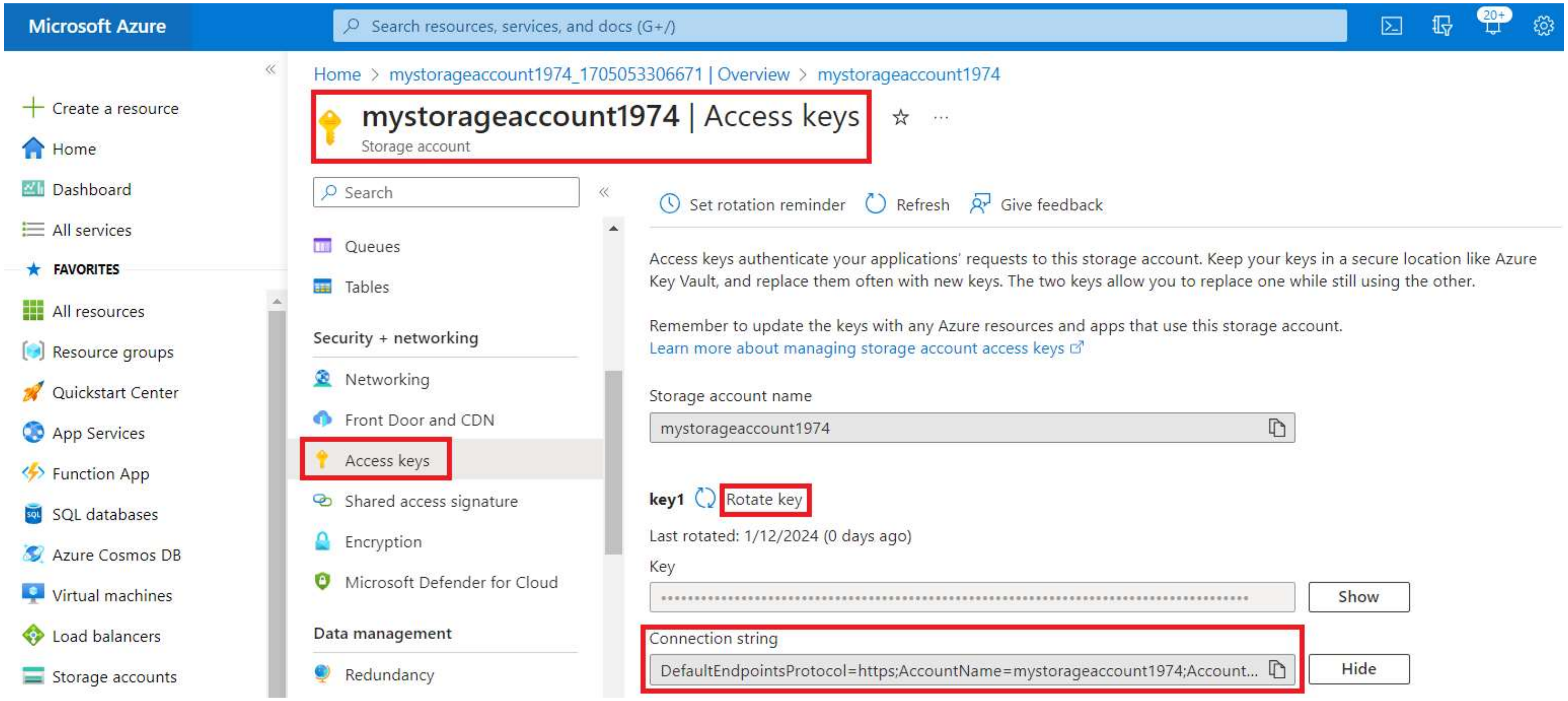
How to create a console application with VSCode

Copy the Azure Account Connection String

Note: if you get an error Rotate the Key



mystorageaccount1974 | Access keys

Storage account

Access keys authenticate your applications' requests to this storage account. Keep your keys in a secure location like Azure Key Vault, and replace them often with new keys. The two keys allow you to replace one while still using the other.

Remember to update the keys with any Azure resources and apps that use this storage account.
Learn more about managing storage account access keys

Storage account name: mystorageaccount1974

key1

Last rotated: 1/12/2024 (0 days ago)

Key: ••

Connection string: DefaultEndpointsProtocol=https;AccountName=mystorageaccount1974;Account...

https://learn.microsoft.com/en-us/azure/storage/blobs/storage-quickstart-blobs-dotnet

C# code samples with Azure SDK for .NET

Azure SDK

Sample 1: create a Blob container inside an Azure Storage account

```
using Azure.Storage.Blobs;

string connectionString = “<AzureStorageAccountConnectionString>";
string containerName = "data1";

BlobServiceClient blobServiceClient = new BlobServiceClient(connectionString);

BlobContainerClient container = await blobServiceClient.CreateBlobContainerAsync(containerName);

await container.SetAccessPolicyAsync(PublicAccessType.Blob);
```

C# code samples with Azure SDK for .NET

Sample 2: List blobs containers in an Azure Storage account

```
using Azure.Storage.Blobs;
using Azure.Storage.Blobs.Models;

string connectionString = "<AzureStorageAccountConnectionString>";
string containerName = "data";

BlobContainerClient blobContainerClient = new BlobContainerClient(connectionString, containerName);

await foreach(BlobItem blobItem in blobContainerClient.GetBlobsAsync())
{
    Console.WriteLine("The Blob Name is {0}",blobItem.Name);
    Console.WriteLine("The Blob Size is {0}", blobItem.Properties.ContentLength);
}
```

C# code samples with Azure SDK for .NET

Azure SDK

Sample 3: Upload a file to a blob container

```
using Azure.Storage.Blobs;
using Azure.Storage.Blobs.Models;

string connectionString = “<AzureStorageAccountConnectionString>";
string containerName = "scripts";
string blobName = "script.sql";
string filePath = "C:\\tmp1\\script.sql";

BlobContainerClient blobServiceClient = new BlobContainerClient(connectionString, containerName);

BlobClient blobClient=blobServiceClient.GetBlobClient(blobName);
await blobClient.UploadAsync(filePath, true);

Console.WriteLine("Uploaded the blob");
```

Application Registration for Azure SDK for .NET

How to create a ResourceGroup (Application Registration)

1. Register the application in Microsoft Entra ID: **Microsoft Entra ID->App registrations**->**Add**
2. We copy the **clientId** and (optionally) you can also get from here the **tenantId**, we paste both values in the application variables **clientId** and **tenantId**
3. We create a new secret clicking on Client credentials link
4. We navigate in Azure Portal to the **Subscriptions** service and we copy the subscription subscriptionId
5. dotnet add package **Microsoft.Rest.Azure.Authentication**
6.
```
string clientId = "XXX";
string clientSecret = "XXX";
string tenantId = "XXX";
string subscriptionId = "XXX";
string resourceGroupName = "myresourcegroupluiscocoenriquez";
string location = "westeurope";
var serviceClientCredentials = ApplicationTokenProvider.LoginSilentAsync(tenantId, clientId, clientSecret).Result;
```

DefaultAzureCredential() for Azure SDK for .NET

1. Login in Azure typing the command (previously install Azure CLI): **az login**

2. Create a C# console application with the command: **dotnet new console --framework net8.0**

3. Load the library “Azure.Identity” running the command: **dotnet add package Azure.Identity --version 1.10.4**

4. Load the library “Azure.Storage.Blobs” running the command:

dotnet add package Azure.Storage.Blobs --version 12.19.1

5. Input the C# application source code:

StorageAccountName

BlobConatinerName

BlobName

```
using Azure.Identity;
using Azure.Storage.Blobs;

var uri = new Uri("https://mynewstorageaccount1974.blob.core.windows.net/newblob/blob.txt");
var cred = new DefaultAzureCredential();
var client = new UploadAsyncBlobClient(uri, cred);
await client. ("blob.txt");
```

How to create a console application with VSCode

1. To install.NET CLI tools download the .NET 8 SDK: https://dotnet.microsoft.com/en-us/download
   https://learn.microsoft.com/en-us/dotnet/core/tools/

2. Open in VSCode a Terminal window and run the command: **dotnet new console --framework net8.0**

3. Load the Azure SDK for .NET libraries: https://www.nuget.org/packages

   ```
   dotnet add package Azure.Identity --version 1.10.4
   dotnet add package Azure.Storage.Blobs --version 12.19.1
   ```

   Type the command **dotnet restore** and see the **csproj** file.

4. Input the source code in the **program.cs** file.

5. For building and running the application type the command: **dotnet run**

How to create a console application with VSCode

```
using Azure.Storage.Blobs;
using Azure.Storage.Blobs.Models;
using Azure.Identity;

// TODO: Replace <storage-account-name> with your actual storage account name
var blobServiceClient = new BlobServiceClient(
        new Uri("https://<storage-account-name>.blob.core.windows.net"),
        new DefaultAzureCredential());

//Create a unique name for the container
string containerName = "quickstartblobs" + Guid.NewGuid().ToString();

// Create the container and return a container client object
BlobContainerClient containerClient = await blobServiceClient.CreateBlobContainerAsync(containerName);

// Create a local file in the ./data/ directory for uploading and downloading
string localPath = "data";
Directory.CreateDirectory(localPath);
string fileName = "quickstart" + Guid.NewGuid().ToString() + ".txt";
string localFilePath = Path.Combine(localPath, fileName);

// Write text to the file
await File.WriteAllTextAsync(localFilePath, "Hello, World!");

// Get a reference to a blob
BlobClient blobClient = containerClient.GetBlobClient(fileName);

Console.WriteLine("Uploading to Blob storage as blob:\n\t {0}\n", blobClient.Uri);
```

How to create a console application with VSCode

```
// Upload data from the local file
await blobClient.UploadAsync(localFilePath, true);

Console.WriteLine("Listing blobs...");

// List all blobs in the container
await foreach (BlobItem blobItem in containerClient.GetBlobsAsync()) {
    Console.WriteLine("\t" + blobItem.Name);
}

// Download the blob to a local file. Append the string "DOWNLOADED" before the .txt extension
string downloadFilePath = localFilePath.Replace(".txt", "DOWNLOADED.txt");

Console.WriteLine("\nDownloading blob to\n\t{0}\n", downloadFilePath);

// Download the blob's contents and save it to a file
await blobClient.DownloadToAsync(downloadFilePath);

// Clean up
Console.Write("Press any key to begin clean up");
Console.ReadLine();

Console.WriteLine("Deleting blob container...");
await containerClient.DeleteAsync();

Console.WriteLine("Deleting the local source and downloaded files...");
File.Delete(localFilePath);
File.Delete(downloadFilePath);

Console.WriteLine("Done");
```

C# code samples with Azure SDK for .NET

Sample 1: How to use DefaultAzureCredential() for uploading a file to an Azure Blob container

Sample 2: How to create an Azure Storage Account

Sample 3: Azure Storage Account operations

Sample 4: How to create an Azure Resource Group

Sample 5: How to create a Blob storage

Sample 6: How to create a FileShare

Sample 7: Accessing with a Storage Account Key

Sample 8: How to create a Blob and Upload a file

Sample 9: Create a Blob, Upload/Donwload a File (accessing with storage account connection-string)

Sample 10: Create a SAS for a Blob

C# code samples with Azure SDK for .NET

Sample 11: How to create a Virtual Network

Sample 12: How to create a Network Interface NIC

Sample 13: How to create a Linux VM and install GUI Desktop

Sample 14: How to create a Windows Server VM with Visual Studio 2022 preinstalled

Sample 15: List the VMs in a ResourceGroup

Sample 16: Delete VM in a ResourceGroup

Sample 17: How to create a Disk in Azure

Sample 18: List the Disks in a ResourceGroup

Sample 19: Delete a Disk in a ResourceGroup

Sample 20: Create a Secret in a Key Vault

C# code samples with Azure SDK for .NET

Azure SDK

Sample 21: How to create an Azure CosmosDB account

Sample 22: How to create an Azure CosmosDB database, a collection and populate it with some documents

Sample 23: Create a CosmosDB database

Sample 24: Create a CosmosDB collection

Sample 25: Create a Cosmos DB for MongoDB and insert some documents

Sample 26: Create an Azure Container Registry (ACR) and deploy with Azure CLI a .NET Web API in Azure ACI

Sample 27: How to create a ResourceGroup (**Application Registration**)

Sample 28: GithubActions How to create from Github an Azure ResourceGroup with Azure SDK for .NET

Sample 29: How to create Azure ResourceGroup from Azure Function

Sample 30: How to create Azure App Service Plan and Azure Web App with Azure SDK for .NET

Sample 31: How to create a .NET8 WebAPI CRUD Azure CosmosDB for MongoDB Microservice

Sample 32: How to create a .NET8 WebAPI CRUD Azure CosmosDB Microservice

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