

# Introduction

In this document, we will discuss about Azure Storage and different types of storage services provided by Azure. We will create a storage account from Azure portal and we will then create Azure function to store the files into Azure blob storage, and finally, we will deploy the same function to the Azure function app from Visual Studio.

If you are new to Azure Functions/Storage then ask **ChatGPT** or check out the below links,

[Azure Functions documentation | Microsoft Learn](#)

[Azure Storage documentation | Microsoft Learn](#)

## What is Azure Storage Service

Whenever we create an application we have to first decide what storage we can use to store the data. Azure Storage provides solution to different storage problems. It provides scalable, available, durable storage for data in azure. Azure storage is a set of different services such as Blobs, Files, Queues, etc. We can interact with azure storage using different programming languages such .NET, JAVA, Golang, Javascript, etc. using the SDKs.

## Different Azure Storage Service

1. **Azure Blob** - also known as blobs which are mainly used to store the binary/text data such as photos, videos, documents, etc.
2. **Azure Tables** - which is nothing but a NoSQL storage for schemaless structured data.
3. **Azure Queue** - it is used to store the messages which can be used to communicate with applications
4. **Azure Files** - it is managed file share service for cloud or on-premise using SMB/NFS protocol.
5. **Azure Disks** - It is a virtual hard disk (VHD) that is of two types: managed and unmanaged.

## What is Azure Blob storage?

Azure Blob storage is a storage service used to store schema-less structured data in the cloud. We can store data such as documents, pictures, videos, log files, backup

files which don't have a fixed structure. Blob storage is similar to directory structure where we can create different containers to store the blobs.

There are 3 types of Blobs:

1. Block Blobs - which are used to store the text/binary data.
2. Append Blobs - nothing but block blobs that are optimized for append operation.
3. Page Blobs - which store random access files up to 8 TiB in size.

## Create simple azure function using C# to upload files in Azure Blob Storage

Prerequisites

1. [Azure](#) account (If you don't have an Azure subscription, [create a free trial account](#))
2. Visual Studio 22 with Azure Development workload
3. Basic knowledge of C#

## Create a Azure Storage resource using Azure Portal

Login to [Azure](#) and click on Create a resource button.

In search box type "storage account" and select it.


Microsoft Azure

Search resources, services, and docs (G+/I)

[Home](#) > [Create a resource](#) >

Storage account

Microsoft



Storage account

[Add to Favorites](#)

Microsoft

★ 4.2 (1749 Azure ratings)

Plan

Storage account

Create

Overview

Plans


Usage Information + Support

Reviews

Microsoft Azure provides scalable, durable cloud storage, backup, and recovery solutions for any data, big or small. It works with the infrastructure you already have to cost-effectively enhance your existing applications and business continuity strategy, and provide the storage required by your cloud applications, including unstructured text or binary data such as video, audio, and images.

More products from Microsoft

[See All](#)




Device Update for IoT Hub

Microsoft

Azure Service

Securely and Reliably update your devices with Device Update for IoT Hub.




Front Door and CDN profiles

Microsoft

Azure Service

Azure Front Door and CDN profiles is security led, modern cloud CDN that provides static and dynamic content acceleration, global load balancing




Azure VMware Solution

Microsoft

Azure Service

Azure VMware Solution (AVS) combines the VMware Software Defined Data Center (SDDC) with Microsoft Azure Cloud bare-metal



API App

Microsoft

Azure Service

scalable RESTful API with enterprise grade security, simple access control and auto SDK generation

Click on Create button and you can see the Create storage account page.

## Create a storage account ...

[Basics](#) [Advanced](#) [Networking](#) [Data protection](#) [Encryption](#) [Tags](#) [Review + create](#)

### 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 ⓘ \*

☒ Make read access to data available in the event of regional unavailability.

[Review + create](#)

[< Previous](#)

[Next : Advanced >](#)

Azure has Resource Groups (RG) act as a container for your resources. So now we are going to create a Storage account resource. First we need to create Resource Group. If you have already created RG then you can use the same here. Under Resource group click on Create New button and give a unique RG name.

## Create a storage account ...

Basics Advanced Networking Data protection Encryption Tags Review + create

### 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 \* Visual Studio Professional

Resource group \* azuretraining

[Create new](#)

A resource group is a container that holds related resources for an Azure solution.

Name \*

OK

Cancel

### Instance details

If you need to create a legacy storage account, select this option.

Storage account name ⓘ \*

Region ⓘ \*

Performance ⓘ \*

☒ Standard: Recommended for most scenarios (general-purpose v2 account)

☐ Premium: Recommended for scenarios that require low latency.

Redundancy ⓘ \*

Geo-redundant storage (GRS)

☒ Make read access to data available in the event of regional unavailability.

Review + create

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Next : Advanced >

Give the unique name to storage account and select the region. Click on **Next : Advanced** button.

[Home](#) > [Create a resource](#) > [Storage account](#) >

## Create a storage account ...

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

resource group

[Create new](#)

### Instance details

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

1

Storage account name ⓘ \*

filestgaccount

Region ⓘ \*

(US) East US

Performance ⓘ \*



**Standard:** Recommended for most scenarios (general-purpose v2 account)



**Premium:** Recommended for scenarios that require low latency.

Redundancy ⓘ \*

Geo-redundant storage (GRS)



Make read access to data available in the event of regional unavailability.

[Review + create](#)

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[Next : Advanced >](#)

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By default the “Enable blob public access” is checked which means that any anonymous user can access blobs within the containers. So uncheck the option and click on Review + Create button

[Home](#) > [Create a resource](#) > [Storage account](#) >


## Create a storage account ...

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

 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  ☒

Enable blob public access  ☐ **1**

Enable storage account key access  ☒

Default to Azure Active Directory authorization in the Azure portal  ☐

Minimum TLS version 

**Review + create** **2**

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[Next : Networking >](#)

Wait for few sec to complete the validation and Review everything is added properly after that click on Create button.

[Home](#) > [Create a resource](#) > [Storage account](#) >

## Create a storage account ...

✓ Validation passed

Basics   Advanced   Networking   Data protection   Encryption   Tags   Review + create

Blob soft delete	Enabled
Blob retainment period in days	7
Container soft delete	Enabled
Container retainment period in days	7
File share soft delete	Enabled
File share retainment period in days	7
Versioning	Disabled
Blob change feed	Disabled
Version-level immutability support	Disabled

### Encryption

Encryption type	Microsoft-managed keys (MMK)
Enable support for customer-managed keys	Blobs and files only
Enable infrastructure encryption	Disabled

Create

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[Download a template for automation](#)

Creating resources will take time so wait for deployment process to finish.



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

Home > filestgaccount\_1649486015501 | Overview

Deployment

Search (Ctrl+/) Delete Cancel Redeploy Refresh

Overview

Inputs

Outputs

Template

We'd love your feedback! →

\*\*\* Deployment is in progress

Deployment name: filestgaccount\_1649486015501  
Subscription: Visual Studio Professional  
Resource group: azuretraining

Start time: 4/9/2022, 12:03:50 PM  
Correlation ID: f8a83339-1a25-4fb8-af40-612007e9ef87

Deployment details (Download)

Resource	Type	Status	Operation details
No results.			

Our storage account is created successfully. Now click on Go to resource button to see the storage account.

Home > filestgaccount\_1649486015501 | Overview

Deployment

Search (Ctrl+/) Delete Cancel Redeploy Refresh

Overview

Inputs

Outputs

Template

We'd love your feedback! →

✓ Your deployment is complete

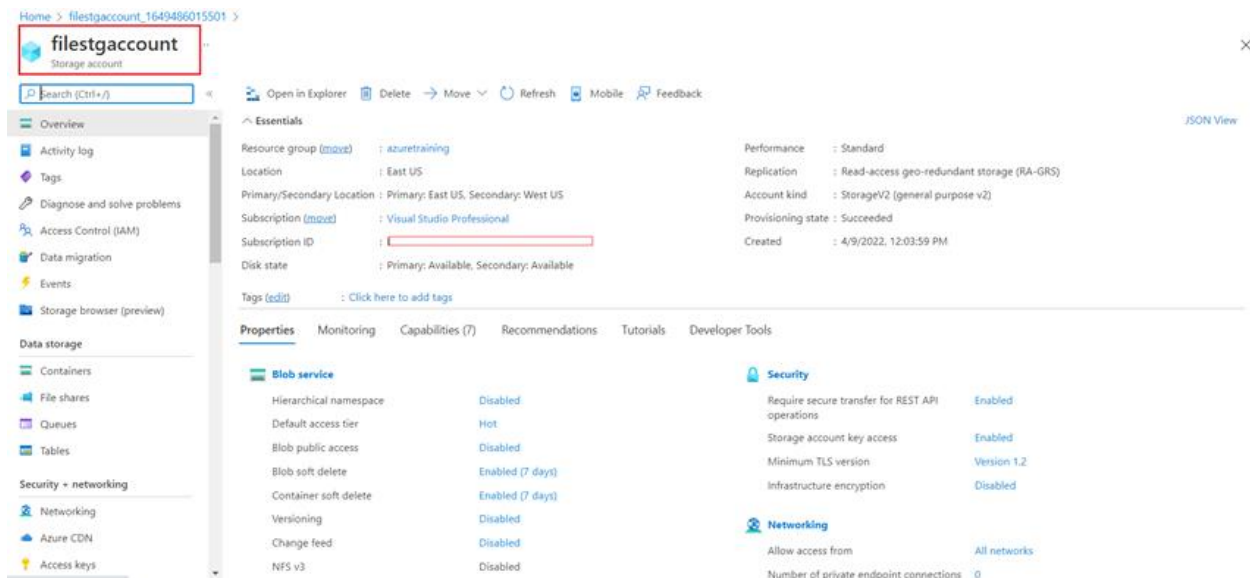
Deployment name: filestgaccount\_1649486015501  
Subscription: Visual Studio Professional  
Resource group: azuretraining

Start time: 4/9/2022, 12:03:50 PM  
Correlation ID: f8a83339-1a25-4fb8-af40-612007e9ef87

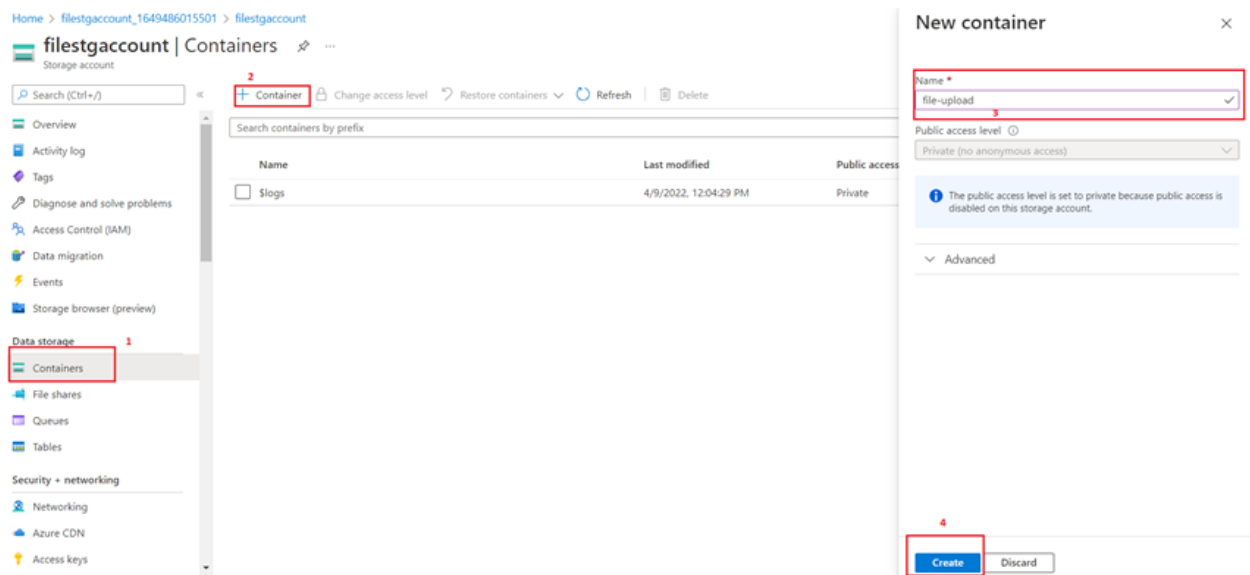
Deployment details (Download)

Next steps

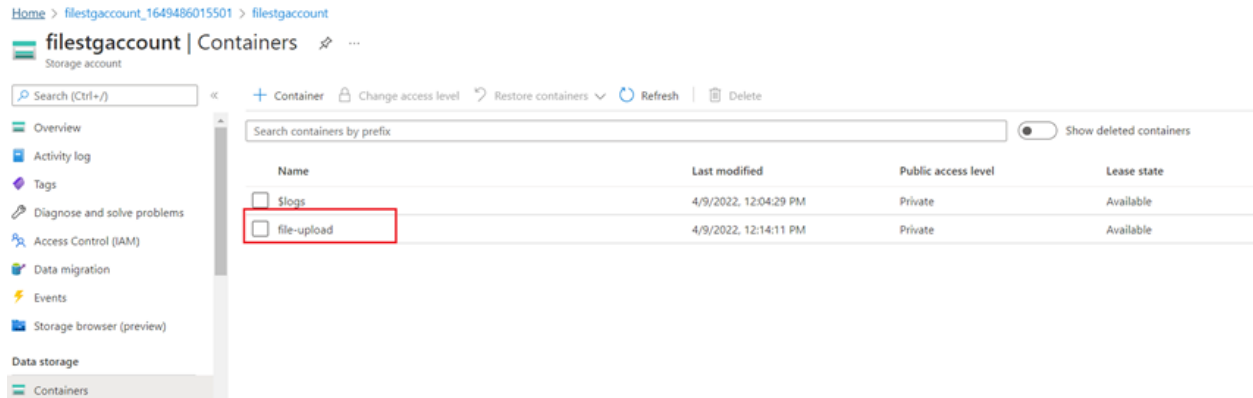
Go to resource



Now the next step is to create a container to store our blobs. So in the left section click on Containers and then click on + Container button. Give the proper name to container in which we are going to upload our files and click on Create button.



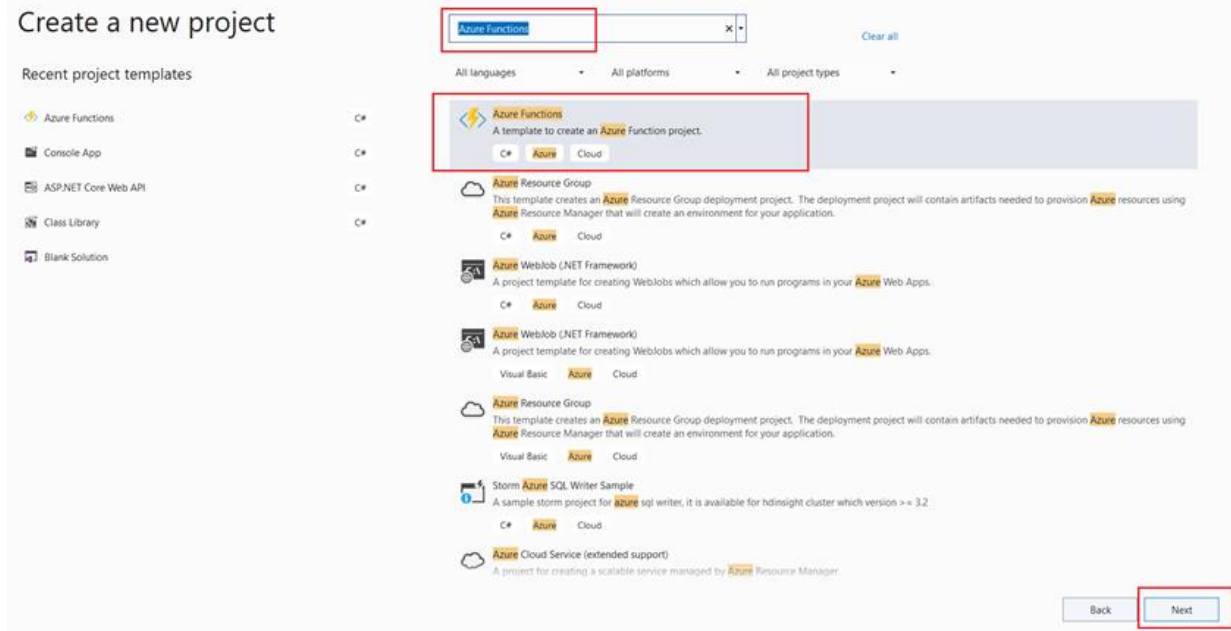
Next step is to create an Azure function that uploads files into the “file-upload” container.



## Create a HTTP trigger azure function using C# to upload files to blob storage

So open Visual Studio and Go to File -> New -> Project. Search "Azure Functions" in the search box and select the Azure function template and click on Next.

### Create a new project



Give a name to the function project and click on Create.

# Configure your new project

Azure Functions C# Azure Cloud

Project name

FileUploadFunction

Location

Solution name ⓘ

FileUploadFunction


☒ Place solution and project in the same directory


Back


Select the HTTP trigger template and set the Authorization level as Anonymous and click on Create.


# Create a new Azure Functions application


.NET 6


 **Empty**  
Creates an Azure Function project with no triggers. Function triggers can be added during development.

 **Queue trigger**  
A C# function that will be run whenever a message is added to a specified Azure Queue Storage

 **Http trigger**  
A C# function that will be run whenever it receives an HTTP request

 **Http trigger with OpenAPI**  
A C# function that will be run whenever it receives an HTTP request and is preconfigured to generate and render OpenAPI document

 **Blob trigger**  
A C# function that will be run whenever a blob is added to a specified container.

 **Timer trigger**  
A C# function that will be run on a specified schedule

Storage account (AzureWebJobsStorage)

Storage emulator

Some capabilities may require an Azure storage account.

Authorization level

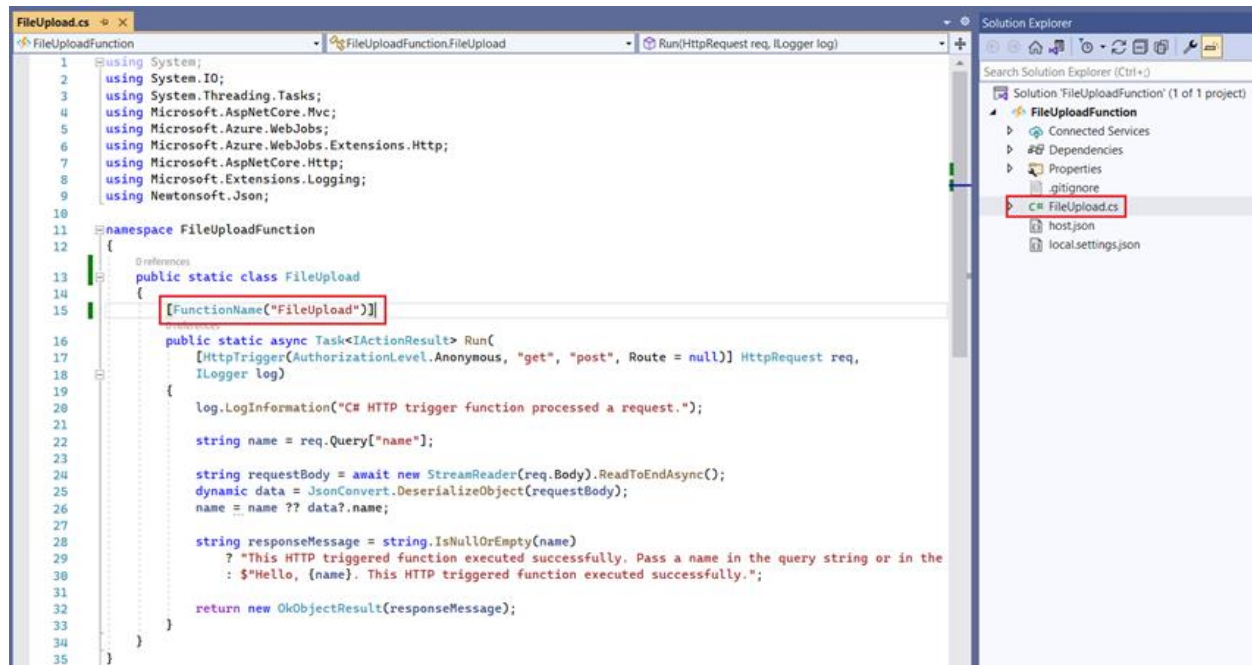
Anonymous

[Get started with Azure Functions](#)

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Create

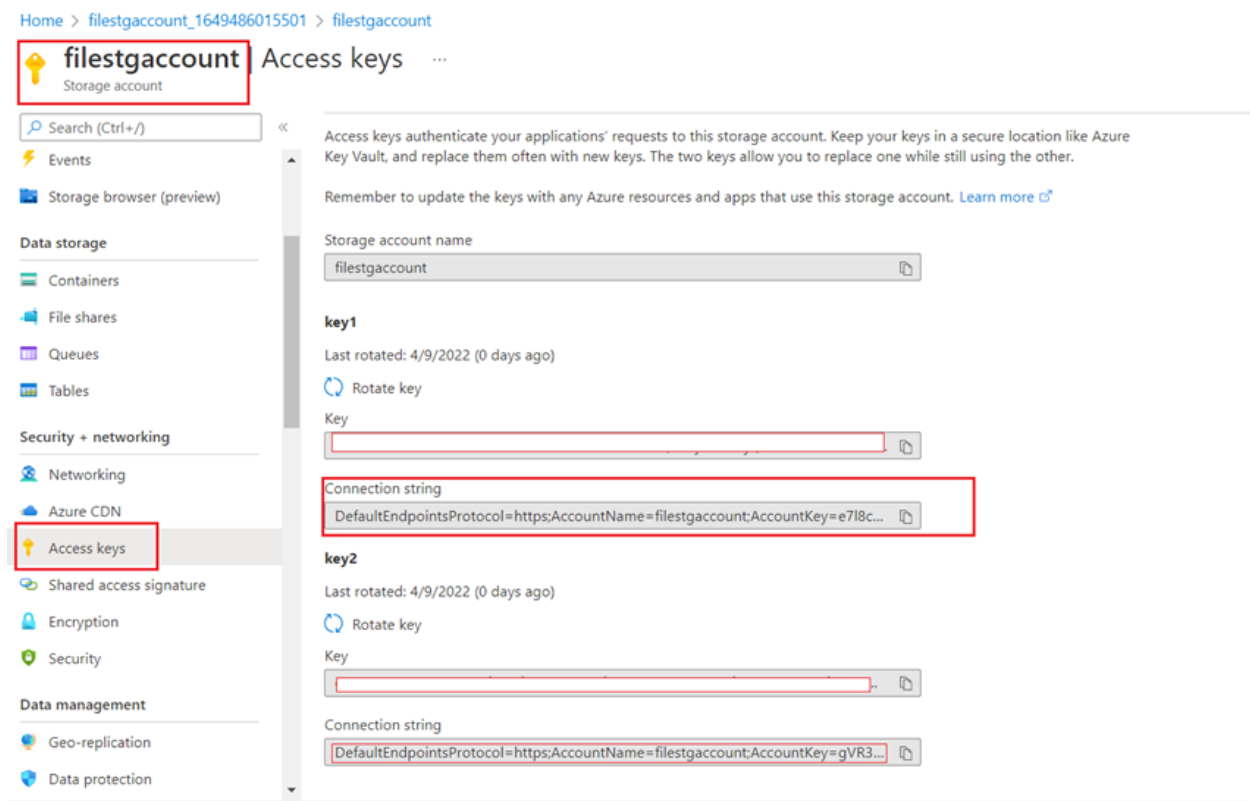
That's it. We have created our first Azure function. By default the name of the function is `Function1.cs` so now change it to **"FileUpload"**.



```
1 using System;
2 using System.IO;
3 using System.Threading.Tasks;
4 using Microsoft.AspNetCore.Mvc;
5 using Microsoft.Azure.WebJobs;
6 using Microsoft.Azure.WebJobs.Extensions.Http;
7 using Microsoft.AspNetCore.Http;
8 using Microsoft.Extensions.Logging;
9 using Newtonsoft.Json;
10
11 namespace FileUploadFunction
12 {
13     public static class FileUpload
14     {
15         [FunctionName("FileUpload")]
16         public static async Task<IActionResult> Run(
17             [HttpTrigger(AuthorizationLevel.Anonymous, "get", "post", Route = null)] HttpRequest req,
18             ILogger log)
19         {
20             log.LogInformation("C# HTTP trigger function processed a request.");
21
22             string name = req.Query["name"];
23
24             string requestBody = await new StreamReader(req.Body).ReadToEndAsync();
25             dynamic data = JsonConvert.DeserializeObject(requestBody);
26             name = name ?? data?.name;
27
28             string responseMessage = string.IsNullOrEmpty(name)
29                 ? "This HTTP triggered function executed successfully. Pass a name in the query string or in the request body."
30                 : $"Hello, {name}. This HTTP triggered function executed successfully.";
31
32             return new OkObjectResult(responseMessage);
33         }
34     }
35 }
```

The Solution Explorer on the right shows the project structure for 'FileUploadFunction' (1 of 1 project). The files listed are: `FileUploadFunction`, `Connected Services`, `Dependencies`, `Properties`, `gitignore`, `C# FileUpload.cs` (highlighted), `host.json`, and `local.settings.json`.

So for our application, we are creating HTTP Trigger function which takes file as input and uploads it into the Azure Blob. To connect with the Blob Storage container we need a connection string. So let's open the Azure Storage resource in portal -> Access Keys -> Click on Show Keys - > Copy the Key 1 Connection String.

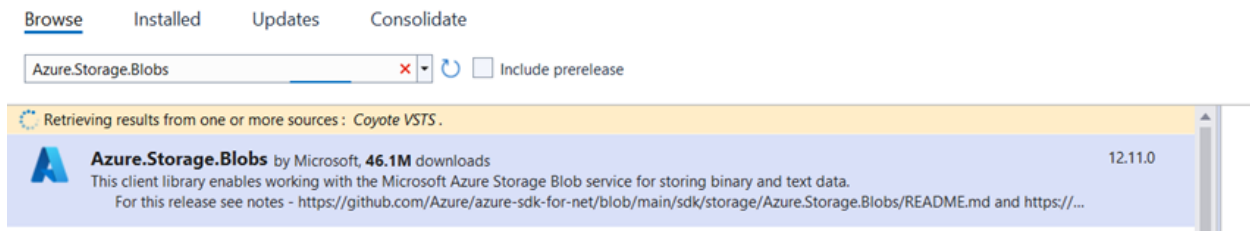


Open the local.settings.json file in our function app and paste the connection string of our Azure Storage resource as value of "AzureWebJobsStorage" key. Also add another key called "ContainerName" and paste the name of container we have created earlier.

```
{
  "IsEncrypted": false,
  "Values": {
    "AzureWebJobsStorage": "<replace your blob storage connection key here>",
    "ContainerName": "file-upload", // Container name
    "FUNCTIONS_WORKER_RUNTIME": "dotnet"
  }
}
```

JavaScript  
Copy

To interact with Azure storage we have to first install the below NuGet package.



Now add the below code to upload a file into the container in our blob storage.

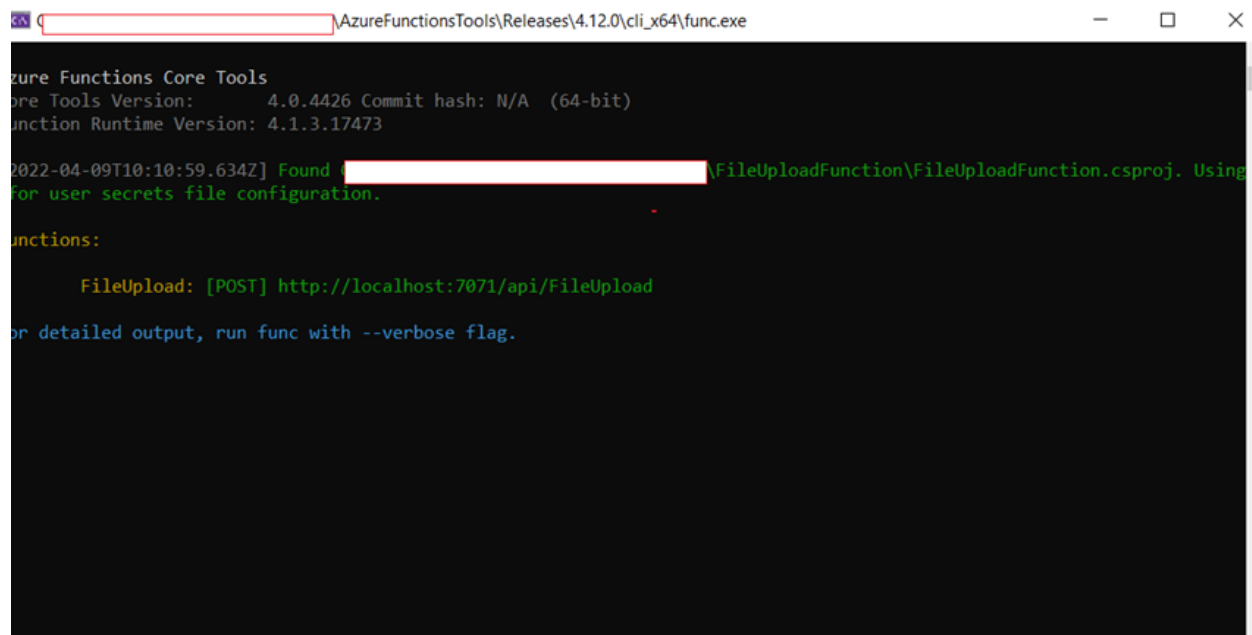
```
using Azure.Storage.Blobs;
using Microsoft.AspNetCore.Http;
using Microsoft.AspNetCore.Mvc;
using Microsoft.Azure.WebJobs;
using Microsoft.Azure.WebJobs.Extensions.Http;
using Microsoft.Extensions.Logging;
using System;
using System.IO;
using System.Threading.Tasks;
namespace FileUploadFunction {
    public static class FileUpload {
        [FunctionName("FileUpload")]
        public static async Task < IActionResult > Run(
            [HttpTrigger(AuthorizationLevel.Anonymous, "post", Route =
null)] HttpRequest req, ILogger log) {
            string Connection =
Environment.GetEnvironmentVariable("AzureWebJobsStorage");
            string containerName =
Environment.GetEnvironmentVariable("ContainerName");
            Stream myBlob = new MemoryStream();
            var file = req.Form.Files["File"];
            myBlob = file.OpenReadStream();
            var blobClient = new BlobContainerClient(Connection,
containerName);
            var blob = blobClient.GetBlobClient(file.FileName);
            await blob.UploadAsync(myBlob);
            return new OkObjectResult("file uploaded successfylly");
        }
    }
}
C#
Copy
```

First we have stored the Blob Storage connection string and container name from configuration into local variables. After that we have read the file request by using

key called "File" into variable and using `OpenReadStream()` function we have read the file into the stream. To interact with Blob storage we first have to create `BlobContainerClient` by passing connection string and container name. After creating client, we have to create `BlobClient` using `GetBlobClient` method by passing input file name.

Finally to upload file to container we have used `UploadAsync` method by passing stream. You can read more about these methods [here](#).

Now run the `FileUpload` function.



```

Azure Functions Core Tools
Core Tools Version: 4.0.4426 Commit hash: N/A (64-bit)
Function Runtime Version: 4.1.3.17473

[2022-04-09T10:10:59.634Z] Found [redacted] \FileUploadFunction\FileUploadFunction.csproj. Using
For user secrets file configuration.

Functions:

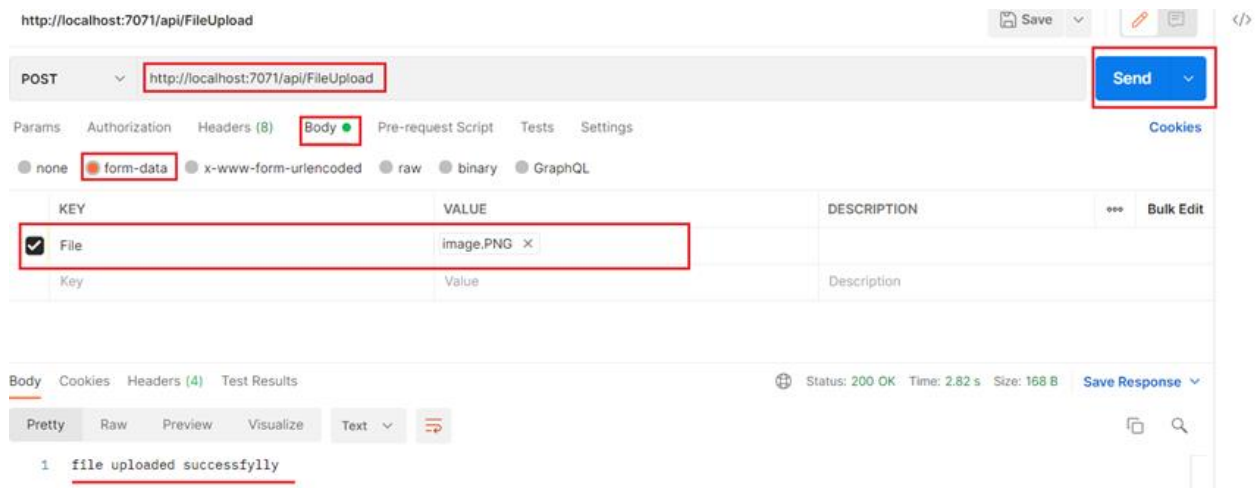
    FileUpload: [POST] http://localhost:7071/api/FileUpload

For detailed output, run func with --verbose flag.
```

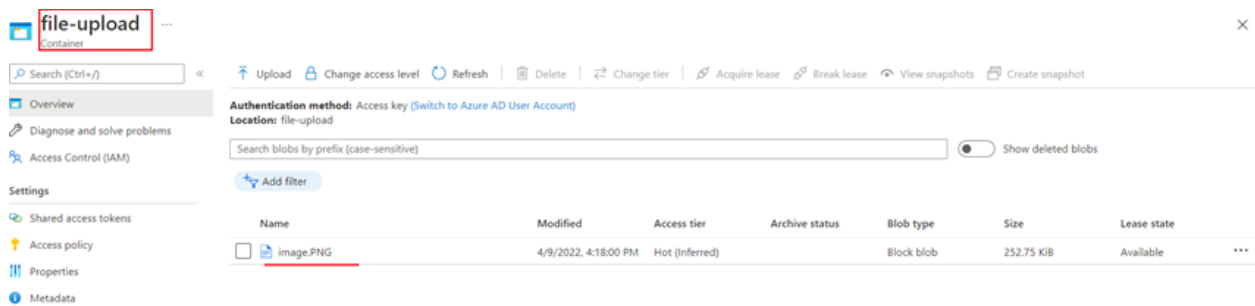
For testing the function open postman and paste the about function URL i.e.  
`http://localhost:7071/api/FileUpload`

Now in our code we have read the file from form data so click on Body and select form-data then add key as "File" and for value select which file you want to upload and click on Send button.





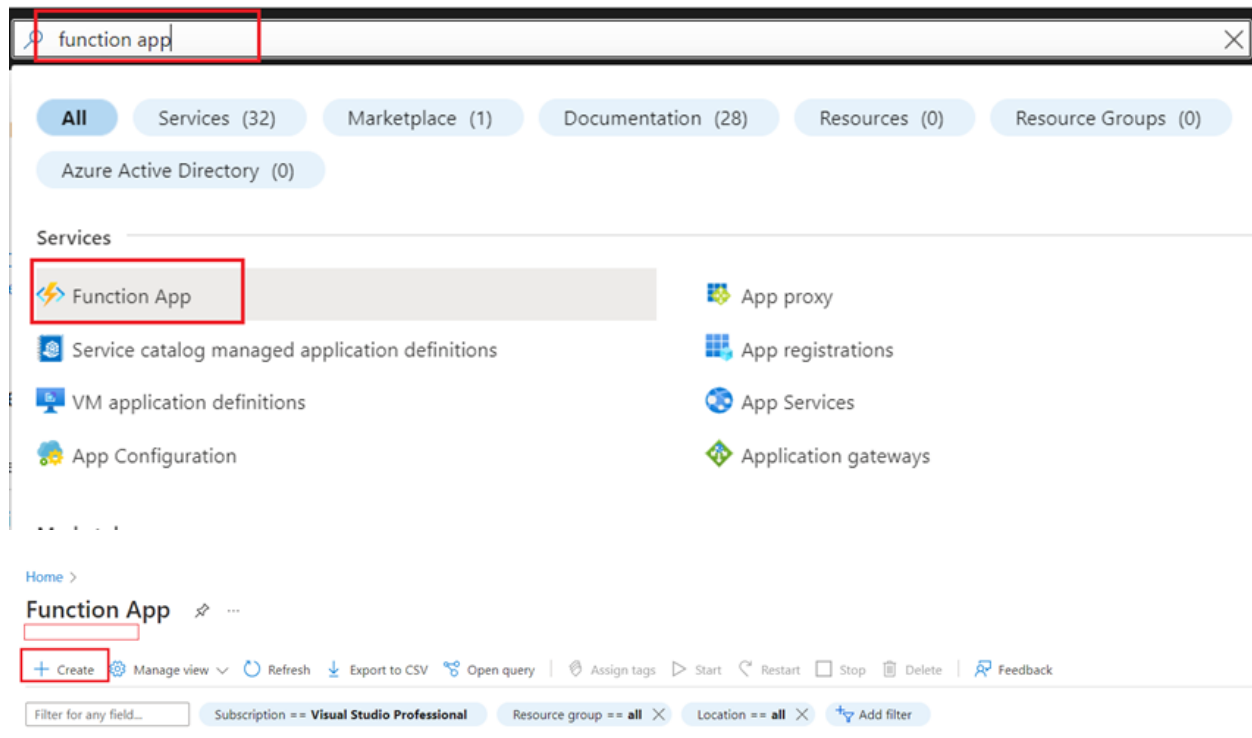
Now if we open our **“file-upload”** container we can see the file which we uploaded.



## Publish Azure function to Azure function app using Visual Studio

### Create a function app using Azure portal

Log in to the [Azure portal](#) In the Search bar, search as "function app" and then select the Function app.



After that click on the "+ Create" button to add a new function app. Fill out the basic details,

## Create Function App ...

Create a function app, which lets you group functions as a logical unit for easier management, deployment and sharing of resources. Functions lets you execute your code in a serverless environment without having to first create a VM or publish a web application.

### Project Details

Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* ⓘ Visual Studio Professional ▼

Resource Group \* ⓘ azuretraining ▼

[Create new](#)

### Instance Details

Function App name \* FileUploadFunApp ▼ .azurewebsites.net

Publish \* ☒ Code ☐ Docker Container

Runtime stack \* .NET ▼

Version \* 6 ▼

Region \* Central US ▼

**Review + create**

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Next : Hosting >

Now click on Review: Create button and review all the details and click on the Create button. Wait for a few minutes to create the resources.

Home >

Microsoft.Web-FunctionApp-Portal-1ca4dc67-ab3c | Overview ⓘ ...

Deployment

Search (Ctrl+J) << Delete Cancel Redeploy Refresh

Overview

Inputs

Outputs

Template

\*\*\* Deployment is in progress

Deployment name: Microsoft.Web-FunctionApp-Portal-1ca4dc67-a... Start time: 4/9/2022, 4:48:52 PM  
Subscription: Visual Studio Professional Correlation ID: 14d3a119-4c23-443c-84a4-04b3bcc4a067  
Resource group: azuretraining

Deployment details (Download)

Resource	Type	Status	Operation details
No results.			

Once deployment is complete click on Go to resource button to see our new function app.

Home >

## Microsoft.Web-FunctionApp-Portal-1ca4dc67-ab3c | Overview

Deployment

Search (Ctrl+/) << Delete Cancel Redeploy Refresh

Overview

Inputs

Outputs

Template

We'd love your feedback! →

\*\*\* Deployment is in progress

Deployment name: Microsoft.Web-FunctionApp-Portal-1ca4dc67-a... Start time: 4/9/2022, 4:48:52 PM  
Subscription: Visual Studio Professional Correlation ID: 14d3a119-4c23-443c-84a4-04b3bcc4a067  
Resource group: azuretraining

Deployment details (Download)

Resource	Type	Status	Operation details
No results.			

## Microsoft.Web-FunctionApp-Portal-1ca4dc67-ab3c | Overview

Deployment

Search (Ctrl+/) << Delete Cancel Redeploy Refresh

Overview

Inputs

Outputs

Template

We'd love your feedback! →

✓ Your deployment is complete

Deployment name: Microsoft.Web-FunctionApp-Portal-1ca4dc67-a... Start time: 4/9/2022, 4:48:52 PM  
Subscription: Visual Studio Professional Correlation ID:   
Resource group: azuretraining

Deployment details (Download)

Next steps

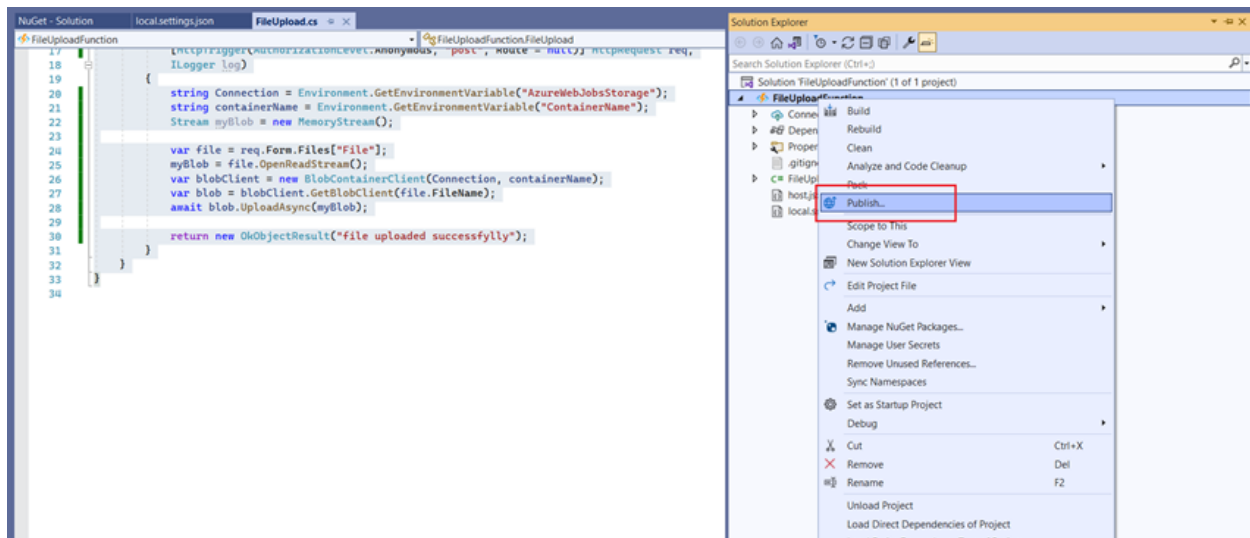
Create a function. Recommended

Manage deployments for your app. Recommended

**Go to resource**

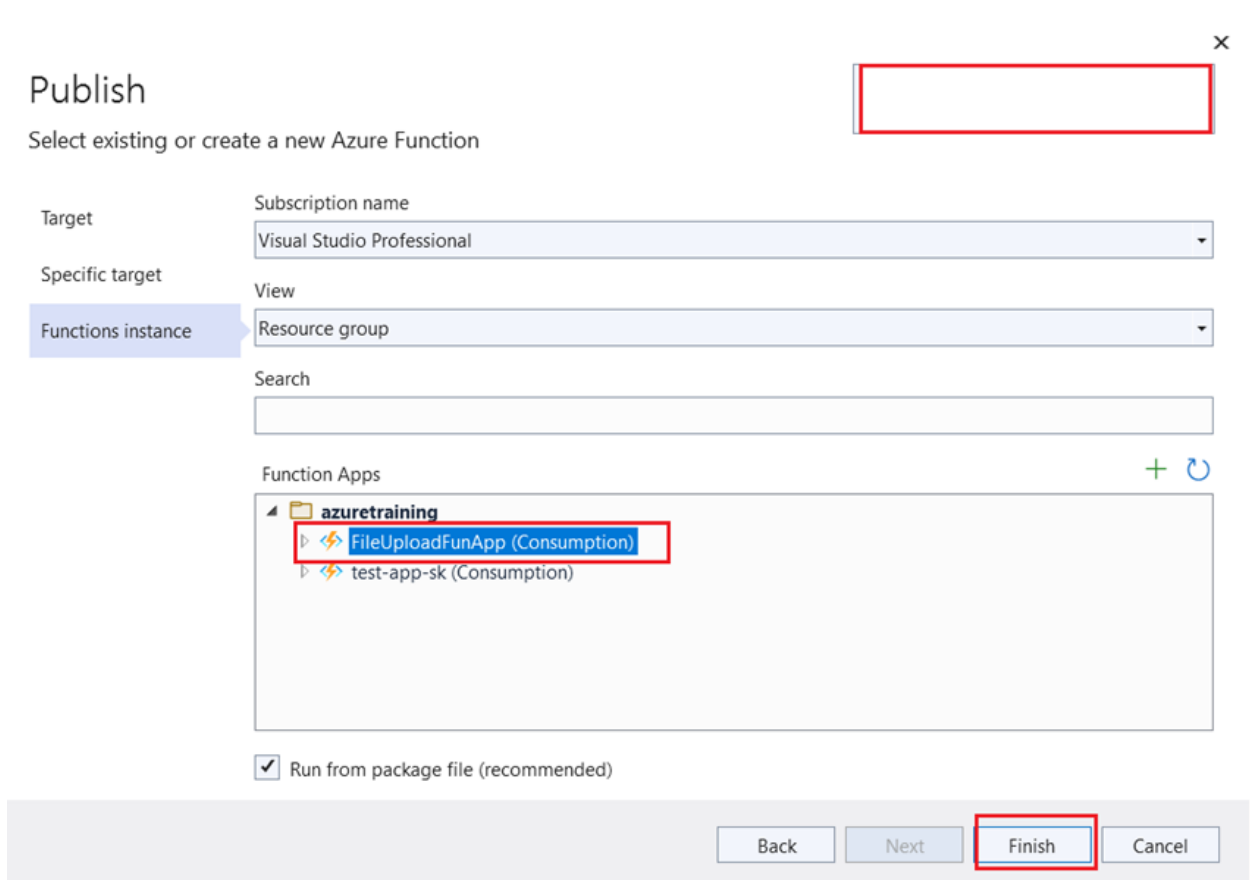
## Publish the azure function into the function app

To deploy our function to Azure we need Azure Function App. Right Click on our solution and click on the Publish button.

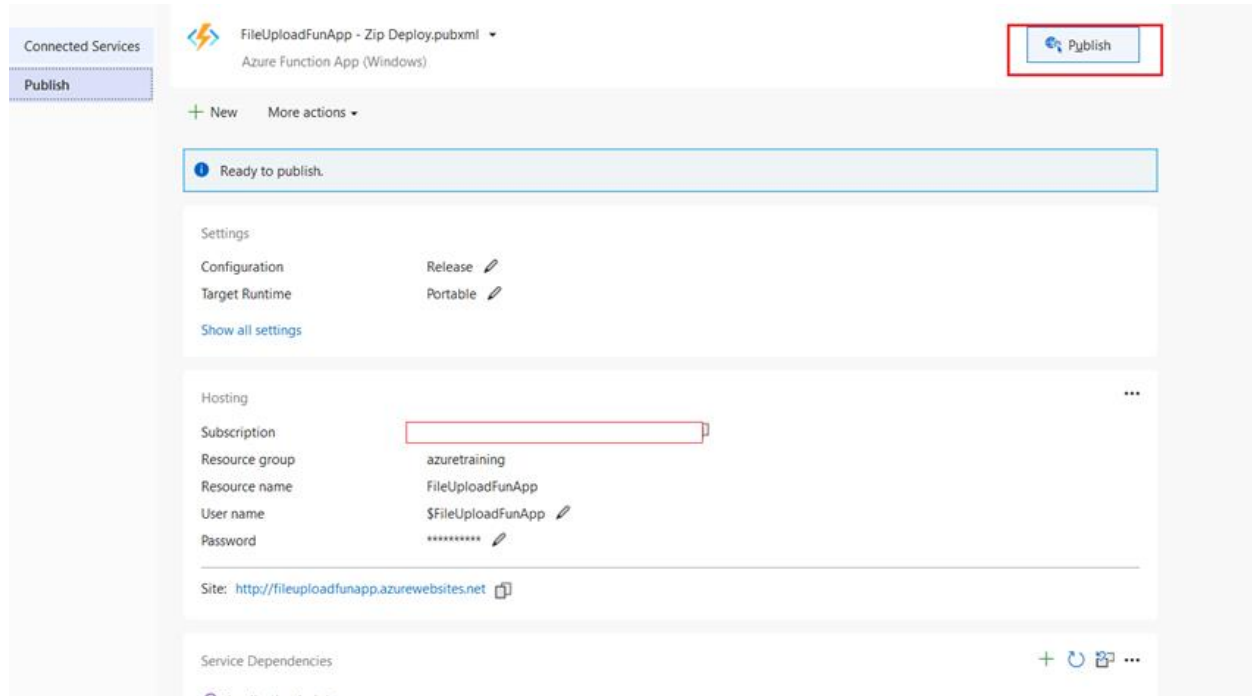


As we are publishing into Azure then Select Azure and click on Next. Select target as "Azure Function App(Windows)" and click on Next. We can either select an already created function app or we can create a new Function app.

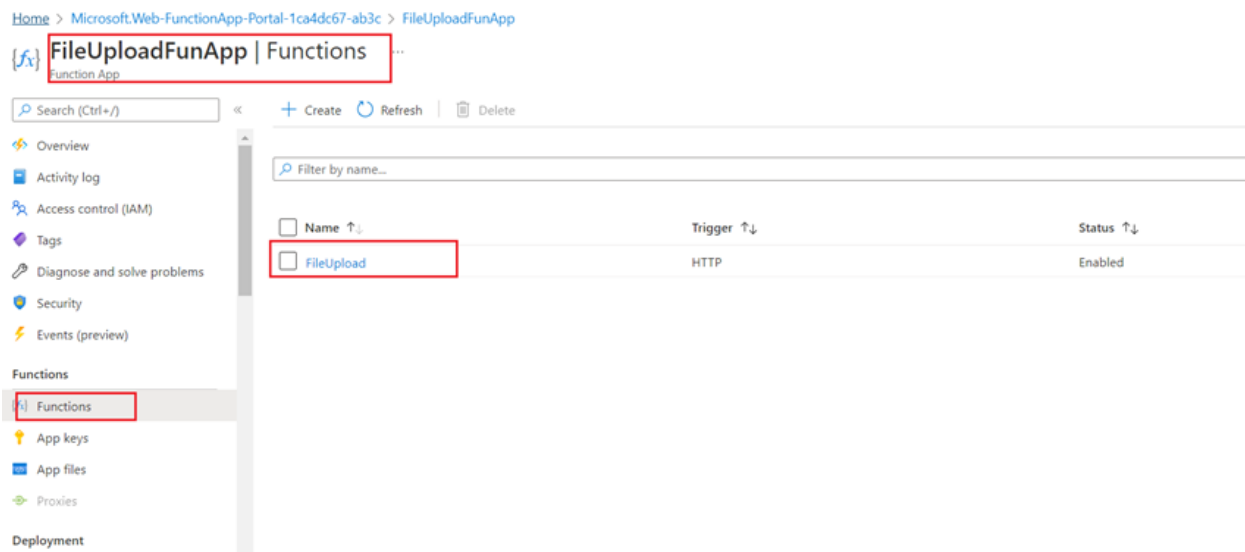
Click on Finish button.



Click on Publish button to push our function to our Function App.

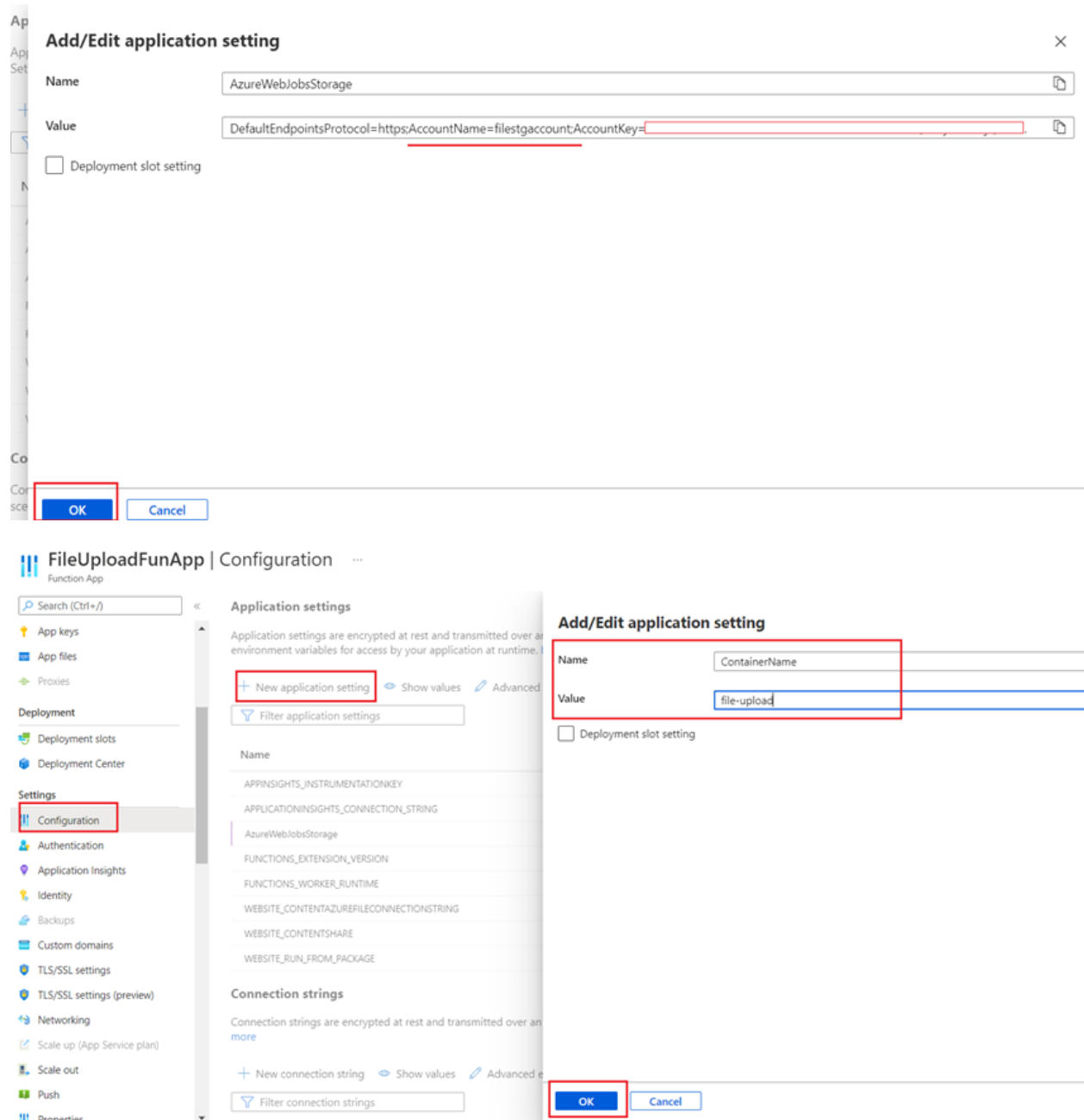


Once our app is successfully published on Azure, go to the Azure portal and search for our function app. Select Functions from the left sidebar to see our deployed function.

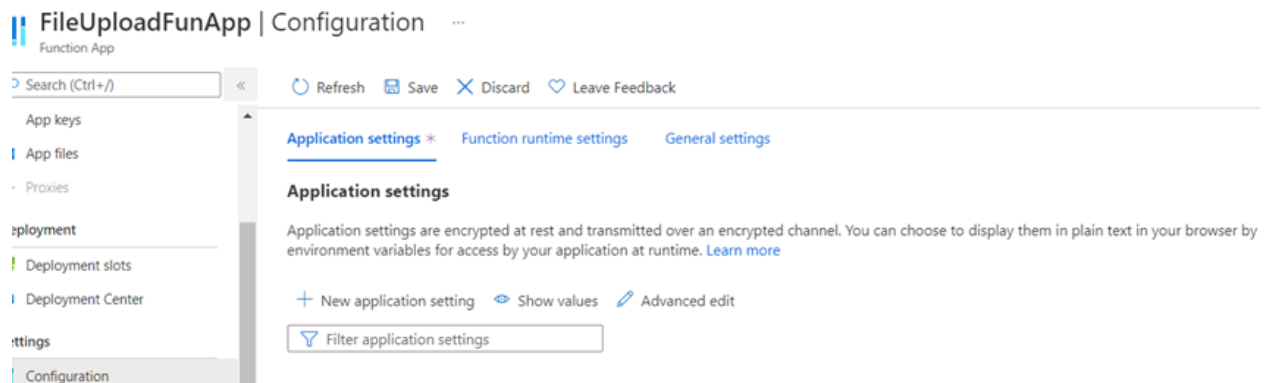


**Configure the storage account connection string into Configuration setting of Function app**

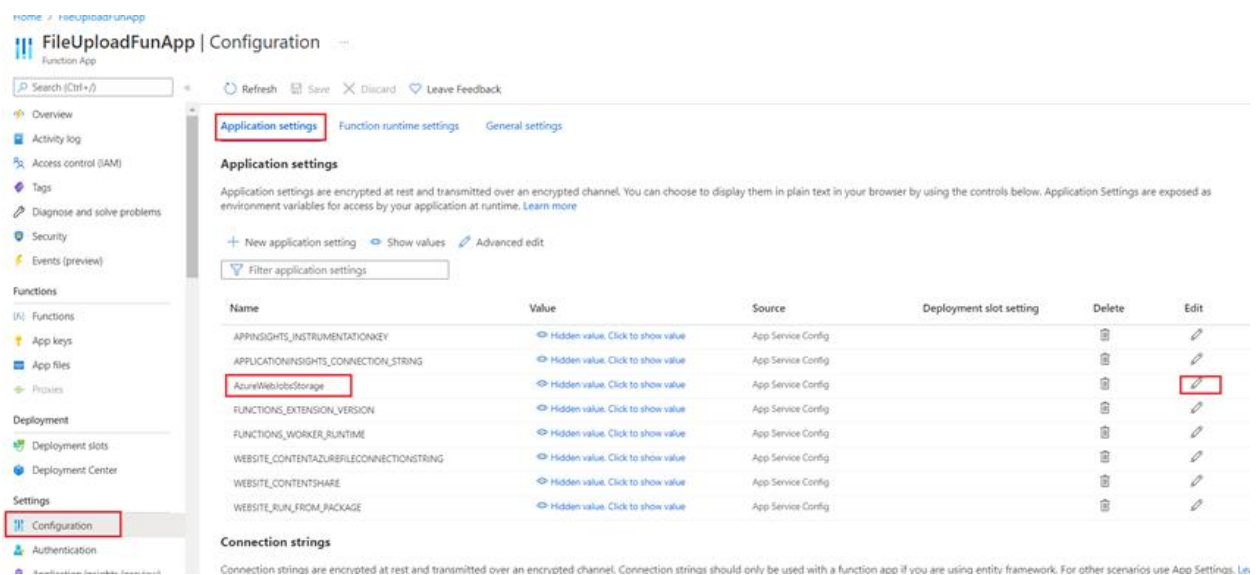
Now we have deployed our function into Function app so next step is to configure the settings. So click on Configuration. For this app we have to set value of Storage connection string and container name in configuration. So search for "AzureWebJobsStorage" and click on Edit button and paste your storage connection string.



Click on "+ New application setting" and give name as "ContainerName" and Value as "file-upload".

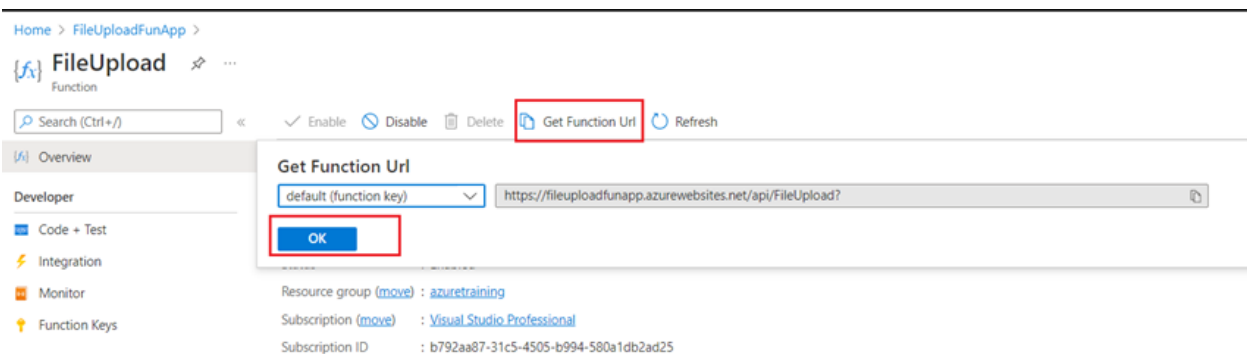


Finally click on Save button to save changes.



## Test publish app using postman

To get the url of deployed function click on Functions -> Select File Upload function -> Click on Get Function Url -> Copy url and paste in postman.





Now as we test locally in form-data add a key "File" and select file you want to upload.

The screenshot shows the Postman interface for a REST client. The URL is `https://fileuploadfunapp.azurewebsites.net/api/FileUpload?`. The method is **POST**. The body is set to **form-data**. A table with the following data is shown:

KEY	VALUE	DESCRIPTION
<input checked="" type="checkbox"/> File	test_sheet.xlsx	
Key	Value	Description

The **Send** button is highlighted. Below the table, the response is shown in the **Body** tab, indicating a successful upload:

```
1 file uploaded successfylly
```

Now if we check container we can see the file uploaded into it.

The screenshot shows the Azure Storage Explorer interface. The container is named **file-upload**. The authentication method is **Access key**. The location is **file-upload**. The search results show the following files:

Name	Modified	Access tier	Archive status	Blob type	Size	Lease state
<input type="checkbox"/> image.PNG	4/9/2022, 4:18:00 PM	Hot (Inferred)		Block blob	252.75 KiB	Available
<input type="checkbox"/> test_sheet.xlsx	4/9/2022, 8:12:58 PM	Hot (Inferred)		Block blob	9.23 KiB	Available