

Rise of Serverless Deployment

Problem Statement

Every website needs to be hosted for it to be available on Internet. There are multiple types of hosting ranging from shared hosting targeted for start-ups and costs few dollars, to dedicated hosting whose price can range up to hundreds of dollars.



Figure 1: Problems in Server Hosted Websites

Now, in a scenario that you are a small company, you'll definitely opt for shared hosting for it to be cost efficient.

But in a case that there is a sudden surge of users on your website, since your plan in the shared hosting cannot handle so many users, your website will crash as it exceeded its bandwidth.

Or you are a medium sized company but in one particular month, there's hardly any traffic on your website but you are still charged hundreds of dollars as server costs.

Here's where “**Serverless Deployment**” comes in.

Despite the name, serverless does not mean the absence of servers.

Serverless architecture refers to a service where server management and maintenance is done by the cloud service provider so that companies can focus on developing products and writing code while the server infrastructure is taken care of.

Advantages of Serverless Deployment:

Scalability

Majority of serverless providers offer their services on-demand. Hence, there is no need to manually scale infrastructure. Your webapp is automatically scaled out or down depending on load.

Cost

Serverless computing costs are not fixed and fluctuate depending on the needs of your company and the traffic. Serverless architecture cuts the costs by 70% to 90% as you do not have to pay for extra services you do not require.

Global data access

The files can be accessed from anywhere and at any time since the cloud provider manages the servers. This option is ideal for companies with remote workers and freelancers who can access essential data from any place in the world.

Thus, Serverless computing is more affordable, scalable, and time-efficient.

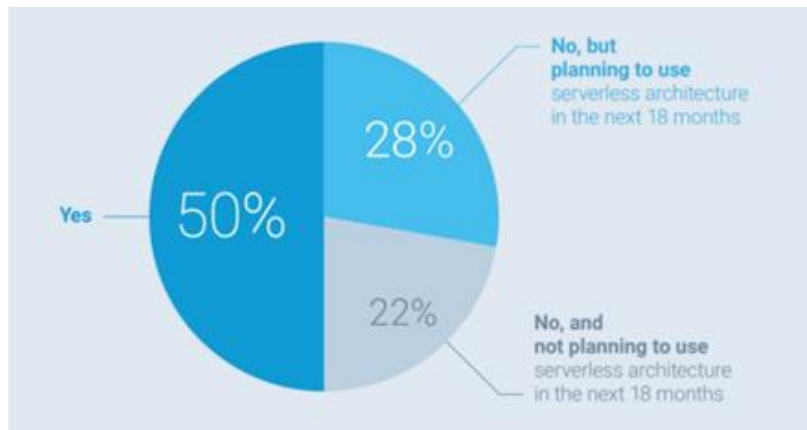


Figure 2: Survey showing companies' plans to use Serverless Architecture

Architecture

In this blog, we'll be deploying a static webpage to the Azure cloud platform to demonstrate the ease of deployment as well as its efficient management.

Azure Services used:

Azure Storage – To store our files

Azure function app – To create a function

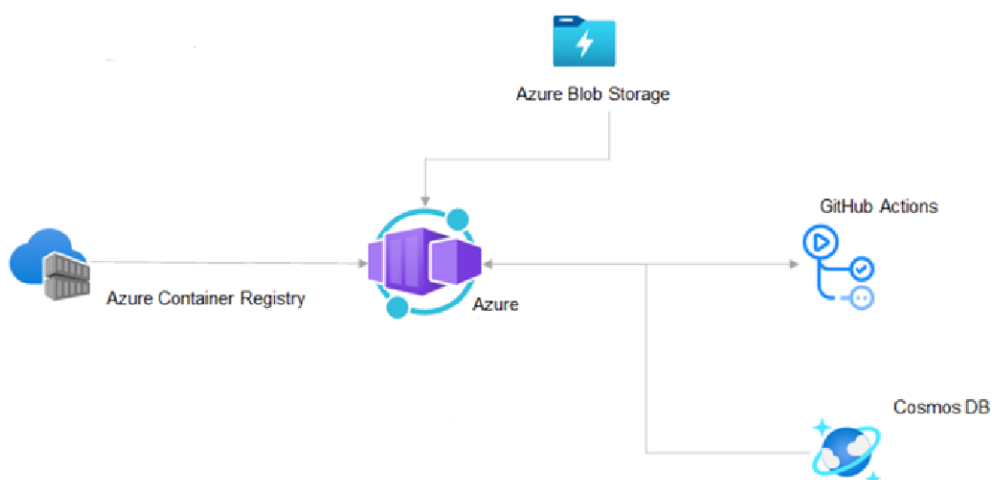


Figure 3: Architecture of Azure for a Full Stack Website

Flow for deploying a static webpage on Azure

- Creating an Azure Storage Blob
- Creating a Function App
- Uploading the files in Storage Container

Technical Details and Implementation of Solution

We'll now be deploying a Static webpage on the Azure cloud platform. Similar steps can be followed to deploy a Full-stack Website, with the addition of connecting or creating the Database on Azure DB as well as the server.

Prerequisites:

- Account with a Service plan at portal.azure.com.
- For students logging in with their university mail, there is an 1-year free subscription with 100 credits.

Steps:

In this blog, we'll be using the portal to make all the necessary resources.

The same steps can also be performed using Azure CLI.

Create an Azure Function App

Function app is a resource that hosts the execution of one or more serverless functions and controls the billing model for the serverless functions.

Log in to the Azure Website.

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

Azure services

[Create a resource](#)
[SQL databases](#)
[Web PubSub Service](#)
[Storage accounts](#)
[Quickstart Center](#)
[Virtual machines](#)
[App Services](#)
[Azure Cosmos DB](#)
[Kubernetes services](#)
[More services](#)

Resources

Recent Favorite

Name	Type	Last Viewed
resourceb753	Storage account	18 hours ago
checkmyweather	Function App	18 hours ago
Resources	Resource group	19 hours ago

[See all](#)

Navigate

[Subscriptions](#)
[Resource groups](#)
[All resources](#)
[Dashboard](#)

Tools

[Microsoft Learn](#) Learn Azure with free online training from Microsoft
 [Azure Monitor](#) Monitor your apps and infrastructure
 [Microsoft Defender for Cloud](#) Secure your apps and infrastructure
 [Cost Management](#) Analyze and optimize your cloud spend for free

Go to Create resource.

The screenshot shows the Azure portal interface with a red arrow pointing to the 'Create a resource' button in the top navigation bar. The left sidebar contains a navigation menu with the following items:

- Create a resource
- Home
- Dashboard
- All services
- FAVORITES
- All resources
- Resource groups
- App Services
- Function App
- SQL databases
- Azure Cosmos DB
- Virtual machines
- Load balancers
- Storage accounts
- Virtual networks
- Azure Active Directory
- Monitor
- Advisor
- Microsoft Defender for Cloud
- Cost Management + Billing
- Help + support
- Cost Management + Billing

The main content area displays the 'Azure services' section, followed by the 'Resources' table, 'Navigate' section, and 'Tools' section, identical to the first image.

In the search service, find the function app.

The screenshot shows the Microsoft Azure Marketplace search interface. At the top, there is a search bar with the text 'function' entered. A large red arrow points from the search bar towards the search results. Below the search bar, there are filters for 'Publisher Type: All' and 'Product Type: All'. The search results are displayed in a grid of cards. The first card is for 'Function App' by Microsoft, which is highlighted with a red arrow. Other cards include 'MAKANA Python Function', 'Azure Network Function Manager - Device', 'VPN Server SoftEther', 'Puppeteer on Azure Functions', 'CAR', 'Delta edgeMES', 'Qualys Virtual Firewall Appliance', 'Apache Tomcat', and another 'VPN Server SoftEther' card. Each card includes a 'Create' button and a heart icon for favorites.

Click on create

The screenshot shows the detailed page for the 'Function App' in the Microsoft Azure Marketplace. The page title is 'Function App' and it is published by Microsoft. It has a rating of 4.1 (1429 ratings). Below the title, there is a 'Plan' dropdown menu set to 'Function App' and a blue 'Create' button. A large red arrow points from the 'Create' button towards the left. Below the 'Create' button, there are tabs for 'Overview', 'Plans', 'Usage Information + Support', and 'Ratings + Reviews'. The 'Overview' tab is selected. The main content area contains a description: 'Write any function in minutes – whether to run a simple job that cleans up a database or build a more complex architecture. Creating functions is easier than ever before, whatever your chosen OS, platform, or development method.' Below the description, there is a section titled 'More products from Microsoft' with a 'See All' link. This section displays four product cards: 'Active Directory Health Check', 'AD Replication Status', 'Device Update for IoT Hub', and 'Front Door and CDN profiles'. Each card includes a 'Create' button and a heart icon for favorites.

Now enter all the details.

The app name should be a unique Domain, as it will serve as a part of the URL.

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

Home > Create a resource > Marketplace > Function App >

Create Function App

Basics **Hosting** Networking Monitoring Deployment Tags Review + create

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 * Azure for Students
Resource Group * (New) Resource group
[Create new](#)

Instance Details

Function App name * Function App name .azurewebsites.net

Publish * Code Docker Container

Runtime stack * Select a runtime stack

Version * Select a runtime stack version

Region * Central US

Operating system
The Operating System has been recommended for you based on your selection of runtime stack.

Operating System * Linux Windows

Plan
The plan you choose dictates how your app scales, what features are enabled, and how it is priced. [Learn more](#)

Plan type * Consumption (Serverless)

[Review + create](#) < Previous Next: Hosting >

Now go to hosting a create a new Storage group.

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

Home > Create a resource > Marketplace > Function App >

Create Function App

Basics **Hosting** Networking Monitoring Deployment Tags Review + create

Storage
When creating a function app, you must create or link to a general-purpose Azure Storage account that supports Blobs, Queue, and Table storage.

Storage account * (New) resources9c58
[Create new](#)

[Review + create](#) < Previous Next: Networking >

Now click on Create.

Azure services

- Create a resource
- SQL databases
- Web PubSub Service
- Storage accounts
- Quickstart Center
- Virtual machines
- App Services
- Azure Cosmos DB
- Kubernetes services
- More services

Resources

Recent Favorite

Name	Type	Last Viewed
resourcesb753	Storage account	19 hours ago
checkmyweather	Function App	19 hours ago
Resources	Resource group	20 hours ago

See all

Navigate

- Subscriptions
- Resource groups
- All resources
- Dashboard

Tools

- Microsoft Learn: Learn Azure with free online training from Microsoft
- Azure Monitor: Monitor your apps and infrastructure
- Microsoft Defender for Cloud: Secure your apps and infrastructure
- Cost Management: Analyze and optimize your cloud spend for free

Useful links

- Technical Documentation
- Azure Migration Tools
- Azure Services: Find an Azure expert
- Recent Azure Updates: Quickstart Center

Azure mobile app

Download on the App Store | GET IT ON Google Play

Now go to the Storage account and change the account type to StorageV2 as it allows you to serve static content like HTML, CSS, JavaScript, and images.

resourcesb753
Storage account

Search

Upload | Open in Explorer | Delete | Move | Refresh | Open in mobile | CLI / PS | Feedback

Overview

Activity log | Tags | Diagnose and solve problems | Access Control (IAM) | Data migration | Events | Storage browser

Data storage

- Containers
- File shares
- Queues
- Tables

Security + networking

- Networking
- Azure CDN
- Access keys
- Shared access signature
- Encryption
- Microsoft Defender for Cloud

Data management

- Redundancy
- Data protection
- Object replication
- Blob inventory

Essentials

Resource group (move) : Resources
Location : Central India
Subscription (mouse) : Azure for Students
Subscription ID : 54d2acaa-f799-47bc-83d7-8b4dde7e7d0
Disk state : Available

Performance : Standard
Replication : Locally-redundant storage (LRS)
Account kind : StorageV2 (general purpose v2)
Provisioning state : Succeeded
Created : 1/6/2023, 12:40:41 AM

Tags (edit) : Click here to add tags

Properties | Monitoring | Capabilities (7) | Recommendations (0) | Tutorials | Developer Tools

Blob service

- Hierarchical namespace: Disabled
- Default access tier: Hot
- Blob public access: Enabled
- Blob soft delete: Disabled
- Container soft delete: Disabled
- Versioning: Disabled
- Change feed: Disabled
- NFS v3: Disabled
- Allow cross-tenant replication: Enabled

File service

- Large file share: Disabled
- Active Directory: Not configured
- Default share-level permissions: Disabled
- Soft delete: Enabled (7 days)
- Share capacity: 5 TiB

Queue service

- CMK support: Disabled

Security

- Require secure transfer for REST API operations: Enabled
- Storage account key access: Enabled
- Minimum TLS version: Version 1.2
- Infrastructure encryption: Disabled

Networking

- Allow access from: All networks
- Number of private endpoint connections: 0
- Network routing: Microsoft network routing
- Access for trusted Microsoft services: Yes
- Endpoint type: Standard

Now go to Static Website Tab and Enable it to show static webpages. Also enter the file name it should display, i.e. index.html.

The screenshot shows the Azure portal interface for a storage account. The left sidebar contains navigation categories: Data storage, Security + networking, Data management, and Settings. The 'Static website' option is highlighted with a red arrow. The main content area shows the 'Essentials' section with account details and a table of service settings. The 'Static website' toggle is currently set to 'Enabled'.

Service	Setting	Value
Blob service	Hierarchical namespaces	Disabled
	Default access tier	Hot
	Blob public access	Enabled
	Blob soft delete	Disabled
	Container soft delete	Disabled
	Versioning	Disabled
File service	Large file share	Disabled
	Active Directory	Not configured
	Default share-level permissions	Disabled
	Soft delete	Enabled (7 days)
	Share capacity	5 TiB
Queue service	CMK support	Disabled

After enabling, it should look like this. Copy the Primary endpoint. This is where our content will be displayed.

The screenshot shows the 'Static website' configuration page. The 'Static website' toggle is now fully enabled. The 'Primary endpoint' is highlighted with a red arrow. The configuration fields are as follows:

Field	Value
Primary endpoint	https://resourcesb753.z29.web.core.windows.net/
Index document name	index.html
Error document path	404.html

Now, we'll update the Cross-Origin Resource Sharing to tell the web browser that it is ok to access another server, i.e. while submitting a form, etc and helps to communicate with the backend. This is generally needed for dynamic websites but it is a good practise to enable it.

Go to the function app you created.

The screenshot shows the Microsoft Azure portal interface. At the top, there is a search bar and navigation icons. Below the search bar, there are sections for 'Azure services', 'Resources', 'Navigate', and 'Tools'. The 'Resources' section is active, showing a table of recent resources. A red arrow points to the 'Function App' resource in the table.

Name	Type	Last Viewed
resourcesb753	Storage account	
checkmyweather	Function App	
Resources	Resource group	20 hours ago

Go to CORS.

The screenshot shows the Microsoft Azure portal interface for a Function App named 'checkmyweather'. The left-hand navigation pane is visible, with the 'CORS' option under the 'API' section highlighted by a large red arrow. The main content area displays the 'Essentials' tab, showing details such as Resource group, Status (Running), Location (Central India), Subscription, and URL. Below this, there are tabs for 'Metrics', 'Features (9)', 'Notifications (1)', and 'Quickstart'. Two charts are visible: 'Function Execution Count' and another chart showing resource usage over time.

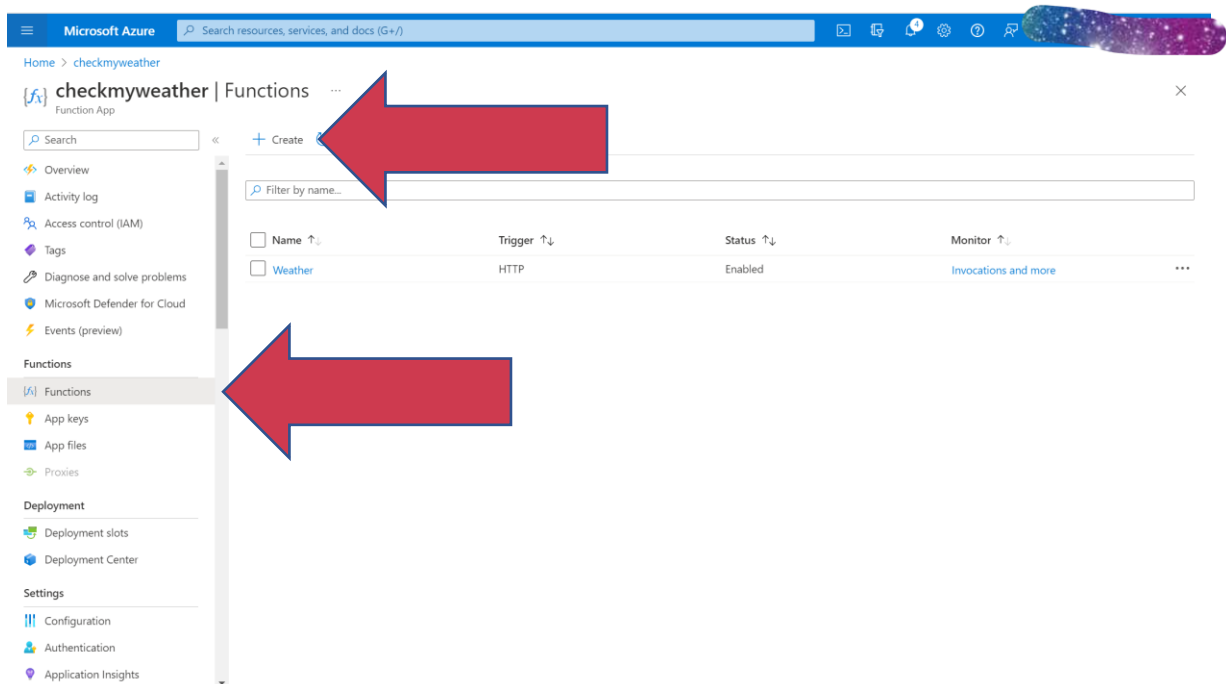
Now paste the URL endpoint copied from Storage and Save it.

The screenshot shows the Microsoft Azure portal interface for the 'checkmyweather' Function App, specifically the 'CORS' configuration page. The left-hand navigation pane is visible, with the 'CORS' option under the 'API' section highlighted. The main content area displays the 'CORS' configuration, including a description of Cross-Origin Resource Sharing (CORS) and a section for 'Allowed Origins'. The 'Allowed Origins' list contains two entries: 'https://portal.azure.com' and 'https://resourcesb753.z29.web.core.windows.net'. The second entry is highlighted by a large red arrow, indicating that this is the URL endpoint to be pasted and saved.

Now we'll create a new function, which is necessary for Full-Stack website deployment.

(Can skip this step for static webpage deployment)

Click on Functions and click on Create.



Select HTTP Trigger and give the Function name.

Click on Create.

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

Home > checkmyweather | Functions

Search

Filter by name...

Name	Trigger
Weather	HTTP

Create function

Select development environment
Instructions will vary based on your development environment. [Learn more](#)

Development environ... Develop in portal

Select a template
Use a template to create a function. Triggers describe the type of events that invoke your functions. [Learn more](#)

Filter

Template	Description
HTTP trigger	A function that will be run whenever it receives an HTTP request, responding based on data in the body or query string
Timer trigger	A function that will be run on a specified schedule
Azure Queue Storage trigger	A function that will be run whenever a message is added to a specified Azure Storage queue
Azure Service Bus Queue trigger	A function that will be run whenever a message is added to a specified Service Bus queue
Azure Service Bus Topic trigger	A function that will be run whenever a message is added to the specified Service Bus topic
Azure Blob Storage trigger	A function that will be run whenever a blob is added to a specified container
Azure Event Hub trigger	A function that will be run whenever an event hub receives a new event

Template details
We need more information to create the HTTP trigger function. [Learn more](#)

New Function * HttpTrigger1

Authorization level * Anonymous

Create Cancel

Now, We'll upload our files.

Go to Storage Account and then Container Tab.

Then go to \$web.

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

Home > resourcesb753 | Containers

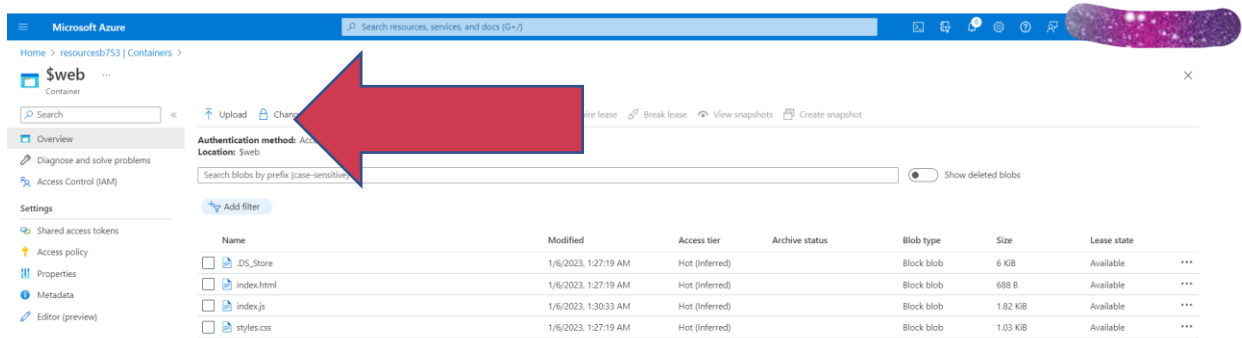
Search

Search containers by prefix Show deleted containers

Name	Last modified	Public access level	Lease state
<input type="checkbox"/> \$logs	5 AM	Private	Available
<input type="checkbox"/> \$web	AM	Private	Available
<input type="checkbox"/> azure-webjobs-hosts	1 AM	Private	Available
<input type="checkbox"/> azure-webjobs-secrets	1/6/2023, 12:43:56 AM	Private	Available

Containers

Click on Upload and Upload all the files for the Webpage.



Now go to the URL endpoint. The Website should be working perfectly.



Sample picture for demonstrating

Now our Website is Successfully Deployed on Serverless Architecture.

Challenges in implementing the solution

The biggest challenge for implementing this was Learning Cloud Computing. Being a 2nd year Computer Engineering Student, you hardly get introduced to cloud computing so early on.

So, learning the basics of cloud as well as implementing it during my semester exams was the biggest challenge for me since I got to know about this blogathon too late.

There were many instances I wanted to back out from applying since I had no idea about cloud, and watching tutorials online as well as studying from documentation took so much time that I doubted I'll even be able to complete before the deadline.

Business Benefit

Most websites all over the world still use server architecture for hosting since it is believed that cloud computing is too difficult of a job and it won't be possible for medium scaled companies to hire cloud experts.

Through this blog, I hope to demonstrate how easy it is for even a student to deploy a static webpage and hence want to convey that with proper research and effort, switching over to Serverless Architecture will be beneficial to any company in the long run.

References

- <https://learn.microsoft.com/en-us/azure/storage/blobs/storage-blob-static-website>
- <https://learn.microsoft.com/en-us/azure/storage/blobs/storage-blob-static-website-host>
- <https://itnext.io/the-only-guide-you-need-for-a-static-website-in-azure-part-2-host-your-static-site-in-azure-9114b7069db2>

By-
Suhaani Aggarwal
2nd Year Computer Engineering Student
1030 words.