*Configure & Use Aspire for Azure Emulators*

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| Document Goals | Provide an overview for developers, on how to quickly configure their .Net 9 Aspire (Hosting) project to consume (Docker) Azure Emulators. |

# Revision History

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| 25-Aug-2025 | 1.0 | Initial draft | Bert O’Neill |
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# Introduction

This document provides an overview on how to configure your Visual Studio (Aspire) environment to incorporate Azure Emulators, to design\test your serverless applications locally.

## Purpose

Your project maybe in a position where you now need to demo to a client the latest Azure feature, your team has developed or you have implemented a code fix, but you’re not able to spin up Azure resources, due to security or financial restrictions. To get around this, you can avail of the latest Serverless Emulators.

## Scope

The scope of this document is to convey the configuration steps needed to start using Azure Emulators with .Net Aspire.

# Prerequisites

* [Docker](https://docs.docker.com/desktop/) (desktop) installed.
* [Visual Studio 22 Community](https://visualstudio.microsoft.com/vs/community/) installed (updated to version 17.14.13 August 2025).
* [Clone GitHub Code Repo](https://github.com/Bert0Neill/AspireAzuriteDemo).
* [NPM](https://nodejs.org/en) installed.

# Emulator Installation (Service Bus \ Storage \ SignalR)

Within your development environment or on a server that your team has access to, install the components below:

## Microsoft Azure SignalR Emulator

From a command prompt, run the following .Net CLI command

dotnet tool **install** -g Microsoft.Azure.SignalR.Emulator

Or *update* if already installed:

dotnet tool **update** -g Microsoft.Azure.SignalR.Emulator

Or to *uninstall*:

dotnet tool **uninstall** -g Microsoft.Azure.SignalR.Emulator

A screenshot of a computer

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For simplicities sake, I have created a folder on my C:\ drive called *Azurite* (this will host the storage files etc.).

### Start SignalR

Run the following command to start the SignalR emulator locally:

asrs-emulator start

Below, you will see the connection string to use within your code:

A screenshot of a computer

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## Azure Storage Emulator (Blob\Queue\Table)

Run the following statement from your command prompt (**NB** I am suppling the path to use, my folder above):

azurite --location **C:\Azurite**\Azurite-Data --debug C:\Azurite\Azurite-Debug.log

You can see the URLs that will be allocated to each storage type, these are the URLs and port numbers that you will later use within your codebase:

A screen shot of a computer

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This will create the appropriate files within the storage location, supplied in the prompt:

A screenshot of a computer

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If you find that the executable (azurite.exe) doesn’t exist within your environment, ensure that you have Visual Studio 22 updated to the latest version – (time of blog 17.14.13):

A screenshot of a computer

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## Service Bus Emulator

Ensure that you have Docker running:

A screen shot of a phone

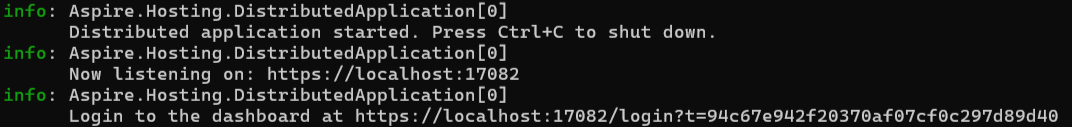
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You won’t have to startup any tools or run any commands to have the Service Bus running, this will be taken care off by the .Net Aspire container project.

Example of an Aspire screen below, showing the Service Bus and SQL Edge images running in a container.

A screenshot of a computer

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Docker will automatically host the same configuration (no need for any setup scripts) – configured within the code:

A screenshot of a computer

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*Alternatively*, you can setup the Service Bus\SQL Edge images manually and connect to those instances instead of a runtime approach *(I’ve included the steps for completeness below, but within this blog, I will let the .Net code define the images for Docker)*:

Copy the following three files to the folder you created earlier (for e.g. C:\Azurite):



A screenshot of a computer

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Edit the **.env** file, so that *CONFIG\_PATH* is pointing to the config.json file location:

A screenshot of a computer code

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Run the following docker composer command to load Docker with the appropriate *Service Bus* emulator and the *SQL Edge* images:

docker compose -f "C:\Azurite\Docker\docker-compose.yaml" up -d

The first time you run the docker compose command it might take a couple of minutes to download the images, but subsequent calls will start immediately.

A screenshot of a computer

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Then, within Docker you can see the Container with the two images loaded:

A screenshot of a computer

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NB: That the two image names come from your Docker Composer file:

A screenshot of a computer

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**NB:** That in the Service Bus logs, you can see the connection string:

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You have now completed the environment setup for Azure emulators!

# Serverless Architecture – Why Use Emulators

For years Amazon has had [LocalStack](https://www.localstack.cloud/), where developers could use Messaging (SQS\SNS), Storage (S3), Database (DynamoDB), Security (Secrets), Compute (Lambda) etc. This has put the Azure community at a disadvantage when it came to prototyping solutions without having to incur a cost or setup resources that needed to be removed upon demo completion.

In the past, I personally had to spin up Azure Resources to demo a new feature while onsite with a client – having to contend with security firewalls and passwords was troublesome but not a showstopper but then seeing how I could use LocalStack and demo on my laptop – was just so much easier!

The attached code is a scalable solution you can demo locally to your clients on-site, without any overheads or costs associated – architectural overview below:

Where multiple clients are updated by SignalR, to new messages posted to the Message Queue, which is in turn monitored by an Azure Function – this makes for a decoupled and scalable solution – all demonstrated locally.

A diagram of a server

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# Project Structure

The projects within the ([repo](https://github.com/Bert0Neill/AspireAzuriteDemo)) solution are individually simplistic in themselves, but put them together and you have a serverless solution that can scale-up and monitor\consume\process millions of messages in a Queue\Topic and inform clients of any new messages. By using SignalR, you can tailor what client see’s what message etc.

* Azurite.AppHost → Aspire Orchestration (Server)
* Azurite.API → Minimal .Net Web API (Server)
* Azurite.BlazorWasmApp → Browser (Client C#)
* Azurite.SignalR → Maintain Browser Sessions (Server)
* Azurite.Fnx\_MonitorServicebusQueue → Monitor Message Queue (Server)

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# Aspire Service Bus NuGet Package

Ensure your Aspire project has a to [Aspire.Azure.Messaging.ServiceBus](https://www.nuget.org/packages/Aspire.Azure.Messaging.ServiceBus/9.4.1#show-readme-container) NuGet package:A close up of a text

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This allows Aspire to define a Service Bus as a resource (in our case an emulator service bus), and inject the connection string into the projects that actually need them (API, Azure Fnx or a Worker Service).

# Create Azure Service Bus Emulator

# Create Azure Function Emulator

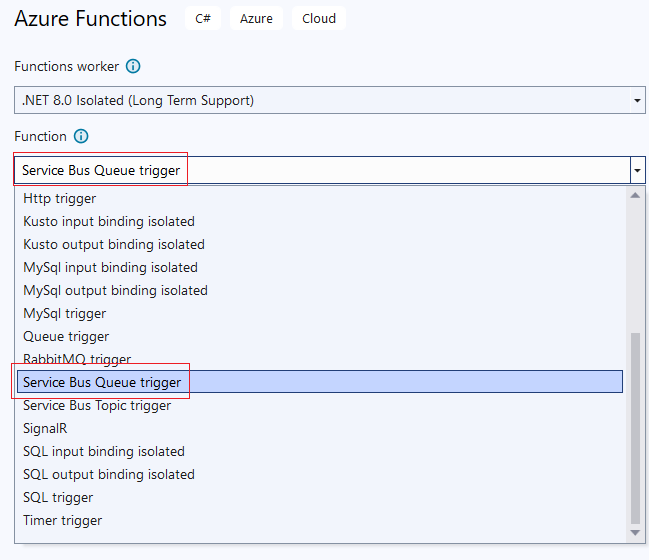
# Create Azure SignalR Emulator

# Create Azure Storage Emulator

# Miscellaneous

## When Adding Your Azure Function Project

Ensure that you Function is a Queue or Topic trigger type:



## Acronym

|  |  |
| --- | --- |
| Abbreviation | Meaning |
| EF | Entity Framework |
| EFC | Entity Framework Core |
| SQL | Structured Query Language |
| TSQL | Transact Structured Query Language |