

2018 Cincinnati Day of Agile & Cincy.Develop();

Sponsors

Diamond



Platinum



Gold



What I Am Doing Wrong with Functions

My Intro

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Agenda

- Overview of Server Less Computing
- Why Server Less Computing?
- Areas we Overlook
- Application Insights with Azure Functions
- Questions

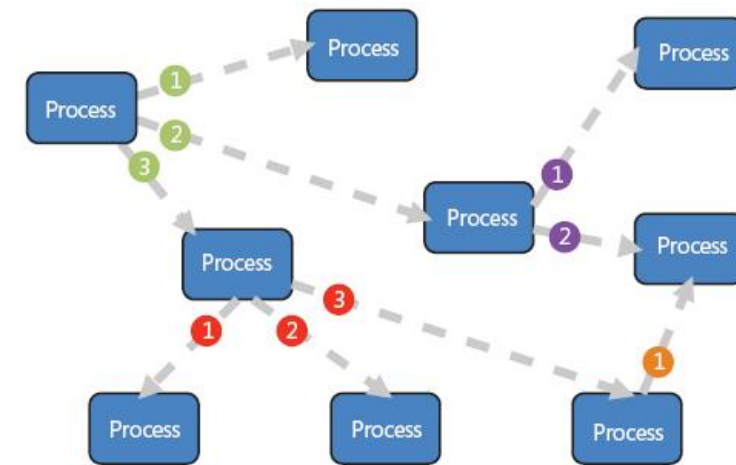
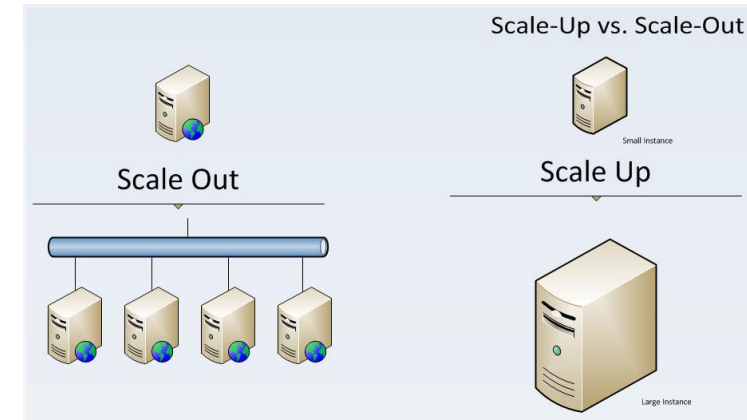
Server Less Computing - Overview

- Does not mean No Servers.
- Enables developers to develop and execute code with out server provisioning.
- “Function as Service” is mainly used to develop event driven applications or perform recurring actions with easier configuration.



Why Server Less Computing ?

- Enables developers to focus on the functionality with out worrying on performance by automatically scaling up or down based on demand.
- Allows to pay for only the execution time along with costs for other resources like storage, network etc..
- Azure Functions, AWS Lambda, Google Cloud Functions , IBM Cloud Functions are different variations of function as service.

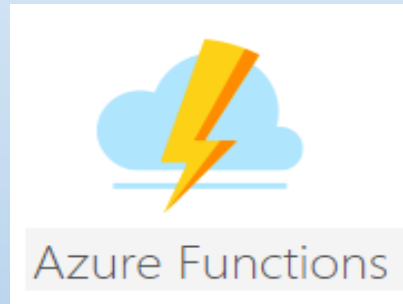


Platform Comparison



	AWS Lambda	Azure Functions	Google Function	IBM Cloud
Languages	Java , Node.js, C# , Python	C#, F#, Node.js, Python, PHP, Bash, Powershell, Custom exe	JavaScript /Node.js	Javascript/Node.js Swift, Python, Java, Docker (custom)
Triggers	HTTP, Event Based, Scheduled	HTTP, Event Based, Scheduled	HTTP , Event Based ,Scheduled	Event Driven, HTTP
Free Trial	Yes	Yes	Yes	Yes
Free Requests	1 Million Free Request per month	1 Million Executions 400,000 GB-s	400,000 GB-seconds 2 million invocations 5GB of Internet egress traffic	400,000 GB-s free

Azure Functions- Areas we Overlook



Areas we Overlook

- Consumption Plan based Functions working well during development but fails with 503 errors during production when executed in parallel load.
- Consumption Plan allows only 300 connections in the host. Any database connections or Http Client initializations should be made static and reused across the function.



503 Service Unavailable

Areas we Overlook

- Queue Trigger is executed for each message which is added to queue. We receive influx of around 300 messages and discover that the function takes more execution time to process the messages.

```
-a795-0ce6bee0752a)
[7/27/2018 3:31:44 AM] C# Queue trigger function processed: 0
[7/27/2018 3:31:44 AM] Function started (Id=1a4594e1-863f-4073-9bd8-f0628c0af2de)[7/27/2018 3:31:44 AM] Function completed (Success, Id=122bc49b-a46d-42cf-a795-0ce6bee0752a, Duration=32ms)

[7/27/2018 3:31:44 AM] Executing 'Function1' (Reason='New queue message detected on 'testqueue'.', Id=1a4594e1-863f-4073-9bd8-f0628c0af2de)
[7/27/2018 3:31:44 AM] C# Queue trigger function processed: 1
[7/27/2018 3:31:44 AM] Function completed (Success, Id=1a4594e1-863f-4073-9bd8-f0628c0af2de, Duration=4ms)
[7/27/2018 3:31:44 AM] Executed 'Function1' (Succeeded, Id=1a4594e1-863f-4073-9bd8-f0628c0af2de)
[7/27/2018 3:31:44 AM] Executed 'Function1' (Succeeded, Id=122bc49b-a46d-42cf-a795-0ce6bee0752a)
[7/27/2018 3:31:44 AM] Function started (Id=269f2ad1-f62a-4f80-983d-457ee6710789)
[7/27/2018 3:31:44 AM] Executing 'Function1' (Reason='New queue message detected on 'testqueue'.', Id=269f2ad1-f62a-4f80-983d-457ee6710789)
[7/27/2018 3:31:44 AM] C# Queue trigger function processed: 2

[7/27/2018 3:31:55 AM] C# Queue trigger function processed: 300
[7/27/2018 3:31:55 AM] Function completed (Success, Id=9317eee5-44e4-42c5-a618-71ff9061cd6c, Duration=5ms)
[7/27/2018 3:31:55 AM] Executed 'Function1' (Succeeded, Id=9317eee5-44e4-42c5-a618-71ff9061cd6c)
```

Areas we Overlook

- Execution time can be reduced if queue messages are processed in batch using host.json configuration. Execution time is reduced by 1ms.

```
{  
  "queues": {  
    "maxPollingInterval": 2000,  
    "visibilityTimeout": "00:00:30",  
    "batchSize": 30,  
    "maxDequeueCount": 5,  
    "newBatchThreshold": 15  
  }  
}
```

```
[7/27/2018 3:44:03 AM] Function started (Id=c8272247-a2a8-41ba-b2ac-b19364d7868f)  
[7/27/2018 3:44:03 AM] Executing 'PostMessageToQueue' (Reason='This function was programmatically called via the host AP  
Is.', Id=c8272247-a2a8-41ba-b2ac-b19364d7868f)  
[7/27/2018 3:44:11 AM] C# HTTP trigger function processed a request.  
[7/27/2018 3:44:14 AM] Function started (Id=83723a95-f1c5-4b1c-bf41-e4edb256280e)  
[7/27/2018 3:44:14 AM] Executing 'Function1' (Reason='New queue message detected on 'testqueue'.', Id=83723a95-f1c5-4b1c  
-bf41-e4edb256280e)  
[7/27/2018 3:44:14 AM] C# Queue trigger function processed: 0  
[7/27/2018 3:44:14 AM] Function started (Id=8c00643d-12a3-46df-b0af-f2ca9a9f672b)  
[7/27/2018 3:44:14 AM] Executing 'Function1' (Reason='New queue message detected on 'testqueue'.', Id=8c00643d-12a3-46df  
-b0af-f2ca9a9f672b)  
[7/27/2018 3:44:14 AM] C# Queue trigger function processed: 1  
[7/27/2018 3:44:14 AM] Function started (Id=dcaac2f4-926a-44ef-8ffa-8e794fccaf87)  
[7/27/2018 3:44:14 AM] Executing 'Function1' (Reason='New queue message detected on 'testqueue'.', Id=dcaac2f4-926a-44ef  
-8ffa-8e794fccaf87)  
[7/27/2018 3:44:23 AM] C# Queue trigger function processed: 299  
[7/27/2018 3:44:23 AM] Function completed (Success, Id=3d565cb9-3520-4eb2-b870-118f8a7ba683, Duration=20ms)  
[7/27/2018 3:44:23 AM] Executed 'Function1' (Succeeded, Id=3d565cb9-3520-4eb2-b870-118f8a7ba683)  
[7/27/2018 3:44:23 AM] Function started (Id=446beac3-023f-405c-9027-f455f64e2fb5)  
[7/27/2018 3:44:23 AM] Executing 'Function1' (Reason='New queue message detected on 'testqueue'.', Id=446beac3-023f-405c  
-9027-f455f64e2fb5)  
[7/27/2018 3:44:23 AM] C# Queue trigger function processed: 300  
[7/27/2018 3:44:23 AM] Function completed (Success, Id=446beac3-023f-405c-9027-f455f64e2fb5, Duration=4ms)  
[7/27/2018 3:44:23 AM] Executed 'Function1' (Succeeded, Id=446beac3-023f-405c-9027-f455f64e2fb5)
```

Areas we Overlook

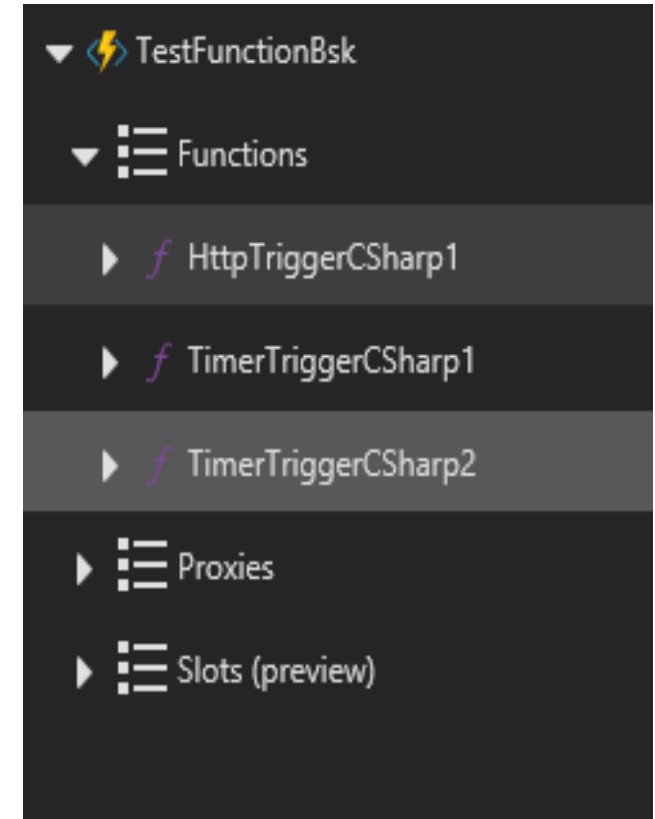
- Functions process failed messages in queue for 5 times by default before moving the message to poison-queue.

```
{  
  "queues": {  
    "maxPollingInterval": 2000,  
    "visibilityTimeout": "00:00:30",  
    "batchSize": 30,  
    "maxDequeueCount": 5,  
    "newBatchThreshold": 15  
  }  
}
```

```
802b-57324d81ebe9)  
7/27/2018 5:13:59 AM] C# Queue trigger function processed: 2  
7/27/2018 5:14:04 AM] A ScriptHost error has occurred  
7/27/2018 5:14:04 AM] Exception while executing function: Function1. QueueFunction: Error while processing.  
7/27/2018 5:14:04 AM] Exception while executing function: Function1  
7/27/2018 5:14:04 AM] Exception while executing function: Function1. QueueFunction: Error while processing.  
7/27/2018 5:14:05 AM] Function completed (Failure, Id=b02a0af5-9ce2-441a-802b-57324d81ebe9, Duration=5455ms)  
7/27/2018 5:14:05 AM] Executed 'Function1' (Failed, Id=b02a0af5-9ce2-441a-802b-57324d81ebe9)  
7/27/2018 5:14:05 AM] mscorlib: Exception while executing function: Function1. QueueFunction: Error while processing.  
7/27/2018 5:14:05 AM] Function had errors. See Azure WebJobs SDK dashboard for details. Instance ID is 'b02a0af5-9ce2-441a-802b-57324d81ebe9'  
7/27/2018 5:14:05 AM] mscorlib: Exception while executing function: Function1. QueueFunction: Error while processing.  
7/27/2018 5:14:05 AM] Message has reached MaxDequeueCount of 5. Moving message to queue 'testqueue-poison'.
```

Areas we Overlook

- Running multiple functions as part of single Function App results in consumption of resources across the functions. If one function consumes major resources this could impact the resource allocation for remaining functions impacting performance of the functions.
- It is recommended to create multiple function app and group high load functions in dedicated function app and remaining low load functions in another function app.

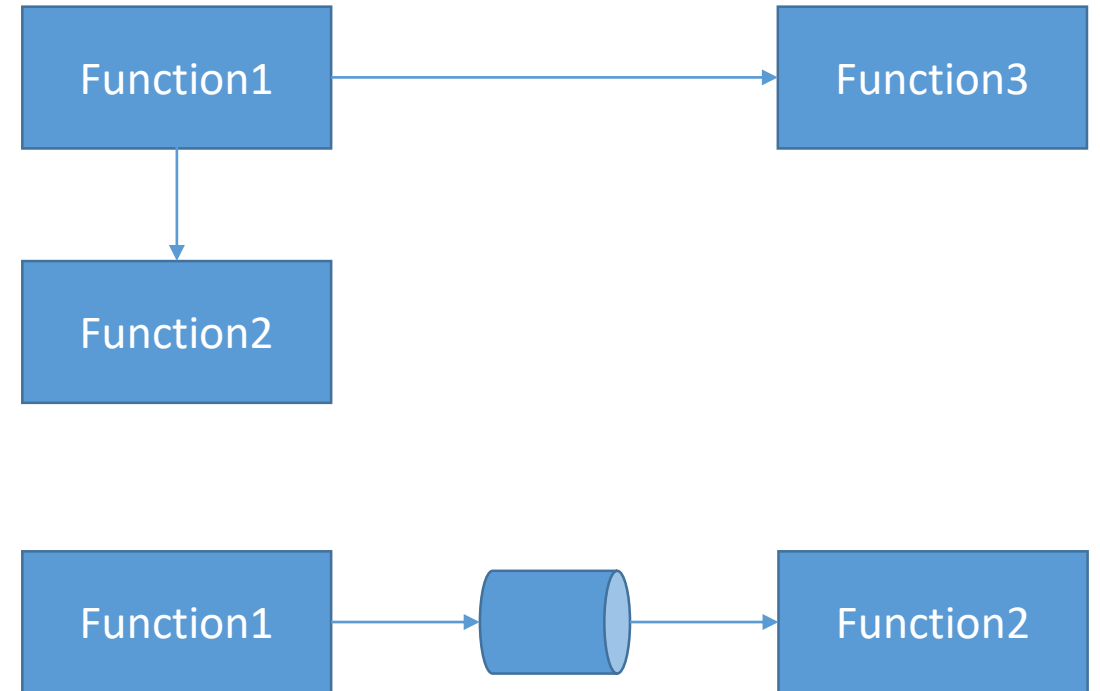


Areas we Overlook

- Functions when executed in Consumption Plan automatically scale up to demand. This leads to increase in the instances of function to handle the load.
- We can control the maximum number of scaled out instances via the `WEBSITE_MAX_DYNAMIC_APPLICATION_SCALE_OUT` app setting. This is currently supported only for C# and is in preview.

Areas we Overlook

- Overtime functions code tend to include more logics to be handled making the function performing cross function calls.
- Cross Function Calls is not recommended and it is best to develop functions as Stateless Functions and consider queue option in place of Cross Function Calls.



Areas we Overlook

- Functions fail to handle concurrent request if there are more number of request received at the same time.
- Host.json can be used to configure http configuration to handle concurrent requests.

```
"http": {  
  "routePrefix": "api",  
  "dynamicThrottlesEnabled": false,  
  "maxConcurrentRequests": 10,  
  "maxOutstandingRequests": 20  
}
```


Areas we Overlook

- Function Proxies can be used to override request and response returned from function.
- Function Proxy is considered a function and when we invoke another function through Function Proxy we would be charged for two separate function executions.

test

Proxy URL

`https://testfunctionbsk.azurewebsites.net/test` [Copy](#)

Route template

`test`

Allowed HTTP methods

Selected methods

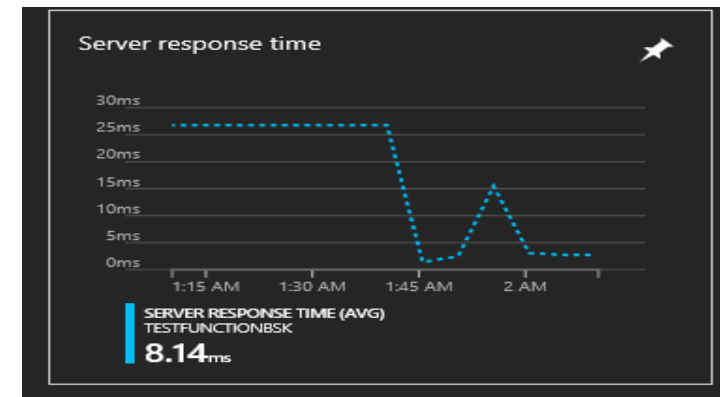
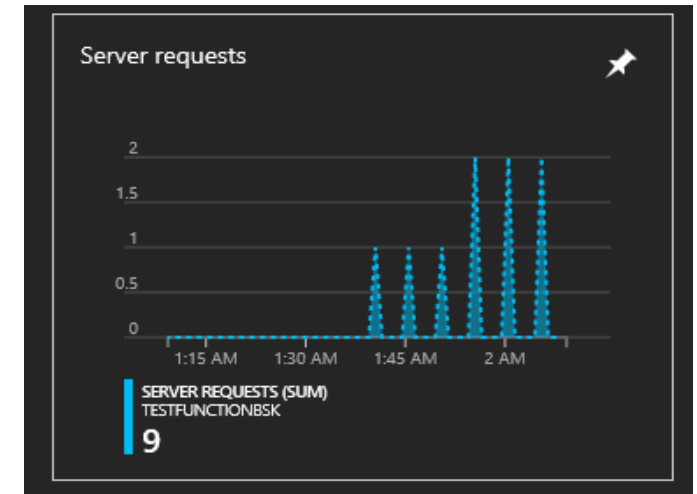
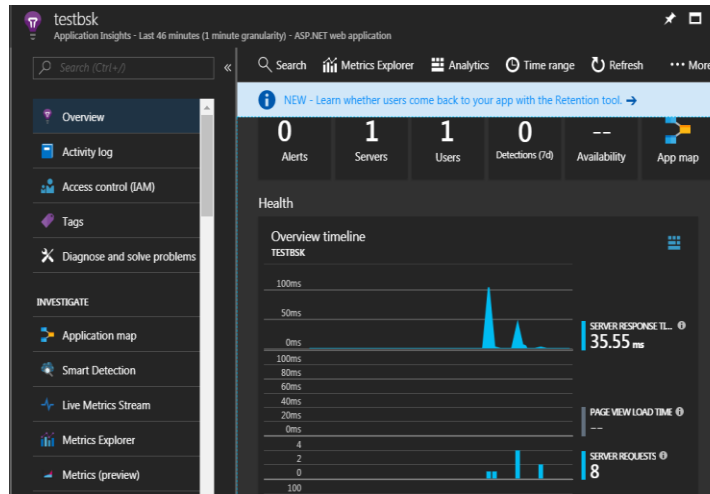
<input checked="" type="checkbox"/> GET	<input checked="" type="checkbox"/> POST	<input type="checkbox"/> DELETE	<input type="checkbox"/> HEAD
<input type="checkbox"/> PATCH	<input type="checkbox"/> PUT	<input type="checkbox"/> OPTIONS	<input type="checkbox"/> TRACE

Backend URL

`testfunctionbsk.azurewebsites.net/api/HttpTriggerCSharp1?code=GrcO5aUZHvArI06uJ2V3FzxmlYYcJhcvU/Mv/QII2ISD2G5m6kmdkg==`

Application Insights

- App Insights can be used to monitor
 - Number of Users
 - Number of Servers
 - Service Response Times
 - Total Number of Requests
 - Failed Request
 - Total Requests By Performance



Application Insights

- Host.json file can be used to monitor the health of the function host. Once default performance counters reaches the threshold function app reaches a hard stop.
- Health Monitor can be used to prevent the hard stop of Function App.

```
{  
  "healthMonitor": {  
    "enabled": true,  
    "healthCheckInterval": "00:00:10",  
    "healthCheckWindow": "00:02:00",  
    "healthCheckThreshold": 6,  
    "counterThreshold": 0.80  
  }  
}
```

References

<https://blogs.msdn.microsoft.com/visualstudioalmrangers/2018/04/03/how-we-checked-and-fixed-the-503-error-and-performance-issue-in-our-azure-function/>

<https://github.com/Azure/azure-functions-host/wiki/Configuration-Settings>

<https://blogs.msdn.microsoft.com/visualstudioalmrangers/2017/09/24/azure-function-integration-tests-automation/>

<https://github.com/Azure/azure-functions-host/wiki/Host-Health-Monitor>

Questions



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