DELPHICON 2023

Celebrating 28 Years of Delphi

embarcadero

When Delphi reaches the Cloud!

by Dion Mai

Agenda

- What is serverless?
- How to implement the back-end?
- How to implement the front-end?
- Advantages of using serverless

About me

Dion Mai

- Development Manager at Aquasoft
- MVP Embarcadero Delphi & C++ Builder
- Delphi Master Certified
- Bachelor of Engineering in Control and Automation

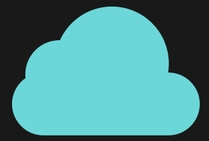
AQUASOFT®

embarcadero MVP

CERTIFIED DELPHI MASTER DEVELOPER

C++

What is Serverless?



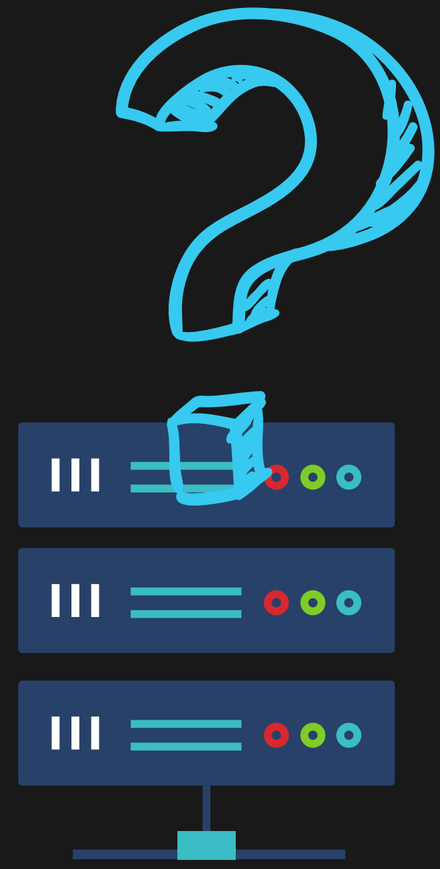
APPLAIED FAAS

Serverless is applaied over FaaS - Funcion as a Service;
but server "*Event Triggered*".

What is Serverless?

SERVERLESS HAS A SERVER?!

Maybe they put the wrong name...



Serverless - at work!

1

HTTP Request

2

Load function and enviroment

3

Running

4

Sending response

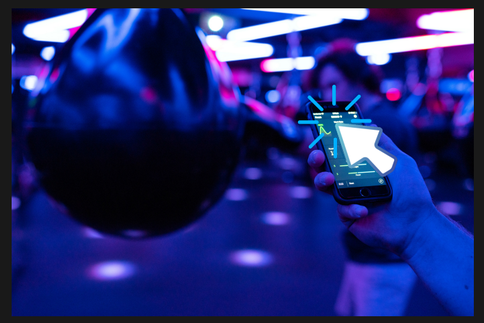
5

Unload all resources

Serverless - once again...

User

Server

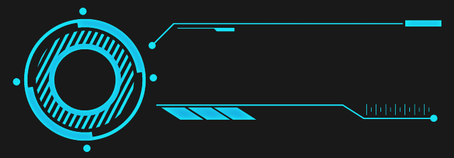


1 Exec request

HTTPS

2 Event is triggered

3 Load function

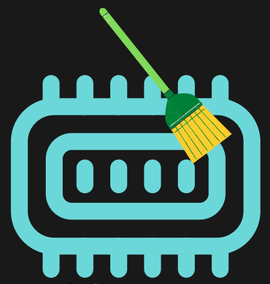


4 Run function

5 Send response data

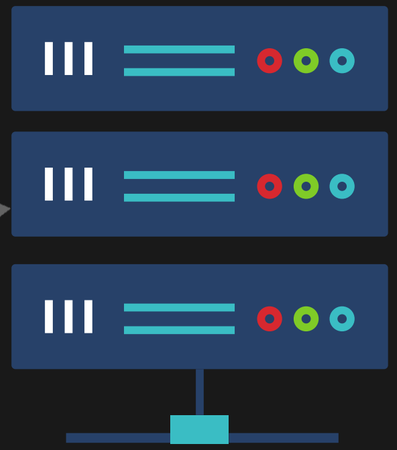
HTTPS

6 Unload function

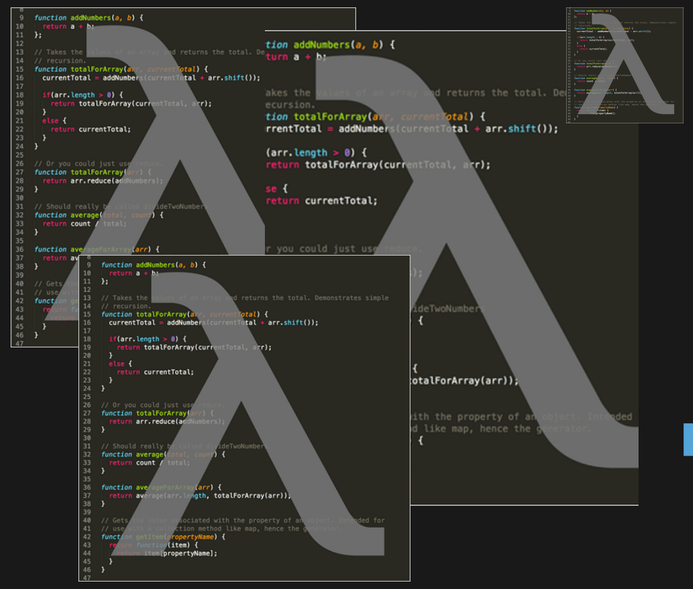


So Serverless?

WE CALL ISOLATED FUNCTIONS FROM CLOUD

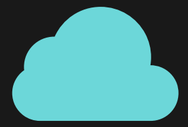


Any system with "infinite functions"



* **DDD (Domain Driven Design)**
Model to help build systems with functions

Serverless - implementing the backend



STEPS TO BUILD

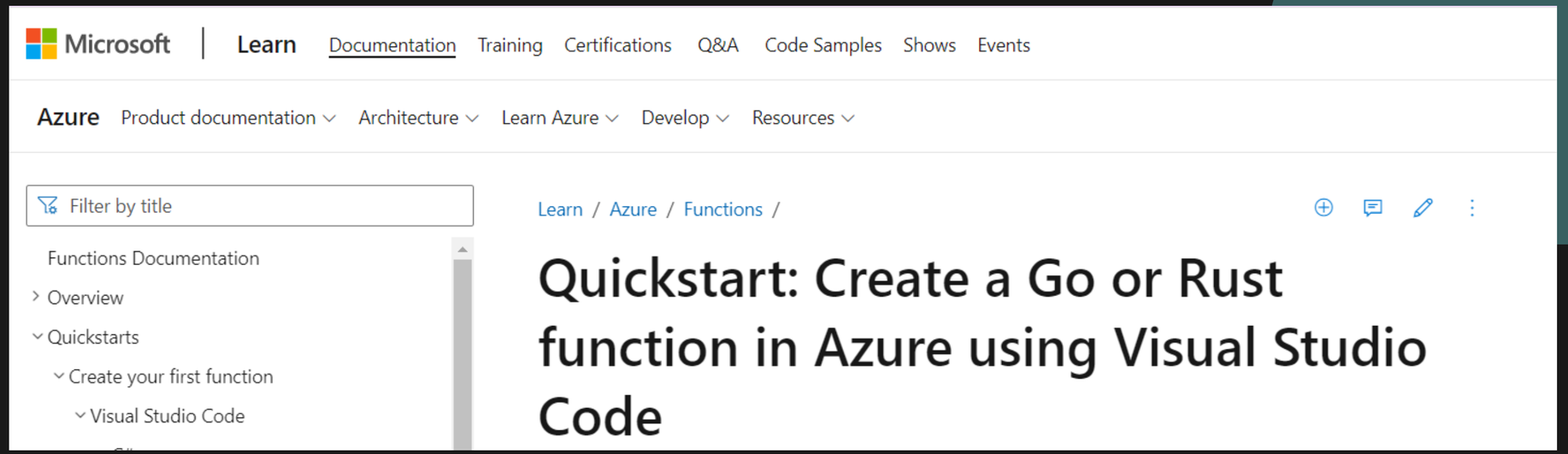
- Select one cloud provider: Azure, AWS, GoogleCloud, IBM Cloud, Alibaba cloud
- Create your account, yes with a credit card on it
- Choose your backend technology
  - Use a native language
  - Use containers, small VMs to run
- Write your function
- Create a deploy environment
- Publish your function
- Other configurations
  - Function execution limit
  - Regions with access
  - Security
  - Logs

Serverless - Lets see Azure sample!

ONLINE MANUAL

Microsoft has an updated online manual:

https://learn.microsoft.com/en-us/azure/azure-functions/create-first-function-vs-code-other?tabs=go%2Cwindows

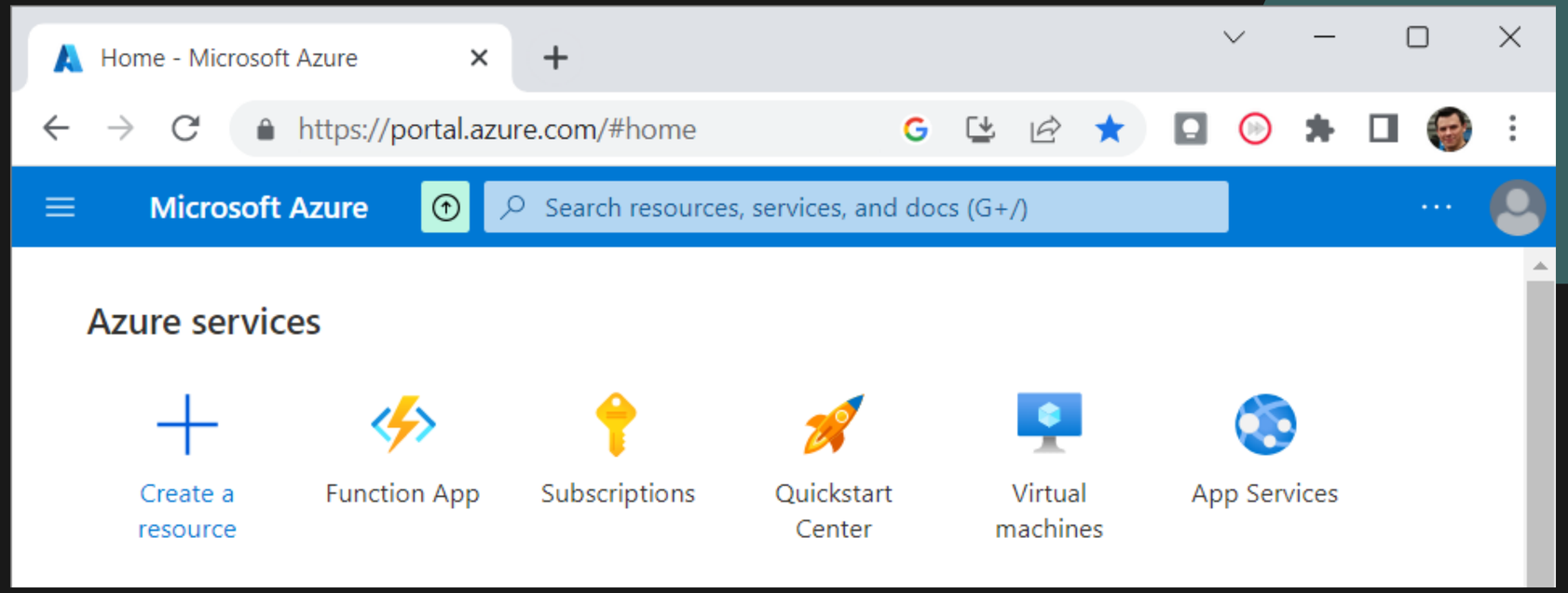


Serverless - Azure

1 - CREATE ACCOUNT

- 30 days of credit to test
- Some resources are *always free* based on consumption
- Yes, here comes your credit card!

https://portal.azure.com/



Serverless - Azure Sample

1 - ACCOUNT DETAILS

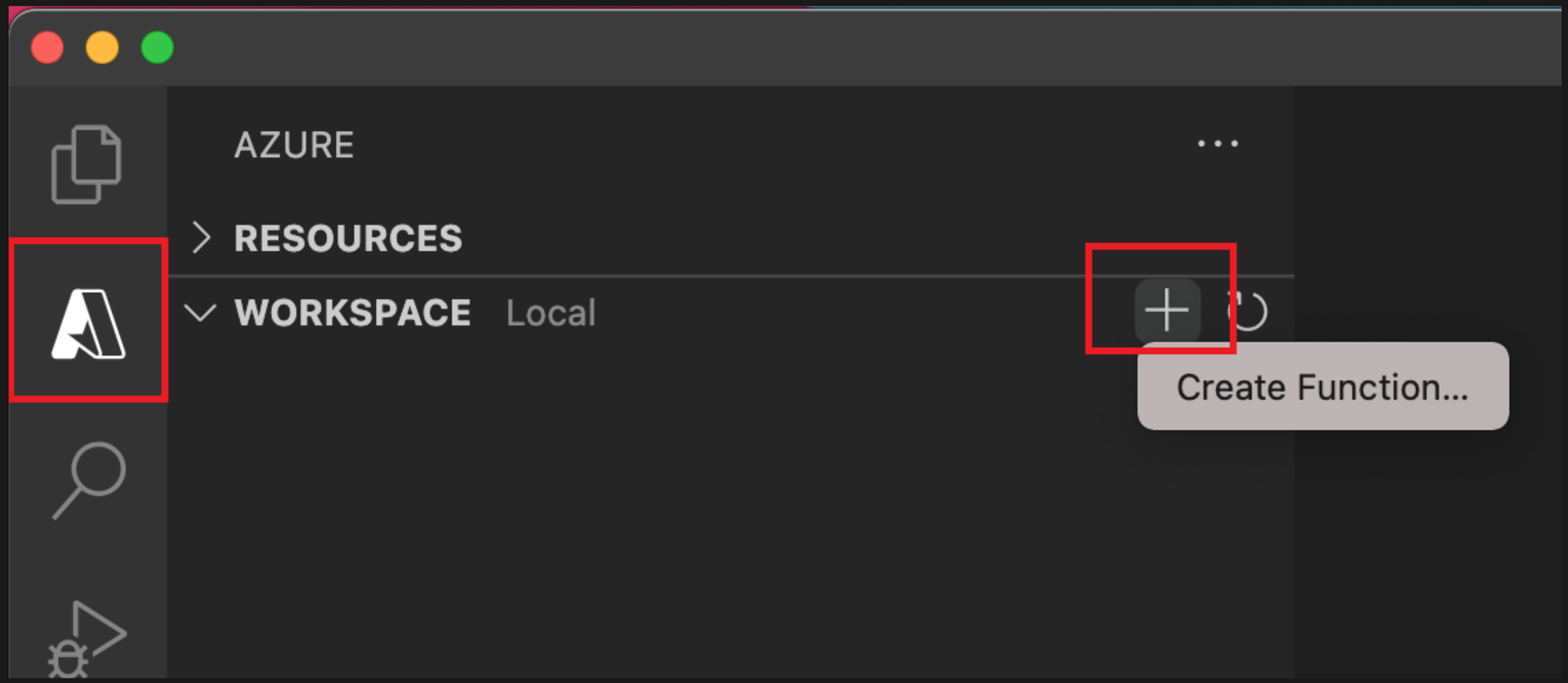
- 1 million free by month
- Even for 5 million execs, the price can be around US$ 1.00
- A virtual machine is many times more expensive

https://azure.microsoft.com/en-us/pricing/calculator/

Serverless - Azure Sample

2 - CONFIGURING DEVELOPMENT ENVIROMENT

- Install Visual Studio Code/Visual Studio
- Install Azure Functions Core Tool
- Create the first function locally



Serverless - Azure Sample

3 - DEFINING FUNCTION TYPE

Functions can be written in the native language or published in the form of executables or containers

Differences:

- Small delay in runtime
- Can be more expensive because of the extra load of data and resources

Function for non native language(Delphi!)

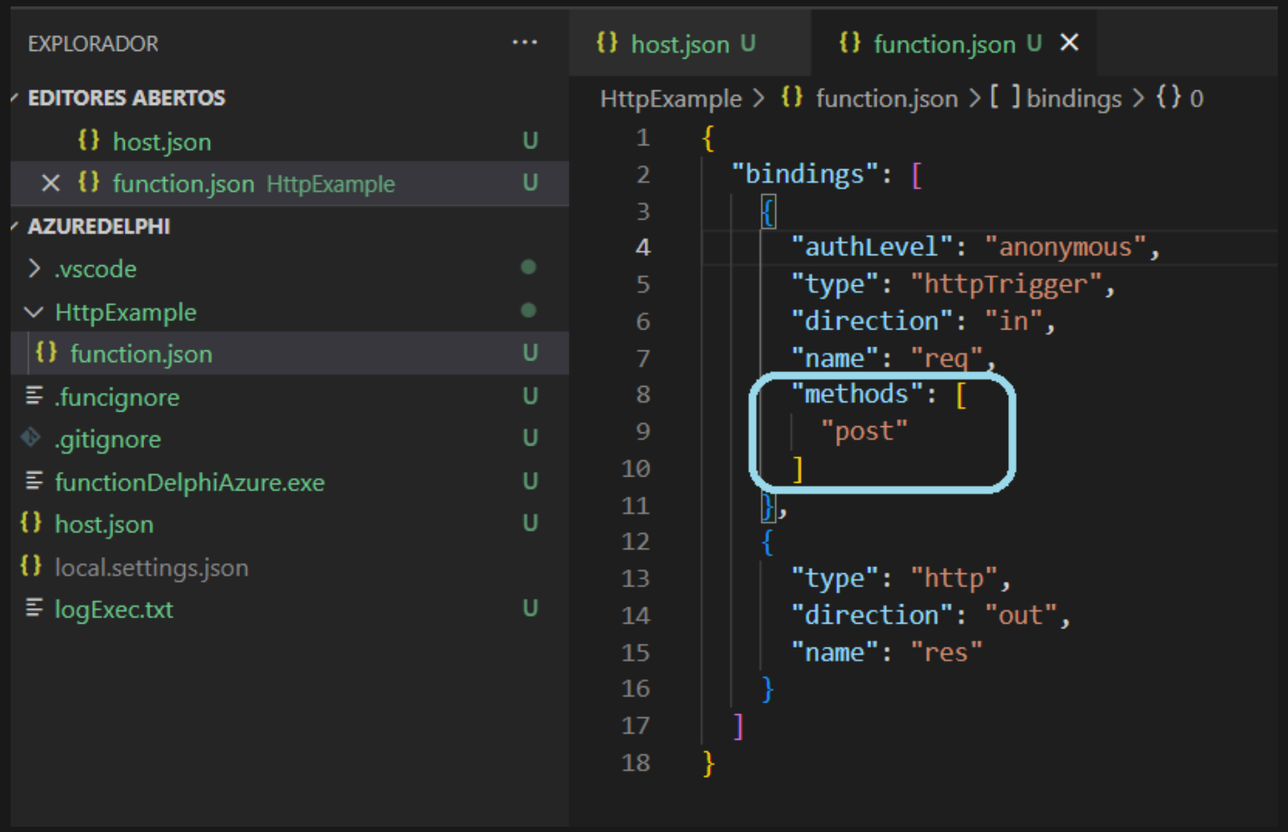
Prompt	Selection
Select a language for your function project	Choose `Custom Handler`.

Function in native language

Prompt	Selection
Select a language	Choose `C#`.
Select a .NET runtime	Select `.NET 6`.

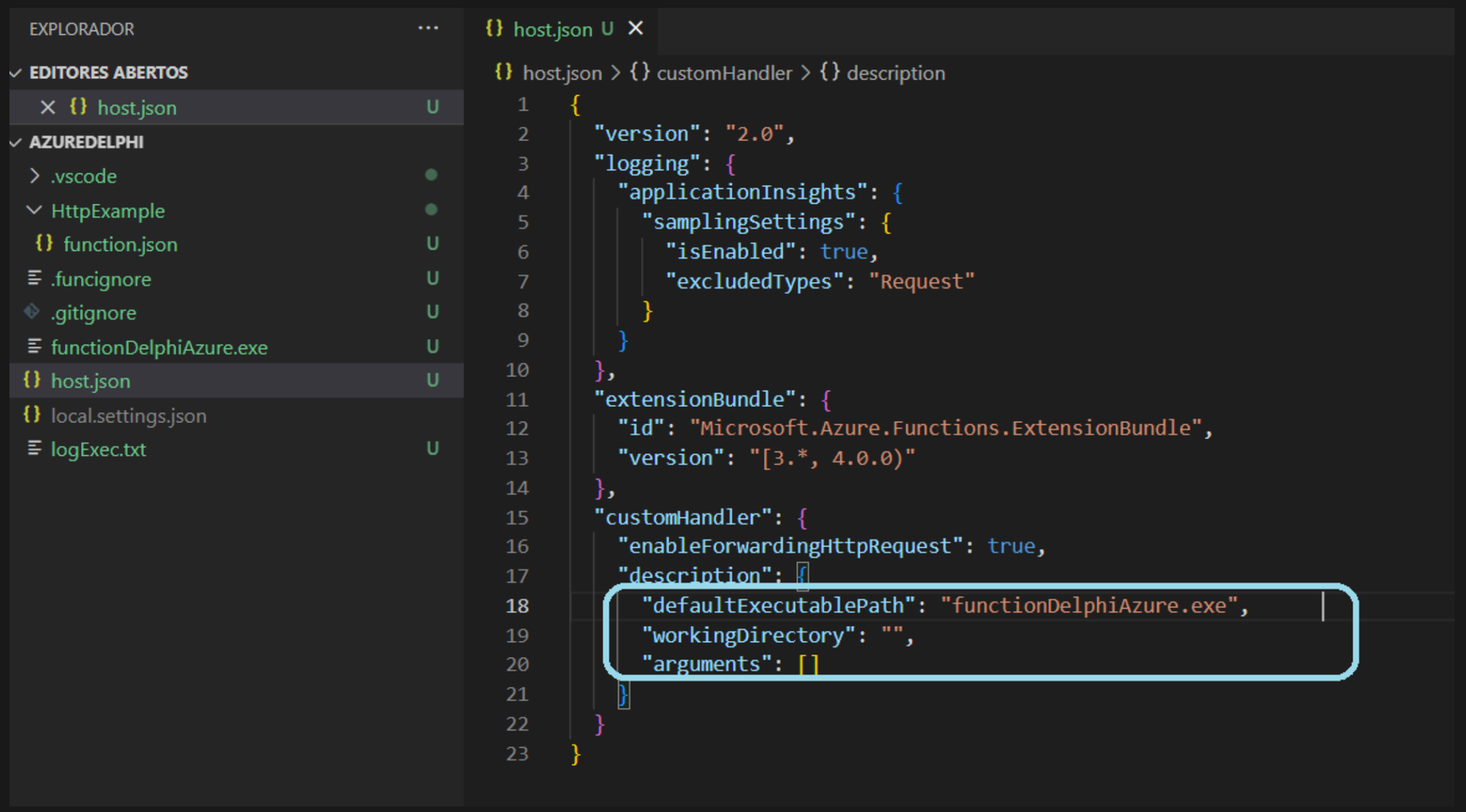
Serverless - Azure Sample

4 - HOW TO CONFIGURE



Serverless - Azure Sample

4 - CONFIGURE FOR EXECUTABLES



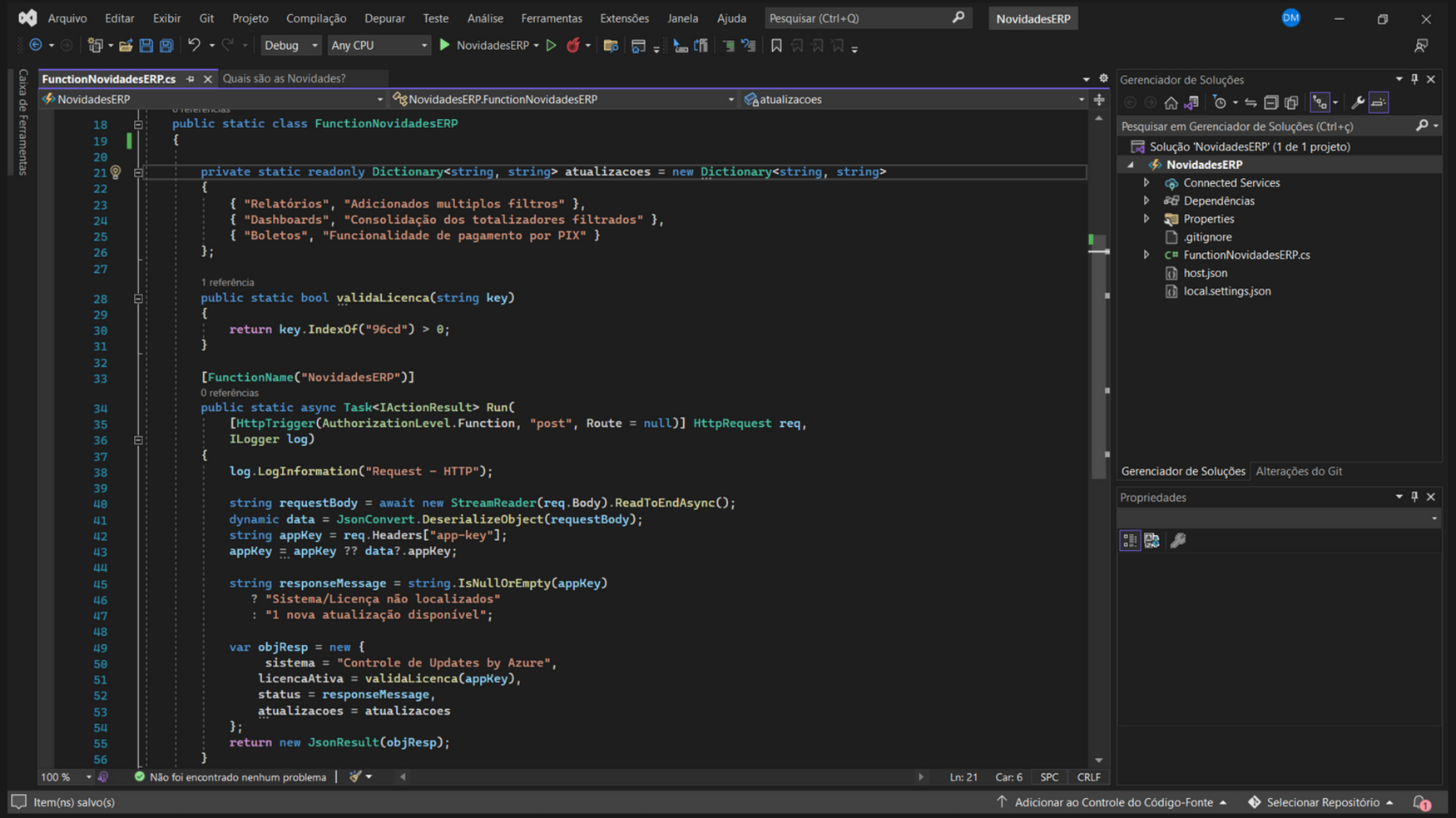
Serverless - Azure Sample

4 - CREATING THE EXECUTABLE IN DELPHI

```
procedure RunServer(APort: Integer);
var
  LServer: TIdHTTPWebBrokerBridge;
  LResponse: string;
begin
  LServer := TIdHTTPWebBrokerBridge.Create(nil);
  try
    var portEnvVarStr: string := GetEnvironmentVariable('FUNCTIONS_CUSTOMHANDLER_PORT');
    var portEnvVar: Integer;
    if TryStrToInt(portEnvVarStr, portEnvVar) then
    begin
      LServer.DefaultPort := portEnvVar;
    end else begin
      LServer.DefaultPort := APort;
    end;

    StartServer(LServer);
    while True do
    begin
      //
    end;

  finally
    StopServer(LServer);
    LServer.Free;
  end;
end;
```

Serverless - Azure Sample

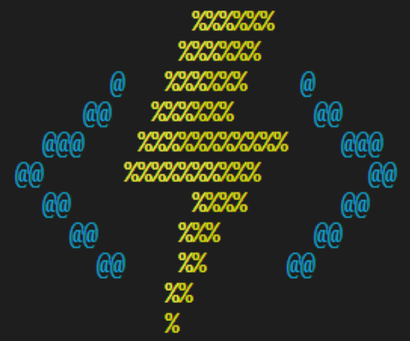
4 - IMPLEMENTING IT NATIVELY



Serverless - Azure Sample

5 - LOCAL RUN AND TEST!

```
PS C:\Users\Dion Mai\Documents\Embarcadero\Studio\Projects\CloudFunctionsClient\AzureDelphi> func start --verbose
```



```
Azure Functions Core Tools
Core Tools Version:       4.0.4785 Commit hash: N/A  (64-bit)
Function Runtime Version: 4.10.4.19213

[2022-10-24T17:55:20.255Z] Building host: startup suppressed: 'False', configuration suppressed: 'False', startup operation id
30f089'
[2022-10-24T17:55:20.263Z] Reading host configuration file 'C:\Users\Dion Mai\Documents\Embarcadero\Studio\Projects\CloudFunct
[2022-10-24T17:55:20.266Z] Host configuration file read:
```

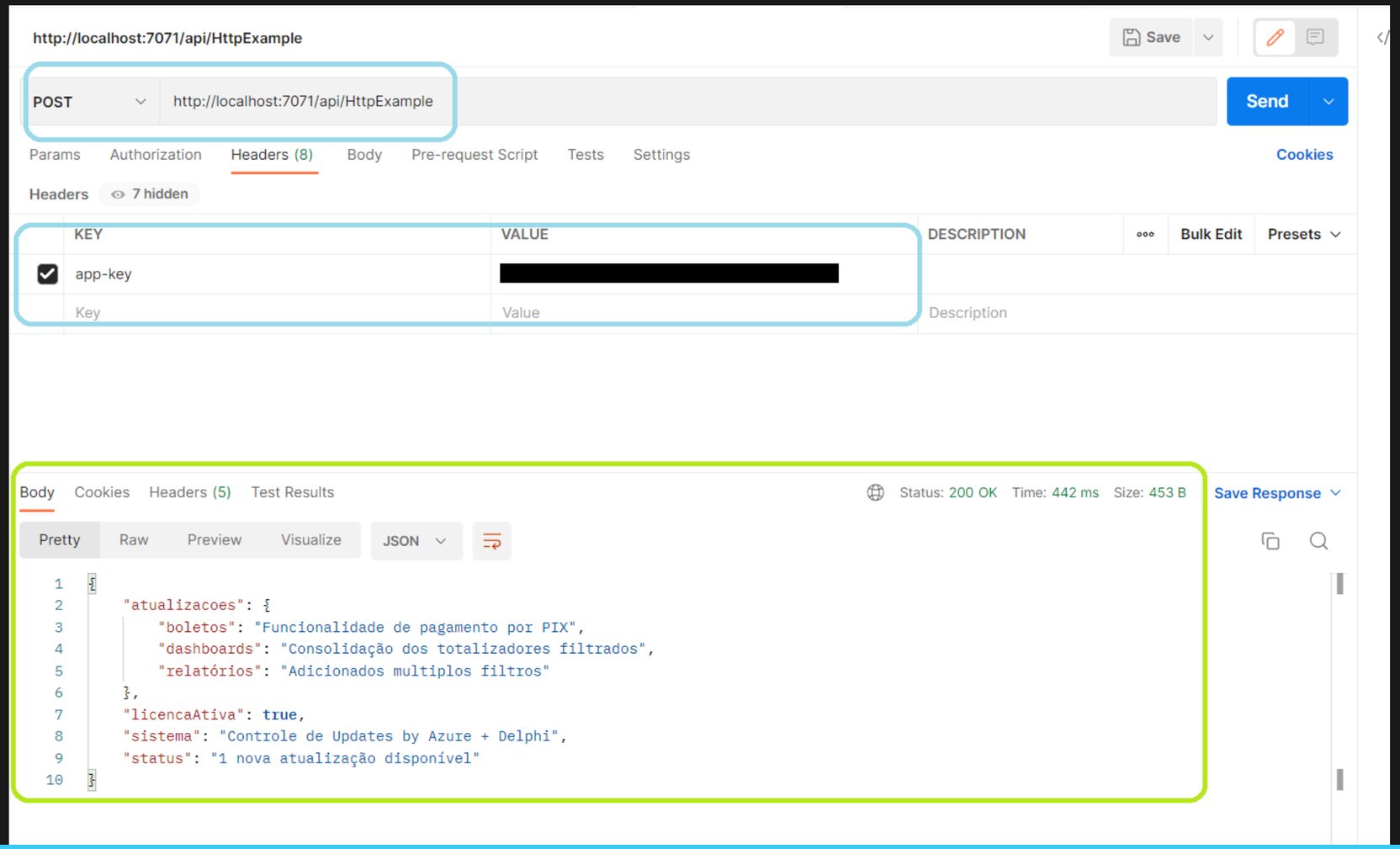
Serverless - Azure Sample

5 - LOCAL RUNNING

```
Functions:

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

[2022-10-24T17:55:22.345Z] Worker process started and initialized.
[2022-10-24T17:55:26.554Z] Host lock lease acquired by instance ID '00000000000000000000000000442FC398'.
```

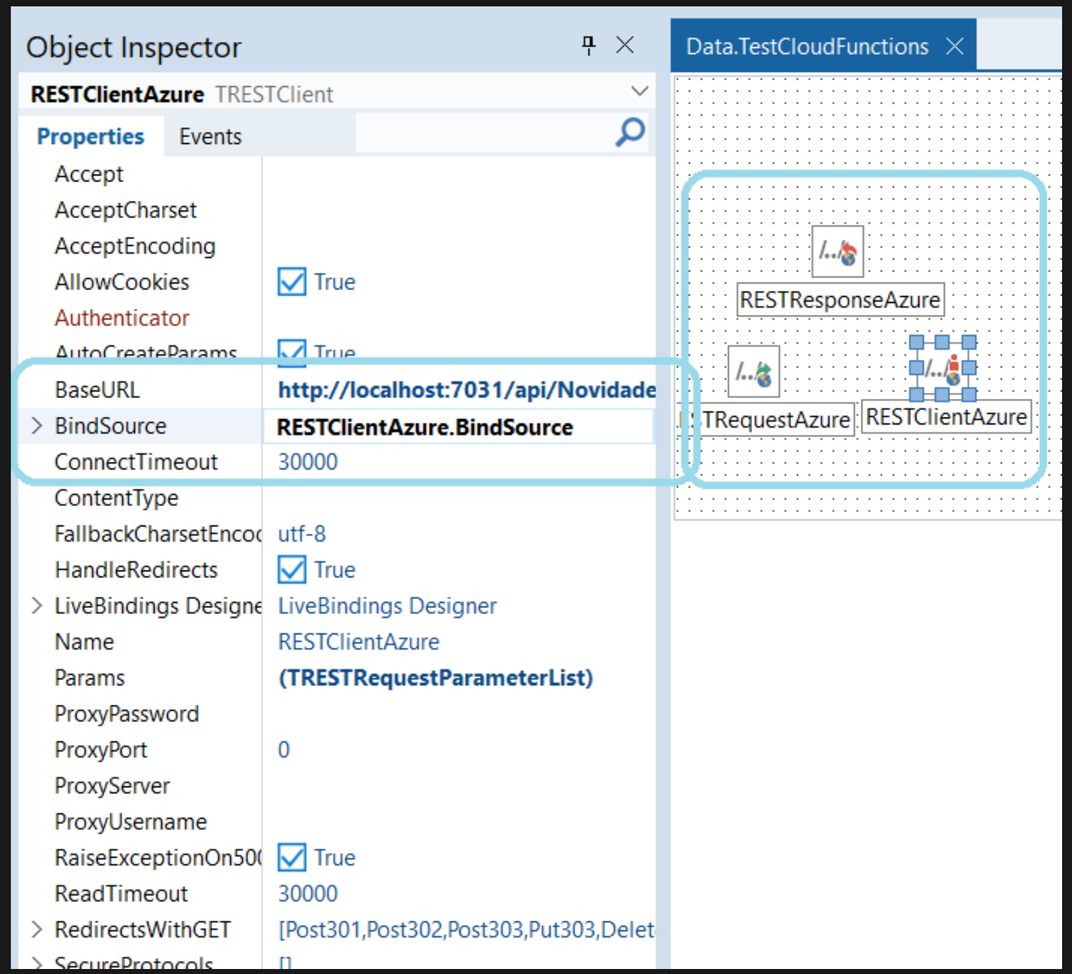
Serverless - Azure Sample

6 - CLIENT CALLING THE FUNCTION LOCALLY



Serverless - Azure Sample

6 - CLIENT CALLING IT FROM DELPHI



Serverless - Azure Sample

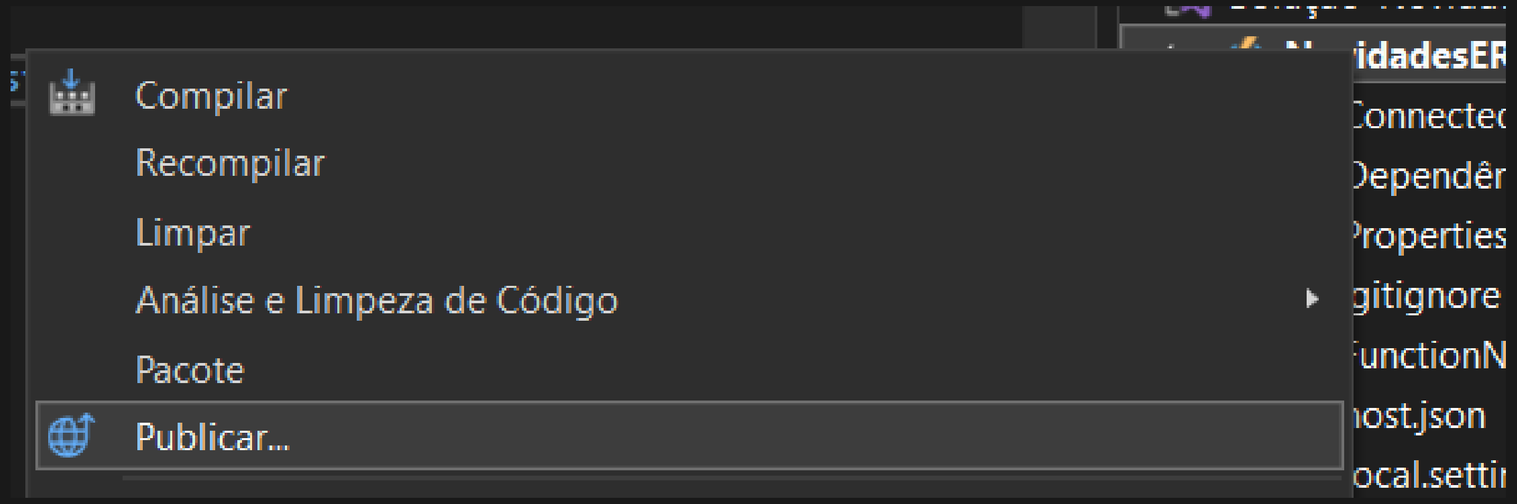
6 - CLIENT CALLING IT FROM DELPHI

```
procedure TdmdTestCloudFunctions.GetAzureVersionUpdates;
begin
  RESTRequestAzure.Execute;
  var jsonContent: string := RESTResponseAzure.Content;

  if jsonContent <> '' then
  begin

  end else begin
    dmdNotifications.Send('Sem resposta!', 'Não foi possível verificar novidades da versão');
  end;
end;
```

Serverless - Azure Sample

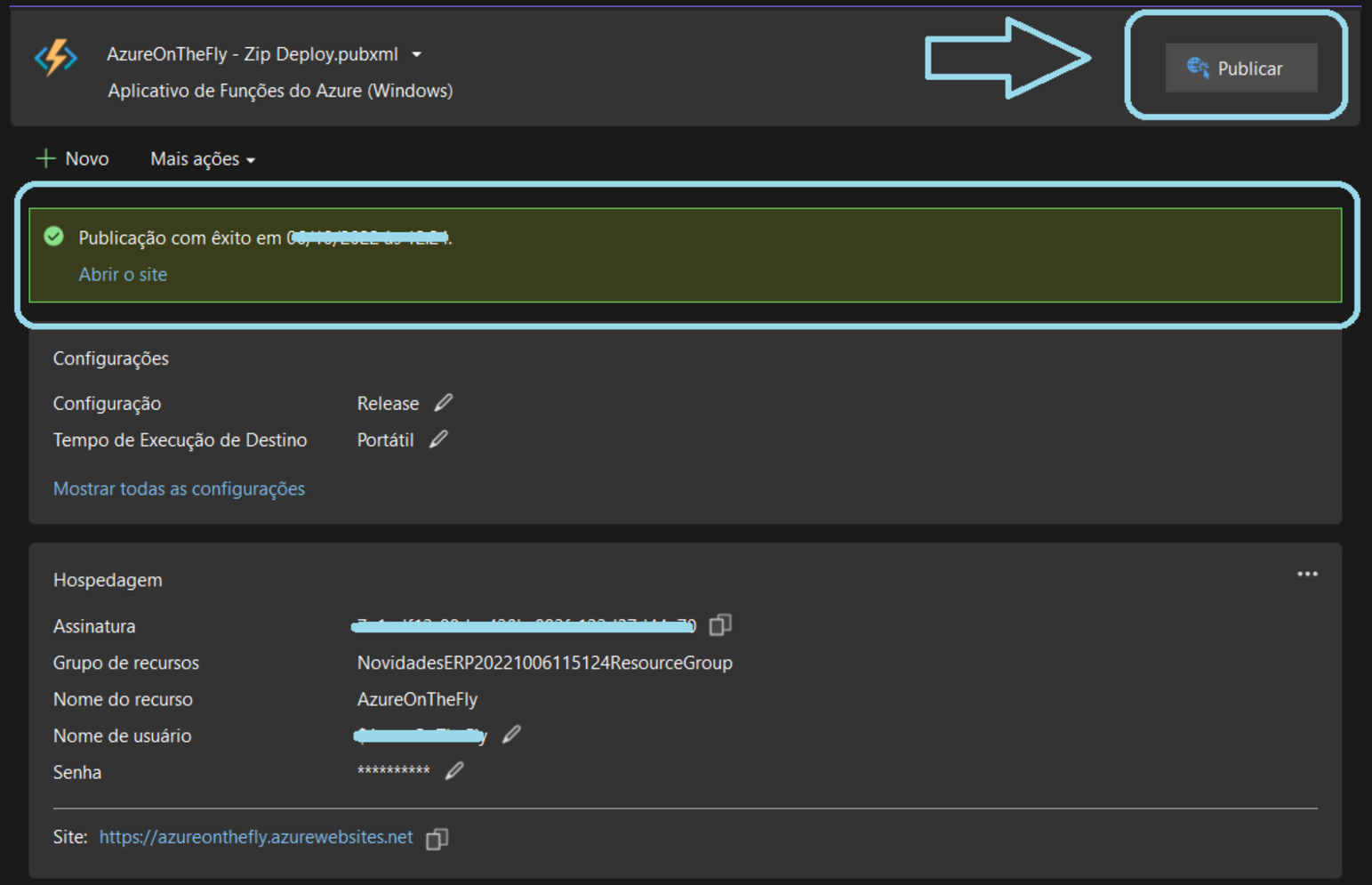
7 - HOW TO DEPLOY

- We need to configure the MS tools
- Once published, the clients can immediately call the function



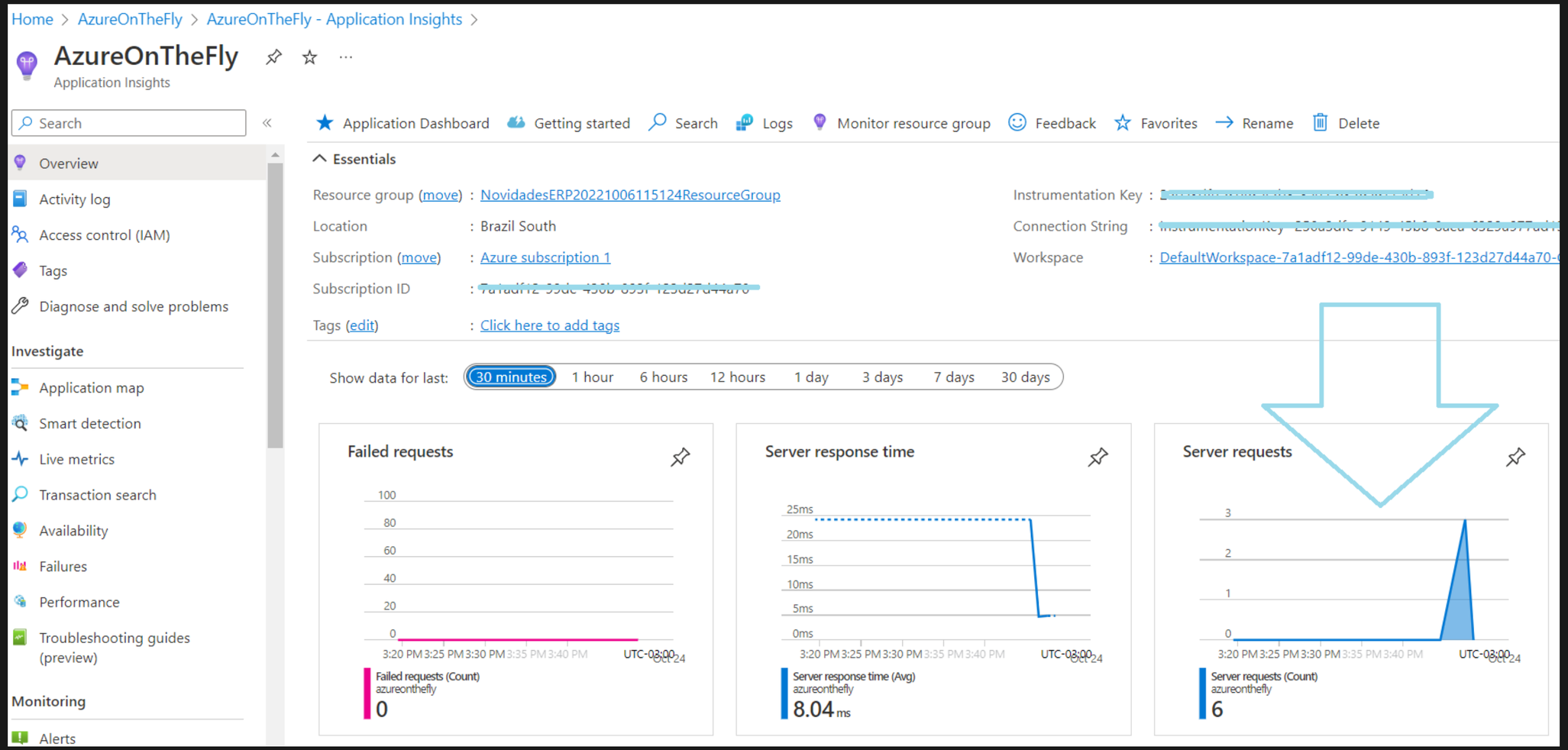
Serverless - Azure Sample

7 - DEPLOY



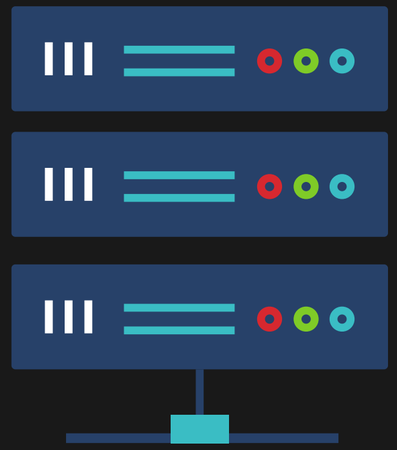
Serverless - Azure Sample

8 - MONITORING THE FUNCTIONS DASHBOARD

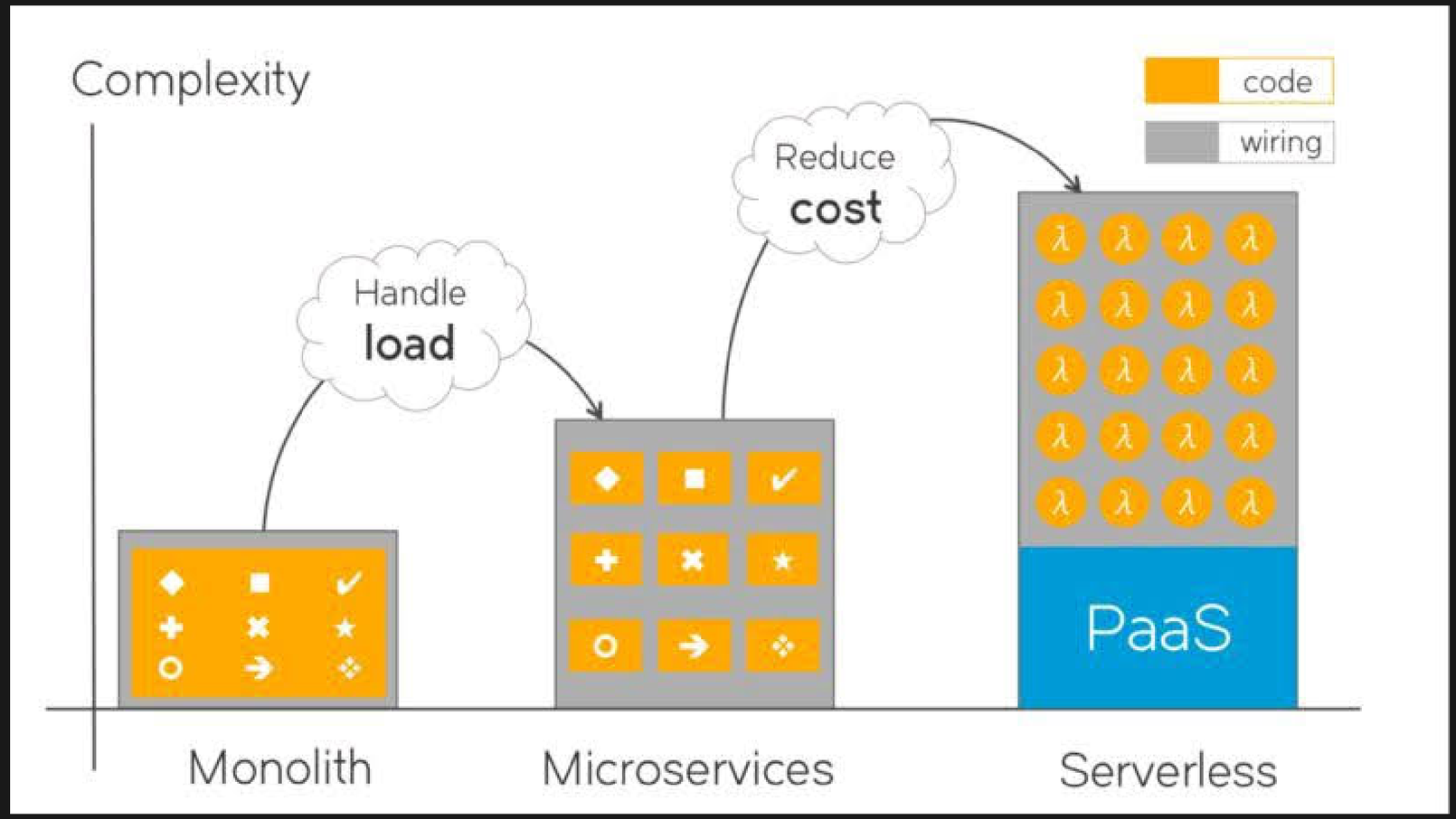


Serverless - A small recap

SERVER LIFECYCLE

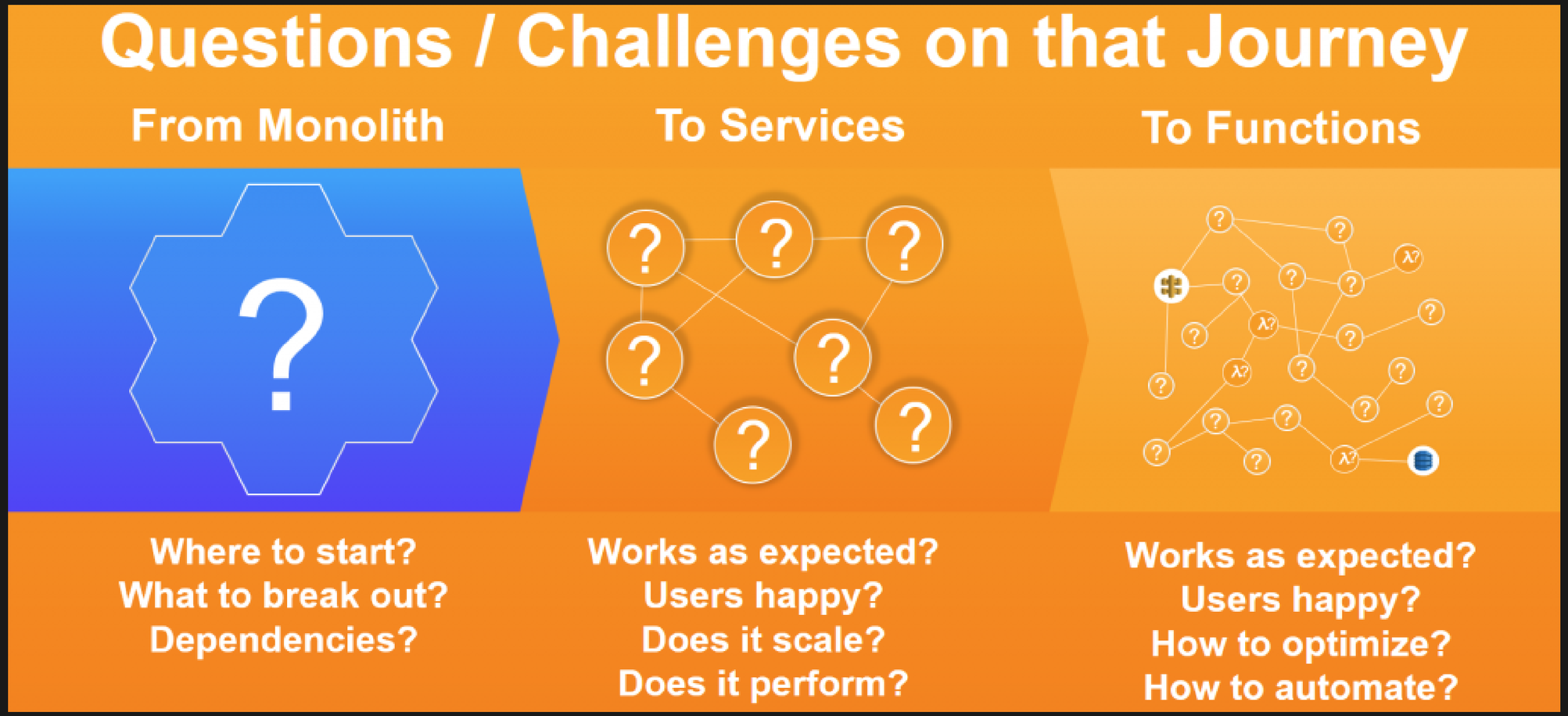


Serverless - Architecture



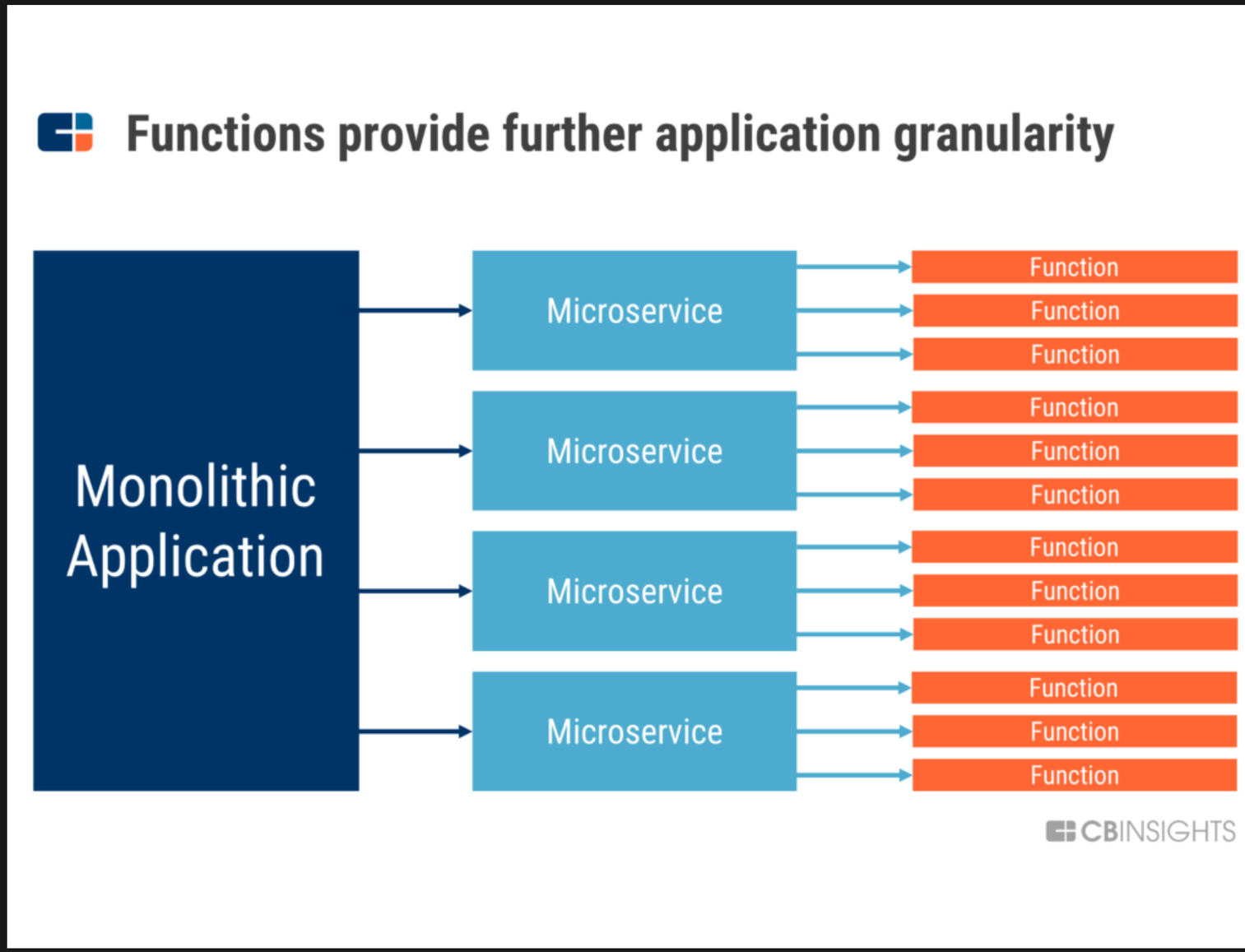
https://forum.huawei.com/enterprise/en/data/attachment/forum/202105/08/232136bdvrz8t8xt4v6hxy.jpg?image_f80b9af5

Serverless - Architecture



https://dt-cdn.net/wp-content/uploads/2018/02/JourneyOverviewWithQuestions-1024x466.png

Serverless - Architecture



Serverless - Advantages of using

THE BENEFITS

- Cost
- Speed to "go live"
- Monitoring Tools
- Increase in source reuse

Serverless - Disadvantages

THE DOWSIDE

- Increase in complexity
- Full dependency on a cloud provider
- Data lock in case of absence of payment
- Mistakes in source or even malicius calls can generate great costs
- Change of cloud provider could demand changes in source

Serverless - Some differences in providers

DIFFERENCES

- Cost
- Access to native languages
- Environment to run the functions
- Need of extra libs to access
- Amount of free calls monthly
- Additional tools

Serverless - Related tools

OTHER TOOLS FROM CLOUD

- Mensage services
- Logs
- "Functions Apps"/"Logical Apps"
- Application Insight
- Monitors

Serverless - Links

SOME TUTORIALS

From Embarcadero

- https://www.youtube.com/watch?v=NihVuXeW5Qo

Custom Handlers(Delphi)

- https://learn.microsoft.com/en-us/azure/azure-functions/create-first-function-vs-code-other?tabs=go%2Cwindows

Native functions

- https://learn.microsoft.com/en-us/azure/azure-functions/functions-create-your-first-function-visual-studio?source=recommendations&tabs=in-process

Thank You!

All samples on GitHub:

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