



**Cloud Development, 2021 fall.  
Lab2**

**Report**

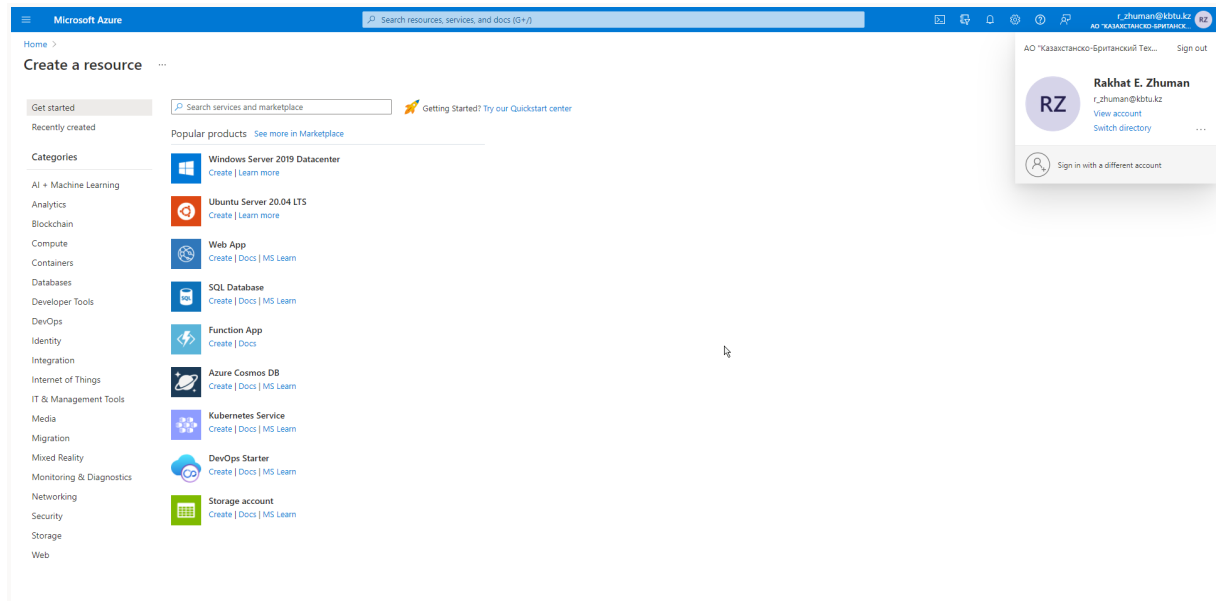
**Implement task processing logic by using Azure Functions**

made by Zhuman Rakhat

Almaty 2021

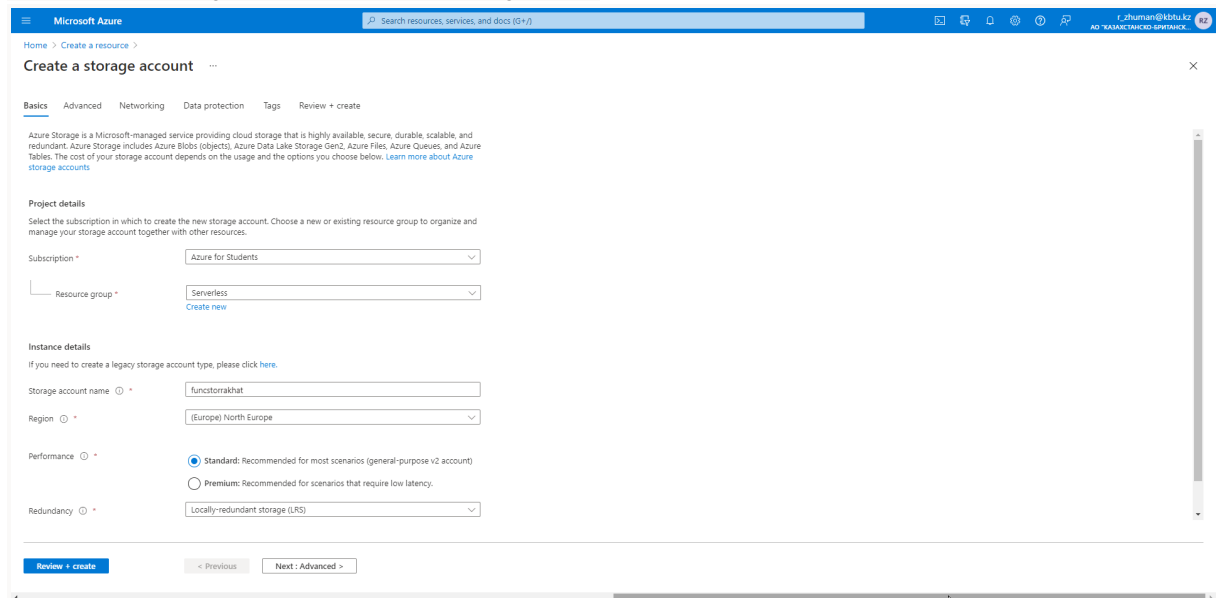
## Exercise 1: Create Azure resources

### Task 1: Open the Azure portal

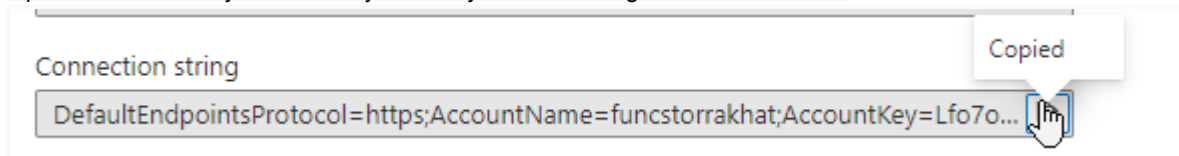


### Task 2: Create an Azure Storage account

Create a new storage account with the following details:



Open the Access Keys section of your newly created storage account instance.



### Task 3: Create a function app

According to the instructions, I chose East US but mine storage account did not come out, so I changed it to North Europe and choose funcstorakhat v2.

Microsoft Azure

Search resources, services, and docs (G+)

Home > Create a resource >

Create Function App

Basics

Hosting

Networking (preview)

Monitoring

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 \*  Serverless   
[Create new](#)

**Instance Details**

Function App name \* funclogicrakhat   
azurewebsites.net

Publish \* ☒ Code ☐ Docker Container

Runtime stack \* .NET

Version \* 3.1

Region \* North Europe

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**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 \* funcstorakhat (v2)   
[Create new](#)

**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

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Next: Networking (preview) >

Microsoft Azure

Search resources, services, and docs (G+)

Home > Create a resource >

Create Function App

Basics

Hosting

Networking (preview)

Monitoring

Tags

Review > create

Azure Monitor application insights is an Application Performance Management (APM) service for developers and DevOps professionals. Enable it below to automatically monitor your application. It will detect performance anomalies, and includes powerful analytics tools to help you diagnose issues and to understand what users actually do with your app. [Learn more](#)

**Application Insights**

Enable Application insights \* ☐ No ☒ Yes

Application Insights \* (new) funclogicrakhat (North Europe)   
[Create new](#)

Region North Europe

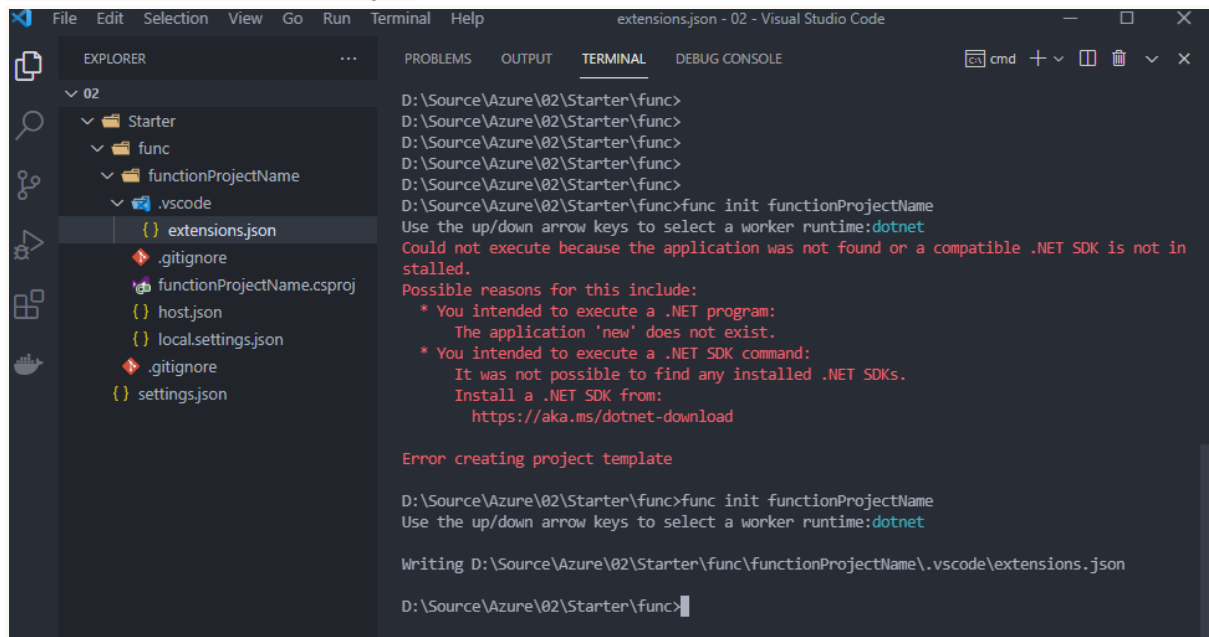
Review > create

< Previous

Next: Tags >

## Exercise 2: Configure local Azure Functions project

### Task 1: Initialize function project



```
File Edit Selection View Go Run Terminal Help extensions.json - 02 - Visual Studio Code
EXPLORER PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
02
  Starter
  func
  functionProjectName
  .vscode
    extensions.json
    .gitignore
    functionProjectName.csproj
    host.json
    local.settings.json
    .gitignore
    settings.json

D:\Source\Azure\02\Starter\func>
D:\Source\Azure\02\Starter\func>
D:\Source\Azure\02\Starter\func>
D:\Source\Azure\02\Starter\func>
D:\Source\Azure\02\Starter\func>
D:\Source\Azure\02\Starter\func>func init functionProjectName
Use the up/down arrow keys to select a worker runtime:dotnet
Could not execute because the application was not found or a compatible .NET SDK is not in
stalled.
Possible reasons for this include:
* You intended to execute a .NET program:
  The application 'new' does not exist.
* You intended to execute a .NET SDK command:
  It was not possible to find any installed .NET SDKs.
  Install a .NET SDK from:
    https://aka.ms/dotnet-download

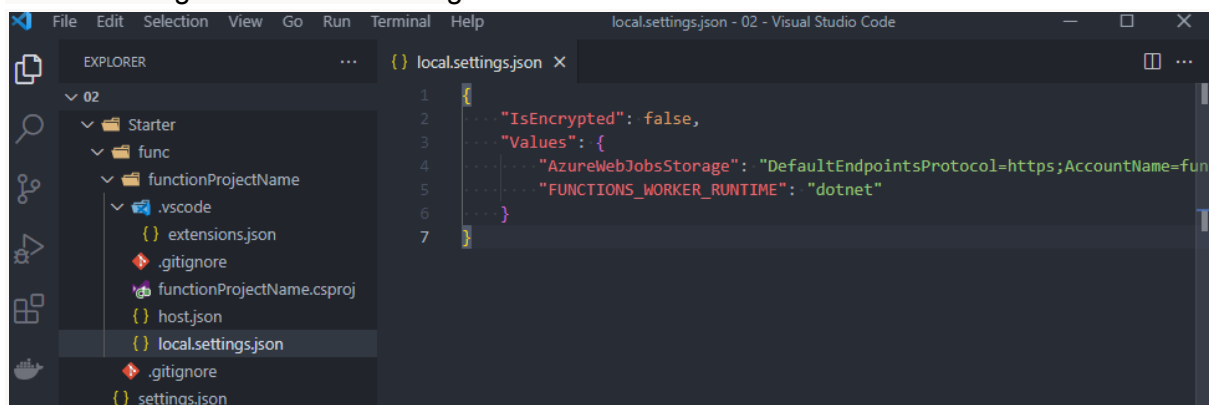
Error creating project template

D:\Source\Azure\02\Starter\func>func init functionProjectName
Use the up/down arrow keys to select a worker runtime:dotnet

Writing D:\Source\Azure\02\Starter\func\functionProjectName\.vscode\extensions.json

D:\Source\Azure\02\Starter\func>
```

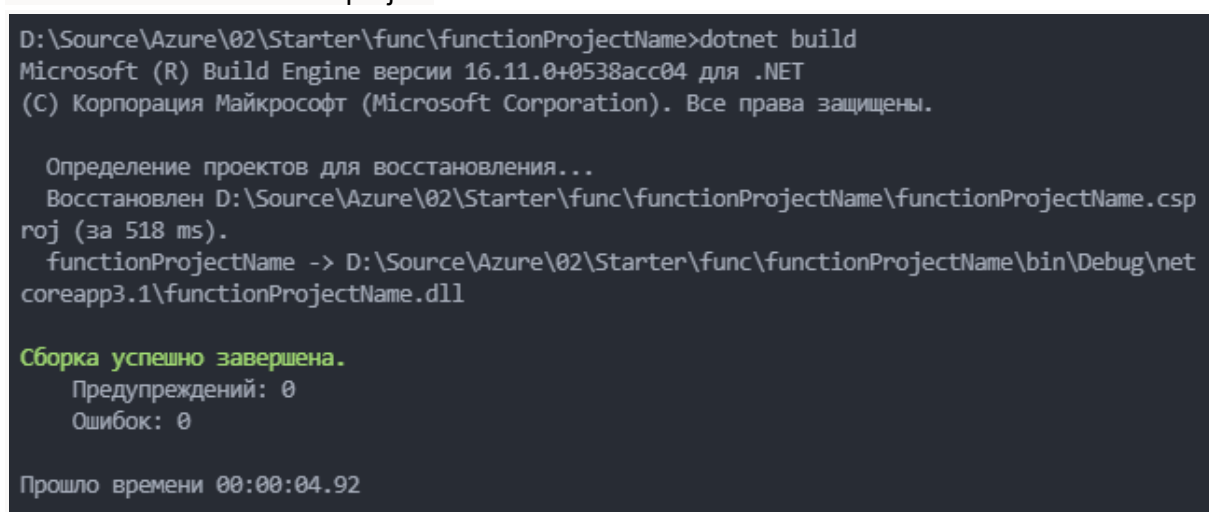
### Task 2: Configure connection string



```
File Edit Selection View Go Run Terminal Help local.settings.json - 02 - Visual Studio Code
EXPLORER PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
02
  Starter
  func
  functionProjectName
  .vscode
    extensions.json
    .gitignore
    functionProjectName.csproj
    host.json
    local.settings.json
    .gitignore
    settings.json

1 {
2   "IsEncrypted": false,
3   "Values": {
4     "AzureWebJobsStorage": "DefaultEndpointsProtocol=https;AccountName=func;AccountKey=key;EndpointSuffix=core.windows.net",
5     "FUNCTIONS_WORKER_RUNTIME": "dotnet"
6   }
7 }
```

### Task 3: Build and validate project



```
D:\Source\Azure\02\Starter\func\functionProjectName>dotnet build
Microsoft (R) Build Engine версии 16.11.0+0538acc04 для .NET
(C) Корпорация Майкрософт (Microsoft Corporation). Все права защищены.

Определение проектов для восстановления...
Восстановлен D:\Source\Azure\02\Starter\func\functionProjectName\functionProjectName.csproj
(за 518 ms).
functionProjectName -> D:\Source\Azure\02\Starter\func\functionProjectName\bin\Debug\net
coreapp3.1\functionProjectName.dll

Сборка успешно завершена.
Предупреждений: 0
Ошибок: 0

Прошло времени 00:00:04.92
```

## Exercise 3: Create a function that's triggered by an HTTP request

### Task 1: Create an HTTP-triggered function

```
D:\Source\Azure\02\Starter\func\functionProjectName>func new --template "Http Trigger" --name Echo
Use the up/down arrow keys to select a template:Function name: Echo

The function "Echo" was created successfully from the "Http Trigger" template.

D:\Source\Azure\02\Starter\func\functionProjectName>
```

## Task 2: Write HTTP-triggered function code

```
{ } local.settings.json  C# Echo.cs  X
1  using Microsoft.AspNetCore.Mvc;
2  using Microsoft.Azure.WebJobs;
3  using Microsoft.AspNetCore.Http;
4  using Microsoft.Extensions.Logging;
5
6
7  public static class Echo{
8      [FunctionName("Echo")]
9      public static IActionResult Run([HttpTrigger("POST")] HttpRequest request, ILogger logger){
10         logger.LogInformation("Received a request");
11         return new OkObjectResult(request.Body);
12     }
13 }
14
15
```

## Task 3: Test the HTTP-triggered function by using httprepl

```
D:\Source\Azure\02\Starter\func\functionProjectName>func start -build
Microsoft (R) Build Engine версии 16.11.0+0538acc04 для .NET
(C) Корпорация Майкрософт (Microsoft Corporation). Все права защищены.

Определение проектов для восстановления...
Все проекты обновлены для восстановления.
functionProjectName -> D:\Source\Azure\02\Starter\func\functionProjectName\bin\output\
functionProjectName.dll

Сборка успешно завершена.
Предупреждений: 0
Ошибок: 0

Прошло времени 00:00:05.59

Azure Functions Core Tools
Core Tools Version:      3.0.3734 Commit hash: 61192bb28820be76916f85209916152801483456
(64-bit)
Function Runtime Version: 3.1.4.0

[2021-09-25T07:27:26.807Z] Found D:\Source\Azure\02\Starter\func\functionProjectName\functionProjectName.csproj. Using for user secrets file configuration.

Functions:

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

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

```

Microsoft Windows [Version 10.0.19043.1237]
(c) Корпорация Майкрософт (Microsoft Corporation). Все права защищены.
Clink v0.4.9 [git:2fd2c2] Copyright (c) 2012-2016 Martin Ridgers
http://mridgers.github.io/clink

C:\Users\zhuma>httprepl http://localhost:7071
Welcome to HttpRepl 5.0!
-----

Telemetry
-----
The .NET tools collect usage data in order to help us improve your experience. The data is collected by Microsoft and shared with the community. You can opt-out of telemetry by setting the DOTNET_HTTPREPL_TELEMETRY_OPTOUT environment variable to '1' or 'true' using your favorite shell.

Read more about HttpRepl telemetry: https://aka.ms/httprepl-telemetry
Read more about .NET CLI Tools telemetry: https://aka.ms/dotnet-cli-telemetry

(Disconnected)> connect http://localhost:7071
Using a base address of http://localhost:7071/
Unable to find an OpenAPI description
For detailed tool info, see https://aka.ms/http-repl-doc

http://localhost:7071/>
No matching command found
Execute 'help' to see available commands

http://localhost:7071/>

http://localhost:7071/api/echo> post --content 3
HTTP/1.1 200 OK
Date: Sat, 25 Sep 2021 07:32:49 GMT
Server: Kestrel
Transfer-Encoding: chunked
3

http://localhost:7071/api/echo> post --content 5
HTTP/1.1 200 OK
Date: Sat, 25 Sep 2021 07:33:13 GMT
Server: Kestrel
Transfer-Encoding: chunked
5

http://localhost:7071/api/echo> post --content "Hello"
HTTP/1.1 200 OK
Date: Sat, 25 Sep 2021 07:33:24 GMT
Server: Kestrel
Transfer-Encoding: chunked
Hello

http://localhost:7071/api/echo> post --content '{"msg": "Successful"}'
HTTP/1.1 404 Not Found
Content-Length: 0
Date: Sat, 25 Sep 2021 07:33:44 GMT
Server: Kestrel

http://localhost:7071/api/echo> exit

C:\Users\zhuma>

For detailed output, run func with --verbose flag.
[2021-09-25T07:32:49.873Z] Executing 'Echo' (Reason='This function was programmatically called via the host APIs.', Id=d60aef37-ebf2-4107-8ee1-0e707078e1c7)
[2021-09-25T07:32:49.882Z] Received a request
[2021-09-25T07:32:49.895Z] Executed 'Echo' (Succeeded, Id=d60aef37-ebf2-4107-8ee1-0e707078e1c7, Duration=44ms)
[2021-09-25T07:33:14.585Z] Executing 'Echo' (Reason='This function was programmatically called via the host APIs.', Id=236f477e-b7f4-46f3-ac18-baba2c724e52)
[2021-09-25T07:33:14.589Z] Received a request
[2021-09-25T07:33:14.591Z] Executed 'Echo' (Succeeded, Id=236f477e-b7f4-46f3-ac18-baba2c724e52, Duration=7ms)
[2021-09-25T07:33:25.545Z] Executing 'Echo' (Reason='This function was programmatically called via the host APIs.', Id=57421710-068b-48be-8b11-ddb75044758d)
[2021-09-25T07:33:25.549Z] Received a request
[2021-09-25T07:33:25.552Z] Executed 'Echo' (Succeeded, Id=57421710-068b-48be-8b11-ddb75044758d, Duration=7ms)

```

## Exercise 4: Create a function that triggers on a schedule

### Task 1: Create a schedule-triggered function

```
D:\Source\Azure\02\Starter\func\functionProjectName>func new --template "
Timer Trigger" --name Recurring
Use the up/down arrow keys to select a template:Function name: Recurring

The function "Recurring" was created successfully from the "Timer Trigger
" template.

D:\Source\Azure\02\Starter\func\functionProjectName>
```

## Task 2: Observe function code

The screenshot shows the Visual Studio Code interface with the Explorer view on the left and the Recurring.cs file open in the editor. The Explorer view shows the project structure: 02 > Starter > func > functionProjectName. The Recurring.cs file is selected. The code in the editor is as follows:

```

1 using System;
2 using Microsoft.Azure.WebJobs;
3 using Microsoft.Azure.WebJobs.Host;
4 using Microsoft.Extensions.Logging;
5
6 namespace functionProjectName
7 {
8     public static class Recurring
9     {
10         [FunctionName("Recurring")]
11         public static void Run([TimerTrigger("0 */5 * * * *")]TimerInfo myTimer, ILogger log)
12         {
13             log.LogInformation($"C# Timer trigger function executed at: {DateTime.Now}");
14         }
15     }
16 }
17

```

### Task 3: Observe function runs

```
D:\Source\Azure\02\Starter\func\functionProjectName>func start --build
Microsoft (R) Build Engine версии 16.11.0+0538acc04 для .NET
(C) Корпорация Майкрософт (Microsoft Corporation). Все права защищены.

Определение проектов для восстановления...
Все проекты обновлены для восстановления.
functionProjectName -> D:\Source\Azure\02\Starter\func\functionProjectName\bin\output\functionProjectName.dll
ame\bin\output\functionProjectName.dll

Сборка успешно завершена.
Предупреждений: 0
Ошибок: 0

Прошло времени 00:00:05.35

Azure Functions Core Tools
Core Tools Version:      3.0.3734 Commit hash: 61192bb28820be76916f85209916152801483456 (64-bit)
Function Runtime Version: 3.1.4.0

[2021-09-25T11:25:43.203Z] Found D:\Source\Azure\02\Starter\func\functionProjectName\functionProjectName.csproj. Using for user secrets file configuration.

Functions:

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

Recurring: timerTrigger

For detailed output, run func with --verbose flag.
[2021-09-25T11:25:51.940Z] Host lock lease acquired by instance ID '000000000000000000000000E10CE443'.
[2021-09-25T11:30:00.028Z] Executing 'Recurring' (Reason='Timer fired at 2021-09-25T17:30:00.0090244+06:00', Id=37ae6189-9236-4293-a249-372c10887063)
[2021-09-25T11:30:00.035Z] C# Timer trigger function executed at: 25.09.2021 17:30:00
[2021-09-25T11:30:00.054Z] Executed 'Recurring' (Succeeded, Id=37ae6189-9236-4293-a249-372c10887063, Duration=33ms)
```

### Task 4: Update the function integration configuration

```
{ } local.settings.json  C# Echo.cs  C# Recurring.cs X
1  using System;
2  using Microsoft.Azure.WebJobs;
3  using Microsoft.Azure.WebJobs.Host;
4  using Microsoft.Extensions.Logging;
5
6  namespace functionProjectName
7  {
8      ....public static class Recurring
9      ....{
10         ....[FunctionName("Recurring")]
11         ....public static void Run([TimerTrigger("*/30 * * * *")]TimerInfo myTimer, ILogger log)
12         ....{
13             ....log.LogInformation($"C# Timer trigger function executed at: {DateTime.Now}");
14             ....}
15         ....}
16     }
17 }
```

## Task 5: Observe function runs

```
Azure Functions Core Tools
Core Tools Version: 3.0.3734 Commit hash: 61192bb28828be76916f85209916152801483456 (64-bit)
Function Runtime Version: 3.1.4.0

[2021-09-25T11:32:20.773Z] Found D:\Source\Azure\02\Starter\func\functionProjectName\functionProjectName.csproj. Using for user secrets file configuration.

Functions:

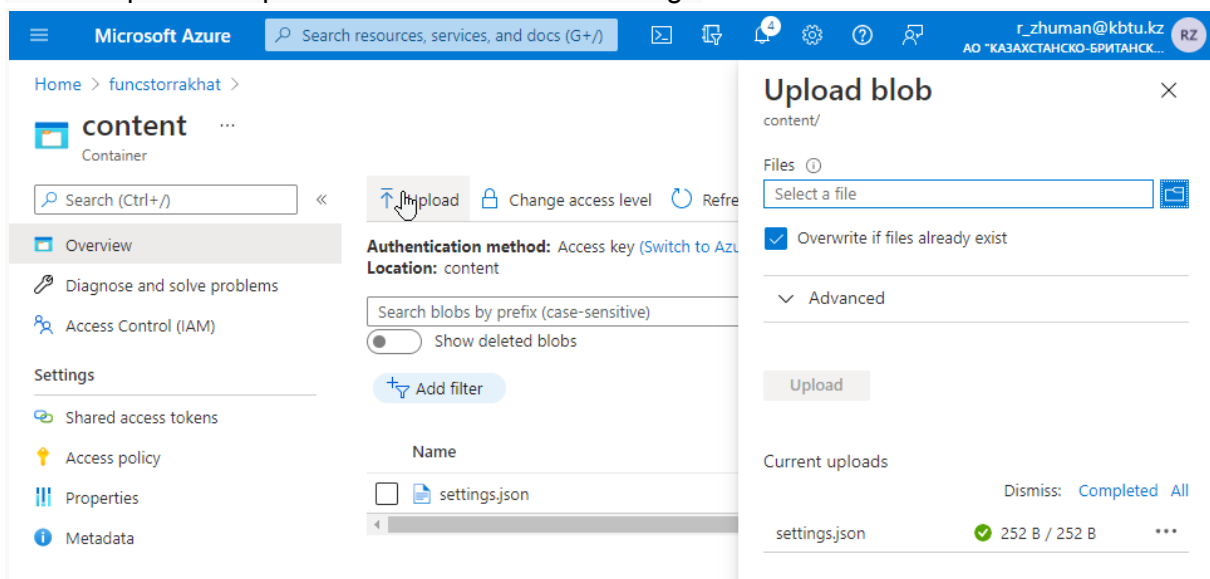
    Echo: [POST] http://localhost:7071/api/Echo

    Recurring: timerTrigger

For detailed output, run func with --verbose flag.
[2021-09-25T11:32:28.171Z] Host lock lease acquired by instance ID '000000000000000000000000E10CE443'.
[2021-09-25T11:32:30.023Z] Executing 'Recurring' (Reason=Timer fired at 2021-09-25T17:32:30.0107052+06:00', Id=b776e29c-1d88-4f9e-9026-fe38a9af9f82)
[2021-09-25T11:32:30.032Z] C# Timer trigger function executed at: 25.09.2021 17:32:30
[2021-09-25T11:32:30.048Z] Executed 'Recurring' (Succeeded, Id=b776e29c-1d88-4f9e-9026-fe38a9af9f82, Duration=30ms)
[2021-09-25T11:33:00.008Z] Executing 'Recurring' (Reason=Timer fired at 2021-09-25T17:33:00.0044054+06:00', Id=828657dd-5515-43cf-aaeb-39edc9cbdf8b)
[2021-09-25T11:33:00.011Z] C# Timer trigger function executed at: 25.09.2021 17:33:00
[2021-09-25T11:33:00.014Z] Executed 'Recurring' (Succeeded, Id=828657dd-5515-43cf-aaeb-39edc9cbdf8b, Duration=9ms)
[2021-09-25T11:33:00.002Z] Executing 'Recurring' (Reason=Timer fired at 2021-09-25T17:33:30.0011354+06:00', Id=e9337228-5c32-4ab0-89ae-843bd9b881b5)
[2021-09-25T11:33:00.005Z] C# Timer trigger function executed at: 25.09.2021 17:33:30
[2021-09-25T11:33:00.007Z] Executed 'Recurring' (Succeeded, Id=e9337228-5c32-4ab0-89ae-843bd9b881b5, Duration=6ms)
```

## Exercise 5: Create a function that integrates with other services

### Task 1: Upload sample content to Azure Blob Storage



### Task 2: Create a Blob-triggered function

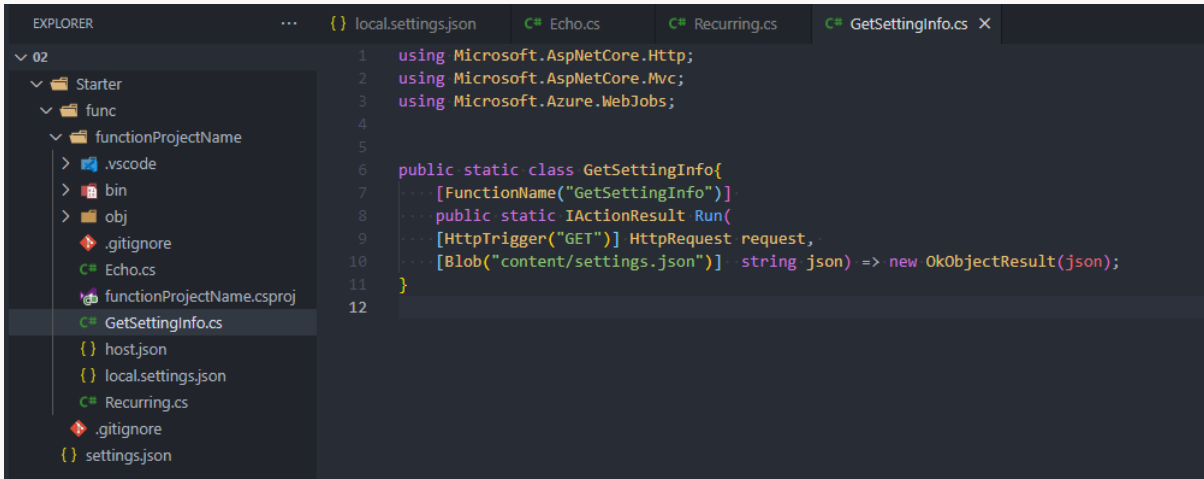


```
D:\Source\Azure\02\Starter\func\functionProjectName>func new --template "Blob Trigger" --name GetSettingInfo
Use the up/down arrow keys to select a template:Function name: GetSettingInfo

The function "GetSettingInfo" was created successfully from the "Blob Trigger" template.

D:\Source\Azure\02\Starter\func\functionProjectName>
```

### Task 3: Write Blob-inputted function code



```

1  using Microsoft.AspNetCore.Http;
2  using Microsoft.AspNetCore.Mvc;
3  using Microsoft.Azure.WebJobs;
4
5
6  public static class GetSettingInfo{
7      [FunctionName("GetSettingInfo")]
8      public static IActionResult Run(
9          [HttpTrigger("GET")] HttpRequest request,
10         [Blob("content/settings.json")] string json) => new OkObjectResult(json);
11     }
12

```

### Task 4: Test the Blob-inputted function by using httprepl

```
C:\Users\zhuma>httprepl http://localhost:7071
(Disconnected)> connect http://localhost:7071
Using a base address of http://localhost:7071/
Unable to find an OpenAPI description
For detailed tool info, see https://aka.ms/http-repl-doc

http://localhost:7071/> cd api

http://localhost:7071/api> cd getsettinginfo

http://localhost:7071/api/getsettinginfo> get
HTTP/1.1 200 OK
Content-Type: text/plain; charset=utf-8
Date: Sat, 25 Sep 2021 11:41:17 GMT
Server: Kestrel
Transfer-Encoding: chunked

{
  "version": "0.2.4",
  "root": "/usr/libexec/mews_principal/",
  "device": {
    "id": "21e46d2b2b926cba031a23c6919"
  },
  "notifications": {
    "email": "joseph.price@contoso.com",
    "phone": "(425) 555-0162 x4151"
  }
}

http://localhost:7071/api/getsettinginfo> exit

C:\Users\zhuma>
```

```

GetSettingInfo: [GET] http://localhost:7071/api/GetSettingInfo

Recurring: timerTrigger

For detailed output, run func with --verbose flag.
[2021-09-25T11:40:45.224Z] Host lock lease acquired by instance ID '00000000000000000000000000000000E10CE443'.
[2021-09-25T11:41:00.025Z] Executing 'Recurring' (Reason='Timer fired at 2021-09-25T17:41:00.0126383+06:00', Id=11105956-9bc8-49f6-9a51-c973b16013fe)
[2021-09-25T11:41:00.033Z] C# Timer trigger function executed at: 25.09.2021 17:41:00
[2021-09-25T11:41:00.051Z] Executed 'Recurring' (Succeeded, Id=11105956-9bc8-49f6-9a51-c973b16013fe, Duration=30ms)
[2021-09-25T11:41:17.954Z] Executing 'GetSettingInfo' (Reason='This function was programmatically called via the host APIs.', Id=268b2d27-57ab-4ce1-a8df-0cbe4fe70ce1)
[2021-09-25T11:41:17.960Z] Executed 'GetSettingInfo' (Succeeded, Id=268b2d27-57ab-4ce1-a8df-0cbe4fe70ce1, Duration=1058ms)

```

### Exercise 6: Deploy a local function project to an Azure Functions app

## Task 1: Deploy using the Azure Functions Core Tools

```
D:\Source\Azure\02\Starter\func\functionProjectName>func azure functionapp publish funclogicrakhat
Microsoft (R) Build Engine версии 16.11.0+0538acc04 для .NET
(C) Корпорация Майкрософт (Microsoft Corporation). Все права защищены.

Определение проектов для восстановления...
Все проекты обновлены для восстановления.
functionProjectName -> D:\Source\Azure\02\Starter\func\functionProjectName\bin\publish\functionProjectName.dll

Сборка успешно завершена.
Предупреждений: 0
Ошибок: 0

Прошло времени 00:00:05.58

Getting site publishing info...
Uploading package...
Uploading 2,62 MB [#####]
Upload completed successfully.
Deployment completed successfully.
Syncing triggers...
Functions in funclogicrakhat:
Echo - [httpTrigger]
    Invoke url: https://funclogicrakhat.azurewebsites.net/api/echo?code=tDxaz2aH9U4far0ucT4LZYu5658165aXana/eVC3ewk8P4rN22GMAQ==

GetSettingInfo - [httpTrigger]
    Invoke url: https://funclogicrakhat.azurewebsites.net/api/getsettinginfo?code=vrmEohUpfvKG2zJKCdgmM4Tp5fB6xLLUPWQF0I0HpMx1pEWIX3SBlg==

Recurring - [timerTrigger]
```

## Task 2: Validate deployment

The screenshot displays the Microsoft Azure portal interface. At the top, the navigation bar includes the Microsoft Azure logo, a search bar, and user information for 'r\_zhuman@kbtu.kz'. The main content area shows the 'GetSettingInfo' function under the 'funclogicrakhat' resource. The 'Code + Test' tab is selected, displaying the 'function.json' file. The code is a JSON configuration for an HTTP trigger function named 'request'.

```
1 {
2   "generatedBy": "Microsoft.NET.Sdk.Functions-3.0.11",
3   "configurationSource": "attributes",
4   "bindings": [
5     {
6       "type": "httpTrigger",
7       "methods": [
8         "GET"
9       ],
10      "authLevel": "function",
11      "name": "request"
12    }
13  ],
14  "disabled": false,
15  "scriptFile": "../bin/functionProjectName.dll",
16  "entryPoint": "GetSettingInfo.Run"
17 }
```

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

Home > All resources > funclogicrakhat > GetSettingInfo

**GetSettingInfo | Code + Test**

Function

Search (Ctrl+/)

Overview

Developer

Code + Test

Integration

Monitor

Function Keys

Editing functions in the portal is not supported for Linux Consumption Function Apps.

funclogicrakhat

```

1  {
2  .. "g
3  .. "c
4  .. "b
5  ..
6  ..
7  ..
8  ..
9  ..
10 ..
11 ..
12 ..
13 ..
14 ..

```

Connected!

Input

Output

HTTP response code

200 OK

HTTP response content

```

{
  "version": "0.2.4",
  "root": "/usr/libexec/mews_principal/",
  "device": {
    "id": "21e46d2b2b926cba031a23c6919"
  },
  "notifications": {
    "email": "joseph.price@contoso.com",
    "phone": "(425) 555-0162 x4151"
  }
}

```

settings.json – Блокнот

Файл Правка Формат Вид Справка

```

{
  "version": "0.2.4",
  "root": "/usr/libexec/mews_principal/",
  "device": {
    "id": "21e46d2b2b926cba031a23c6919"
  },
  "notifications": {
    "email": "joseph.price@contoso.com",
    "phone": "(425) 555-0162 x4151"
  }
}

```

## Exercise 7: Clean up your subscription

Task 1: Open Azure Cloud Shell and list resource groups

Task 2: Delete a resource group

Bash

Requesting a Cloud Shell. **Succeeded.**  
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI  
Type "help" to learn about Cloud Shell

```

rakhat@Azure:~$ az group delete --name Serverless --no-wait --yes
rakhat@Azure:~$

```

Task 3: Close the active application

- OK)