



**Cloud Development, 2021 fall.  
Lab 4**

**Report**

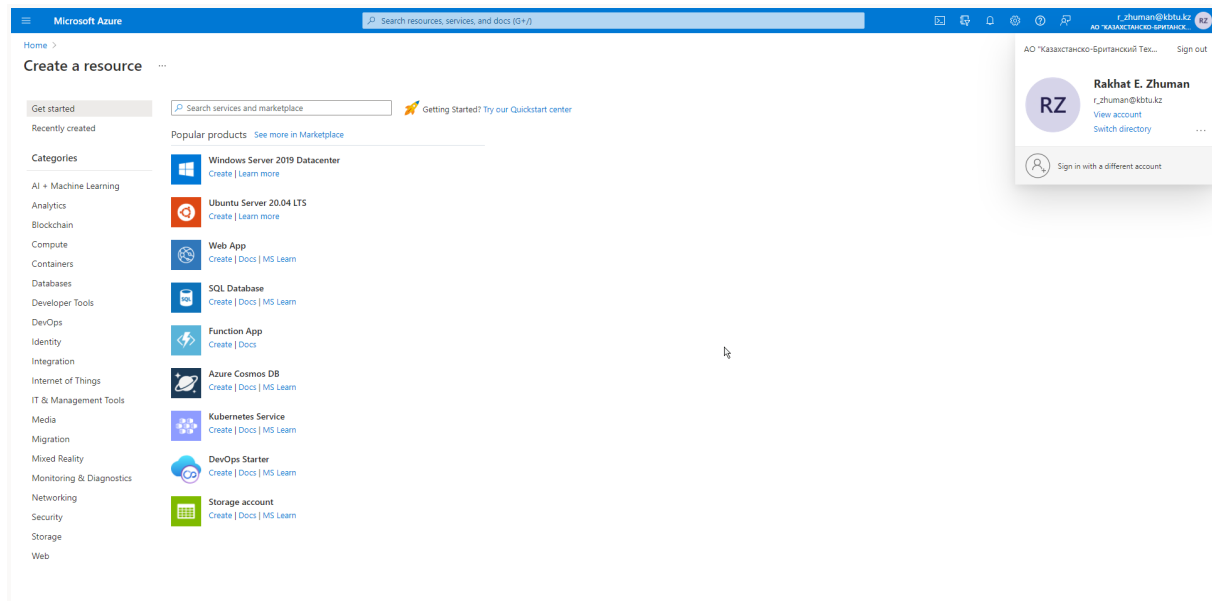
**Constructing a polyglot data solution**

made by Zhuman Rakhat

Almaty 2021

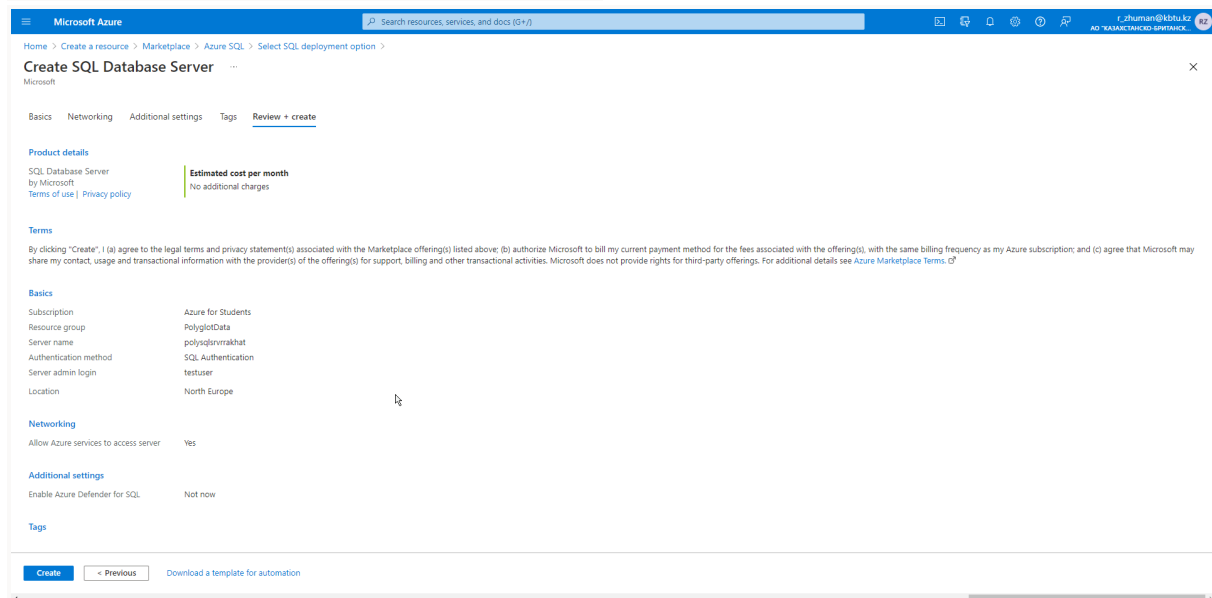
## Exercise 1: Create Azure resources

### Task 1: Open the Azure portal



The screenshot shows the Microsoft Azure portal home page. The top navigation bar includes the Microsoft Azure logo, a search bar, and user information for 'RZ' (Rakhat E. Zhuman). The main content area is titled 'Create a resource' and features a sidebar with categories like AI + Machine Learning, Analytics, Blockchain, Compute, Containers, Databases, Developer Tools, DevOps, Identity, Integration, Internet of Things, IT & Management Tools, Media, Migration, Mixed Reality, Monitoring & Diagnostics, Networking, Security, Storage, and Web. The main area displays 'Popular products' with links to create or learn more about various services: Windows Server 2019 Datacenter, Ubuntu Server 20.04 LTS, Web App, SQL Database, Function App, Azure Cosmos DB, Kubernetes Service, DevOps Starter, and Storage account.

### Task 2: Create an Azure SQL Database server resource



The screenshot shows the 'Create SQL Database Server' wizard in the Azure portal. The breadcrumb trail is 'Home > Create a resource > Marketplace > Azure SQL > Select SQL deployment option > Create SQL Database Server'. The 'Review + create' tab is selected. The 'Product details' section shows 'SQL Database Server by Microsoft' with an 'Estimated cost per month' of 'No additional charges'. The 'Terms' section contains a legal disclaimer. The 'Basics' section shows the following configuration: Subscription (Azure for Students), Resource group (PolyglotData), Server name (polyglotserverakhat), Authentication method (SQL Authentication), Server admin login (testuser), and Location (North Europe). The 'Networking' section shows 'Allow Azure services to access server' set to 'Yes'. The 'Additional settings' section shows 'Enable Azure Defender for SQL' set to 'Not now'. At the bottom, there are buttons for 'Create', '< Previous', and 'Download a template for automation'.

### Task 3: Create an Azure Cosmos DB account resource

Microsoft Azure

Search resources, services, and docs (G+)

Home > Create a resource > Select API option >

## Create Azure Cosmos DB Account - Core (SQL)

Validation Success

Basics Global Distribution Networking Backup Policy Encryption Tags **Review + create**

**Creation Time**

Estimated Account Creation Time (in minutes) 2

The estimated creation time is calculated based on the location you have selected

**Basics**

Subscription	Azure for Students
Resource Group	PolyglotData
Location	North Europe
Account Name	(new) polycosmosrakhat
API	Core (SQL)
Capacity mode	Provisioned throughput
Geo-Redundancy	Enable
Multi-region Writes	Enable
Availability Zones	Disable

**Backup Policy**

Backup policy	Periodic
Backup storage redundancy	Geo-redundant backup storage

**Networking**

Connectivity method	All networks
---------------------	--------------

Create Previous Next Download a template for automation

## Task 4: Create an Azure Storage account resource

Microsoft Azure

Search resources, services, and docs (G+)

Home > Create a resource >

## Create a storage account

Validation passed

Basics Advanced Networking Data protection Tags **Review + create**

**Basics**

Subscription	Azure for Students
Resource Group	PolyglotData
Location	north europe
Storage account name	polyglotrakhat
Deployment model	Resource manager
Performance	Standard
Replication	Locally-redundant storage (LRS)

**Advanced**

Secure transfer	Enabled
Allow storage account key access	Enabled
Allow cross-tenant replication	Enabled
Default to Azure Active Directory authorization in the Azure portal	Disabled
Infrastructure encryption	Disabled
Blob public access	Enabled
Minimum TLS version	Version 1.2
Enable hierarchical namespace	Disabled
Enable network file system v3	Disabled
Access tier	Hot
Large file shares	Disabled

Create < Previous Next > Download a template for automation

## Exercise 2: Import and validate data

### Task 1: Upload image blobs

Microsoft Azure

Search resources, services, and docs (G+)

Home > polyglotrakhat > images

## images | Properties

Container

Search (Ctrl+F) Refresh

Overview Diagnose and solve problems Access Control (IAM) Settings Shared access tokens Access policy Properties Metadata

**NAME**

images

**URL**

https://polyglotrakhat.blob.core.windows.net/images

**LAST MODIFIED**

10/9/2021, 1:12:29 PM

**ETAG**

0x8D98AF427E66F2B

**LEASE STATUS**

Unlocked

**LEASE STATE**

Available

**LEASE DURATION**

-

**ENCRYPTION SCOPE**

\$account-encryption-key

**VERSION-LEVEL IMMUTABILITY SUPPORT**

Disabled

Calculate size

Microsoft Azure

Home > polystorakhat > images

Authentication method: Access key (Switch to Azure AD User Account)  
Location: images

Search blobs by prefix (case-sensitive)

Name	Modified	Access tier	Blob type
<input type="checkbox"/> awc_jersey_male.jpg	10/9/2021, 1:17:43 PM	Hot (inferred)	Block blob
<input type="checkbox"/> awc_tee_male_yellow.jpg	10/9/2021, 1:17:43 PM	Hot (inferred)	Block blob
<input type="checkbox"/> bike_lock.jpg	10/9/2021, 1:17:43 PM	Hot (inferred)	Block blob
<input type="checkbox"/> bikepump.jpg	10/9/2021, 1:17:43 PM	Hot (inferred)	Block blob
<input type="checkbox"/> clipless_pedals.jpg	10/9/2021, 1:17:43 PM	Hot (inferred)	Block blob
<input type="checkbox"/> double_headlight.jpg	10/9/2021, 1:17:43 PM	Hot (inferred)	Block blob
<input type="checkbox"/> fork.jpg	10/9/2021, 1:17:43 PM	Hot (inferred)	Block blob
<input type="checkbox"/> frame_black.jpg	10/9/2021, 1:17:44 PM	Hot (inferred)	Block blob
<input type="checkbox"/> frame_silver.jpg	10/9/2021, 1:17:43 PM	Hot (inferred)	Block blob
<input type="checkbox"/> frame.jpg	10/9/2021, 1:17:43 PM	Hot (inferred)	Block blob
<input type="checkbox"/> handlebar.jpg	10/9/2021, 1:17:43 PM	Hot (inferred)	Block blob
<input type="checkbox"/> handpump.jpg	10/9/2021, 1:17:43 PM	Hot (inferred)	Block blob
<input type="checkbox"/> hotrodlike_black.jpg	10/9/2021, 1:17:44 PM	Hot (inferred)	Block blob
<input type="checkbox"/> hotrodlike_f.jpg	10/9/2021, 1:17:44 PM	Hot (inferred)	Block blob
<input type="checkbox"/> hotrodlike_silver.jpg	10/9/2021, 1:17:44 PM	Hot (inferred)	Block blob
<input type="checkbox"/> innertube.jpg	10/9/2021, 1:17:44 PM	Hot (inferred)	Block blob
<input type="checkbox"/> julianax_r_02_blue.jpg	10/9/2021, 1:17:44 PM	Hot (inferred)	Block blob
<input type="checkbox"/> julianax_r_02_yellow.jpg	10/9/2021, 1:17:44 PM	Hot (inferred)	Block blob

Upload blob

Files

Select a file

Overwrite if files already exist

Advanced

Upload

Current uploads

Dismiss: Completed All

wheel.jpg 10 KIB / 10 KIB

water\_bottle\_cage.jpg 4 KIB / 4 KIB

water\_bottle.jpg 5 KIB / 5 KIB

tirepatch\_kit.jpg 8 KIB / 8 KIB

tail\_lights.jpg 8 KIB / 8 KIB

superlight\_silver.jpg 9 KIB / 9 KIB

superlight\_red.jpg 11 KIB / 11 KIB

superlight\_black.jpg 9 KIB / 9 KIB

street\_tires.jpg 10 KIB / 10 KIB

sprocket.jpg 5 KIB / 5 KIB

single\_headlight.jpg 6 KIB / 6 KIB

silver\_chain.jpg 6 KIB / 6 KIB

shorts\_male.jpg 5 KIB / 5 KIB

shorts\_female.jpg 6 KIB / 6 KIB

saddle.jpg 4 KIB / 4 KIB

roadster\_yellow\_f.jpg 10 KIB / 10 KIB

roadster\_red.jpg 11 KIB / 11 KIB

## Task 2: Upload an SQL .bacpac file

Microsoft Azure

Home > polystorakhat > databases

Authentication method: Access key (Switch to Azure AD User Account)  
Location: databases

Search blobs by prefix (case-sensitive)

Name	Modified	Access tier	Blob type
<input type="checkbox"/> AdventureWorks.bacpac	10/9/2021, 1:19:11 PM	Hot (inferred)	Block blob

Upload blob

Files

Select a file

Overwrite if files already exist

Advanced

Upload

Current uploads

Dismiss: Completed All

AdventureWorks.bacpac 30 KIB / 30 KIB

wheel.jpg 10 KIB / 10 KIB

water\_bottle\_cage.jpg 4 KIB / 4 KIB

water\_bottle.jpg 5 KIB / 5 KIB

tirepatch\_kit.jpg 8 KIB / 8 KIB

tail\_lights.jpg 8 KIB / 8 KIB

superlight\_silver.jpg 9 KIB / 9 KIB

superlight\_red.jpg 11 KIB / 11 KIB

superlight\_black.jpg 9 KIB / 9 KIB

street\_tires.jpg 10 KIB / 10 KIB

sprocket.jpg 5 KIB / 5 KIB

single\_headlight.jpg 6 KIB / 6 KIB

silver\_chain.jpg 6 KIB / 6 KIB

shorts\_male.jpg 5 KIB / 5 KIB

shorts\_female.jpg 6 KIB / 6 KIB

saddle.jpg 4 KIB / 4 KIB

roadster\_yellow\_f.jpg 10 KIB / 10 KIB

## Task 3: Import an SQL database

Notifications

More events in the activity log →

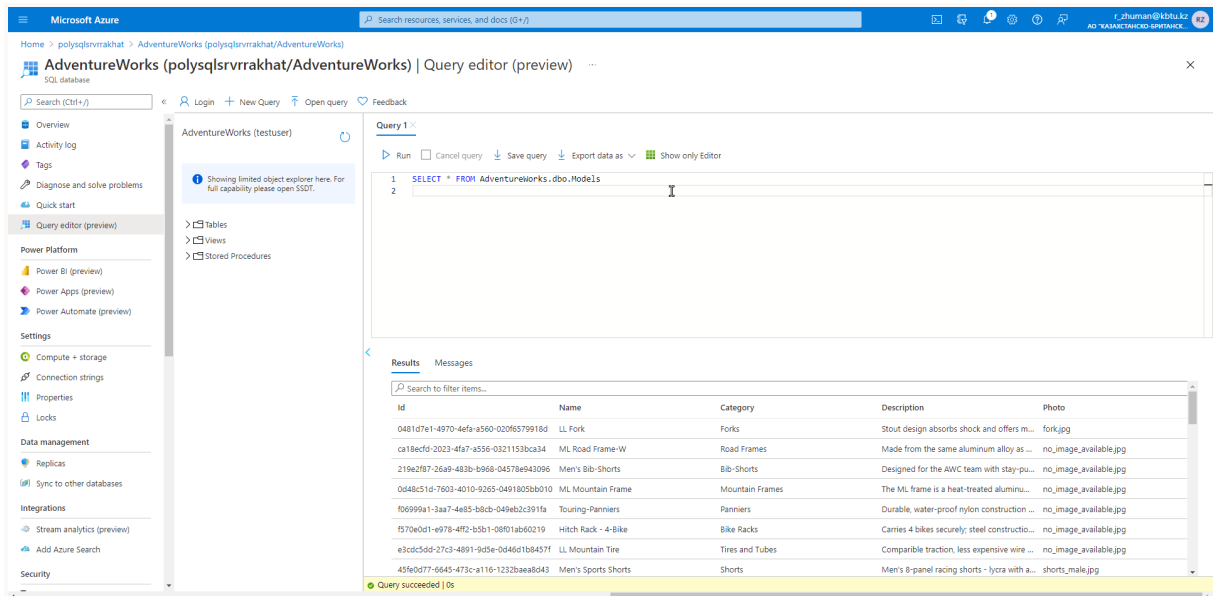
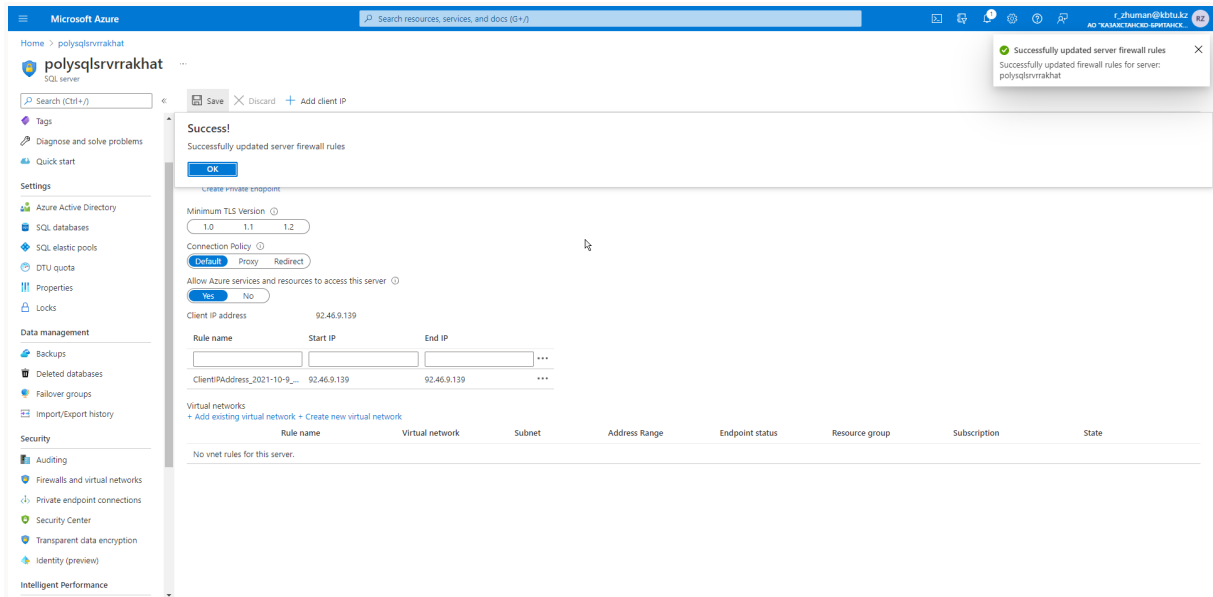
Dismiss all

Request submitted to import database

Import operation for AdventureWorks accepted. Browse > SQL servers > polysqlsvrrakhat > Import/Export History for progress information.

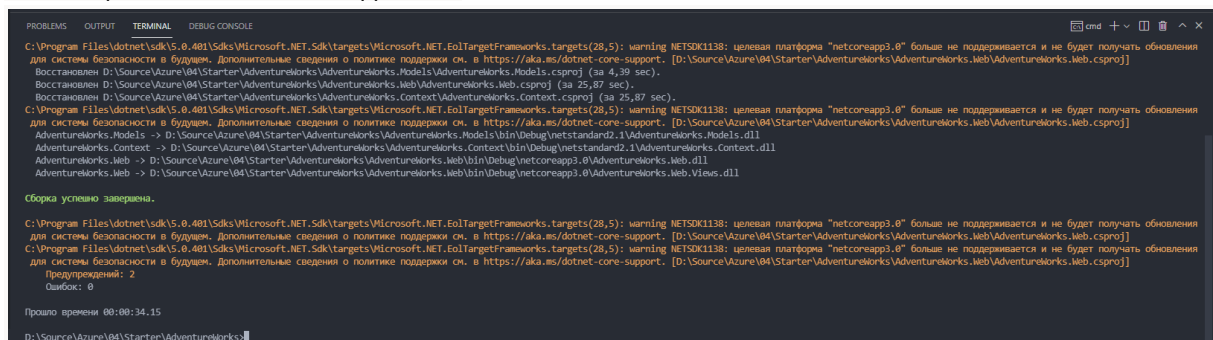
a few seconds ago

## Task 4: Use an imported SQL database

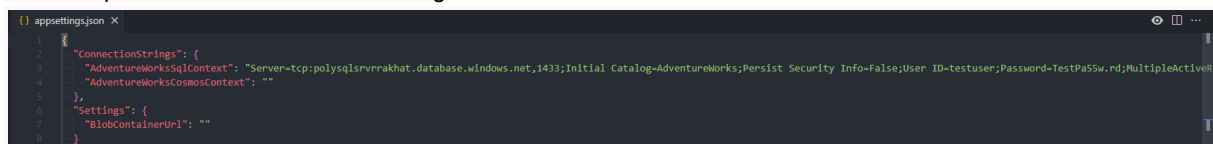


## Exercise 3: Open and configure a .NET web application

### Task 1: Open and build the web application



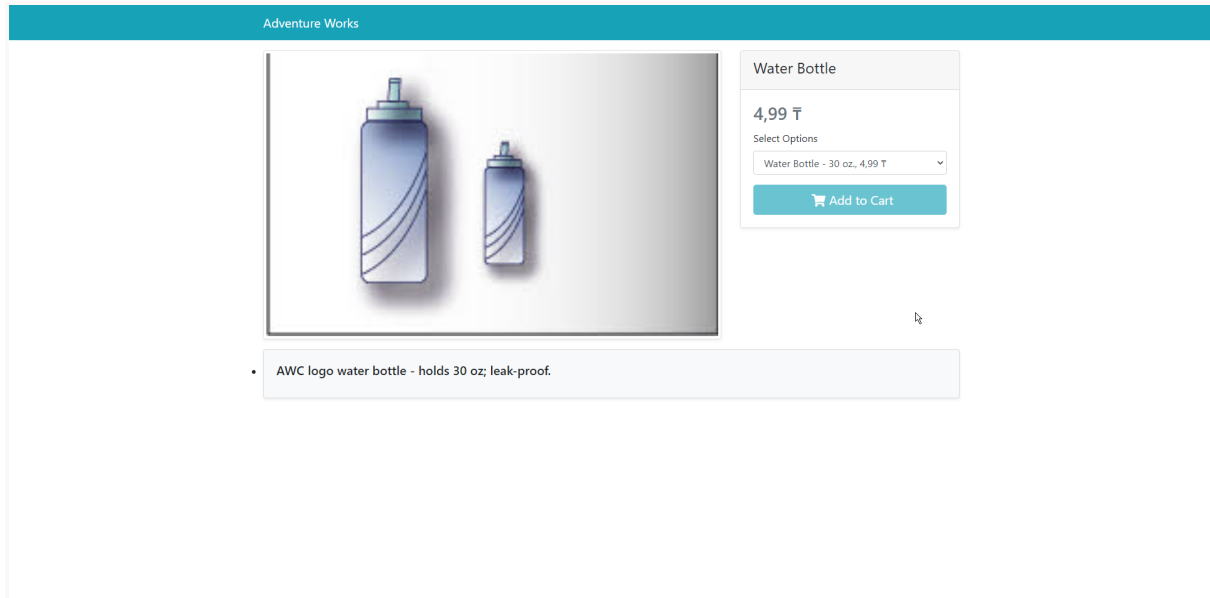
### Task 2: Update the SQL connection string



### Task 3: Update the blob base URL

```
"Settings": {  
  "BlobContainerUrl": "https://polystorakhat.blob.core.windows.net/images"  
}
```

### Task 4: Validate the web application



## Exercise 4: Migrating SQL data to Azure Cosmos DB

### Task 1: Create a migration project

```
D:\Source\Azure\04\Starter\AdventureWorks>dotnet new console --name AdventureWorks.Migrate  
Шаблон "Console Application" успешно создан.  
  
Идет обработка действий после создания...  
Выполнение запуска "dotnet restore" на AdventureWorks.Migrate\AdventureWorks.Migrate.csproj...  
  Определение проектов для восстановления...  
Восстановлен D:\Source\Azure\04\Starter\AdventureWorks\AdventureWorks.Migrate\AdventureWorks.Migrate.csproj (за 68 ms).  
Восстановление выполнено.  
  
D:\Source\Azure\04\Starter\AdventureWorks>dotnet add .\AdventureWorks.Migrate\AdventureWorks.Migrate.csproj reference  
Отсутствует обязательный аргумент для команды: reference  
Использование: dotnet add <PROJECT> reference [параметры] <PROJECT_PATH>  
  
Аргументы:  
  <PROJECT>      Обрабатываемый файл проекта. Если файл не указан, команда будет искать его в текущем каталоге.  
  <PROJECT_PATH> Пути к проектам, которые добавляются как ссылки.  
  
Параметры:  
  -h, --help      Показать справку командной строки.  
  -f, --framework <FRAMEWORK> Добавление ссылки только для конкретной целевой платформы.  
  --interactive    Позволяет остановить команду и ожидать ввода или действия пользователя (например, для проверки подлинности).  
  
D:\Source\Azure\04\Starter\AdventureWorks>dotnet add .\AdventureWorks.Migrate\AdventureWorks.Migrate.csproj reference .\AdventureWorks.Models\AdventureWorks.Models.csproj  
Ссылка ".\AdventureWorks.Models\AdventureWorks.Models.csproj" добавлена в проект.  
  
D:\Source\Azure\04\Starter\AdventureWorks>dotnet add .\AdventureWorks.Migrate\AdventureWorks.Migrate.csproj reference .\AdventureWorks.Context\AdventureWorks.Context.csproj  
Ссылка ".\AdventureWorks.Context\AdventureWorks.Context.csproj" добавлена в проект.  
  
D:\Source\Azure\04\Starter\AdventureWorks>cd AdventureWorks.Migrate\  
  
D:\Source\Azure\04\Starter\AdventureWorks\AdventureWorks.Migrate>dotnet add package Microsoft.EntityFrameworkCore.SqlServer --version 3.0.1
```

```
Сборка успешно завершена.  
Предупреждений: 0  
Ошибок: 0  
  
Прошло времени 00:00:02.14  
  
D:\Source\Azure\04\Starter\AdventureWorks\AdventureWorks.Migrate>
```

### Task 2: Create a .NET class

```
10 public class Program  
11 {  
12     private const string sqlDBConnectionString = "Server=tc:polysqlsrvrakhat.database.windows.net,1433;Initial Catalog=AdventureWorks;Persist Security Info=False;User ID=testuser;Password=TestPa55w.r  
13     private const string cosmosDBConnectionString = "AccountEndpoint=https://polycosmosrakhat.documents.azure.com:443/;AccountKey=fPSP6UAX07so30MnH161RnXGvUc1KkVR75xRnxD0eHth8Bg1mwydJRx3oBbfzhe0N19Nhn  
14     public static async Task Main(string[] args)
```

### Task 3: Get SQL database records by using Entity Framework

```
D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Migrate>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...
Все проекты обновлены для восстановления.
Adventureworks.Models -> D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Models\bin\Debug\netstandard2.1\Adventureworks.Models.dll
Adventureworks.Context -> D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\bin\Debug\netstandard2.1\Adventureworks.Context.dll
Adventureworks.Migrate -> D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Migrate\bin\Debug\net5.0\Adventureworks.Migrate.dll

Сборка успешно завершена.
Предупреждений: 0
Ошибок: 0

Прошло времени 00:00:01.49

D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Migrate>
```

## Task 4: Insert items into Azure Cosmos DB

```
D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Migrate>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...
Все проекты обновлены для восстановления.
Adventureworks.Models -> D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Models\bin\Debug\netstandard2.1\Adventureworks.Models.dll
Adventureworks.Context -> D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\bin\Debug\netstandard2.1\Adventureworks.Context.dll
Adventureworks.Migrate -> D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Migrate\bin\Debug\net5.0\Adventureworks.Migrate.dll

Сборка успешно завершена.
Предупреждений: 0
Ошибок: 0

Прошло времени 00:00:01.33

D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Migrate>
```

## Task 5: Perform a migration

```
Upserted document #077 [Activity Id:5b414e38-fb44-4769-893e-cdffc0f32f85]
Upserted document #078 [Activity Id:1844f4a7-28ee-4fa6-b883-dc6f8d55c0a3]
Upserted document #079 [Activity Id:9e8a3553-6998-42e6-b157-f72c18b82944]
Upserted document #080 [Activity Id:104458cd-168e-4a07-ba8d-d4dc96c5860c]
Upserted document #081 [Activity Id:7275de5d-689d-411a-a482-b888f6941234]
Upserted document #082 [Activity Id:4017a0ad-339f-43a2-a088-ca38f20554fc]
Upserted document #083 [Activity Id:9705311a-188e-4fca-a04b-d969f686c4f]
Upserted document #084 [Activity Id:6e68ff42-2de1-47d9-02a1-a19e26a63733]
Upserted document #085 [Activity Id:241777a5-b9d1-4c63-a4fe-74cb755f8375]
Upserted document #086 [Activity Id:c1413226-2933-44a5-83fc-fd7842bec6e7]
Upserted document #087 [Activity Id:f6e62c29-b8a5-40b2-82b8-07b4b4b5f4e]
Upserted document #088 [Activity Id:f059d26e-e8eb-4935-8dfe-e6d4776f9c4c]
Upserted document #089 [Activity Id:72825eda-1fab-4ba5-93a8-21c57167a2d8]
Upserted document #090 [Activity Id:afd13ec4-1f81-451e-b8e5-5fc33222036]
Upserted document #091 [Activity Id:9d449ac7-0278-4453-93f4-f6a1c3a6a56]
Upserted document #092 [Activity Id:b05f200e-b1aa-4131-8104-0250f78e04fa]
Upserted document #093 [Activity Id:a2a2b839-de38-4937-ab97-f59a3e6b13e]
Upserted document #094 [Activity Id:15f071a0-8e10-48c2-add2-2f06c227d75c]
Upserted document #095 [Activity Id:c8455db8-4217-4bf8-bad1-49a7e9852bd6]
Upserted document #096 [Activity Id:c852f189-d7f4-434a-9b6c-1b256b734a4]
Upserted document #097 [Activity Id:b1331d88-4e57-4221-a91c-7a1d12a09f77]
Upserted document #098 [Activity Id:5b53e4a2-a14a-4cb8-a630-afcbec475c4e]
Upserted document #099 [Activity Id:8ba8657d-70c1-4c6e-8f92-4f7694c8a3b]
Upserted document #100 [Activity Id:3ca91ea-a785-489c-afdc-df411da0697c]
Upserted document #101 [Activity Id:ccf8faab-4c23-4130-ae5b-264f806e883f]
Upserted document #102 [Activity Id:747acda-e18a-41c2-b32e-589ac920d6f1]
Upserted document #103 [Activity Id:e64dc8cb-b71d-47f2-b775-886c9b403891]
Upserted document #104 [Activity Id:dba77fbc-937d-44a5-8459-69551df20963]
Upserted document #105 [Activity Id:1da4d82-e8bf-430f-9777-041f56b273b]
Upserted document #106 [Activity Id:990602a6-3c8e-45e3-ada7-cdb35cb42113]
Upserted document #107 [Activity Id:b2f20727-62bf-4d0e-802e-9f9ebc4470d5]
Upserted document #108 [Activity Id:4327ef27-215e-4e5d-968d-a5a4e7f18a3]
Upserted document #109 [Activity Id:44b3ae4f-9f6b-40ad-b138-fF881ddada]
Upserted document #110 [Activity Id:8ccb3204-8789-4842-b134-f6a9e58f497a]
Upserted document #111 [Activity Id:95c14121-b00e-48cf-b058-f11352105008]
Upserted document #112 [Activity Id:f4f767c7-0b23-46e0-993a-10d9199055e3]
Upserted document #113 [Activity Id:66ba219e-d3c3-4c00-8050-4fe19fd6d4ff]
Upserted document #114 [Activity Id:28b8363d-986f-4b06-92cd-ce50a4c21238]
Upserted document #115 [Activity Id:4c38917d-a78d-49d3-8bea-660067aebfa]
Upserted document #116 [Activity Id:f1472a6f-4e44-4a5e-ad3e-a0052c0ff5b0]
Upserted document #117 [Activity Id:4d729e2-7a24-44f0-ba2c-f0ff93c2b88f]
Upserted document #118 [Activity Id:3ce976c4-5053-4411-90c9-e671e7a030f]
Upserted document #119 [Activity Id:5d7b1697-7739-4bf1-b080-2faaedf19c36]
Total Azure Cosmos DB Documents: 119

D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Migrate>
```

## Task 6: Validate the migration

The screenshot shows the Microsoft Azure portal interface. On the left, the 'All resources' list includes 'AdventureWorks (polycosmosrakhat/Adv...)'. The main area displays the 'Data Explorer' for the 'polycosmosrakhat' database. The 'Online' container is selected, and a query 'SELECT VALUE COUNT(1) FROM models' is executed. The results show a single value of 119, indicating the total number of documents in the 'models' collection.

## Exercise 5: Accessing Azure Cosmos DB by using .NET

### Task 1: Update library with the Cosmos SDK and references

```
D:\Source\Azure\04\Starter\Adventureworks>cd Adventureworks.Context\
D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context>dotnet add package Microsoft.Azure.Cosmos --version 3.4.1
Определение проектов для восстановления...
Writing C:\Users\zhuma\AppData\Local\Temp\tmp433A.tmp
Info : Добавление PackageReference для пакета "Microsoft.Azure.Cosmos" в проект "D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\Adventureworks.Context.csproj".
Info : Идет восстановление пакетов для D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\Adventureworks.Context.csproj...
Info : Пакет "Microsoft.Azure.Cosmos" совместим со всеми указанными платформами в проекте "D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\Adventureworks.Context.csproj".
Info : Cosmos PackageReference для пакета "Microsoft.Azure.Cosmos" версии "3.4.1" добавлена в файл "D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\Adventureworks.Context.csproj".
Info : Выходя из восстановления...
Info : Идет создание файла MSBuild D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\obj\Adventureworks.Context.csproj.nuget.g.props.
Info : Идет создание файла MSBuild D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\obj\Adventureworks.Context.csproj.nuget.g.targets.
Info : Записи файла ресурсов на диск. Путь: D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\obj\project.assets.json
log : Восстановлен D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\Adventureworks.Context.csproj (за 351 ms).

D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context>
D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context>dotnet build
Microsoft (R) Build Engine версии 16.11.0+8538acc04 для .NET
(C) Корпорация Майкрософт (Microsoft Corporation). Все права защищены.

Определение проектов для восстановления...
Все проекты обновлены для восстановления.
Adventureworks.Models -> D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Models\bin\Debug\netstandard2.1\Adventureworks.Models.dll
Adventureworks.Context -> D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\bin\Debug\netstandard2.1\Adventureworks.Context.dll

Сборка успешно завершена.
Предупреждений: 0
Ошибок: 0

Прошло времени 00:00:01.67

D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context>
```

## Task 2: Write .NET code to connect to Azure Cosmos DB

```
1 namespace Adventureworks.Context
2 {
3     public class AdventureWorksCosmosContext : IAdventureWorksProductContext
4     {
5         private readonly Container _container;
6         public AdventureWorksCosmosContext(string connectionString, string database = "Retail", string container = "Online")
7         {
8             _container = new CosmosClient(connectionString)
9                 .GetDatabase(database)
10                .GetContainer(container);
11         }
12         public async Task<Model> FindModelAsync(Guid id)
13         {
14             var iterator = _container.GetItemIterable<Model>()
15                 .Where(m => m.id == id)
16                 .ToFeedIterator<Model>();
17             List<Model> matches = new List<Model>();
18             while (iterator.HasMoreResults)
19             {
20                 var next = await iterator.ReadNextAsync();
21                 matches.AddRange(next);
22             }
23             return matches.SingleOrDefault();
24         }
25         public async Task<List<Model>> GetModelsAsync()
26         {
27             string query = @"SELECT * FROM Items";
28             var iterator = _container.GetItemQueryIterator<Model>(query);
29             List<Model> matches = new List<Model>();
30             while (iterator.HasMoreResults)
31             {
32                 var next = await iterator.ReadNextAsync();
33                 matches.AddRange(next);
34             }
35             return matches;
36         }
37         public async Task<Product> FindProductAsync(Guid id)
38         {
39             string query = @"SELECT VALUE products
40                             FROM models
41                             JOIN products IN models.Products
42                             WHERE products.id = '{id}'";
43             var iterator = _container.GetItemQueryIterator<Product>(query);
44             List<Product> matches = new List<Product>();
45             while (iterator.HasMoreResults)
46             {
47                 var next = await iterator.ReadNextAsync();
48                 matches.AddRange(next);
49             }
50             return matches.SingleOrDefault();
51         }
52     }
53 }
```

```
D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context>dotnet build
Microsoft (R) Build Engine версии 16.11.0+8538acc04 для .NET
(C) Корпорация Майкрософт (Microsoft Corporation). Все права защищены.

Определение проектов для восстановления...
Все проекты обновлены для восстановления.
Adventureworks.Models -> D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Models\bin\Debug\netstandard2.1\Adventureworks.Models.dll
Adventureworks.Context -> D:\Source\Azure\04\Starter\Adventureworks\Adventureworks.Context\bin\Debug\netstandard2.1\Adventureworks.Context.dll

Сборка успешно завершена.
Предупреждений: 0
Ошибок: 0

Прошло времени 00:00:01.20
```

## Task 3: Update the Azure Cosmos DB connection string

```
1 {
2     "ConnectionStrings": {
3         "AdventureWorksSqlContext": "Server=tcpsqlsrvrnhkhat.database.windows.net,1433;Initial Catalog=Adventureworks;Persist Security Info=False;User ID=testuser;Password=TestPa55w.rd;MultipleActiveResultSets=True;Application Name=Adventureworks;Encrypt=True;TrustServerCertificate=False;Connection Timeout=30; ",
4         "AdventureWorksCosmosContext": "AccountEndpoint=https://polycosmosrakhath.documents.azure.com:443/;AccountKey=fPSP6UjX07so3QmH161RnXGvUc1KKV75xRnxDmHh8g1mYdJfX3o8BfzheON19HhncUzP46vLiHy98Q=="
5     },
6     "Settings": {
7         "BlobContainerUrl": "https://polystorprakhath.blob.core.windows.net/images"
8     }
9 }
```


## Task 4: Update .NET application startup logic



localhost:2000/details/52x72c1-dbf-4516-927d-c76469ed32e

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### Adventure Works



Touring-1000

2 384,07 ₸

Select Options

Touring-1000 Blue, 50, 2 384,07 ₸

Add to Cart

- Travel in style and comfort. Designed for maximum comfort and safety. Wide gear range takes on all hills. High-tech aluminum alloy construction provides durability without added weight.

## Exercise 6: Clean up your subscription

### Task 2: Delete resource groups

```
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

rahmat@Azure:~$ az group delete --name PolyglotData --no-wait --yes
rahmat@Azure:~$
```