Create an App for Azure (part 4)

Cloud, CSS, Docker, HTML, PHP

Language ★ Skills : 5

The digital transition has pushed software companies and enterprises to migrate their applications to the web. Azure cloud services have provided the ideal platform, the right services, and the tools to go digital while keeping full control over the data. This publication proposes the creation of a simple application by discovering some of these services and tools.

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By Olivier Paudex

Creating Azure infrastructure

Once the container is created, we can start dealing with the Azure infrastructure that will host our application.

> This publication is composed of several parts. This being the 4th part.

The naming of services

Microsoft recommends naming services in a structured manner.

- An acronym or abbreviation for the service.
- The type of resource or information specifying its function.
- The name of the application if the one is dedicated to it.
- The region of the service.
- The instance of the service.

Example:

Sigle	**Resource Type**	**Application**	**Region**	**Instance**	**Description**
pe	sqlsrv	imagesgallery	westeu	001	The SQL server endpoint for the Images Gallery application
st		imagesgallery	westeu	001	Storage for the Images Gallery application
snet	backend	imagesgallery	westeu	001	The application's private subnet

Example service naming

Azure Container Registry

The first task is going to be creating an **"ACR"** or **"Azure Container Registry"**.

- Create a resource group for the network elements.
- Create an **"ACR"** in Azure of type basic.
- Copy its name to the clipboard from the **"Overview"** tab.
- Go back to VSCode and enter the command below.

```
az login
```

This will open a login window to connect to your Azure account.

- Close the window
- Enter the command below

```
az acr login --name [ACR name]
```

This will connect you with the ACR.

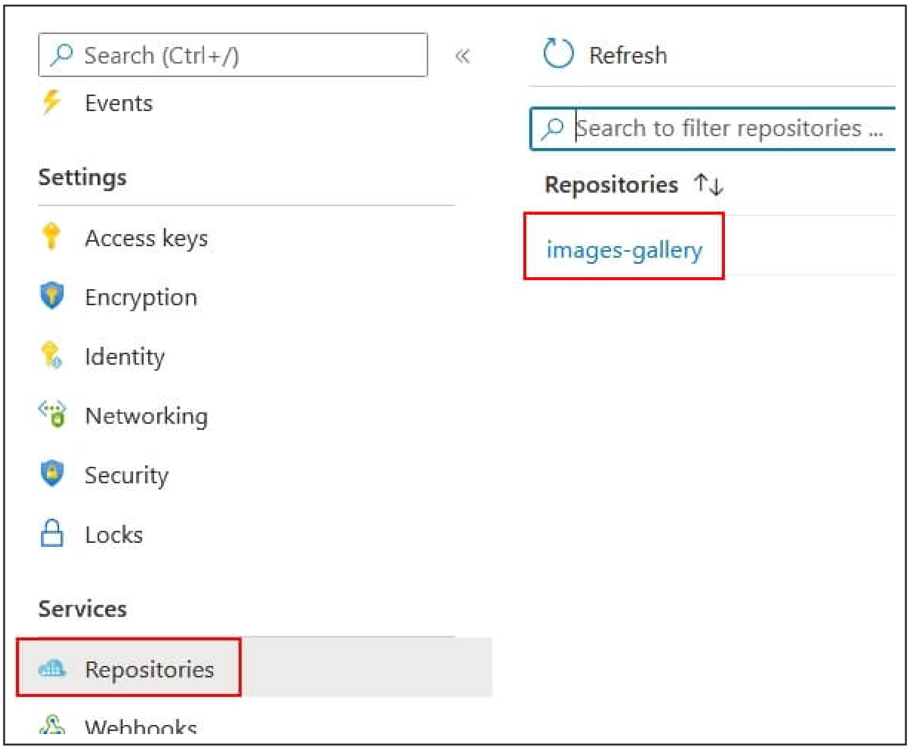
- Create a tag of your docker image. A tag is a version of the image, here 1.0

```
docker tag [docker image name] [ACR name].azurecr.io/images-gallery:1.0
```

- Push image into Azure

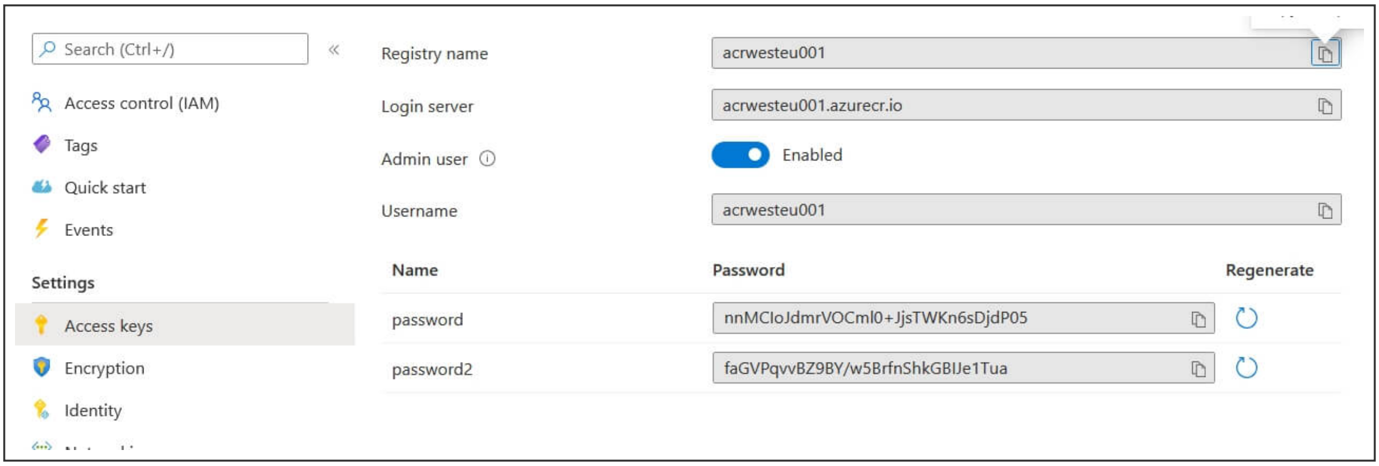
```
docker push [ACR name].azurecr.io/images-gallery:1.0
```

- Click on **"Repositories"** in the ACR and verify that the container is present.



The ACR Directory

- Enable the **"Admin"** option.



Registry name: acrwesteu001

Login server: acrwesteu001.azurecr.io

Admin user ⓘ: ● Enabled

Username: acrwesteu001

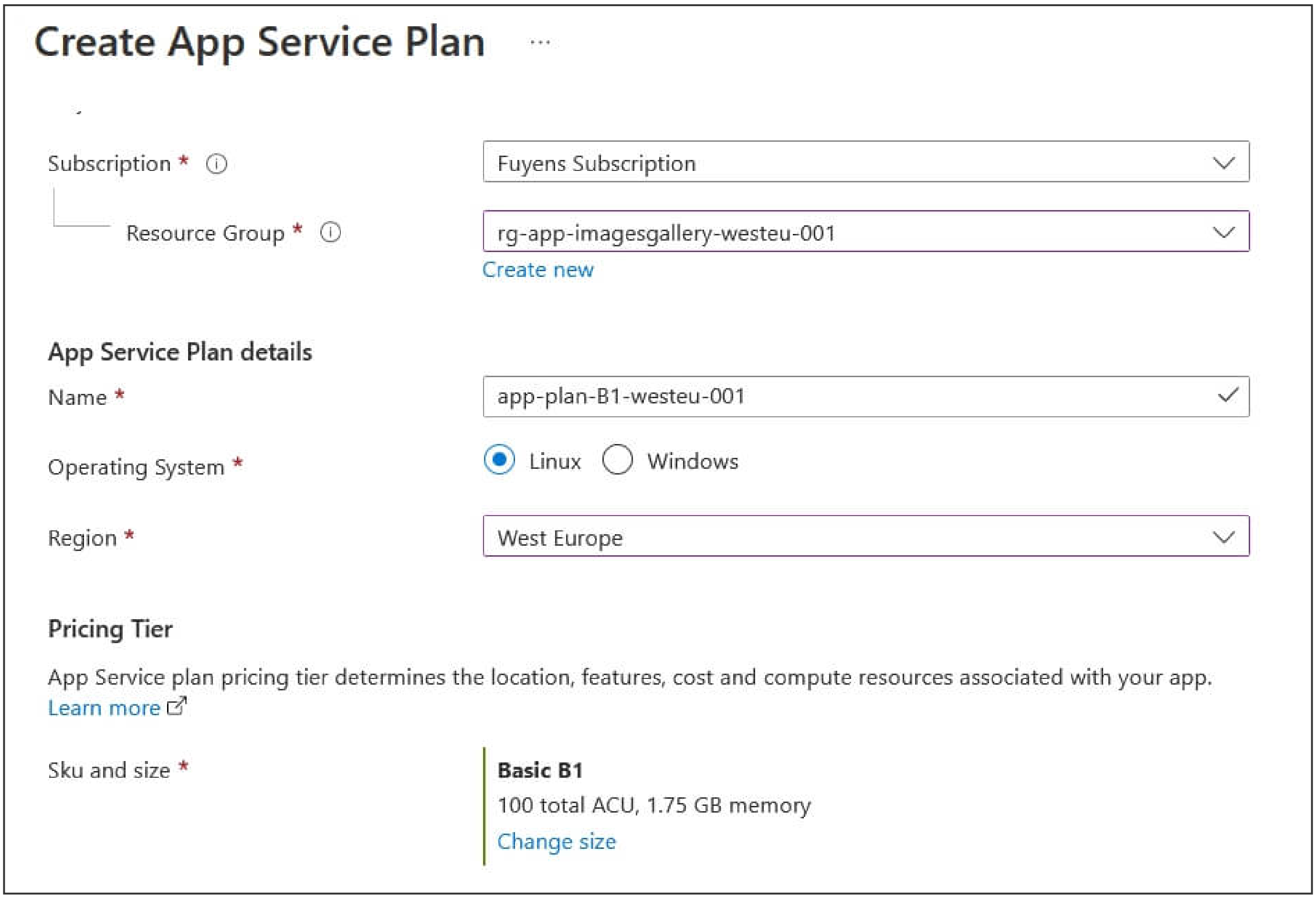
Name	Password	Regenerate
password	nnMCIoJdmrVOCml0+JjsTWKn6sDjdP05	↻
password2	faGVPqvvBZ9BY/w5BrfnShkGBIJe1Tua	↻

Enable the "Admin user"

App services

Microsoft Azure offers the ability to create applications without worrying about its maintenance. The service can be linked to a GitHub account or a container. One can also program a '**CI/CD**" to create a continuous development environment. The service also has the ability to adapt to demand (auto-scaling).

- Create a resource group for the application.
- Create an **"App service plans"** of type B1. The free version does not allow you to create SSL certificates.



Create App Service Plan ...

Subscription * : Fuyens Subscription

Resource Group * : rg-app-imagesgallery-westeu-001

App Service Plan details

Name * : app-plan-B1-westeu-001

Operating System * : ● Linux ○ Windows

Region * : West Europe

Pricing Tier

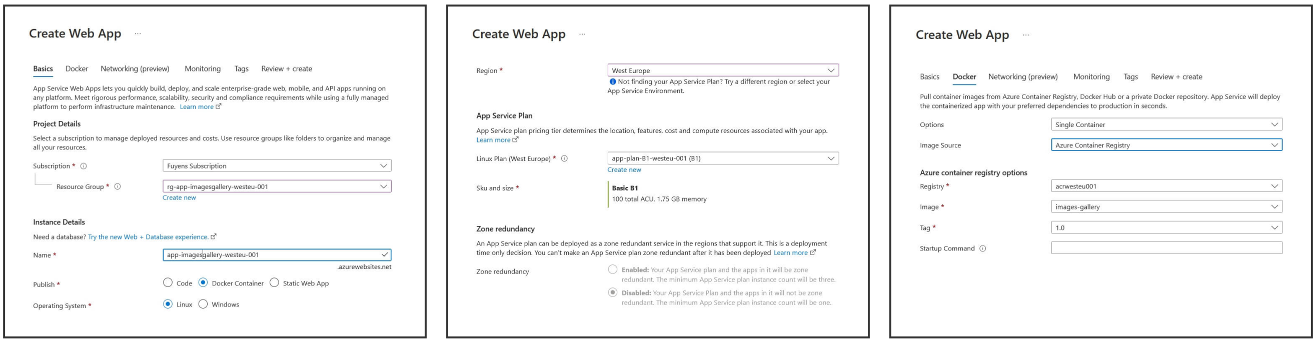
App Service plan pricing tier determines the location, features, cost and compute resources associated with your app.

Sku and size * : **Basic B1**
100 total ACU, 1.75 GB memory

The rate plan for the app service

- Create an application
- Enter a name for the application. This one doesn't really matter. It is the SSL certificate and DNS that will give the real name of the application to be used in the URL.
- Select **"Docker Container"**.
- Select **"Linux"**.

- Select the rate plan created above.
- Select the container from the **ACR**.



Create Web App ···

App Service Web Apps lets you quickly build, deploy, and scale enterprise-grade web, mobile, and API apps running on any platform. Meet rigorous performance, scalability, security and compliance requirements while using a fully managed platform to perform infrastructure maintenance. Learn more

Project Details

Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Fuyens Subscription

Resource Group * : rg-app-imagesgallery-westeu-001

Create new

Instance Details

Need a database? Try the new Web + Database experience.

Name * : app-imagesgallery-westeu-001 .azurewebsites.net

Publish * : ○ Code ● Docker Container ○ Static Web App

Operating System * : ● Linux ○ Windows

Create Web App ···

Region * : West Europe

Not finding your App Service Plan? Try a different region or select your App Service Environment.

App Service Plan

App Service plan pricing tier determines the location, features, cost and compute resources associated with your app. Learn more

Linux Plan (West Europe) * : app-plan-B1-westeu-001 (B1)

Create new

Sku and size * : **Basic B1** 100 total ACU, 1.75 GB memory

Zone redundancy

An App Service plan can be deployed as a zone redundant service in the regions that support it. This is a deployment time only decision. You can't make an App Service plan zone redundant after it has been deployed Learn more

Zone redundancy : ○ **Enabled:** Your App Service plan and the apps in it will be zone redundant. The minimum App Service plan instance count will be three.

● **Disabled:** Your App Service Plan and the apps in it will not be zone redundant. The minimum App Service plan instance count will be one.

Create Web App ···

Pull container images from Azure Container Registry, Docker Hub or a private Docker repository. App Service will deploy the containerized app with your preferred dependencies to production in seconds.

Options : Single Container

Image Source : Azure Container Registry

Azure container registry options

Registry * : acrwesteu001

Image * : images-gallery

Tag * : 1.0

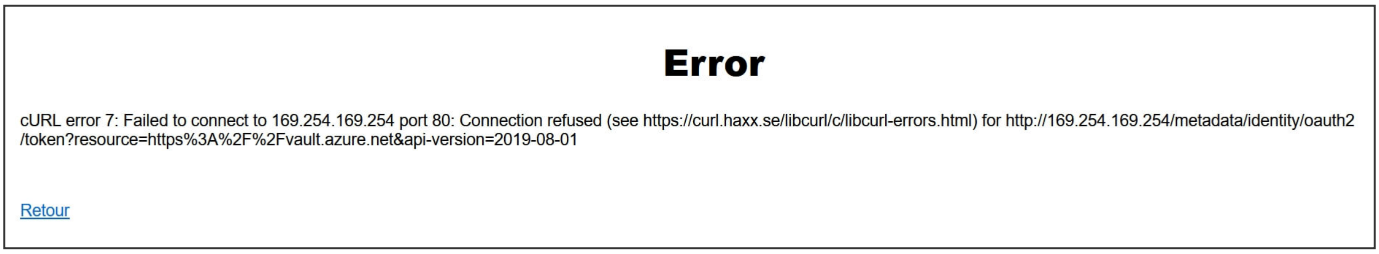
Startup Command :

Creating the app

- Leave the **"Enable Network injection" option set to Off"**. Application security will be addressed later.
- Leave the other options.

Here we go, the app is created and should already respond to the URL**"https://[app name].azurewebsites.net/"**. It may take a good minute for the app to start up for the first time, so be patient!

At this point, the app should return an error of type**"Failed to connect"**. This is normal. We need to take care of creating the database and storage.



Error

cURL error 7: Failed to connect to 169.254.169.254 port 80: Connection refused (see https://curl.haxx.se/libcurl/c/libcurl-errors.html) for http://169.254.169.254/metadata/identity/oauth2/token?resource=https%3A%2F%2Fvault.azure.net&api-version=2019-08-01

Retour

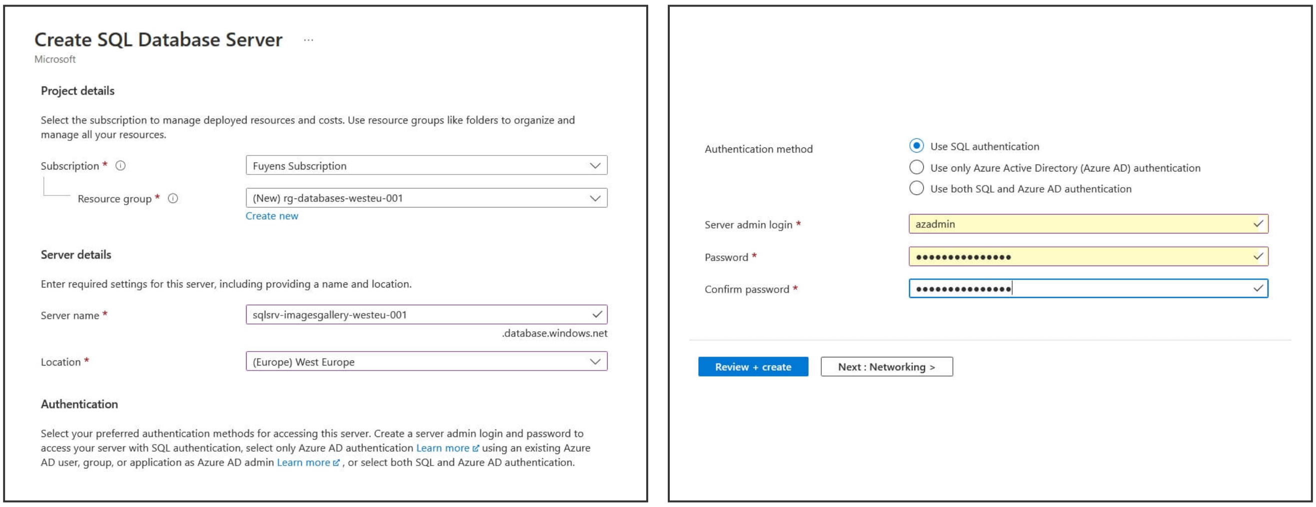
The error screen and a message

The SQL server

Microsoft Azure offers its own database engine called **"Azure SQL Server"**. It's a lightweight version of **"Microsoft SQL Server"**. It is a **"PaaS"**, namely a **"Platform as a Service"**. In the same way as **"The App Services"**, the advantage of "PaaS" comes that it is administered by Microsoft. We do not take care of the update, nor the maintenance of the server. It is quite possible to make the server redundant through **"replicas"** and elastic mode.

Even if we use a service, we're going to have to create two elements, the server and the database.

- Create a resource group for the server and database.
- Name it **"sqlsrv-imagesgallery-westeu-001"**.
- Enter a location.
- Enter the login **"azadmin"** for the admin.
- Enter a password and confirm it. **Don't forget to write it down**.
- Create the server.



Create SQL Database Server ···
Microsoft

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ⓘ: Fuyens Subscription
Resource group * ⓘ: (New) rg-databases-westeu-001
Create new

Server details

Enter required settings for this server, including providing a name and location.

Server name *: sqlsrv-imagesgallery-westeu-001 ✓
.database.windows.net
Location *: (Europe) West Europe

Authentication

Select your preferred authentication methods for accessing this server. Create a server admin login and password to access your server with SQL authentication, select only Azure AD authentication Learn more using an existing Azure AD user, group, or application as Azure AD admin Learn more , or select both SQL and Azure AD authentication.

Authentication method:
● Use SQL authentication
○ Use only Azure Active Directory (Azure AD) authentication
○ Use both SQL and Azure AD authentication

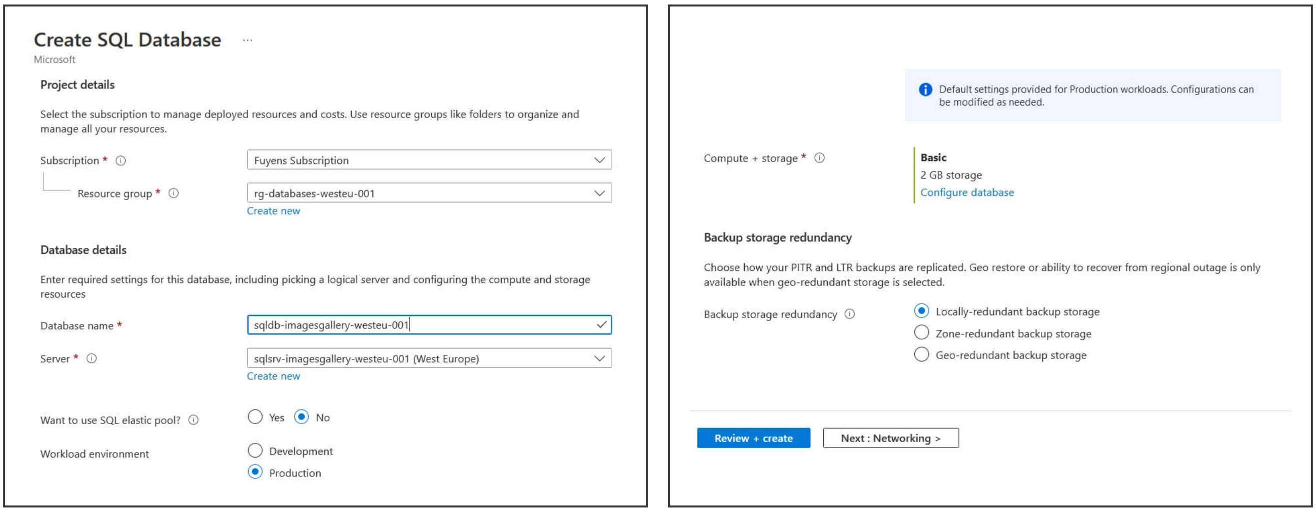
Server admin login *: azadmin ✓
Password *: ••••••••••••••• ✓
Confirm password *: ••••••••••••••• ✓

Creating the database server

The database

Step two, creating the database. We will choose the most basic options

- Select the same resource pool as the SQL server.
- Name it **“sqldb-imagesgallery-westeu-001”**.
- Select **“No”** for the **“elastic pool”** option.
- Select **“Production”**.
- Select the cheapest server, i.e. the **“Basic”** option.
- Select **“LRS”** for redundancy.



Create SQL Database ···
Microsoft

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Fuyens Subscription

Resource group * : rg-databases-westeu-001
Create new

Database details

Enter required settings for this database, including picking a logical server and configuring the compute and storage resources

Database name * : sqldb-imagesgallery-westeu-001

Server * : sqlsrv-imagesgallery-westeu-001 (West Europe)
Create new

Want to use SQL elastic pool? : ○ Yes ● No

Workload environment : ○ Development ● Production

Default settings provided for Production workloads. Configurations can be modified as needed.

Compute + storage * : Basic
2 GB storage
Configure database

Backup storage redundancy

Choose how your PITR and LTR backups are replicated. Geo restore or ability to recover from regional outage is only available when geo-redundant storage is selected.

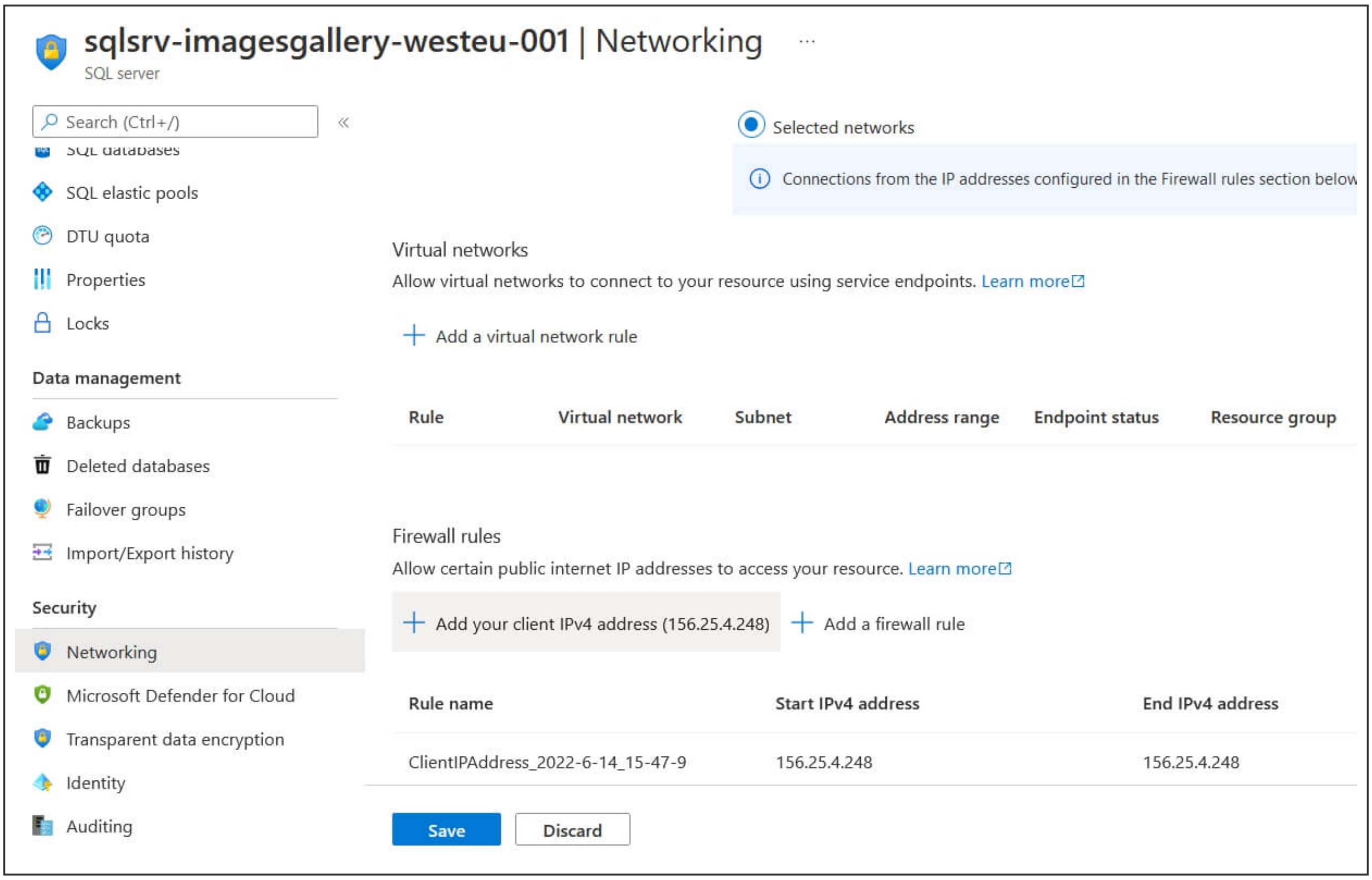
Backup storage redundancy : ● Locally-redundant backup storage
○ Zone-redundant backup storage
○ Geo-redundant backup storage

Creating the database

Connecting to the database

We’ll have to set up the server so we can access it.

- Start by clicking on the **“Networking”** tab and make sure the **“Selected networks”** option is enabled.
- Add your public IP address in the section about the firewall.



sqlsrv-imagesgallery-westeu-001 | Networking

SQL server

● Selected networks

Connections from the IP addresses configured in the Firewall rules section below

Virtual networks

Allow virtual networks to connect to your resource using service endpoints. Learn more

+ Add a virtual network rule

Rule	Virtual network	Subnet	Address range	Endpoint status	Resource group

Firewall rules

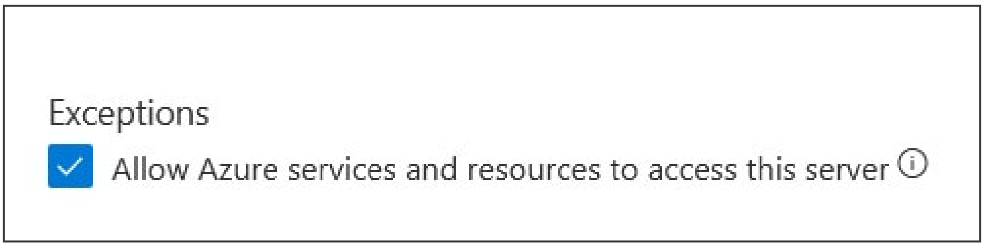
Allow certain public internet IP addresses to access your resource. Learn more

+ Add your client IPv4 address (156.25.4.248) + Add a firewall rule

Rule name	Start IPv4 address	End IPv4 address
ClientIPAddress_2022-6-14_15-47-9	156.25.4.248	156.25.4.248

The "Networking" tab of SQL Server

- Check the option the exception **"Allow Azure services and resources to access this server"**.

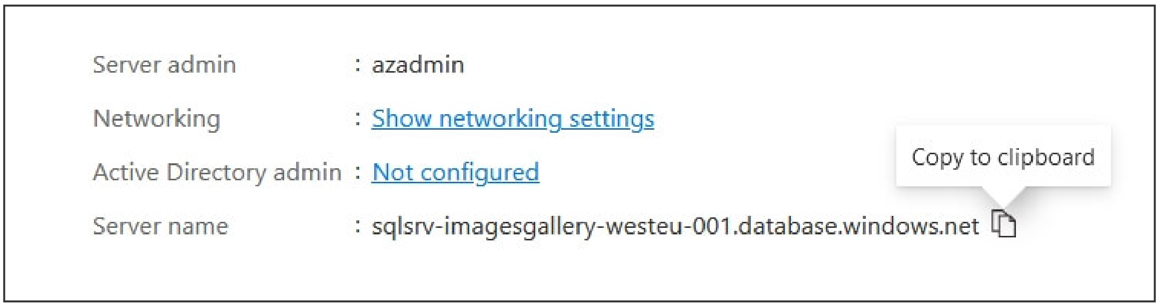


Exceptions

☑ Allow Azure services and resources to access this server

Authorize the application to access the database

- Download **Azure Data Studio** and install it on your PC.
- Click on the **"Overview"** tab of the SQL Server.
- Find its name by clicking on the note.



Server admin : azadmin

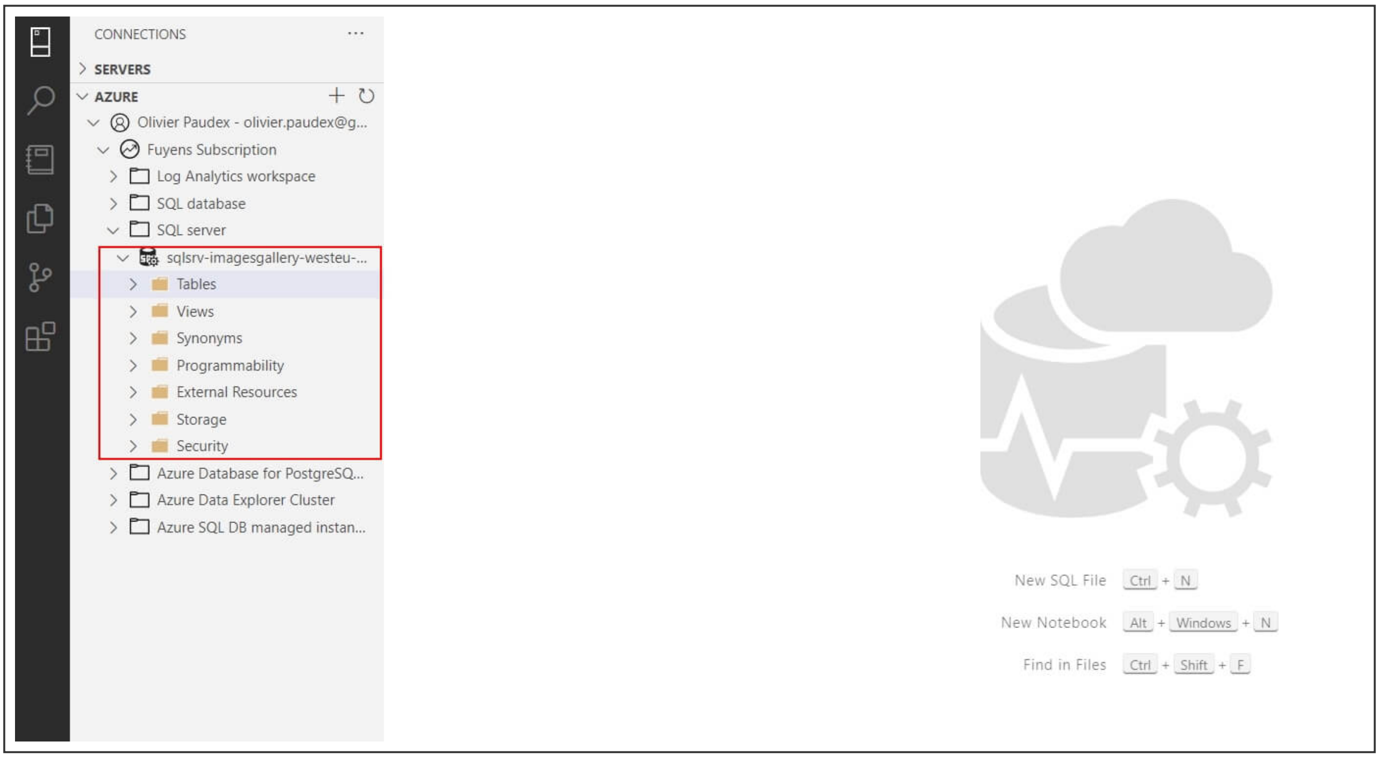
Networking : Show networking settings

Active Directory admin : Not configured

Server name : sqlsrv-imagesgallery-westeu-001.database.windows.net

The "Overview" tab and the server name

- Enter the connection information into **Azure Data Studio** and connect.
- Once the connection is active, we can see the server name and the folders attached to it.



CONNECTIONS
SERVERS
AZURE
Olivier Paudex - olivier.paudex@g...
Fuyens Subscription
Log Analytics workspace
SQL database
SQL server
sqlsrv-imagesgallery-westeu-...
Tables
Views
Synonyms
Programmability
External Resources
Storage
Security
Azure Database for PostgreSQ...
Azure Data Explorer Cluster
Azure SQL DB managed instan...
New SQL File Ctrl + N
New Notebook Alt + Windows + N
Find in Files Ctrl + Shift + F

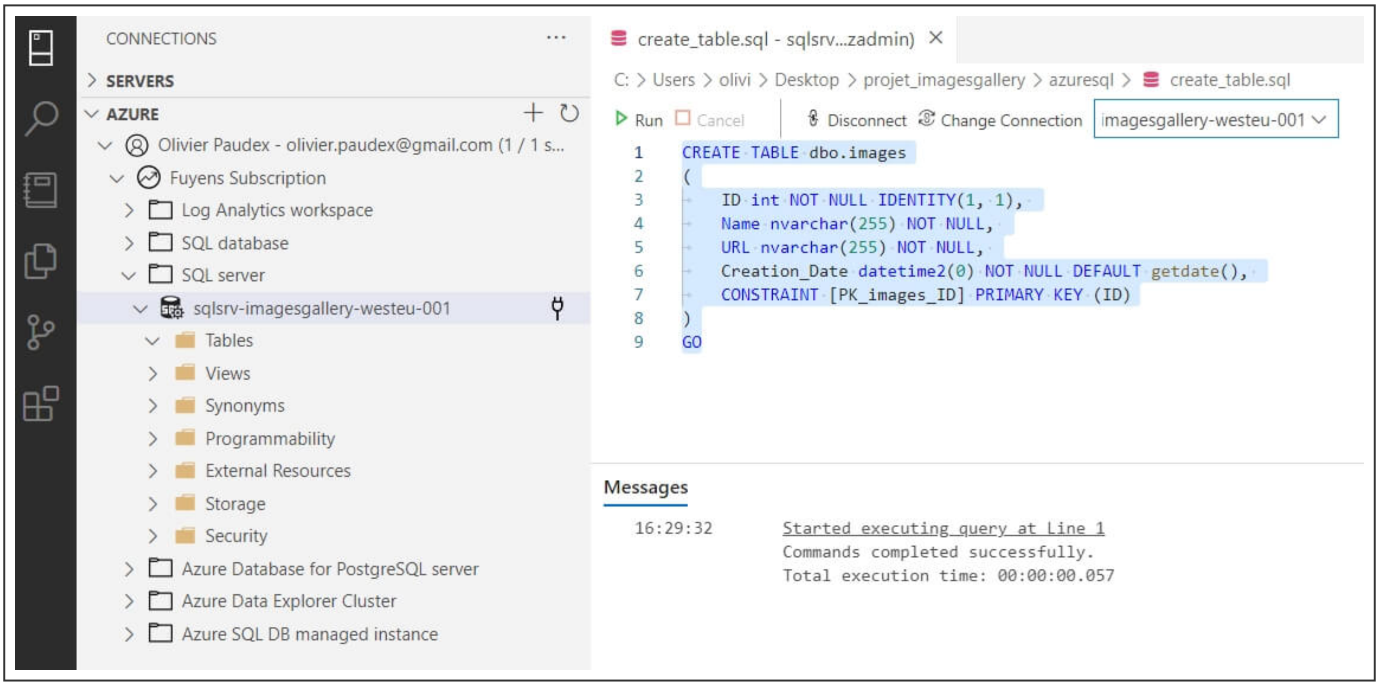
Azure Data Studio

Creating the database

- Copy and paste the small script below.

```
CREATE TABLE dbo.images
(
   ID int NOT NULL IDENTITY(1, 1),
   Name nvarchar(255) NOT NULL,
    URL nvarchar(255) NOT NULL,
   Creation_Date datetime2(0) NOT NULL DEFAULT getdate(),
   CONSTRAINT [PK_images_ID] PRIMARY KEY (ID)
)GO
```

- Save it to a file **"azure.sql"**.
- Return to Azure Data Studio and open the file.
- Accept the security caveats.
- Click **"Run"**.


CONNECTIONS
SERVERS
AZURE
Olivier Paudex - olivier.paudex@gmail.com (1 / 1 s...
Fuyens Subscription
Log Analytics workspace
SQL database
SQL server
sqlsrv-imagesgallery-westeu-001
Tables
Views
Synonyms
Programmability
External Resources
Storage
Security
Azure Database for PostgreSQL server
Azure Data Explorer Cluster
Azure SQL DB managed instance
create_table.sql - sqlsrv...zadmin)
C: > Users > olivi > Desktop > projet_imagesgallery > azuresql > create_table.sql
Run
Cancel
Disconnect
Change Connection
imagesgallery-westeu-001
Messages

```
CREATE TABLE dbo.images
(
    ID int NOT NULL IDENTITY(1, 1),
    Name nvarchar(255) NOT NULL,
    URL nvarchar(255) NOT NULL,
    Creation_Date datetime2(0) NOT NULL DEFAULT getdate(),
    CONSTRAINT [PK_images_ID] PRIMARY KEY (ID)
)
GO
```

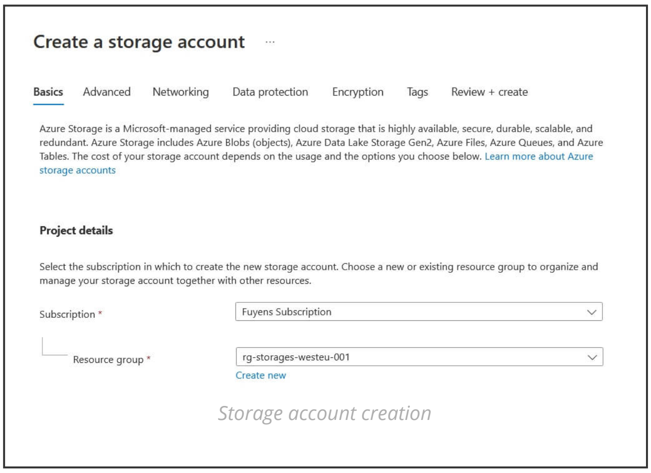
```
16:29:32        Started executing query at Line 1
                Commands completed successfully.
                Total execution time: 00:00:00.057
```

The database creation with Azure Data Studio

Storage

One of the first functions of the cloud is data storage. Again, storage in Azure is a service. No need to install a file server.

- Create a resource group for the storage.
- Create a storage account.
- Enter a name for the storage. The name must be **UNIQUE** to the world, with no capital letters and symbols.
- Select the **"Standard"** option.
- Select the **"LRS (Local Redundancy Storage)"** option.
- Accept all other options.
- Create the storage account.



Azure Storage is a Microsoft-managed service providing cloud storage that is highly available, secure, durable, scalable, and redundant. Azure Storage includes Azure Blobs (objects), Azure Data Lake Storage Gen2, Azure Files, Azure Queues, and Azure Tables. The cost of your storage account depends on the usage and the options you choose below. Learn more about Azure storage accounts

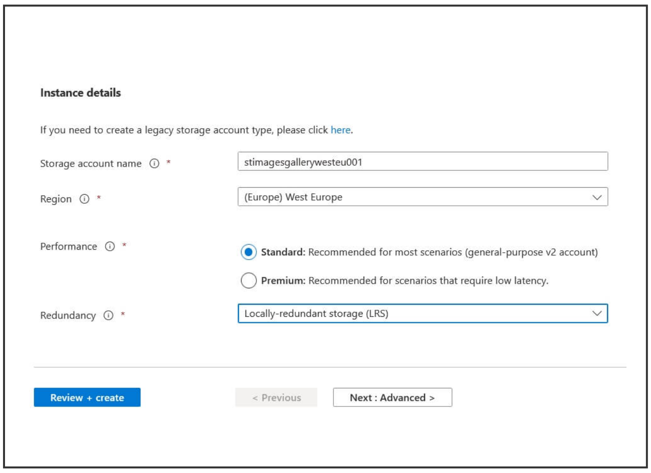
Project details

Select the subscription in which to create the new storage account. Choose a new or existing resource group to organize and manage your storage account together with other resources.

Subscription * Fuyens Subscription

Resource group * rg-storages-westeu-001

Storage account creation



Instance details

If you need to create a legacy storage account type, please click here.

Storage account name ⓘ * stimagesgallerywesteu001

Region ⓘ * (Europe) West Europe

Performance ⓘ *
● **Standard:** Recommended for most scenarios (general-purpose v2 account)
○ **Premium:** Recommended for scenarios that require low latency.

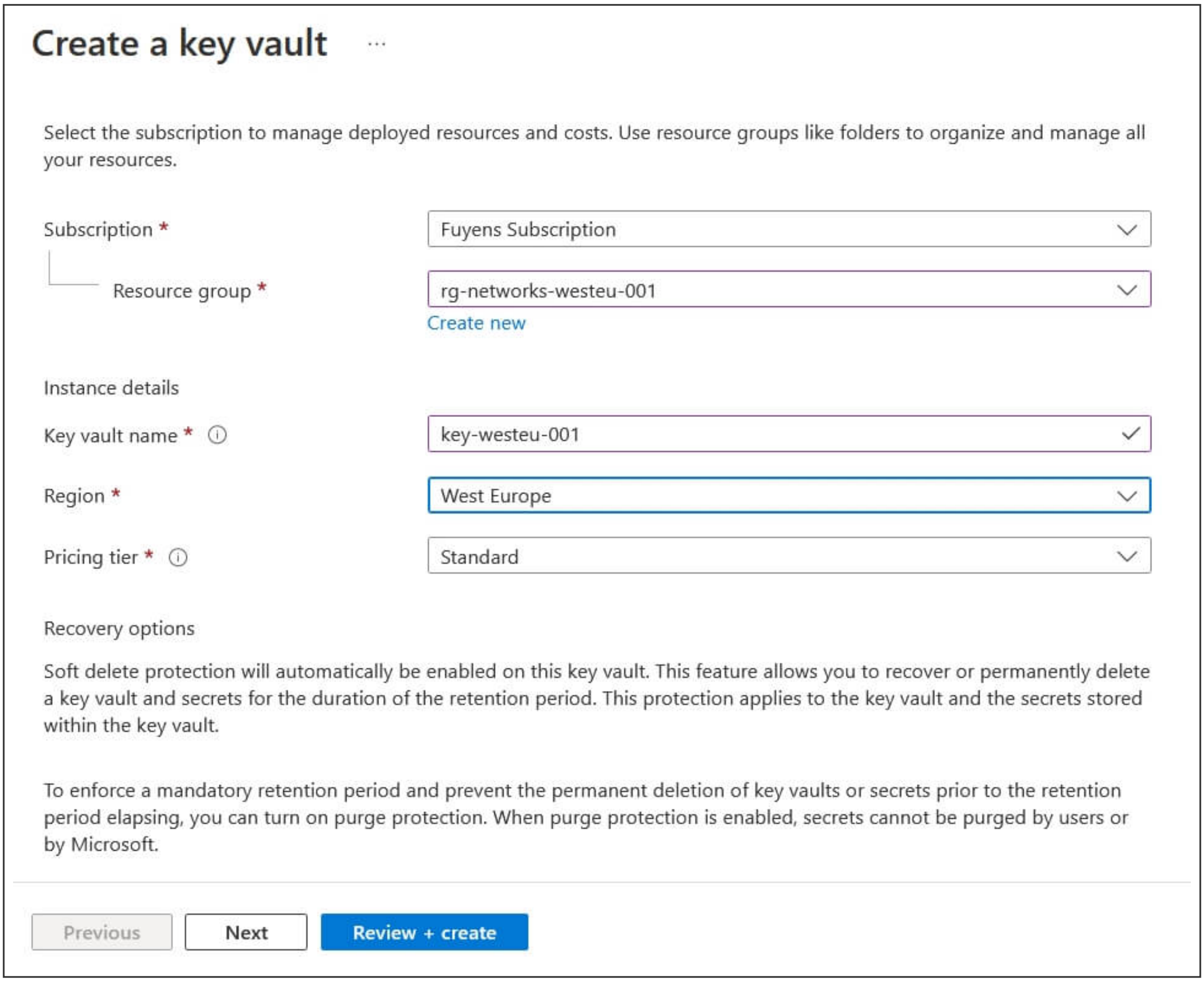
Redundancy ⓘ * Locally-redundant storage (LRS)

Storage account creation

The vault (keyvault)

The next service is the vault. This is the one that will hold the certificate and login passwords for the database and storage.

- Create a **"Key Vault"**.
- Select the network resource group.
- Name it **"key-westeu-001"**.
- Create the keyvault



Create a key vault

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Fuyens Subscription

Resource group * : rg-networks-westeu-001

Create new

Instance details

Key vault name * : key-westeu-001

Region * : West Europe

Pricing tier * : Standard

Recovery options

Soft delete protection will automatically be enabled on this key vault. This feature allows you to recover or permanently delete a key vault and secrets for the duration of the retention period. This protection applies to the key vault and the secrets stored within the key vault.

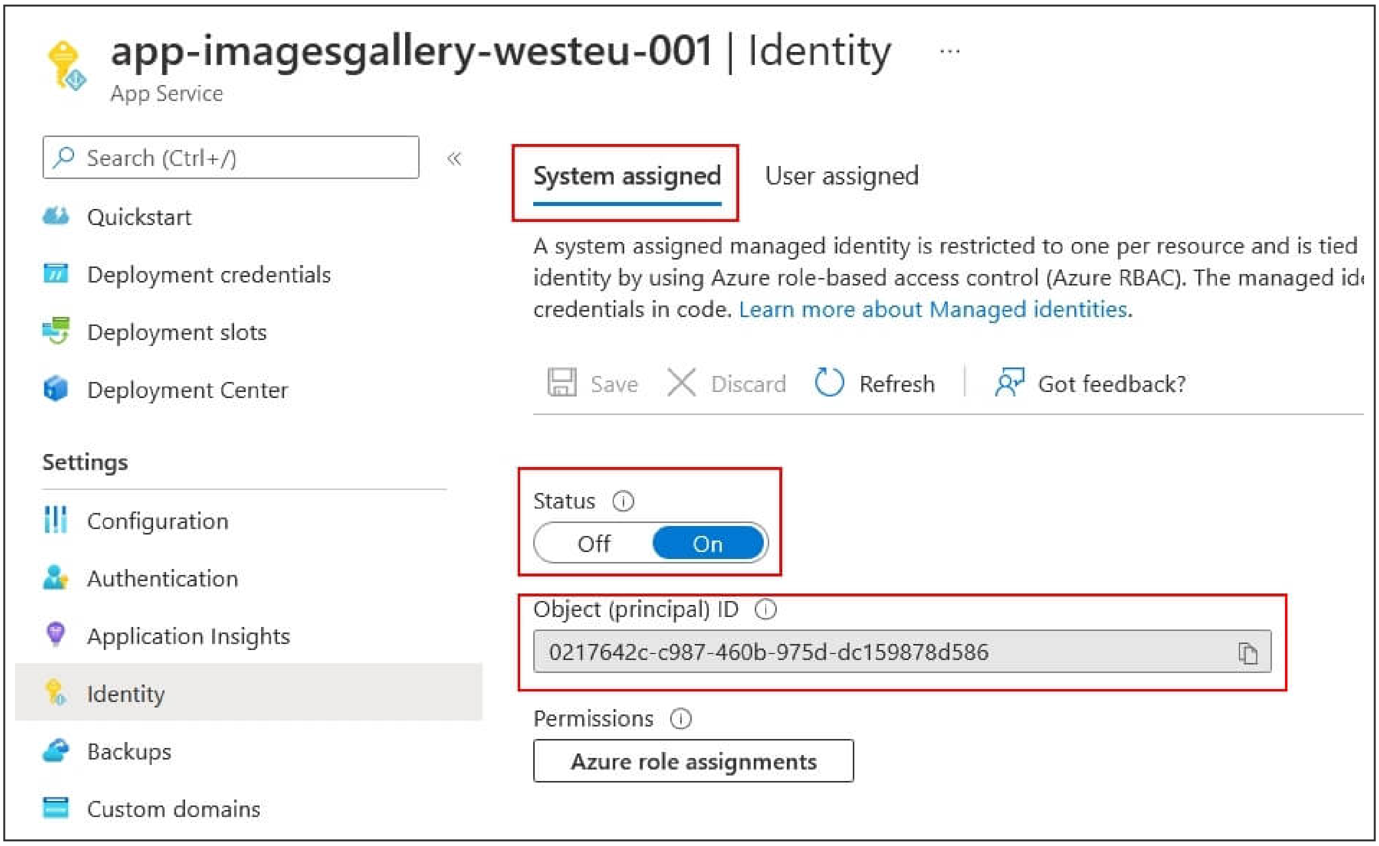
To enforce a mandatory retention period and prevent the permanent deletion of key vaults or secrets prior to the retention period elapsing, you can turn on purge protection. When purge protection is enabled, secrets cannot be purged by users or by Microsoft.

Vault creation

Configuring the keyvault

To access the keyvault, the various services must be registered in Azure AD.

- Return to the application (App Services).
- Click on the **"Identity"** tab.
- Create a **"managed identity"** of type **"system assigned"** for the application.
- Enable the service by dragging the button to **"On"**.
- Copy the object ID.



app-imagesgallery-westeu-001 | Identity ...

App Service

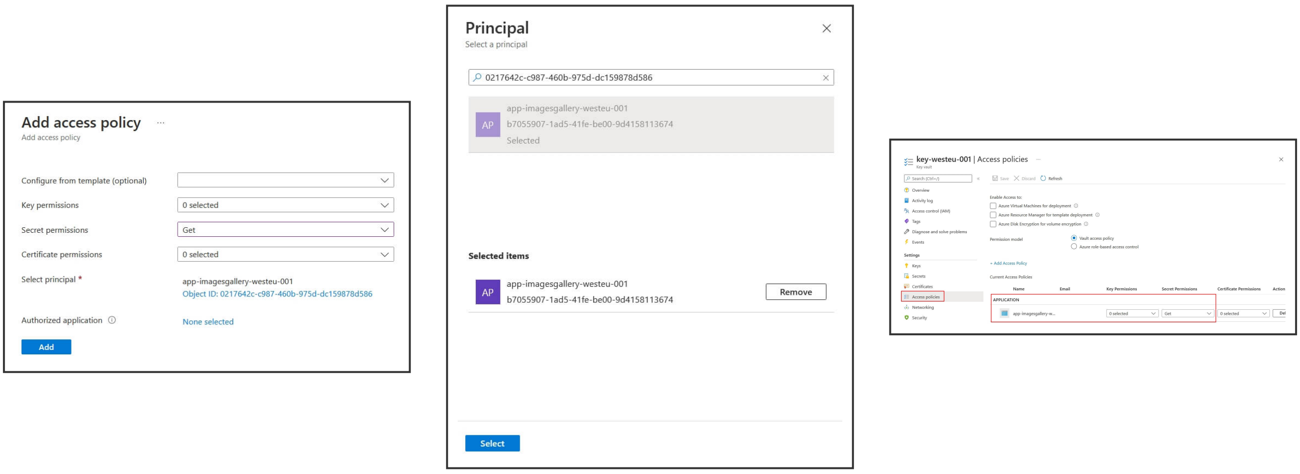
A system assigned managed identity is restricted to one per resource and is tied identity by using Azure role-based access control (Azure RBAC). The managed id credentials in code. Learn more about Managed identities.

Status: Off [✓ On]

Object (principal) ID: 0217642c-c987-460b-975d-dc159878d586

Application registration

- Go back to the keyvault.
- Click on the **"Access Policies"** tab.
- Click on **"Add Access policy"**.
- Select **"Get"** for the **"Secret permissions"**.
- Select **"Select Principal"**.
- Paste the application ID.
- Save.



Add access policy
Add access policy

Configure from template (optional)	
Key permissions	0 selected
Secret permissions	Get
Certificate permissions	0 selected
Select principal *	app-imagesgallery-westeu-001 Object ID: 0217642c-c987-460b-975d-dc159878d586
Authorized application	None selected

Principal
Select a principal

0217642c-c987-460b-975d-dc159878d586

AP app-imagesgallery-westeu-001
b7055907-1ad5-41fe-be00-9d4158113674
Selected

Selected items

AP app-imagesgallery-westeu-001
b7055907-1ad5-41fe-be00-9d4158113674

key-westeu-001 | Access policies
Key vault

Enable Access to:
□ Azure Virtual Machines for deployment
□ Azure Resource Manager for template deployment
□ Azure Disk Encryption for volume encryption

Permission model
● Vault access policy
○ Azure role-based access control

Current Access Policies

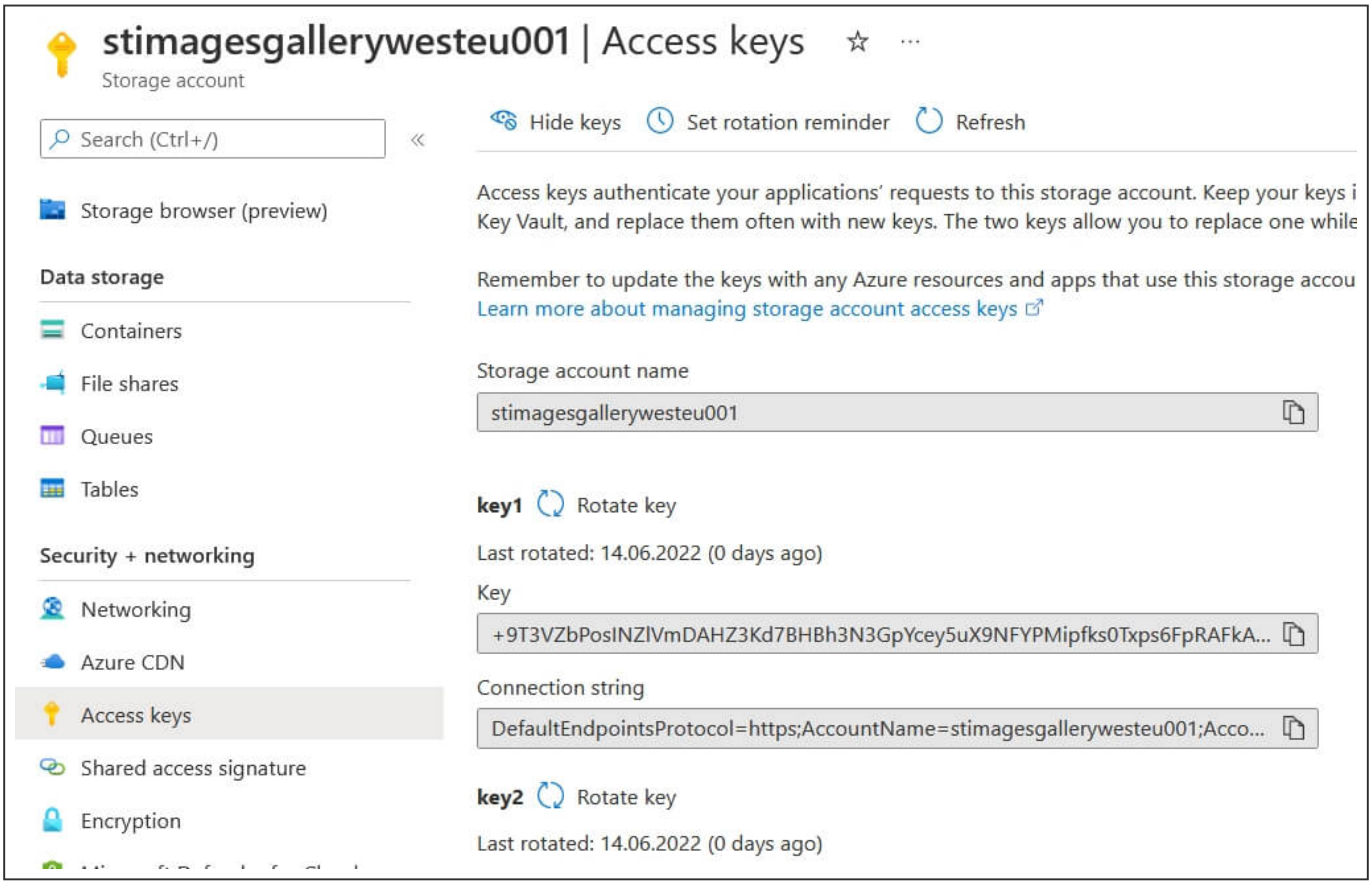
Name	Email	Key Permissions	Secret Permissions	Certificate Permissions	Action
APPLICATION					
app-imagesgallery-w...		0 selected	Get	0 selected	Del

Adding an access font for the application

The Secrets

We call **"secrets"**, a string of characters less than 10kb in length used as a password or other confidential items.

- Go back to the storage account.
- Click on the **"Access keys"** tab.
- View the keys by clicking on **"Show keys"** at the very top of the screen.
- Copy key number 1.



stimagesgallerywesteu001 | Access keys ☆ ···

Storage account

Search (Ctrl+/) «

Storage browser (preview)

Data storage

Containers

File shares

Queues

Tables

Security + networking

Networking

Azure CDN

Access keys

Shared access signature

Encryption

Hide keys Set rotation reminder Refresh

Access keys authenticate your applications' requests to this storage account. Keep your keys i
Key Vault, and replace them often with new keys. The two keys allow you to replace one while

Remember to update the keys with any Azure resources and apps that use this storage accou
Learn more about managing storage account access keys

Storage account name

stimagesgallerywesteu001

key1 Rotate key

Last rotated: 14.06.2022 (0 days ago)

Key

+9T3VZbPosINZlVmDAHZ3Kd7BHBh3N3GpYcey5uX9NFYPMipfks0Txps6FpRAFkA...

Connection string

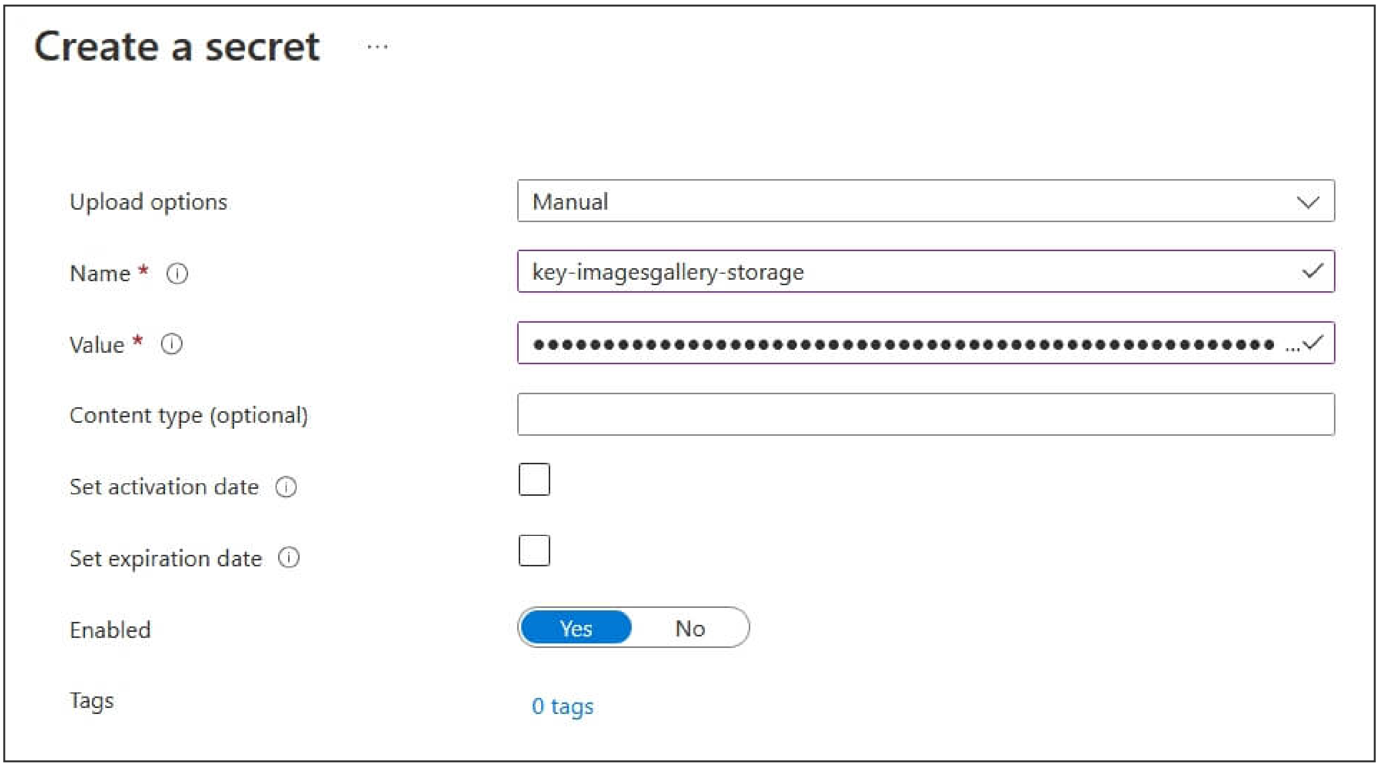
DefaultEndpointsProtocol=https;AccountName=stimagesgallerywesteu001;Acco...

key2 Rotate key

Last rotated: 14.06.2022 (0 days ago)

Storage account access keys

- Return to Keyvault.
- Create a secret for the storage account password.
- Name it **"key-imagesgallery-storage"**.
- Paste in key number 1.



Create a secret ···

Upload options: Manual

Name *: key-imagesgallery-storage

Value *: ••• ...

Content type (optional):

Set activation date: □

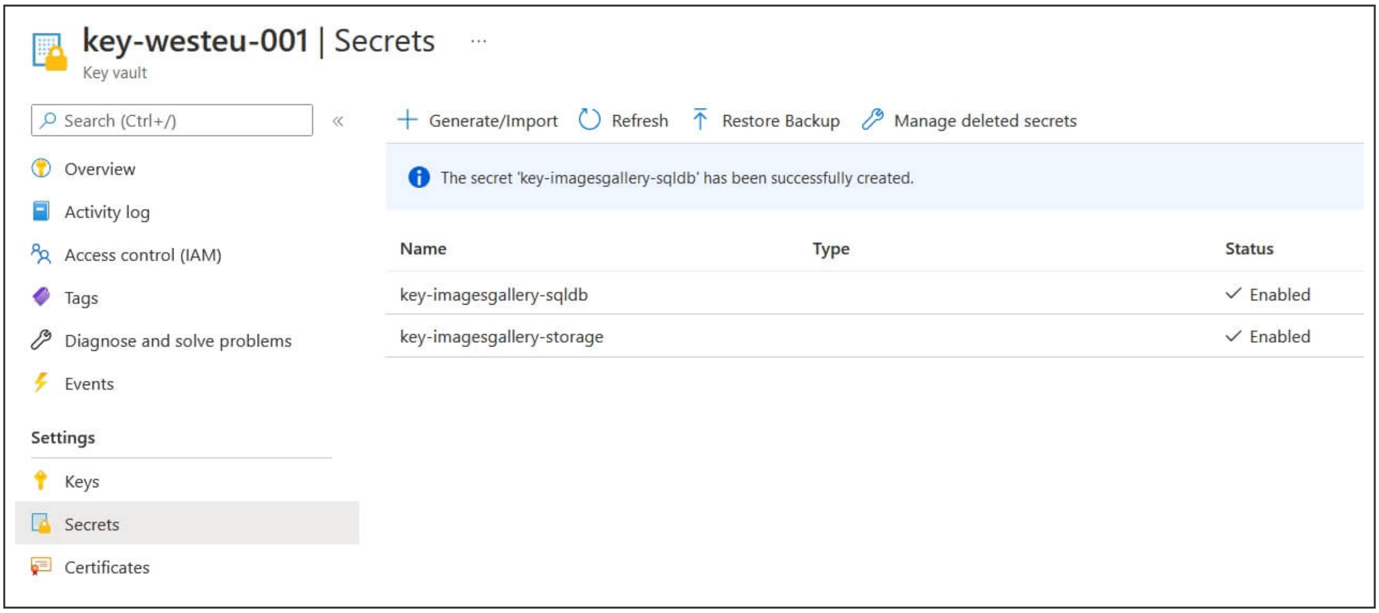
Set expiration date: □

Enabled: Yes / No

Tags: 0 tags

The secret of storage

- Start over for the database.
- Name it this time **“key-imagesgallery-sqldb”**.
- Paste in the SQL server password. If you forgot to write it down, you have the option of doing a password reset.

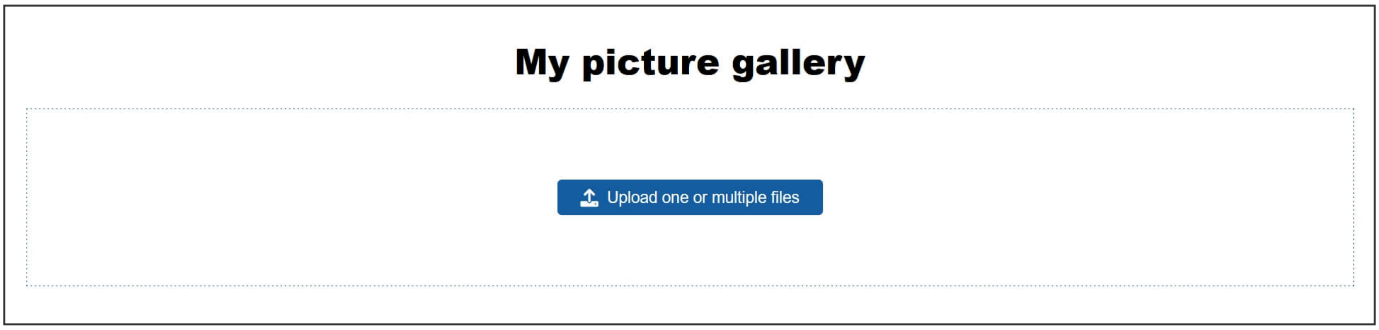


The secret 'key-imagesgallery-sqldb' has been successfully created.

Name	Type	Status
key-imagesgallery-sqldb		✓ Enabled
key-imagesgallery-storage		✓ Enabled

The Two Secrets of Infrastructure

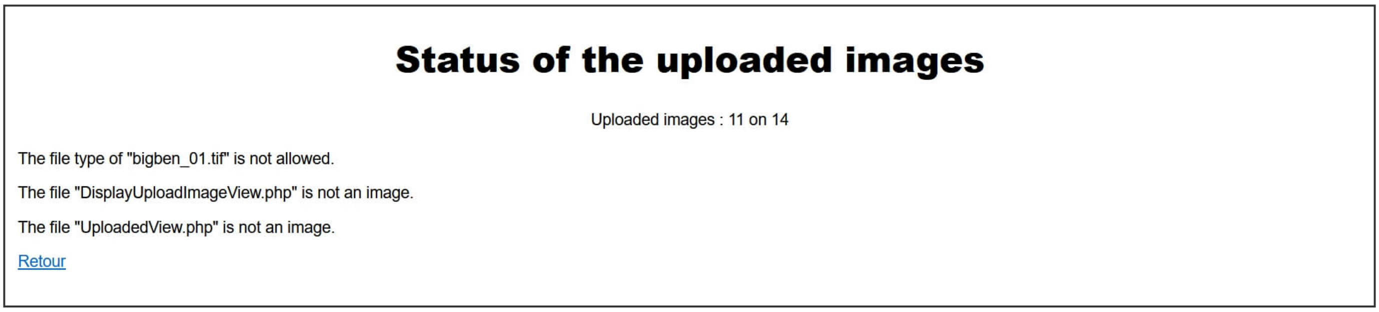
At this point, the application should work with the URL: **"https://[app name].azurewebsites.net/"**.



The application (without content)

- Try uploading images.

You should see the result of the upload. It shows the number of images uploaded, the total number of images as well as any errors that occurred.



Status of the uploaded images

Uploaded images : 11 on 14

The file type of "bigben_01.tif" is not allowed.

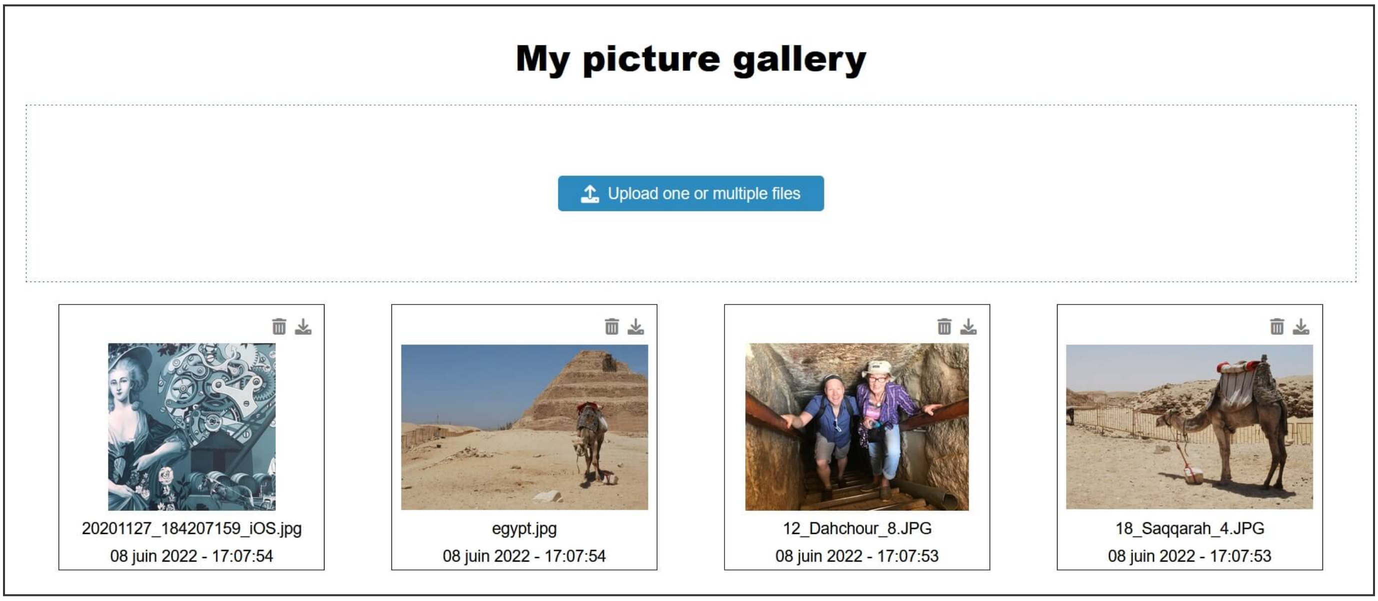
The file "DisplayUploadImageView.php" is not an image.

The file "UploadedView.php" is not an image.

Retour

The result of uploading images

- Click on the **"Go Back"** link and you will see the thumbnails of the images displayed.
- Then it is possible to download or delete the thumbnails by clicking on the trash can and/or download icon.



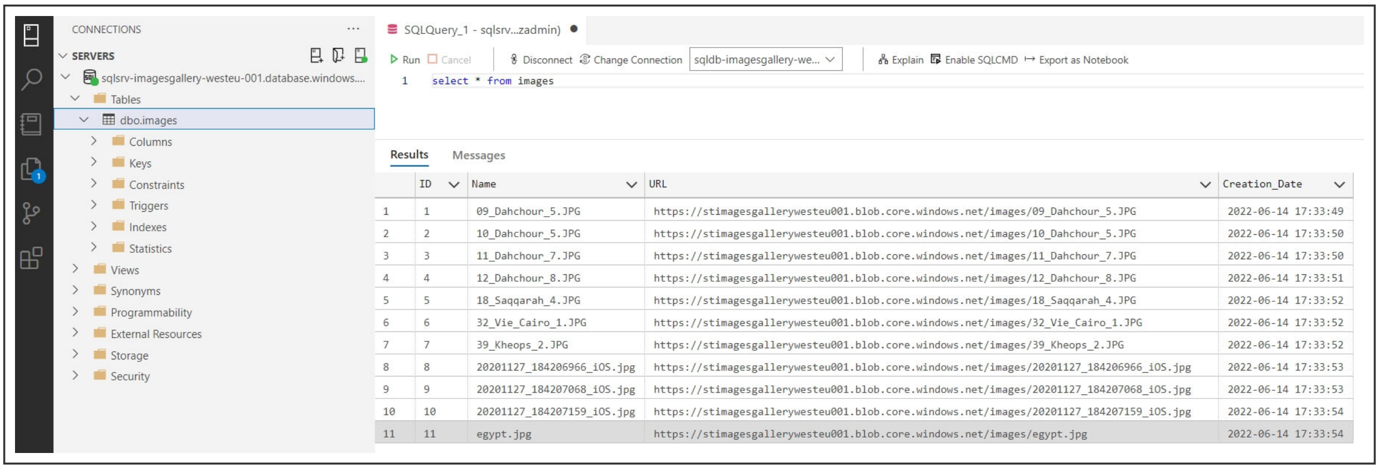
My picture gallery

The application (with content)

Content verification

The contents of the database can be viewed with **Azure Data Studio**.

- Connect to the database and run the SQL query **"Select * from images"**.
- Azure Data Studio does display the images contained in the application.



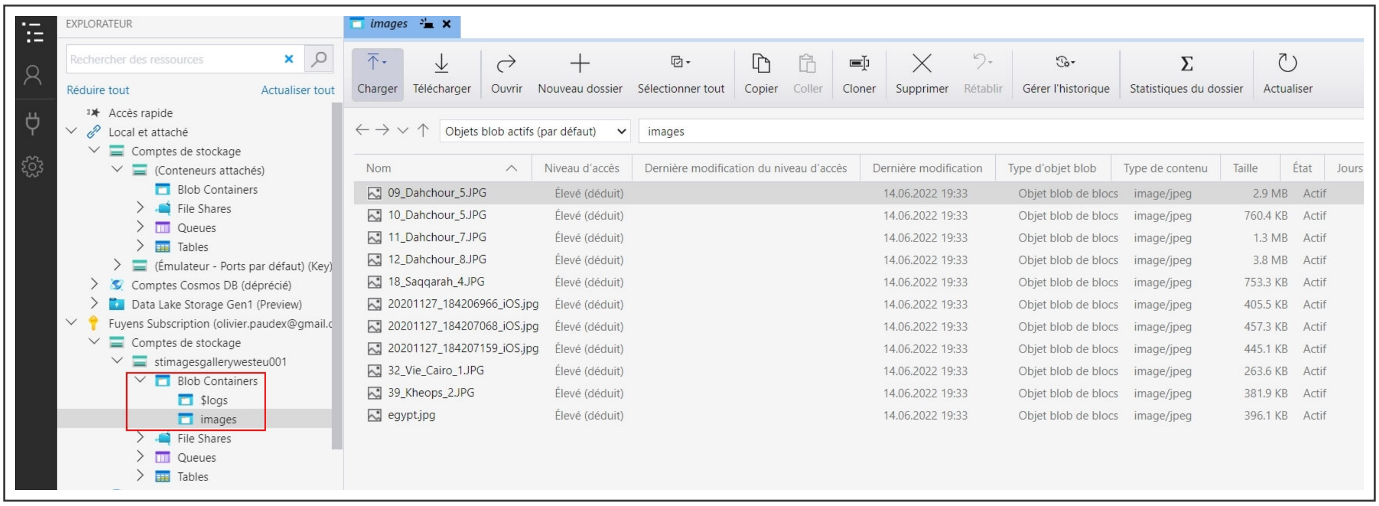
```sql
select * from images
```

	ID	Name	URL	Creation_Date
1	1	09_Dahchour_5.JPG	https://stimagesgallerywesteu001.blob.core.windows.net/images/09_Dahchour_5.JPG	2022-06-14 17:33:49
2	2	10_Dahchour_5.JPG	https://stimagesgallerywesteu001.blob.core.windows.net/images/10_Dahchour_5.JPG	2022-06-14 17:33:50
3	3	11_Dahchour_7.JPG	https://stimagesgallerywesteu001.blob.core.windows.net/images/11_Dahchour_7.JPG	2022-06-14 17:33:50
4	4	12_Dahchour_8.JPG	https://stimagesgallerywesteu001.blob.core.windows.net/images/12_Dahchour_8.JPG	2022-06-14 17:33:51
5	5	18_Saqqarah_4.JPG	https://stimagesgallerywesteu001.blob.core.windows.net/images/18_Saqqarah_4.JPG	2022-06-14 17:33:52
6	6	32_Vie_Cairo_1.JPG	https://stimagesgallerywesteu001.blob.core.windows.net/images/32_Vie_Cairo_1.JPG	2022-06-14 17:33:52
7	7	39_Kheops_2.JPG	https://stimagesgallerywesteu001.blob.core.windows.net/images/39_Kheops_2.JPG	2022-06-14 17:33:52
8	8	20201127_184206966_iOS.jpg	https://stimagesgallerywesteu001.blob.core.windows.net/images/20201127_184206966_iOS.jpg	2022-06-14 17:33:53
9	9	20201127_184207068_iOS.jpg	https://stimagesgallerywesteu001.blob.core.windows.net/images/20201127_184207068_iOS.jpg	2022-06-14 17:33:53
10	10	20201127_184207159_iOS.jpg	https://stimagesgallerywesteu001.blob.core.windows.net/images/20201127_184207159_iOS.jpg	2022-06-14 17:33:54
11	11	egypt.jpg	https://stimagesgallerywesteu001.blob.core.windows.net/images/egypt.jpg	2022-06-14 17:33:54

The database contents

Also, it is possible to check the content of the storage.

- Download [**Azure Storage Explorer**] and install it on your PC.
- Log in.



Nom	Niveau d'accès	Dernière modification du niveau d'accès	Dernière modification	Type d'objet blob	Type de contenu	Taille	État	Jours
09_Dahchour_5.JPG	Élevé (déduit)		14.06.2022 19:33	Objet blob de blocs	image/jpeg	2.9 MB	Actif	
10_Dahchour_5.JPG	Élevé (déduit)		14.06.2022 19:33	Objet blob de blocs	image/jpeg	760.4 KB	Actif	
11_Dahchour_7.JPG	Élevé (déduit)		14.06.2022 19:33	Objet blob de blocs	image/jpeg	1.3 MB	Actif	
12_Dahchour_8.JPG	Élevé (déduit)		14.06.2022 19:33	Objet blob de blocs	image/jpeg	3.8 MB	Actif	
18_Saqqarah_4.JPG	Élevé (déduit)		14.06.2022 19:33	Objet blob de blocs	image/jpeg	753.3 KB	Actif	
20201127_184206966_iOS.jpg	Élevé (déduit)		14.06.2022 19:33	Objet blob de blocs	image/jpeg	405.5 KB	Actif	
20201127_184207068_iOS.jpg	Élevé (déduit)		14.06.2022 19:33	Objet blob de blocs	image/jpeg	457.3 KB	Actif	
20201127_184207159_iOS.jpg	Élevé (déduit)		14.06.2022 19:33	Objet blob de blocs	image/jpeg	445.1 KB	Actif	
32_Vie_Cairo_1.JPG	Élevé (déduit)		14.06.2022 19:33	Objet blob de blocs	image/jpeg	263.6 KB	Actif	
39_Kheops_2.JPG	Élevé (déduit)		14.06.2022 19:33	Objet blob de blocs	image/jpeg	381.9 KB	Actif	
egypt.jpg	Élevé (déduit)		14.06.2022 19:33	Objet blob de blocs	image/jpeg	396.1 KB	Actif	

The contents of the images container

The application will automatically create a **“blob container”** called images. This one contains our images.

Here we go, the application works and that’s already not bad. But there is still room for improvement.

Conclusion

This chapter has covered the registry in which the container was dropped, as well as the various services used for this application such as storage, database, and vault.

Finally, it is also about two of the indispensable tools when it comes to using storage and database services.

- Azure Data Studio
- Azure Storage Explorer

The next chapter will focus on the security of the application and on the Azure cloud in general.