

# Infrastructure preparation

## BC Cloud on Azure Virtual Machine

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Revision 1.2

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# 1 About BI4Dynamics BC Cloud installation

## 1.1 Infrastructure and application installations

BI4Dynamics SaaS installation comes in two steps:

### 1.1.1 Infrastructure part: installation of Azure Virtual Machine

Azure resources must be prepared ahead of BI4Dynamics application installation. Installation is focused on creation and setting of Azure Virtual Machine.

### 1.1.2 Application part: installation of BI4Dynamics application

**BI4Dynamics application on VM is very similar to** on-premises installation. Here is the link to installation documentation: <https://www.bi4dynamics.com/documents/>

## 1.2 Installation of Azure VM

This document will guide you through installation of Azure VM and resources needed to run BI4Dynamics Cloud.

### 1.2.1 Installation documentation from Microsoft

Microsoft documentation **How to use the Azure portal to provision a Windows virtual machine with SQL Server** has more details that needed in BI4Dynamics process:

<https://docs.microsoft.com/en-us/azure/azure-sql/virtual-machines/windows/create-sql-vm-portal#4-configure-sql-server-settings>

You do not need to use this documentation if you follow BI4Dynamics installation described in below.

### 1.2.2 Prerequisites

- User must be **administrator** and **App Dev** in Azure portal with active **Azure subscription**.
- User must have **EXTEND.MGT. - ADMIN** and **SUPER** permissions set in Business Central (**D365 EXTENSION MGT** prior to Business Central 2021).

### 1.2.3 Deliverables

- ✓ SQL Virtual Machine with PolyBase and some Azure modules to host BI4Dynamics data warehouse
- ✓ Blob Storage Account with Container to store data exported from BC

### 1.2.4 Expected installation time

First time user:



**60 minutes**

Installation step	Time (min)
Creating Virtual Machine,	15
Setting up Virtual Machine	30
Blob Storage and Container instance	15
Total time	60

Deployment time of Azure resources may vary 50% (no rule in respect of daytime or region).

## 2 Create Azure SQL Virtual Machine

### 2.1 Create Azure SQL



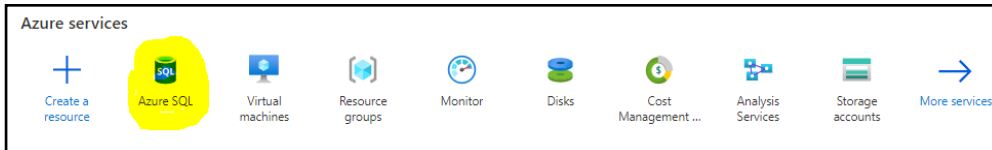
15 minutes

#### 2.1.1 Login to azure portal

Login to Azure portal: <https://portal.azure.com/#home>

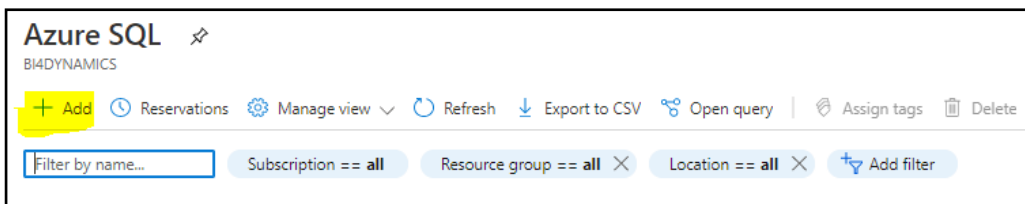
#### 2.1.2 Create VM as Azure SQL Service

##### Select Azure SQL

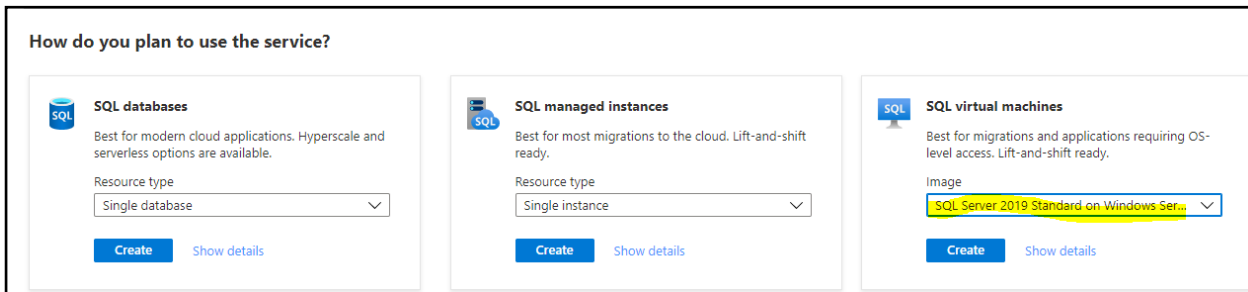


Do not use Virtual machine ikon, as that will install VM without SQL server pre-installed and would require SQL server installation separately. Use Azure SQL option, that is VM with SQL server preinstalled.

##### Click Add



##### Select SQL Server 2019 Standard on Windows Server



##### Click Create

Settings start on **Basic** tab:

- Create or select **Resource Group**.
- Set virtual machine **Name** and **Region**.

**Create a virtual machine**

Basics | Disks | Networking | Management | Advanced | SQL Server settings | Tags | Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

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

Subscription \*

Resource group \*  [Create new](#)

**Instance details**

Virtual machine name \*

Region \*

Availability options

Image \*  [See all images](#)

Azure Spot instance

Size \*  [See all sizes](#)

- Select **Size** that will support your data load (a new window will open for this selection):

Search by VM size... | Display cost: Monthly | vCPUs: 2 | RAM (GiB): 8 | Add filter

Showing 13 of 408 VM sizes | Subscription: Pay-As-You-Go | Region: West Europe | Current size: Standard\_B2ms | Image: SQL Server 2019 Standard on Windows Server 2019 | [Learn more about VM sizes](#)

VM Size	Family	vCPUs	RAM (GiB)	Data disks	Max IOPS	Temp storage (GiB)
Most used by Azure users						
The most used sizes by users in Azure						
D2s_v3	General purpose	2	8	4	3200	16
B2ms	General purpose	2	8	4	1920	16
D-Series v4						
The latest generation D family sizes recommended for your general purpose needs						
D2as_v4	General purpose	2	8	4	3200	16
D2ds_v4	General purpose	2	8	4	3200	75
D2s_v4	General purpose	2	8	4	3200	0
B-Series						
Ideal for workloads that do not need continuous full CPU performance						
B2ms	General purpose	2	8	4	1920	16
D-Series v3						
The 3rd generation D family sizes for your general purpose needs						

- Click **Select**
- Enter **Administrator account**: this is a new account; you cannot use any existing AD, AAD or other account.

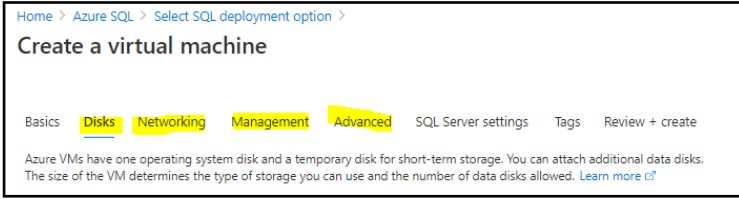
**Administrator account**

Username \*

Password \*

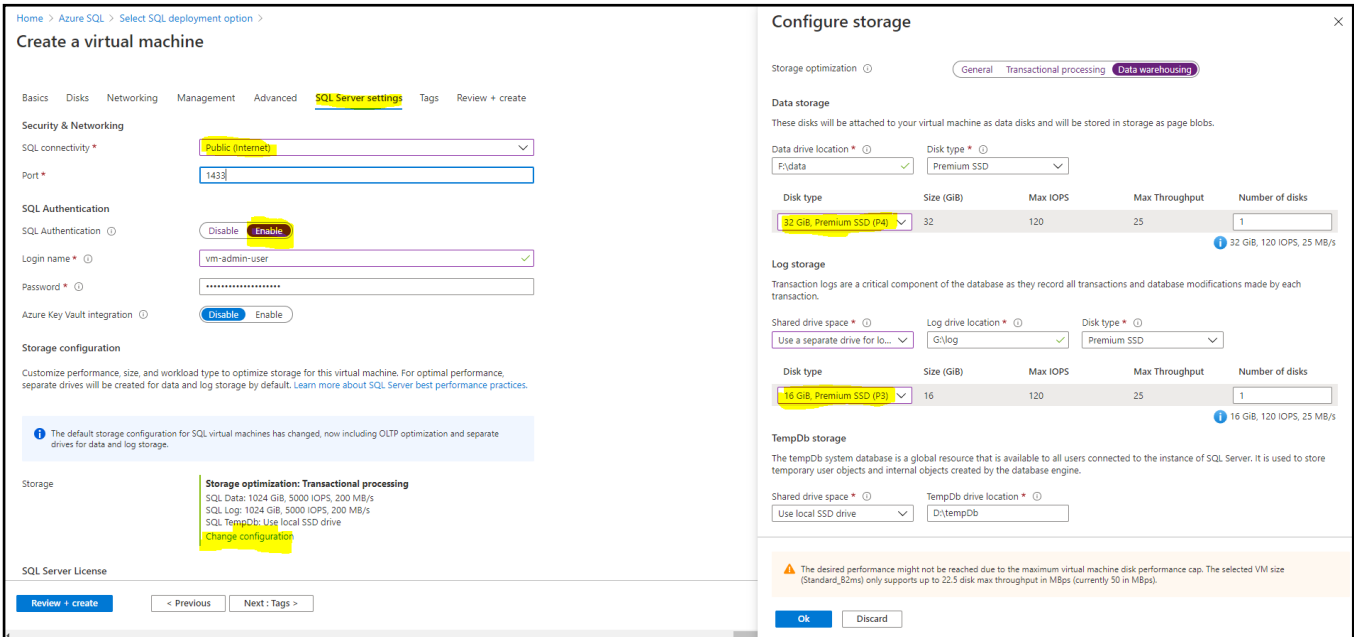
Confirm password \*

Leave default values on **Disks, Networking, Management, Advanced** or change it according to your needs.



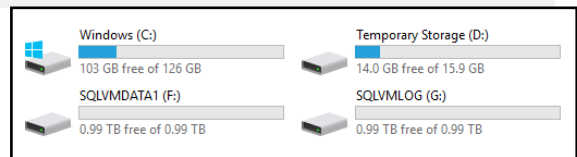
Click on **SQL Server Settings** tab

- **SQL Connectivity** select **Public (Internet)**
- **SQL Authentication** select **Enable** (default Login name and password from VM is populated automatically)
- Under storage section click **Change configuration** and select the setup (separate or shared) configuration and size of your SQL data disks.



Default VM disk configuration comes with 4 disks:

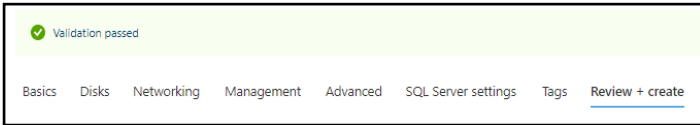
- C: 128 GB for **operating system** (default option in VM SKU)
- D: 16 GB for **temporary files** (default option in VM SKU)
- F: 1 TB for **SQL data** (default option in VM SQL installation)
- G: 1 TB for **SQL log** (default option in VM SQL installation)



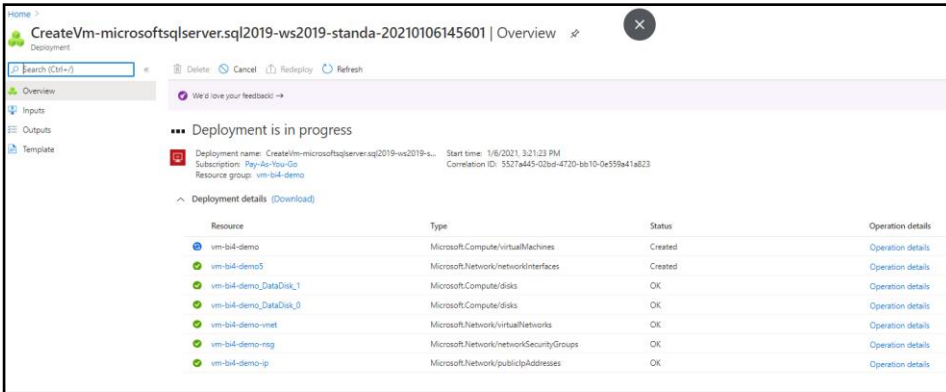
Default disk configuration for 2 data disks are SSD Premium disks, 1 TB each. **Check which disk type you need.** It may happen that the costs of default VM SQL data disks are higher than the cost of provisioned core VM with SQL server.

Click on **Tags** and leave default values (or change it according to your needs)

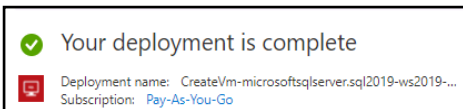
Click on **Review + create** to validate the settings



Click **Create** to create your VM (deployment will take 5-10 minutes, depends on geo location and time):



With this step we have created a VM.



In next steps we will configure VM.

You have successfully created VM.

## 2.2 Configure Virtual Machine



### 2.2.1 Set public IP and DNS name

Go to resource Virtual Machine and click **Configure** in DNS name:

Enter **DNS name label** (hint: name can be same as virtual machine name).

Click on **Save**

### 2.2.2 Setup RDP connection

Click on **Connect** button on header toolbar

and select **RDP** and **Download RDP File**.

You have downloaded RDP file to download folder. File name is the VM name.

You have successfully created and configured VM.



### 3 Setup Virtual Machine

We have created a VM in previous step. Now we continue with settings and adding resources to VM.

#### 3.1 Connect to Virtual Machine.

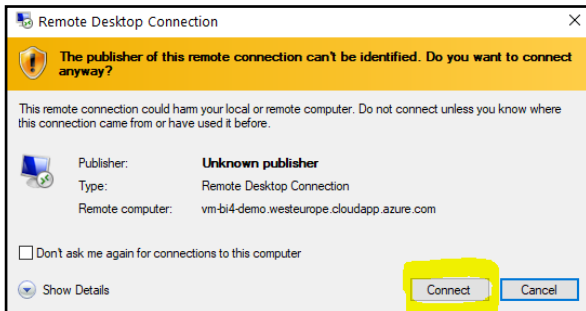


2 minutes

Click on **RDP file** that you have saved to download folder in previous steps

Name	Date modified	Type	Size
vm-bi4-demo.rdp	06/01/2021 16:04	Remote Desktop Connection	1 KB

and click **Connect**:

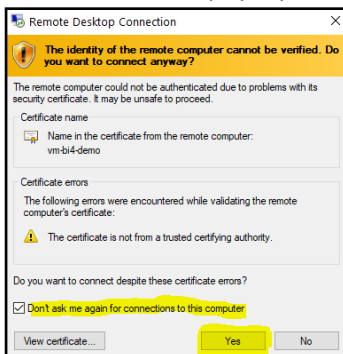


Enter administrator account credential that you have entered for this VM. Login does not require domain therefore start the name with \ followed by the **Name**.



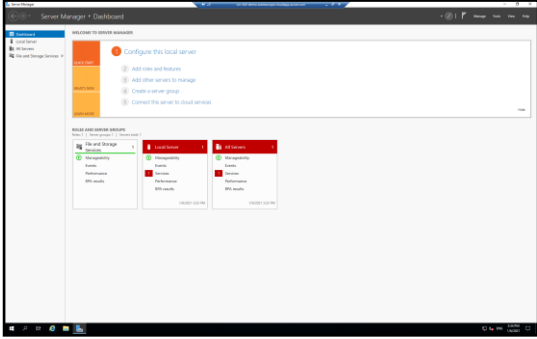
Click **OK**

This window will pop-up. Check **Don't ask me again for connect to this computer**.



and click **Yes** to connect.

Now you should be connected to VM with RDP. Your screen should look like this:

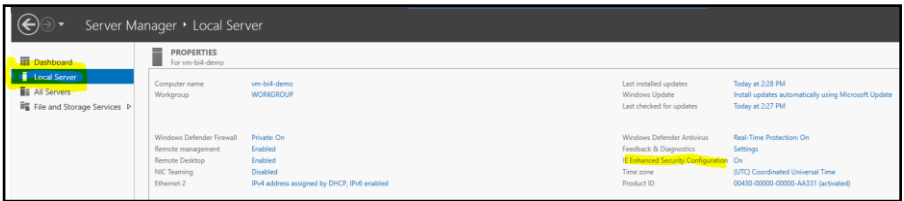


Server Manager is started automatically.

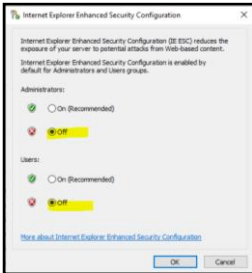
You are connected to VM by using RDP access.

### 3.2 Set security configuration

If Server Manager is not open, enter **Server Manager** in Windows search to start Server Manager. Select row **Local Server** and click on the **IE Enhanced Security Configuration**.



New pop-up window will open. Set both options to **Off** and confirm the selection by clicking **OK**.

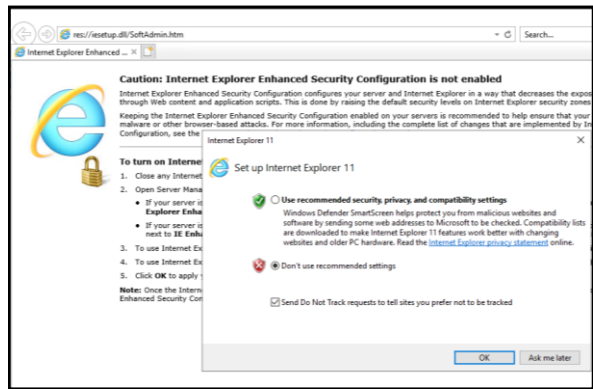


Run Internet explorer from Taskbar



and pop-up window will open:

- Select **Don't use recommended Settings**
- Keep option **"Send Do Not track"** checked.
- Confirm **OK**.



## 3.3 Install Azure CLI

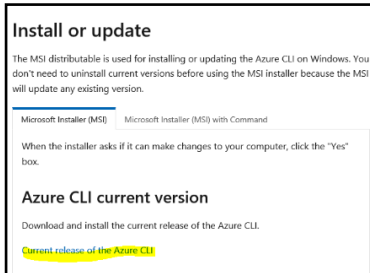


### 3.3.1 About CLI

The **Azure command-line interface (Azure CLI)** is a set of commands used to create and manage **Azure** resources. The **Azure CLI** is available across **Azure** services and is designed to get you working quickly with **Azure**, with an emphasis on automation.

### 3.3.2 Install CLI

Go to <https://docs.microsoft.com/en-us/cli/azure/install-azure-cli-windows?view=azure-cli-latest&tabs=azure-cli> and install Azure CLI.





## 3.4 Download auxiliary installation files



### 3.4.1 Run Loopback script

Here is the link to auxiliary installation files: <https://www.bi4dynamics.com/dl/azure/VM.zip>. There are 2 files:

1. **Enable PolyBase script:** SQL script that will enable PolyBase feature.
2. **Loopback script:** this script will enable access to SQL server on VM from resource outside of VM. We will be using Docker to interface with SQL server.

 enable_polybase	12/1/2020 12:40 PM	Microsoft SQL Ser...	1 KB
 loopback	11/30/2020 11:34 ...	Registration Entries	1 KB

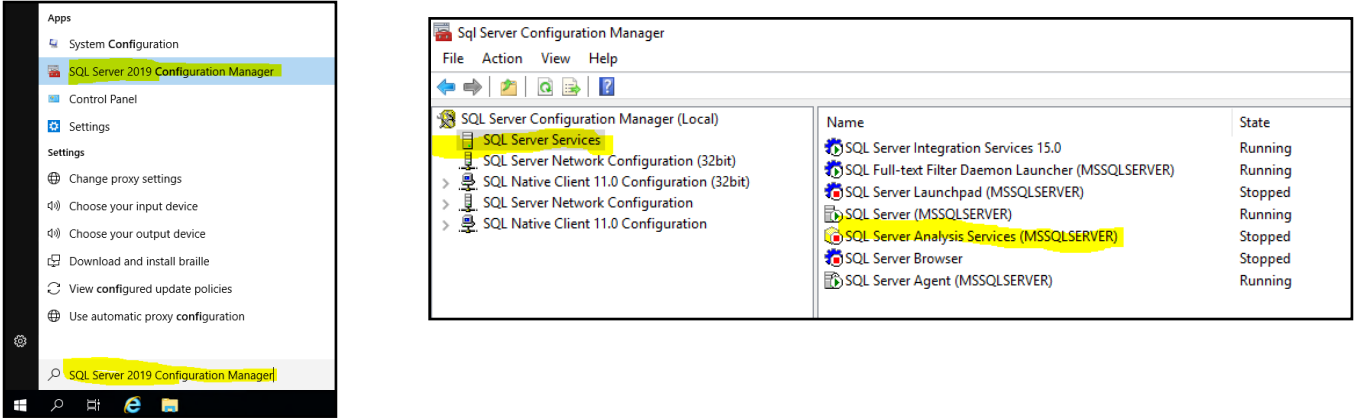
Run (double click) **loopback.reg** file. It will finish immediately.

### 3.5 Setup SQL server Analysis Services



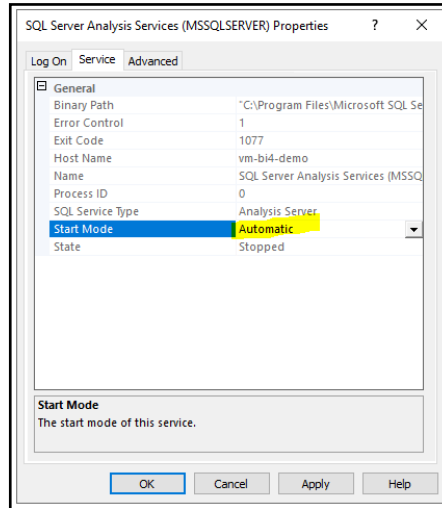
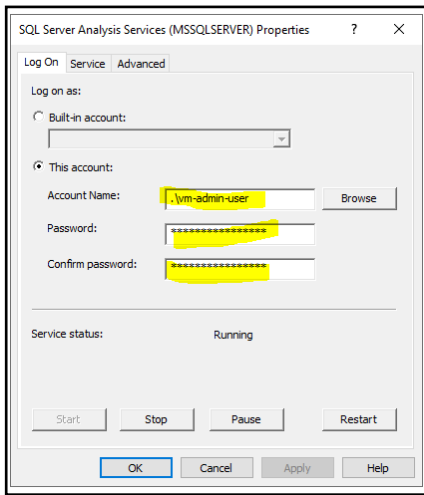
SQL server Analysis Services is by default running as services. We need to change it to user (administrator that we created).

Go to **SQL Server 2019 Configuration Manager** and go to **SQL Server Services** menu:



Change Log-on Account for **SQL Server Analysis Services** to VM admin account:

Set start mode to **Automatic**:



And **Start** the service.

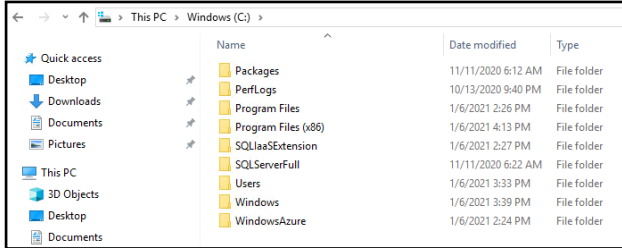
### 3.6 Install PolyBase



#### 3.6.1 Install PolyBase SQL feature

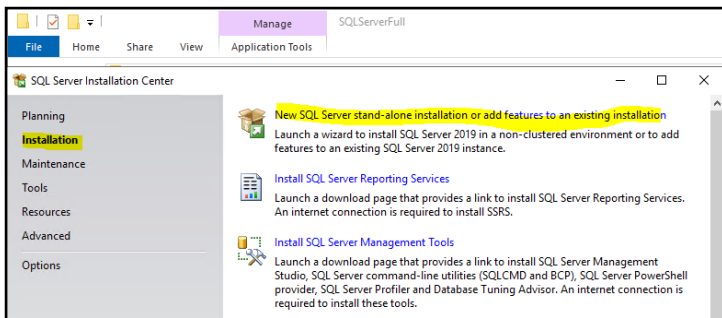
Every VM machine with SQL server has folder containing SQL installation files

C:\SQLServerFull\

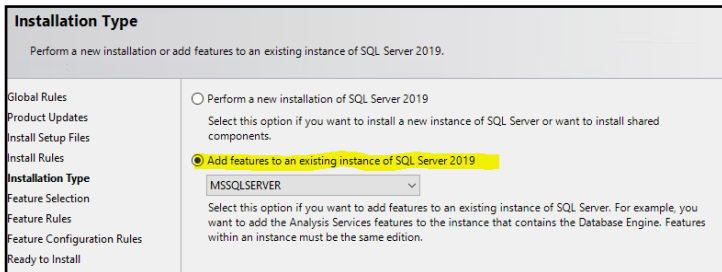


Run C:\SQLServerFull\setup.exe

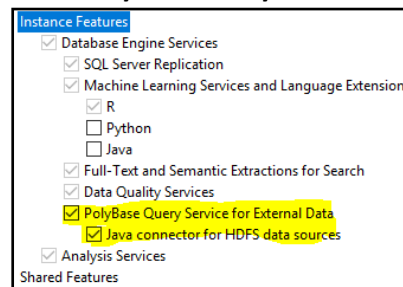
Select Installation and New SQL Server stand-alone installation or add features to existing installation.



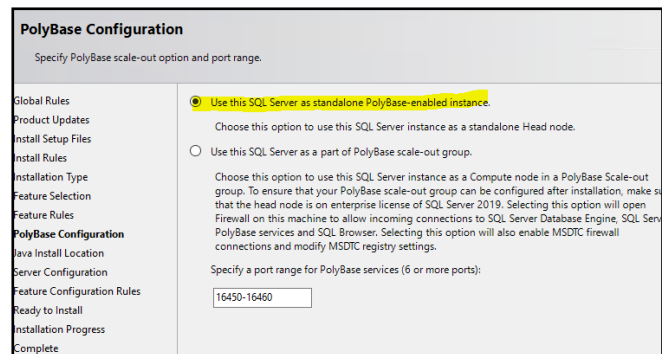
Select Add features to an existing instance



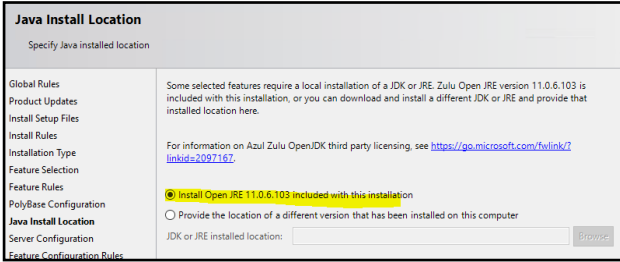
Select PolyBase Query Service and Java connector



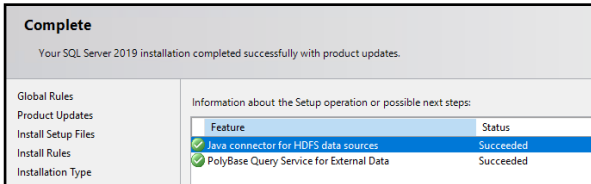
Select Use this SQL Server as standalone ...



Keep the option **Install open JRE** selected.



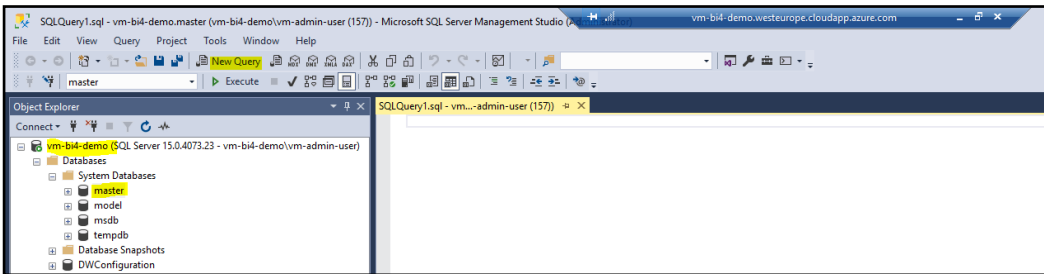
Follow the next steps to finish the installation and **Install** newly selected features. It will take 4 minutes.



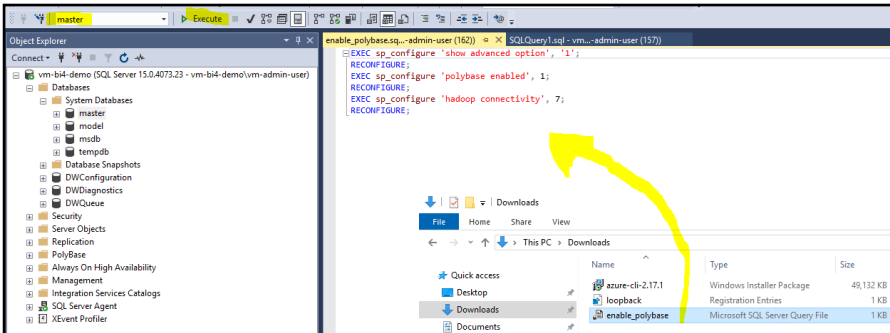
**Restart** SQL server database engine from the Configuration Manager.

### 3.6.2 Enable PolyBase

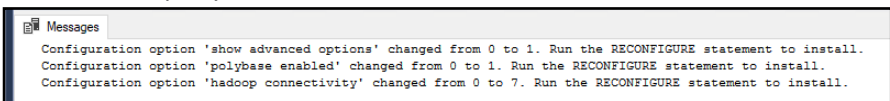
Connect to VM and **open SSMS** (SQL Server Management Studio), **connect** to SQL server instance, select **master** database in System Databases and create **New query**:



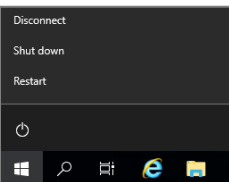
Open **enable\_polybase.sql** file provided with by BI4Dynamics in master database connection



and **Execute** query on master database.



After enabling PolyBase, close the window and **Restart** VM from Taskbar:



You have successfully installed and enabled PolyBase.

### 3.7 Install Azure modules

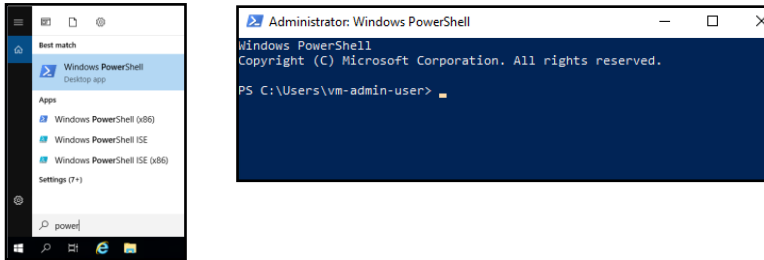


3 minutes

In this step we will add Azure modules that are needed for Azure authentication and registration. These are official Microsoft modules available on the internet.

Process requires installation of **NuGet** provider, that will manage the packages. Download and installation is done by **PowerShell**.

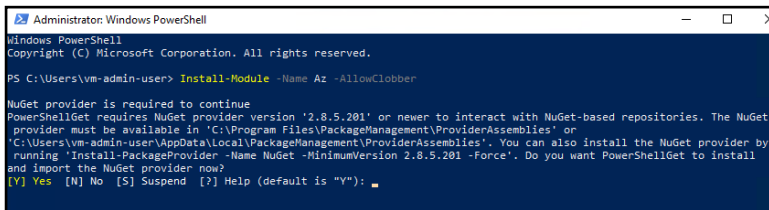
By typing windows search **power** open **PowerShell**, a desktop application:



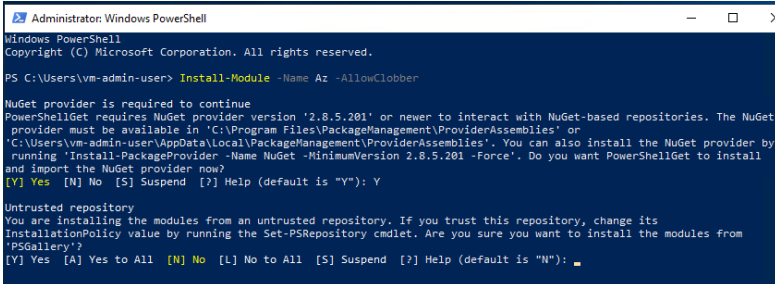
Run command (copy exact text): **Install-Module -Name Az -AllowClobber**

This message will display. Confirm **"Y"**

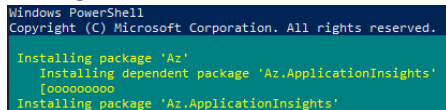
Process will need few minutes to complete...



Another message will display. Confirm **"Y"**



During 2-minute installation, this window will be displayed:



Run command (copy exact text): **Install-Module "AzureAD"**

Confirm **"Y"** to install the package and close PowerShell.

You have successfully installed Azure VM with required resources.  
This ends Azure SQL Virtual Machine installation.



## 4 Create other Azure resources

We will create:

1. **Blob Storage** in **Storage Account** with **Storage Containers** to store data in Azure Data Lake
  2. **Container Instance**, named **Docker Container**, a self-contained Azure resource that acts like virtual machine
- Container** name is used as **Storage Container** and **Docker Container**, this to someone new, may be confusing.

### 4.1 Create Blob Storage

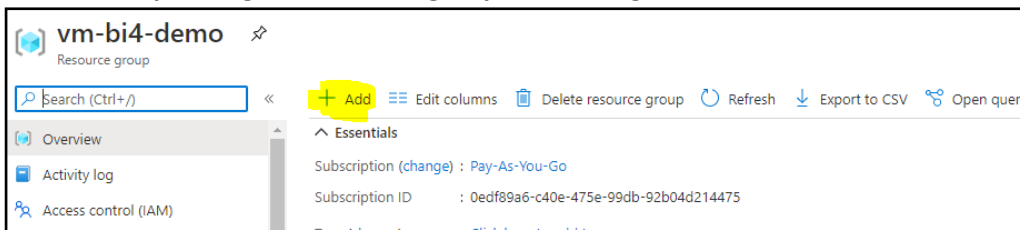
Blob storage will keep BC and application data.



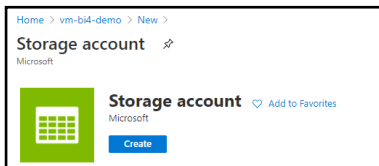
2 minutes

#### 4.1.1 Create storage account

Go to **Azure portal**, go to **Resource group** that belongs to Virtual Machine, click **Add**



Enter **Storage Account** into search window, click on **Create**



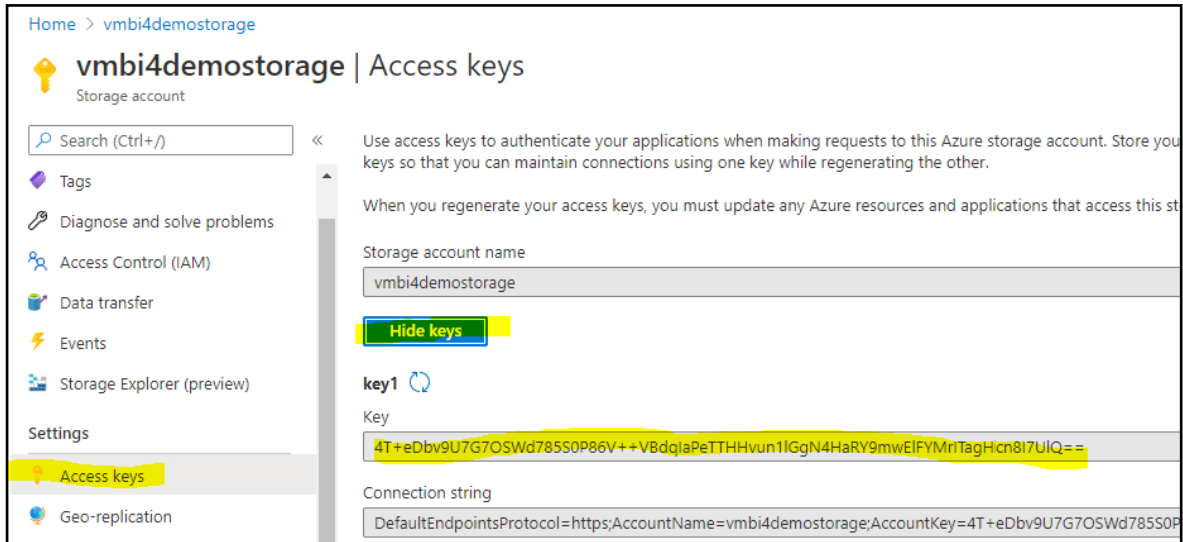
Add **Storage account name**, select the same **Location** as VM and change **Replication** to LRS.

Keep other tab option default.

Click **Review and Create**. (Finish in 20- 30 seconds)

Go to **Storage Account**, select **Access Key**, select **Show keys**

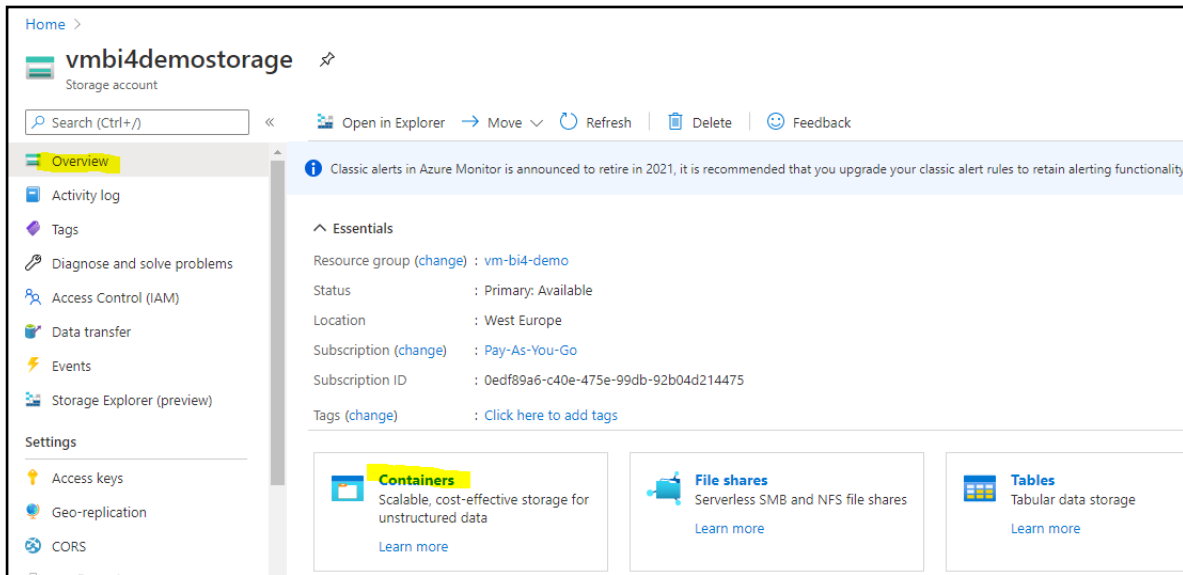
**Copy the content of the key**



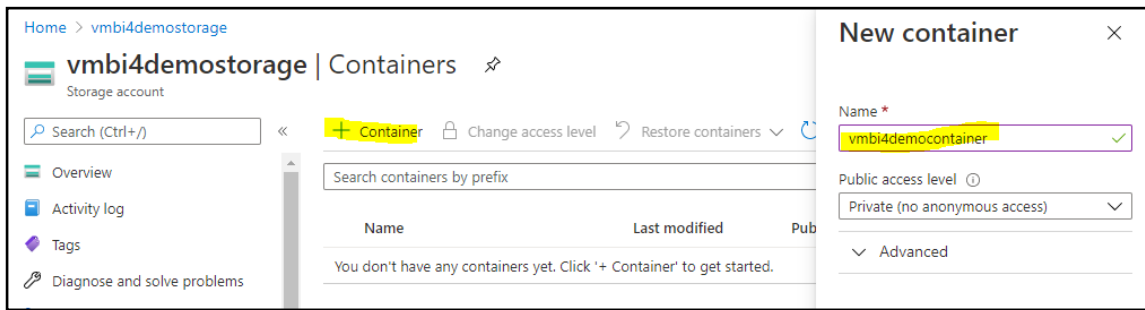
Save Storage Key to notepad file.

### 4.1.2 Create (storage) container

Go to Storage Account **Overview** and select **Containers**



Click on **+ Container** and enter new container **Name**



Click **Create**.

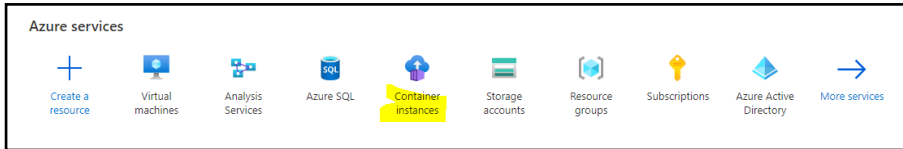
You have successfully created Storage Account with one container.

## 4.2 Create Container Instance

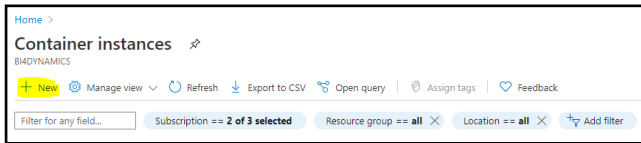
With these settings we will create a docker container (a light virtual machine) based on BI4Dynamics image that is used for running table export from BC to Blob storage. Docker will run at scheduled time and automatically shut down after finishing the export.



Go to Azure service, click **Container instance**



click **+ New** to create a new container instance



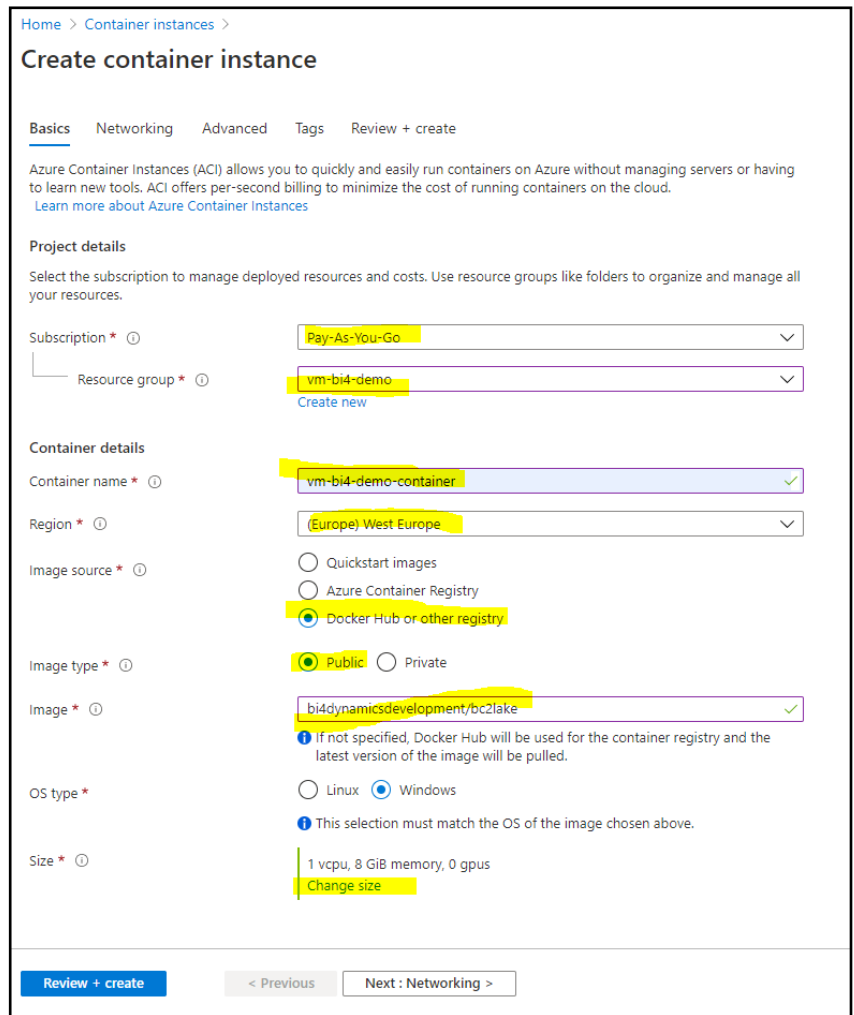
Select:

- Subscription: *Pay-As-You-Go*
- Resource group: *vm-bi4-demo*
- Container name (any name): *vm-bi4-demo-container*
- Region (same as VM)

**Important: following settings MUST be exactly like below:**

- Image source:  
**Docker Hub or other registry**
- Image type: **Public**
- Image:  
**bi4dynamicsdevelopment/bc2lake**
- OS Type:  
**Windows**
- Size change to  
**1vcpu, 8GiB memory (minimum)**
- Confirm change **OK**

Click **Next: Networking**  
Click **Next: Advanced**



Under Advanced tab set the following

- Restart policy: **Never**
- Environment variables keys must be exact:
  - **StorageAccountName** enter the name of storage account that is used for Blob Storage
  - **BlobAccessKey** of the same storage account
  - **ContainerName** of the storage account

Home > Container instances >

## Create container instance

Basics Networking **Advanced** Tags Review + create

Configure additional container properties and variables.

Restart policy ⓘ

Environment variables

Mark as secure	Key	Value	
No	StorageAccountName	vmbi4demostorageaccount	
No	BlobAccessKey	ae65d5siaxFYyFvp8F04Gr1dCLgc...	
No	ContainerName	vmbi4democontainer	

Command override ⓘ

Example: [ "/bin/bash", "-c", "echo hello; sleep 100000" ]

These Keys and Values give Docker instance access to Blob Storage.

Click **Review and Create**

Click **Create**

Home > Container instances >

## Create container instance

✔ Validation passed

Basics Networking Advanced Tags **Review + create**

**Basics**

Subscription Pay-As-You-Go  
 Resource group vmbi4-demo  
 Region west-europe  
 Container name vmbi4-demo-container  
 Image type Public  
 Image tdynamics/bc2lake  
 OS type Windows  
 Memory (GB) 8  
 Number of CPU cores 1  
 CPU type (review) None  
 CPU count 0

**Networking**

Networking type Public  
 Ports 80 (TCP)

**Advanced**

Restart policy Never  
 Environment variables 1  
 Command override []

**Tags**

(None)

[Create](#) [Previous](#) [Next](#) [Download a template for automation](#)

You have successfully created Docker instance

## 5 Result

### 5.1 Information needed for BI4Dynamics application installation

These fields created in this installation will be needed in BI4Dynamics **application** installation.

#### 5.1.1 Information about Azure SQL Virtual Machine

Description	Value
VM Admin Account	vm-admin-user
VM Admin Account Password	6!dJ2yS34MbbQiPHs@rd

#### 5.1.2 Information about Azure Storage and Container instance

Description	Value
Subscription	Pay-As-You-Go
Virtual Machine Resource Group	vm-bi4-demo
Azure Storage Account Name	vmbi4demostorage
Container Name	vmbi4democontainer
Storage Account Blob Key	4T+eDbv9U7G7Wd785S0P86V++VBdqIaPeTTHHvun1lGgN4l==
Container instance name	vm-bi4-demo-container

### 5.2 Next step – BI4Dynamics applications installation

Here is document to install BI4Dynamics BC: <https://www.bi4dynamics.com/documents/>