SQL Server 2022 on Windows Server 2022 Core Edition

markswinkels.nl/sql-server-2022-on-windows-server-2022-core-edition

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March 17, 2023

Today I’m going to install SQL Server 2022 on Windows Server 2022 Core Azure Edition. In a previous blog I installed ADDS on Windows Server Core edition.

Part 1: Install and configure ADDS on Windows Server Core in Azure
Part 2: Install and configure ADDS on Windows Server Core in Azure

I have done a large number of SQL server implementations in recent years, both in on-prem datacenter and in Azure (IaaS). Now that SQL 2022 is available, I’ve taken a look at the differences compared to previous versions. Installing on Windows Server Core edition is also supported, so I take that scenario as a starting point.

Basic Infrastructure

As a basis, it is of course important that an Active Directory environment is available. In my demo environment I ran a domain controller in Azure based on Windows Server 2022 Azure Edition. This server provides the other servers with DNS. The domain is called ‘demo.lab’.

SQL server preparations

As already mentioned, I performed the SQL Server 2022 installation on a server with Windwos Server 2022 Core edition Azure Edition. For a complete list of available versions of Windows Server 2022, see the link below. https://learn.microsoft.com/en-us/windows-server/get-started/editions-comparison-windows-server-2022?tabs=full-comparison

The new SQL server has the following resources:

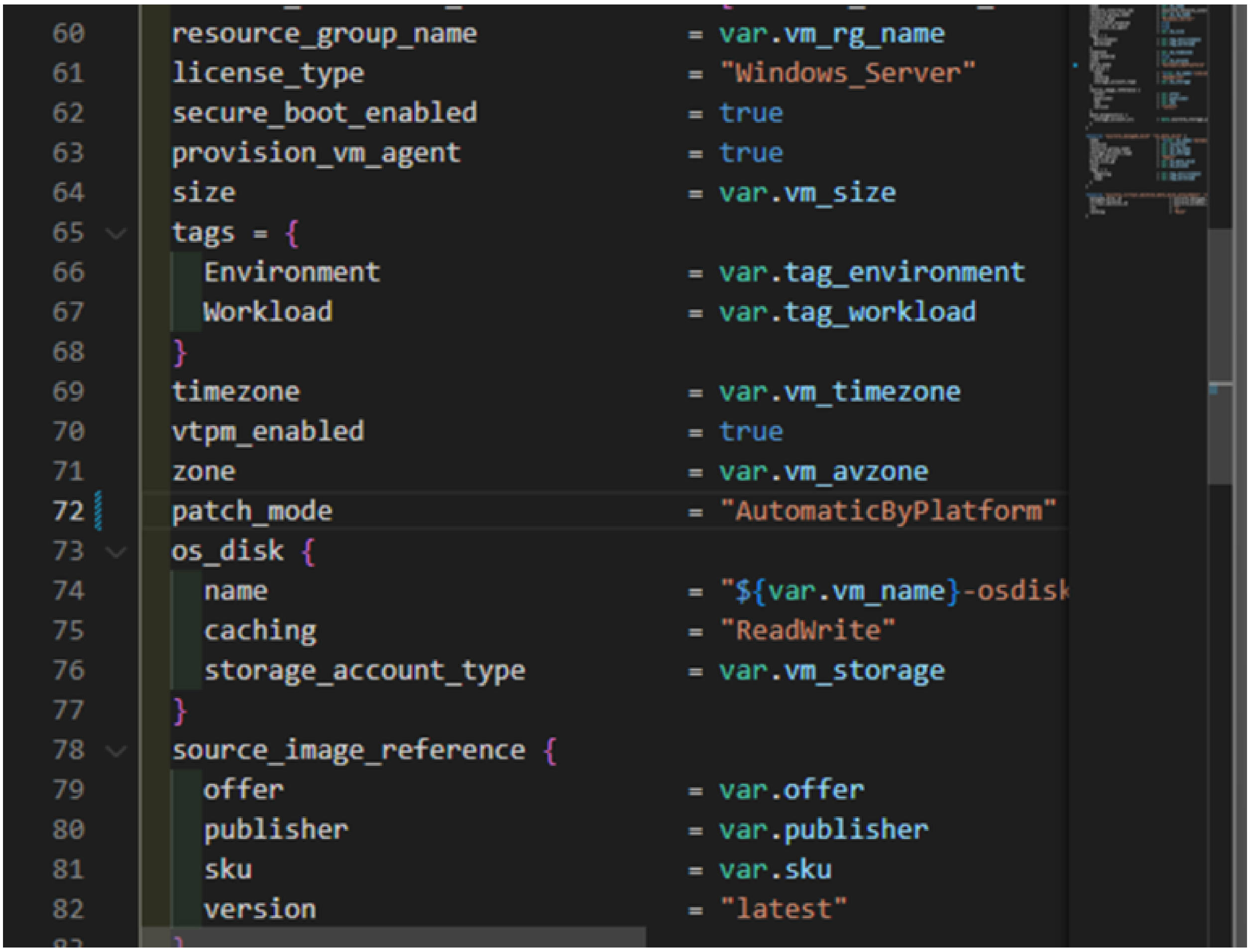
- 2 vCPU
- 8 gb memory

- OS disk 127 GB
- Application disk 100 GB
- SQL DB & Log disk 20 GB

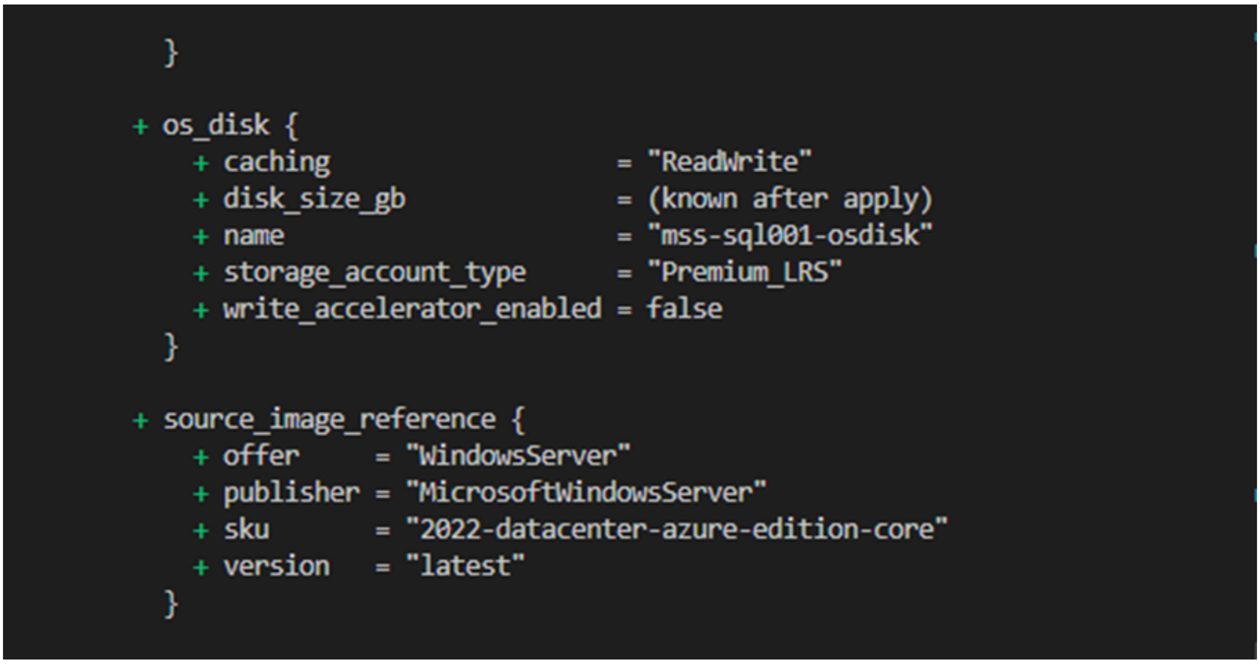
> This is a demo environment, so the sizing of the server is not according to the recommendations. Always make sure you're making the right sizing for your production environment and workloads.

For an overview of the prerequisites for installing SQL Server 2022, see the link below. https://learn.microsoft.com/en-us/sql/sql-server/install/hardware-and-software-requirements-for-installing-sql-server-2022?view=sql-server-ver16

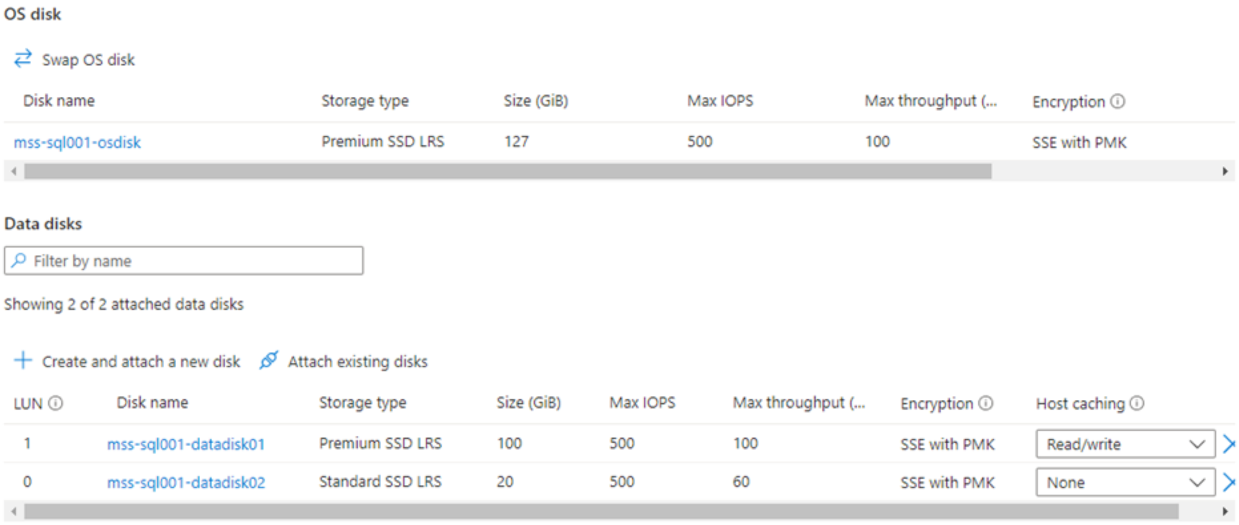
I used Terraform to roll out the server. In the variable file (.tfvars) Iused the latest version of the SKU '2022-datacenter-azure-edition-core'.



```
resource_group_name                = var.vm_rg_name
license_type                       = "Windows_Server"
secure_boot_enabled                = true
provision_vm_agent                 = true
size                               = var.vm_size
tags = {
  Environment                      = var.tag_environment
  Workload                         = var.tag_workload
}
timezone                           = var.vm_timezone
vtpm_enabled                       = true
zone                               = var.vm_avzone
patch_mode                         = "AutomaticByPlatform"
os_disk {
  name                             = "${var.vm_name}-osdisk
  caching                          = "ReadWrite"
  storage_account_type             = var.vm_storage
}
source_image_reference {
  offer                            = var.offer
  publisher                        = var.publisher
  sku                              = var.sku
  version                          = "latest"
```



```
    }

  + os_disk {
      + caching                   = "ReadWrite"
      + disk_size_gb              = (known after apply)
      + name                      = "mss-sql001-osdisk"
      + storage_account_type      = "Premium_LRS"
      + write_accelerator_enabled = false
    }

  + source_image_reference {
      + offer     = "WindowsServer"
      + publisher = "MicrosoftWindowsServer"
      + sku       = "2022-datacenter-azure-edition-core"
      + version   = "latest"
    }
```



OS disk

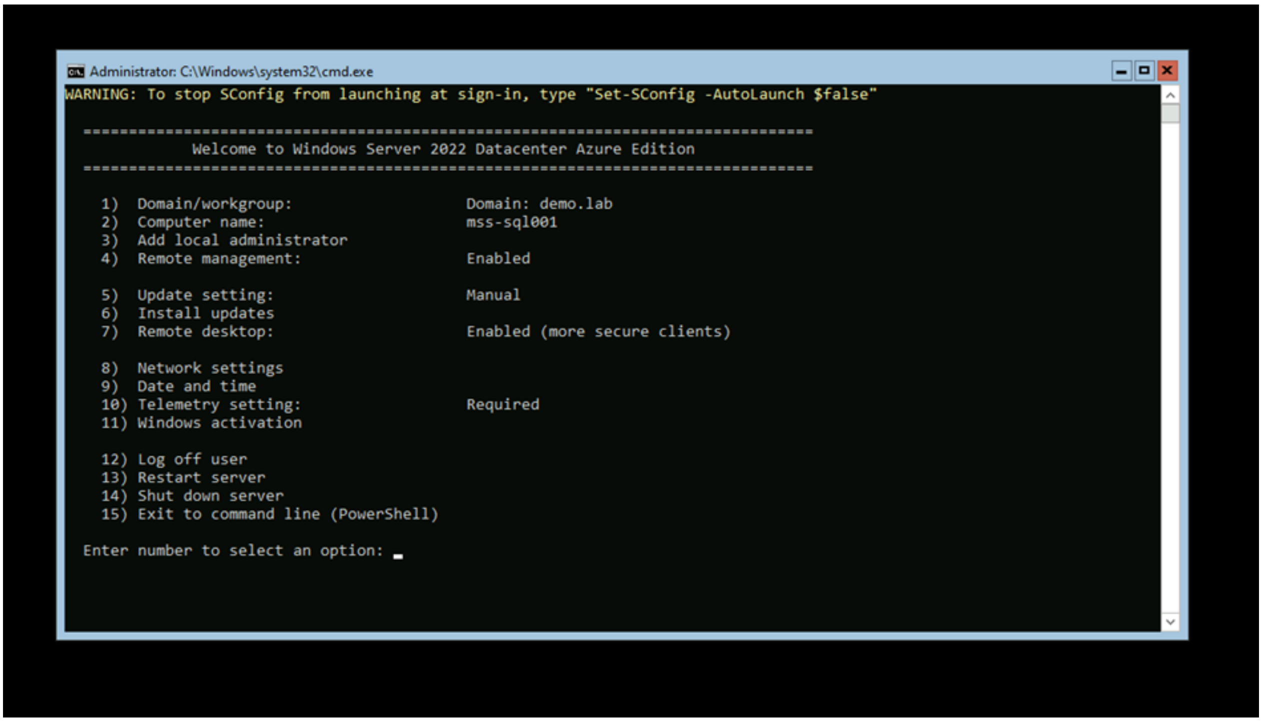
Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...	Encryption
mss-sql001-osdisk	Premium SSD LRS	127	500	100	SSE with PMK

Data disks

Showing 2 of 2 attached data disks

LUN	Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...	Encryption	Host caching
1	mss-sql001-datadisk01	Premium SSD LRS	100	500	100	SSE with PMK	Read/write
0	mss-sql001-datadisk02	Standard SSD LRS	20	500	60	SSE with PMK	None

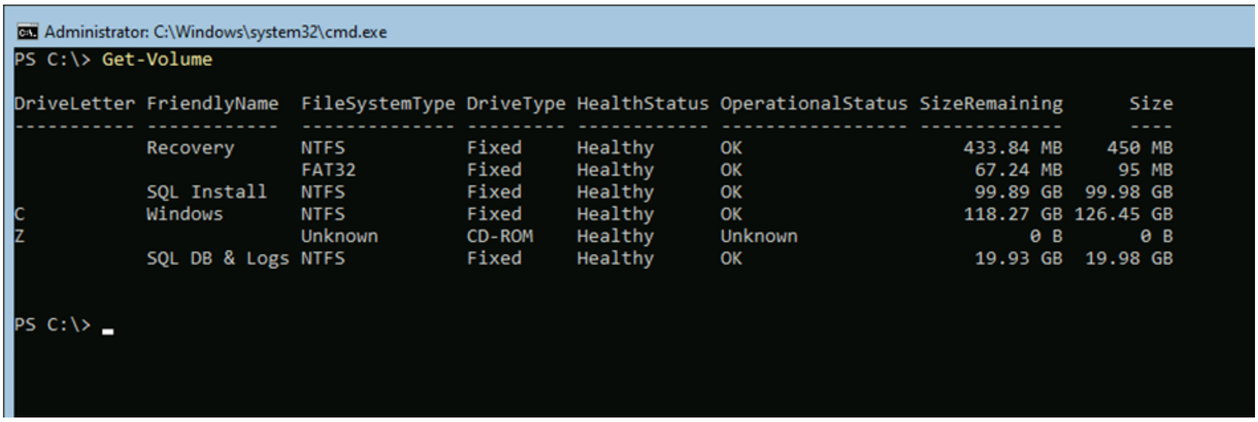
After a few minutes, the new Windows Server 2022 Azure Edition Core is up and running. The first step is to join the server to the Active Directory environment.



```
WARNING: To stop SConfig from launching at sign-in, type "Set-SConfig -AutoLaunch $false"

  ===============================================================================
               Welcome to Windows Server 2022 Datacenter Azure Edition
  ===============================================================================

    1)  Domain/workgroup:                    Domain: demo.lab
    2)  Computer name:                       mss-sql001
    3)  Add local administrator
    4)  Remote management:                   Enabled

    5)  Update setting:                      Manual
    6)  Install updates
    7)  Remote desktop:                      Enabled (more secure clients)

    8)  Network settings
    9)  Date and time
    10) Telemetry setting:                   Required
    11) Windows activation

    12) Log off user
    13) Restart server
    14) Shut down server
    15) Exit to command line (PowerShell)

  Enter number to select an option:
```

```
## to enable Remote Event Management.
Enable-NetFirewallRule -Displaygroup "Remote Event*"


## to enable Remote Scheduled Tasks.
Enable-NetFirewallRule -Displaygroup "Remote Scheduled*"

## to enable Remote Service Management.
Enable-NetFirewallRule -Displaygroup "Remote Service*"

## to enable Remote Firewall Management
Enable-NetFirewallRule -DisplayGroup "Windows Defender Firewall Remote Management"


## to enable remote Disk Management
Enable-NetFirewallRule -Displaygroup "Remote Volume*" to enable Remote Volume
Management
```

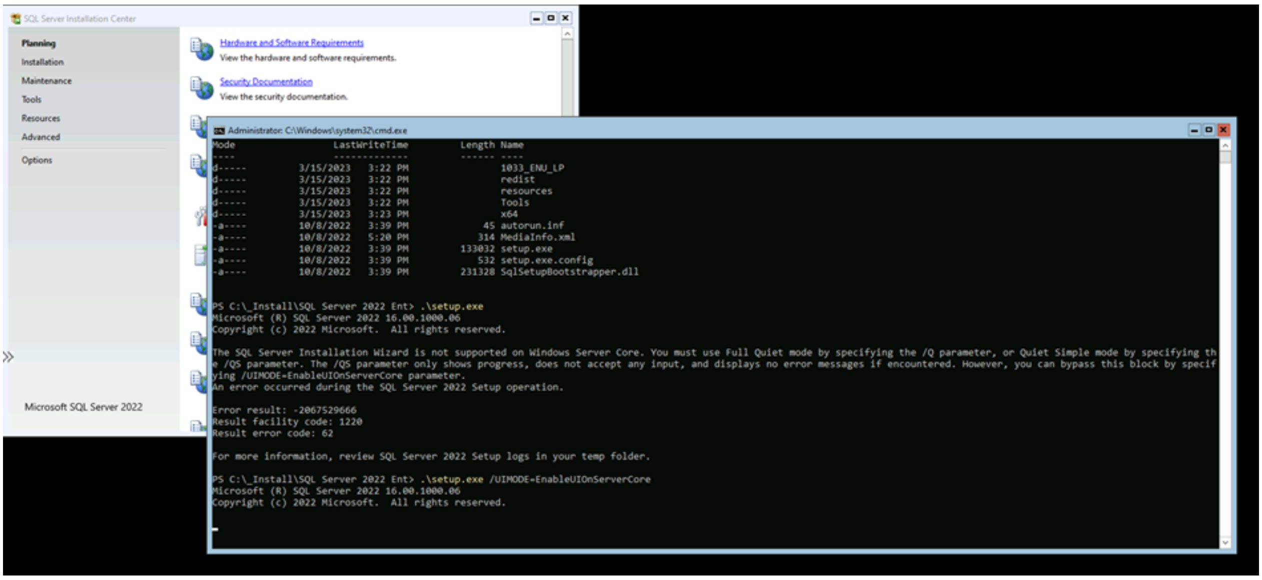
From my management server, I configured the disks, file system type, and partitions through Remote Disk Management (Server Manager)



```
PS C:\> Get-Volume

DriveLetter FriendlyName  FileSystemType DriveType HealthStatus OperationalStatus SizeRemaining      Size
----------- ------------  -------------- --------- ------------ ----------------- -------------      ----
            Recovery      NTFS           Fixed     Healthy      OK                    433.84 MB    450 MB
                          FAT32          Fixed     Healthy      OK                     67.24 MB     95 MB
            SQL Install   NTFS           Fixed     Healthy      OK                     99.89 GB  99.98 GB
C           Windows       NTFS           Fixed     Healthy      OK                    118.27 GB 126.45 GB
Z                         Unknown        CD-ROM    Healthy      Unknown                     0 B       0 B
            SQL DB & Logs NTFS           Fixed     Healthy      OK                     19.93 GB  19.98 GB


PS C:\>
```

SQL Server 2022 installation

Download the SQL Server 2022 installation files and copy them to the local drive of your SQL server. In my example ‘C:_Install’.
Normally, you would start the setup using the ‘.\setup.exe’ command, but on Windows Server Core edition, you get an error.


SQL Server Installation Center
Planning
Installation
Maintenance
Tools
Resources
Advanced
Options
Microsoft SQL Server 2022
Hardware and Software Requirements
View the hardware and software requirements.
Security Documentation
View the security documentation.
Administrator: C:\Windows\system32\cmd.exe

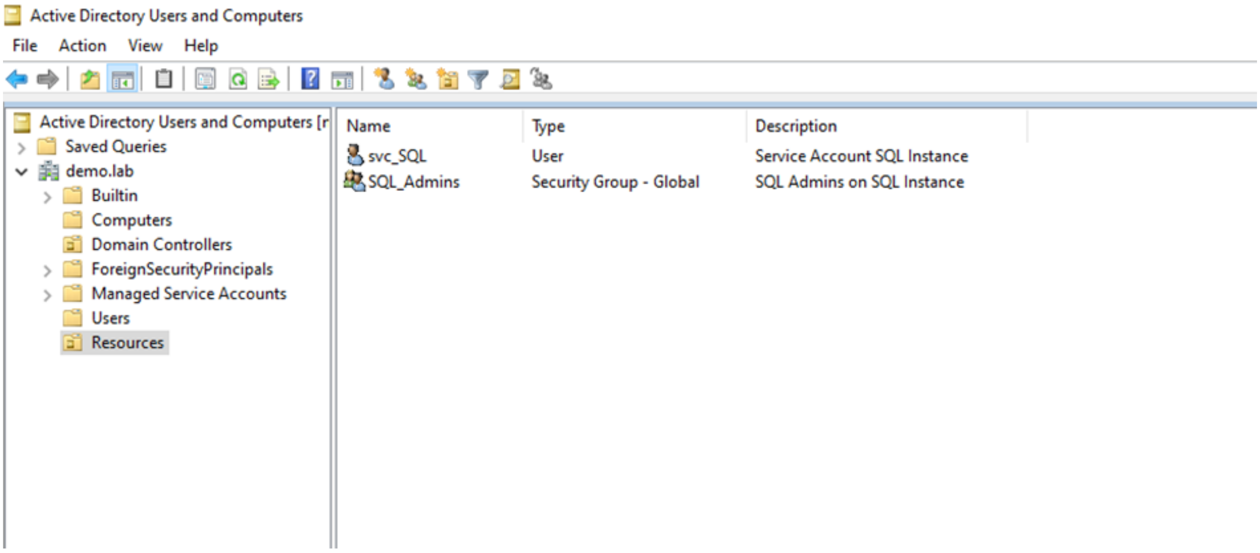
```
Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----         3/15/2023   3:22 PM                1033_ENU_LP
d-----         3/15/2023   3:22 PM                redist
d-----         3/15/2023   3:22 PM                resources
d-----         3/15/2023   3:22 PM                Tools
d-----         3/15/2023   3:23 PM                x64
-a----         10/8/2022   3:39 PM             45 autorun.inf
-a----         10/8/2022   5:20 PM            314 MediaInfo.xml
-a----         10/8/2022   3:39 PM         133032 setup.exe
-a----         10/8/2022   3:39 PM            532 setup.exe.config
-a----         10/8/2022   3:39 PM         231328 SqlSetupBootstrapper.dll


PS C:\_Install\SQL Server 2022 Ent> .\setup.exe
Microsoft (R) SQL Server 2022 16.00.1000.06
Copyright (c) 2022 Microsoft.  All rights reserved.

The SQL Server Installation Wizard is not supported on Windows Server Core. You must use Full Quiet mode by specifying the /Q parameter, or Quiet Simple mode by specifying th
e /QS parameter. The /QS parameter only shows progress, does not accept any input, and displays no error messages if encountered. However, you can bypass this block by specif
ying /UIMODE=EnableUIOnServerCore parameter.
An error occurred during the SQL Server 2022 Setup operation.

Error result: -2067529666
Result facility code: 1220
Result error code: 62

For more information, review SQL Server 2022 Setup logs in your temp folder.

PS C:\_Install\SQL Server 2022 Ent> .\setup.exe /UIMODE=EnableUIOnServerCore
Microsoft (R) SQL Server 2022 16.00.1000.06
Copyright (c) 2022 Microsoft.  All rights reserved.

_
```

> You can use the ‘**.\setup.exe /UIMODE=EnableUIOnServerCore**‘ command to enable the graphical user interface, but this didn’t work for me either. I was not able to click on some links within the window.

I performed the installation via the command line. The link below shows all the available installation switches.
https://learn.microsoft.com/en-us/sql/database-engine/install-windows/install-sql-server-from-the-command-prompt?view=sql-server-ver16

> This is a demo environment, so the installation is just an example. Always make sure you’re using the right installation switches and values for your production environment.

First, I’ve created a new service account ‘svc_SQL’ and a new security group ‘SQL_Admins’ within my Active Directory environment.

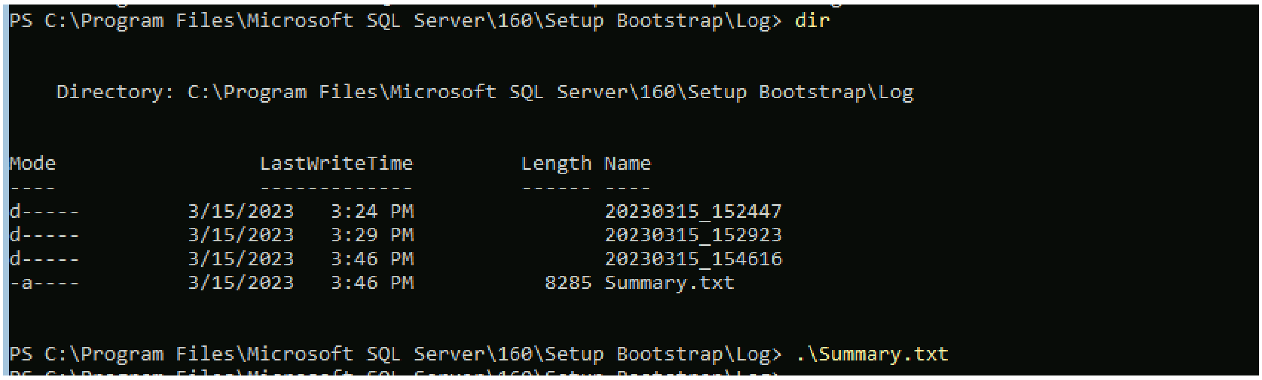


Name	Type	Description
svc_SQL	User	Service Account SQL Instance
SQL_Admins	Security Group - Global	SQL Admins on SQL Instance

```
.\setup.exe /q /ACTION=Install /IACCEPTSQLSERVERLICENSETERMS="True" /FEATURES=SQL
/INSTANCENAME=MSSQLSERVER /SQLSVCACCOUNT="demo.lab\svc_SQL"
/SQLSVCPASSWORD="BM&mdi#hy78^%$#d" /SQLSYSADMINACCOUNTS="demo.lab\SQL_Admins"
/AGTSVCACCOUNT="NT AUTHORITY\NETWORK SERVICE" /INSTALLSQLDATADIR="D:\Program
Files\Microsoft SQL Server" /SQLUSERDBDIR="E:\DB" /SQLUSERDBLOGDIR="E:\DBLOGS"
/SQLSVCINSTANTFILEINIT="True"
```

You can find the logging in the following directory.

```
C:\Program Files\Microsoft SQL Server\160\Setup Bootstrap\Log
```



```
PS C:\Program Files\Microsoft SQL Server\160\Setup Bootstrap\Log> dir


    Directory: C:\Program Files\Microsoft SQL Server\160\Setup Bootstrap\Log


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----         3/15/2023   3:24 PM                20230315_152447
d-----         3/15/2023   3:29 PM                20230315_152923
d-----         3/15/2023   3:46 PM                20230315_154616
-a----         3/15/2023   3:46 PM           8285 Summary.txt


PS C:\Program Files\Microsoft SQL Server\160\Setup Bootstrap\Log> .\Summary.txt
```

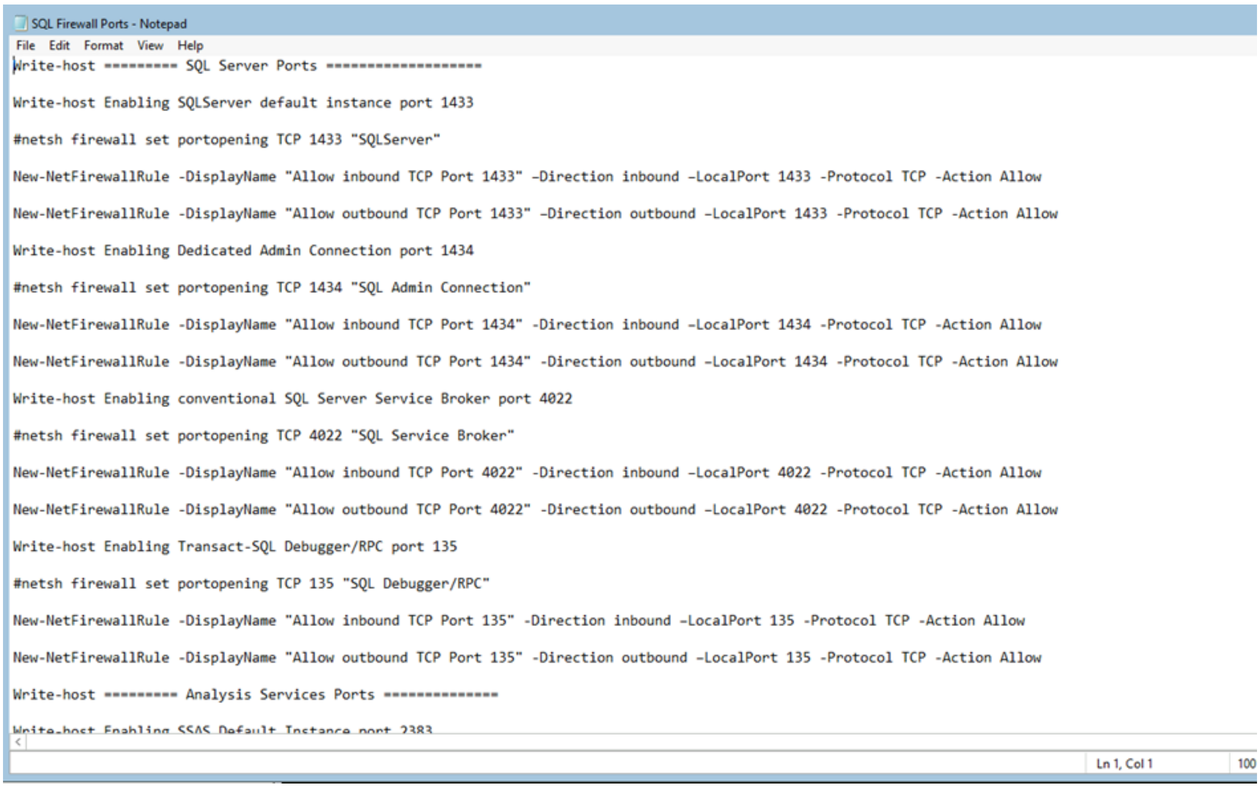
Now it’s time to wait! The installation of SQL Server 2022 will take some time, it depends on what features will be installed.

What about the Windows firewall..?

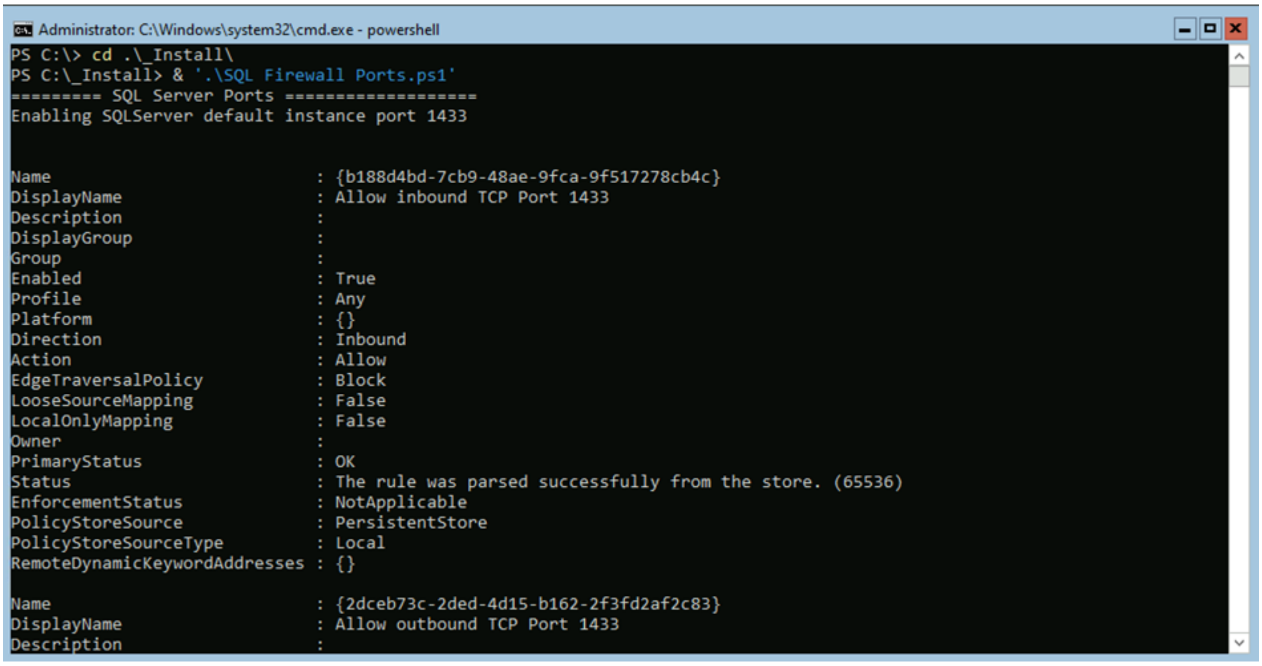
A good hardened server has enabled the Windows firewall. It is important that the correct ports are allowed so that the newly installed SQL server is approachable and manageable.

I’ve created a Powershell script to enable the necessary ports within the Windows firewall configuration. You can download that script on my GitHub.

The script called ‘SQL Firewall Ports.ps1’.



```
Write-host ========= SQL Server Ports ===================

Write-host Enabling SQLServer default instance port 1433

#netsh firewall set portopening TCP 1433 "SQLServer"

New-NetFirewallRule -DisplayName "Allow inbound TCP Port 1433" -Direction inbound -LocalPort 1433 -Protocol TCP -Action Allow

New-NetFirewallRule -DisplayName "Allow outbound TCP Port 1433" -Direction outbound -LocalPort 1433 -Protocol TCP -Action Allow

Write-host Enabling Dedicated Admin Connection port 1434

#netsh firewall set portopening TCP 1434 "SQL Admin Connection"

New-NetFirewallRule -DisplayName "Allow inbound TCP Port 1434" -Direction inbound -LocalPort 1434 -Protocol TCP -Action Allow

New-NetFirewallRule -DisplayName "Allow outbound TCP Port 1434" -Direction outbound -LocalPort 1434 -Protocol TCP -Action Allow

Write-host Enabling conventional SQL Server Service Broker port 4022

#netsh firewall set portopening TCP 4022 "SQL Service Broker"

New-NetFirewallRule -DisplayName "Allow inbound TCP Port 4022" -Direction inbound -LocalPort 4022 -Protocol TCP -Action Allow

New-NetFirewallRule -DisplayName "Allow outbound TCP Port 4022" -Direction outbound -LocalPort 4022 -Protocol TCP -Action Allow

Write-host Enabling Transact-SQL Debugger/RPC port 135

#netsh firewall set portopening TCP 135 "SQL Debugger/RPC"

New-NetFirewallRule -DisplayName "Allow inbound TCP Port 135" -Direction inbound -LocalPort 135 -Protocol TCP -Action Allow

New-NetFirewallRule -DisplayName "Allow outbound TCP Port 135" -Direction outbound -LocalPort 135 -Protocol TCP -Action Allow

Write-host ========= Analysis Services Ports ==============

Write-host Enabling SSAS Default Instance port 2383
```

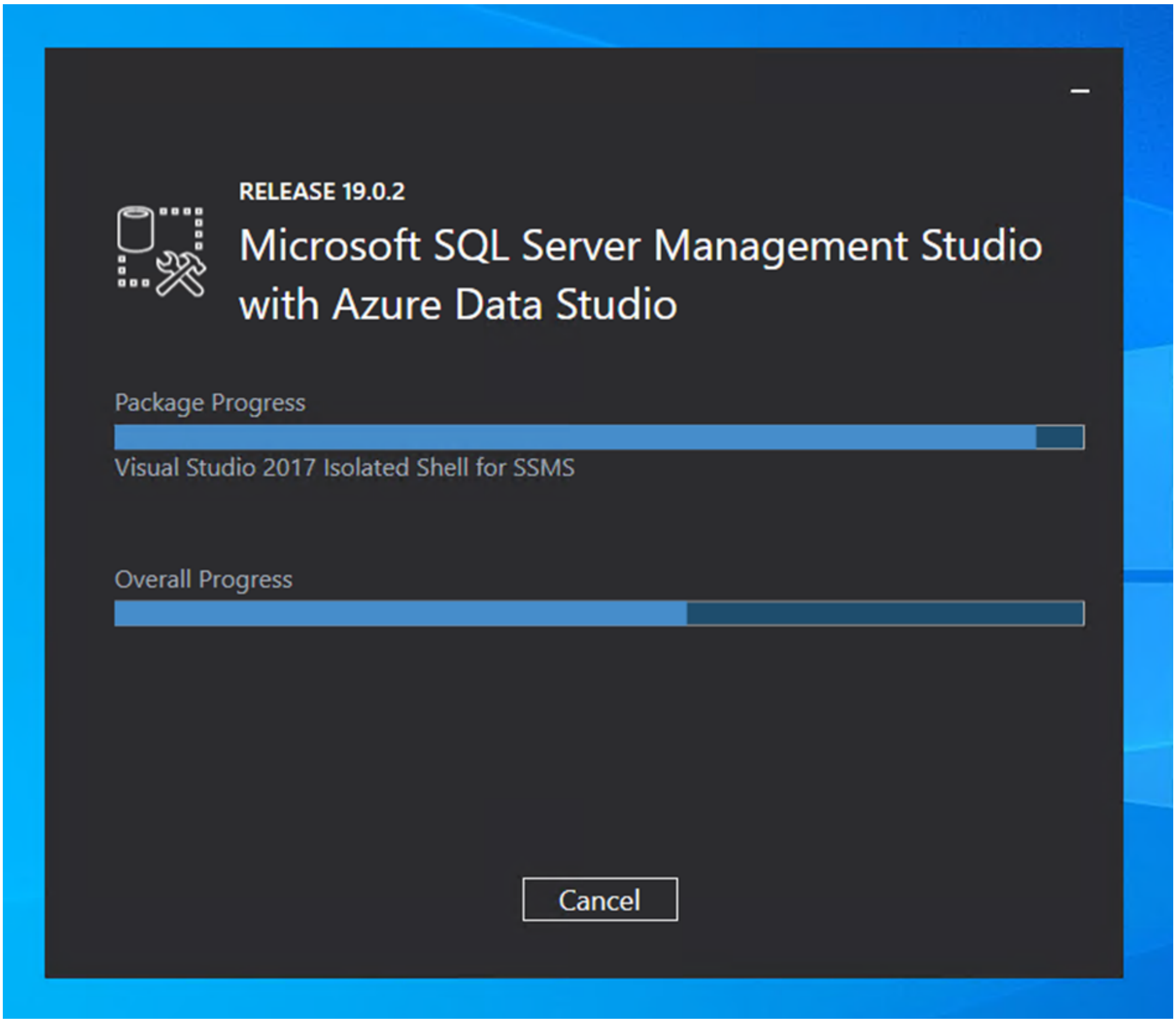


```
PS C:\> cd .\_Install\
PS C:\_Install> & '.\SQL Firewall Ports.ps1'
========= SQL Server Ports ===================
Enabling SQLServer default instance port 1433


Name                          : {b188d4bd-7cb9-48ae-9fca-9f517278cb4c}
DisplayName                   : Allow inbound TCP Port 1433
Description                   :
DisplayGroup                  :
Group                         :
Enabled                       : True
Profile                       : Any
Platform                      : {}
Direction                     : Inbound
Action                        : Allow
EdgeTraversalPolicy           : Block
LooseSourceMapping            : False
LocalOnlyMapping              : False
Owner                         :
PrimaryStatus                 : OK
Status                        : The rule was parsed successfully from the store. (65536)
EnforcementStatus             : NotApplicable
PolicyStoreSource             : PersistentStore
PolicyStoreSourceType         : Local
RemoteDynamicKeywordAddresses : {}

Name                          : {2dceb73c-2ded-4d15-b162-2f3fd2af2c83}
DisplayName                   : Allow outbound TCP Port 1433
Description                   :
```

SQL Server Management Tools

When the installation is completed, you can start installing the SQL Management Tools on your management server(s). In my environment, I'm using two management tools:

- SQL Managed Studio (SSMS)
- Azure Data Studio



RELEASE 19.0.2

Microsoft SQL Server Management Studio with Azure Data Studio

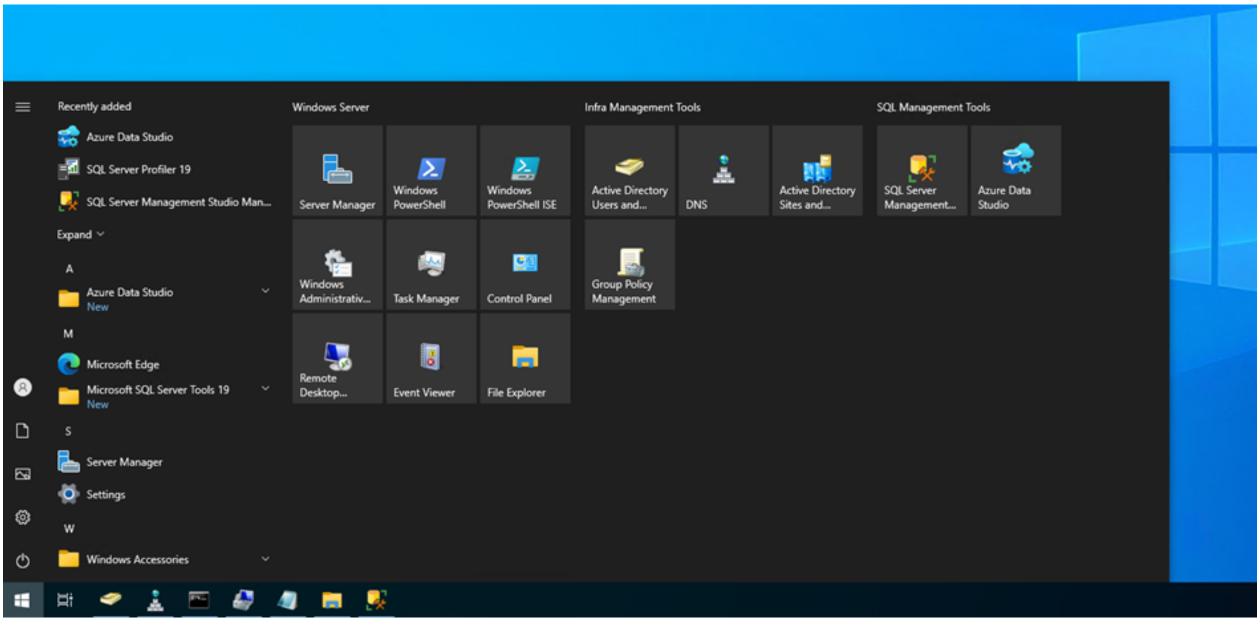
Package Progress

Visual Studio 2017 Isolated Shell for SSMS

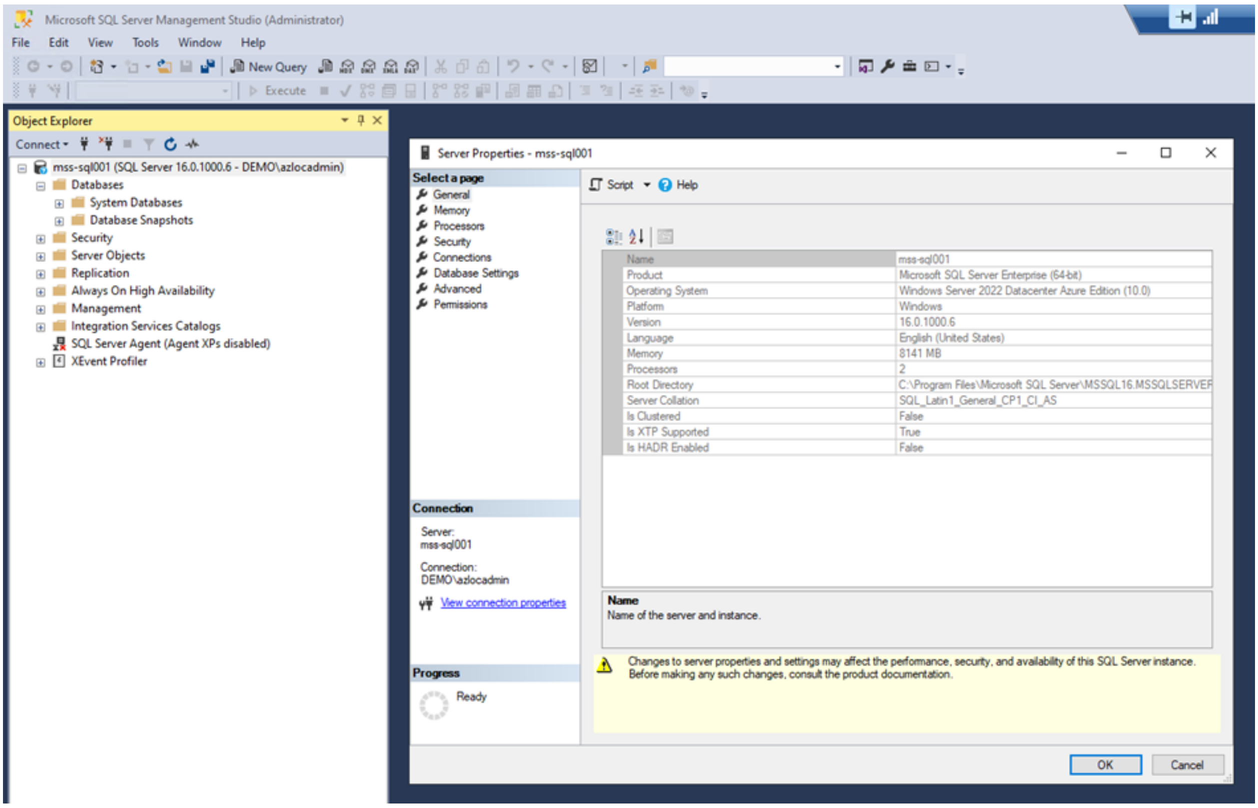
Overall Progress

In the link below you can download the latest version of Azure Data Studio. https://learn.microsoft.com/en-us/sql/azure-data-studio/download-azure-data-studio?view=sql-server-ver16&tabs=redhat-install%2Credhat-uninstall

After the installation has completed, the management tools are available.



We can successfully connect through SSMS (SQL Server Management Studio).



Server Properties - mss-sql001

mss-sql001 (SQL Server 16.0.1000.6 - DEMO\azlocadmin)
- Databases
  - System Databases
  - Database Snapshots
- Security
- Server Objects
- Replication
- Always On High Availability
- Management
- Integration Services Catalogs
- SQL Server Agent (Agent XPs disabled)
- XEvent Profiler

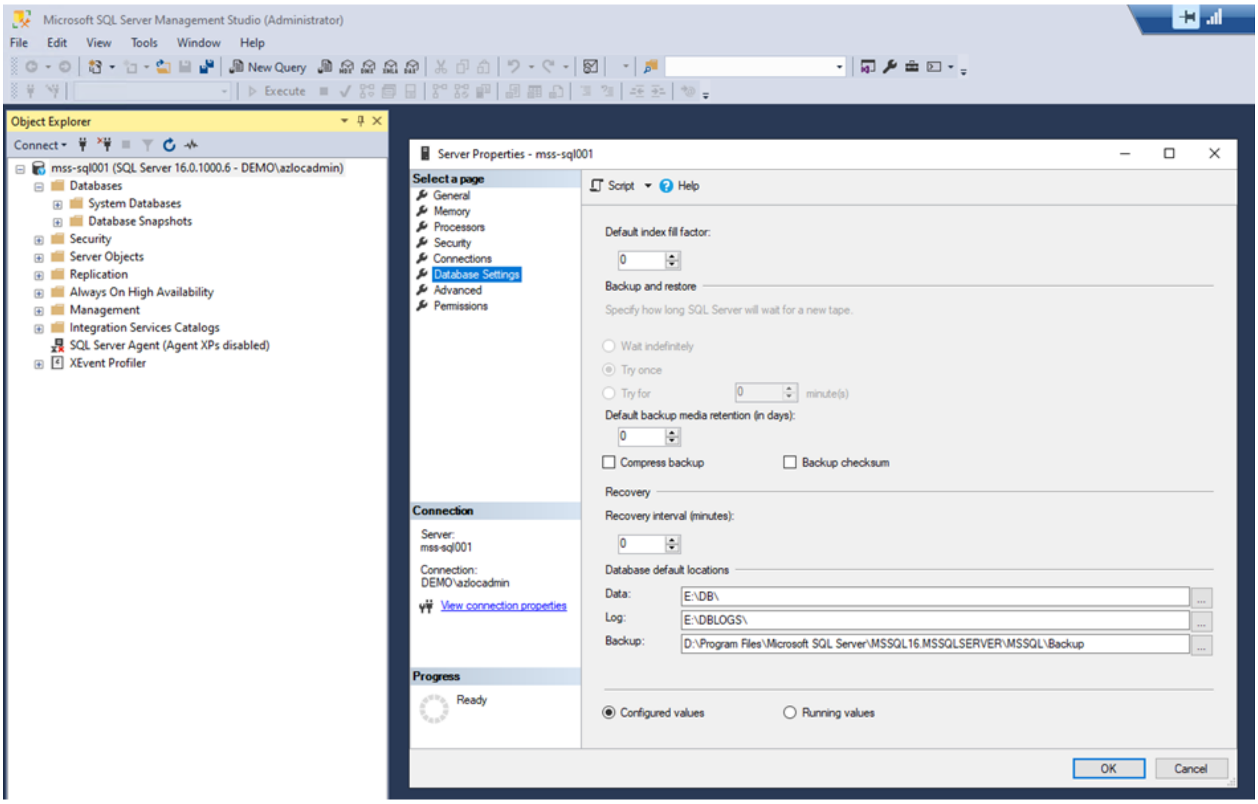
Name	mss-sql001
Product	Microsoft SQL Server Enterprise (64-bit)
Operating System	Windows Server 2022 Datacenter Azure Edition (10.0)
Platform	Windows
Version	16.0.1000.6
Language	English (United States)
Memory	8141 MB
Processors	2
Root Directory	C:\Program Files\Microsoft SQL Server\MSSQL16.MSSQLSERVEF
Server Collation	SQL_Latin1_General_CP1_CI_AS
Is Clustered	False
Is XTP Supported	True
Is HADR Enabled	False

Name
Name of the server and instance.

Connection
Server:
mss-sql001
Connection:
DEMO\azlocadmin
View connection properties

Changes to server properties and settings may affect the performance, security, and availability of this SQL Server instance. Before making any such changes, consult the product documentation.

Progress
Ready



Server Properties - mss-sql001

Default index fill factor:
0

Backup and restore
Specify how long SQL Server will wait for a new tape.
○ Wait indefinitely
● Try once
○ Try for 0 minute(s)

Default backup media retention (in days):
0

□ Compress backup □ Backup checksum

Recovery
Recovery interval (minutes):
0

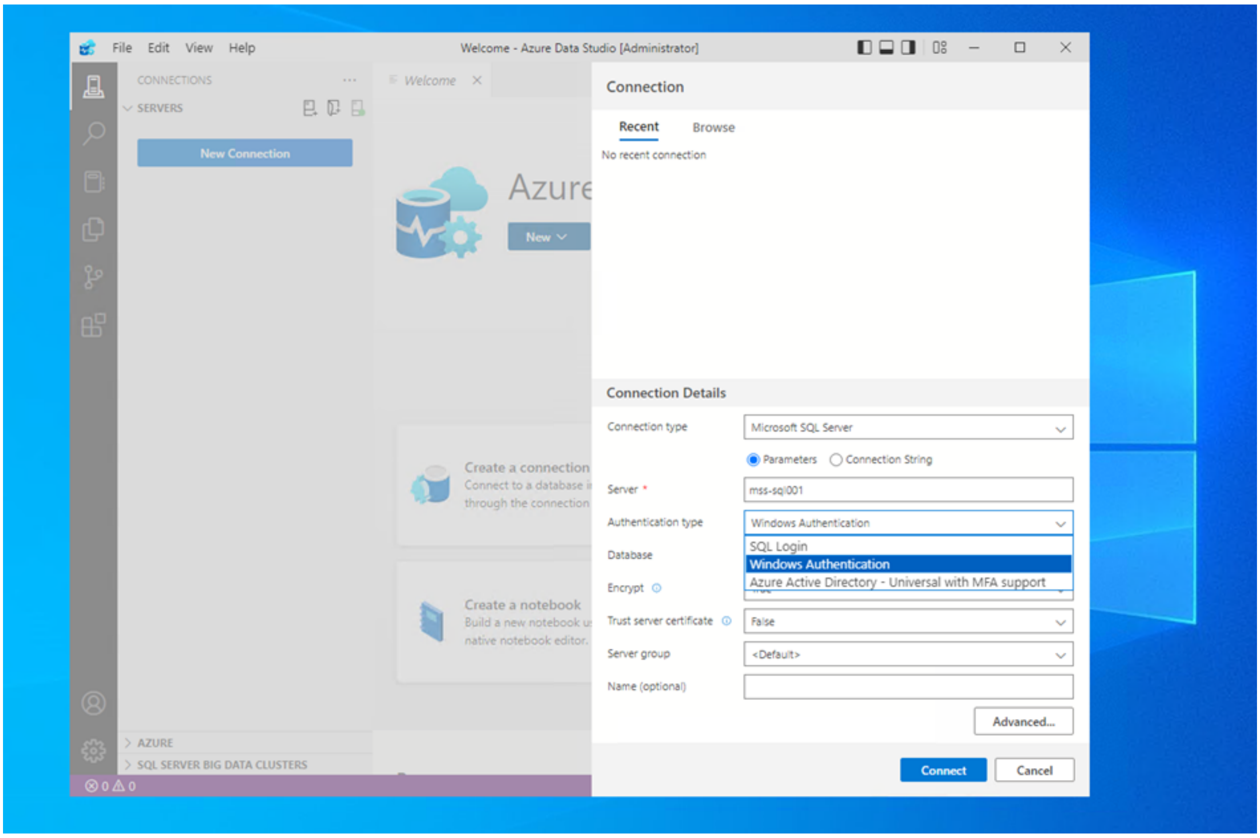
Database default locations
Data: E:\DB\
Log: E:\DBLOGS\
Backup: D:\Program Files\Microsoft SQL Server\MSSQL16.MSSQLSERVER\MSSQL\Backup

● Configured values ○ Running values

Connection
Server:
mss-sql001
Connection:
DEMO\azlocadmin
View connection properties

Progress
Ready

And we can also connect through the new Azure Data Studio.



No recent connection

Connection Details

Connection type: Microsoft SQL Server

● Parameters ○ Connection String

Server *: mss-sql001

Authentication type: Windows Authentication

- SQL Login
- Windows Authentication
- Azure Active Directory - Universal with MFA support

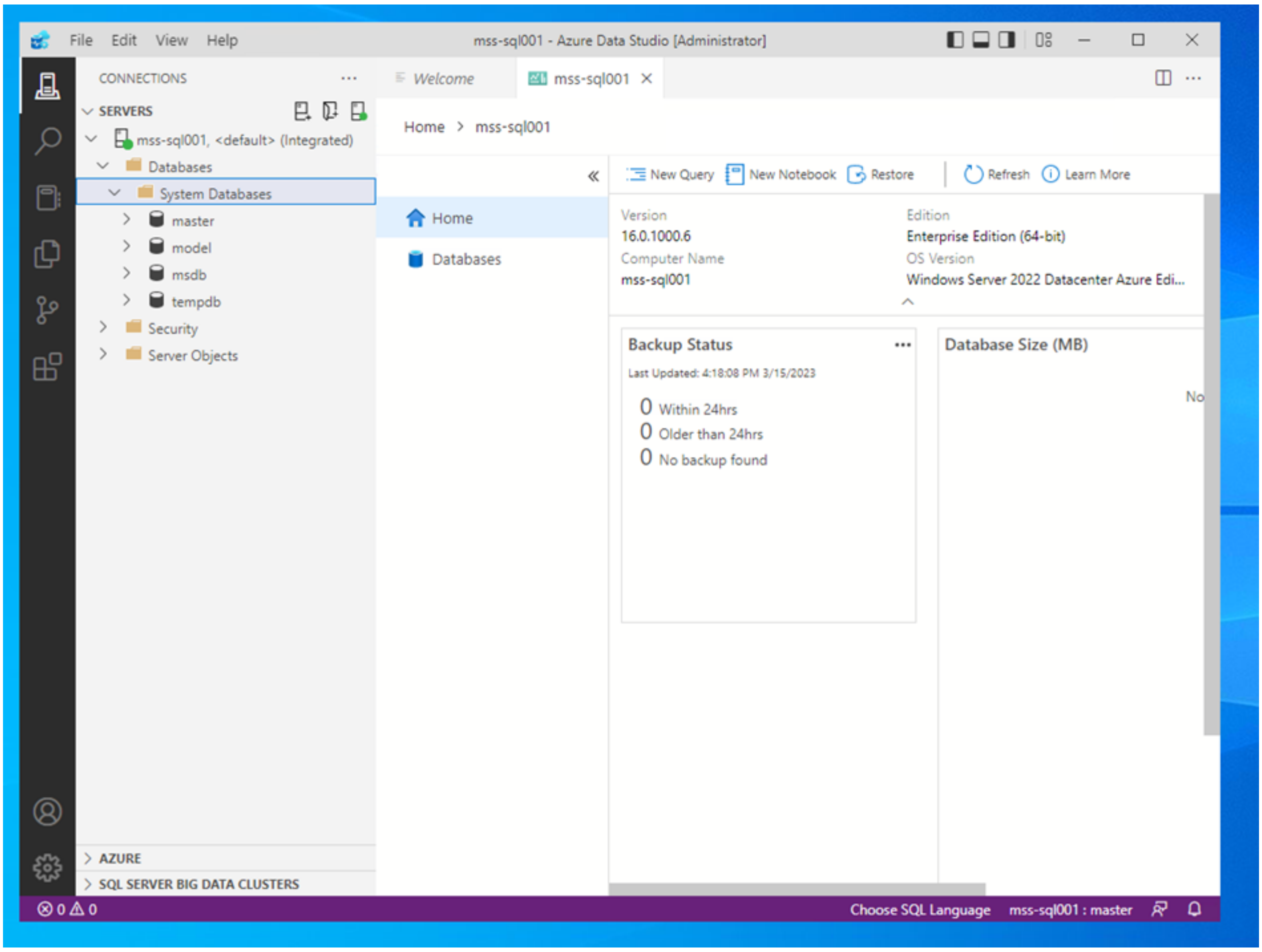
Database

Encrypt

Trust server certificate: False

Server group: <Default>

Name (optional)



- mss-sql001, <default> (Integrated)
  - Databases
    - System Databases
      - master
      - model
      - msdb
      - tempdb
  - Security
  - Server Objects

Version: 16.0.1000.6

Edition: Enterprise Edition (64-bit)

Computer Name: mss-sql001

OS Version: Windows Server 2022 Datacenter Azure Edi...

Backup Status

Last Updated: 4:18:08 PM 3/15/2023

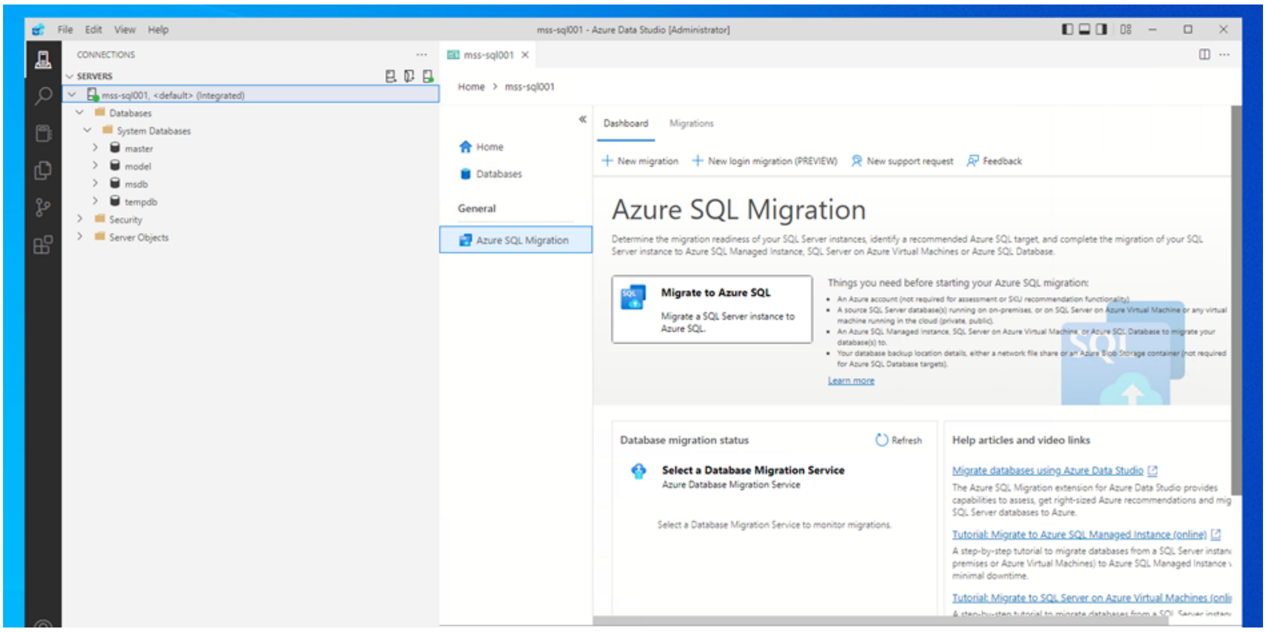
0 Within 24hrs

0 Older than 24hrs

0 No backup found

Database Size (MB)

When you want to migrate your SQL databases to Azure SQL or Azure SQL Managed Instance, you can install the ‘Azure SQL Migration’ extension within Azure Data Studio. From here, you can perform an database assessment to see what migration strategy is the best for your environment. After the assessment, you can migrate your databases to Azure.



Azure SQL Migration

Determine the migration readiness of your SQL Server instances, identify a recommended Azure SQL target, and complete the migration of your SQL Server instance to Azure SQL Managed Instance, SQL Server on Azure Virtual Machines or Azure SQL Database.

Migrate to Azure SQL

Migrate a SQL Server instance to Azure SQL.

Things you need before starting your Azure SQL migration:

- An Azure account (not required for assessment or SKU recommendation functionality).
- A source SQL Server database(s) running on on-premises, or on SQL Server on Azure Virtual Machine or any virtual machine running in the cloud (private, public).
- An Azure SQL Managed Instance, SQL Server on Azure Virtual Machine, or Azure SQL Database to migrate your database(s) to.
- Your database backup location details, either a network file share or an Azure Blob Storage container (not required for Azure SQL Database targets).

Database migration status

Select a Database Migration Service

Azure Database Migration Service

Select a Database Migration Service to monitor migrations.

Help articles and video links

Migrate databases using Azure Data Studio

The Azure SQL Migration extension for Azure Data Studio provides capabilities to assess, get right-sized Azure recommendations and mig SQL Server databases to Azure.

Tutorial: Migrate to Azure SQL Managed Instance (online)

A step-by-step tutorial to migrate databases from a SQL Server instan premises or Azure Virtual Machines) to Azure SQL Managed Instance minimal downtime.

Tutorial: Migrate to SQL Server on Azure Virtual Machines (onli

Summary

When you are going to build a new SQL Server 2022 environment, it is definitely advisable to seriously look at Windows Server 2022 Core edition. This version of Windows Server 2022 has a small footprint, requires a restart less often, is optimally tuned for workloads and applications and has a smaller attack surface than the full-fledged Windows Server installation with GUI.

Thank you for reading and for supporting my blog.