

Tech Data SQL Server on Azure Step by Step Deployment Guide

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1. Introduction

This is a step by step guide for deploying Tech Data SQL Server on Windows Server in an Azure CSP subscription that was purchased through the StreamOne Portal. Prior knowledge is required with SQL Server, Windows Server, and Microsoft Azure. In depth training on these technologies is outside of this guide. Most of the Figures provided in this guide are extracted from Microsoft online official documentations. Screenshots are taken as an example.

SQL Server on Azure virtual machines enables you to use full versions of SQL Server in the Cloud without having to manage any on-premises hardware. SQL on Windows includes a SQL Server 2017 image installed on a Windows Server 2016 and with different version options:

- SQL Server 2017 Enterprise Windows Server 2016
- SQL Server 2017 Standard on Windows Server 2016
- SQL Server 2017 Web on Windows Server 2016
- Free SQL Server License: SQL Server 2017 Express on Windows Server 2016
- Free SQL Server License: SQL Server 2017 Developer on Windows Server 2016

Azure virtual machines run in many different geographic regions around the world. They also offer a variety of machine sizes. The virtual machine image gallery allows you to create a SQL Server VM with the right version, edition, and operating system. This makes virtual machines a good option for many different SQL Server workloads.

Although it is not a PaaS solution, it provides several advantages such as automated patching, automated Backup high availability, instant scaling, pay for what you consume, and high-availability.

The solution provides a validated pre-architected design with the recommended configurations and the necessary assessment to choose the right version and facilitates SQL Server deployment. It also provides the necessary deployment documentation and the Performance best practices for SQL Server in Azure Virtual Machines. Everything is deployed with a simple click.

Installing SQL server on Azure VMs as an IaaS have several advantages mainly in terms of cost reduction and administration burden as described in Figure 1.

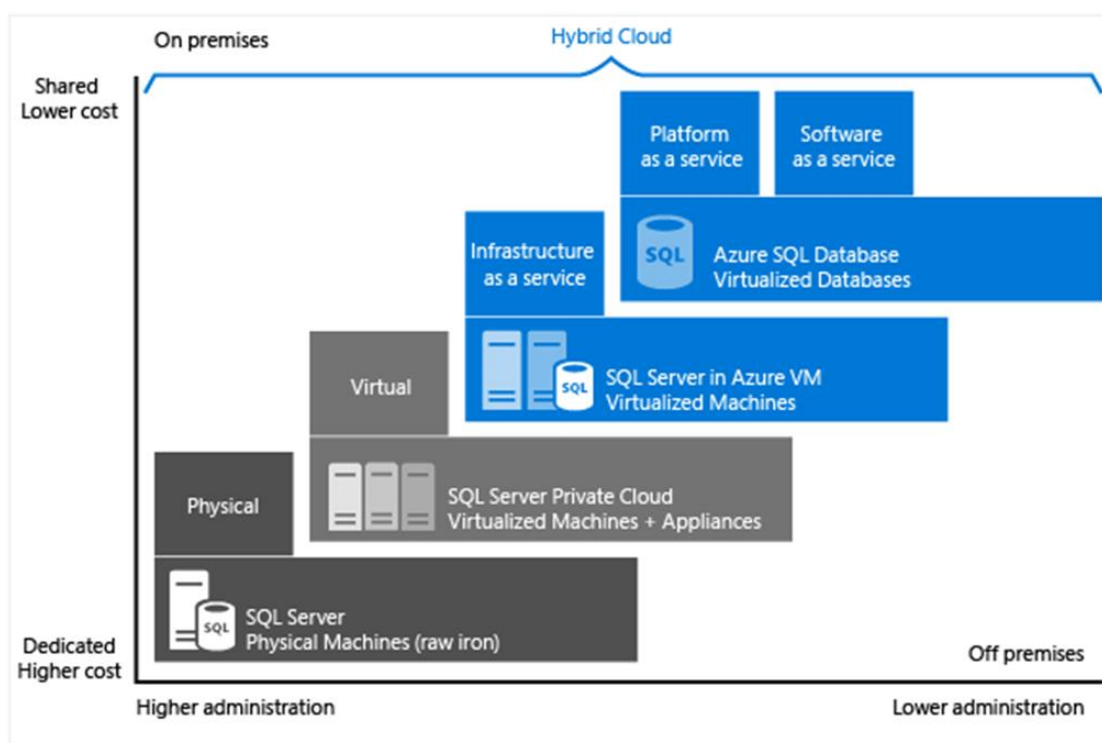


Figure 1. Advantages of SQL Server as an IaaS

A brief description of each image is provided as follows:

SQL Server 2017 Enterprise Windows Server 2016

This image contains the full version of SQL Server 2017 Enterprise edition on Windows Server 2016. SQL Server 2017 represents a major step towards making SQL Server a platform that gives you choices of development languages, data types, on-premises or cloud, and operating systems by bringing the power of SQL Server to Linux, Linux-based Docker containers, and Windows. It provides comprehensive capabilities for mission-critical transactional processing, data warehousing, and real-time business intelligence. It includes the database engine with support for In-Memory transactional processing and analytics, automatic database tuning and new graph capabilities for modeling many-to-many relationships. This edition also includes Always On for +99.99% high availability and read scale-out capabilities. Various layers of protection, including innovative features like Always Encrypted and Row-Level Security for the highest data protection. SQL Server Machine Learning Services for integrated advanced analytics with Python and R language support. Includes Integration Services for moving and transforming data, Analysis Services for data mining and Master Data Services for data modeling.

SQL Server 2017 Standard on Windows Server 2016

This image contains the Standard edition of SQL Server 2017 on Windows Server 2016. Standard edition provides core data management capabilities for medium-size transactional processing and data warehousing. It includes the database engine with a basic version of Always On high availability and Row-Level Security. Includes Management Studio for integrated administration and development, Integration Services for moving and transforming data and Analysis Services for data mining.

SQL Server 2017 Web on Windows Server 2016

This image contains the Web edition of SQL Server 2017 on Windows Server 2016. This provides a low-cost database solution for medium-size web applications. It includes the core database engine and Management Studio for integrated administration and development. Also includes Integration Services for moving and transforming data, and Analysis Services for data mining. We recommend that you use a virtual machine size of DS12 or higher.

Free SQL Server License: SQL Server 2017 Express on Windows Server 2016

This image contains the Express edition of SQL Server 2017 on Windows Server 2016. This is a free (no SQL Server licensing cost) database system for lightweight applications. It includes the core database engine, limited to 1 GB memory and 10 GB storage, and Management Studio for integrated administration and development.

Free SQL Server License: SQL Server 2017 Developer on Windows Server 2016

This image contains the Developer edition of SQL Server 2017 on Windows Server 2016. This free edition (no SQL Server licensing cost) includes all the functionality of Enterprise edition, but it is licensed for development and testing only, not production. It provides comprehensive capabilities for mission-critical transactional processing, data warehousing, and real-time business intelligence. It includes the database engine with support for In-Memory transactional processing and analytics, automatic database tuning and new graph capabilities for modeling many-to-many relationships. This edition also includes Always On for +99.99% high availability and read scale-out capabilities. Various layers of protection, including innovative features like Always Encrypted and Row-Level Security for the highest data protection. SQL Server Machine Learning Services for integrated advanced analytics with Python and R language support. Includes Integration Services for moving and transforming data, Analysis Services for data mining and Master Data Services for data modeling.

Enterprise	Standard	Express	Developer
<ul style="list-style-type: none">✓ Mission critical high availability✓ Enhanced in-memory performance✓ Faster performance with Adaptive Query Processing✓ Unparalleled data security✓ End-to-end mobile BI with rich visualizations on all major platforms✓ In-database advanced analytics built-in at scale with R and Python	<ul style="list-style-type: none">✓ End-to-end database security with Always Encrypted✓ Enhanced in-memory performance for all workloads✓ Basic reporting✓ Basic analytics	<ul style="list-style-type: none">✓ Development and management tools✓ Free to use (no software costs)	<ul style="list-style-type: none">✓ Build, test, and demo apps in non-production environments✓ Free to use (no software costs)✓ All Enterprise Edition features available

Figure 2. SQL Server Version Comparison

2. Deploy in StreamOne Cloud Marketplace.

- Connect to StreamOne Cloud Marketplace and search for the Microsoft Azure SKU in Most Viewed, browsing by Categories or Vendor, or directly searching for it in the upright search field

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Logged in as William.Matyas@azlan.com [Log Off]

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Dear reseller, We are pleased to announce that StreamOne is now live in Slovakia. With this addition the platform reaches now 17 European countries, strengthening the TD Cloud presence in Europe.

Most Viewed	Newest
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Microsoft Azure Microsoft	Automation_MSP_Listing_FIN oneQATest Cloud Storage
BitTitan Cloud Enablement Services BitTitan Encryption	Microsoft Annual Billing Microsoft Email Archiving
Automation Listing FIN oneQATest Migrations Tools	Cisco Spark - Prepaid Annual Cisco Communications
Cisco Spark - Monthly Cisco Communications	Intercompany Test IBM Softlayer Cloud Storage

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PRODUCT SEARCH RESULTS FOR 'Azure'

IaaS/PaaS

Microsoft Azure
Microsoft



Microsoft Azure is a market leading cloud platform that enables you to quickly build, deploy, and manage applications across a global network of Microsoft-managed datacentres. Microsoft provides Cloud Infrastructure as a Service, Application Platform as a Service, and Cloud Storage Services

With Tech Data, you can sell the complete Azure experience. This covers everything from assessing cloud readiness to spinning up a VM instance, and migrations to ongoing management of assets. Tech Data have partnered with NetEnrich allowing resellers to offer white-labelled services for Azure.

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- You will then be able to browse the different skus, Click on "ADD TO CART" button of registration SKU

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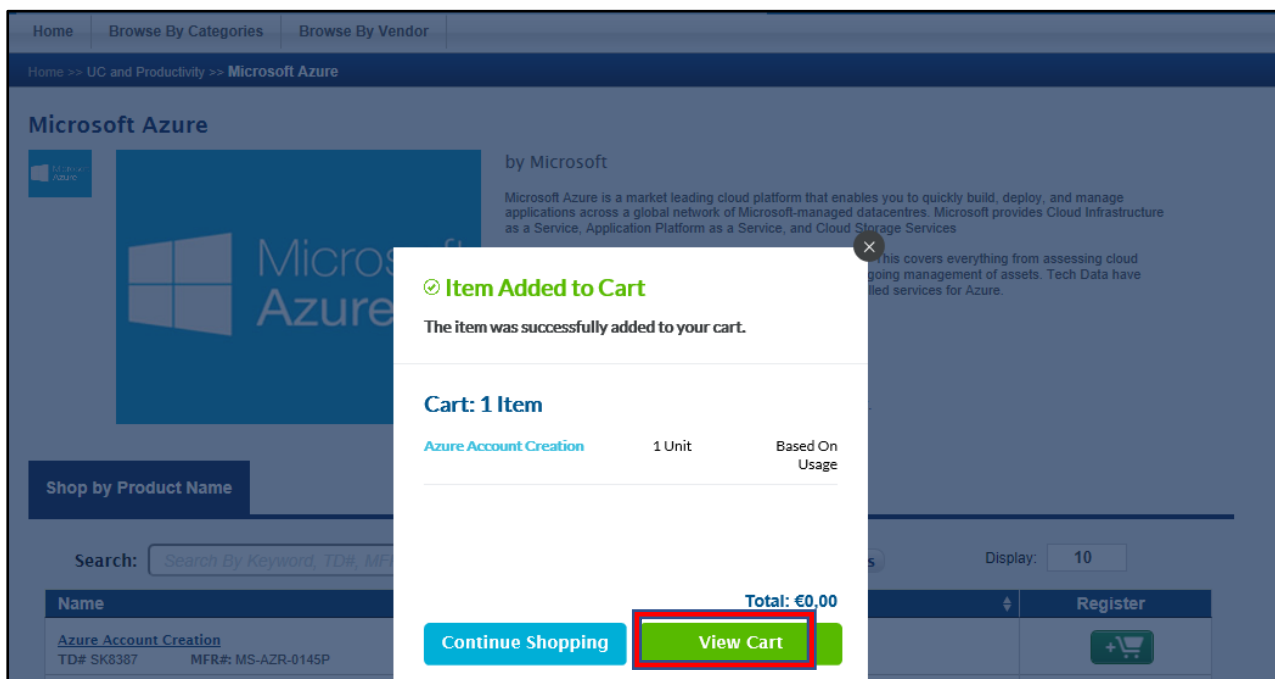
Display:

Name	Register
Azure Backup TD# SK8398 MFR#: td-backup-on-ms-azure	
Azure Registration - For Sandbox testing TD# SK35380 MFR#: td-on-ms-azure	
Azure Site Recovery TD# SK8399 MFR#: td-site-recovery-ms-azure	
Azure SQL DBaaS TD# SK8401 MFR#: td-sqlserver-ms-cloud	
Azure Storage TD# SK8400 MFR#: td-file-storage-ms-azure-std	
Azure Virtual Machine TD# SK35322 MFR#: MS-AZR-0146P22	
Backup On Azure Production TD# SK35316 MFR#: td-backupp-on-ms-azure	
NetApp Cloud Volumes TD# SK35323 MFR#: MS-AZR-0146PM	
Red Hat OpenShift TD# SK35327 MFR#: MS-AZR-0146P	<div style="border: 2px solid red; padding: 2px;">  </div>
Small Business Cloud Server v2 TD# SK35343 MFR#: azure-sbcsv2-uk-sku	

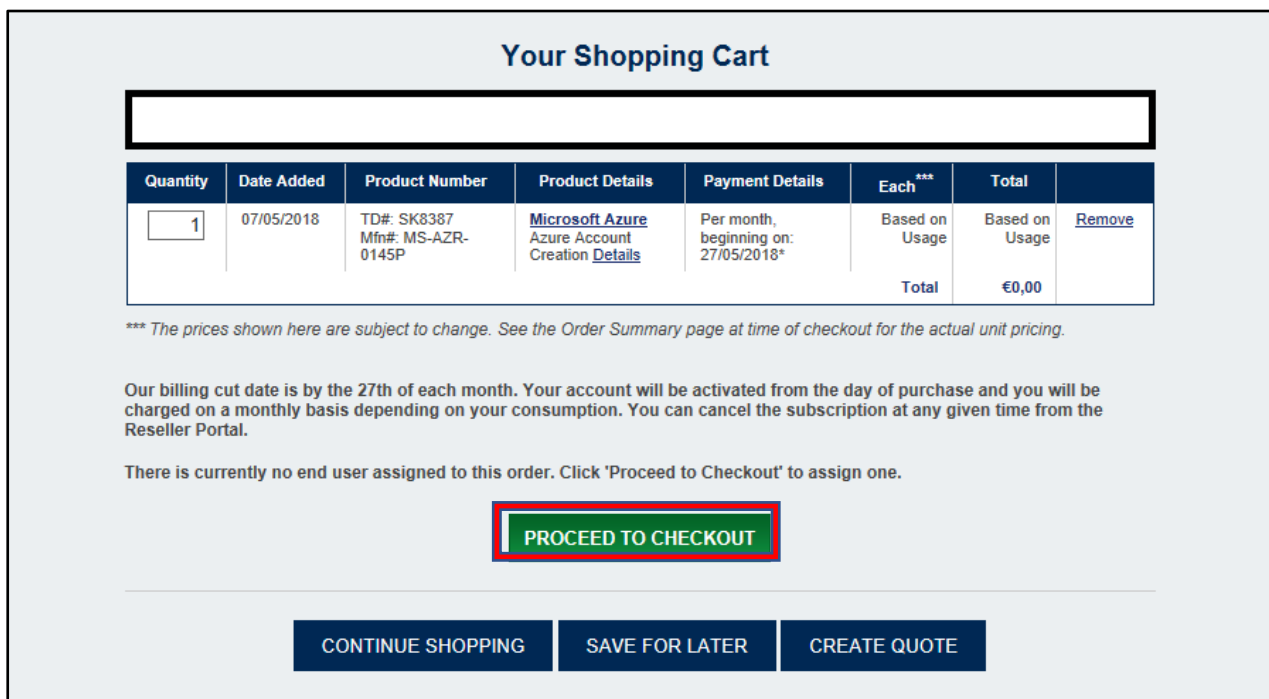
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- Click on "View Cart" button



- Click on 'Proceed to Checkout' button



- Fill End User information or select any end user using your email and click on "Continue to Configuration" button

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Checkout
Logged in with ID: 345802 | Log Out

Cart → End Customer Info → Azure Settings → Configuration → Payment → Summary → Complete

< Return to Shopping

📞 Sales and Customer Support: +358 20 1553 694

✓ End Customer Info

The following products require end user information: *Indicates a required field

- Azure Account Creation

Please select or enter an end user for the products above:

Select From Address Book

Company Name:*

Techdata France

First Name:*

William

Last Name:*

Matyas

Title/Position:

Cloud Architect

Phone Number:*

0033682323069

End Customer Email:*

william.matyas@techdata.com

Confirm End Customer Email:*

william.matyas@techdata.com

Address Line 1:*

142 avenue de Stalingrad

Address Line 2:

📖 This email address MUST be associated with the end customer domain to set up the account properly. If you do not wish to send communication directly to this email you will have the option to specify a different email address during the next step in the Account Administration section.

Configuration page should be displayed.

Fill in your Microsoft Partner Network ID.

Click on Create a New end customer Microsoft account button.

Enter any unique domain name and click on Check Availability button.

SQL SERVER ON AZURE - STEP BY STEP GUIDE

10

Select "The End Customer email" radio button from the "Account Administration" module.
Or select "I will administer the account" radio button from the account administration module and enter the Delegate admin email ID.

Click on "Continue to Payment" button.

Click on "Continue to Summary" button.
Verify the information shown and click on "Place Order" button.

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[End Customer Info](#)
[Configuration](#)
[Payment](#)
[Summary](#)
[Complete](#)

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Sales and Customer Support: +44 1256 788 050

End Customer Information
Change

Ryan Berger's Burgers

Ryan Berger
B+B York
15 St. Peters Grove
York, YO30 6AQ, United Kingdom
ryan.berger@techdata.com

Configuration
Change

Microsoft Account Domain:
azrhos11td.onmicrosoft.com

Credentials will be sent to:
ryan.berger@techdata.com

Order Summary
Edit Cart

Quantity	Product	Price Each	Total
1	Red Hat OpenShift	Based on Usage	Based on Usage
	Red Hat OpenShift		
	You will be billed based on account usage		

Have a promo code?

Total: £0.00

Payment Method
Change

Reseller PO Number:
1234

Payment Method:
Terms

Terms and Conditions

☒ I have read and agree to the Reseller Marketplace Terms*

☒ I have read and agree to Vendor Terms For Microsoft*

Place Order

Your order should be complete.

✓ Order Complete

Order #S000186103

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Thank you for your business.
Your order is currently being processed.

To check the status of your order please visit the [Reseller Portal](#) and view [Order Tracking](#)

When we have completed processing your order:

- An email will be sent to your end user with getting started instructions,

Order Summary

Order Date: 07-05-2018 12:54 PM CEST

Reseller PO #: 123456789

Sold To:

TECH DATA FINLAND OY EI TILAUKSIA
TALLE ASIAKASNUMEROLLE SOKERILINNANTIE 11 C
ESPOO, 02600 FI
9999999999
S1QATestingEmail@techdata.com

End Customer Information:


Techdata France
William Matyas
142 avenue de Stalingrad
Colombes 92700
France
william.matyas@techdata.com

Items Purchased

Qty	M/Part#	Vendor	Description	Date	Promo	Each	Total
1	MS-AZR-0145P	Microsoft	Azure Account Creation	07/05/2018		Based on usage	Based on usage
						Total	€0,00

[Return to Shopping](#)

You should receive an email with your Microsoft Subscription Information:




Dear William Matyas,

Your Microsoft account has been setup.

Please continue to <https://login.microsoftonline.com> and login with the username and password below for your Office 365 subscriptions.
For Azure, please use <https://portal.azure.com/>

Username: admin@williamtestocp.onmicrosoft.com


Password: *****



Your Subscriptions:

Name	Quantity
Azure Account Creation	1

And another email regarding the deployment of your Azure Bundle:



Hi!

Your Azure Bundle has been deployed!

This is to inform you that the Azure Bundle has been deployed successfully. Please find the details below.

Sales Order Details

Sales Order #: S000186148

Reseller PO: test

End Customer PO:

Account Number: 0000345802

End Customer Email: william.matyas@techdata.com

Bundle Details

Bundle Name: Red Hat OpenShift

Subscription Id: 475e5e96-bf99-4ab9-ab76-a9d5fbfd9a32

Datacenter Location: West Europe

Credentials

Now click on Reseller Portal, then Customer Admin. Look for your Customer and click on IaaS/PaaS.

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Welcome Tech Data 703212

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Address Book

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Home Page

Orders

Insights

Recurring Billing

Customer Admin

Address Book

Opportunities

My Profile

Customer Admin

Show 100 entries

Search: ryan.b

Company	Email
Ryan Berger's Burgers	ryan.berger@techdata.com

SaaS

IaaS/PaaS

Billing

Quotes

Company Info

Carts

Showing 1 to 1 of 1 entries (Filtered from 37 total entries)

First

Previous

1

Next

Last

Then Click on Modify:

16/01/19 05:52:PM CET	S000260371 Sandbox	StreamOne	Microsoft	MS-AZR-0145P	SK7608	azrhos11td	both infrastructure-as-a-service and platform-...	1	<div><div>Support</div><div>Modify</div></div>
--------------------------	-----------------------	-----------	-----------	--------------	--------	------------	---	---	--

Showing 1 to 12 of 12 entries

First

Previous

1

Next

Last

Cancelled IaaS/PaaS Applications

Then click on “Click to Configure”:

The screenshot displays the 'Customer Admin' section of the Tech Data 703212 portal. The interface includes a sidebar with navigation links: Home Page, Orders, Insights, Recurring Billing, Customer Admin (highlighted), Address Book, Opportunities, and My Profile. The main content area shows the 'Status of Subscription' as 'Active', the 'Current Billing Cycle' as '12/01/2019 - 11/02/2019', the 'Current Budget' as '£0.00', and the 'Subscription Usage' as '£0.00'. Below this, a 'Usage Threshold Notification at: 0%' is shown with an 'edit' button. The 'Reseller Information' and 'End User Information' sections provide contact details for Tech Data and Ryan Berger's Burgers, respectively. The 'Subscription Settings' section shows the domain 'azrhos11td' and the subscription name 'Microsoft Azure'. A table lists two subscriptions: 'Azure Registration - Base Subscription' and 'Azure Bundle - Red Hat OpenShift'. The 'Click to Configure' button for the 'Azure Bundle - Red Hat OpenShift' subscription is highlighted with a red box. A disclaimer on the right states 'Data updates every 24 hours'. A 'Need to access your end user's subscription' message with a 'View Steps' link is also present.

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Welcome Tech Data 703212 Search Address Book Find

Home Page
Orders
Insights
Recurring Billing
Customer Admin
Address Book
Opportunities
My Profile

Status of Subscription: Active
Current Billing Cycle: 12/01/2019 - 11/02/2019
Current Budget: £0.00
Subscription Usage: £0.00

Usage Threshold Notification at: 0% [edit](#)

Disclaimer: Data updates every 24 hours

Reseller Information
Reseller PO#: 1234
Tech Data
Wessex House, Oxford Road Chineham Business Park
Basingstoke, Hampshire RG14 1PA GB
S1QATestingEmail@techdata.com
1231223111

End User Information
End User PO#: Ryan Berger's Burgers
Ryan Berger
8+B York 15 SL Peters Grove
York
YO30 6AQ
ryan.berger@techdata.com
3526502341

Subscription Settings
Domain: azrhos11td
Subscription name: Microsoft Azure [edit](#)

Order #	Vendor	Name	Delegate	Manage	Status	Created On	Modified On
S000260371 Sandbox	Microsoft	Azure Registration Base Subscription	Delegate	Manage	suspended / active	16/01/2019 05:22 PM CET	16/01/2019 05:52 PM CET
S000260371	Microsoft	Azure Bundle - Red Hat OpenShift			Click to Configure	16/01/2019 05:22 PM CET	16/01/2019 05:22 PM CET

Need to access your end user's subscription
Click the View steps option below for more information on how to get started.
[View Steps](#)

Information related to selected bundle should be displayed.

✓ Configure your Red Hat OpenShift v2 Solution

Location

Select data center location

North Europe

Resource Group Name

azrhos11td

Basic Information

Admin username

redhatadmin

Admin password

Confirm password

SSH Private Key

```
-----BEGIN RSA PRIVATE KEY-----
MIICdQIBADANBgkqhkiG9w0BAQEFAASCAl8wggJbAgEAAoGBAKRmVZ/DZI57pctEjmipzI0/g+8w
sIZzX9Wa10kejtD6Iu2cWEZGw8mgMR+TfaQUH2XodzqjMnsVA8V+hqcyPw8sDQ1mIE/KUeoF4I3
rdAAMc5gTgXoM9N9bRmra1gVVzh/Vx195RogvGUfaFiAnNqxcn9w88XE0V4Q8q2Rl6qzAgMBAAEC
gYEAneT2J/d5SEShcMhyo2qav8acxfADzq5tdARLnIZivKayQjgbbGRDq0KSsTR1iqBb4wTKxYKV
4ZIVDbmmhomSwxQHns7tMds+xeRdddWway6SfDHUB+iPg6YGCtaeKpfq4CzMz7hSxHt5sHZsLtk
HkSV0r1DM8nbq6gENO/jJmECQQDprIwB+Zokiizw7pXCbXkZISTwJEhzhIFX6NnhDLT81YKDFpCK
p7JHoUQN4J3Qk1hnAfILnKzLOf32ec/1NYE5AkEAtBtm9le+f61NVUPluV7u6uXcJMgwQVPUQ0wRf
mPl 8lIl1t+S/u77nnd7v1una8T2777u777nnd10777fhrVTSI BHSuT /B01dEnK6dnew /V/B3u7uK1 1hv
```

Fill the Basic Information.

Please note that the Admin Username and the Admin Password will be used to access the OpenShift Container Platform Console.

Select Location from location drop down and fill in the Resource Group Name.

A SSH key pair will get generated and you need to copy and save the private key. Once the OpenShift bundle is deployed in the Azure portal, you might need to use this Key to login into the underlying VMs.

Enter Red Hat Subscription Manager credentials:

The screenshot shows a web interface for setting up an SSH Private Key and Red Hat Subscription Manager credentials. At the top, the title "SSH Private Key" is displayed. Below it, a large text box contains the generated RSA private key, starting with "-----BEGIN RSA PRIVATE KEY-----" and ending with "-----END RSA PRIVATE KEY-----". The key text is wrapped in a light gray box. Below the key, the section "Private Key secured" includes a checked checkbox and a warning: "Your SSH Private Key is required to logon to the Bastion instance directly. Please make sure to store your key in a safe place. It will never be displayed again and Tech Data will keep no copy of it." Below this, a text prompt says "Check the box to proceed if you have secured your Private Key." The next section is "Red Hat Subscription Manager Credentials", which includes three input fields: "Red Hat Subscription Manager username", "Red Hat Subscription Manager password", and "Red Hat Subscription Manager pool ID". At the bottom, a light gray bar contains the text: "Complete all required fields and press the validate button. Validation may take several minutes".

SSH Private Key

```
-----BEGIN RSA PRIVATE KEY-----
MIICdQIBADANBgkqhkiG9w0BAQEFAASCAL8wggJbAgEAAoGBAKRmVZ/DZIS7pctEjmipzI0/g+8w
siZzX9Wa10kejtD6Iu2cWEZGw8mgMR+TfaqUH2XodzqjMnsVA8V+hqcgypW8sDQ1mIE/KUeoF4I3
rdAAMc5gTgXxM9N9bRmra1gVVzh/Vx195RogvGUfaFiAnNqxcn9w88XE0V4Q8q2Rl6qzAgMBAAEC
gYEAnEt2J/d5SEShcMhyo2qav8acxfADzq5tdARLnIZivKayQjgbbGRDq0KSsTRliq8b4wTKxYKV
4ZIVDbmmhomSwxQHns7tMdtS+xeRdddWVay6SfDHUB+iPg6YGCTaeKpfq4CzMz7hSxHt5sHZsLtk
HkSV0rLDM8nbq6gENO/jJmECQQDprIwB+Zokiizw7pXCbXkZI5TwjEhzhIfX6NnhDLT81YKDFpCK
p7JHoUQN4J3Qk1hnAfILnKzLOf32ec/1NYE5AkEAt8tm9le+f61NVUMuV7u6uXcJMghQVPUQwRf
mDL8UWU1t5/y22gpW2xlwne8T227Jy2OzggU920fbcYISLRHSwI/B01dErK6Hmoy/VR3WZwSLLbv
8JRxyr1FEoyhNXg0gXaDj6mRa7340Um20gpp1r0aEOnTLWysMEfLpSf6wnBAkAXn5B9tzyRwpXO
HSWY9Diloutd2ET6H7q1QwmlW2PknY/DyINQ92wexqiIew727XVUy61LUy1KUsEh1CYiEoMDJAKAu
6fyAI1YDXmNczYyHjydBm20WpJmeaO18rvxsh4RXWmuyvfHQ38VywwHqL+qa7gkTa7akjkn5QrXC
LgcadMuf
-----END RSA PRIVATE KEY-----
```

Private Key secured

☒ Your SSH Private Key is required to logon to the Bastion instance directly. Please make sure to store your key in a safe place. It will never be displayed again and Tech Data will keep no copy of it.

Check the box to proceed if you have secured your Private Key.

Red Hat Subscription Manager Credentials

Red Hat Subscription Manager username

Red Hat Subscription Manager password

Red Hat Subscription Manager pool ID

Complete all required fields and press the validate button. Validation may take several minutes

SSH Private Key:

You will be given your Private SSH Key during the order of you OpenShift Container Platform bundle. Please make sure you secure this key and store it in a safe place as you will need it for SSH access to any of your instances. Your key will be displayed only once and there is no way to recover it later on. For security reasons, Tech Data does not keep a copy.

Then, Click on Validate.

An API call will be hit from backend and validate the Red Hat Subscription Manager Username. It will also retrieve the Red Hat Subscription Manager Pool ID.

The screenshot shows a web form with two main sections. The first section, titled 'Red Hat Subscription Manager Credentials', contains three input fields: 'Red Hat Subscription Manager username' with the value 'william.matyas', 'Red Hat Subscription Manager password' with masked characters, and 'Red Hat Subscription Manager pool ID' which is currently disabled with a grey background and the text 'Complete all required fields and press the validate button. Validation may take several minute'. Below these fields is a red 'Validate' button. The second section, titled 'Advanced Bundle Settings', includes a 'Deployment size' dropdown menu set to 'Dev/Test', an 'OpenShift cluster prefix' input field with the value 'openshift', and three toggle switches for 'Enable metrics', 'Enable logging', and 'Enable Container Native Storage', all of which are currently turned off.

You can then select the Deployment Size.

OpenShift Cluster Prefix: Cluster Prefix used to configure hostnames for all nodes (bastion, master, infra and app nodes).

Enable Metrics: Enable Metrics if you wish to deploy Metrics

Enable Logging: Enable Logging if you wish to deploy Logging

Enable Container Native Storage: Enable CNS if you wish to deploy an extra Gluster File Storage for Container storage

Click on 'Continue Configuration' button.

3. Connect to Azure Portal

Connect to the Azure Portal <https://portal.azure.com> with your credentials. You would need to login using the same user name and password as the one created in StreamOne and what was emailed to you.

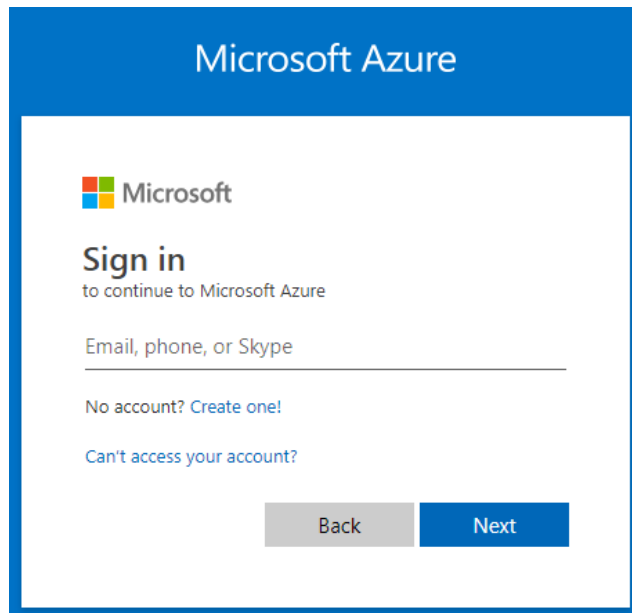


Figure 3. Sign-in to Azure Portal

You will then be connected to the Azure Portal. Go to Resource groups and choose the resource group name in which the resources are deployed, it is the resource group name you initially provided in Stream one.

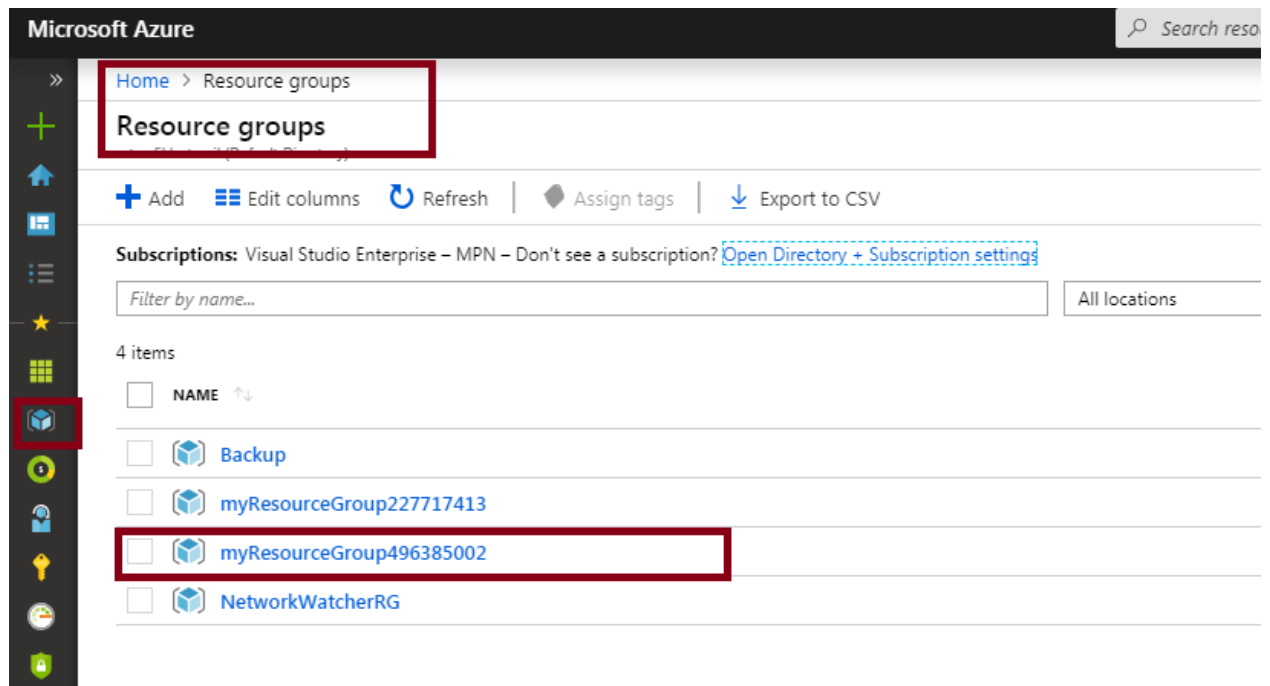


Figure 4. Resource groups list

After deployment, you would see the resources as follows

myResourceGroup496385002
Resource group

Search (Ctrl+/) Add Edit columns Delete resource group Refresh Move Assign tags Delete Export to CSV

Subscription (change): Visual Studio Enterprise - MPN Deployments: 1 Succeeded
Subscription ID: d66f13b7-4a33-4d7c-9d5c-f7b2650d5236
Tags (change): Click here to add tags

Filter by name... All types All locations

10 items ☒ Show hidden types

NAME	TYPE	LOCATION
g6bqy35cczss	Storage account	West Europe
shutdown-computevm-sqlvm	Microsoft.DevTestLab/schedules	West Europe
sqlip	Public IP address	West Europe
sqlnic	Network interface	West Europe
sqlnsg	Network security group	West Europe
sqlvm	Virtual machine	West Europe
SqlIaaSExtension (sqlvm/SqlIaaSExtension)	Microsoft.Compute/virtualMachines/extensions	West Europe
sqlvm_disk2_23fab86785e041bcb45cbd1c60d0cff6	Disk	West Europe
sqlvm_OsDisk_1_636b378a833b43b0ad9574ac53d6572b	Disk	West Europe
vnet	Virtual network	West Europe

Figure 5. Resources within the provisioned resource group

Since RDP is by default enabled in this solution, you can go to the windows Server VM (sqlvm) and connect

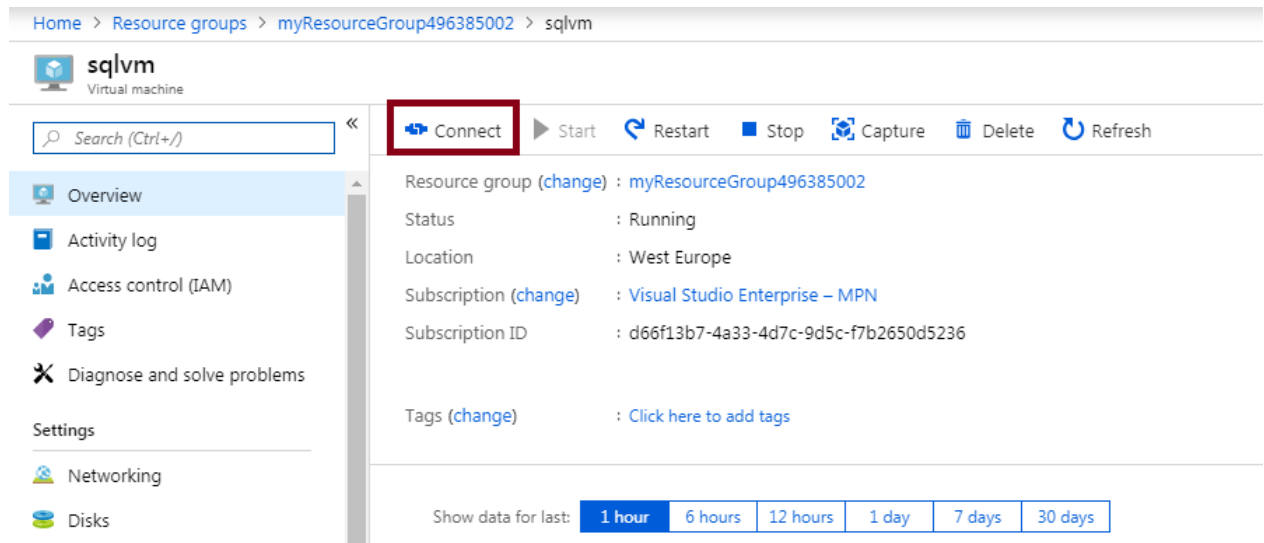


Figure 6. connect to Azure VM

Download the RDP file and connect using

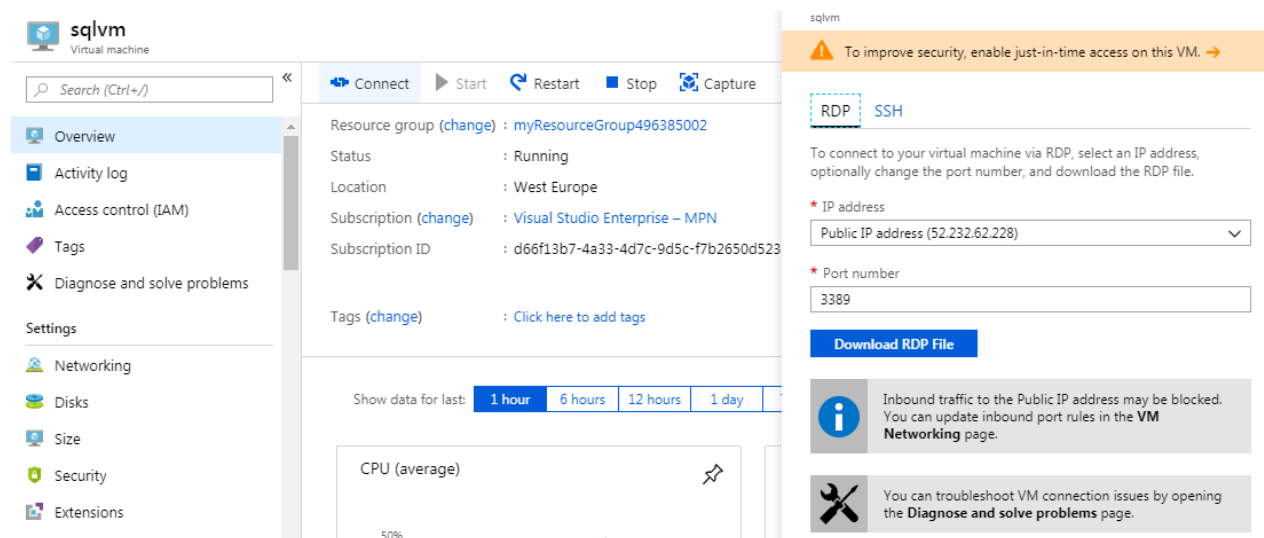


Figure 7. Download RDP file

Use the admin user name and password you initially provided in stream one to log into the remote session.

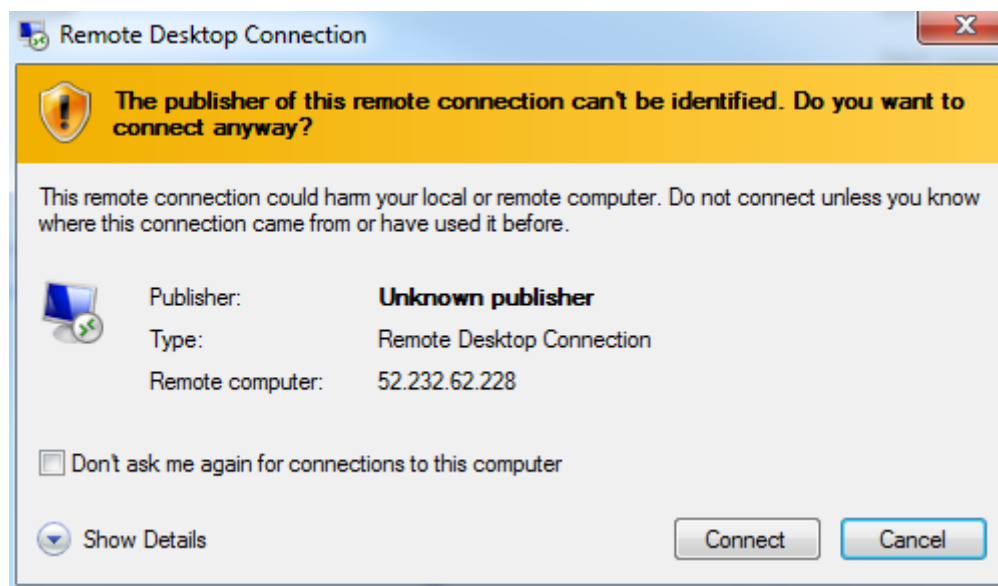


Figure 8. Initiate a RDP session

Once logged in to the VM, open Microsoft SQL Server Management Studio 17

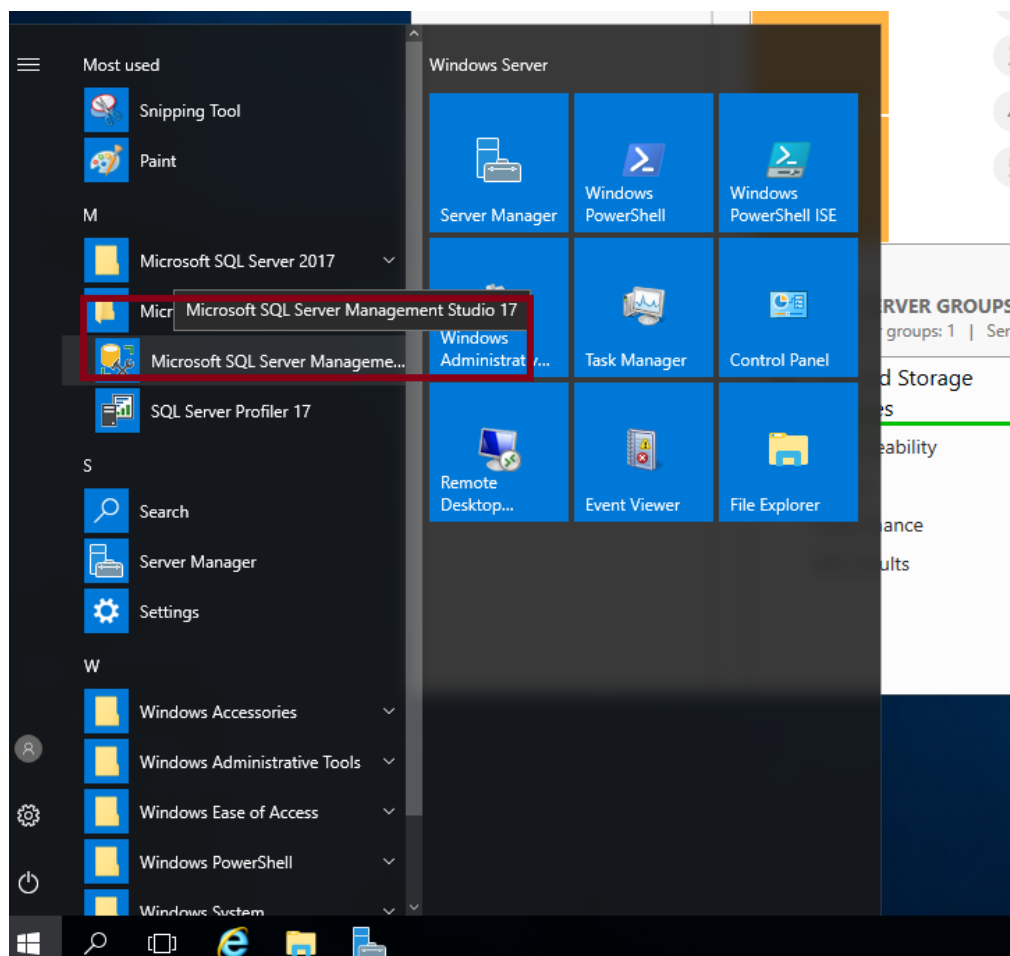


Figure 9. Open SSMS

You would be able to login into Database engine using either the VM (Windows Server) admin account via Windows Authentication or using SQL Server Admin account and password via SQL Server Authentication, the SQL Server Admin account and password are those you initially provided in stream one

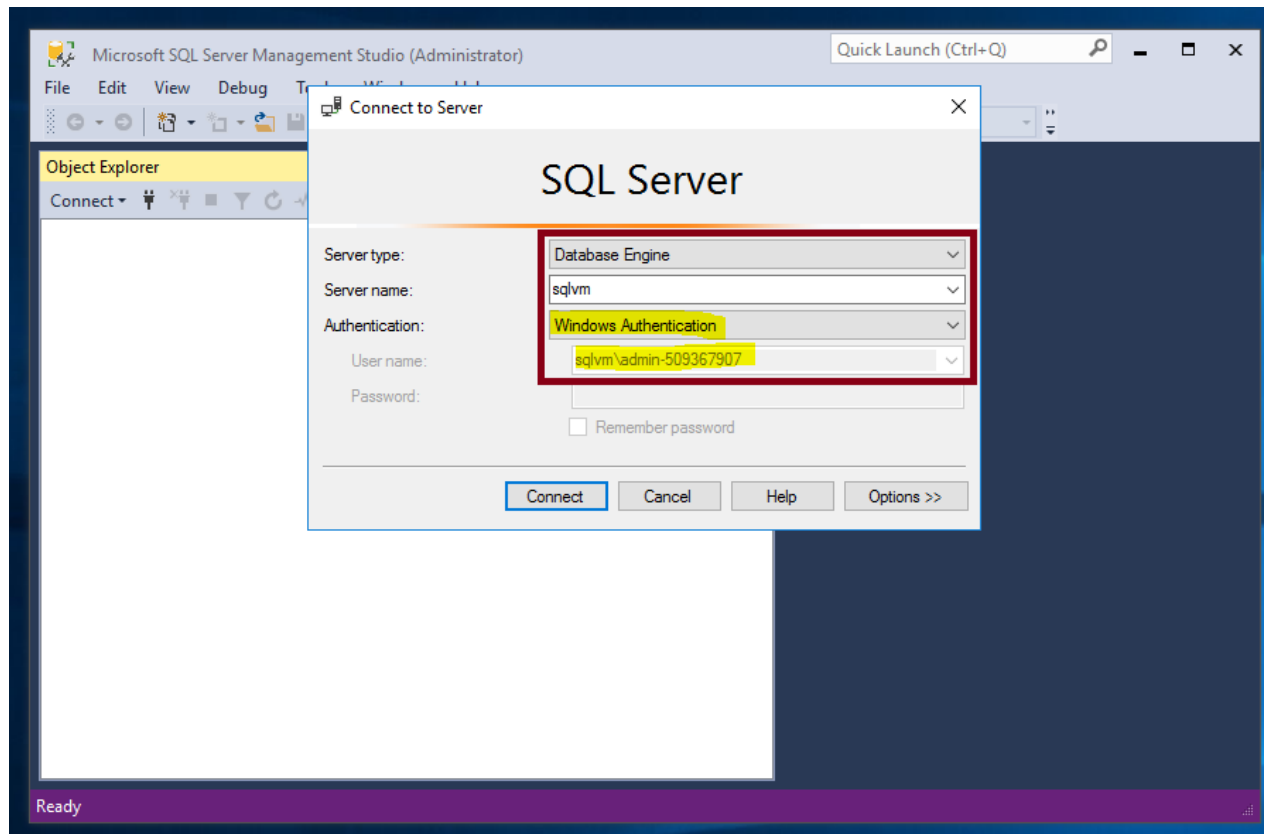


Figure 10. Login to the Database Engine using Windows Authentication

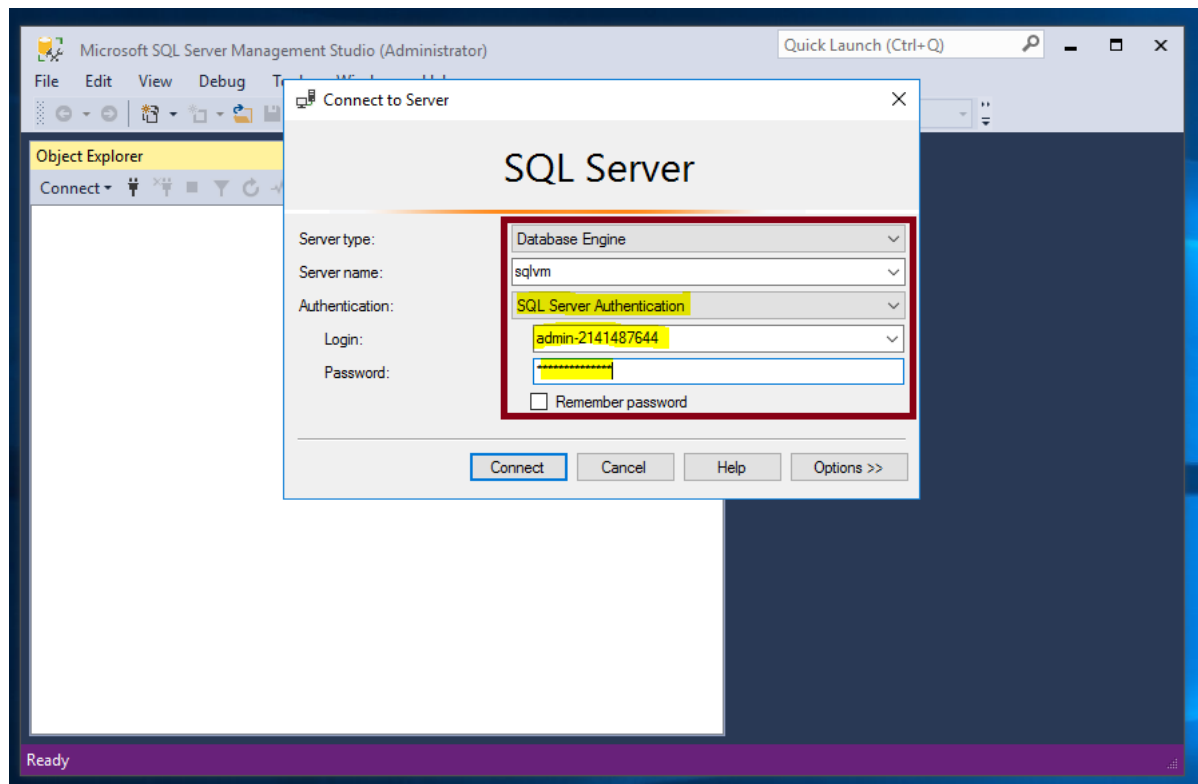


Figure 11. Login to the Database Engine using SQL server Authentication

Once successfully logged in, you would be able to access the Database engine

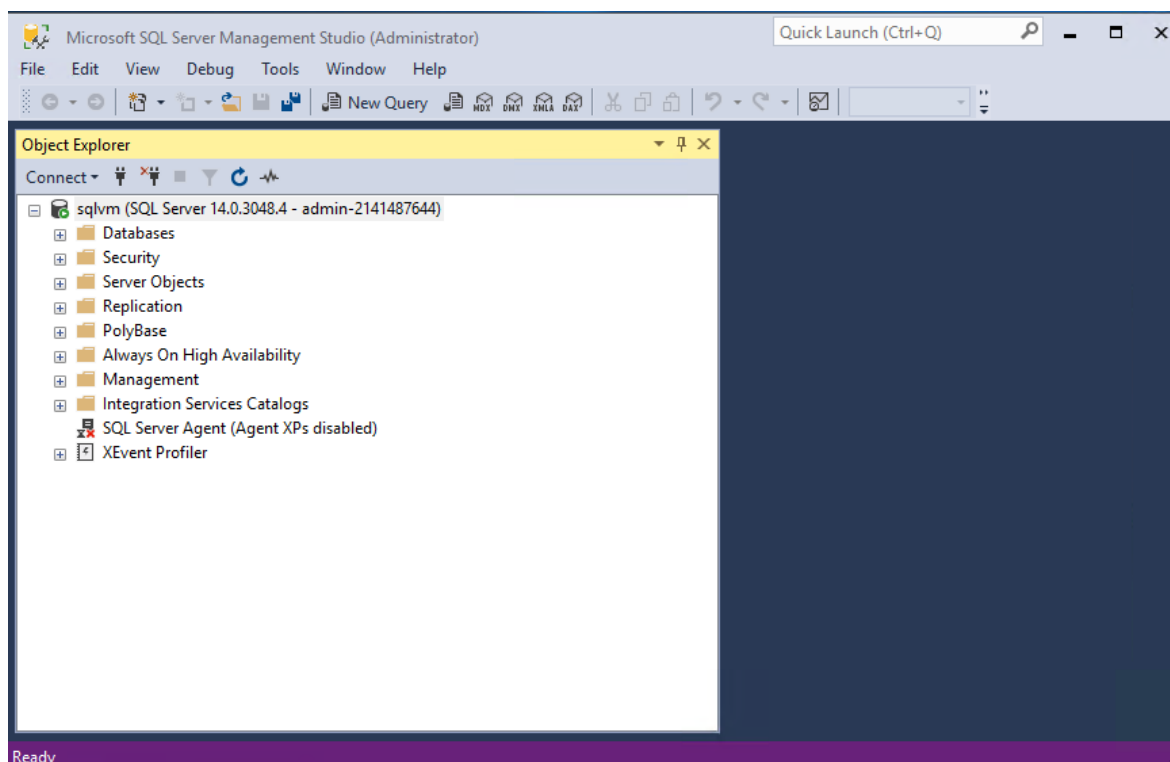


Figure 12. Object Explorer in SSMS

4. Post-Deployment Tasks

After you have successfully deployed the solution, you can configure additional items, among the:

4.1 Azure hybrid benefit

The Azure Hybrid Benefit for Windows Server allows you to save up to 40% on Windows Server VMs in Azure by utilizing your on-premises Windows Server licenses with Software Assurance. You can configure enable it from the configuration section.

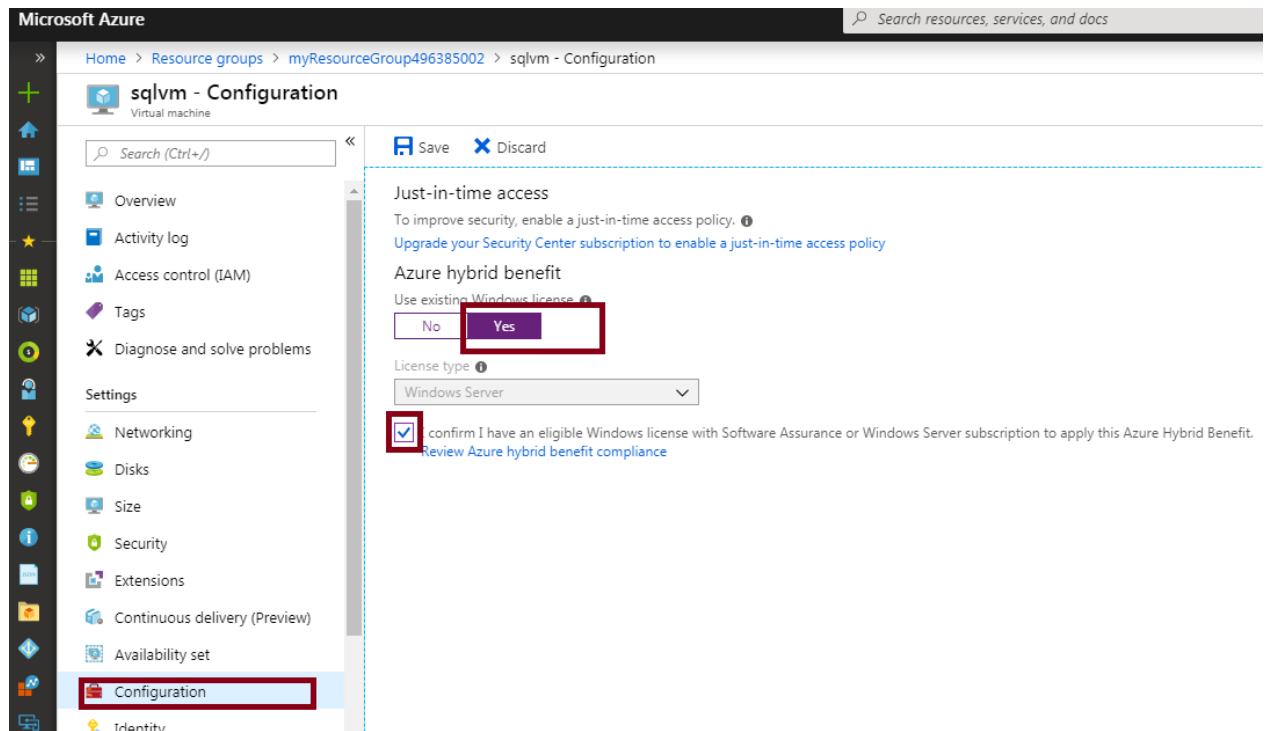


Figure 13. Azure Hybrid Benefit

Additionally, there are two licensing models for a virtual machine (VM) hosting SQL Server - pay-per-usage, and bring your own license (BYOL). And now, using either PowerShell or Azure CLI, you can modify which licensing model your SQL Server VM uses.

Switching between the two license models incurs no downtime, does not restart the VM, adds no additional cost (in fact, activating AHB reduces cost) and is effective immediately.

You can use PowerShell to change your licensing model as follows. Be sure that your SQL Server VM has already been registered with the new SQL resource provider before switching the licensing model.

```
$SqlVm = Get-AzureRmResource -ResourceType Microsoft.SqlVirtualMachine/SqlVirtualMachines -
ResourceGroupName <resource_group_name> -ResourceName <VM_name>
$SqlVm.Properties.sqlServerLicenseType="AHUB"
<# the following code snippet is only necessary if using Azure Powershell version > 4
$SqlVm.Kind= "LicenseChange"
$SqlVm.Plan= [Microsoft.Azure.Management.ResourceManager.Models.Plan]::new()
$SqlVm.Sku= [Microsoft.Azure.Management.ResourceManager.Models.Sku]::new() #>
$SqlVm | Set-AzureRmResource -Force
```

For more information, refer to the article below:

<https://docs.microsoft.com/en-us/azure/virtual-machines/windows/sql/virtual-machines-windows-sql-ahb>

Alternatively, you can switch in the portal in the SQL server configuration section of the VM.

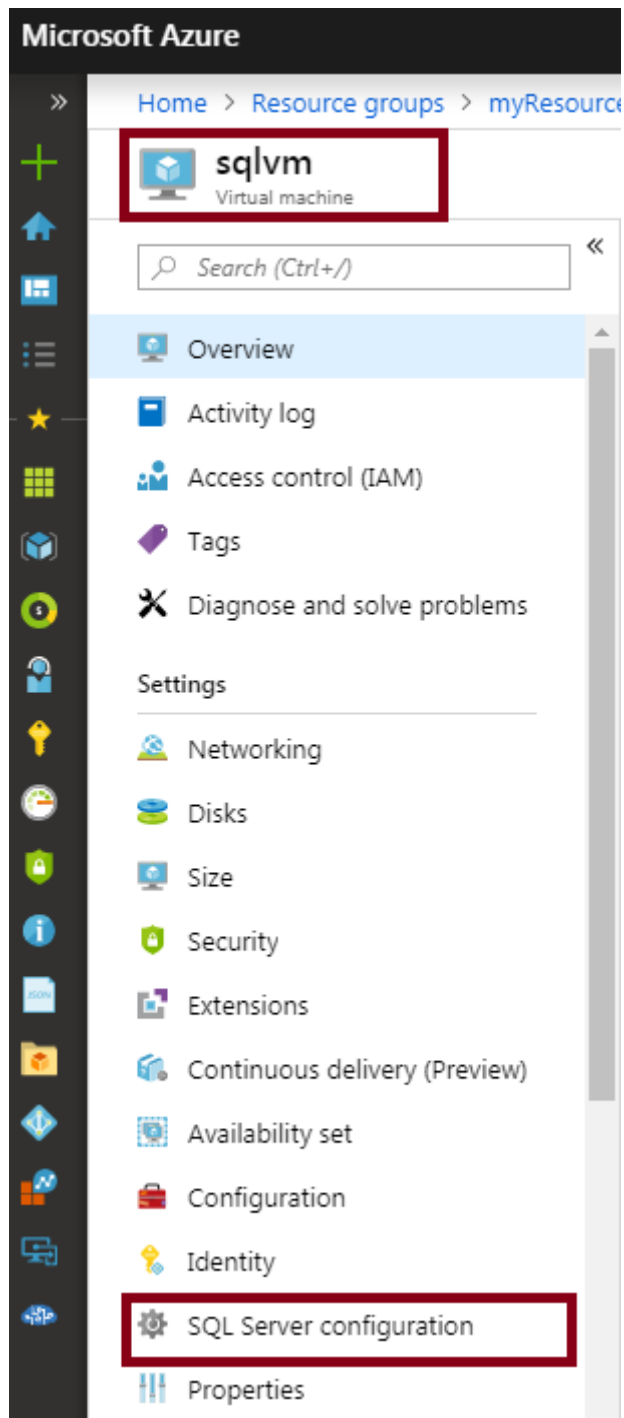
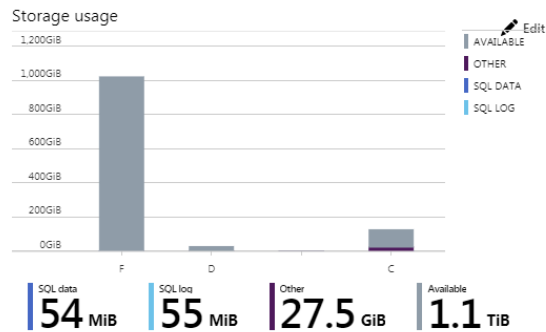


Figure 14. SQL Server Configuration

SQL Server configuration □

SQL Server 2017 Enterprise



SQL Server License

Cancel

License type Pay As You Go

Save up to 43% with licenses you already own. Already have a SQL Server license?

☐ Yes ☒ No

Figure 15. switch SQL Server License

4.2 Size

The following VM sizes are selected for the provided versions:

- Standard_DS3_v2 (Enterprise)
- Standard_DS2_v2 (Standard or Web)
- Standard_DS1_v2 (Free Express)
- Standard_D2s_v3 (Free Developer)

You can still scale up and change VM size after deployment from size section.

Home > Resource groups > myResourceGroup496385002 > sqlvm - Size

sqlvm - Size
Virtual machine

Search (Ctrl+J)

Search by VM size... Clear all filters

Size: Small (0-4) Generation: Current Family: General purpose Premium disk: Supported

Showing 12 of 41 VM sizes | Subscription: Visual Studio Enterprise – MPN | Region: West Europe | Current size: Standard_DS3_v2

VM SIZE	OFFERING	FAMILY	VCPUS	RAM (GB)	DATA DISKS	MAX IOPS
B1ms	Standard	General purpose	1	2	2	800
B1s	Standard	General purpose	1	1	2	400
B2ms	Standard	General purpose	2	8	4	2400
B2s	Standard	General purpose	2	4	4	1600
B4ms	Standard	General purpose	4	16	8	3600
D2s_v3	Standard	General purpose	2	8	4	3200
D4s_v3	Standard	General purpose	4	16	8	6400
DS1_v2	Standard	General purpose	1	3.5	4	3200
DS2_v2	Standard	General purpose	2	7	8	6400
DS2_v2	Promo	General purpose	2	7	8	6400
DS3_v2	Standard	General purpose	4	14	16	12800
DS3_v2	Promo	General purpose	4	14	16	12800

Figure 16. Size SQL Server VM

4.3 Backup

By default, Enterprise, Standard, and Free Developer versions have Automated backup enabled with 30 days retention period. You provide the password for Encryption certificate while provisioning these a solution with these versions in stream one. If the password changes, a new certificate is generated with that password, but the old certificate remains to restore prior backups. Backup is configured to use the same storage account used for Boot Diagnostics.

You can still modify the backup configuration from the SQL server configuration section of the SQL VM.

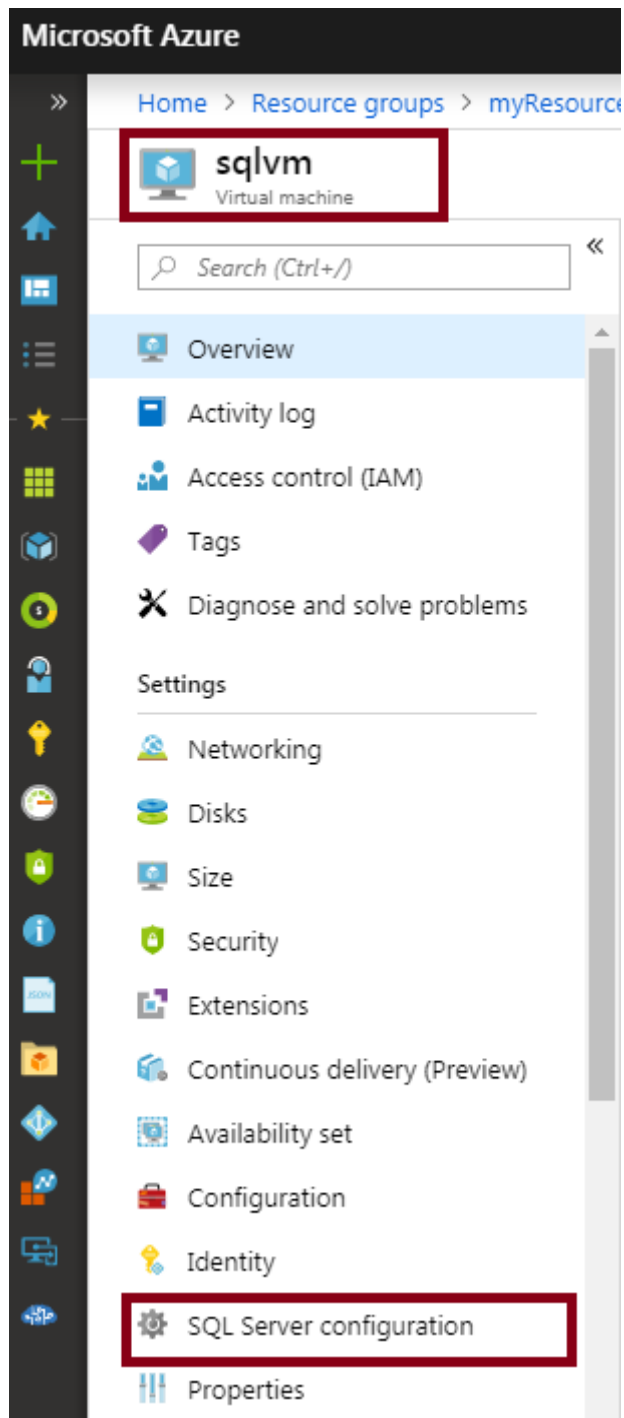


Figure 17. SQL Server Configuration

Select the Edit part in the “Automated Backup” section.


Microsoft Azure

Home > Resource groups > myResourceGroup496385002 > sqlvm > SQL Server configuration

SQL Server configuration


Port	1433
SQL Authentication	Enabled

Automated patching

 Edit

Automated patching	Enabled
Maintenance schedule	Sunday
Maintenance start hour (local time)	02:00
Maintenance window duration (minutes)	60

Automated backup

 Edit

Automated backup	Enabled
Retention period (days)	30
Storage account	g6bqy35cczcscs
Encryption	Enabled
Backup system databases	Disabled
Configure backup schedule	Automated

Azure Key Vault integration


 Edit

Figure 18. Automated Backup

Automated backup ✕ Cancel

* Automated backup Disable Enable

* Retention period (days) 30

* Storage account g6bqy35cczcss >

* Encryption Disable Enable

* Password

* Backup system databases ⓘ Disable Enable

* Configure backup schedule ⓘ Manual Automated

Figure 19. Edit Automated Backup Settings

4.4 Auto-shutdown

By Default, the VMs of all SQL versions are scheduled to Auto-shutdown on 7 PM UTC. You can still modify this configuration afterwards from Operations>Auto-shutdown section.

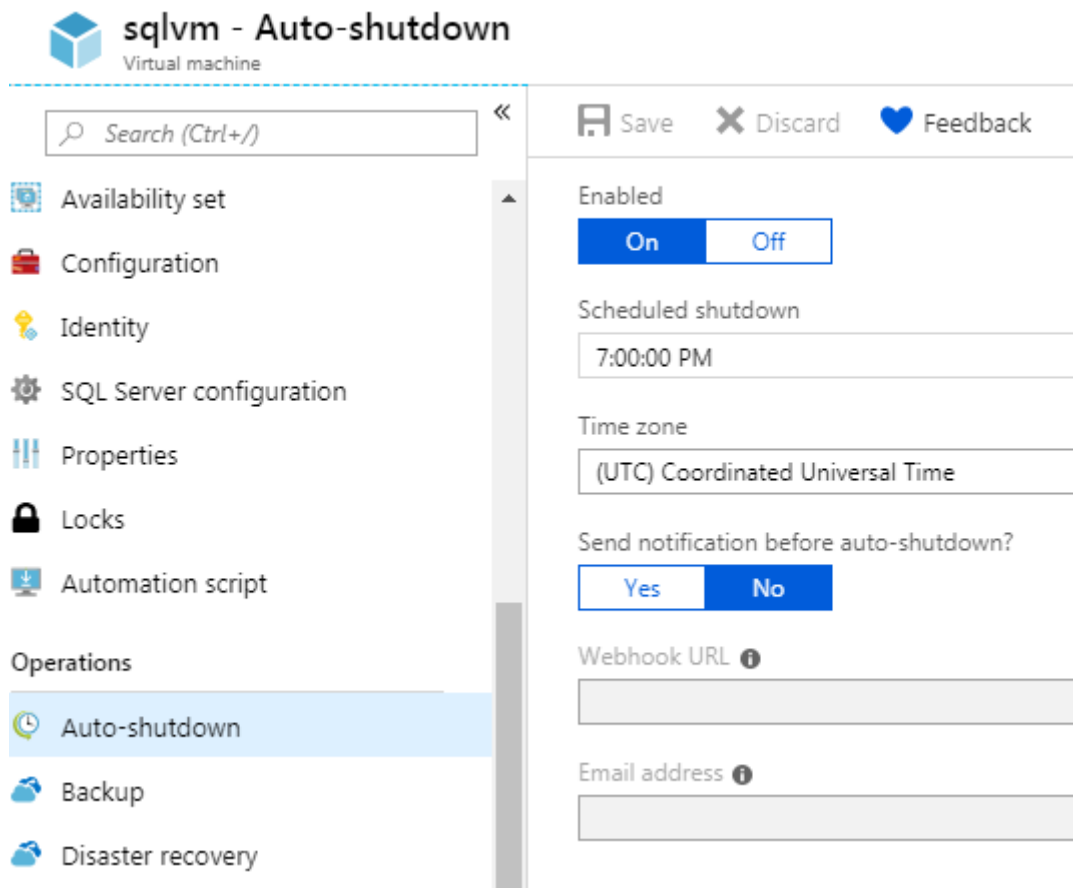


Figure 20. Auto-Shutdown Settings

4.5 Automated Patching

SQL server automated patching is enabled by default to start on Sundays at 2:00 local time for 60 minutes of Maintenance windows duration. You can modify this configuration at SQL Server Configuration>Automated Patching section.

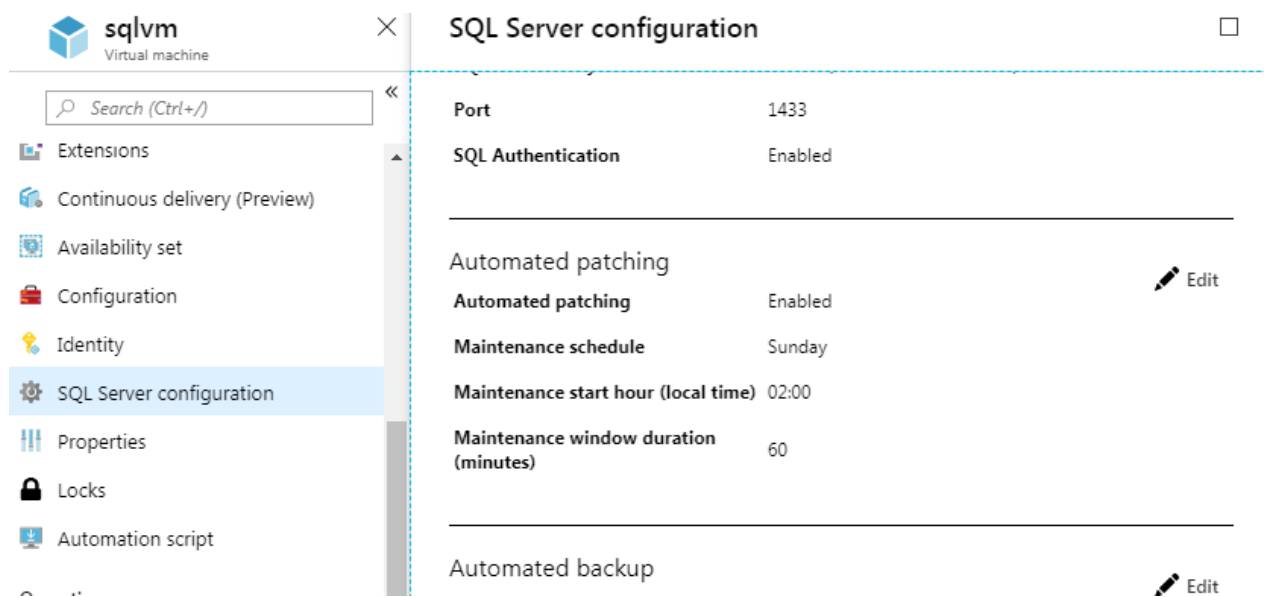


Figure 21. Automated Patching Settings

4.6 Boot Diagnostics

By Default, Boot Diagnostics is enabled and captured serial console output and screenshots of the virtual machine running on a host are stored in a general purpose v2 LRS Azure storage account, which name is randomly generated.

You can disable or modify this configuration from the section Support + Troubleshooting>Boot Diagnostics> Settings

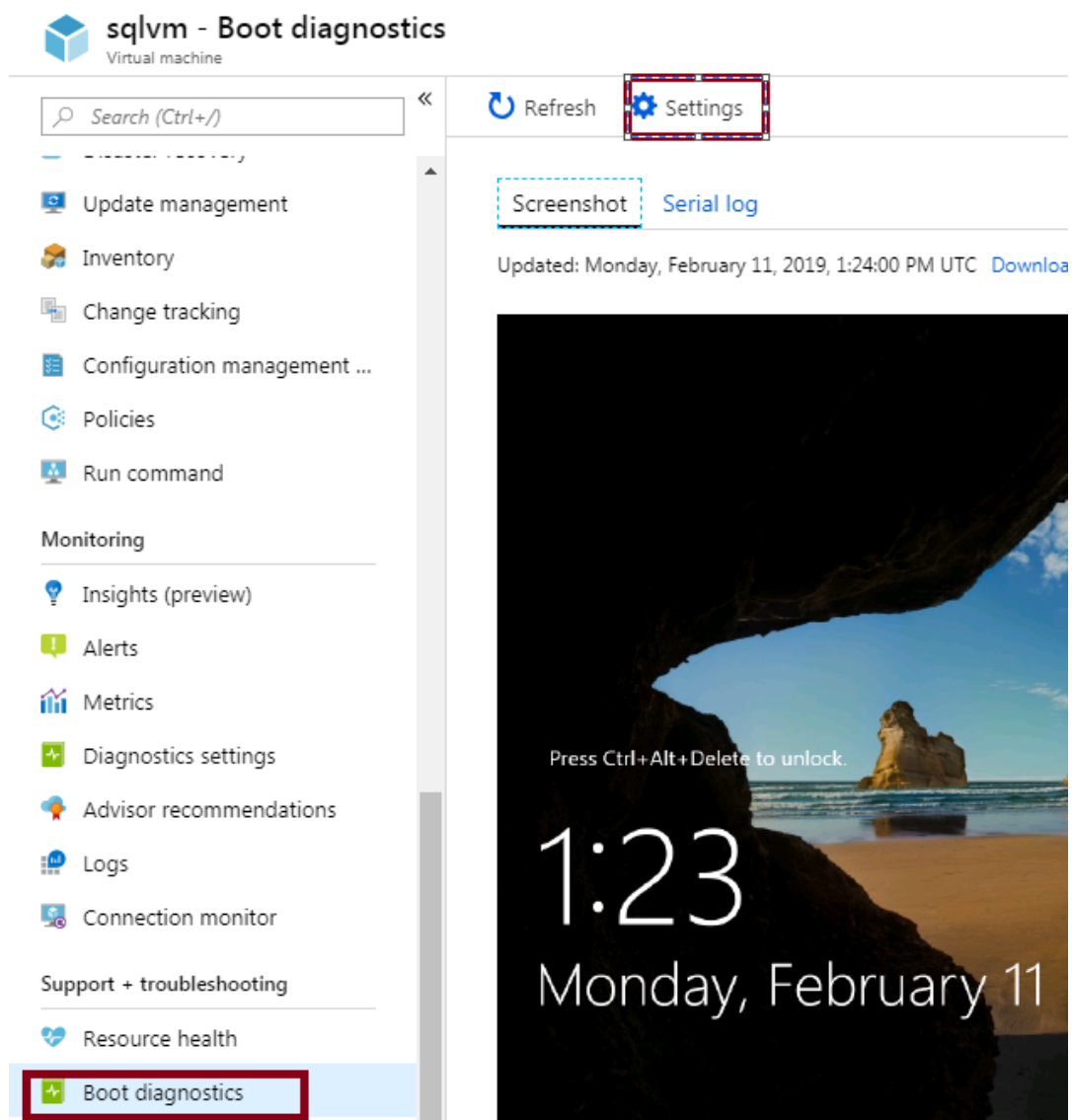


Figure 22. Boot diagnostics Settings

4.7 Performance Best-Practices

This solution follows best practices guidelines in terms of VM size and storage, for more details on further performance enhancements, please refer to the link below:

<https://docs.microsoft.com/en-us/azure/virtual-machines/windows/sql/virtual-machines-windows-sql-performance>

5. Architecture

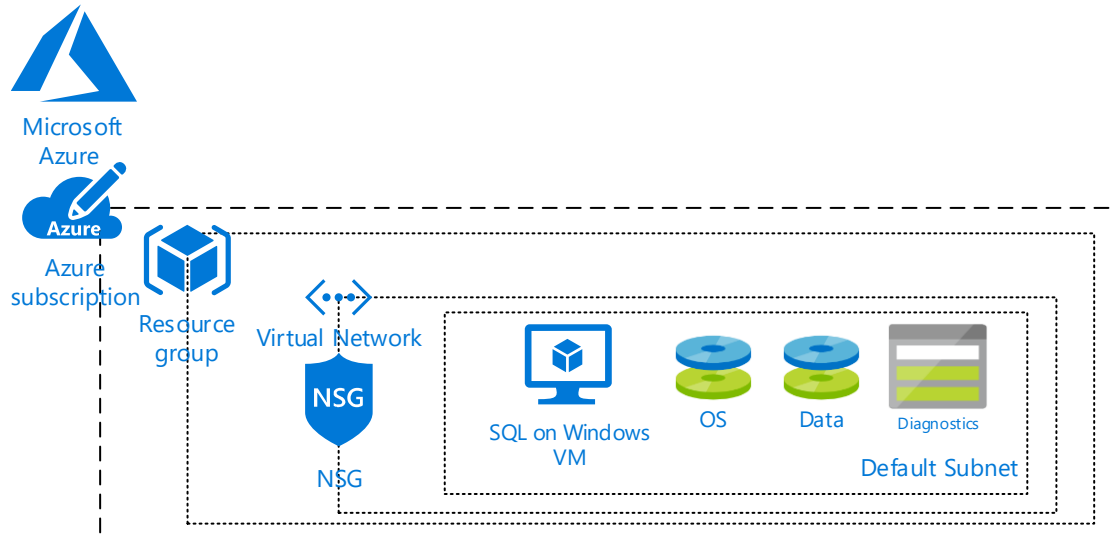


Figure 23. Provisioned Architecture of the solution

6. BOM

- Virtual Machine (on which SQL server is installed)
 - Standard_DS3_v2 (Enterprise)
 - Standard_DS2_v2 (Standard or Web)
 - Standard_DS1_v2 (Free Express)
 - Standard_D2s_v3 (Free Developer)
- A Default subnet (address range: **10.0.0.0/24**) within a virtual network
- Network interface card for the VM
- A Premium 1 TB SSD managed disks for Data
- A Premium 127 GB SSD managed disks for OS
- A Public dynamic IP address – Basic SKU
- Network security group: act as a firewall for the default subnet in which the VM is connected
- Locally redundant V2 storage account for boot diagnostics and Automated Backup (if necessary).

7. Limitations

The below are common references for features comparison, for more details please refer to the official documentations at:

<https://docs.microsoft.com/en-us/azure/sql-database/sql-database-paas-vs-sql-server-iaas?toc=%2fazure%2fvirtual-machines%2fwindows%2fsql%2ftoc.json#a-closer-look-at-azure-sql-database-and-sql-server-on-azure-vm>

<https://docs.microsoft.com/en-us/azure/virtual-machines/windows/sql/virtual-machines-windows-sql-backup-recovery>

SQL Server on VM	Managed instance in SQL Database	Single database / elastic pool in SQL Database
<p>You have full control over the SQL Server engine.</p> <p>Up to 99.95% availability.</p> <p>Full parity with the matching version of on-premises SQL Server.</p> <p>Fixed, well-known database engine version.</p> <p>Easy migration from SQL Server on-premises.</p> <p>Private IP address within Azure VNet.</p> <p>You have ability to deploy application or services on the host where SQL Server is placed.</p>	<p>High compatibility with SQL Server on-premises.</p> <p>99.99% availability guaranteed.</p> <p>Built-in backups, patching, recovery.</p> <p>Latest stable Database Engine version.</p> <p>Easy migration from SQL Server.</p> <p>Private IP address within Azure VNet.</p> <p>Built-in advanced intelligence and security.</p> <p>Online change of resources (CPU/storage).</p>	<p>The most commonly used SQL Server features are available.</p> <p>99.99% availability guaranteed.</p> <p>Built-in backups, patching, recovery.</p> <p>Latest stable Database Engine version.</p> <p>Ability to assign necessary resources (CPU/storage) to individual databases.</p> <p>Built-in advanced intelligence and security.</p> <p>Online change of resources (CPU/storage).</p>
<p>You need to manage your backups and patches.</p> <p>You need to implement your own High-Availability solution.</p> <p>There is a downtime while changing the resources(CPU/storage)</p>	<p>There is still some minimal number of SQL Server features that are not available.</p> <p>No guaranteed exact maintenance time (but nearly transparent).</p> <p>Compatibility with the SQL Server version can be achieved only using database compatibility levels.</p>	<p>Migration from SQL Server might be hard.</p> <p>Some SQL Server features are not available.</p> <p>No guaranteed exact maintenance time (but nearly transparent).</p> <p>Compatibility with the SQL Server version can be achieved only using database compatibility levels.</p> <p>Private IP address cannot be assigned (you can limit the access using firewall rules).</p>

Figure 24. Feature comparison among different SQL Database deployment options 1

	Azure SQL Database Logical servers, elastic pools, and single databases	Azure SQL Database Managed Instance	Azure Virtual Machine SQL Server
Best for:	New cloud-designed applications that want to use the latest stable SQL Server features and have time constraints in development and marketing.	New applications or existing on-premises applications that want to use the latest stable SQL Server features and that are migrated to the cloud with minimal changes.	Existing applications that require fast migration to the cloud with minimal changes or no changes. Rapid development and test scenarios when you do not want to buy on-premises non-production SQL Server hardware.
	Teams that need built-in high availability, disaster recovery, and upgrade for the database.	Same as SQL Database.	Teams that can configure, fine tune, customize, and manage high availability, disaster recovery, and patching for SQL Server. Some provided automated features dramatically simplify this.
	Teams that do not want to manage the underlying operating system and configuration settings.	Same as SQL Database.	You need a customized environment with full administrative rights.
	Databases of up to 100 TB.	Same as SQL Database.	SQL Server instances with up to 64 TB of storage. The instance can support as many databases as needed.
Compatibility	Supports most on-premises database-level capabilities.	Supports almost all on-premises instance-level and database-level capabilities.	Supports all on-premises capabilities.

Resources:	You do not want to employ IT resources for configuration and management of the underlying infrastructure but want to focus on the application layer.	Same as SQL Database.	You have some IT resources for configuration and management. Some provided automated features dramatically simplify this.
Total cost of ownership:	Eliminates hardware costs and reduces administrative costs.	Same as SQL Database.	Eliminates hardware costs.
Business continuity:	In addition to built-in fault tolerance infrastructure capabilities , Azure SQL Database provides features, such as automated backups , Point-In-Time Restore , geo-restore , and failover groups and active geo-replication to increase business continuity. For more information, see SQL Database business continuity overview .	Same as SQL Database, plus user-initiated, copy-only backups are available.	SQL Server on Azure VMs lets you set up a high availability and disaster recovery solution for your database's specific needs. Therefore, you can have a system that is highly optimized for your application. You can test and run failovers by yourself when needed. For more information, see High Availability and Disaster Recovery for SQL Server on Azure Virtual Machines .
Hybrid cloud:	Your on-premises application can access data in Azure SQL Database.	Native virtual network implementation and connectivity to your on-premises environment using Azure Express Route or VPN Gateway.	With SQL Server on Azure VMs, you can have applications that run partly in the cloud and partly on-premises. For example, you can extend your on-premises network and Active Directory Domain to the cloud via Azure Virtual Network . In addition, you can store on-premises data files in Azure Storage using SQL Server Data Files in Azure . For more information, see Introduction to SQL Server 2014 Hybrid Cloud .
	Supports SQL Server transactional replication as a subscriber to replicate data.	Replication is not supported for Azure SQL Database Managed Instance.	Fully supports SQL Server transactional replication , Always On Availability Groups , Integration Services, and Log Shipping to replicate data. Also, traditional SQL Server backups are fully supported

Figure 25. Feature comparison among different SQL Database deployment options 2

	Automated Backup	Azure Backup for SQL	Manual backup
Requires additional Azure service		✓	
Configure backup policy in Azure portal	✓	✓	
Restore databases in Azure portal		✓	
Manage multiple servers in one dashboard		✓	
Point-in-time restore	✓	✓	✓
15-minute Recovery Point Objective (RPO)	✓	✓	✓
Short-term backup retention policy (days)	✓	✓	
Long-term backup retention policy (months, years)		✓	
Built-in support for SQL Server Always On		✓	
Backup to Azure Storage account(s)	✓ (automatic)	✓ (automatic)	✓ (customer managed)
Management of storage and backup files		✓	
Backup to attached disks on the VM			✓
Central customizable backup reports		✓	
Consolidated email alerts for failures		✓	
Customize monitoring based on Log Analytics		✓	
Monitor backup jobs with SSMS or Transact-SQL scripts	✓	✓	✓
Restore databases with SSMS or Transact-SQL scripts	✓		✓

Figure 26. Feature comparison among different Backup options