Two-tier App migration on Azure Container: Lab Guide

Overview

This guide will help you in migrating On-premises two-tier WebApp with database to Windows Container and PaaS database on Azure.

Content

Lab 1: Getting Started with Azure

Lab Overview

In this lab, you will be deploying pre-requisite infrastructure which is simulation of on-premises two-tier webapp with MS SQL database.

Prerequisites

- Windows or a Mac machine with HTML5 supported browser such as Microsoft Edge, Internet Explorer, Chrome or Firefox.

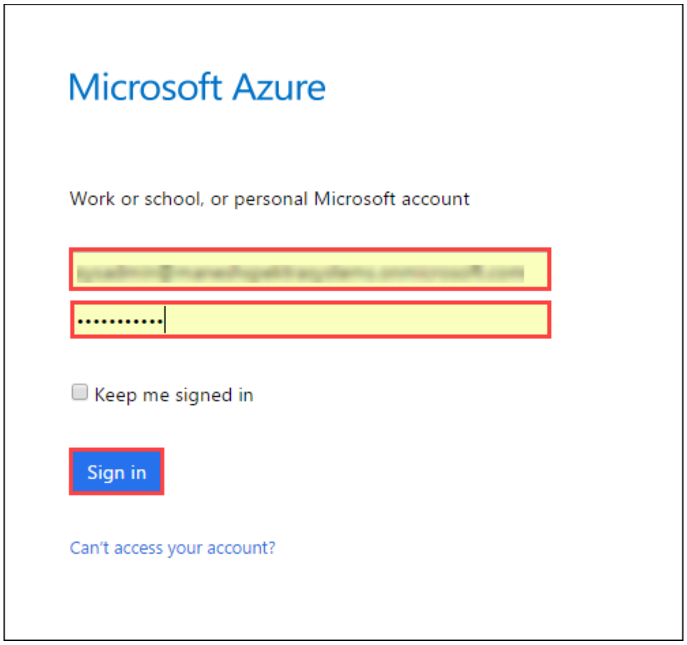
Time Estimate

20 minutes

Exercise 1: Deploy Pre-requisite ON-preminses template

In this exercise, you will log into the Azure Portal using your Azure credentials.

1. **Launch** a browser and **Navigate** to **https://portal.azure.com**. Provide you Azure login credentials and click on **Sign In**.



Microsoft Azure

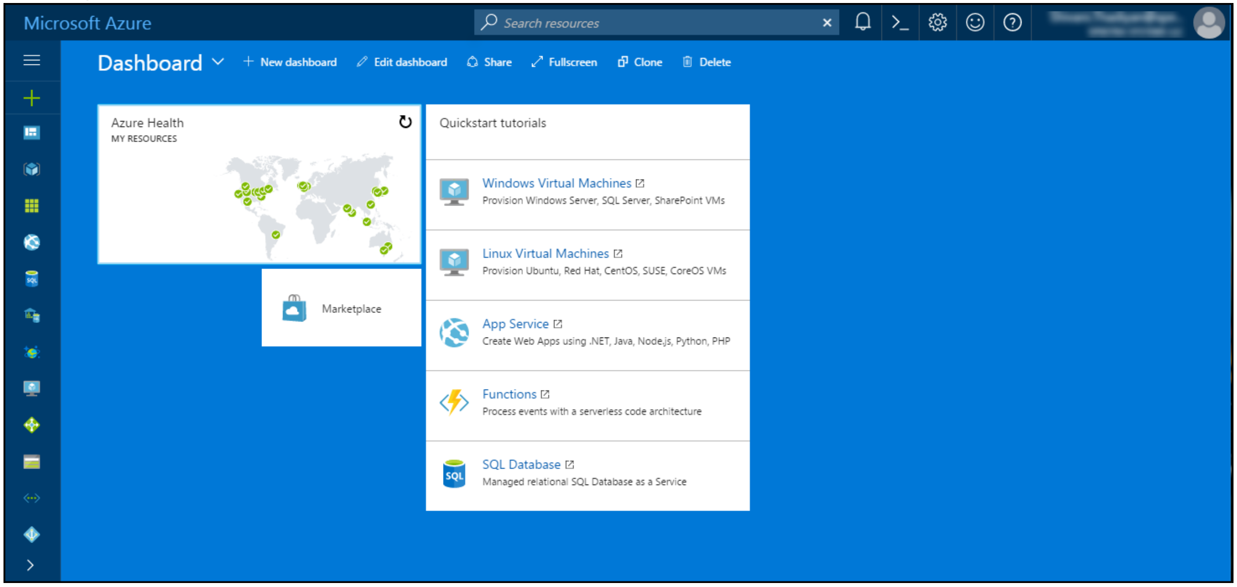
Work or school, or personal Microsoft account

[redacted]

•••••••••••

□ Keep me signed in

2. Now, you will be directed to the Azure Dashboard.


Microsoft Azure
Search resources
Dashboard
+ New dashboard
Edit dashboard
Share
Fullscreen
Clone
Delete
Azure Health
MY RESOURCES
Marketplace
Quickstart tutorials
Windows Virtual Machines
Provision Windows Server, SQL Server, SharePoint VMs
Linux Virtual Machines
Provision Ubuntu, Red Hat, CentOS, SUSE, CoreOS VMs
App Service
Create Web Apps using .NET, Java, Node.js, Python, PHP
Functions
Process events with a serverless code architecture
SQL Database
Managed relational SQL Database as a Service
SQL

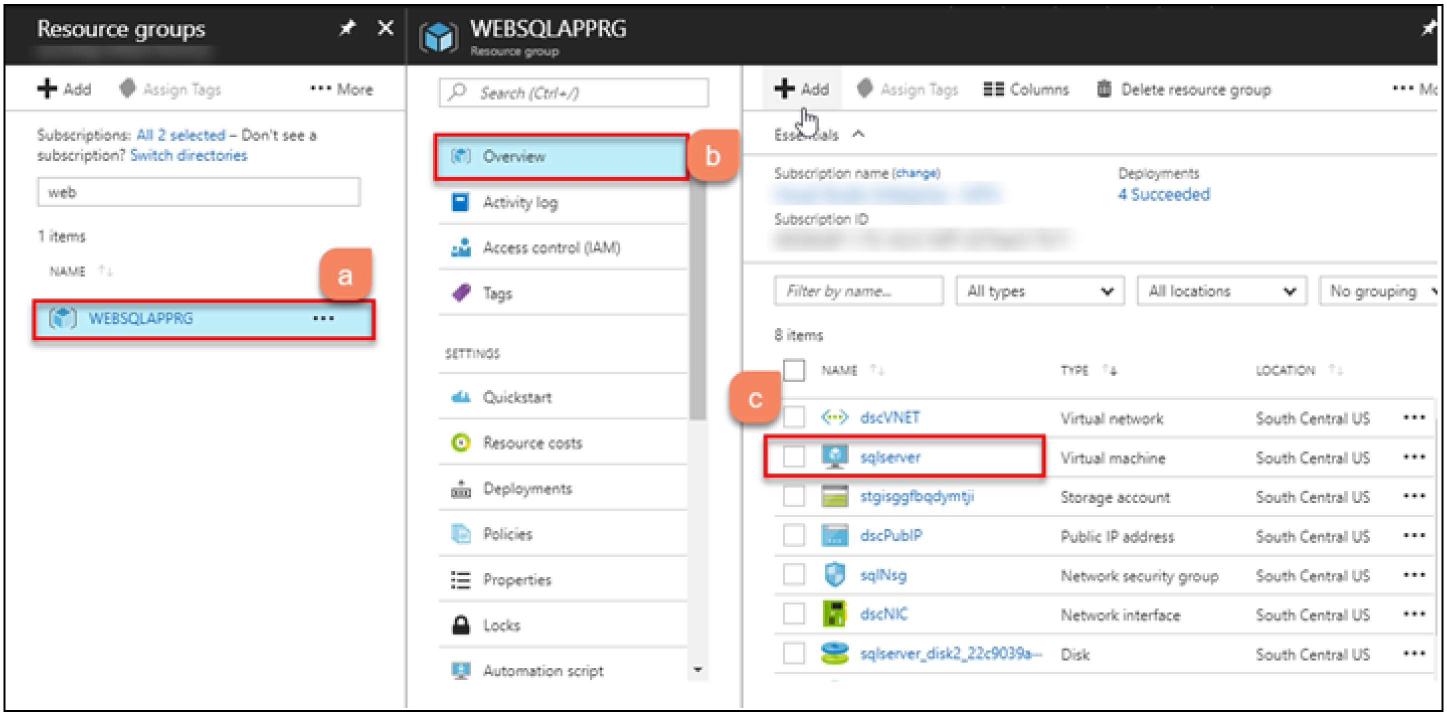
3. Open github url (https://github.com/wmhussain/two-tier-app-migration-containers) and click on deploy to azure to create pre-requiste simulation of on-premises two tier infrastructure.
   a. *ResourceGroup:* **OnPremisesRG (**any valid name**)**
   b. *Location:* **East US**(any location)
   c. *Virtual Machine Name:* **WebDbServer** (Any valid name)
   d. *Admin User:* **demouser** (any username of your choice)
   e. *Admin Password:* *< Valid Password>*

   Accepts terms and conditions and click on **Purchase** button.

Exercise 2: Verify the DB and WebApp

In this exercise, we will login to VM which is pre-deployed as a part of lab. Login to VM with the credentials provided in mail.

1. In Azure portal, click on Resource Group which contains the pre-deployed on-premises infrastructure then click on **Overview** tab and finally on VM.



Subscriptions: All 2 selected – Don't see a subscription? Switch directories

web

1 items

NAME
WEBSQLAPPRG

Subscription name (change)
[redacted]

Deployments
4 Succeeded

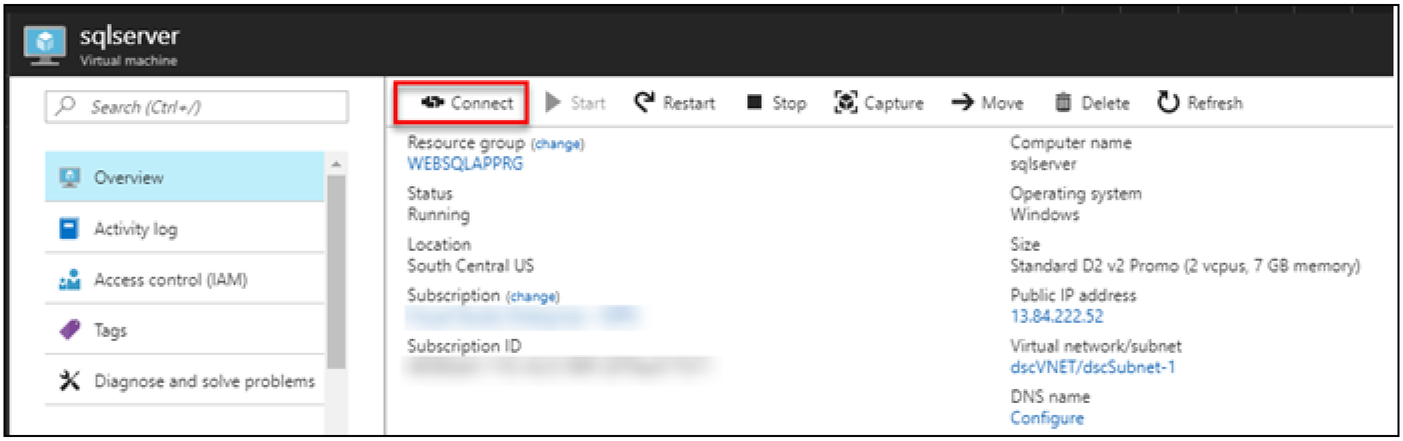
Subscription ID
[redacted]

Filter by name... | All types | All locations | No grouping

8 items

NAME	TYPE	LOCATION
dscVNET	Virtual network	South Central US
sqlserver	Virtual machine	South Central US
stgisggfbqdymtji	Storage account	South Central US
dscPublP	Public IP address	South Central US
sqlNsg	Network security group	South Central US
dscNIC	Network interface	South Central US
sqlserver_disk2_22c9039a...	Disk	South Central US

2. In overview section, click on **Connect** button. It will download an RDP file. Click on the same to connect the VM.



Resource group (change)
WEBSQLAPPRG

Status
Running

Location
South Central US

Subscription (change)
[redacted]

Subscription ID
[redacted]

Computer name
sqlserver

Operating system
Windows

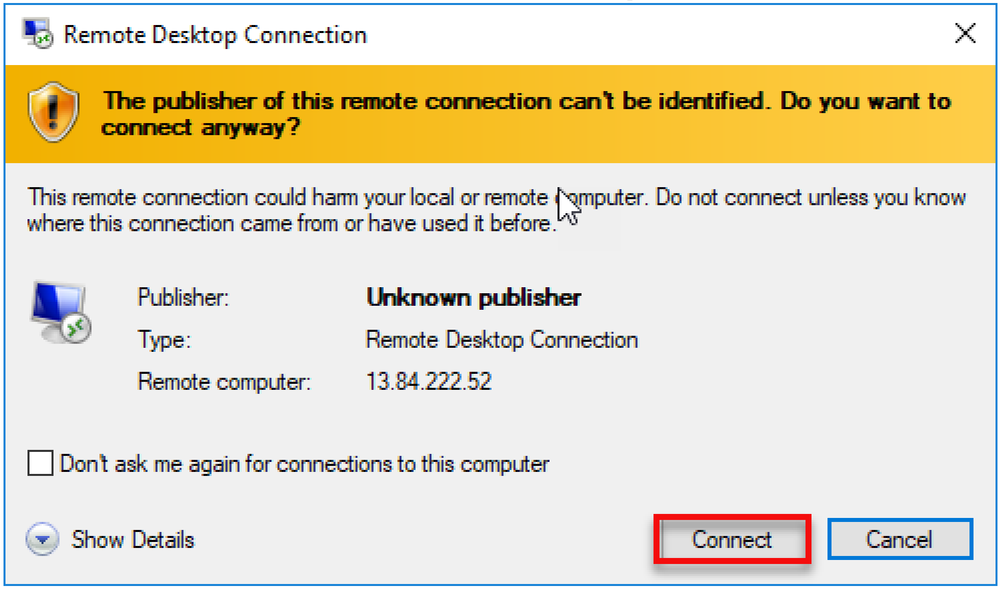
Size
Standard D2 v2 Promo (2 vcpus, 7 GB memory)

Public IP address
13.84.222.52

Virtual network/subnet
dscVNET/dscSubnet-1

DNS name
Configure

3. Click on **Connect** button in **Remote Desktop Connection** Wizard.



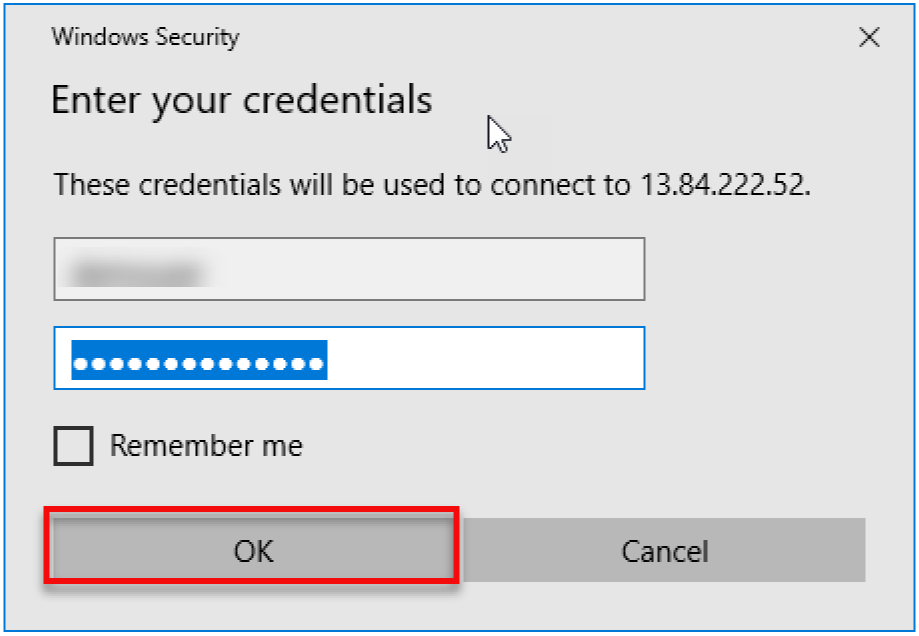
The publisher of this remote connection can't be identified. Do you want to connect anyway?

This remote connection could harm your local or remote computer. Do not connect unless you know where this connection came from or have used it before.

Publisher:	**Unknown publisher**
Type:	Remote Desktop Connection
Remote computer:	13.84.222.52

☐ Don't ask me again for connections to this computer

4. Enter the credentials provided in the mail to connect to VM.



Windows Security

Enter your credentials

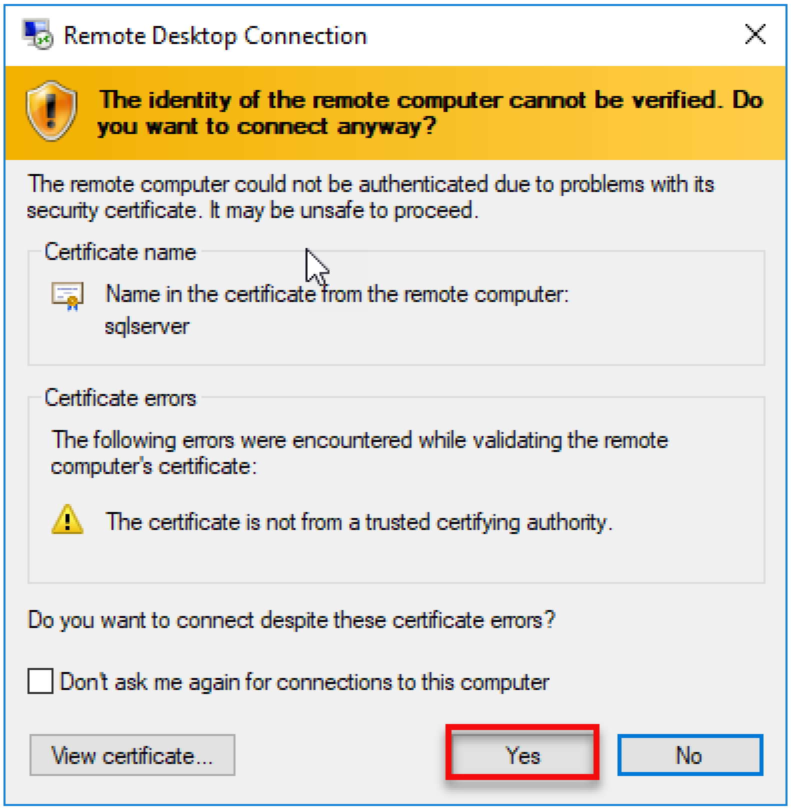
These credentials will be used to connect to 13.84.222.52.

[redacted]

●●●●●●●●●●●●●●

□ Remember me

5. Click on **Yes** button.



Remote Desktop Connection

The identity of the remote computer cannot be verified. Do you want to connect anyway?

The remote computer could not be authenticated due to problems with its security certificate. It may be unsafe to proceed.

Certificate name

Name in the certificate from the remote computer:
sqlserver

Certificate errors

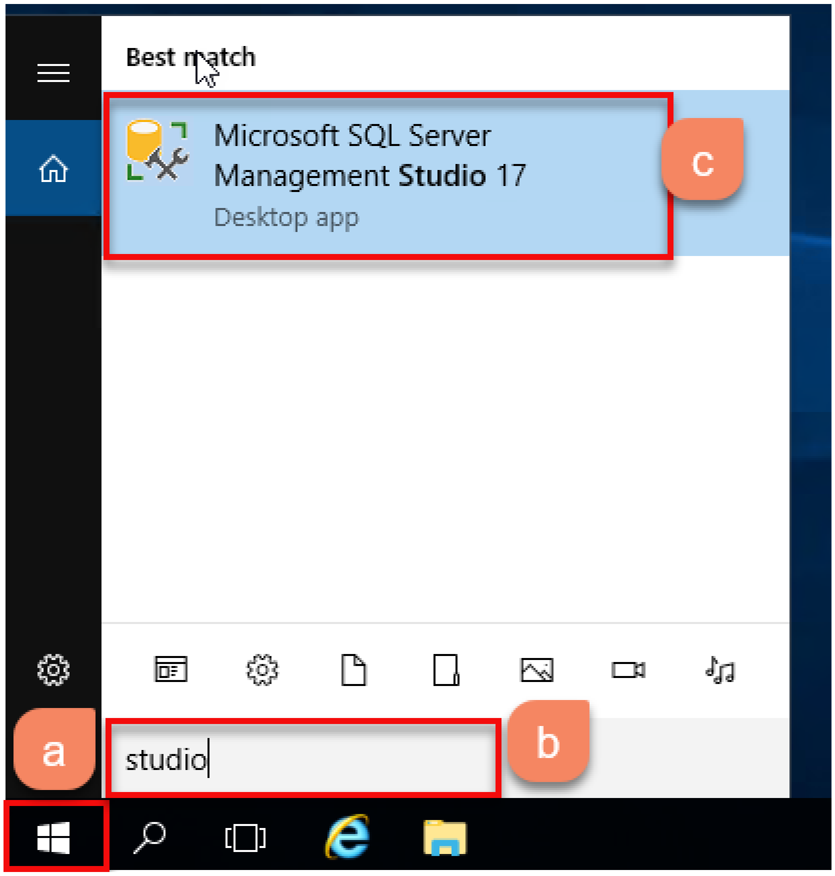
The following errors were encountered while validating the remote computer's certificate:

The certificate is not from a trusted certifying authority.

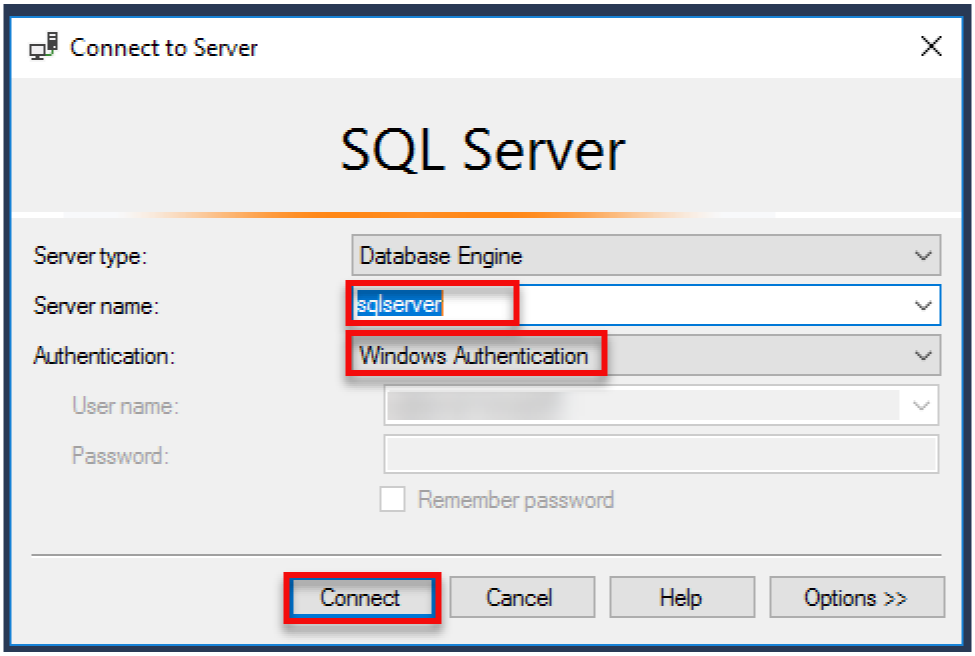
Do you want to connect despite these certificate errors?

□ Don't ask me again for connections to this computer

6. Once you are logged in the Windows OS, click on **start** button and search for '**Microsoft SQL Server management Studio**' and click on that as shown below.



7. In the Connect to Server wizard, verify that Server name is set to *VM's name* and Authentication is **Windows Authentication**. Click **Connect** button to connect to database.



Connect to Server

SQL Server

Server type: Database Engine

Server name: sqlserver

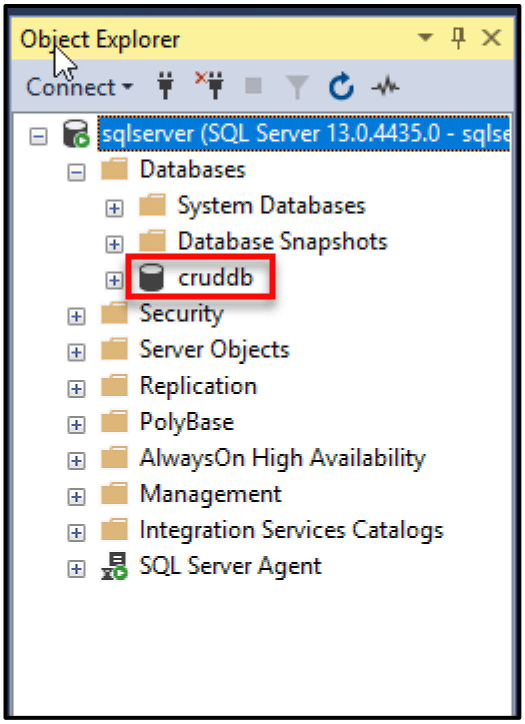
Authentication: Windows Authentication

User name:

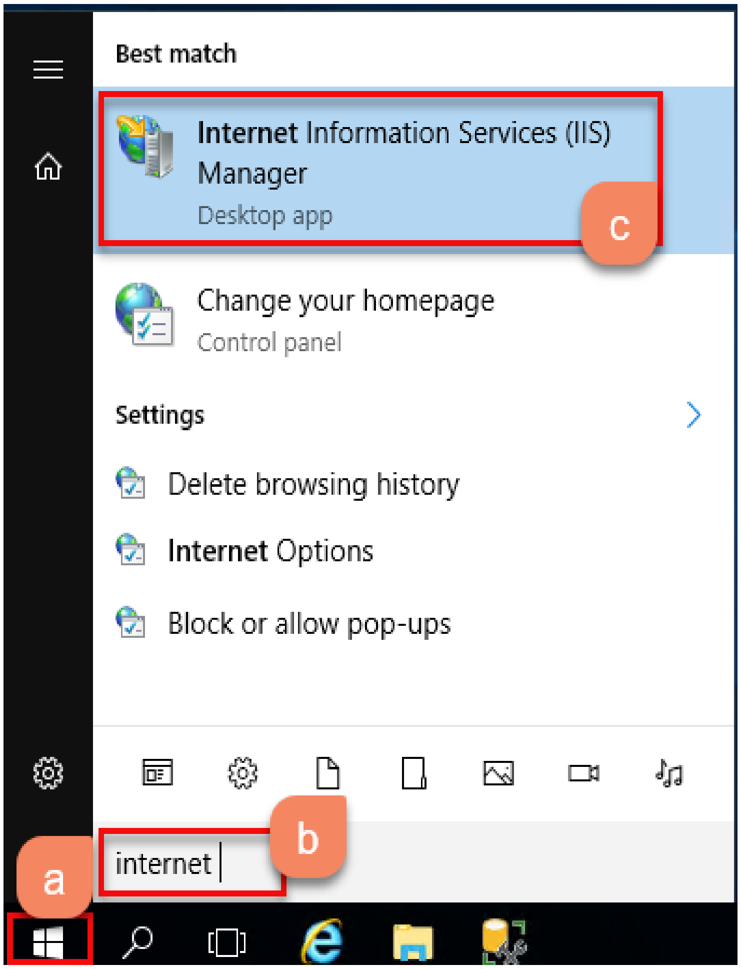
Password:

□ Remember password

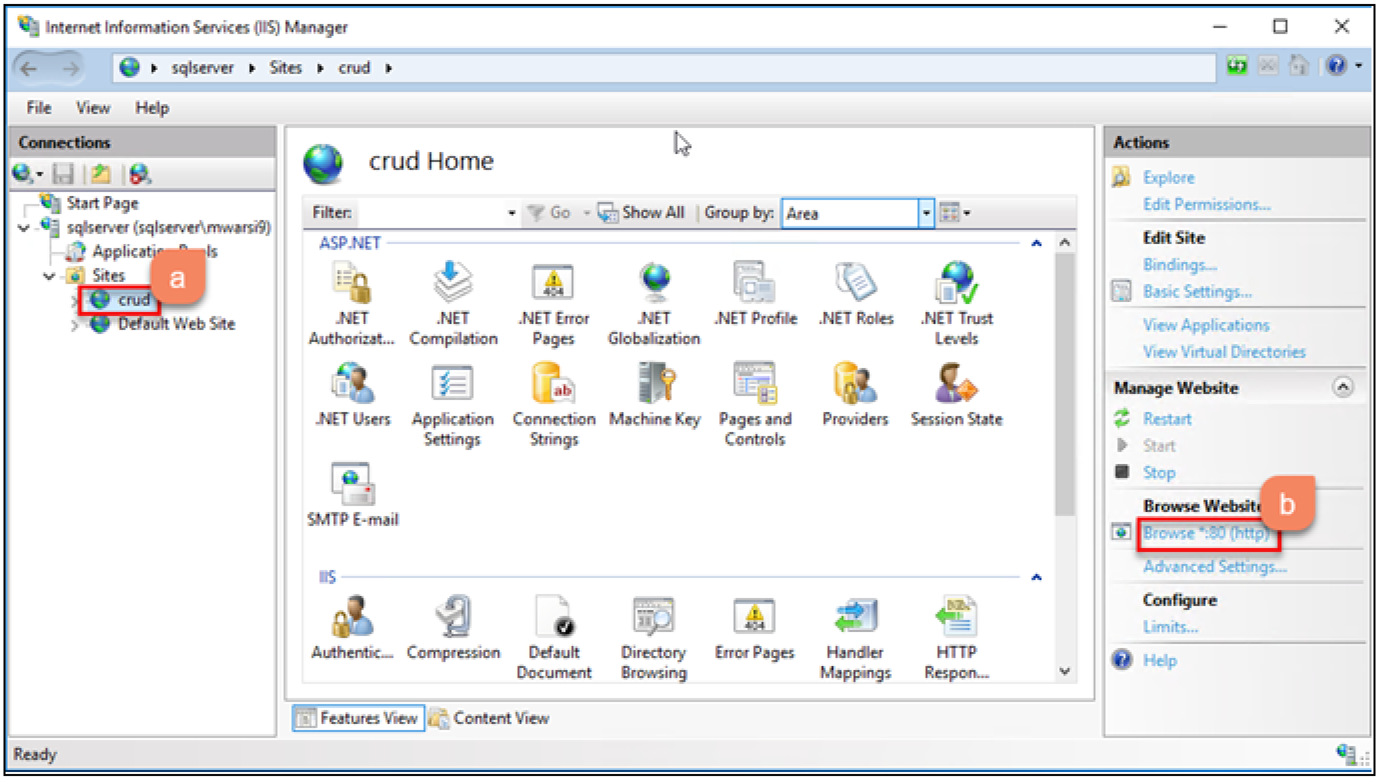
8. Once you are connected to database, you can verify that database named **cruddb** exists. Minimise the the studio.



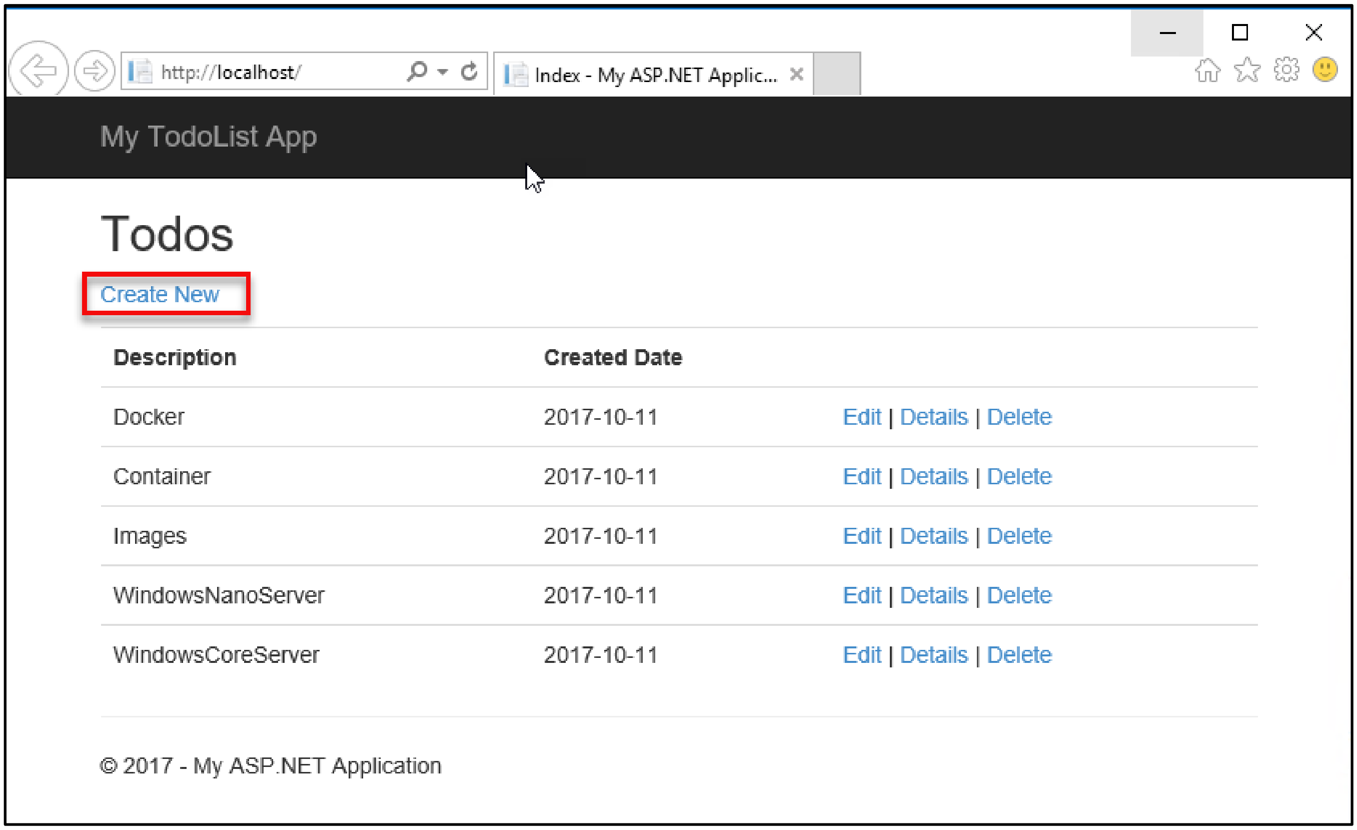
9. Click on **Start** button and search for *Internet Information Manager* and open the application.



10. In IIS Manager, expand the server and then Sites, you will see a site named as **crud.** Click on that site. And then click on browse site as shown below.



11. A web application will get open in IE. Create some record in that application as shown below.



My TodoList App

Todos

Create New

Description	Created Date	
Docker	2017-10-11	Edit | Details | Delete
Container	2017-10-11	Edit | Details | Delete
Images	2017-10-11	Edit | Details | Delete
WindowsNanoServer	2017-10-11	Edit | Details | Delete
WindowsCoreServer	2017-10-11	Edit | Details | Delete

© 2017 - My ASP.NET Application

12. This completes the verification of our on-premises two-tier web application. You can also verify the records in SQL database manually (Optional).

Lab 2: Two-tier WebApp migration to Container on Azure.

Lab Overview

In this lab, you will

- Verify the prerequisite Environment which is simulating the on-premises two-tier webapp.
- Verify the database and web-application.

Prerequisites

- Windows or a Mac machine with HTML5 supported browser such as Microsoft Edge, Internet Explorer, Chrome or Firefox.
- Lab 1 must be completed.

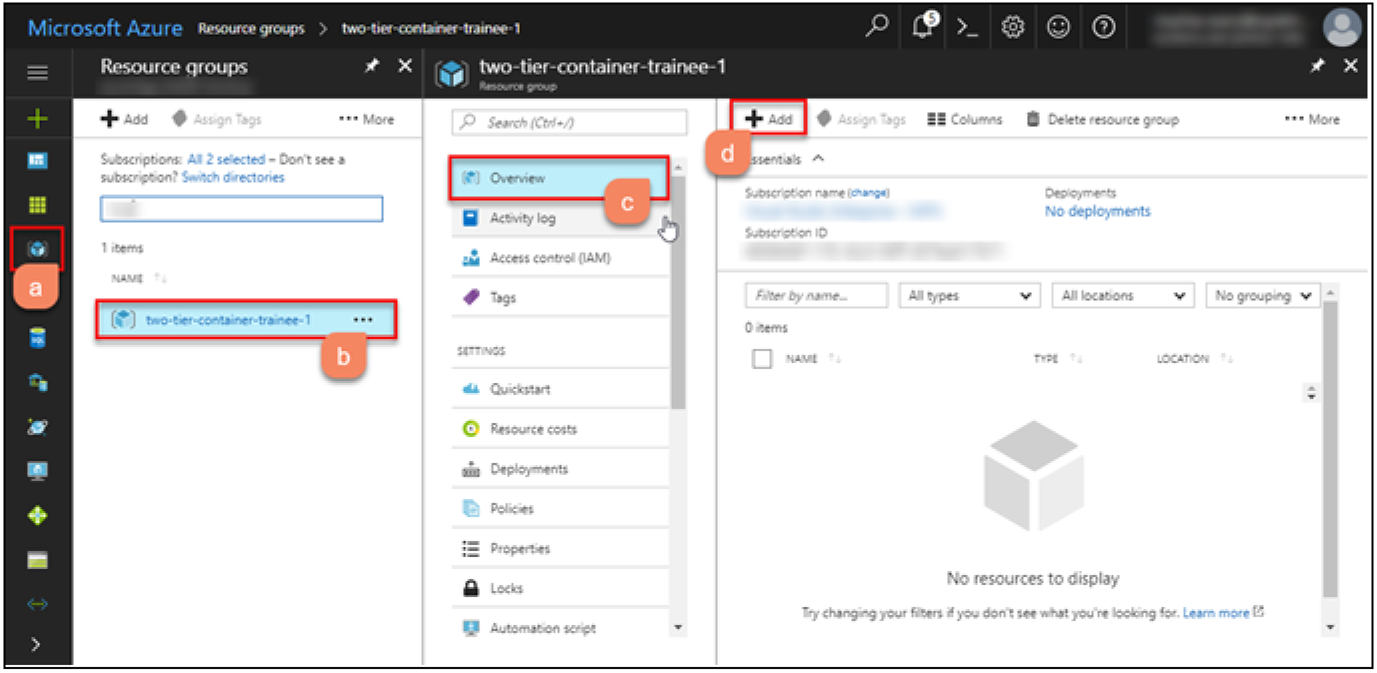
Time Estimate

20 minutes

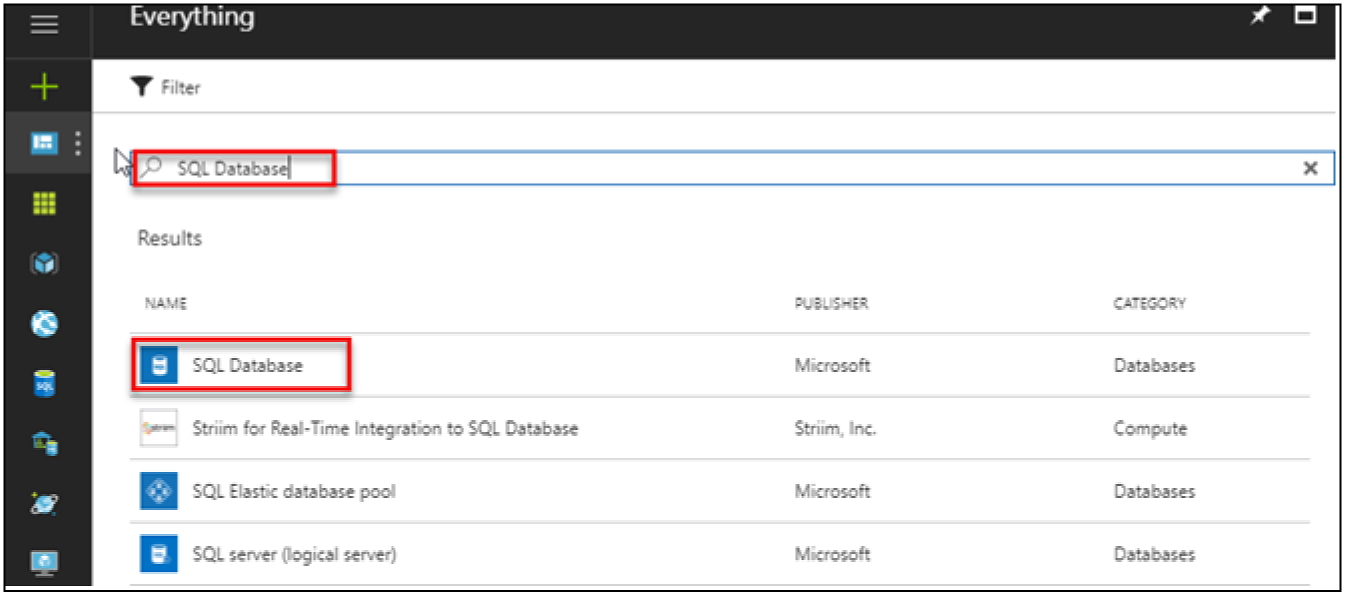
Exercise 1: Deploy Azure SQL DB for migration

In this exercise, we will deploy Azure SQL database which is required for migration of on-premises database to Azure.

1. Open Azure portal, click on Resource group icon on the left, create a resource group.
   a. Resource Group Name : **two-tier-container-trainee-1**(any valid name)
   b. Location: **East US**(any valid location)
2. Now, select that resource group. Under the **Overview** section click on **Add** button.



3. Search for *SQL Database* and select **SQL Database**



Everything

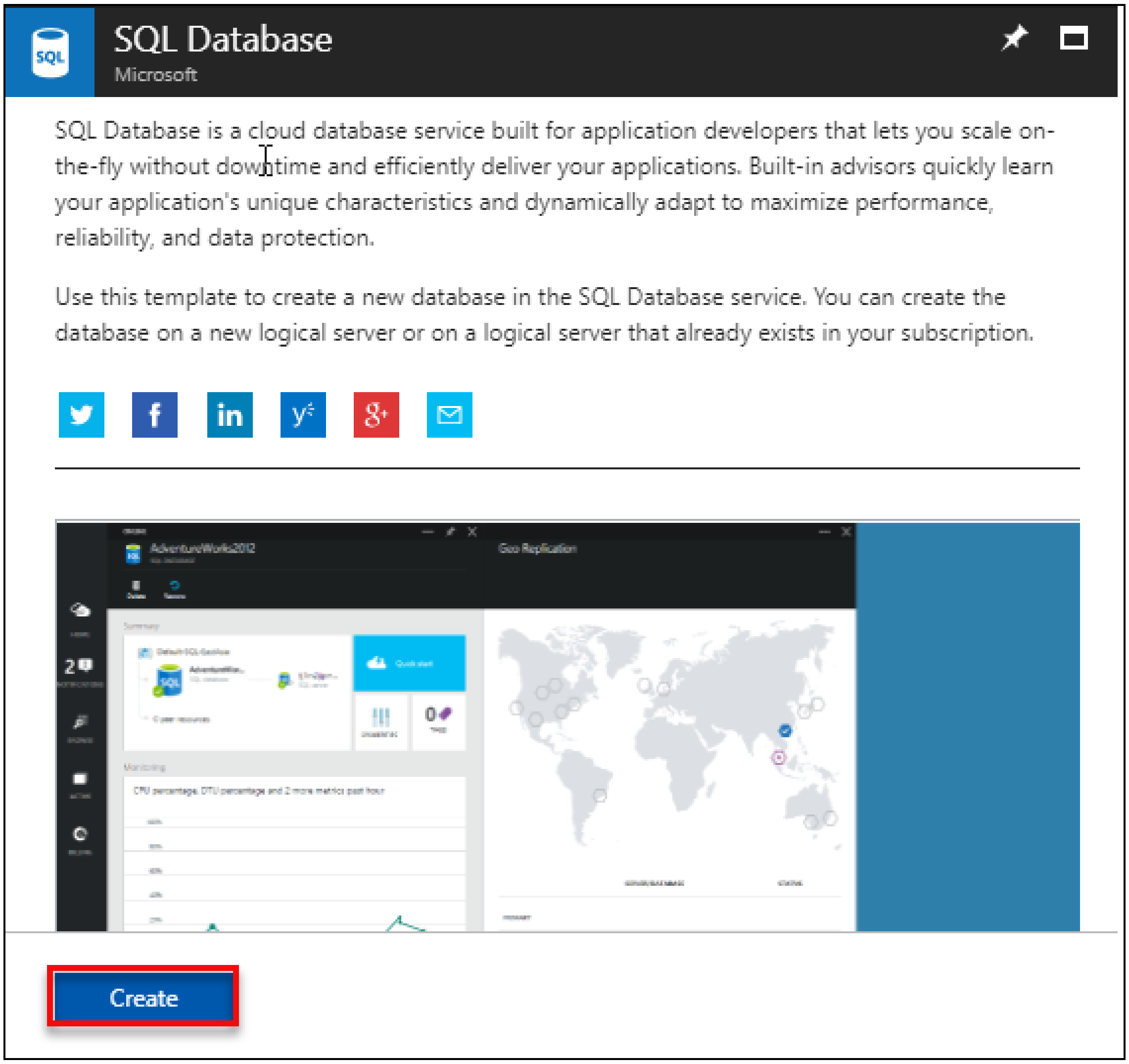
Filter

SQL Database

Results

NAME	PUBLISHER	CATEGORY
SQL Database	Microsoft	Databases
Striim for Real-Time Integration to SQL Database	Striim, Inc.	Compute
SQL Elastic database pool	Microsoft	Databases
SQL server (logical server)	Microsoft	Databases

4. Click on **Create** button.



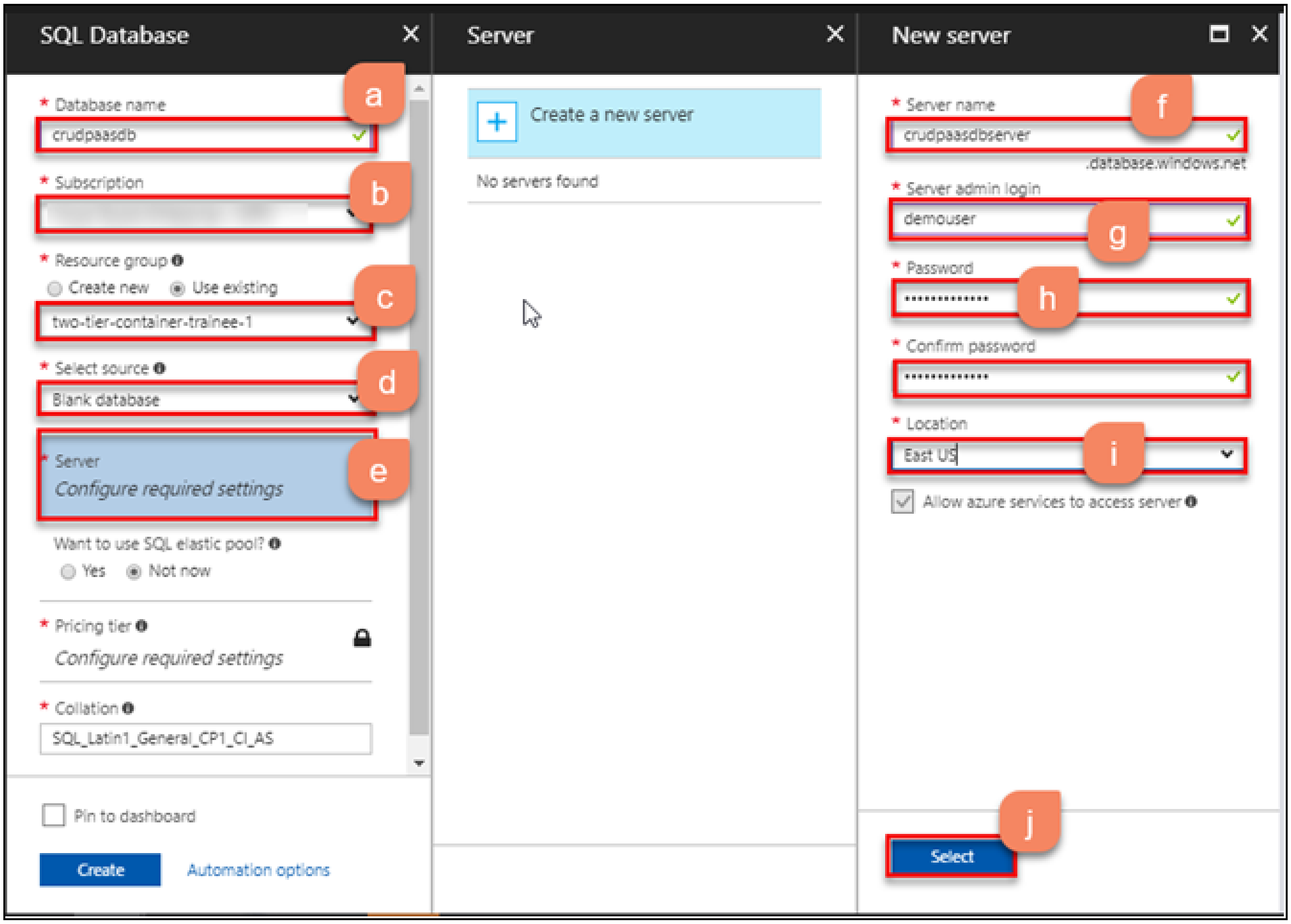
SQL Database

Microsoft

SQL Database is a cloud database service built for application developers that lets you scale on-the-fly without downtime and efficiently deliver your applications. Built-in advisors quickly learn your application's unique characteristics and dynamically adapt to maximize performance, reliability, and data protection.

Use this template to create a new database in the SQL Database service. You can create the database on a new logical server or on a logical server that already exists in your subscription.

5. Populate the below parameters as shown below. Check for the unique value for server name (f) in Server creation wizard.



SQL Database

* Database name: crudpaasdb

* Subscription: [redacted]

* Resource group: ○ Create new ● Use existing — two-tier-container-trainee-1

* Select source: Blank database

* Server: Configure required settings

Want to use SQL elastic pool? ○ Yes ● Not now

* Pricing tier: Configure required settings

* Collation: SQL_Latin1_General_CP1_CI_AS

□ Pin to dashboard

Server

Create a new server

No servers found

New server

* Server name: crudpaasdbserver .database.windows.net

* Server admin login: demouser

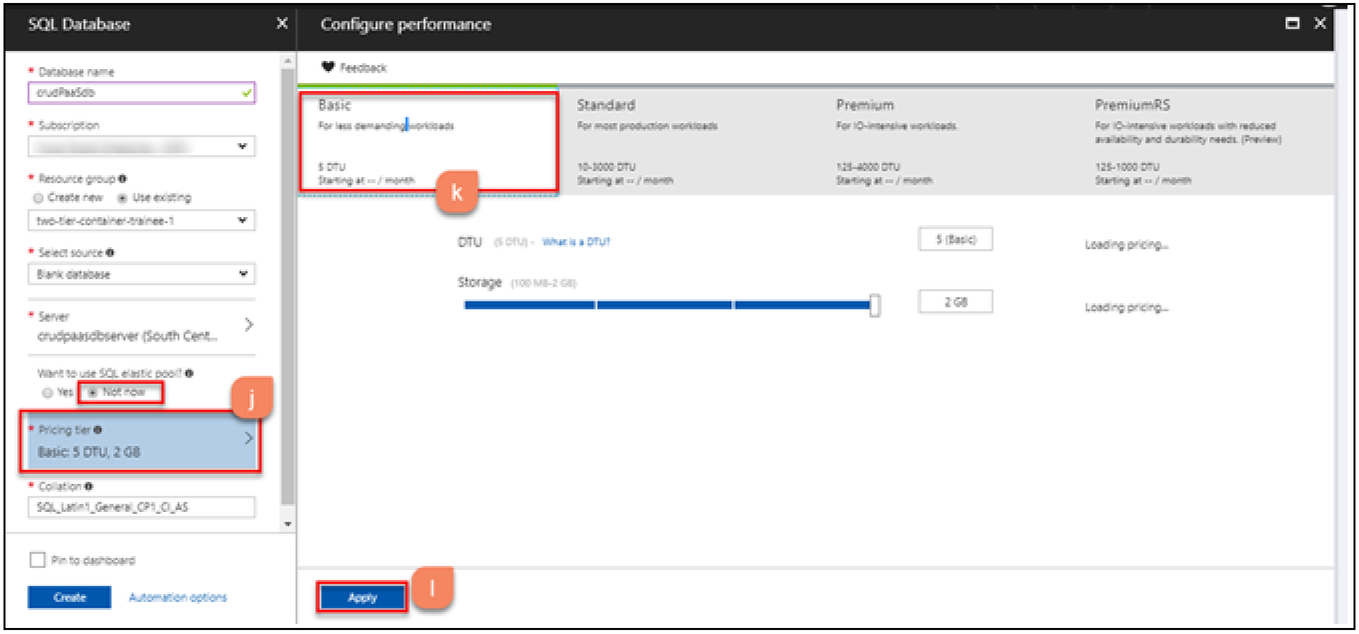
* Password: ••••••••••••••

* Confirm password: ••••••••••••••

* Location: East US

☑ Allow azure services to access server

6. Select the size of database to be **Basic.** Click on **Apply.**



SQL Database

* Database name: crudPaaSdb

* Subscription: [redacted]

* Resource group: ○ Create new ● Use existing — two-tier-container-trainee-1

* Select source: Blank database

* Server: crudpaasdbserver (South Cent...

Want to use SQL elastic pool? ○ Yes ● Not now

* Pricing tier: Basic: 5 DTU, 2 GB

* Collation: SQL_Latin1_General_CP1_CI_AS

□ Pin to dashboard

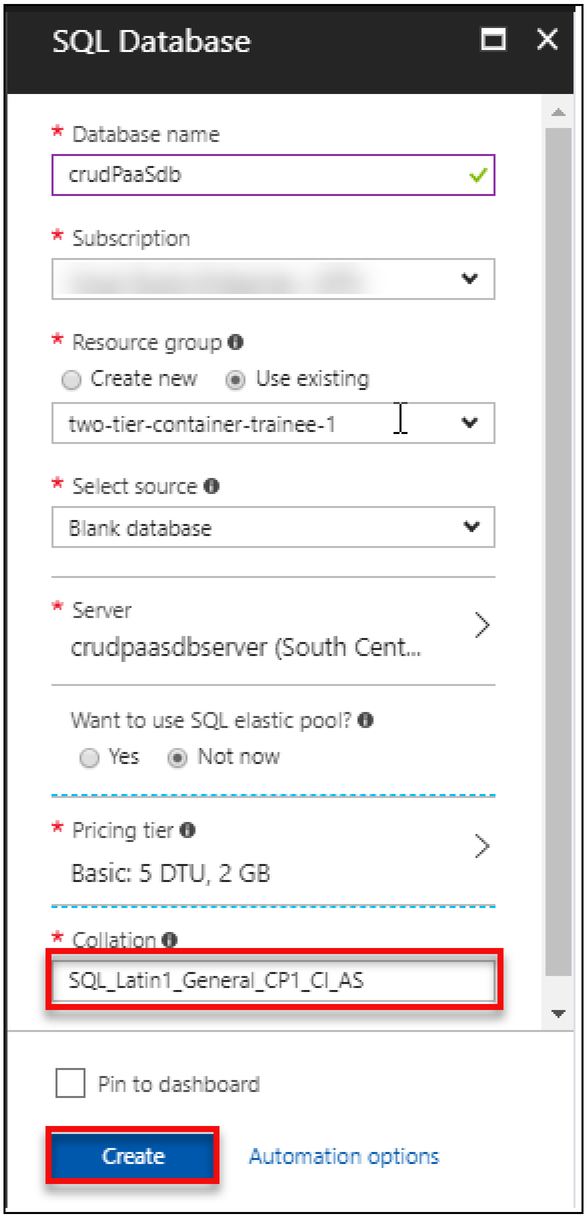
Configure performance

Basic	Standard	Premium	PremiumRS
For less demanding workloads	For most production workloads	For IO-intensive workloads.	For IO-intensive workloads with reduced availability and durability needs. (Preview)
5 DTU Starting at -- / month	10-3000 DTU Starting at -- / month	125-4000 DTU Starting at -- / month	125-1000 DTU Starting at -- / month

DTU (5 DTU) - What is a DTU? — 5 (Basic) — Loading pricing...

Storage (100 MB-2 GB) — 2 GB — Loading pricing...

7. Leave the collation as default and click on **Create** button.



SQL Database

* Database name

crudPaaSdb

* Subscription

[redacted]

* Resource group

○ Create new ● Use existing

two-tier-container-trainee-1

* Select source

Blank database

* Server

crudpaasdbserver (South Cent...

Want to use SQL elastic pool?

○ Yes ● Not now

* Pricing tier

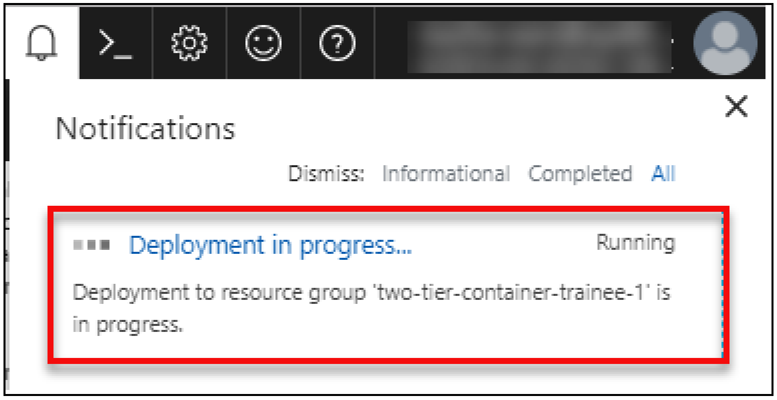
Basic: 5 DTU, 2 GB

* Collation

SQL_Latin1_General_CP1_CI_AS

□ Pin to dashboard

8. It will be validate and then deployment will start.



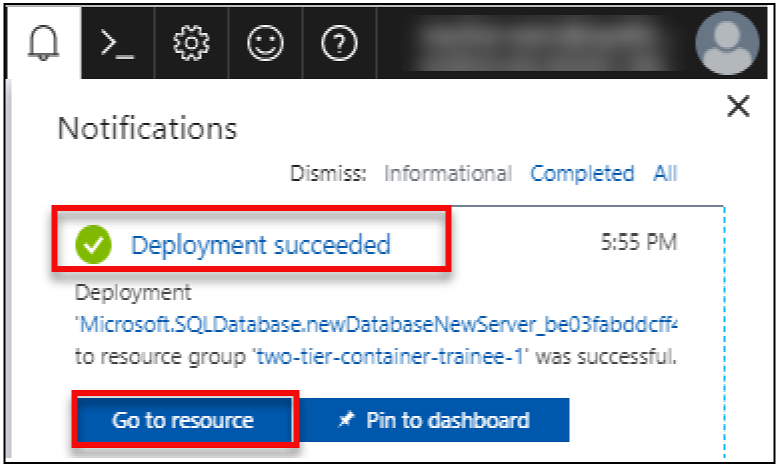
Notifications

Dismiss: Informational Completed All

Deployment in progress... Running

Deployment to resource group 'two-tier-container-trainee-1' is in progress.

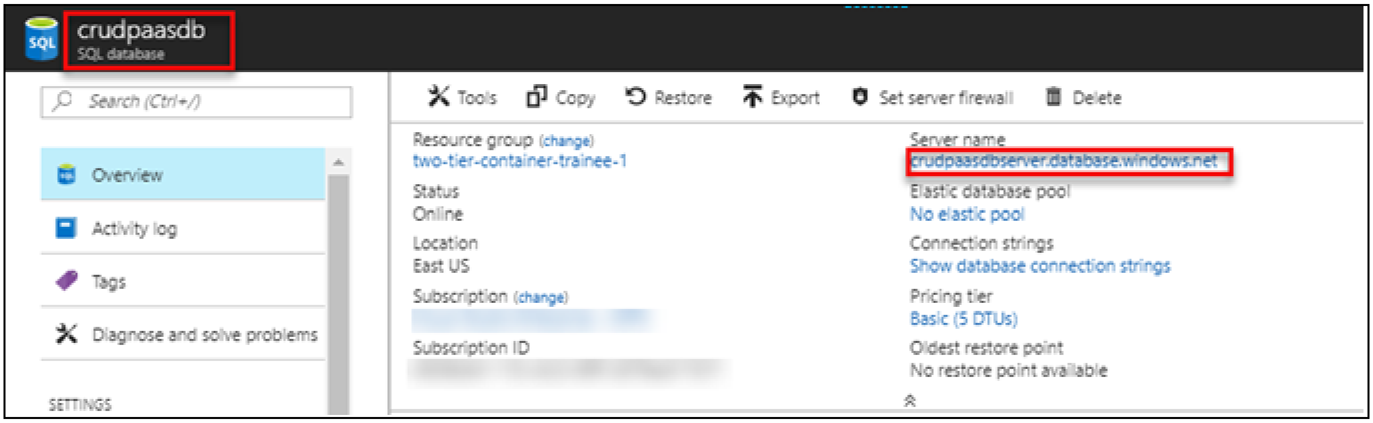
9. After deployment gets completed, click on **Go to resource** to verify that resource is successfully deployed.



Deployment succeeded 5:55 PM

Deployment 'Microsoft.SQLDatabase.newDatabaseNewServer_be03fabddcff4 to resource group 'two-tier-container-trainee-1' was successful.

10. You will see that database is created. Note down the server name to be used later.



Resource group (change)
two-tier-container-trainee-1

Status
Online

Location
East US

Subscription (change)
[redacted]

Subscription ID
[redacted]

Server name
crudpaasdbserver.database.windows.net

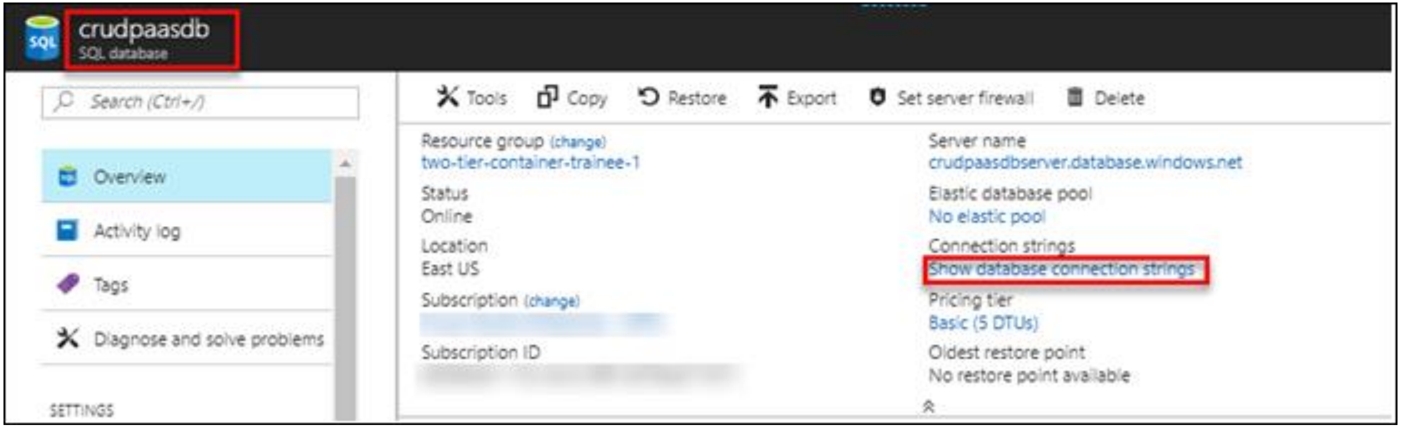
Elastic database pool
No elastic pool

Connection strings
Show database connection strings

Pricing tier
Basic (5 DTUs)

Oldest restore point
No restore point available

11. Click on **Show Database Connection Strings** as shown below.



Resource group (change)
two-tier-container-trainee-1

Status
Online

Location
East US

Subscription (change)
[redacted]

Subscription ID
[redacted]

Server name
crudpaasdbserver.database.windows.net

Elastic database pool
No elastic pool

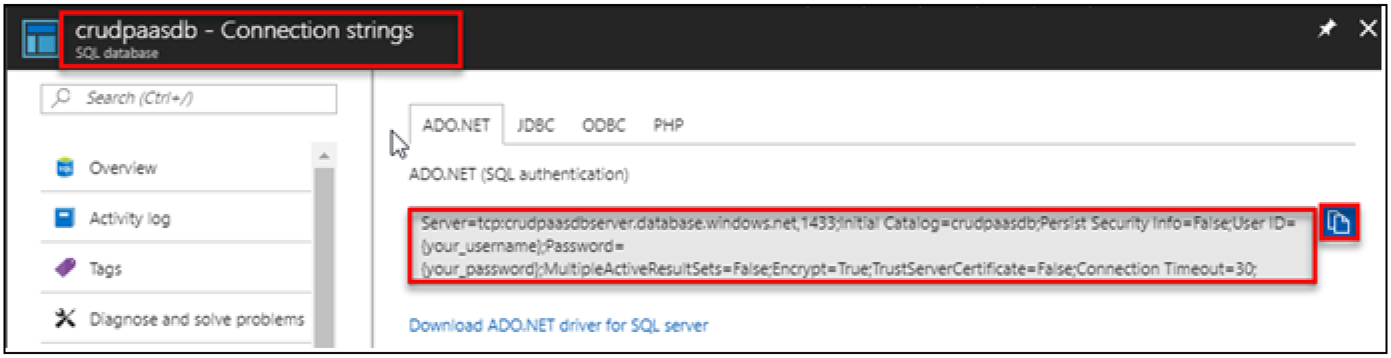
Connection strings
Show database connection strings

Pricing tier
Basic (5 DTUs)

Oldest restore point
No restore point available

12. Copy the connection string in notepad to be used in database migration and modify the you're {your_username} and {your_password} with actual values you used while creating database in Lab2→ Exercise 1 → Step 4.

```
Server=tcp:cs2df6508fc98d4362.database.windows.net,1433;Initial
Catalog=cruddb;Persist Security Info=False;User
ID={your_username};Password={your_password};MultipleActiveResultSets=False;E
ncrypt=True;TrustServerCertificate=False;Connection Timeout=30;
```


crudpaasdb - Connection strings
SQL database
Search (Ctrl+/)
Overview
Activity log
Tags
Diagnose and solve problems
ADO.NET
JDBC
ODBC
PHP
Download ADO.NET driver for SQL server

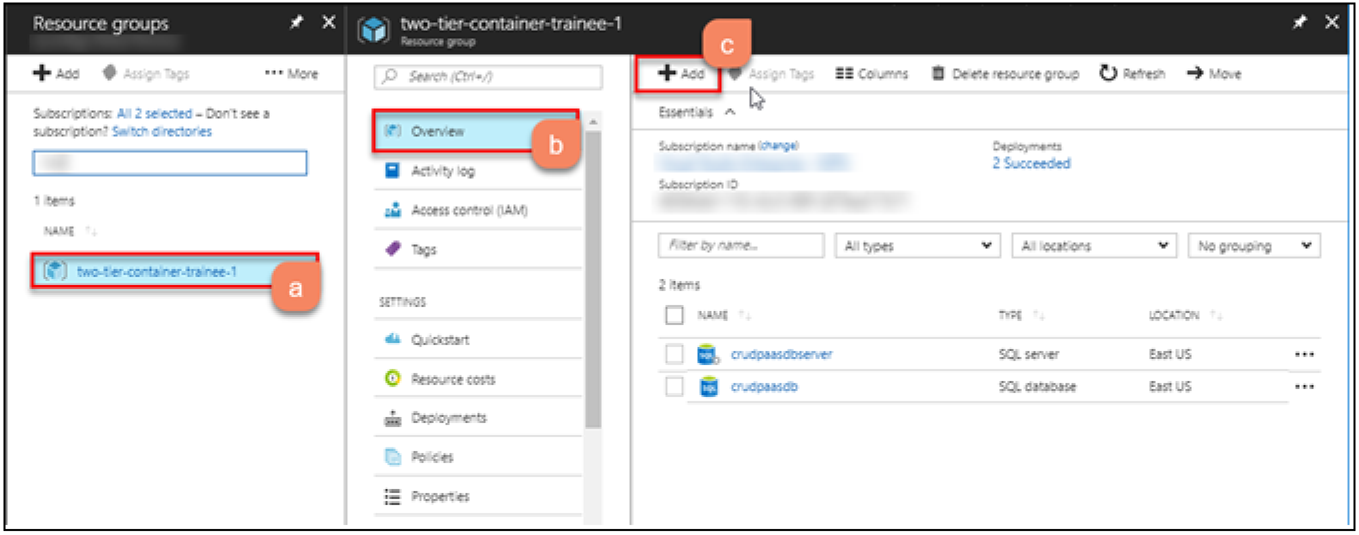
ADO.NET (SQL authentication)

```
Server=tcp:crudpaasdbserver.database.windows.net,1433;Initial Catalog=crudpaasdb;Persist Security Info=False;User ID=
{your_username};Password=
{your_password};MultipleActiveResultSets=False;Encrypt=True;TrustServerCertificate=False;Connection Timeout=30;
```

Exercise 2: Deploy Windows 2016 Server with Docker

In this exercise, we will create Windows server with Docker to migrate WebApp on container.

1. Click on resource group , click on **Add** button under **Overview** section.

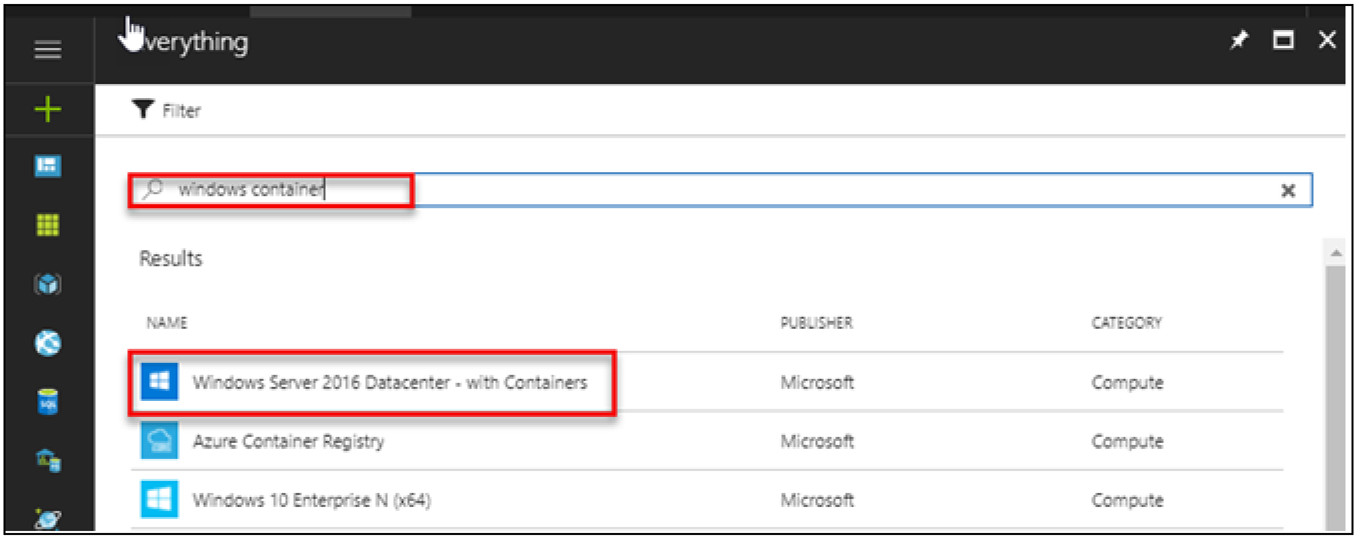


Subscription name (change) [redacted]

Subscription ID [redacted]

NAME	TYPE	LOCATION
crudpaasdbserver	SQL server	East US
crudpaasdb	SQL database	East US

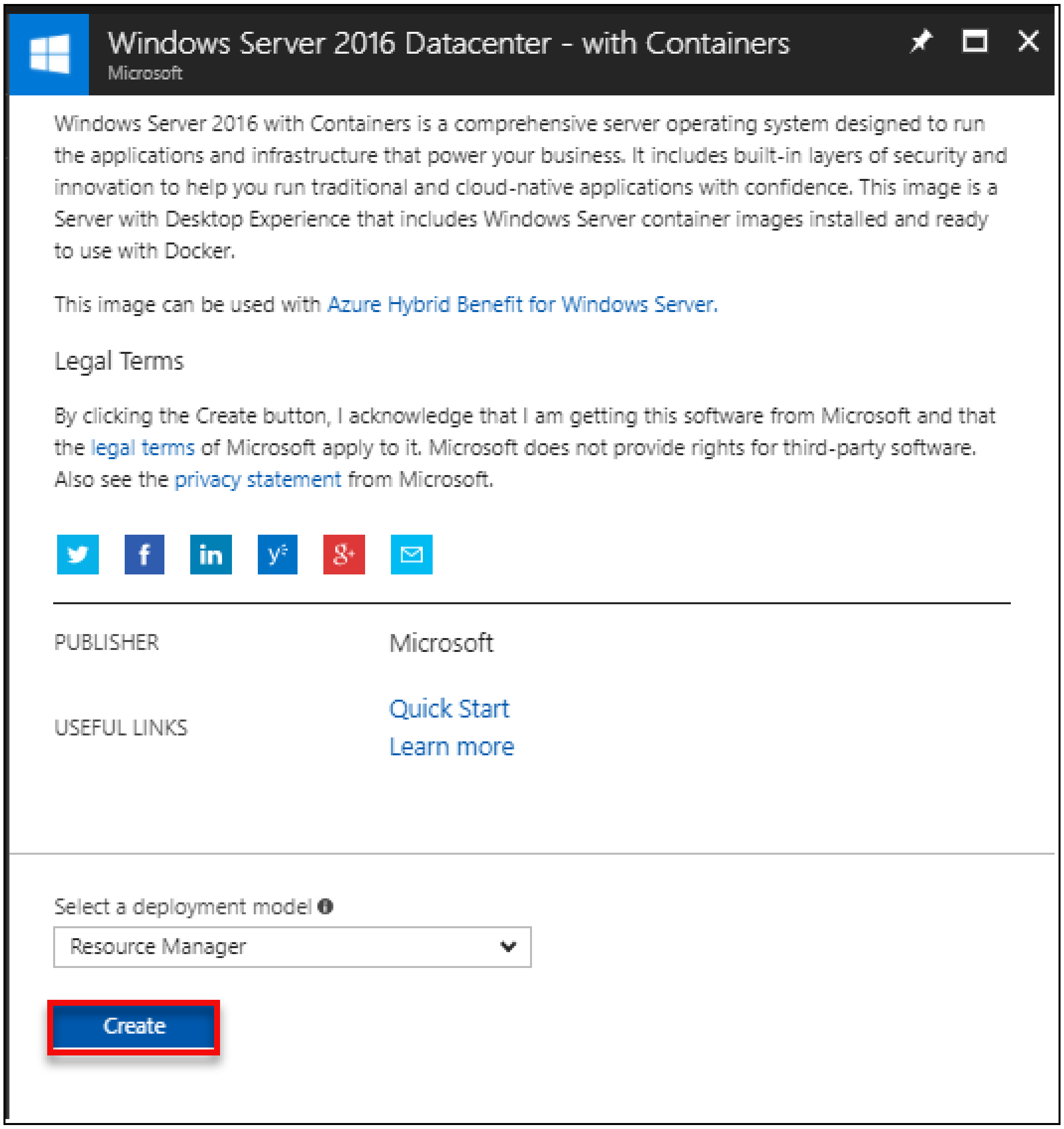
2. Search for *Windows Container* and then select **Windows Server 2016 Datacenter – with Container.**



windows container

NAME	PUBLISHER	CATEGORY
Windows Server 2016 Datacenter - with Containers	Microsoft	Compute
Azure Container Registry	Microsoft	Compute
Windows 10 Enterprise N (x64)	Microsoft	Compute

3. Click on **Create** button in the **Windows Server 2016 Datacenter – with Container** blade.



Windows Server 2016 Datacenter - with Containers
Microsoft

Windows Server 2016 with Containers is a comprehensive server operating system designed to run the applications and infrastructure that power your business. It includes built-in layers of security and innovation to help you run traditional and cloud-native applications with confidence. This image is a Server with Desktop Experience that includes Windows Server container images installed and ready to use with Docker.

This image can be used with Azure Hybrid Benefit for Windows Server.

Legal Terms

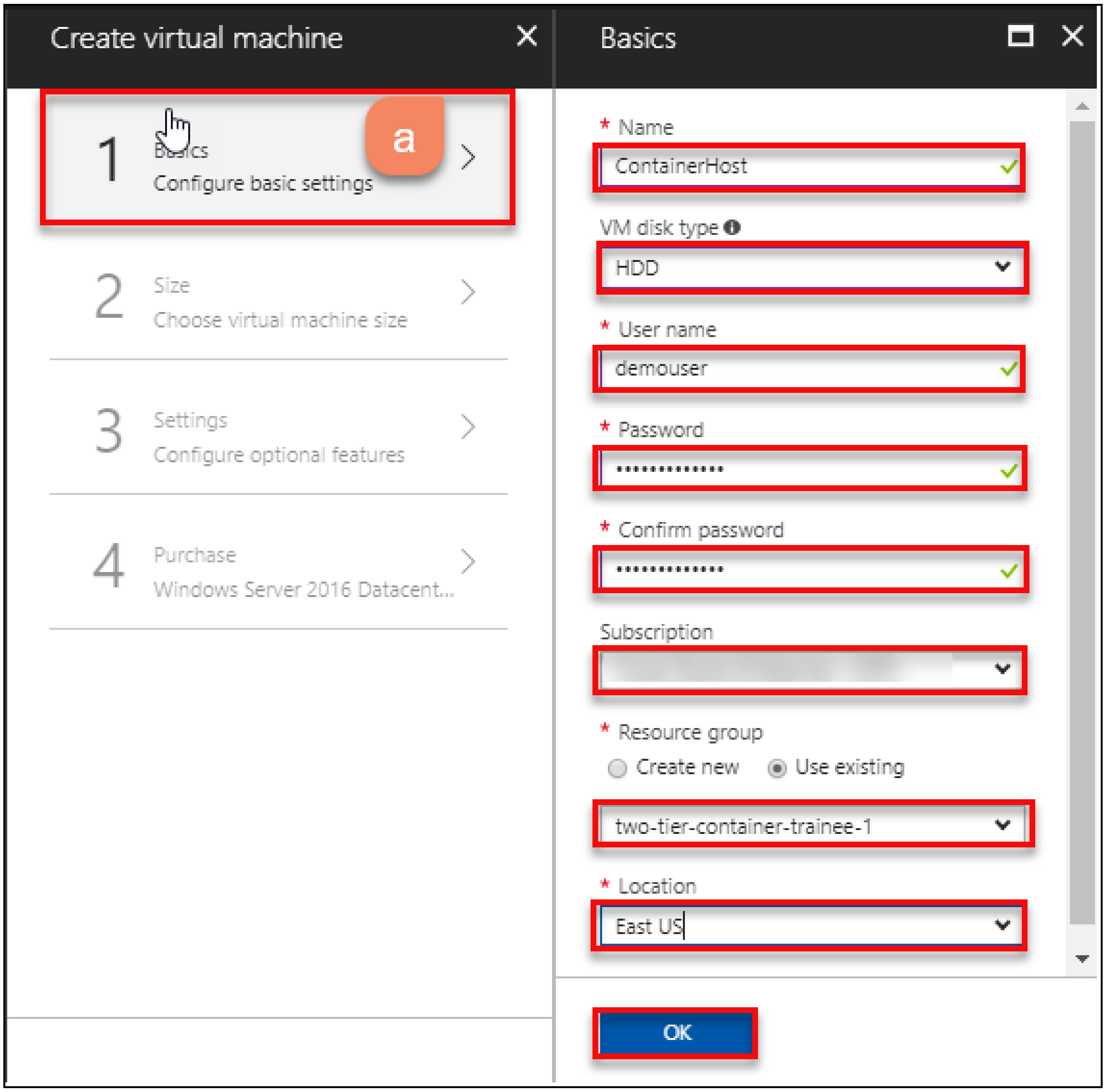
By clicking the Create button, I acknowledge that I am getting this software from Microsoft and that the legal terms of Microsoft apply to it. Microsoft does not provide rights for third-party software. Also see the privacy statement from Microsoft.

PUBLISHER Microsoft

USEFUL LINKS Quick Start
Learn more

Select a deployment model: Resource Manager

4. In **Basics** section, populate the parameters as shown below and clicn **OK**



* Name: ContainerHost

VM disk type: HDD

* User name: demouser

* Password: ••••••••••••••

* Confirm password: ••••••••••••••

Subscription: [redacted]

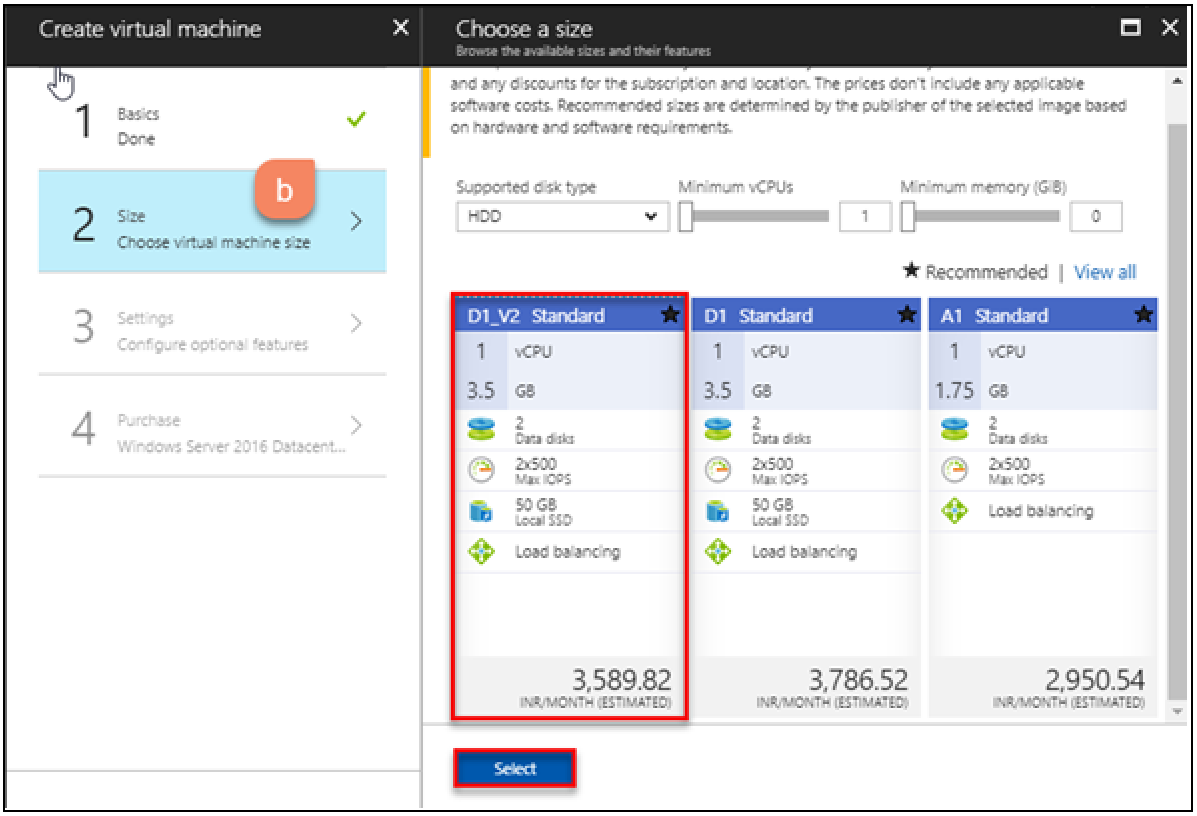
* Resource group

○ Create new ● Use existing

two-tier-container-trainee-1

* Location: East US

5. Select the size of the VM as **D1_V2 Standard** and click **Select.**



Create virtual machine
1 Basics Done
2 Size Choose virtual machine size
b
3 Settings Configure optional features
4 Purchase Windows Server 2016 Datacent...
Choose a size
Browse the available sizes and their features
Select

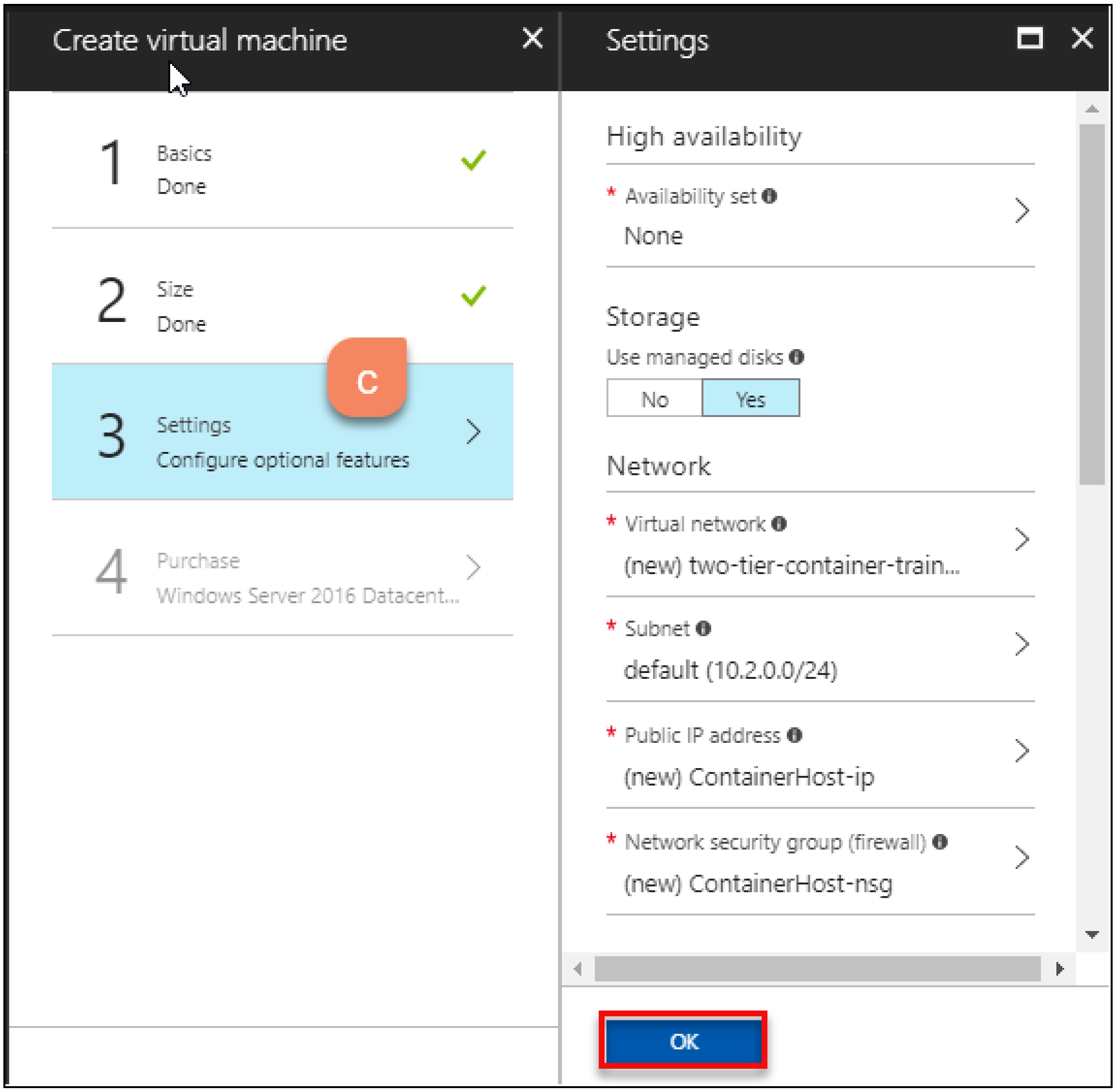
and any discounts for the subscription and location. The prices don't include any applicable software costs. Recommended sizes are determined by the publisher of the selected image based on hardware and software requirements.

Supported disk type: HDD
Minimum vCPUs: 1
Minimum memory (GiB): 0

★ Recommended | View all

D1_V2 Standard ★	D1 Standard ★	A1 Standard ★
1 vCPU	1 vCPU	1 vCPU
3.5 GB	3.5 GB	1.75 GB
2 Data disks	2 Data disks	2 Data disks
2x500 Max IOPS	2x500 Max IOPS	2x500 Max IOPS
50 GB Local SSD	50 GB Local SSD	Load balancing
Load balancing	Load balancing	
3,589.82 INR/MONTH (ESTIMATED)	3,786.52 INR/MONTH (ESTIMATED)	2,950.54 INR/MONTH (ESTIMATED)

6. In **Settings** Blade, continue with defaults and click on **OK** button.



Create virtual machine
1 Basics Done ✓
2 Size Done ✓
C
3 Settings Configure optional features
4 Purchase Windows Server 2016 Datacent...
Settings
OK

High availability

* Availability set: None

Storage

Use managed disks: No [✓ Yes]

Network

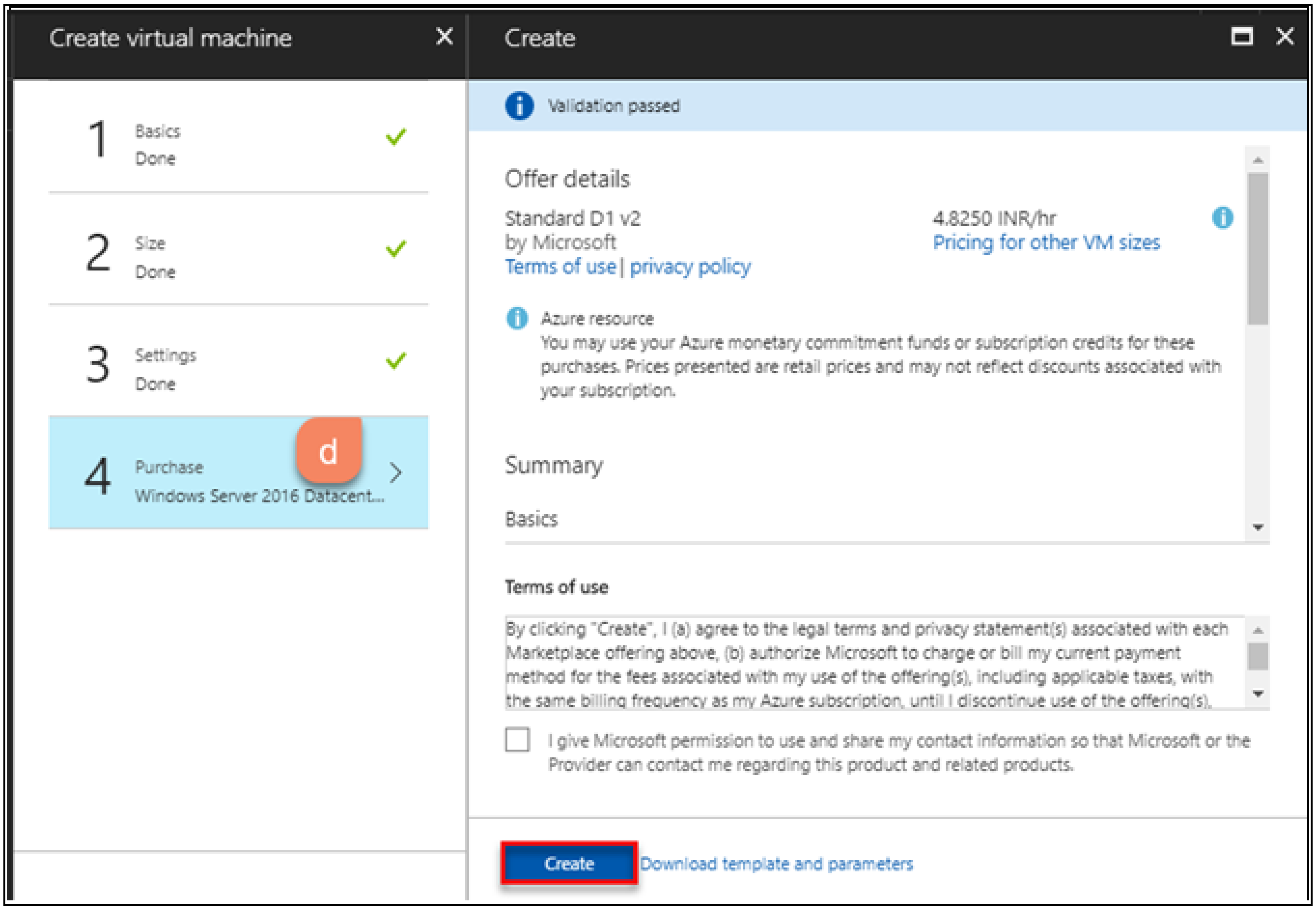
* Virtual network: (new) two-tier-container-train...

* Subnet: default (10.2.0.0/24)

* Public IP address: (new) ContainerHost-ip

* Network security group (firewall): (new) ContainerHost-nsg

7. In Purchase Blade, click on **Create** button.


Create virtual machine
1 Basics Done
2 Size Done
3 Settings Done
4 Purchase Windows Server 2016 Datacent...
d
Create
Create
Download template and parameters

Validation passed

Offer details

Standard D1 v2
by Microsoft
Terms of use | privacy policy

4.8250 INR/hr
Pricing for other VM sizes

Azure resource
You may use your Azure monetary commitment funds or subscription credits for these purchases. Prices presented are retail prices and may not reflect discounts associated with your subscription.

Summary

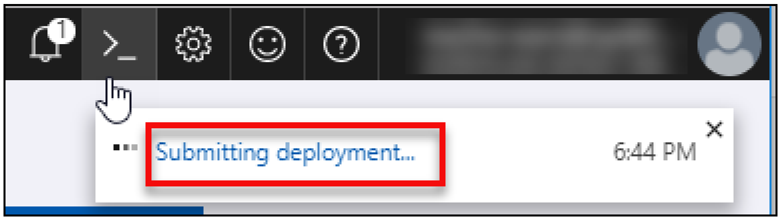
Basics

Terms of use

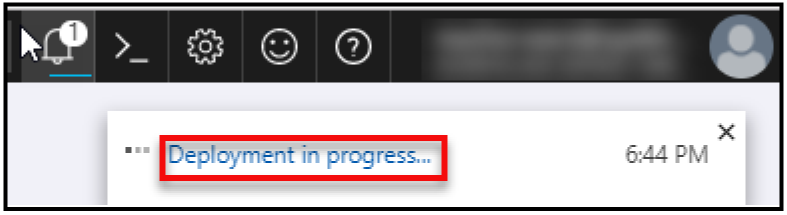
By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with each Marketplace offering above, (b) authorize Microsoft to charge or bill my current payment method for the fees associated with my use of the offering(s), including applicable taxes, with the same billing frequency as my Azure subscription, until I discontinue use of the offering(s),

□ I give Microsoft permission to use and share my contact information so that Microsoft or the Provider can contact me regarding this product and related products.

8. A notification will get raise for submitting the deployment and then deployment will get started.

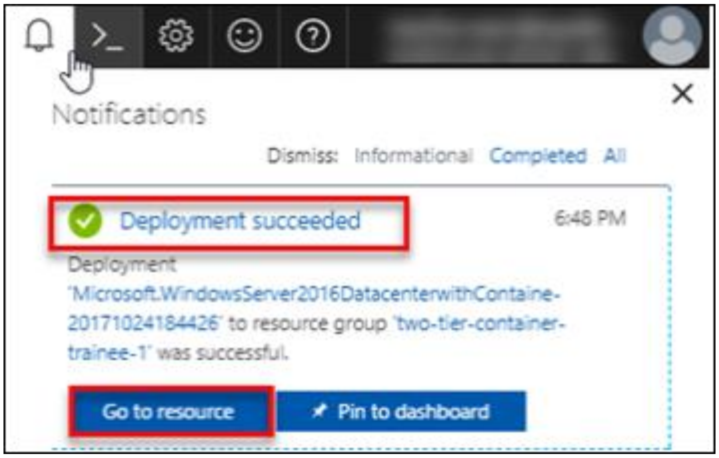


Submitting deployment... 6:44 PM



Deployment in progress... 6:44 PM

9. Once deployment is successful, below notification will be raised. Click on **Go to resource** to validate the resource.

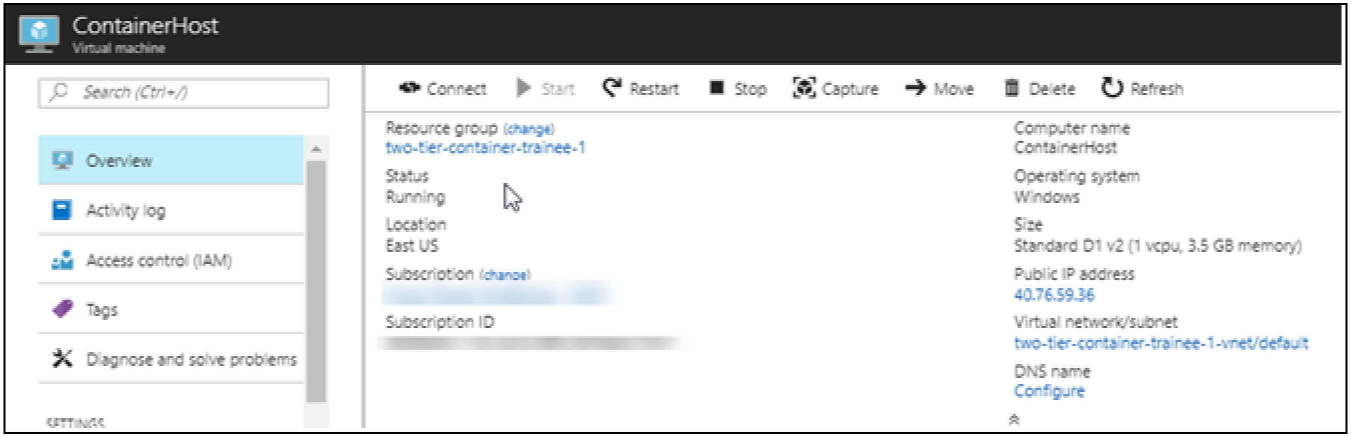


[redacted]

Deployment succeeded 6:48 PM

Deployment 'Microsoft.WindowsServer2016DatacenterwithContaine-20171024184426' to resource group 'two-tier-container-trainee-1' was successful.

10. Windows VM with container is successfully installed.



Resource group (change)
two-tier-container-trainee-1

Status
Running

Location
East US

Subscription (change)
[redacted]

Subscription ID
[redacted]

Computer name
ContainerHost

Operating system
Windows

Size
Standard D1 v2 (1 vcpu, 3.5 GB memory)

Public IP address
40.76.59.36

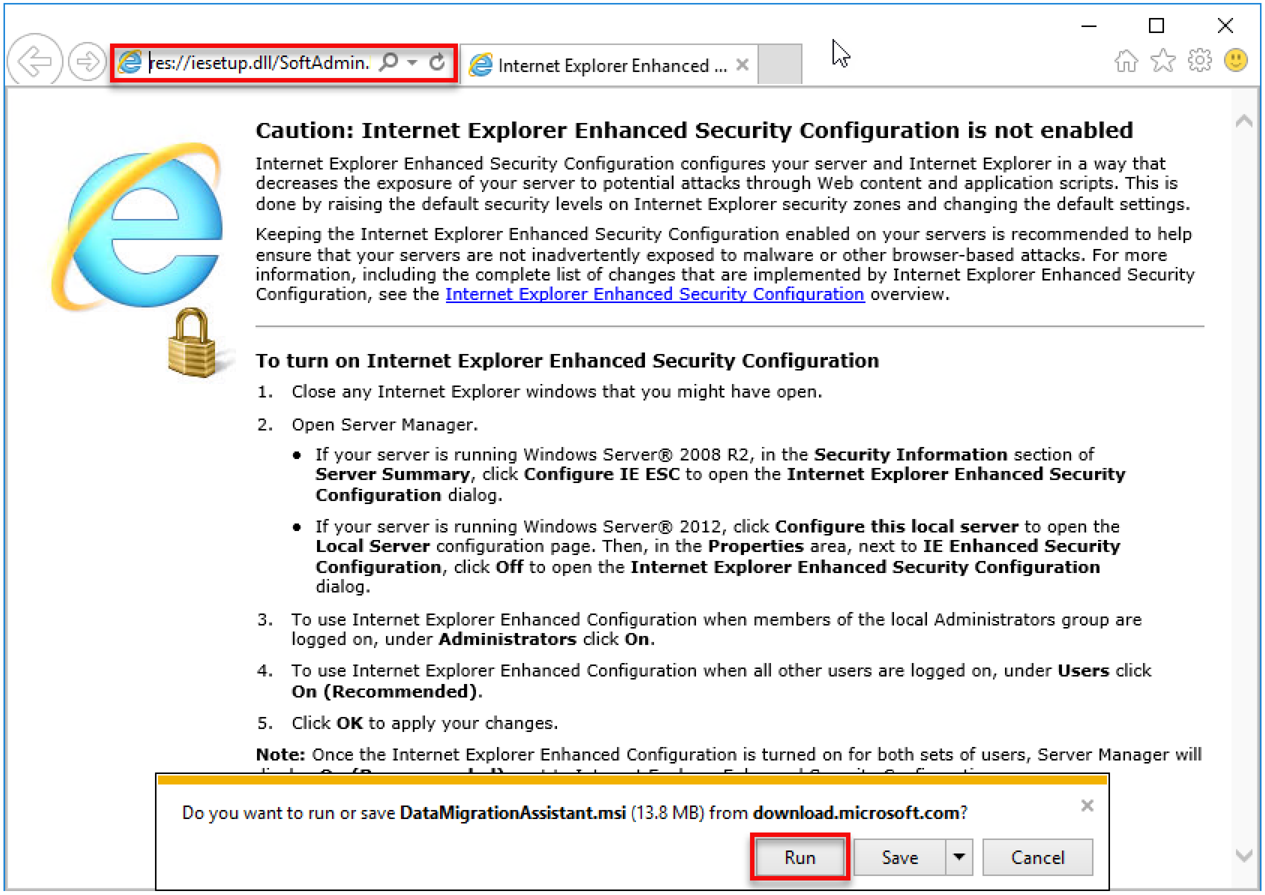
Virtual network/subnet
two-tier-container-trainee-1-vnet/default

DNS name
Configure

Exercise 3: Install DMA in On-premises VM and migrate database

In this exercise, we will login to on-premises VM and install database migration assistant.

1. Login to On-premises VM if not already logged-in, follow Lab1 → Exercise 2 → step-1 to step-5.
2. Open Internet Explorer and download the DMA from Url. Click on **Run** when prompted.



Caution: Internet Explorer Enhanced Security Configuration is not enabled

Internet Explorer Enhanced Security Configuration configures your server and Internet Explorer in a way that decreases the exposure of your server to potential attacks through Web content and application scripts. This is done by raising the default security levels on Internet Explorer security zones and changing the default settings.

Keeping the Internet Explorer Enhanced Security Configuration enabled on your servers is recommended to help ensure that your servers are not inadvertently exposed to malware or other browser-based attacks. For more information, including the complete list of changes that are implemented by Internet Explorer Enhanced Security Configuration, see the Internet Explorer Enhanced Security Configuration overview.

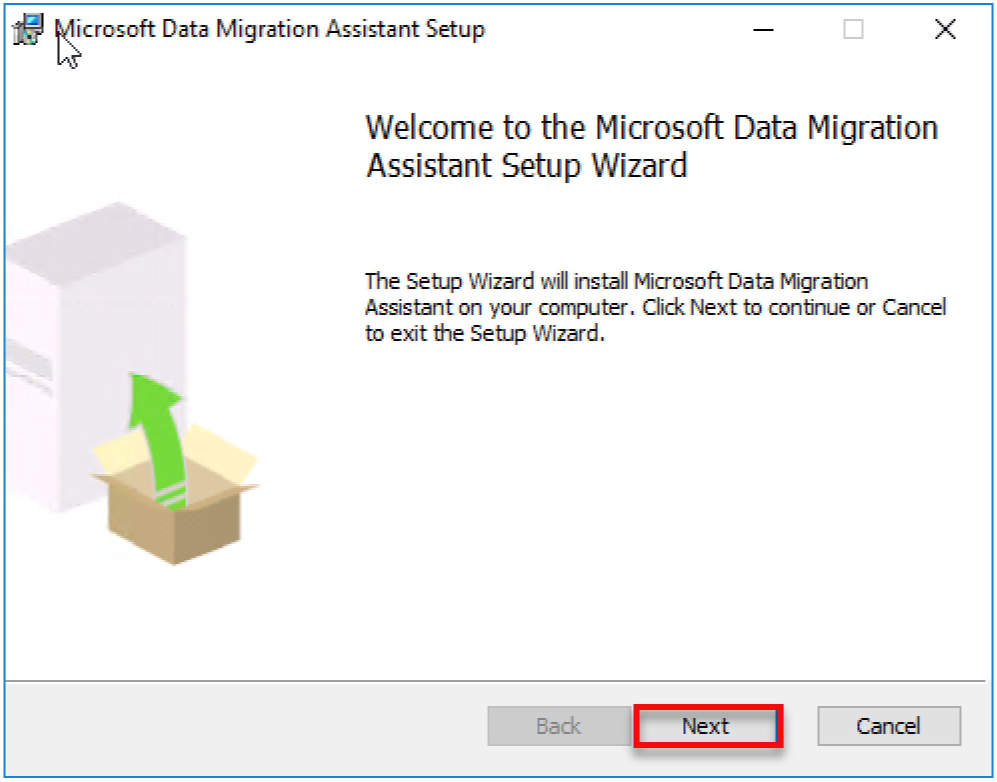
To turn on Internet Explorer Enhanced Security Configuration

1. Close any Internet Explorer windows that you might have open.
2. Open Server Manager.
   - If your server is running Windows Server® 2008 R2, in the **Security Information** section of **Server Summary**, click **Configure IE ESC** to open the **Internet Explorer Enhanced Security Configuration** dialog.
   - If your server is running Windows Server® 2012, click **Configure this local server** to open the **Local Server** configuration page. Then, in the **Properties** area, next to **IE Enhanced Security Configuration**, click **Off** to open the **Internet Explorer Enhanced Security Configuration** dialog.
3. To use Internet Explorer Enhanced Configuration when members of the local Administrators group are logged on, under **Administrators** click **On**.
4. To use Internet Explorer Enhanced Configuration when all other users are logged on, under **Users** click **On (Recommended)**.
5. Click **OK** to apply your changes.

Note: Once the Internet Explorer Enhanced Configuration is turned on for both sets of users, Server Manager will

Do you want to run or save **DataMigrationAssistant.msi** (13.8 MB) from **download.microsoft.com**?

3. Click on **Next** when DMS setup wizard pops-up.

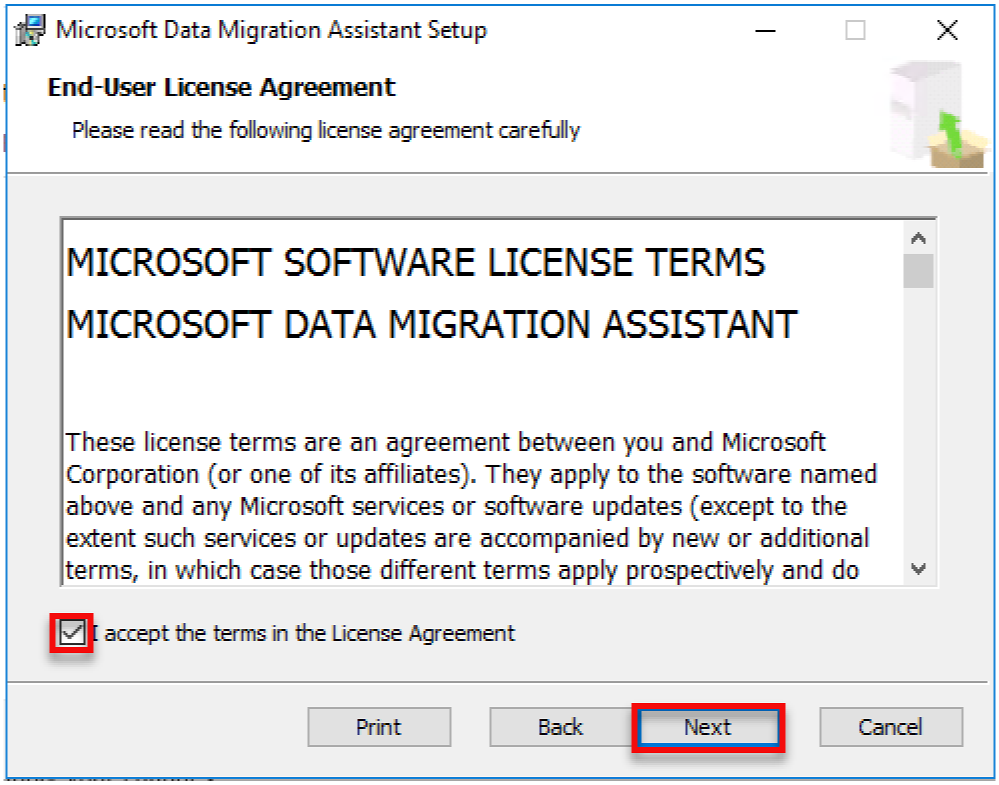


Microsoft Data Migration Assistant Setup

Welcome to the Microsoft Data Migration Assistant Setup Wizard

The Setup Wizard will install Microsoft Data Migration Assistant on your computer. Click Next to continue or Cancel to exit the Setup Wizard.

4. Check the **Accept License Aggreement** and click **Next.**



Microsoft Data Migration Assistant Setup

End-User License Agreement

Please read the following license agreement carefully

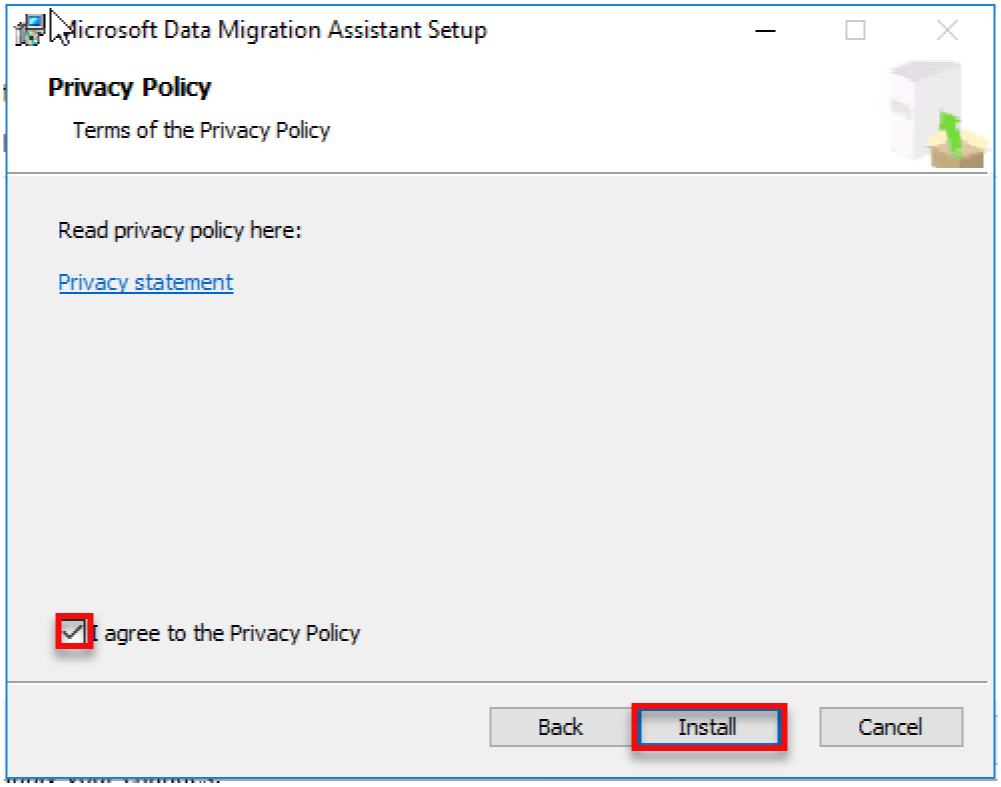
MICROSOFT SOFTWARE LICENSE TERMS

MICROSOFT DATA MIGRATION ASSISTANT

These license terms are an agreement between you and Microsoft Corporation (or one of its affiliates). They apply to the software named above and any Microsoft services or software updates (except to the extent such services or updates are accompanied by new or additional terms, in which case those different terms apply prospectively and do

☑ I accept the terms in the License Agreement

5. Check the **I agree to the privacy policy**, and click on **Install.**



Microsoft Data Migration Assistant Setup

Privacy Policy

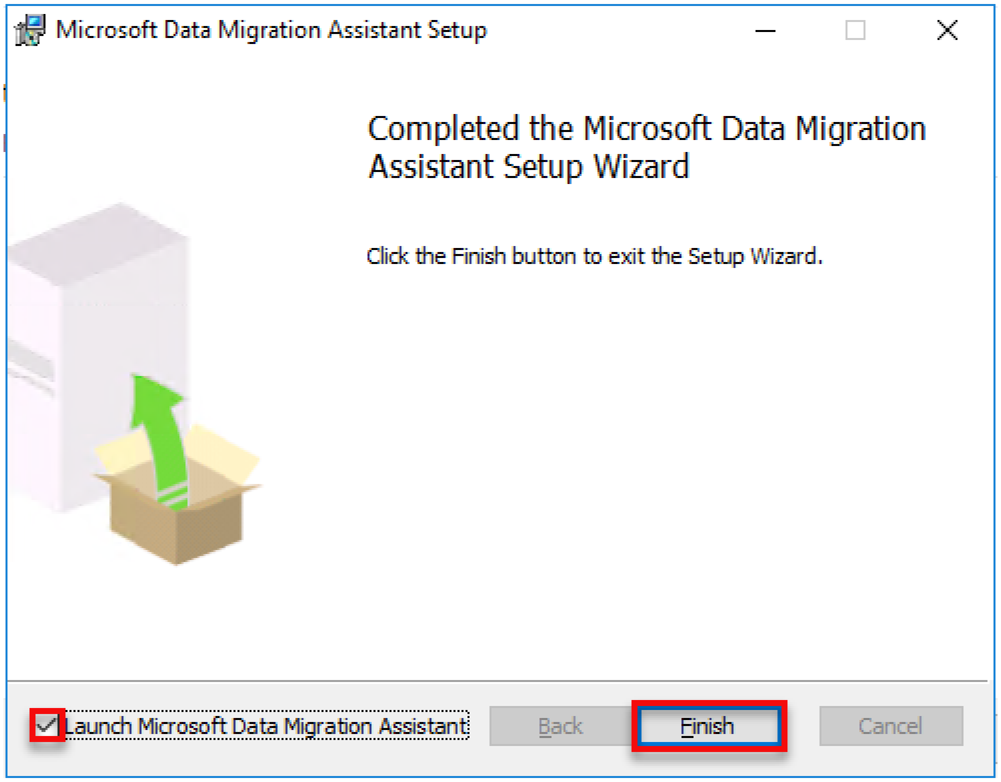
Terms of the Privacy Policy

Read privacy policy here:

Privacy statement

☑ I agree to the Privacy Policy

6. Once installation completes, check the **Launch Microsoft Data Migration Assistant** and click on **Finish.**



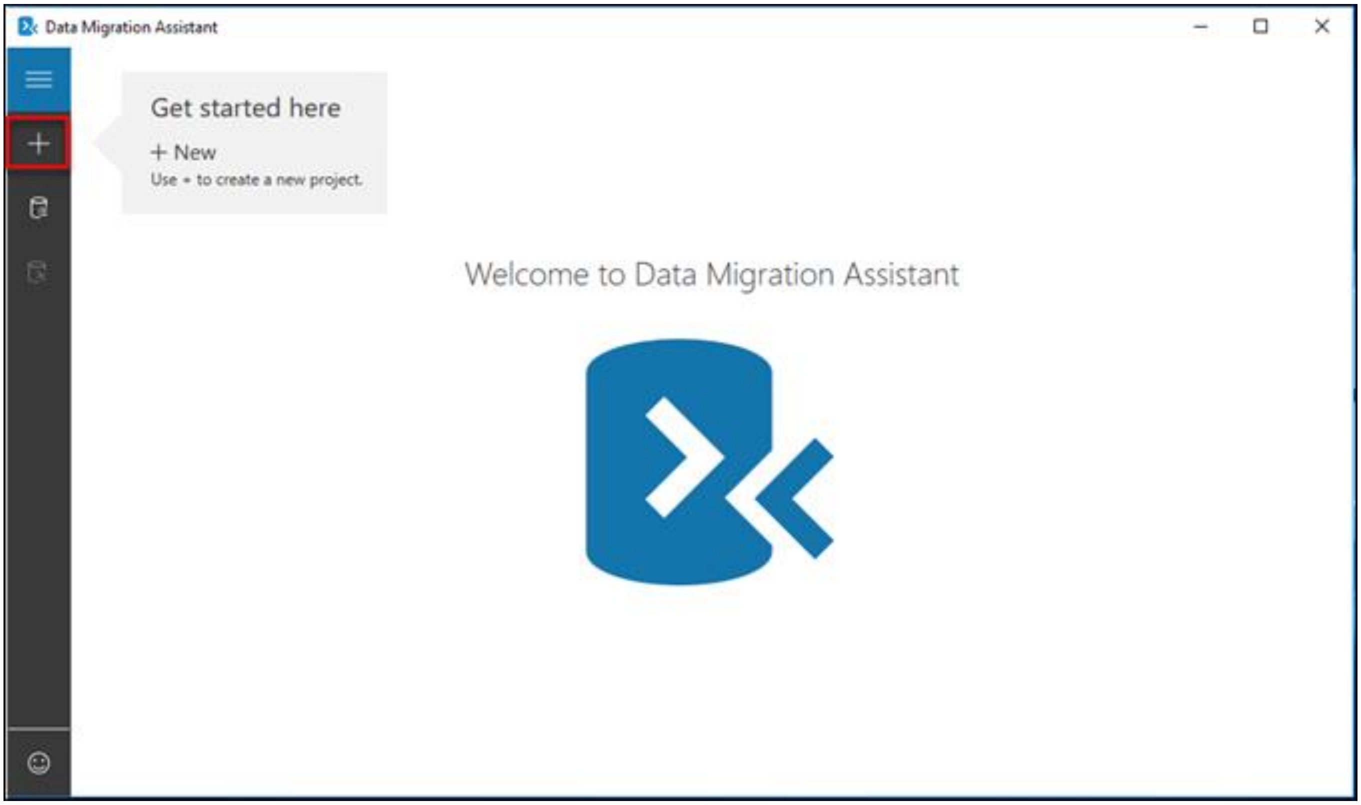
Microsoft Data Migration Assistant Setup

Completed the Microsoft Data Migration Assistant Setup Wizard

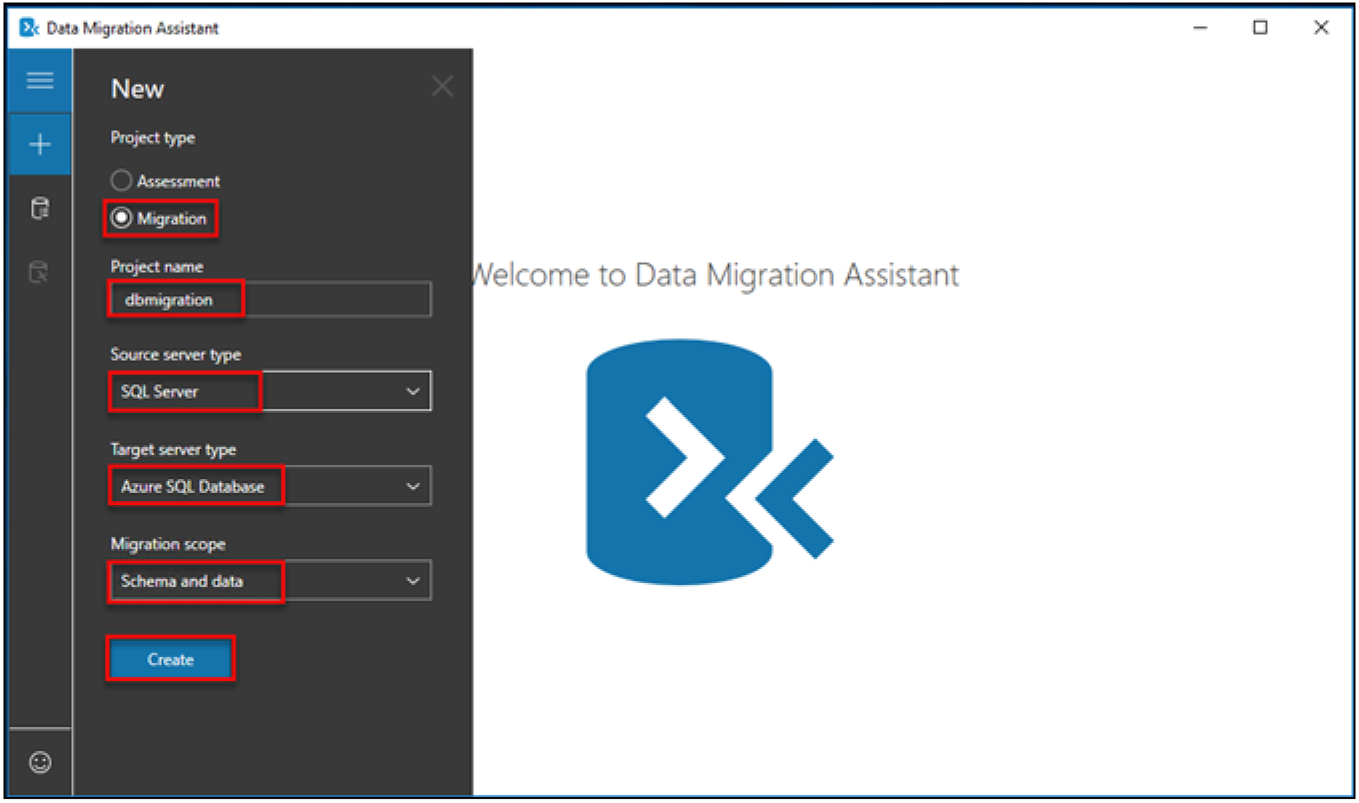
Click the Finish button to exit the Setup Wizard.

☑ Launch Microsoft Data Migration Assistant

7. When Data Migration Assitant application launches, click on **+** button on the left to create a new project.


Data Migration Assistant
Get started here
+ New
Use + to create a new project.
Welcome to Data Migration Assistant

8. Populate the New Project with values provided below and click on **Create** button
   a. *Project Type:* **Migration**
   b. *Project Name: <any name>*
   c. *Source server type:* **SQL Server**
   d. *Target Server Type:* **Azure SQL Database**
   e. *Migration Scope:* **Schema and data**



New

Project type

○ Assessment
● Migration

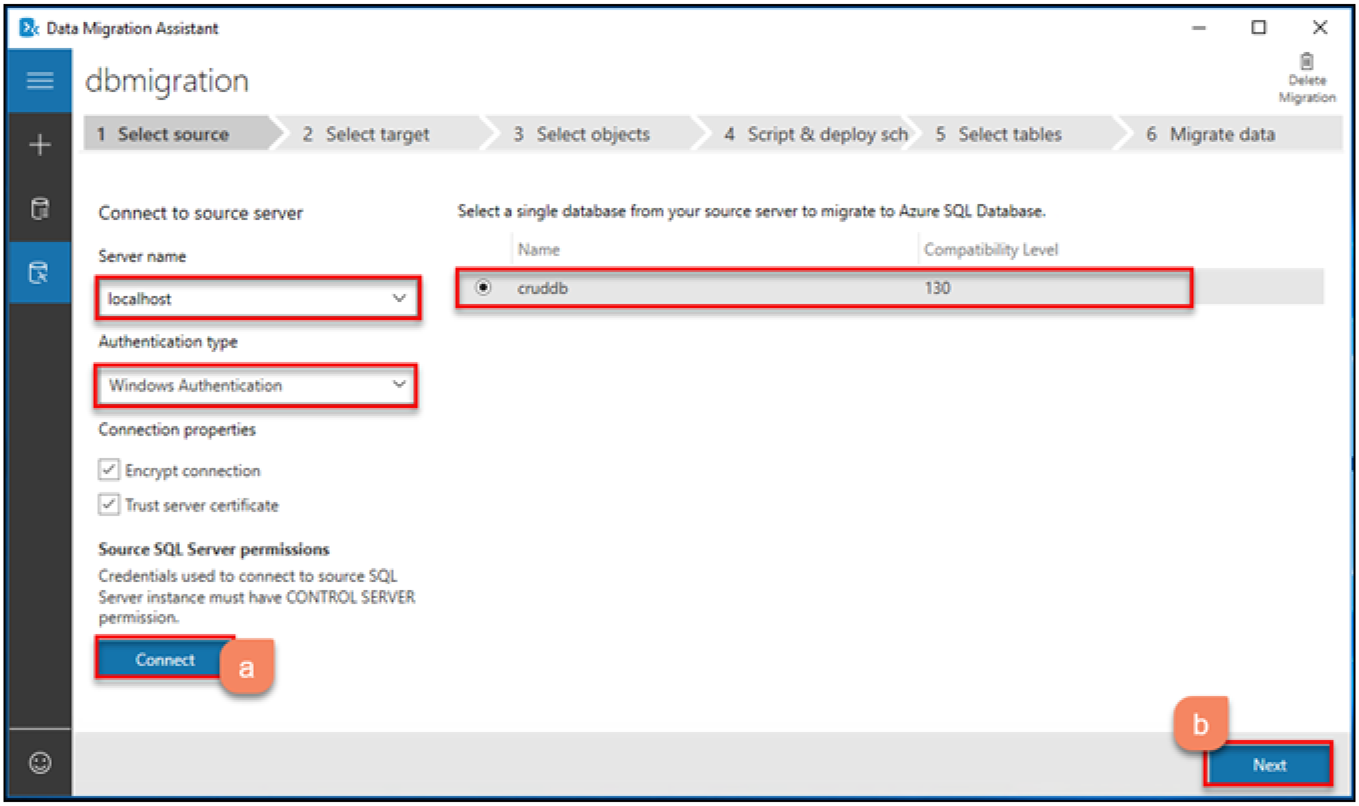
Project name: dbmigration

Source server type: SQL Server

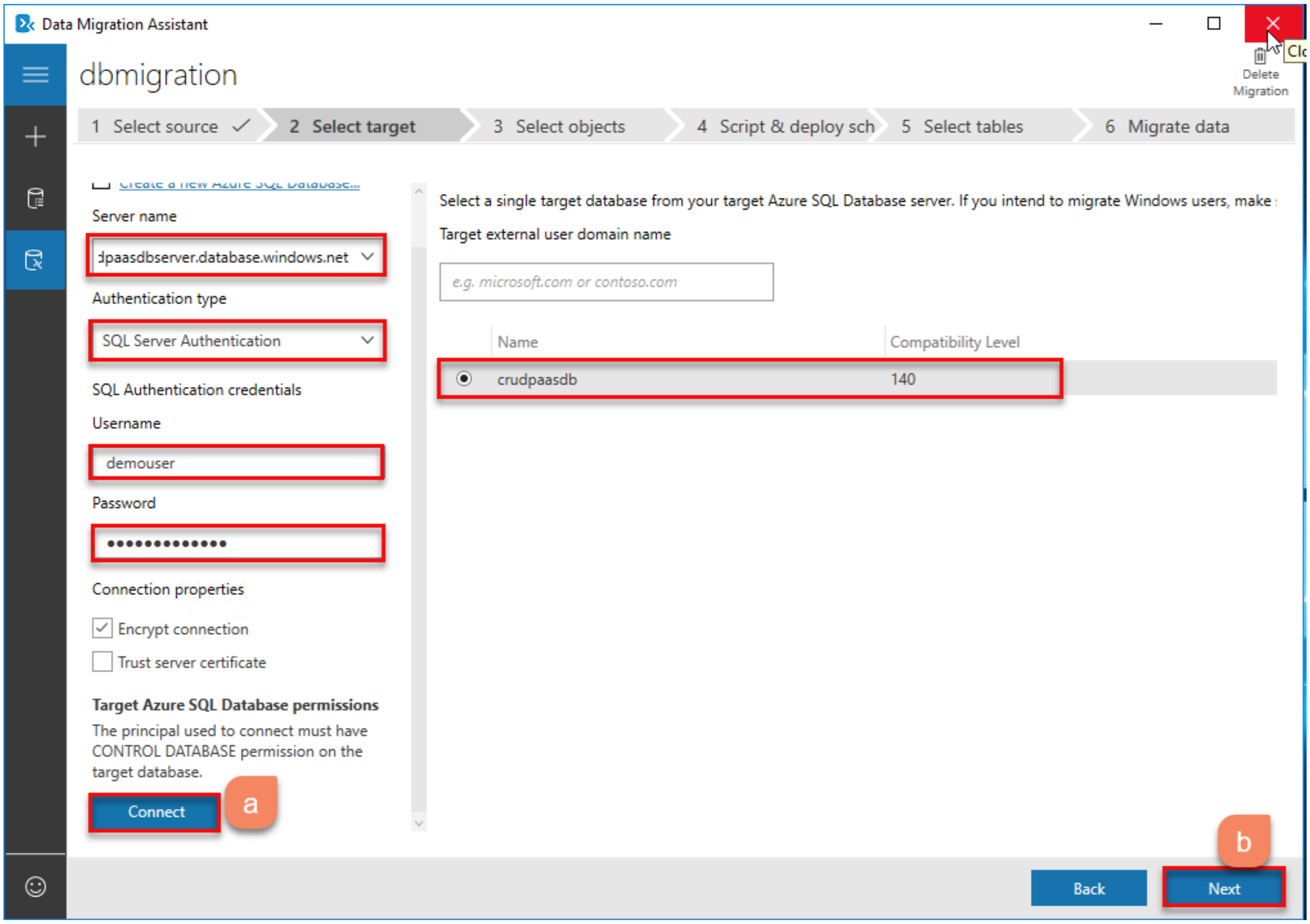
Target server type: Azure SQL Database

Migration scope: Schema and data

9. In the **Select Source**, populate below parameter and click **Connect** which will list down the database to be migrated, click **Next**
    a. *Server name:* **localhost** (as tool is installed on same server where database in installed)
    b. *Authentication type:* **Windows Authentication** (logged in user do have rights on database)



10. In the **Select target**, populate the below parameter and click **Connect** which will list down the database at destination. Select the databse and click **Next**
    a. Server Name: <<Exercise 2→ Step 9>
    b. Authentication type: **SQL Server Authentication**
    c. Username: <Lab2→ Exercise 1→ Step 4 → g>
    d. Password: < Lab2→ Exercise 1→ Step 4 → h >



Create a new Azure SQL Database...

Server name: dpaasdbserver.database.windows.net

Authentication type: SQL Server Authentication

SQL Authentication credentials

Username: demouser

Password: ••••••••••••••

Connection properties

☑ Encrypt connection

□ Trust server certificate

Target Azure SQL Database permissions

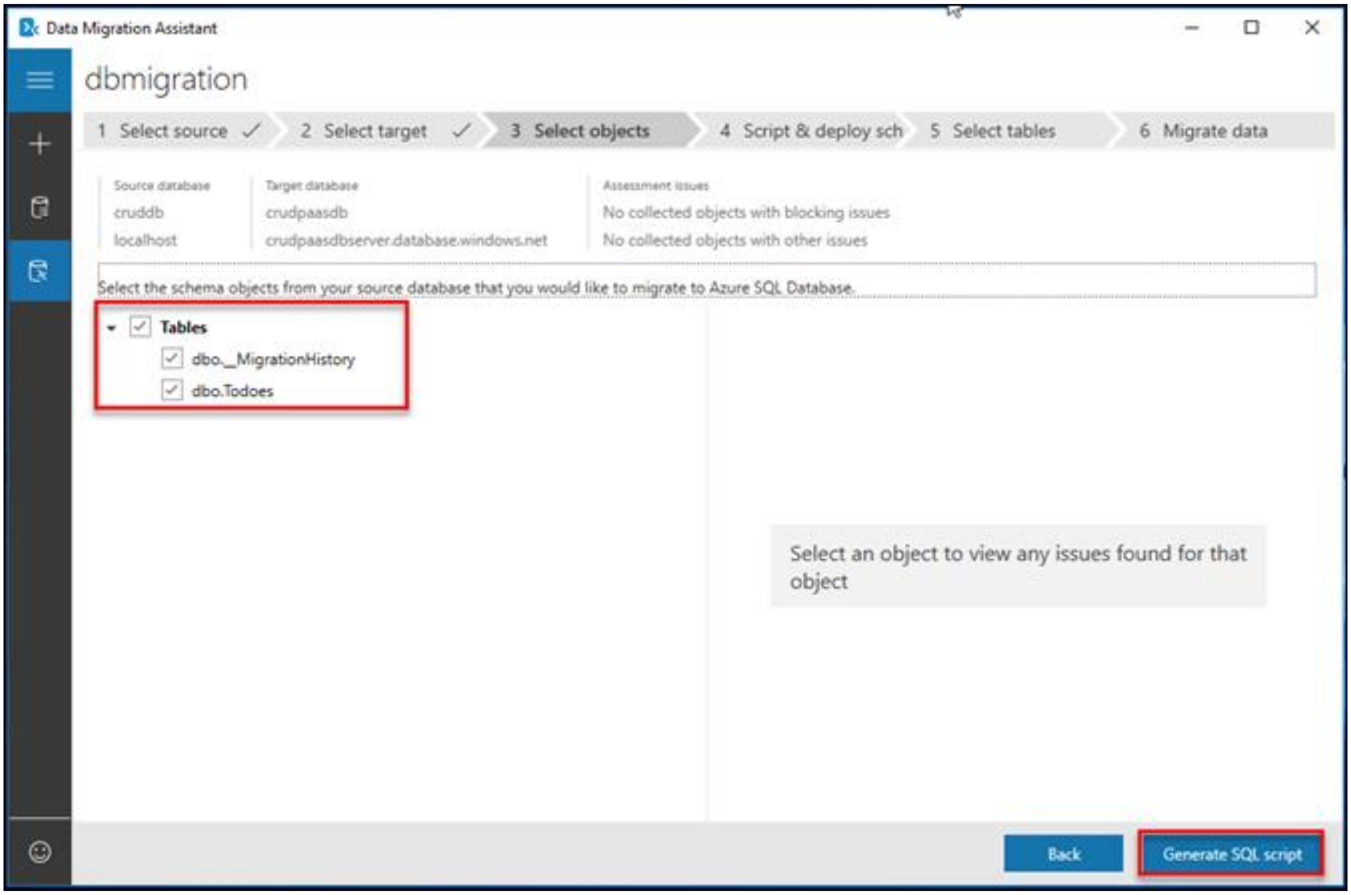
The principal used to connect must have CONTROL DATABASE permission on the target database.

Select a single target database from your target Azure SQL Database server. If you intend to migrate Windows users, make

Target external user domain name: e.g. microsoft.com or contoso.com

	Name	Compatibility Level
●	crudpaasdb	140

11. In **Select objects**, you will be provided with the tables which are in source database, here you can select/deselect table which you want to migrate to Azure PaaS database. Keep the default and click on **Generate SQL Script.**



Source database: cruddb, localhost

Target database: crudpaasdb, crudpaasdbserver.database.windows.net

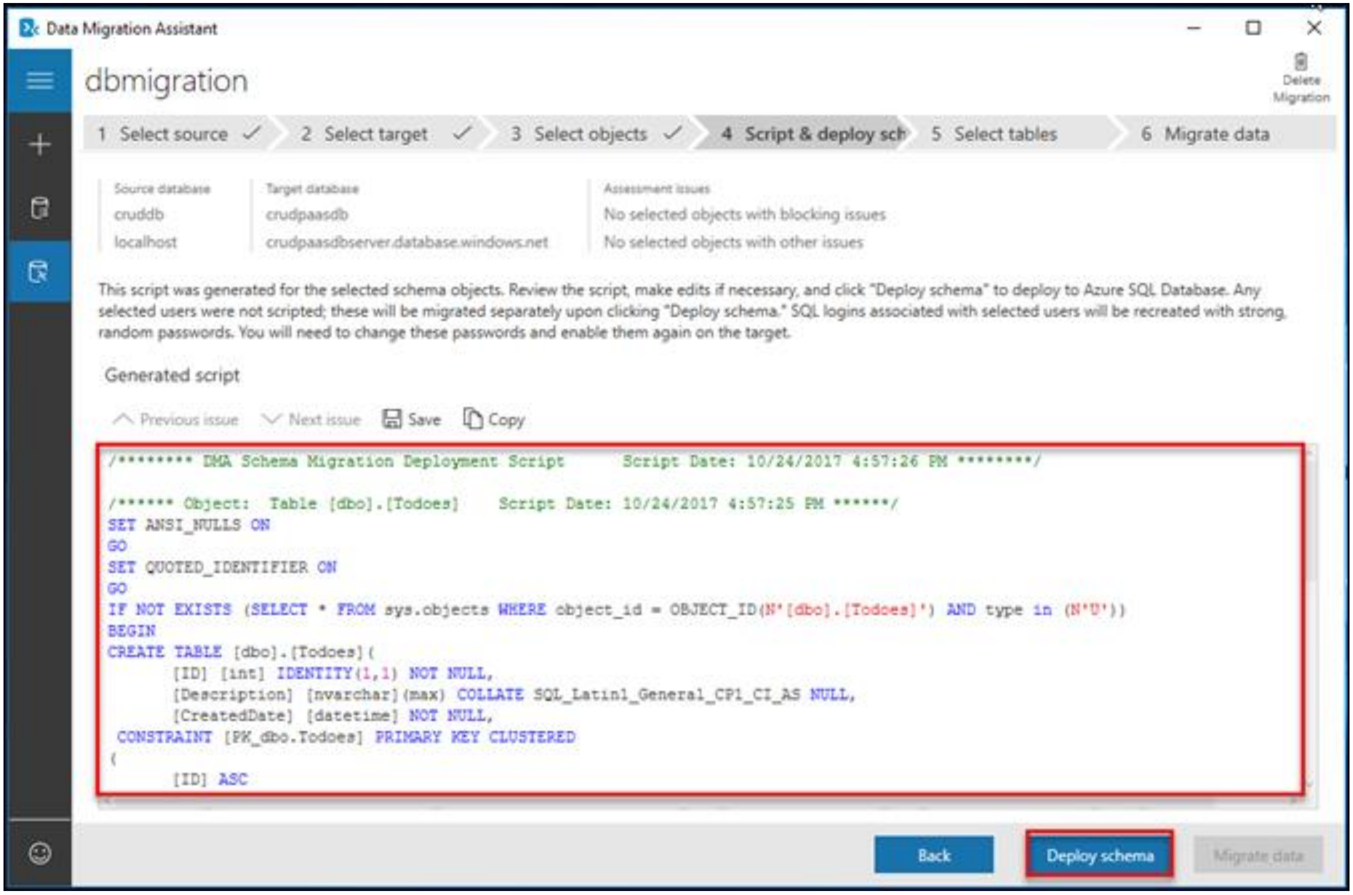
Assessment issues: No collected objects with blocking issues; No collected objects with other issues

Select the schema objects from your source database that you would like to migrate to Azure SQL Database.

- ☑ Tables
  - ☑ dbo.__MigrationHistory
  - ☑ dbo.Todoes

Select an object to view any issues found for that object

12. You will see an SQL script which will be used to create schema at destination database. Click on **Deploy schema** button.



Source database: cruddb, localhost

Target database: crudpaasdb, crudpaasdbserver.database.windows.net

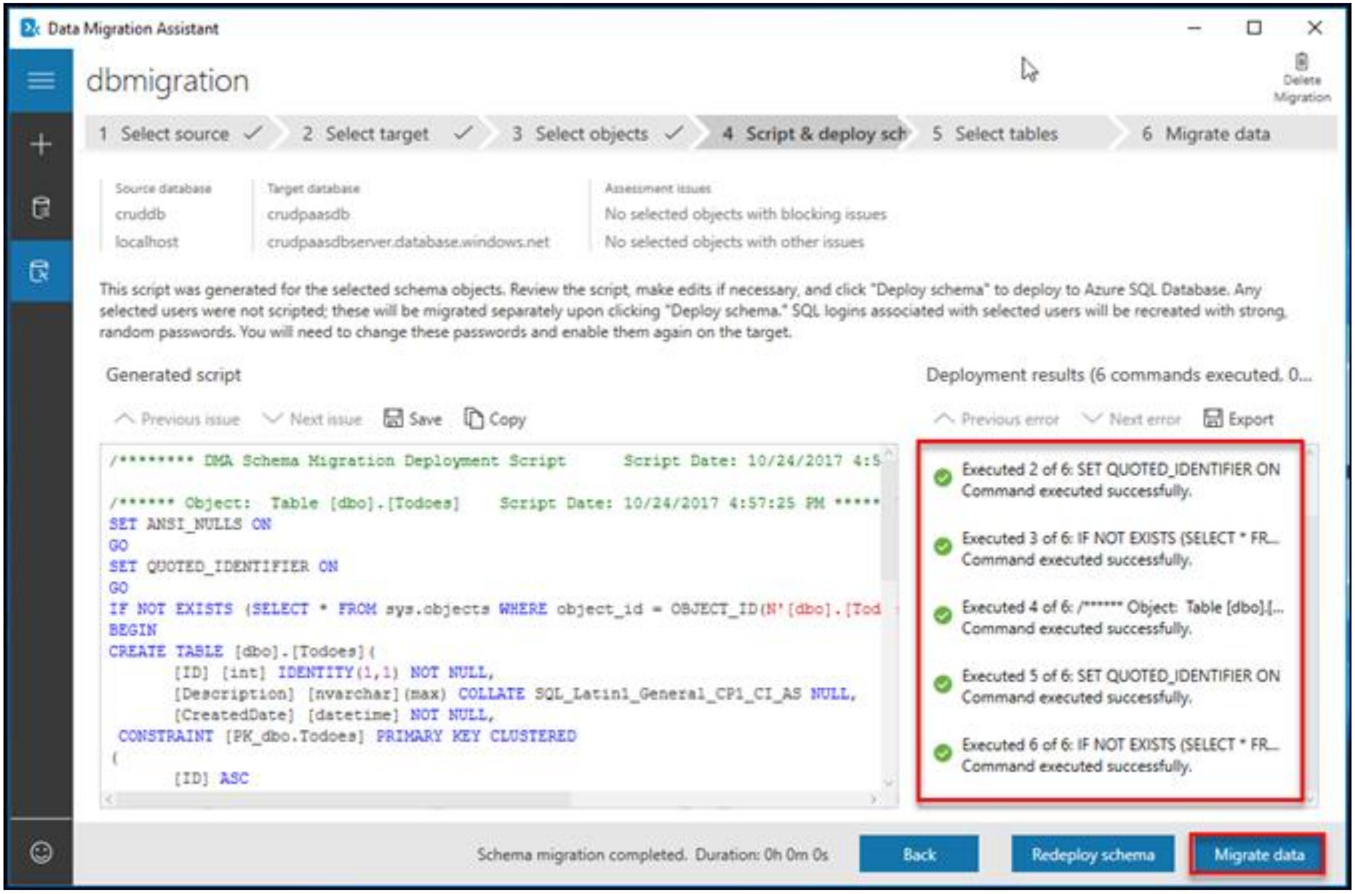
Assessment issues: No selected objects with blocking issues; No selected objects with other issues

This script was generated for the selected schema objects. Review the script, make edits if necessary, and click "Deploy schema" to deploy to Azure SQL Database. Any selected users were not scripted; these will be migrated separately upon clicking "Deploy schema." SQL logins associated with selected users will be recreated with strong, random passwords. You will need to change these passwords and enable them again on the target.

Generated script

```
/******** DMA Schema Migration Deployment Script      Script Date: 10/24/2017 4:57:26 PM ********/

/****** Object:  Table [dbo].[Todoes]    Script Date: 10/24/2017 4:57:25 PM ******/
SET ANSI_NULLS ON
GO
SET QUOTED_IDENTIFIER ON
GO
IF NOT EXISTS (SELECT * FROM sys.objects WHERE object_id = OBJECT_ID(N'[dbo].[Todoes]') AND type in (N'U'))
BEGIN
CREATE TABLE [dbo].[Todoes](
	[ID] [int] IDENTITY(1,1) NOT NULL,
	[Description] [nvarchar](max) COLLATE SQL_Latin1_General_CP1_CI_AS NULL,
	[CreatedDate] [datetime] NOT NULL,
 CONSTRAINT [PK_dbo.Todoes] PRIMARY KEY CLUSTERED
(
	[ID] ASC
```

13. You will see the execution of script is done successfully completed in **Deployment results.** Click on **Migrate Data**.



Source database
cruddb
localhost

Target database
crudpaasdb
crudpaasdbserver.database.windows.net

Assessment issues
No selected objects with blocking issues
No selected objects with other issues

This script was generated for the selected schema objects. Review the script, make edits if necessary, and click "Deploy schema" to deploy to Azure SQL Database. Any selected users were not scripted; these will be migrated separately upon clicking "Deploy schema." SQL logins associated with selected users will be recreated with strong, random passwords. You will need to change these passwords and enable them again on the target.

Generated script

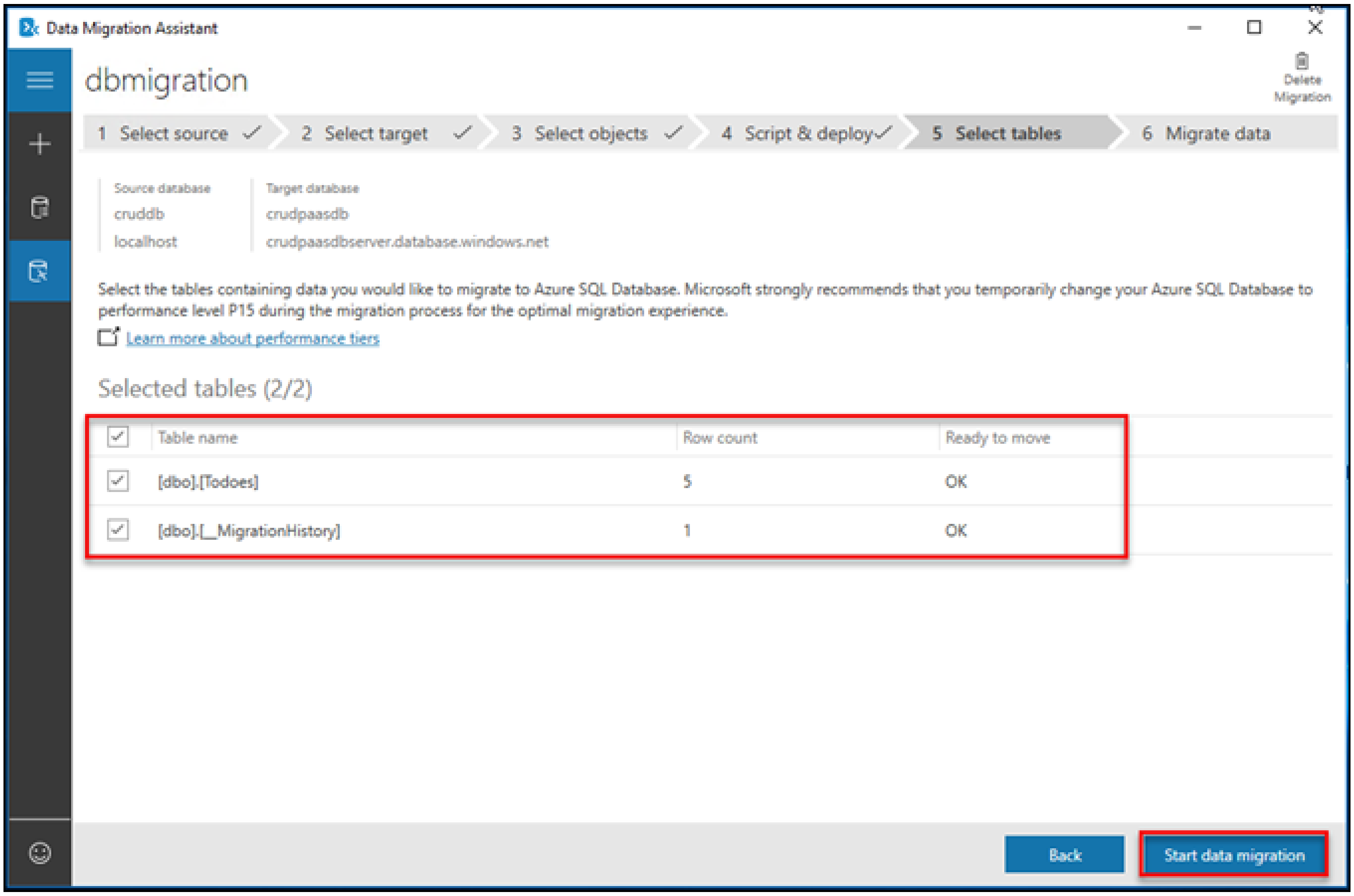
```
/******** DMA Schema Migration Deployment Script      Script Date: 10/24/2017 4:5

/****** Object:  Table [dbo].[Todoes]    Script Date: 10/24/2017 4:57:25 PM *****
SET ANSI_NULLS ON
GO
SET QUOTED_IDENTIFIER ON
GO
IF NOT EXISTS (SELECT * FROM sys.objects WHERE object_id = OBJECT_ID(N'[dbo].[Tod
BEGIN
CREATE TABLE [dbo].[Todoes](
	[ID] [int] IDENTITY(1,1) NOT NULL,
	[Description] [nvarchar](max) COLLATE SQL_Latin1_General_CP1_CI_AS NULL,
	[CreatedDate] [datetime] NOT NULL,
 CONSTRAINT [PK_dbo.Todoes] PRIMARY KEY CLUSTERED
(
	[ID] ASC
```

Deployment results (6 commands executed, 0...

```
Executed 2 of 6: SET QUOTED_IDENTIFIER ON
Command executed successfully.

Executed 3 of 6: IF NOT EXISTS (SELECT * FR...
Command executed successfully.

Executed 4 of 6: /****** Object: Table [dbo].[...
Command executed successfully.

Executed 5 of 6: SET QUOTED_IDENTIFIER ON
Command executed successfully.

Executed 6 of 6: IF NOT EXISTS (SELECT * FR...
Command executed successfully.
```

Schema migration completed. Duration: 0h 0m 0s

14. In Select tables, you can choose which all table data to be migrated. Leave it default and click on **Start data migration.**



Source database
cruddb
localhost

Target database
crudpaasdb
crudpaasdbserver.database.windows.net

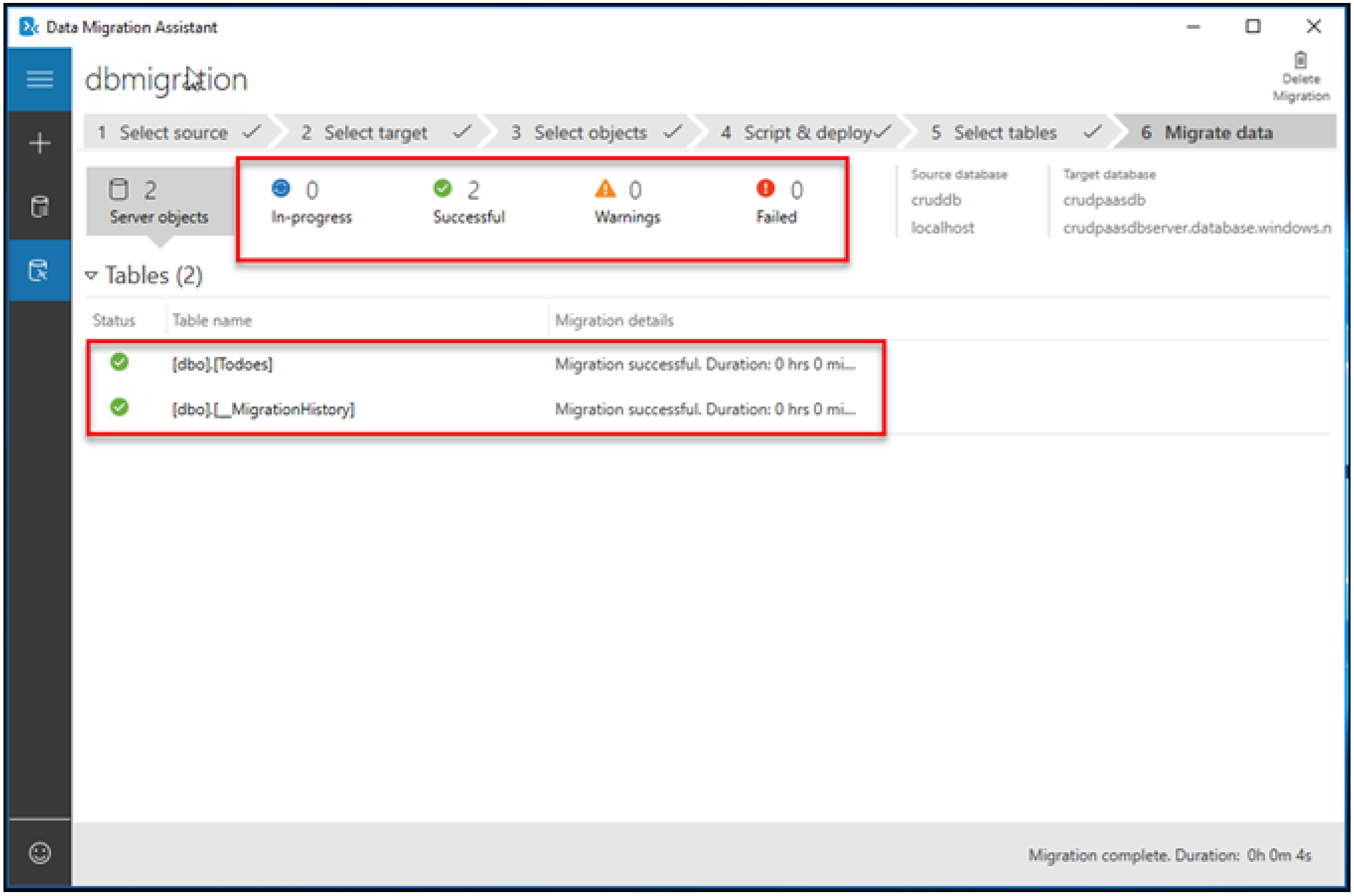
Select the tables containing data you would like to migrate to Azure SQL Database. Microsoft strongly recommends that you temporarily change your Azure SQL Database to performance level P15 during the migration process for the optimal migration experience.

Learn more about performance tiers

Selected tables (2/2)

☑	Table name	Row count	Ready to move
☑	[dbo].[Todoes]	5	OK
☑	[dbo].[__MigrationHistory]	1	OK

15. In **Migrate data**, You can see the final status of data migration.



2 Server objects | 0 In-progress | 2 Successful | 0 Warnings | 0 Failed

Source database
cruddb
localhost

Target database
crudpaasdb
crudpaasdbserver.database.windows.n

Tables (2)

Status	Table name	Migration details
✓	[dbo].[Todoes]	Migration successful. Duration: 0 hrs 0 mi...
✓	[dbo].[__MigrationHistory]	Migration successful. Duration: 0 hrs 0 mi...

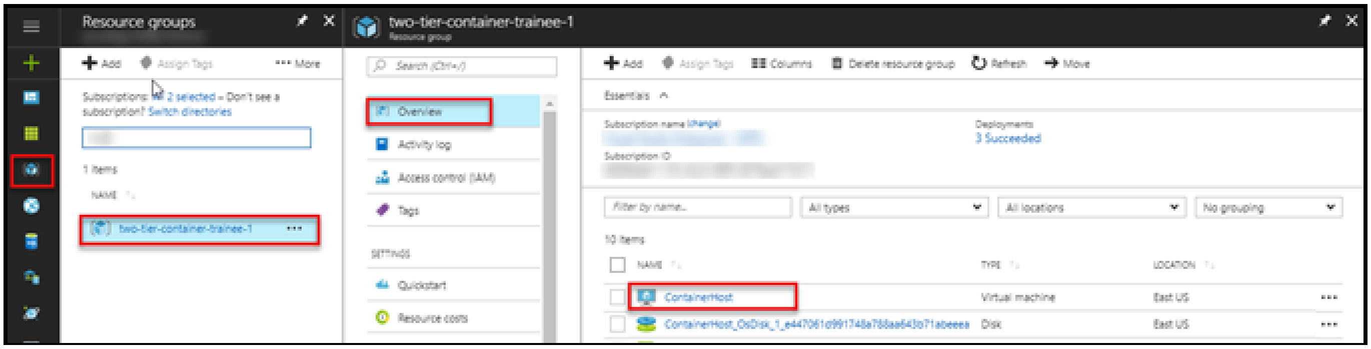
Migration complete. Duration: 0h 0m 4s

Now we have successfully migrated SQL database to Azure SQL database. Next, we we will move on to migrate webapp to containers.

Exercise 4: Migrate WebApp to Container

In this exercise, we will login to VM which we created in Exercise 2 and migrate WebApp to container.

1. Click on resource group icon in Azure portal and select the resource group in which you have create DockerHost in Exercise 2. Under overview seciton, click on Container Host VM.



Subscriptions: All 2 selected – Don't see a subscription? Switch directories

1 items

NAME
two-tier-container-trainee-1

Subscription name (change)
[redacted]

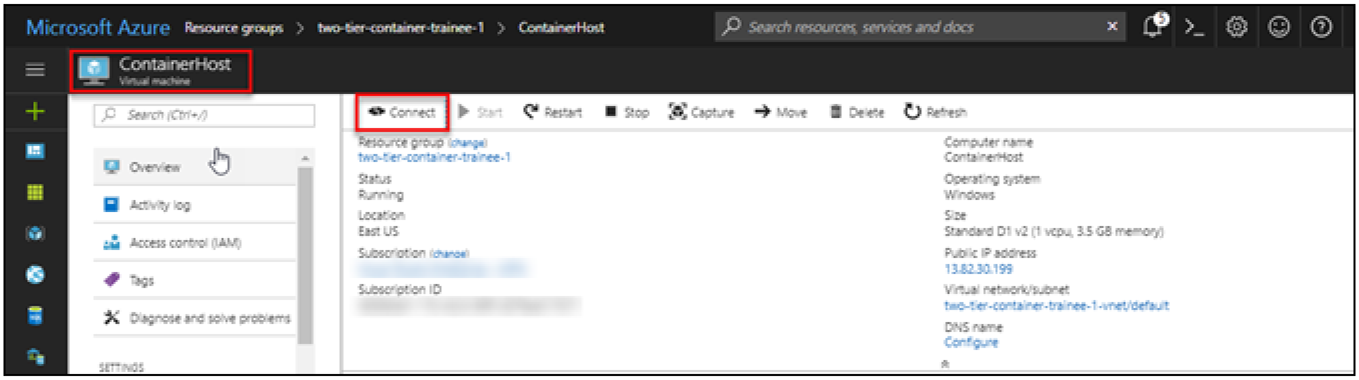
Subscription ID
[redacted]

Deployments
3 Succeeded

10 items

NAME	TYPE	LOCATION
ContainerHost	Virtual machine	East US
ContainerHost_OsDisk_1_e447061d991748a788aa643b71abeeea	Disk	East US

2. In overview section, click on **Connect** button. It will download an RDP file. Click on the same to connect the VM.



Resource group (change)
two-tier-container-trainee-1

Status
Running

Location
East US

Subscription (change)
[redacted]

Subscription ID
[redacted]

Computer name
ContainerHost

Operating system
Windows

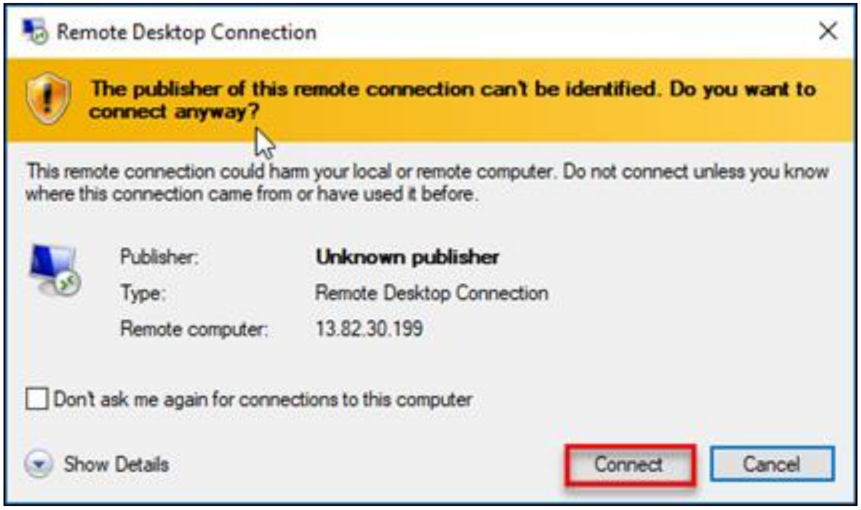
Size
Standard D1 v2 (1 vcpu, 3.5 GB memory)

Public IP address
13.82.30.199

Virtual network/subnet
two-tier-container-trainee-1-vnet/default

DNS name
Configure

3. Click on **Connect** button in Remote Desktop Connection Wizard.



The publisher of this remote connection can't be identified. Do you want to connect anyway?

This remote connection could harm your local or remote computer. Do not connect unless you know where this connection came from or have used it before.

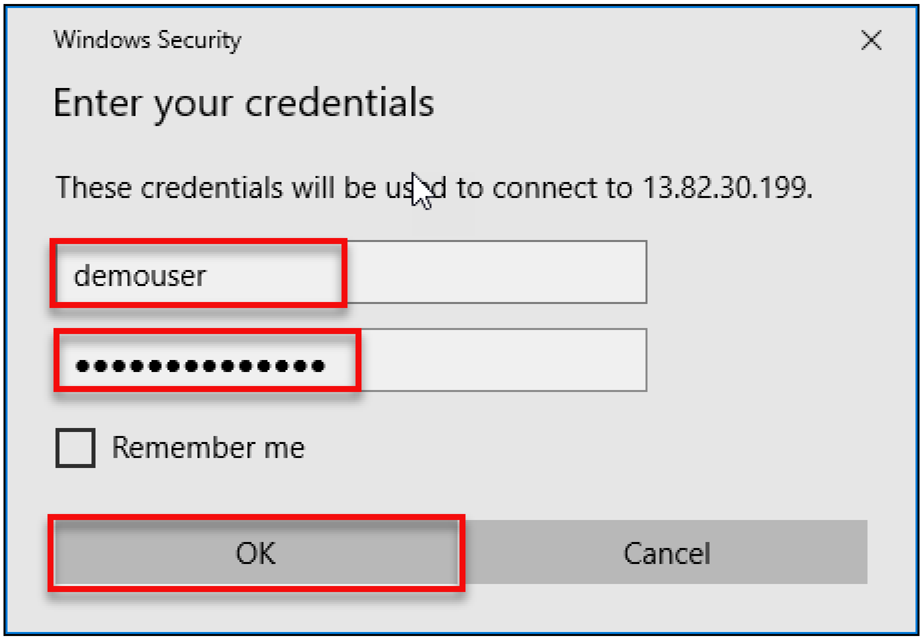
Publisher: **Unknown publisher**

Type: Remote Desktop Connection

Remote computer: 13.82.30.199

☐ Don't ask me again for connections to this computer

4. Enter the credentials provided in the mail to connect to VM.



Windows Security

Enter your credentials

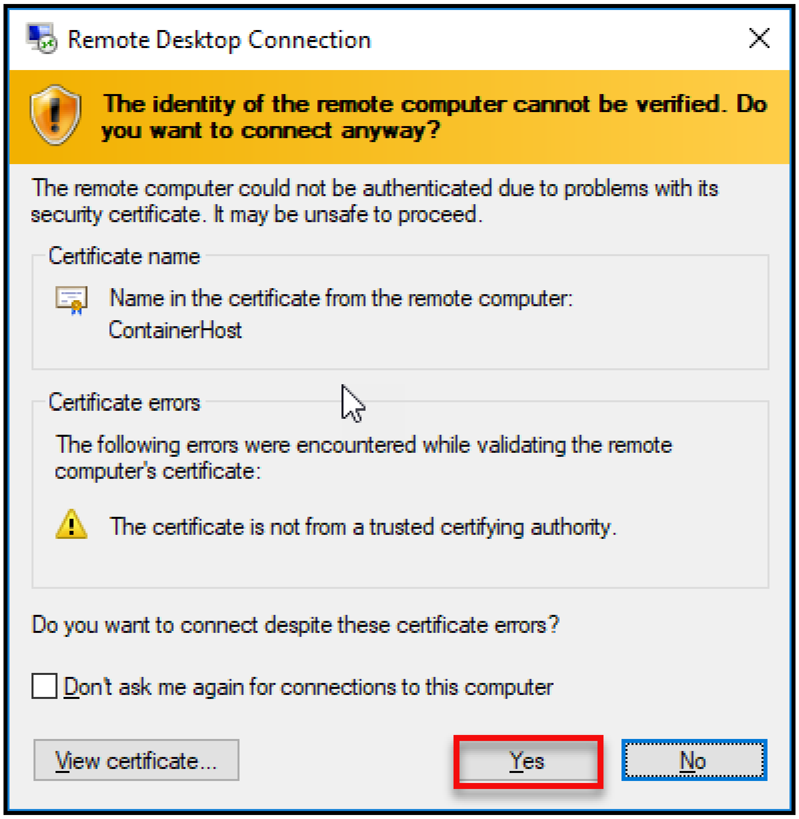
These credentials will be used to connect to 13.82.30.199.

demouser

●●●●●●●●●●●●●●

□ Remember me

5. Click on **Yes** button.



Remote Desktop Connection

The identity of the remote computer cannot be verified. Do you want to connect anyway?

The remote computer could not be authenticated due to problems with its security certificate. It may be unsafe to proceed.

Certificate name

Name in the certificate from the remote computer:
ContainerHost

Certificate errors

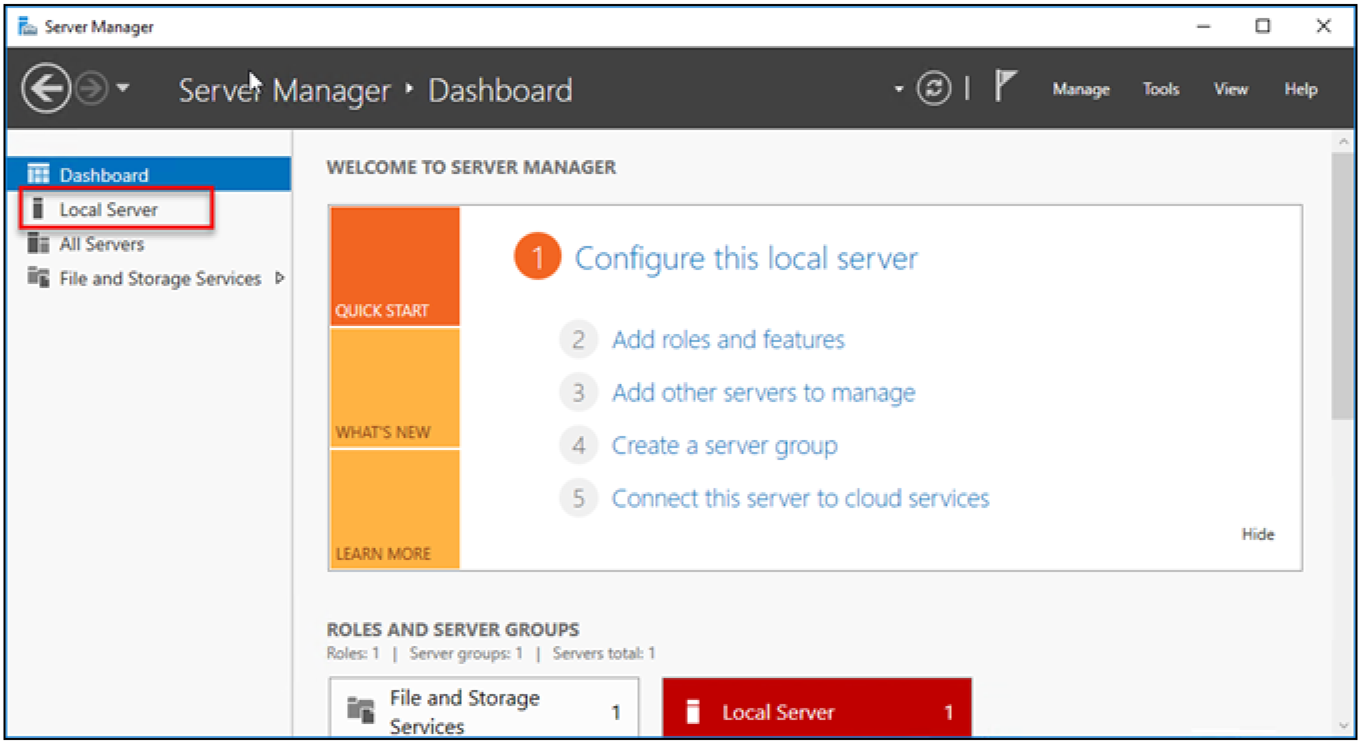
The following errors were encountered while validating the remote computer's certificate:

The certificate is not from a trusted certifying authority.

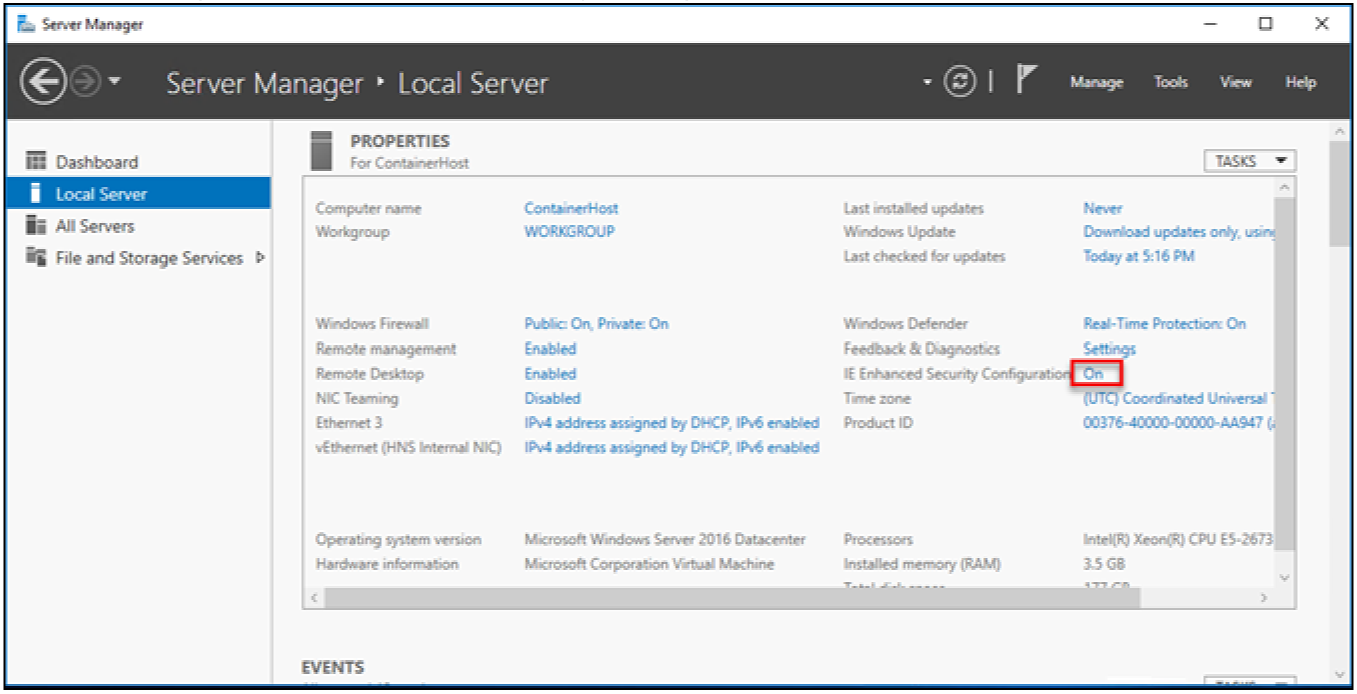
Do you want to connect despite these certificate errors?

□ Don't ask me again for connections to this computer

6. Once you are logged into server, you will see Server Manager dashboard. Click on **Local Server**.


Server Manager
Server Manager ‣ Dashboard
Manage
Tools
View
Help
Dashboard
Local Server
All Servers
File and Storage Services
WELCOME TO SERVER MANAGER
QUICK START
WHAT'S NEW
LEARN MORE
1 Configure this local server
2 Add roles and features
3 Add other servers to manage
4 Create a server group
5 Connect this server to cloud services
Hide
ROLES AND SERVER GROUPS
Roles: 1 | Server groups: 1 | Servers total: 1
File and Storage Services 1
Local Server 1

7. Click on **On** against IE Enhanched Security Configuration.



Computer name ContainerHost
Workgroup WORKGROUP

Last installed updates Never
Windows Update Download updates only, usin
Last checked for updates Today at 5:16 PM

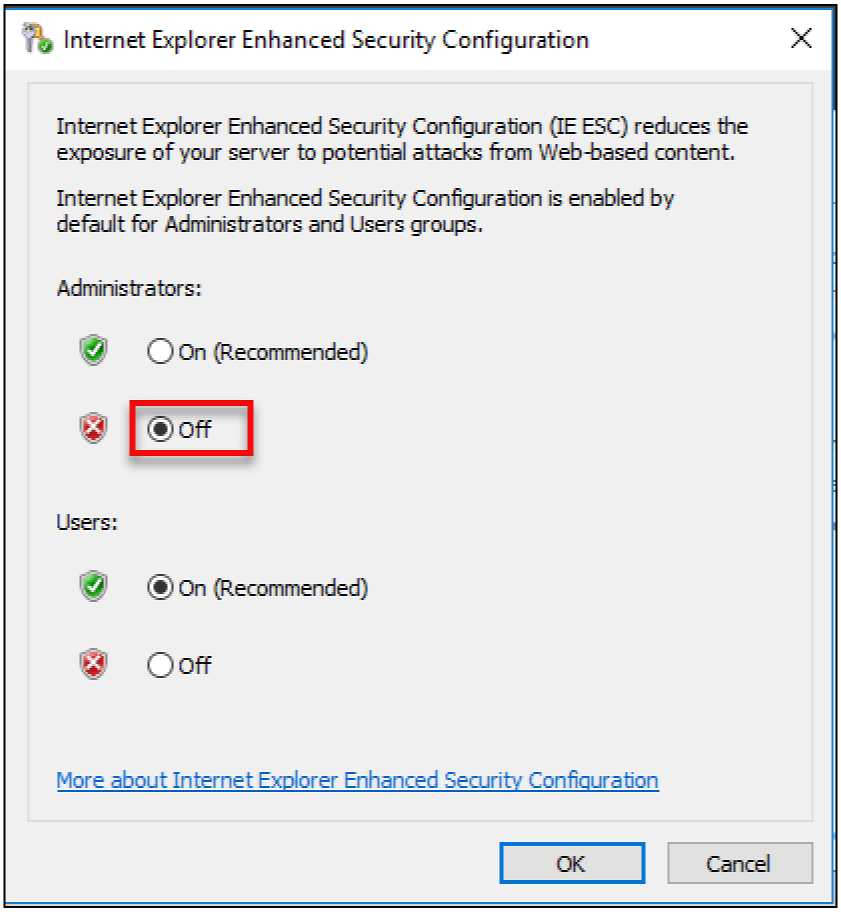
Windows Firewall Public: On, Private: On
Remote management Enabled
Remote Desktop Enabled
NIC Teaming Disabled
Ethernet 3 IPv4 address assigned by DHCP, IPv6 enabled
vEthernet (HNS Internal NIC) IPv4 address assigned by DHCP, IPv6 enabled

Windows Defender Real-Time Protection: On
Feedback & Diagnostics Settings
IE Enhanced Security Configuration On
Time zone (UTC) Coordinated Universal T
Product ID 00376-40000-00000-AA947 (a

Operating system version Microsoft Windows Server 2016 Datacenter
Hardware information Microsoft Corporation Virtual Machine

Processors Intel(R) Xeon(R) CPU E5-2673
Installed memory (RAM) 3.5 GB

8. In IE Enhanched Security Configuration, select **Off** for **Administrators** and click on **OK**



Internet Explorer Enhanced Security Configuration

Internet Explorer Enhanced Security Configuration (IE ESC) reduces the exposure of your server to potential attacks from Web-based content.

Internet Explorer Enhanced Security Configuration is enabled by default for Administrators and Users groups.

Administrators:

○ On (Recommended)

● Off

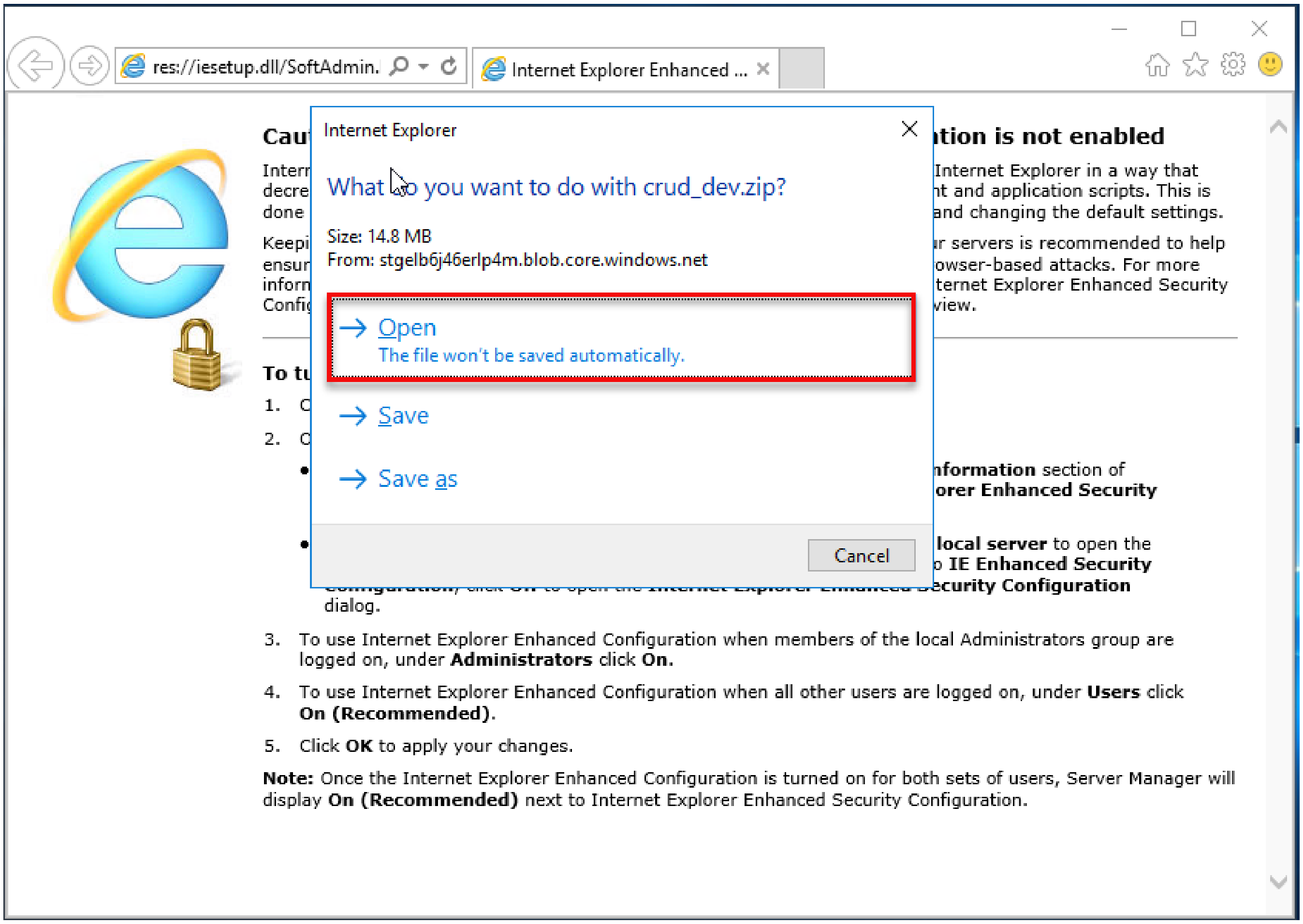
Users:

● On (Recommended)

○ Off

More about Internet Explorer Enhanced Security Configuration

9. Download the package which contains the WebApp deployment package as well as Docker file from this url using IE browser and when prompted, click on **Open**.



Internet Explorer

What do you want to do with crud_dev.zip?

Size: 14.8 MB
From: stgelb6j46erlp4m.blob.core.windows.net

→ Open
The file won't be saved automatically.

→ Save

→ Save as

Cancel

Cau ... ation is not enabled

Intern ... Internet Explorer in a way that decre ... nt and application scripts. This is done ... and changing the default settings.

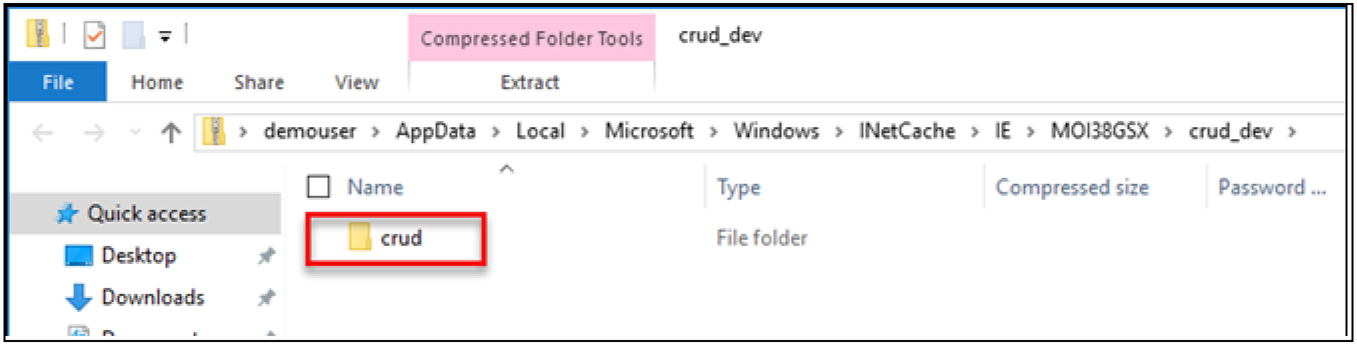
Keepi ... r servers is recommended to help ensur ... owser-based attacks. For more inforn ... ternet Explorer Enhanced Security Confi ... view.

To tu

1. C
2. C
   - ... **nformation** section of ... **orer Enhanced Security**
   - ... **local server** to open the ... **IE Enhanced Security Configuration**, click **OK** to open the **Internet Explorer Enhanced Security Configuration** dialog.
3. To use Internet Explorer Enhanced Configuration when members of the local Administrators group are logged on, under **Administrators** click **On.**
4. To use Internet Explorer Enhanced Configuration when all other users are logged on, under **Users** click **On (Recommended)**.
5. Click **OK** to apply your changes.

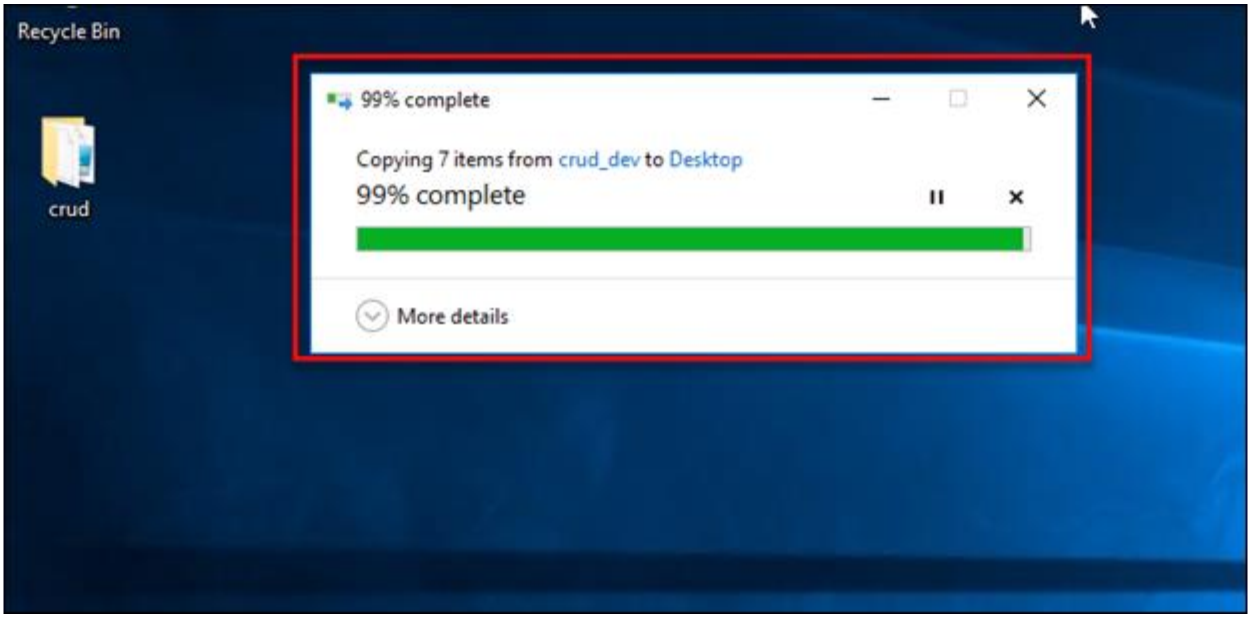
Note: Once the Internet Explorer Enhanced Configuration is turned on for both sets of users, Server Manager will display **On (Recommended)** next to Internet Explorer Enhanced Security Configuration.

10. Copy the package folder and paste the same on desktop.

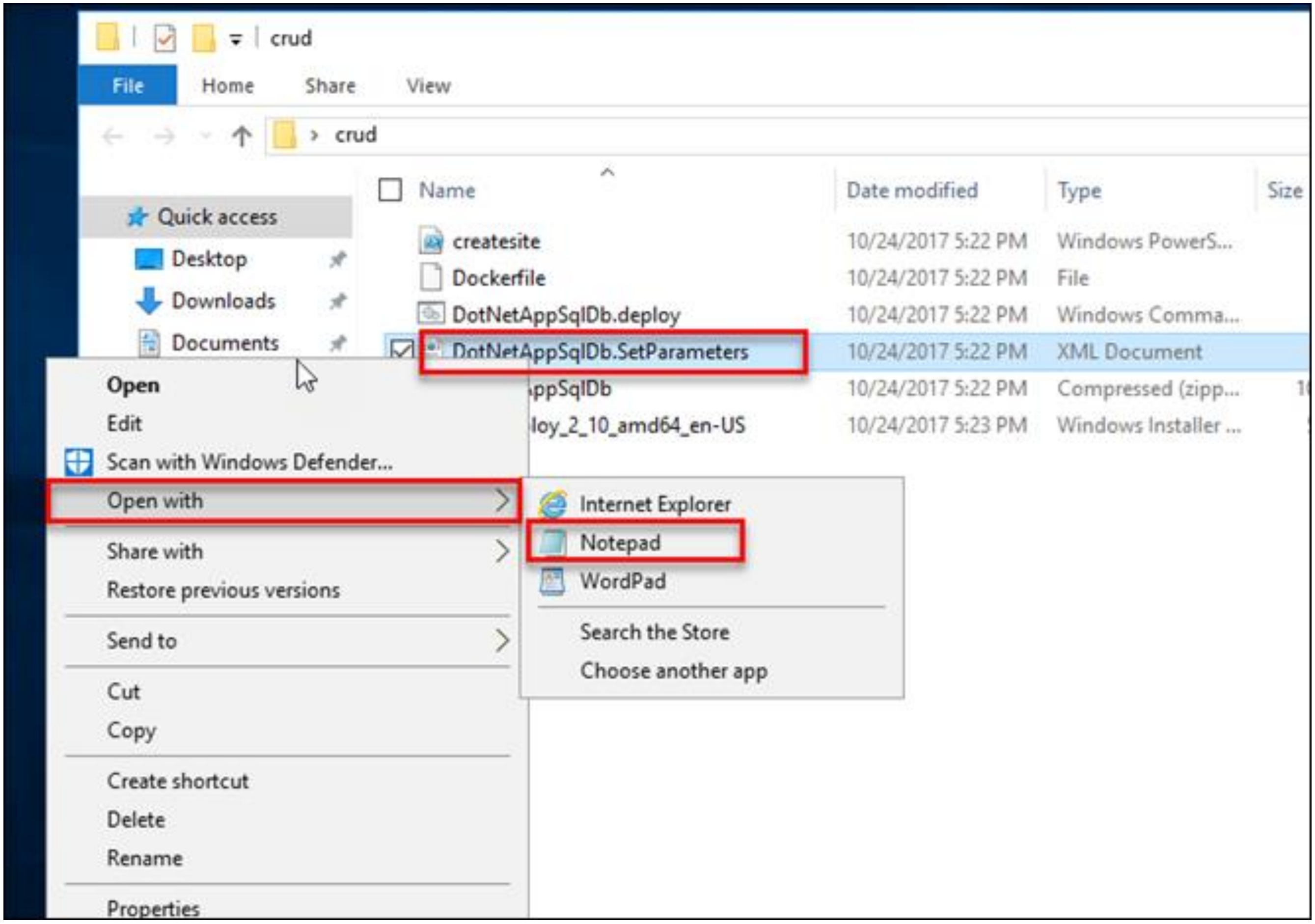


Compressed Folder Tools
crud_dev
File
Home
Share
View
Extract
demouser › AppData › Local › Microsoft › Windows › INetCache › IE › MOI38GSX › crud_dev ›
Quick access
Desktop
Downloads

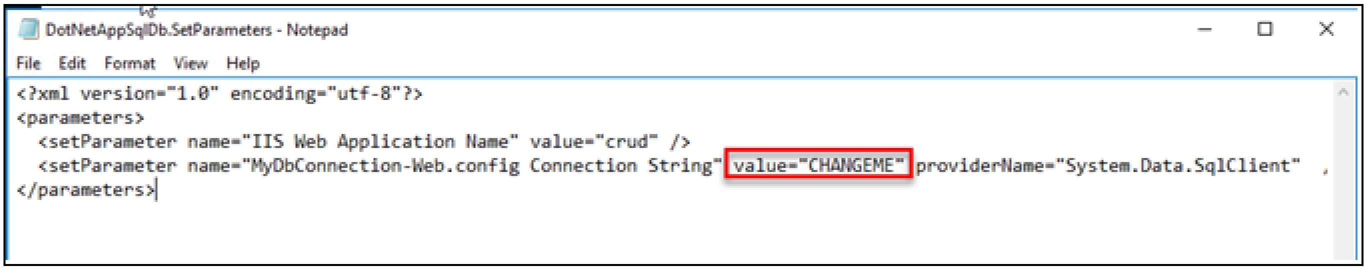
Name	Type	Compressed size	Password ...
crud	File folder		



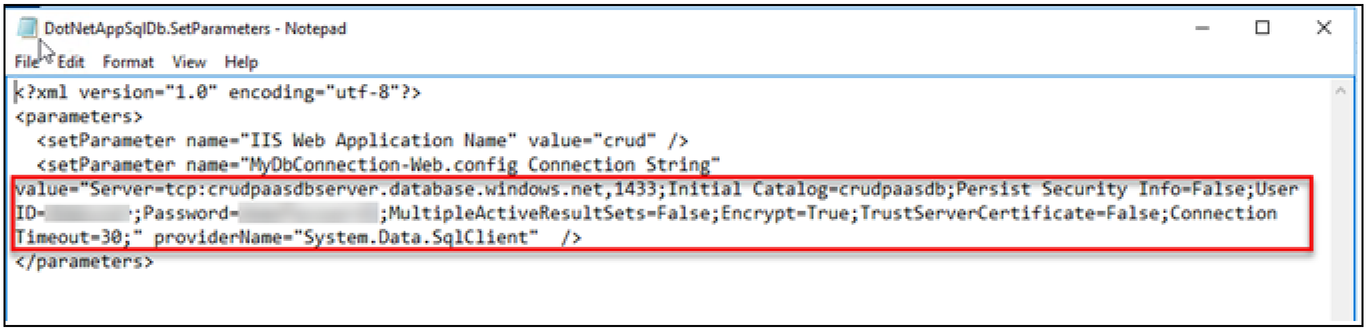
11. Open that folder and edit the **DotnetAppSqlDb.SetParamters** file in notepad as shown below.



12. You need to change the keywork **CHANGEME** with the database conneciton string you copied in Exercise 2 → step 11.

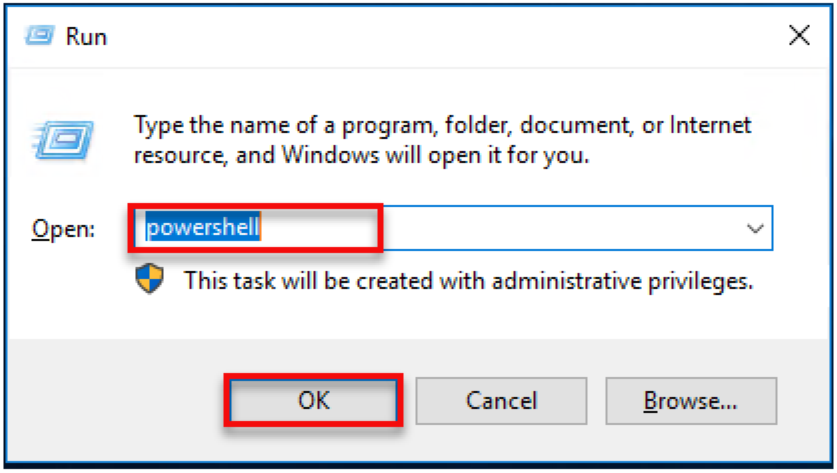

DotNetAppSqlDb.SetParameters - Notepad
File Edit Format View Help

```
<?xml version="1.0" encoding="utf-8"?>
<parameters>
  <setParameter name="IIS Web Application Name" value="crud" />
  <setParameter name="MyDbConnection-Web.config Connection String" value="CHANGEME" providerName="System.Data.SqlClient"
</parameters>
```


DotNetAppSqlDb.SetParameters - Notepad
File Edit Format View Help

```
<?xml version="1.0" encoding="utf-8"?>
<parameters>
  <setParameter name="IIS Web Application Name" value="crud" />
  <setParameter name="MyDbConnection-Web.config Connection String"
value="Server=tcp:crudpaasdbserver.database.windows.net,1433;Initial Catalog=crudpaasdb;Persist Security Info=False;User
ID=[redacted];Password=[redacted];MultipleActiveResultSets=False;Encrypt=True;TrustServerCertificate=False;Connection
Timeout=30;" providerName="System.Data.SqlClient"  />
</parameters>
```

13. Open powershell, click **Window Key + r ,** type powershell and click **OK.**



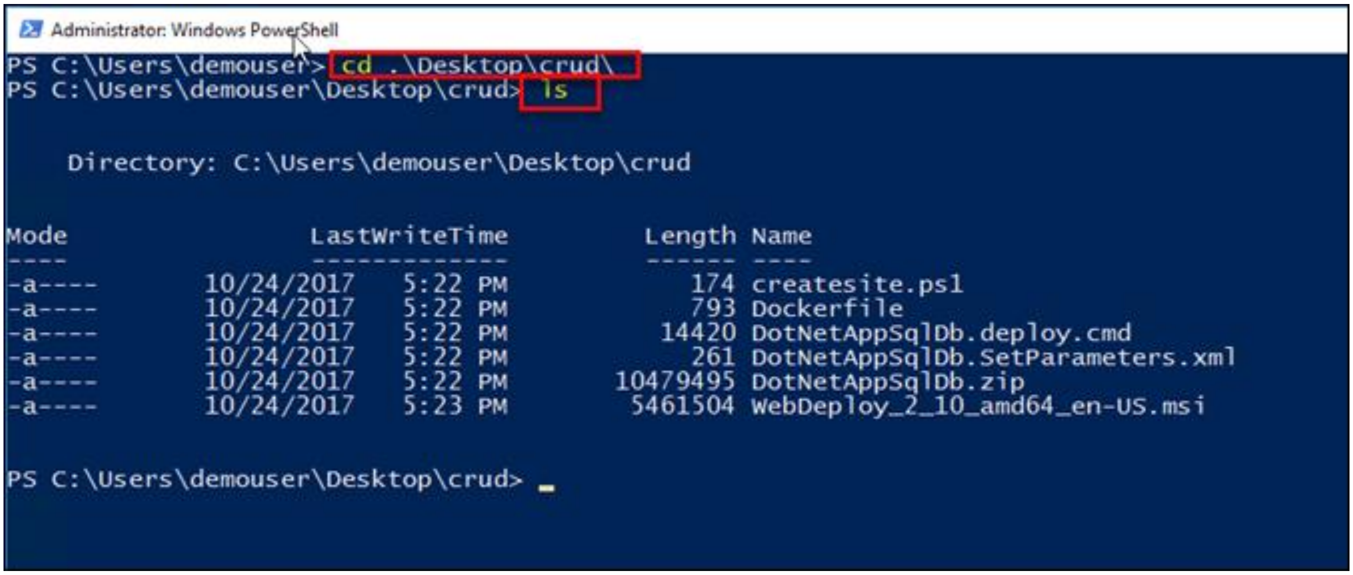
Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.

Open: powershell

This task will be created with administrative privileges.

14. Change the directory to the package folder you copied to desktop by running below command

```
cd .\Desktop\crud
```



```
PS C:\Users\demouser> cd .\Desktop\crud\
PS C:\Users\demouser\Desktop\crud> ls


    Directory: C:\Users\demouser\Desktop\crud


Mode                LastWriteTime         Length Name
----                -------------         ------ ----
-a----       10/24/2017   5:22 PM            174 createsite.ps1
-a----       10/24/2017   5:22 PM            793 Dockerfile
-a----       10/24/2017   5:22 PM          14420 DotNetAppSqlDb.deploy.cmd
-a----       10/24/2017   5:22 PM            261 DotNetAppSqlDb.SetParameters.xml
-a----       10/24/2017   5:22 PM       10479495 DotNetAppSqlDb.zip
-a----       10/24/2017   5:23 PM        5461504 WebDeploy_2_10_amd64_en-US.msi


PS C:\Users\demouser\Desktop\crud> _
```

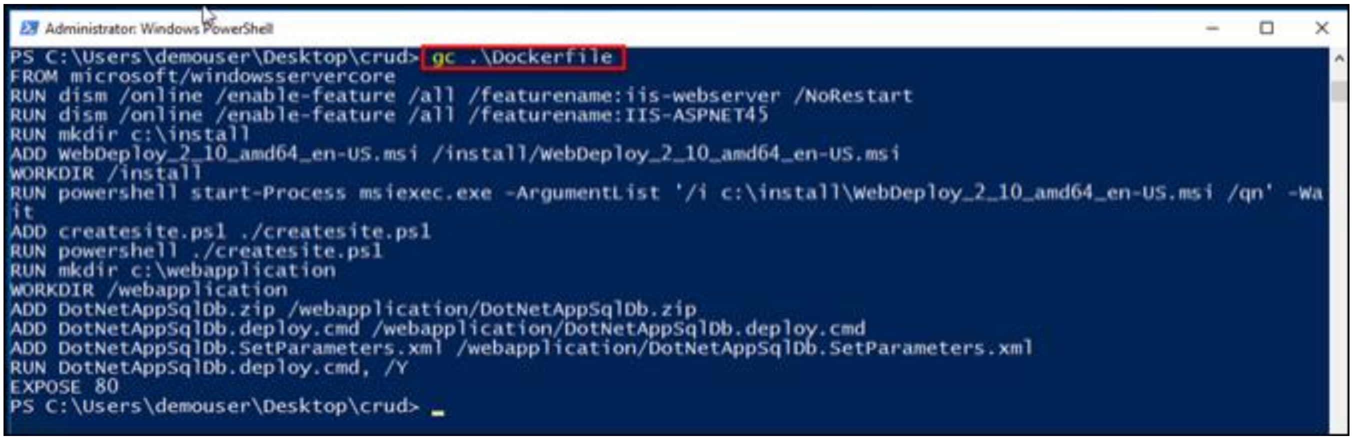
15. Run bleow command to read the content of Docker file.

```
gc .\Dockerfile
```

Content of file shown below:

```
FROM microsoft/windowsservercore
RUN dism /online /enable-feature /all /featurename:iis-webserver /NoRestart
RUN dism /online /enable-feature /all /featurename:IIS-ASPNET45
RUN mkdir c:\install
ADD WebDeploy_2_10_amd64_en-US.msi /install/WebDeploy_2_10_amd64_en-US.msi
WORKDIR /install
RUN powershell start-Process msiexec.exe -ArgumentList '/i
c:\install\WebDeploy_2_10_amd64_en-US.msi /qn' -Wait
ADD createsite.ps1 ./createsite.ps1
RUN powershell ./createsite.ps1
RUN mkdir c:\webapplication
WORKDIR /webapplication
ADD DotNetAppSqlDb.zip /webapplication/DotNetAppSqlDb.zip
ADD DotNetAppSqlDb.deploy.cmd /webapplication/DotNetAppSqlDb.deploy.cmd
ADD DotNetAppSqlDb.SetParameters.xml
/webapplication/DotNetAppSqlDb.SetParameters.xml
RUN DotNetAppSqlDb.deploy.cmd, /Y
EXPOSE 80
```

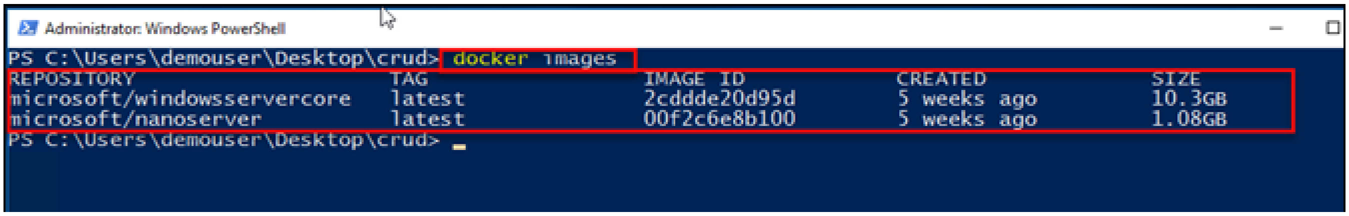
```
Note:Explanation of Dockerfile
1. It is using windows server core container as base image.
2. Installed IIS-WebServer feature and IIS-ASPNET feature.
3. Installed MS WebDeploy software to deploy Website which is supplied as
   WebPackage from Visual Studio. Same package is used to deploy app in On-
   premises VM also.
4. Crearesite.ps1 is script is used to create website in IIS.
5. DotNetAppSqlDb.deploy.cmd uses MS webdeploy to deploy application in IIS.
```



```
PS C:\Users\demouser\Desktop\crud> gc .\Dockerfile
FROM microsoft/windowsservercore
RUN dism /online /enable-feature /all /featurename:iis-webserver /NoRestart
RUN dism /online /enable-feature /all /featurename:IIS-ASPNET45
RUN mkdir c:\install
ADD WebDeploy_2_10_amd64_en-US.msi /install/WebDeploy_2_10_amd64_en-US.msi
WORKDIR /install
RUN powershell start-Process msiexec.exe -ArgumentList '/i c:\install\WebDeploy_2_10_amd64_en-US.msi /qn' -Wa
it
ADD createsite.ps1 ./createsite.ps1
RUN powershell ./createsite.ps1
RUN mkdir c:\webapplication
WORKDIR /webapplication
ADD DotNetAppSqlDb.zip /webapplication/DotNetAppSqlDb.zip
ADD DotNetAppSqlDb.deploy.cmd /webapplication/DotNetAppSqlDb.deploy.cmd
ADD DotNetAppSqlDb.SetParameters.xml /webapplication/DotNetAppSqlDb.SetParameters.xml
RUN DotNetAppSqlDb.deploy.cmd, /Y
EXPOSE 80
PS C:\Users\demouser\Desktop\crud> _
```

16. Run below command to list down the images which are already present in Docker Host.

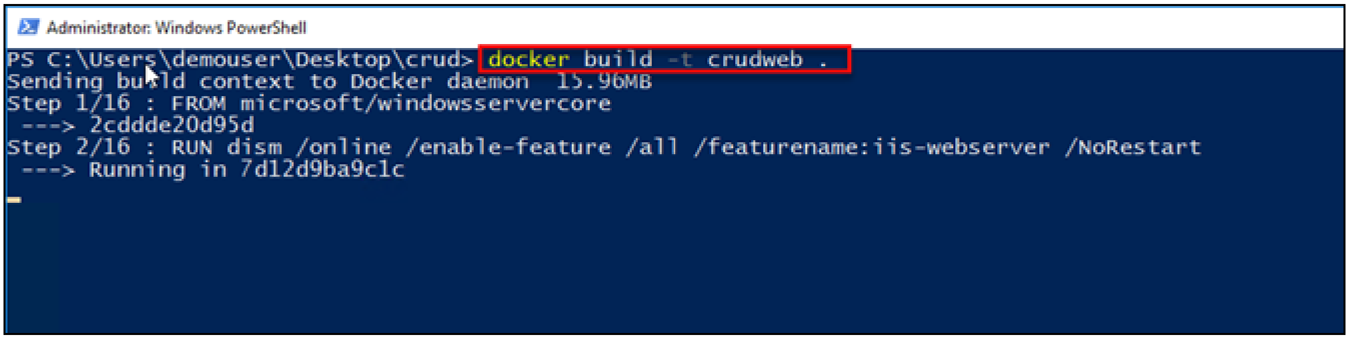
```
docker images
```



```
PS C:\Users\demouser\Desktop\crud> docker images
REPOSITORY                       TAG                 IMAGE ID            CREATED             SIZE
microsoft/windowsservercore      latest              2cddde20d95d        5 weeks ago         10.3GB
microsoft/nanoserver             latest              00f2c6e8b100        5 weeks ago         1.08GB
PS C:\Users\demouser\Desktop\crud> _
```

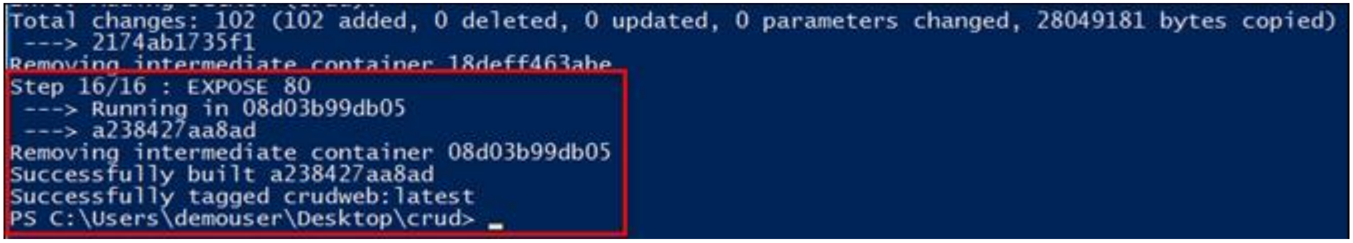
17. Run below command to build the image using the given Docker file.

```
docker build -t crudweb .
```



```
PS C:\Users\demouser\Desktop\crud> docker build -t crudweb .
Sending build context to Docker daemon  15.96MB
Step 1/16 : FROM microsoft/windowsservercore
 ---> 2cddde20d95d
Step 2/16 : RUN dism /online /enable-feature /all /featurename:iis-webserver /NoRestart
 ---> Running in 7d12d9ba9c1c
_
```

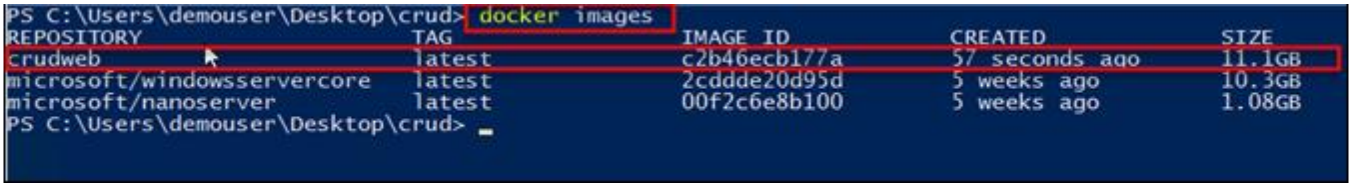
18. Above step will take 8 to 10 minutes for successful completion.



```
Total changes: 102 (102 added, 0 deleted, 0 updated, 0 parameters changed, 28049181 bytes copied)
 ---> 2174ab1735f1
Removing intermediate container 18deff463abe
Step 16/16 : EXPOSE 80
 ---> Running in 08d03b99db05
 ---> a238427aa8ad
Removing intermediate container 08d03b99db05
Successfully built a238427aa8ad
Successfully tagged crudweb:latest
PS C:\Users\demouser\Desktop\crud> _
```

19. Run the below command again to see the list of images which will show newly created image.

```
docker images
```



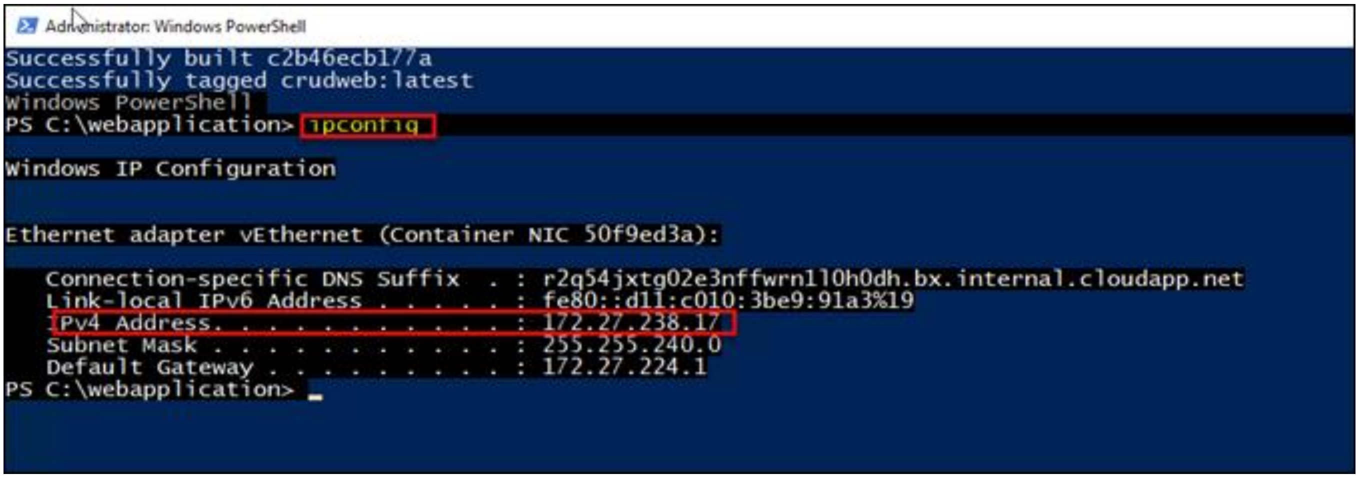
```
PS C:\Users\demouser\Desktop\crud> docker images
REPOSITORY                       TAG                 IMAGE ID            CREATED             SIZE
crudweb                          latest              c2b46ecb177a        57 seconds ago      11.1GB
microsoft/windowsservercore      latest              2cddde20d95d        5 weeks ago         10.3GB
microsoft/nanoserver             latest              00f2c6e8b100        5 weeks ago         1.08GB
PS C:\Users\demouser\Desktop\crud> _
```

20. Run the below command to launch the container using the image which you created in above step.

```
docker run -it crudweb powershell.exe
```

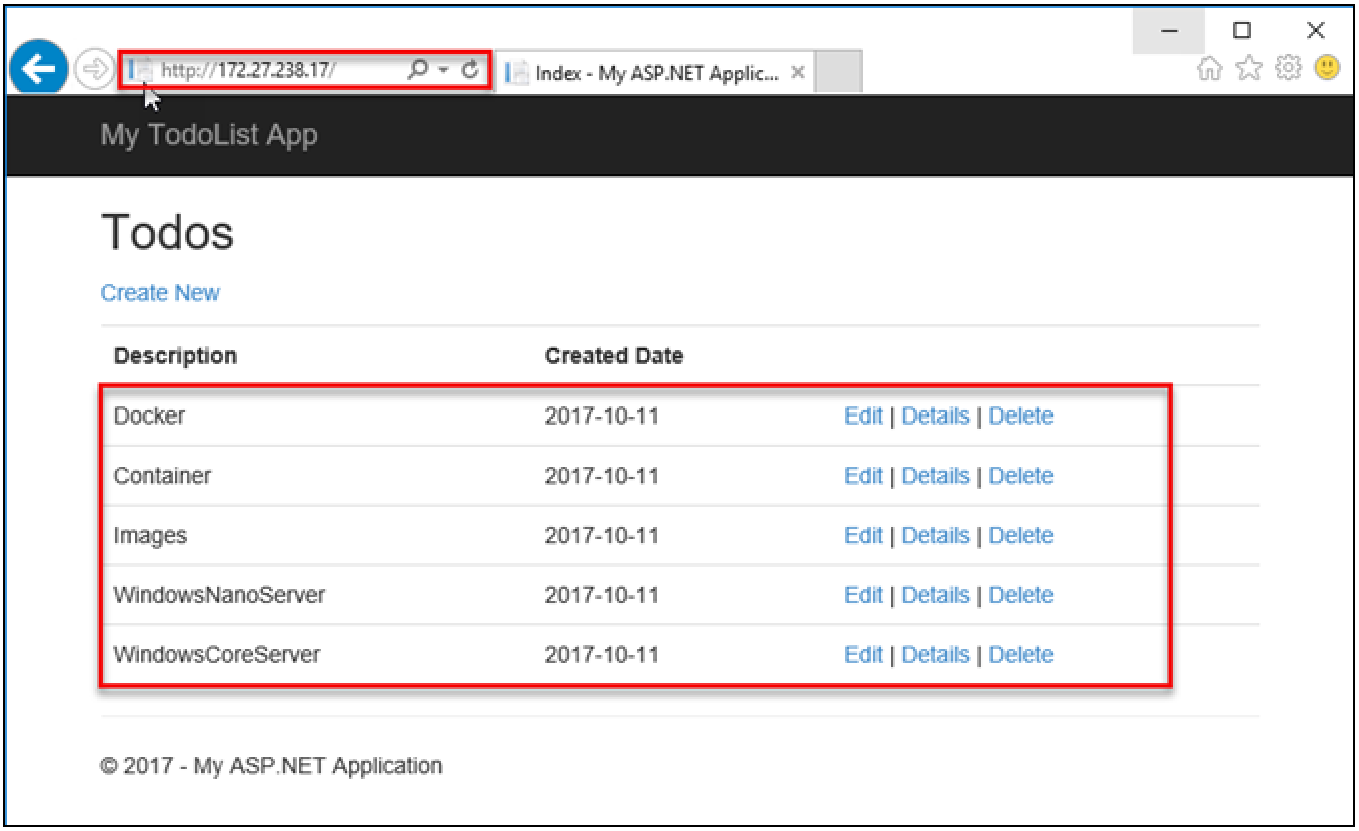
Once container is launched, run below command in Container Powershell to get the ip address.

```
ipconfig
```



```
Successfully built c2b46ecb177a
Successfully tagged crudweb:latest
Windows PowerShell
PS C:\webapplication> ipconfig

Windows IP Configuration


Ethernet adapter vEthernet (Container NIC 50f9ed3a):

   Connection-specific DNS Suffix  . : r2q54jxtg02e3nffwrn110h0dh.bx.internal.cloudapp.net
   Link-local IPv6 Address . . . . . : fe80::d11:c010:3be9:91a3%19
   IPv4 Address. . . . . . . . . . . : 172.27.238.17
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Default Gateway . . . . . . . . . : 172.27.224.1
PS C:\webapplication> _
```

21. Open the IP address from above step in browser inside docker host VM and verify that it does have the records which you created in your on-premises VM before migration.



http://172.27.238.17/

My TodoList App

Todos

Create New

Description	Created Date	
Docker	2017-10-11	Edit | Details | Delete
Container	2017-10-11	Edit | Details | Delete
Images	2017-10-11	Edit | Details | Delete
WindowsNanoServer	2017-10-11	Edit | Details | Delete
WindowsCoreServer	2017-10-11	Edit | Details | Delete

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*** This ends the lab.***