

SAP HANA ON AZURE (LARGE INSTANCES) SETUP

Prepare your Large Instances for HANA installation

By Sachin Ghorpade

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End-to-end setup for SAP HANA on Azure Large Instances

So, you are ready to deploy SAP HANA on Azure large Instances, great! And, you want to know the step-by-step process with screen shots to start the work? Then you are reading the right article.

Here are the high-level steps:

1. Set up the Azure virtual network.
2. Provide the provisioning details to Microsoft for the HANA Large Instances.
3. Connect your virtual network to the HANA Large Instances.
4. Test the connectivity from the Azure virtual machine (VM) to the HANA Large Instances.
5. Install HANA on HANA Large Instances server.

You should complete the following before you begin .

- Read the "[Overview and Architecture](#)" documentation.
- SAP sizing has been accomplished.
- A SAP Large Instance contract has been arranged with the Microsoft account team.
- Validated the operating system version will support your planned HANA version.
- Obtained a operating system subscription/license . (You will need to activate the operating system after the provisioning is completed by Microsoft team.)
- Licensing to install SAP HANA has been put in place.

Definitions

Let's understand the various terms used in this documentation.

- **SAP HANA on Azure Large Instances or in short HANA Large Instances:** Official name for HANA Instances on SAP HANA TDI-certified hardware that is deployed in Large Instance stamps in different Azure regions. The related term HANA Large Instances is short for SAP HANA on Azure (Large Instances).
- **Virtual network.:** Your own network in Azure.
- **P2P or point to point range:** ExpressRoute P2P connections between an Azure virtual network and HANA Large Instances.
- **Address space:** The virtual network address range.
- **Gateway:** Azure gateway.

Set up the virtual network

The very first step is to set up the virtual network in Azure. You will need to provide the following information to Microsoft to set up the HANA Large Instances server and the ExpressRoute circuit from your Azure virtual network to the HANA Large Instance server.

- Virtual network address space
- P2P range
- ServerIP address pool

Note The virtual network address space, P2P range, and ServerIP address pool MUST NOT overlap with each other and/or with your other connected networks such as on-premises or other Azure networks.

Prerequisite

You must have an Azure subscription. Please get one from the Azure site <https://portal.azure.com/>, if needed.

Create a virtual network

This section helps you set up the virtual network in Azure. We will use the following sample ranges to set up the virtual network, subnet, and the gateway.

Virtual network name: Testing_vNet

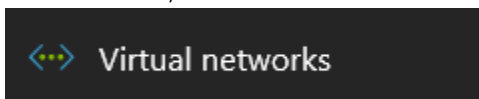
Address space: 10.11.0.0/24, Range will be 10.11.0.0-10.11.0.255 (256 IP addresses)

Virtual machine subnet: 10.11.0.0/25, Range will be 10.11.0.0–10.11.0.127 (128 IPs for VMs)

Gateway subnet: 10.11.0.128/27, Range will be 10.11.0.128–10.11.0.159 (32 IPs for Gateway)

Note If you want to calculate IP ranges, use an online CIDR calculators like <http://www.ipaddressguide.com/cidr>.

1. Login to Azure portal <https://portal.azure.com/>.
2. From the **Services** bar, click **Virtual networks**.



3. Click **Add**.
4. Fill out the Name, Address space, Subnet name, Subnet address range, Subscription, Resource group, and location fields.

Create virtual network

*

Name

Testing_vNet

✓

*

Address space ⓘ

10.11.0.0/24

✓

10.11.0.0 - 10.11.0.255 (256 addresses)

*

Subnet name

VirtualMachine_Subnet

✓

*

Subnet address range ⓘ

10.11.0.0/25

✓

10.11.0.0 - 10.11.0.127 (128 addresses)

*

Subscription

SF... Azure

▼

*

Resource group ⓘ

Create new

Use existing

Testing

▼

*

Location

East US

▼

Pin to dashboard

Create

Automation options

5. Click **Create**.
6. It takes about 30 seconds to create a virtual network. You can see the status in the **Notification** area.

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@microsoft...

😊

Notifications

Dismiss:

Informational

Completed

All

✓

Deployments succeeded 2:17 PM

Deployment to resource group ' Testing' was successful.

5

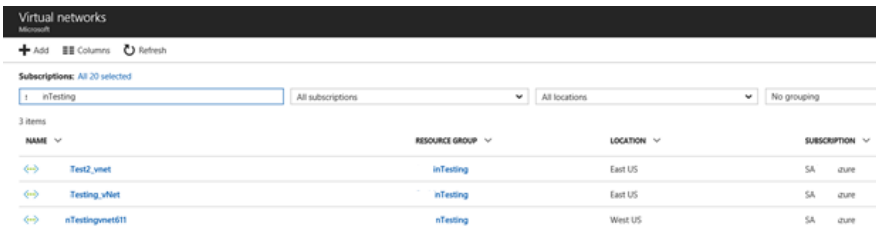
- Now you have successfully created a virtual network.

After the virtual network is created, you can proceed to set up the gateway subnet.

Gateway subnet creation

Let's create a gateway subnet inside the virtual network.

- Go to **Virtual networks** and search for the newly created virtual network



Virtual networks

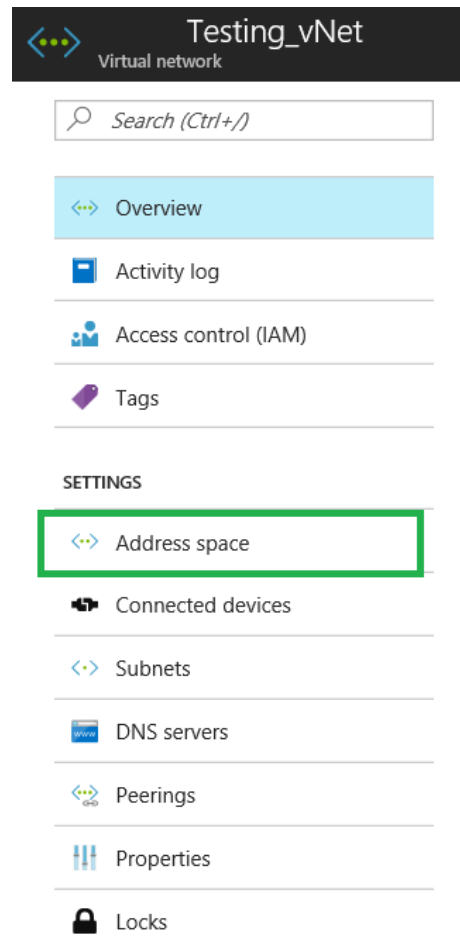
Subscriptions: All 20 selected

1 nTesting | All subscriptions | All locations | No grouping

3 items

NAME	RESOURCE GROUP	LOCATION	SUBSCRIPTION
Test2_vnet	nTesting	East US	SA azure
Testing_vNet	nTesting	East US	SA azure
nTestingnet611	nTesting	West US	SA azure

- Click the name of the virtual network (In this example Testing_virtual network).
- Click **Address space** under **Settings**.



Testing_vNet
Virtual network

Search (Ctrl+J)

Overview

Activity log

Access control (IAM)

Tags

SETTINGS

Address space

Connected devices

Subnets

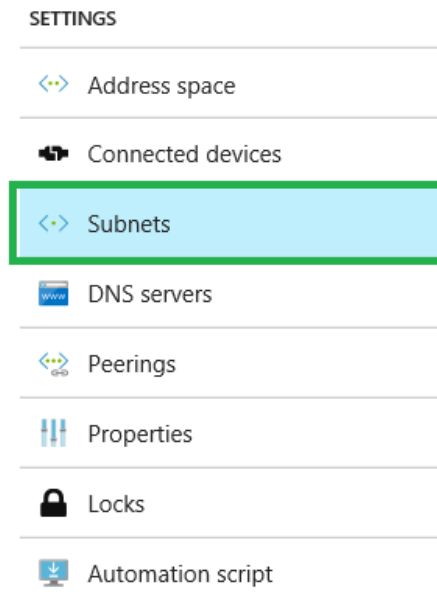
DNS servers

Peerings

Properties

Locks

4. Validate this is the address space you wanted during setup.
5. Click **Subnets**.



6. Select **Gateway subnet**.
7. Enter the address range for the gateway subnet (10.11.0.128/27) and click **OK**.

Note The name GatewaySubnet is grayed out and you can NOT change it.

A screenshot of the 'Add subnet' dialog box in the Azure portal. The dialog has a title bar 'Add subnet' and a subtitle 'SachinTesting_vNet'. It contains two main sections: 'Name' and 'Address range (CIDR block)'. The 'Name' field is grayed out and contains 'GatewaySubnet'. The 'Address range (CIDR block)' field contains '10.11.0.128/27' and is highlighted with a green border. Below this field, it shows '10.11.0.128 - 10.11.0.159 (32 addresses)'. At the bottom, there is a 'Route table' section with 'None' selected and a right arrow icon.

8. You will see that the GatewaySubnet was created.

+ Subnet + Gateway subnet

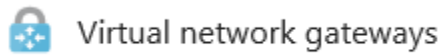
Search subnets

NAME	ADDRESS RANGE	AVAILABLE ADDRESSES	SECURITY GROUP
VirtualMachine_Subnet	10.11.0.0/25	123	-
GatewaySubnet	10.11.0.128/27	27	-

Once the gateway subnet is created, we are ready to create a gateway.

Gateway creation

- From the **Services** bar, select **Virtual network gateways**. If you don't find it, choose **More services** or search for it.



- Click **Add** to create a new gateway.
 - Gateway type: ExpressRoute
 - SKU**: High performance or Ultra performance

Note Only High performance and Ultra performance SKUs are supported for HANA Large Instances

Create virtual network gate... ✕

★ Name

Testing_GW ✓

Gateway type ⓘ

VPN **ExpressRoute**

★ SKU ⓘ

High performance ▼

★ Virtual network ⓘ

Testing_vNet >

★ Public IP address ⓘ

Testing_GW >

★ Subscription

SA | Azure ▼

Resource group ⓘ

Testing

★ Location ⓘ

East US ▼

☐ Pin to dashboard

Create

Automation options

Provisioning a virtual network gateway may take up to 45 minutes.

- It may take up to 45 minutes to create the gateway. You can check status from the **Notification** area. You don't need to be on the page to monitor it. It will run in background and update the **Notification** area when ready (or if there are any errors).

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@microsoft...

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×

Notifications

Dismiss: Informational Completed All

■ ■ ■

Deployment in progress...

Running

Deployment to resource group 'Testing' is in progress.

After the gateway is created, you are ready to provide the information to Microsoft team to

9

provision the ExpressRoute circuit and the HANA Large Instance server.

Provide the provisioning details to Microsoft

Once you have set up the virtual network, please contact your Microsoft Account Executive or Technical Account Manager to receive an onboarding form. On the onboarding form, you need to provide the following information.

- **Virtual network address space.** You set this up in the step above. In this example, the value is 10.11.0.0/24.
- **P2P range.** This range MUST be a /29 subnet. You can use 10.12.0.0/29, for example.
- **ServerIP address pool.** The recommended range is /24. You can use 10.13.0.0/24, for example.
- **Server IP address.** Please pick an IP address from the ServerIP Address Pool. Note, the first 30 IP addresses are reserved for Microsoft infrastructure configuration. So, in this example, your first available IP address for a blade would be 10.13.0.30
- **Region.** Indicate in which region you need HANA Large Instances to be deployed.
Example North America GA, US East
- **SKU.** You have various options for SKUs, please select one based on your requirements and per your enterprise agreement with Microsoft. Example: S192.
- **HANA SID.** HANA system identifier you plan to use so storage mount points can be configured accordingly during the onboarding. Example: HLM.
- **UID.** Sidadm user ID. Example: 1005.
- **GID.** Sapsys group ID. Example 1001.

Note

The Virtual network address space, P2P range, or ServerIP address pool MUST NOT overlap with each other and/or with your other connected networks like on-premises or other Azure networks.

Connect your Azure virtual network to HANA Large Instances

Once the Microsoft team have completed the onboarding, they will provide the following information to you.

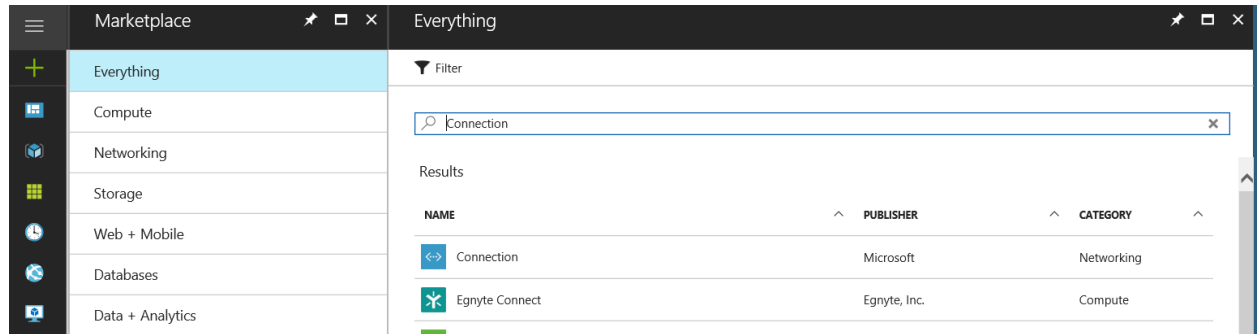
- Circuit ID.
- Authorization key.
- Root credentials.
- IP address of the server (this is the same IP that you provided in the onboarding form).
- Storage layout (volume size and the mount points created).

To connect the Azure virtual network to HANA Large Instances, you will need the circuit ID





and authorization key so you can connect them using ExpressRoute.

You can use Azure portal or PowerShell to connect the virtual network for Large Instance using ExpressRoute. We're going to use the portal. If you prefer PowerShell, you can find the script to use at ["SAP HANA \(Large Instances\) infrastructure and connectivity on Azure."](#)

1. From the **Services** bar, click **Connection**. If you don't see **Connection**, click **+New**, and search for **Connection**, and select it.



2. Click **Create** to create a new connection.

 **Connection**   







Microsoft

A VPN connection securely connects two Azure virtual networks, or a virtual network and your local network using Internet Protocol security (IPsec). It can also be used to connect a virtual network to an ExpressRoute circuit. Traffic between the two networks is encrypted by one gateway and decrypted by the other, to protect data when transmitted via the Internet.

A connection consists of different components depending on the connection type. When configuring a connection between two virtual networks, also known as a VNet-to-VNet connection, each network contains a virtual network gateway. The two virtual networks can be in different regions and subscriptions, and different deployment models. For example, use a VNet-to-VNet connection to connect a Classic virtual network to one deployed using Resource Manager.

When configuring a connection between a virtual network and your local network, also known as a site-to-site connection, the virtual network contains a virtual network gateway for the Azure side of the VPN connection, and a local network gateway represents the hardware or software VPN device on your side. The connection wizard creates the right resources depending on the connection type.

Microsoft Azure provides a [99.9% uptime SLA](#) for virtual network gateways.

PUBLISHER	Microsoft
USEFUL LINKS	Service overview Documentation Pricing details

Create

- Fill out the **Basics** information. Ensure you select **ExpressRoute** for the **Connection type**.

Create connection

Basics

1 Basics
Configure basic settings

2 Settings
Configure connection settings

3 Summary
Review and create

* Connection type ⓘ
ExpressRoute

* Subscription
SA .zure

* Resource group ⓘ
☐ Create new ☒ Use existing
 Testing

* Location
East US

OK

4. From **Settings**:
 - a. Select the gateway you created (In our example "Testing_GW").
 - b. Select **Redeem authorization**.
 - c. Enter the **Authorization key** provided by Microsoft.
 - d. Peer circuit URI should be in the format shown below and will be provided by Microsoft as part of Large Instance onboarding
 "/subscriptions/your_subscription_id/resourceGroups/resource_group_name/providers/Microsoft.Network/expressRouteCircuits/ExpressRoute_circuit_name."

Note You won't find the "Redeem authorization" option if you try to create the connection directly from the gateway.

Create connection [Close] [X]

Settings [Close] [X]

- 1 Basics
Configure basic settings ✓
- 2 Settings
Configure connection settings >
- 3 Summary
Review and create >

* Virtual network gateway ⓘ >
Testing_GW

☒ Redeem authorization ⓘ

* Authorization key
31903c 524c5f47 ✓

* Peer circuit URI
/subscriptions/b146b9...-ac6f-1b... ✓

* Connection name
Testing_ER_Connection ✓

5. Review the details, and click **OK**.

Create connection [Close] [X] **Summary** [Close] [X]

- 1 Basics
Configure basic settings ✓
- 2 Settings
Configure connection settings ✓
- 3 Summary
Review and create >

Basics

Connection type	ExpressRoute
Subscription	SA zure
Resource Group	Testing
Location	East US

Settings

Virtual network gateway	Testing_GW
Redeem ExpressRoute authorization	Yes
Authorization key	31903c c5f47
Peer circuit URI	/subscriptions/b146b9...-ac6f-1b... bc2b...
Connection name	Testing_ER_Connection

OK

6. You can check the status from the **Notifications** area.



Notifications

Dismiss: Informational Completed All

Deployment in progress... Running

Deployment to resource group ' Testing' is in progress.

7. It takes few minutes to create a connection.



Notifications

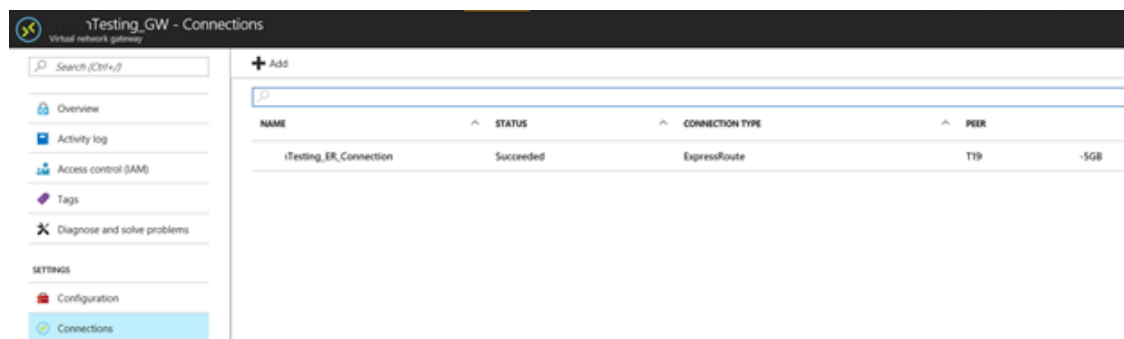
Dismiss: Informational Completed All

✓ Deployments succeeded 12:13 PM

Deployment to resource group ' Testing' was successful.

After the connection is set up, you will be able to see the connection status in gateway (Under the **Connection** option).

Note Ensure that connection status is "Succeeded."



Test the connectivity

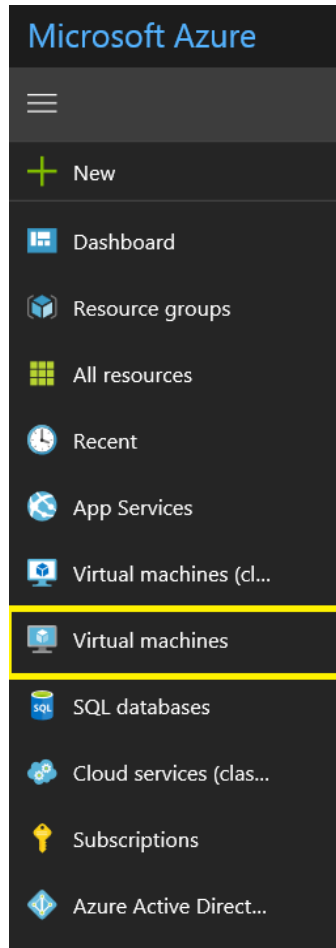
You now have Large Instance ExpressRoute connection set up from the gateway, and you are can

set up access to your Large Instance server. First, you need to set up a VM (let's call it a jump box) in Azure in the same virtual network from where you set up the ExpressRoute connectivity.

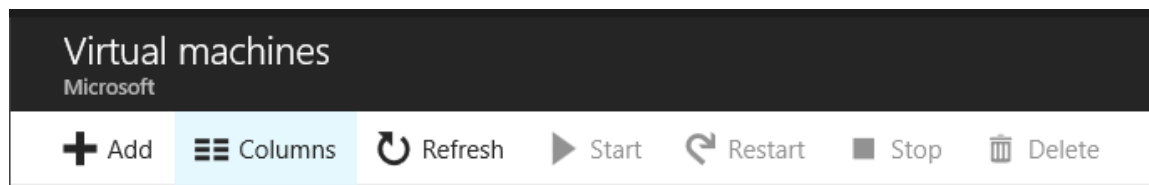
Set up a VM

Let's set up a VM called "TestingJB" (JB=Jump Box). To create a VM:

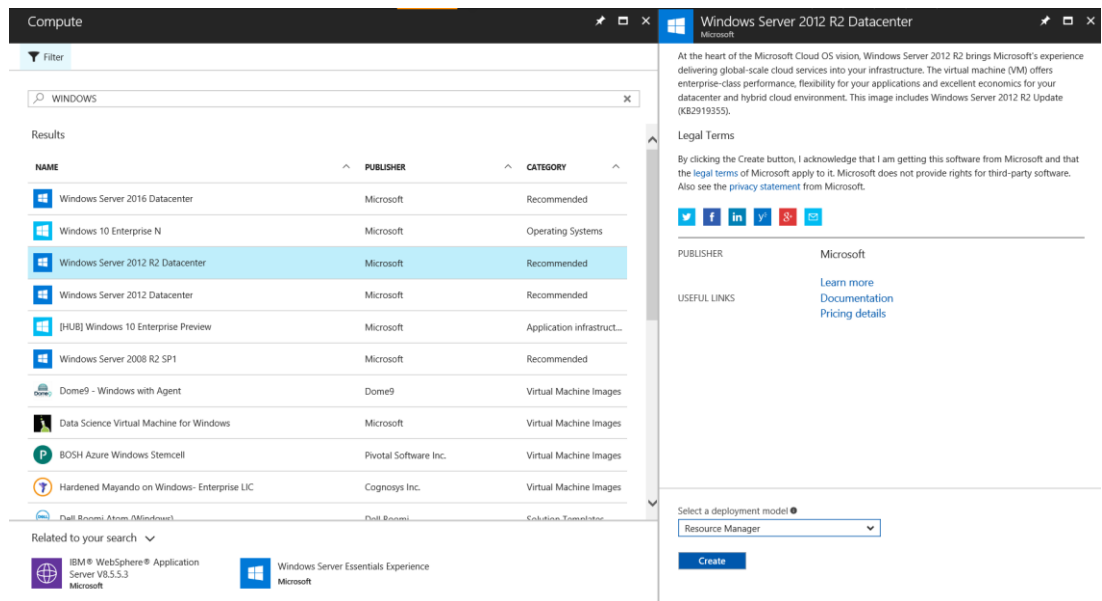
1. Click **Virtual machines**.



2. Click **Add**.



3. Search for the Windows operating system (I chose Windows Server 2012 R2 Datacenter).



4. Click **Create**, and enter the details to set up your VM.

The screenshot shows the 'Create virtual machine' wizard in the 'Basics' step. The left sidebar contains four steps: 1. Basics (selected), 2. Size, 3. Settings, and 4. Summary. The main area contains the following fields and options:

- Name:** iTesting18
- VM disk type:** HDD
- User name:** sac_in
- Password:** [masked]
- Confirm password:** [masked]
- Subscription:** SA_zure
- Resource group:** Use existing (selected), iTesting
- Location:** East US
- Save money:** Save up to 40% with a license you already own.
- Already have a Windows Server license?:** No (selected)

An 'OK' button is located at the bottom right of the form.

5. Choose a VM size (I chose 4 core; 8GB).

Choose a size
Browse the available sizes and their features

Supported disk type: HDD Minimum cores: 4 Minimum memory (GiB): 8

★ Recommended | View all

DS3_V2 Standard		DS4_V2 Standard		DS5_V2 Standard	
4	Cores	8	Cores	16	Cores
14	GB	28	GB	56	GB
	8 Data disks		16 Data disks		32 Data disks
	12800 Max IOPS		25600 Max IOPS		51200 Max IOPS
	28 GB Local SSD		56 GB Local SSD		112 GB Local SSD
	Load balancing		Load balancing		Load balancing
	Premium disk support		Premium disk support		Premium disk support

6. Select the **Storage** and **Network** settings.

Create virtual machine

Settings

1 Basics Done ✓

2 Size Done ✓

3 Settings Configure optional features >

4 Summary Windows Server 2012 R2 Datacenter >

You've chosen to use a standard disk on a size that supports premium disks. This could impact operating system performance and is not recommended. Consider using premium storage (SSD) instead.

Storage

Disk type HDD SSD

Use managed disks No Yes

Network

* Virtual network Testing_vNet >

* Subnet VirtualMachine_Subnet (10.11.0.0... >

* Public IP address (new) iTestingJB-ip >

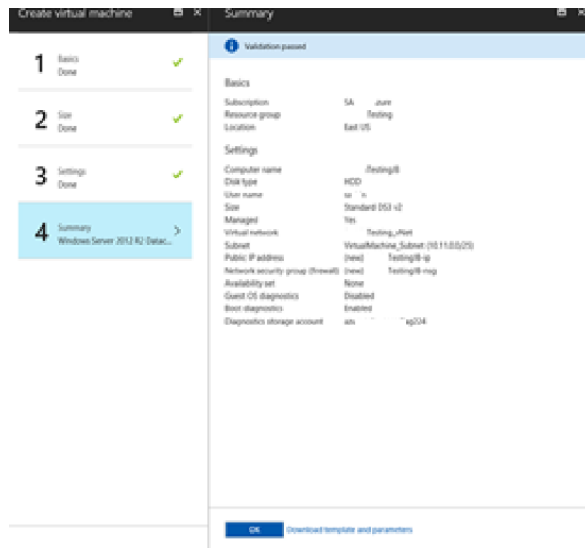
* Network security group (firewall) (new) iTestingJB-nsg >

Extensions

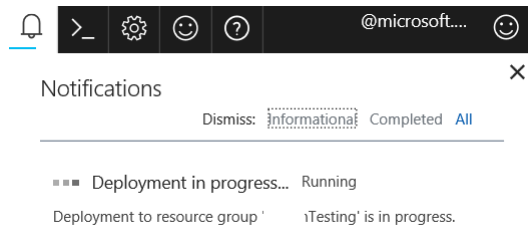
Extensions No extensions >

OK

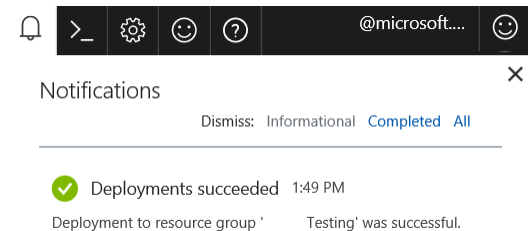
7. Review the **Summary**.



8. You can check the status of the VM creation from the **Notification** area.



9. It takes a few minutes to create a VM.



After a VM is created, you can log in by clicking the **Connect** button.

Note If you have not previously set up a VM in your domain, your user should be in the following format `/your-username` when you log on to the VM.

Download PuTTY

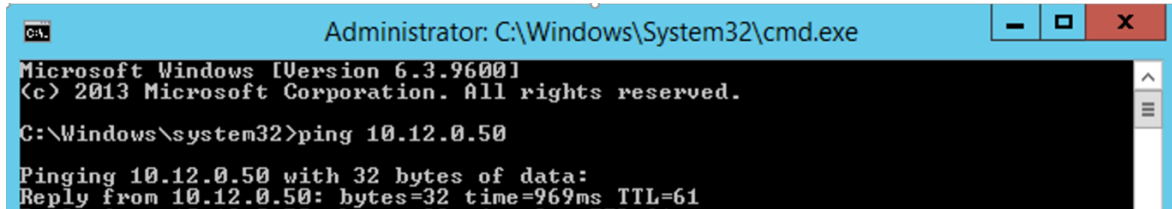
To access your HANA Large Instance server(s), you will need an SSH and telnet client like PuTTY. You can download it from <http://www.putty.org/>

Once downloaded, copy PuTTY to your newly created VM ("TestingJB"). You can simply copy the PuTTY installer file from your local on-premises machine and paste it to the VM desktop in Azure.

After the file is copied to a VM, extract the PuTTY installer.

Connect to the HANA Large Instances

Log in to your Azure VM jump box. You can try a basic test by pinging the HANA Large Instance with the IP address. (The IP address of the Large Instance server should have already been provided by the Microsoft team.)

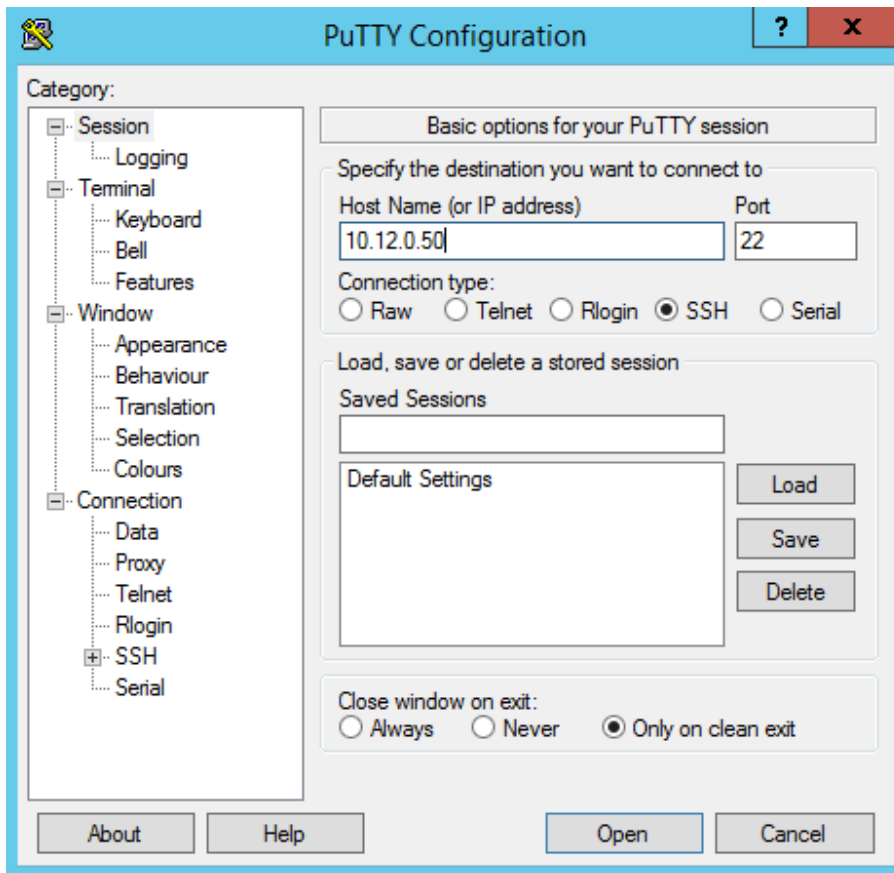


```
Administrator: C:\Windows\System32\cmd.exe
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Windows\system32>ping 10.12.0.50

Pinging 10.12.0.50 with 32 bytes of data:
Reply from 10.12.0.50: bytes=32 time=969ms TTL=61
```

Open PuTTY (A shortcut should be on your desktop after you have installed PuTTY.)



Log in to the Large Instance server and change the temporary root password provided by the Microsoft team.

```

10.12.0.50 - PuTTY
login as: root
Using keyboard-interactive authentication.
Password:
Using keyboard-interactive authentication.
You are required to change your password immediately (root enforced)
Changing password for root.
(current) UNIX password:
Using keyboard-interactive authentication.
New password:
Using keyboard-interactive authentication.
Retype new password:
Last login: Mon May 15 14:28:22 2017

```

Validate the server

After you connect to the HANA Large Instances server, you may want to validate the server. Here are few commands to validate the server components.

Command	Description
uname -n	Network hostname
uname -r	Kernel release
Lscpu	CPU Information
df -h	Storage space, Mount Point, and so on
Ifconfig	Network Ethernet cards

Install HANA on the Large Instances server

Before you start the HANA installation, you'll need to perform the following:

1. Time server (NTP) set up.
2. Register the operating system for a permanent license.
3. Patch the HANA Large Instances server to the appropriate patch/service pack level.
4. Review the SAP notes for prerequisites and for post installation of SAP HANA. Here are a few key notes:

[SAP Note 2235581 - SAP HANA: Supported Operating Systems](#)

[SAP Note 2009879 - SAP HANA Guidelines for RedHat Enterprise Linux \(RHEL\) Operating System](#)

[SAP Note 2292690 - SAP HANA DB: Recommended OS settings for RHEL 7.2](#)

[SAP Note 2247020 - SAP HANA DB: Recommended OS settings for RHEL 6.7](#)

[SAP Note 2001528 - Linux: SAP HANA Database SPS 08 revision 80 \(or higher\) on RHEL 6 or SLES 11](#)

[SAP Note 2228351 - Linux: SAP HANA Database SPS 11 revision 110 \(or higher\) on RHEL 6 or SLES 11](#)

[SAP Note 1943937 - Hardware Configuration Check Tool - Central Note \(contains the user guide for HWCCT\)](#)

Congratulations, you are now ready to install SAP HANA!