



Installation runbook for Cloudbase Solutions – Hyper-V Compute

Partner Name:	Cloudbase Solutions		
Product Name:	Hyper-V Compute Driver		
Product Type:	Hypervisor		
Product Version:	12.0		
MOS Version:	6.1		
OpenStack version:	Juno		

Contents

Document History Introduction 1.1 Objective 1.2 Target Audience Product Overview Joint reference architecture Networking 4.1 Physical & Logical network topology Installation and Configuration 5.1 Overview of MOS installation steps

5.2 MOS Installation in details

5.3 Creation of OpenStack environment

5.4 MOS Deployment

5.5 <Driver name> Installation steps

<u>Testing</u>

6.1 Test tools

6.2 Test cases

6.2.2 Deployment modes and configuration options

6.2.3 Functional testing

6.2.4 Performance testing

6.2.5 Negative testing

6.3 Test results (if FUEL HealthCheck is used)

Document History

Version	Revision Date	Description
0.1	21-10-2015	Initial Version

1. Introduction

This document is to serve as a detailed Deployment Guide for the Hyper-V Compute driver provided by Cloudbase Solutions. It describes the reference architecture, installation steps for certified MOS+Hyper-V, limitations and testing procedures.

1.1 Objective

This document contains information to help OpenStack operators understand and deploy MOS with Hyper-V compute nodes. The OpenStack deployment can have Hyper-V only compute nodes or a mix of multiple hypervisors, e.g. Hyper-V, KVM, ESXi hosts.

1.2 Target Audience

Those who want to benefit from running Windows-native applications within OpenStack.

2. Product Overview

OpenStack supports multiple types of hypervisors on a single cloud, which means that you can run KVM and Hyper-V side by side with complete interoperability. One of the great advantages is that you can have Windows instances running on Hyper-V, taking advantage of Microsoft's support for your Windows guests, while keeping Linux instances on KVM in a totally transparent way for your users.

Cloudbase OpenStack Compute Hyper-V installer offers a simple and fast way to deploy Nova Compute on Hyper-V, using a neat and tidy GUI for the occasional deployment or an automated and unattended mode for deployments on a massive number of servers.

Cloudbase OpenStack Hyper-V Compute driver is compatible with Juno, Kilo, Liberty version of OpenStack.

3. Joint reference architecture

Cloudbase OpenStack Hyper-V Compute driver requires Neutron ML2 core plugin enabled. Mirantis OpenStack has it out-of-box so no additional work required to adjust Mirantis OpenStack.

Hyper-V Compute driver supports iSCSI and SMB3 OpenStack volumes while Mirantis OpenStack supports iSCSI and Ceph volumes out-of-box but SMB3 volumes may also be enabled as a part of Professional Services engagement.

Hyper-V Compute driver integrates with Ceilometer.

All above means that almost any Mirantis OpenStack cloud may be integrated with Hyper-V Compute driver. In this runbook we use the following configuration:

- Neutron ML2 based networking on top of OpenVSwitch
- VLAN segmentation for tenant networks
- iSCSI volumes provided by Cinder LVM driver
- Ceilometer installed with MongoDB installed at one of the Controller nodes
- Two Controller nodes
- 1 KVM Compute nodes
- One Cinder LVM node
- One Hyper-V Compute node based on Microsoft Windows Hyper-V Server 2012 R2

4. Networking

The Hyper-V Driver is based on Neutron ML2 plugin and supports VLAN, flat and VXLAN, NVGRE types of segmentation. All OpenStack underlying networks should be exposed to Hyper-

V Compute node. The NIC configuration of Hyper-V Compute node is done the similar way as it is for KVM Compute, Controller, Storage nodes.



4.1 Physical & Logical network topology

5. Installation and Configuration

5.1 Overview of MOS installation steps

Cloudbase Nova Hyper-V driver works with any existing OpenStack Cloud as such no special settings are required. For the purpose of this example we have a simple MOS cloud with 2 controller nodes, 1 compute node and 1 storage node.

The following documentation provides step by step manual instructions, but it can be fully automated via Puppet for larger scale deployments.

5.2 MOS Installation in details

Any standard OpenStack environment, e.g. using CentOS or Ubuntu works. The Hyper-V driver integrates with any OpenStack deployment, by adding additional compute nodes.

Download and install MOS 6.1 Master node using the official documentation.

After it's done go to Fuel UI and create an environment.

Create a new Ope	enStack environ	ment	×
Name and Release	Name	cbsl fuel demo	1
✓ Compute			J
 Networking Setup 	OpenStack Release	Juno on CentOS 6.5 (2014.2.2-6.1)	J
Storage Backends		Please make sure your Fuel master node has internet access. To specify alternate repositories, or to create a local mirror,	
Additional Services		please check the Settings tab before deployment.	
Finish		This option will install the OpenStack Juno packages using a CentOS based operating system. With high availability features built in, you are getting a robust, enterprise-grade OpenStack deployment.	
Cancel		← Prev Next →	

For the Compute nodes we use KVM

Create a new Ope	enSt	ack environment	×
✓ Name and Release		KVM	
Compute	0	Choose this type of hypervisor if you run OpenStack on hardware	
 Networking Setup Storage Backends Additional Services Finish 		QEMU Choose this type of hypervisor if you run OpenStack on virtual hosts vCenter Choose this option if you have a vCenter environment with ESXi servers to be used as hypervisors	
Cancel		← Prev Next→	

For the networking we use Neutron with VLANs.



That's it, we have a new OpenStack Environment.

Create a new Ope	enStack environment ×
 Name and Release Compute Networking Setup Storage Backends Additional Services 	Your environment is now ready for deployment! After clicking on the Create button, you can select Deploy Changes or make additional configuration choices in the Fuel Environments console.
Finish	
Cancel	← Prev Create

5.3 MOS Deployment

The 4 nodes added to the new environment:

- o 1 Controller node
- 1 Controller node with MongoDB for Ceilometer
- o 1 KVM Compute node
- o 1 Storage node

		-	σ×
\leftarrow \rightarrow O 10.7.20.2:8000/#cluster/4/nodes		≡ Ø	۰۰۰ ۵
	Image: Settings Image: Set		
Gr	roup By Filter By Roles V Node name/mac Configure Disks Configure Interfaces Add Nodes		
	Select All		
	Controller (I)		
	VVVV Unitided (e6:fd) D VIEWOY CPULI-4 (4) HCD: SDA GE CAME &A GE		
	Controller, Telemetry - MongoDB (1)		
	Unitiled (7c06) D VIENOY CPUL4(# HCD:50.66 RAM:50.68 C		
	Compute (1) Select All		
	Untitled (b/:70) D viewor CPU:2(2) HCD:30.0 GR RAM:40.GB		
	Storage - Cinder (1) Select All		
	Untitled (68:a1) D Viewar CPU: 1 (1) HDC: 100.0 GB RAM: 30.0 B		
	Copyright © 2013-2015 Milantis All rights reserved.		
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Each node has two physical NICs. One NIC will be used for the public network and the other will be used for the PXE network as well as the VLAN Tagged Storage, Management and Private networks.

Nodes	Networks	Ö Settings	Logs	Health Check	Actions			A Deple	oy Changes
Configu	ure interfa	ices on Ur	ntitled (67	':4a)					
e	tho MAC: 00: Speed: N	0c:29:21:67:4a /A		Admin (P.	XE)	Storage VLAN ID:102	Management VLAN ID:101	Private VLAN IDs:1000-1030	
						MTU		Disable Offloadir	ig 🔲
e e	MAC: 00: Speed: N	0c:29:21:67:54 /A		Public					
						ΜΤυ		Disable Offloadir	ig 🔲

5.4 Hyper-V Compute Driver Installation steps

To begin with, all you need is a host running the <u>freely available Microsoft Hyper-V Server 2012 R2</u> or alternatively Windows Server 2012 R2 with the Hyper-V Role enabled.

• Setting up networking

The Windows Server 2012 R2/ Hyper-V Server 2012 R2 will work with only one network interface that would be used for management, storage and tenant networks. In other words, the networks should be mapped to the ones defined in MOS.

For our example MOS deployment we have defined an untagged **Public** network, **Management** network tagged with VLAN 101, **Storage** network tagged with VLAN 102 and **Private** network with VLANs 1000-1030. In order to have the same on the Windows node we need to take advantage of a feature called Nic-Teaming in order to create tagged virtual NICs.

First, let's list all net adapters (PowerShell is used for Microsoft Windows configuration here and further):

PS > Get-NetAdapter

The output should be something similar:

Name		InterfaceDes	cription			ifIndex St	atus
MacAddress	LinkSpeed						
			-				
Ethernet1		Intel(R) 82	574L Gigabit	Network	Co#2	15 Up	00-0C-29-
8B-73-83	1 Gbps						
Ethernet0		Intel(R) 82	574L Gigabit	Network	Conn	12 Up	00-0C-29-
8B-73-79	1 Gbps						

In this situation, Ethernet1 is the physical interface we will be using for creating vNICs for the Management and Storage Networks as well as the Private Network.

Let's go ahead and create a new NetLbfoTeam and add two vNICs to that team:

```
PS > New-NetLbfoTeam -Name Bond0 -TeamMembers Ethernet1
PS > Add-NetLbfoTeamNic -Team Bond0 -VlanID 101 -Name Management
PS > Add-NetLbfoTeamNic -Team Bond0 -VlanID 102 -Name Storage
```

Now can see the two new vNICs we just created:

PS > Get-Net	Adapter				
Name LinkSpeed		InterfaceDescription	ifIndex	Status	MacAddress
 <mark>Storage</mark> 8B-73-83	1 Chos	Microsoft Network Adapter Multiple#3	43	Up	00-0C-29-
Management	I ODPD	Microsoft Network Adapter Multiple#2	35	Up	00-0C-29-
8B-73-83	1 Gbps			-	
Bond0		Microsoft Network Adapter Multiplexo	26	Up	00-0C-29-
8B-73-83	1 Gbps	Trebal (D) 005741 dischib Naturni da #0	1 6	The	00 00 00
BCHERNELI 8B-73-83	1 Ghns	Inter(R) 825/4L GIGADIT Network Co#2	12	Uр	00-00-29-
Ethernet0	T ODED	Intel(R) 82574L Gigabit Network Conn	12	Up	00-0C-29-
8B-73-79	1 Gbps	-		-	

We can now go ahead and add IPs to these new interfaces:

PS > Get-NetAdapter

```
PS > New-NetIPAddress -InterfaceIndex 35 -IPAddress <ip from
management class> -PrefixLength <prefix length for management
network>
PS > New-NetIPAddress -InterfaceIndex 43 -IPAddress <ip from storage
class> -PrefixLength <prefix length for storage network>
```

Installing Hyper-V Nova Compute and Hyper-V Neutron Agent

Once the Windows Server / Hyper-V Server setup is complete, you can install the OpenStack Compute role using our <u>OpenStack compute installer</u>. Download the appropriate installer version and run it.

The first step is to add a Hyper-V virtual switch, which can be created using the installer. The virtual switch needs to be created on the Bond0 interface we created previously.

Name LinkSpeed		InterfaceDescription	ifIndex	Status	MacAddress
Storage 88-73-83	1 Chos	Microsoft Network Adapter Multiple#3	43	Up	00-0C-29-
Management	1 0000	Microsoft Network Adapter Multiple#2	35	Up	00-0C-29-
8B-73-83	1 Gbps				
<mark>Bond0</mark>		Microsoft Network Adapter Multiplexo	26	Up	00-0C-29-
8B-73-83	1 Gbps				
Ethernet1		Intel(R) 82574L Gigabit Network Co#2	15	Up	00-0C-29-
8B-73-83	1 Gbps				
Ethernet0		Intel(R) 82574L Gigabit Network Conn	12	Up	00-0C-29-
8B-73-79	1 Gbps				

Select the appropriate interface from the installer dropdown to create the virtual switch.

	_ □ X
Virtual Switch Please chooose a virtual switch or create a new one	
 <u>C</u>hoose existing virtual switch <u>A</u>dd a new external virtual switch 	Skip c <u>o</u> nfiguration
Existing virtual switch:	
Network interface:	
Microsoft Network Adapter Multiplexor Driver	×
New virtual switch name:	
Shared for management	
Back	<u>N</u> ext Cancel

Next, you'll need the host addresses URLs for the Glance API and AMQP server as well as credentials for AMQP.

An easy way to get the API endpoint URLs is by using Horizon. Login as an administrator and navigate to the projects Access & Security section, API Access tab and select the URL corresponding to the Image service.

cess & Se	curity		
Security Groups	Key Pairs	Floating IPs	API Access
API Endpoi	nts		
Service			Service Endpoint
Compute			http://192.168.78.31:8774/v2/1d85ecd809a848b3aad7dbd2aff15160
Network			http://192.168.78.31:9696/
Volumev2			http://192.168.78.31:8776/v2/1d85ecd809a848b3aad7dbd2aff15160
S3			http://192.168.78.31:8080
Image			http://192.168.78.31.9292
Cloudformation			http://192.168.78.31:8000/v1/
Volume			http://192.168.78.31:8776/v1/1d85ecd809a848b3aad7dbd2aff15160
EC2			http://192.168.78.31:8773/services/Cloud
Orchestration			http://192.168.78.31:8004/v1/1d85ecd809a848b3aad7dbd2aff15160
Object Store			
Identity			http://192.168.78.31:5000/v2.0

You will need to provide a Neutron API endpoint as well. The Neutron API endpoint can be obtained in the same way as the Glance one, listed as Network under the API Access tab in Horizon.

You will also be prompted for credentials for neutron authentication. The simplest way to find those credentials is to look on the controller node in */etc/nova/nova.conf*, in the [neutron] section. The values you are looking for are:

[neutron] admin_tenant_name admin_username admin_password

The AMQP RabbitMQ configuration can be retrieved from /etc/nova/nova.conf as well:

[oslo_messaging_rabbit]
rabbit_userid
rabbit_password
rabbit_hosts

After the installation, you can verify if the nova-compute service and the neutron hyper-v agent are up and running as expected by executing the following commands on the controller:

nova service-list

Output shows the HyperV compute nodes:

 Id led Re	+ Binary eason	Host	Zone	Status	+	Updated_at	+
<pre>led Re + 1 2 3 4 6 8 10 12 14 16</pre>	eason + nova-consoleauth nova-scheduler nova-conductor nova-conductor nova-cert nova-consoleauth nova-scheduler nova-conductor nova-cert nova-cert nova-cert nova-cert nova-compute	<pre>node-8.cloudbase.it node-8.cloudbase.it node-8.cloudbase.it node-8.cloudbase.it node-11.cloudbase.it node-11.cloudbase.it node-11.cloudbase.it node-11.cloudbase.it node-10.cloudbase.it</pre>	<pre>internal internal internal</pre>	<pre>+</pre>	up up	2015-10-12T15:19:45.000000 2015-10-12T15:19:46.000000 2015-10-12T15:19:12.000000 2015-10-12T15:19:46.000000 2015-10-12T15:19:16.000000 2015-10-12T15:19:20.000000 2015-10-12T15:19:21.000000 2015-10-12T15:19:28.000000 2015-10-12T15:19:28.000000	
18 20	nova-compute nova-compute nova-compute 	HYPERV2 HYPERV3	nova nova	enabled enabled	up up	2015-10-12T15:19:46.000000 2015-10-12T15:19:42.000000	- -

neutron agent-list

Output show the HyperV nodes that run HyperV Neutron Agent:

+ id nary	1	agent_type	ľ	host	1	alive	1	admin_state_up	1	bi
+										
0370f120-584f-4ca2-8bc6-05ceeef7fc32		Open vSwitch agent		node-11.cloudbase.it		:-)		True		ne
utron-openvswitch-agent										
15d046c7-4798-43e2-985b-72781ff58b46		Metadata agent		node-11.cloudbase.it		:-)		True		ne
utron-metadata-agent										
164549ed-3546-46e8-9100-7777d6973bf8		HyperV agent		HYPERV3				True		ne
utron-hyperv-agent										
2ef4954f-8a25-408c-9b5b-e6818a422717		HyperV agent		HYPERV1				True		ne
utron-hyperv-agent										
490d95a2-129c-4666-a2b2-0fe04a2f6175		DHCP agent		node-8.cloudbase.it		:-)		True		ne
utron-dhcp-agent										
7ac09a26-35e4-4200-9683-3a0e69c4a148		DHCP agent		node-11.cloudbase.it				True		ne
utron-dhcp-agent										
84a29237-eec1-4929-baae-851ef8c906da		Open vSwitch agent		node-10.cloudbase.it				True		ne
utron-openvswitch-agent										
881e443f-bba2-4a73-b8b7-9ae52d9738d6		Metadata agent		node-8.cloudbase.it				True		ne
utron-metadata-agent										
<pre> c2109ab0-a710-4cc6-bbd6-83c9531f4ce9</pre>		HyperV agent		HYPERV2				True		ne
utron-hyperv-agent										
d6e740de-f875-4a43-88e2-a44a59436bed		Open vSwitch agent		node-8.cloudbase.it				True		ne
utron-openvswitch-agent										
f0351b02-3885-4a00-8e42-55492a537d89		L3 agent		node-8.cloudbase.it				True		ne
utron-13-agent										
f489aded-852b-4cf6-89b8-291dd9356642		L3 agent		node-11.cloudbase.it		:-)		True		ne
utron-13-agent										
+										

• Enable the Hyper-V Neutron Agent

By default, Fuel does not enable the Hyper-V agent in the Neutron configuration. Simply edit the/*etc/neutron/plugins/ml2/ml2_plugin.ini* file and add **hyperv** to the list of enabled mechanism drivers:

mechanism_drivers = openvswitch,hyperv

After editing and saving the ml2_plugin.ini file, restart neutron-server

service neutron-server restart

This change needs to be repeated on all the Controller nodes.

Add Hyper-V guest images to Glance

An evaluation image for Windows Server 2012R2 can be found at: <u>https://cloudbase.it/windows-cloud-images/</u>

When adding Hyper-V VHD or VHDX images to Glance, make sure to specify the *hypervisor_type* property to let the Nova scheduler know that you want to target Hyper-V:

```
glance image-create --property hypervisor_type=hyperv --name
"Windows Server 2012 R2 Std" \
--container-format bare --disk-format vhd --file windows2012r2.vhdx
```

6. Testing

- 6.1 Test tools
- Tempest
- Since the HyperV nodes are not managed by FUEL, HealthChecks are not available.

6.2 Test cases

Minimum scenario tests of Tempest.

6.3 Test results

+	+.	+		+
name		time	status	
<pre>+</pre>	_basic_scenario	504.0854	success	+
,	+	+		· C