



Technical Report

Using Puppet and NetApp OnCommand Cloud Manager to Create a Highly Available MySQL Database on Top of an ONTAP Cloud HA Working Environment

Step-by-Step Guide

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Abstract

This document describes the required steps to automatically create a highly available MySQL database that utilizes a NetApp® OnCommand® Cloud Manager (OCCM) HA working environment using Puppet.

The process connects the Amazon Linux AMI server with the working environment's iSCSI server using the iSCSI initiator and multipath module. The process creates the required storage objects, formatting them and installing MySQL on them.

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1 Introduction

1.1 Purpose

This document describes the required steps to automatically create a highly available MySQL database that utilizes a NetApp OnCommand Cloud Manager (OCCM) HA working environment using Puppet.

The process connects the Amazon Linux AMI server with the working environment's iSCSI server using the iSCSI initiator and multipath module. The process creates the required storage objects, formatting them and installing MySQL on them.

This example uses a Ubuntu server as the Puppet master.

1.2 Environment

- NetApp OnCommand Cloud Manager (OCCM) for NetApp ONTAP® Cloud software in an AWS account.
- A Puppet master server with access to the Puppet agent.
- A Puppet agent server to communicate with OnCommand Cloud Manager.
- AWS VPC with required infrastructure for an HA OTC working environment (subnets, route table, and so on).
- The necessary ports (for Puppet and communication with OCCM) must be opened in the relevant security groups.

2 Prerequisites

The prerequisites for implementing a working environment include:

- Amazon AWS account
- A working Puppet environment
- The `Netapp-occm-x.x.x.tar.gz` file of the Puppet module

The prerequisites for configuring the Puppet agent include:

- Connection to NetApp OnCommand Cloud Manager (OCCM)
- The `Netapp-occm-x.x.x.tar.gz` file of the Puppet module

3 Preparing the Puppet Environment

To prepare the Puppet environment to use the Puppet NetApp and OCCM module, follow these steps:

1. Pass the `Netapp-occm-x.x.x.tar.gz` file into the Puppet master server.
2. Install the NetApp and OCCM module on the Puppet master server:
 - a. Run the Puppet module `install [.tar.gz path] --ignore-dependencies` command.
Example: `Puppet module install /tmp/netapp-occm-1.0.1.tar.gz --ignore-dependencies`
3. Install Puppet dependencies modules on the Puppet master:
 - a. Run the Puppet module `install Puppetlabs/MySQL` command.
 - b. Note: The dependencies are a Puppet requirement because of using a `.tar.gz` module installation.

4 Creating ONTAP Cloud HA Working Environment with Highly Available MySQL Database on It Using Puppet Module

To create a new HA working environment with MySQL on it, you need to use both of OCCM's Puppet modules—`occm::workingEnvironment` and `occm::configure`—one after the other.

To create a new HA working environment with an HA MySQL on it, follow these steps:

1. Include the `occm::workingEnvironment` and `occm::configure` modules in your Puppet master, specifying the suitable parameters as defined in the sections "[Creating HA ONTAP Cloud Working Environment Using Puppet Module](#)" and "[Creating a Highly Available MySQL Database on Top of an ONTAP Cloud HA Working Environment](#)."

Note: Verify that the common parameters defined in both modules are the same.

Example:

```
node default {  
  
  class {'::occm::working_environment':  
    cloudManager_host => '172.3.3.3',  
    cloudManager_user => 'myUser@netapp.com',  
    cloudManager_pass => 'myPassword',  
    we_tenantName => 'Tenant1',  
    we_region => 'us-east-1',  
    we_name => 'myWorkingEnv',  
    we_pass => 'myWePassword',  
    we_vpcId => 'vpc-b15c50d5',  
    we_node1SubnetId => 'subnet-a4ga95ac',  
    we_node2SubnetId => 'subnet-n5687a9e',  
    we_mediatorSubnetId => 'subnet-83r6d400',  
    we_keyPairName => 'myKetPair',  
    we_clusterFloatingIP => '1.1.1.1',  
    we_dataFloatingIP => '2.2.2.2',  
    we_dataFloatingIP2 => '3.3.3.3',  
    we_routeTableId => 'rtb-02a46747',  
    we_ebsVolumeType => 'gp2',  
    we_ebsVolumeSize => '500',  
    we_ebsVolumeSizeUnit => 'GB',  
  }  
  
  class {'::occm::configure':  
  
    cloudManager_host => '172.3.3.3',  
    cloudManager_user => 'myUser@netapp.com',  
    cloudManager_pass => 'myPassword',  
    we_name => 'myWorkingEnv',  
    otc_adminUser => 'admin',  
    otc_pass => 'myPassword',  
    vol_size => '50g',  
    vol_name => 'occmVol',  
    aggr_name => 'aggr1',  
    lun_name => 'myLun',  
    igroup_name => 'myIgroup',  
    lun_size => '5g',  
    db_name => 'myOCCM',  
  }  
}
```

5 Creating HA ONTAP Cloud Working Environment Using Puppet Module

Creation of the HA working environment is activated by the Puppet agent, which communicates with OCCM through the NetApp OnCommand Cloud Manager REST API.

To implement a new HA working environment on an existing OCCM system, follow these steps:

1. Verify that you installed the NetApp and OCCM module on your Puppet module ([see “Preparing the Puppet Environment”](#)).
2. Verify that your Puppet agent has a connection to your OCCM server.
3. Include the `occm::working_environment` class in your Puppet module, specifying the following parameters:

Parameter	Description	Default Value
cloudManager_host	The OCCM server on which the working environment will be created	-
cloudManager_user	The OCCM server user name on which the working environment will be created	-
cloudManager_pas	The OCCM server password with which the working environment will be created	-
we_tenantName	The OCCM tenant on which the working environment will be created	Tenant1
we_region	The AWS region in which the working environment will be created	us-east-1
we_name	The name of the new working environment	newWE
we_pass	The password of the new working environment	Occm123
we_vpcl	The AWS VPC on which the working environment will be created; must be the same as the OCCM AWS VPC	-
we_node1SubnetId	The subnet of the first data node in the new working environment; must be part of the VPC mentioned above	-
we_node2SubnetId	The subnet of the second data node in the new working environment; must be part of the VPC mentioned above	-
we_mediatorSubnetId	The subnet of the working environment mediator in the new working environment; must be part of the VPC mentioned above	-
we_keyPairName	The AWS key pair for the created servers of the new working environment	-
we_clusterFloatingIP	The working environment cluster management floating IP	1.1.1.1
we_dataFloatingIP	The working environment's first node floating IP address	1.1.1.2
we_dataFloatingIP2	The working environment's second node floating IP address	1.1.1.3
we_routeTableId	Route table ID that should include routes to the floating IP addresses	-
we_ebsVolumeType	AWS disk type (gp2 / st1)	gp2
we_ebsVolumeSize	AWS disk size number (100GB; only for gp2 / 500GB / 1TB / 2TB / 4TB / 8TB)	1
we_ebsVolumeSizeUnit	AWS disk unit (GB / TB)	TB

Example:

```
class {'::occm::working_environment':
    cloudManager_host => '172.3.3.3',
    cloudManager_user => 'myUser@netapp.com',
    cloudManager_pass => 'myPassword',
    we_tenantName => 'Tenant1',
    we_region => 'us-east-1',
    we_name => 'myWorkingEnv',
    we_pass => 'myWePassword',
    we_vpcId => 'vpc-b15c50d5',
    we_node1SubnetId => 'subnet-a4ga95ac',
    we_node2SubnetId => 'subnet-n5687a9e',
    we_mediatorSubnetId => 'subnet-83r6d400',
    we_keyPairName => 'myKetPair',
    we_clusterFloatingIP => '1.1.1.1',
    we_dataFloatingIP => '2.2.2.2',
    we_dataFloatingIP2 => '3.3.3.3',
    we_routeTableId => 'rtb-02a46747',
    we_ebsVolumeType => 'gp2',
    we_ebsVolumeSize => '500',
    we_ebsVolumeSizeUnit => 'GB',
}
```

4. Run the Puppet agent command on your Puppet agent to execute the Puppet master class definition.
5. Verify your OCCM for the newly created working environment.

Note: The working environment process can take up to 25 minutes. Consider setting your agent server session so that you don't disconnect.

6 Creating a Highly Available MySQL Database on Top of an ONTAP Cloud HA Working Environment

The automatic configuration of the working environment associated with the agent includes the following steps:

1. Creating the iSCSI initiator on the agent and connecting to the iSCSI server on the working environment
2. Creating a volume on the target aggregate
3. Creating a LUN and mapping it to a new igroup containing the initiator IQN
4. Connecting the LUN with multipath I/O with two paths—one for each node
5. Creating a partition on the new multipath device and mounting it on `/mysqlData`
6. Installing MySQL on the LUN at `/mysqlData/mysql`

To configure the Puppet agent to connect the OCCM working environment, follow these steps:

1. Verify that you installed the NetApp and OCCM module on your Puppet module (see [“Preparing the Puppet Environment”](#)).
2. Verify that you installed the NetApp and OCCM module dependencies (see [“Preparing the Puppet Environment”](#)).
3. Verify that your Puppet agent is connected to your OCCM server.
4. Include the `occm::configure` class in your Puppet module, specifying the following parameters:

Parameter	Description	Default Value
<code>cloudManager_host</code>	The OCCM server on which the working environment will be created	-
<code>cloudManager_user</code>	The OCCM server user name with which the working environment will be created	-
<code>cloudManager_pas</code>	The OCCM server password on which the working environment will be created	-
<code>we_name</code>	The name of the new working environment	<code>newWE</code>
<code>otc_adminUser</code>	The working environment’s admin user name	<code>Admin</code>
<code>otc_pass</code>	The working environment’s admin password	
<code>vol_size</code>	The size of the volume that will be created	
<code>vol_name</code>	The name of the volume that will be created	
<code>aggr_name</code>	The aggregate on which the volume will be created	
<code>lun_name</code>	The name of the LUN that will be created	
<code>igroup_name</code>	The name of the iGroup that will be created	
<code>lun_size</code>	The size of the LUN that will be created	
<code>db_name</code>	The name of the database that will be created	

Example:

```
class {'::occm::configure':  
  
    cloudManager_host => '172.3.3.3',  
    cloudManager_user => 'myUser@netapp.com',  
    cloudManager_pass => 'myPassword',  
    we_name => 'myWorkingEnv',  
    otc_adminUser => 'admin',  
    otc_pass => 'myPassword',  
    vol_size => '50g',  
    vol_name => 'occmVol',  
    aggr_name => 'aggr1',  
    lun_name => 'myLun',  
    igroup_name => 'myIgroup',  
    lun_size => '5g',  
    db_name => 'myOCCM',  
  
}
```

5. Run the Puppet agent to execute the Puppet master class definition.
6. Check you can write to your new MySQL DB.

Note: The DB will be created at `/mysqlData/mysql`.

Refer to the [Interoperability Matrix Tool \(IMT\)](#) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. The NetApp IMT defines the product components and versions that can be used to construct configurations that are supported by NetApp. Specific results depend on each customer's installation in accordance with published specifications.

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