



Cisco UCS Director Express for Big Data Baremetal Agent Installation and Configuration Guide, Release 1.0

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Preface

This preface contains the following sections:

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Audience

This guide is intended primarily for data center administrators who use Cisco UCS Director Express for Big Data and who have responsibilities and expertise in one or more of the following:

- Server administration
- Storage administration
- Network administration
- Network security
- Virtualization and virtual machines

Conventions

Text Type	Indication
GUI elements	GUI elements such as tab titles, area names, and field labels appear in this font . Main titles such as window, dialog box, and wizard titles appear in this font .
Document titles	Document titles appear in <i>this font</i> .
TUI elements	In a Text-based User Interface, text the system displays appears in <code>this font</code> .

Text Type	Indication
System output	Terminal sessions and information that the system displays appear in <i>this font</i> .
CLI commands	CLI command keywords appear in this font . Variables in a CLI command appear in <i>this font</i> .
[]	Elements in square brackets are optional.
{x y z}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x y z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

**Note**

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the document.

**Tip**

Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.

**Caution**

Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

**Timesaver**

Means *the described action saves time*. You can save time by performing the action described in the paragraph.

**Warning****IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS

Related Documentation

Cisco UCS Director Documentation Roadmap

For a complete list of Cisco UCS Director documentation, see the *Cisco UCS Director Documentation Roadmap* available at the following URL: http://www.cisco.com/en/US/docs/unified_computing/ucs/ucs-director/doc-roadmap/b_UCSDirectorDocRoadmap.html.

Cisco UCS Documentation Roadmaps

For a complete list of all B-Series documentation, see the *Cisco UCS B-Series Servers Documentation Roadmap* available at the following URL: <http://www.cisco.com/go/unifiedcomputing/b-series-doc>.

For a complete list of all C-Series documentation, see the *Cisco UCS C-Series Servers Documentation Roadmap* available at the following URL: <http://www.cisco.com/go/unifiedcomputing/c-series-doc>.

**Note**

The *Cisco UCS B-Series Servers Documentation Roadmap* includes links to documentation for Cisco UCS Manager and Cisco UCS Central. The *Cisco UCS C-Series Servers Documentation Roadmap* includes links to documentation for Cisco Integrated Management Controller.

Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to ucs-director-docfeedback@cisco.com. We appreciate your feedback.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation*, at: <http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html>.

Subscribe to *What's New in Cisco Product Documentation*, which lists all new and revised Cisco technical documentation as an RSS feed and delivers content directly to your desktop using a reader application. The RSS feeds are a free service.



Overview

This chapter contains the following sections:

- [About Cisco UCS Director Express for Big Data Baremetal Agent, page 1](#)
- [Minimum System Requirements, page 1](#)
- [Guidelines and Limitations, page 2](#)

About Cisco UCS Director Express for Big Data Baremetal Agent

You can use Cisco UCS Director Express for Big Data Baremetal Agent (Baremetal Agent) to automate the process of using a Preboot Execution Environment (PXE) to install operating systems on baremetal servers or virtual machines.

Baremetal Agent provides the following services that are required for a functional PXE install environment:

- Dynamic Host Control Protocol (DHCP)
- Hypertext Transfer Protocol (HTTP)
- Trivial File Transfer Protocol (TFTP)

When this environment is operational and Baremetal Agent and Cisco UCS Director Express for Big Data are correctly configured, you can build PXE installation tasks into any Cisco UCS Director Express for Big Data infrastructure workflow.

You can access Baremetal Agent through Cisco UCS Director Express for Big Data or Secure Shell (SSH).

Minimum System Requirements

For proper installation and operation of Baremetal Agent, your environment must meet the minimum system requirements.

Minimum Requirements for VMware vSphere

Name	Requirements
VMware vCenter Server	4.0 and later
Minimum reservation in VMware vCenter	Minimum number of CPUs—2 Memory—3 GB Hard disk—40 GB

Guidelines and Limitations

Before you install Baremetal Agent, take note of the following guidelines and limitations.

Number of Cisco UCS Director Express for Big Data applications per Cisco UCS Director Express for Big Data application.

Each Baremetal Agent application can connect to only one Cisco UCS Director Express for Big Data node. A single Cisco UCS Director Express for Big Data node cannot support multiple Baremetal Agent applications.

Network Reachability

After installation and configuration, your environment must have the following network reachability:

- Baremetal Agent must be able to reach Cisco UCS Director Express for Big Data over the network.
- Cisco UCS Director Express for Big Data must be able to reach Baremetal Agent over the network.
- The baremetal servers must be on the same network as Baremetal Agent.

DHCP Configuration

If you use DHCP, you must locate one DHCP server in the same PXE VLAN as Baremetal Agent and configure that DHCP server with the IP address range required by your DHCP server.

VLAN Configuration

When setting up the network configuration, the most common configuration uses one PXE VLAN and one Management VLAN (separate VLANs). However, Baremetal Agent supports one VLAN for both, if you prefer. For more information about the network configuration options, see <http://www.cisco.com/c/en/us/support/servers-unified-computing/ucs-director/products-installation-guides-list.html>.

You must configure the VLANs end-to-end between Cisco UCS, Cisco UCS Director Express for Big Data, and Baremetal Agent. However, when you configure Baremetal Agent, do not assume that routing will occur between the PXE_VLAN Layer 2 network and the Management VLAN network.

If you configure Baremetal Agent to use DHCP, you must locate and configure the DHCP server in the PXE VLAN and its subnet. This DHCP server serves the transient IP address required for the PXE process. In an environment with two VLANs, the server is allocated an IP address from the subnet of the Management VLAN. This IP address is typically assigned from an IP address pool that is managed by Cisco UCS Director Express for Big Data.

If you configure Baremetal Agent with two VLANs, you must set up two IP address attributes:

- One IP address for Baremetal Agent in the PXE VLAN
- A second IP address for Baremetal Agent in the Management VLAN

TFTP Server

With Baremetal Agent, you use the Cisco UCS Director Express for Big Data TFTP server to ensure that configurations, such as dynamic variables, function properly.

When you add a Baremetal Agent account, Baremetal Agent configures the TFTP server when services are started.



Installation of Cisco UCS Director Express for Big Data Baremetal Agent

This chapter contains the following sections:

- [Installing Cisco UCS Director Express for Big Data Baremetal Agent on VMware vSphere, page 5](#)

Installing Cisco UCS Director Express for Big Data Baremetal Agent on VMware vSphere

For Cisco UCS Director Express for Big Data Baremetal Agent, you need to install Cisco UCS Director Baremetal Agent first and then install the Cisco UCS Director Express for Big Data Baremetal Agent package.

Before You Begin

- You must have system administrator privileges for VMware vSphere or vCenter.
- If you want to use a static IP address rather than DHCP, you must know the following information:
 - IP address
 - Subnet mask
 - Default gateway
- Configure the network adapter on VMware vSphere before starting to deploy Cisco UCS Director Express for Big Data Baremetal Agent, which allows you to configure the network adapter mentioned in Step 20, c.

Step 1

On the Cisco.com download site for Cisco UCS Director, download Cisco UCS Director Baremetal Agent and unzip the OVF file in to the folder.

Note For Cisco UCS Director Express for Big Data Baremetal Agent, you have to download the CUCSD_BMA_5_2_0_0_VMWARE_GA.zip file of Cisco UCS Director Baremetal Agent 5.2 (VMware vSphere OVF Appliance).

- Step 2** Log in to VMware vSphere Client.
- Step 3** In the **Navigation** pane, click the vSphere host on which you want to deploy Cisco UCS Director Express for Big Data Baremetal Agent.
- Step 4** Choose **File > Deploy OVF Template**.
- Step 5** In the **Source** screen of the **Deploy OVF Template** window, do one of the following to choose your OVF source location and then click **Next**:
- If the OVF file is stored on your local computer, browse to the location, choose the file, and click **Open**.
 - If the OVF file is stored on a server on your local area network, enter the location of the file including the IP address or fully qualified domain name of the server.
- Step 6** In the **OVF Template Details** screen, verify the details and click **Next**.
- Step 7** In the **End User License Agreement** screen, review the license agreement and click **Accept**.
- Step 8** In the **Name and Location** screen, do the following:
- a) In the **Name** field, enter a unique name for the VM.
 - b) In the **Inventory Location** area, choose the location where you want the VM to reside.
 - c) Click **Next**.
- Step 9** In the **Storage** screen, choose the storage location for the VM and click **Next**.
- Step 10** In the **Disk Format** screen, click **Next** to accept the default radio button for **Thick Provision (Lazy Zeroed)** format.
- Step 11** In the **Network Mapping** screen, choose the network for the VM and click **Next**.
- Step 12** In the **Properties** screen, do the following:
- a) In the **BMA Root Password** field, enter the password that you want to use as the root password.
 - b) Configure the IP addresses for the NICs that you want to assign, as follows:
 - To use DHCP to assign the IP addresses, leave the default of 0.0.0.0 in the IP address fields.
 - To use static IP addresses, enter the desired IP addresses in the IP address fields. If you only want to configure one NIC, only complete one set of IP addresses and leave the second set at the default.
 - c) Click **Next**.
- Step 13** In the **Ready to Complete** screen, verify the settings and click **Finish**.
A message appears to indicate that Cisco UCS Director Express for Big Data is being deployed.
- Step 14** Log into the Cisco UCS Director Express for Big Data Baremetal Agent server with root privileges, and check if you are able to ping the Cisco UCS Director Express for Big Data Baremetal Agent server.
- Step 15** In the **Navigation** pane, choose the Cisco UCS Director Express for Big Data Baremetal Agent server.
- a) Choose the **Resource Allocation** tab, and click **Edit**.
 - b) Choose the **Resources** tab, and set CPU and Memory **Reservation** settings to the maximum.
 - c) Click **OK**.
-



CHAPTER

3

Installation of the Cisco UCS Director Express for Big Data Baremetal Agent Package

This chapter contains the following section:

- [Installing the Cisco UCS Director Express for Big Data Baremetal Agent Package, page 7](#)
- [Configuring the Network Interface using Shelladmin, page 10](#)
- [Configuring the DHCP Server for a Baremetal Agent Account, page 10](#)

Installing the Cisco UCS Director Express for Big Data Baremetal Agent Package

- Step 1** On the Cisco.com download site for Cisco UCS Director Express for Big Data, download the UCSDEpress_BMA_5.0_Big_Data_Package.tgz file and copy this file to the Cisco UCS Director Express for Big Data server.
- Step 2** Extract the UCSDEpress_BMA_5.0_Big_Data_Package.tgz file.
Ensure that the patch script UCSDEpress_BMA_5.0_Big_Data_Package_Install.sh has execute permissions.
- Step 3** Execute the UCSDEpress_BMA_5.0_Big_Data_Package_Install.sh file from the same folder.
- Step 4** Copy Red Hat ISO into /opt/cnsaroot/images/RHEL6.4, a directory that already exists in the Cisco UCS Director Express for Big Data server.
- Step 5** Copy Red Hat specific image files into /opt/cnsaroot/RHEL6.4.
- Step 6** Add Baremetal Agent account to Cisco UCS Director Express for Big Data, as described in [Configuring Cisco UCS Director Express for Big Data Baremetal Agent](#).
- Step 7** Configure DHCP, as described in [Configuring the DHCP Server for a Baremetal Agent Account, on page 10](#)
- Step 8** Download Cloudera and MapR software RPMS to the Cisco UCS Director Express for Big Data server, as listed in [Cloudera and MapR RPMS, on page 8](#).
- Step 9** Initiate Baremetal Agent services by clicking **Start Services**.

If the DHCP sever is not correctly configured, the status displayed in the Enabled Services column will indicate that services are not enabled.

BMA status will become "active" once the network services are started correctly.

What to Do Next

Apply licenses to Hadoop distributions.

- For Cloudera, download the ClouderaEnterpriseLicense.lic file to `/opt/cnsaroot/bd-sw-rep/cloudera-5.0.1` directory of the Baremetal Agent server.
- For MapR, copy the license text in the license.txt file from MapR to the `/opt/cnsaroot/bd-sw-rep/MapR_RPMS` directory of the Baremetal Agent server.

Cloudera and MapR RPMS

Download the following packages for Cloudera:

- `pssh-2.3.1.tar.gz` to `/opt/cnsaroot/bd-sw-rep/` from <https://pypi.python.org/packages/source/p/pssh/pssh-2.3.1.tar.gz>
- `clustershell-1.6-1.el6.noarch.rpm` to `/opt/cnsaroot/bd-sw-rep/` from http://dl.fedoraproject.org/pub/epel/6/x86_64/clustershell-1.6-1.el6.noarch.rpm
- `cm5.0.1-centos6.tar.gz` to `/opt/cnsaroot/bd-sw-rep/cloudera-5.0.1` from <http://archive.cloudera.com/cm5/repo-as-tarball/5.0.1/cm5.0.1-centos6.tar.gz>
- `cdh5.0.1-centos6.tar.gz` to `/opt/cnsaroot/bd-sw-rep/cloudera-5.0.1` from <http://archive.cloudera.com/cdh5/repo-as-tarball/5.0.1/cdh5.0.1-centos6.tar.gz>
- `mysql-connector-java-5.1.26.tar.gz` to `/opt/cnsaroot/bd-sw-rep/cloudera-5.0.1` from <http://cdn.mysql.com/archives/mysql-connector-java-5.1/mysql-connector-java-5.1.26.tar.gz>

Download the following packages to `/opt/cnsaroot/bd-sw-rep/MapR_3_1_1` for MapR:

- `ext-2.2.zip` from <http://extjs.com/deploy/ext-2.2.zip>
- `libgenders-1.14-2.el6.rf.x86_64.rpm` from http://pkgs.repoforge.org/libgenders/libgenders-1.14-2.el6.rf.x86_64.rpm
- `libgenders-devel-1.14-2.el6.rf.x86_64.rpm` from http://pkgs.repoforge.org/libgenders/libgenders-devel-1.14-2.el6.rf.x86_64.rpm
- `license.txt` —Get the Evaluation license keys from MapR.
- `pdsh-2.27-1.el6.rf.x86_64.rpm` from http://pkgs.repoforge.org/pdsh/pdsh-2.27-1.el6.rf.x86_64.rpm
- `soci-3.2.1-1.el6.x86_64.rpm` to from ftp://ftp.univie.ac.at/systems/linux/fedora/epel/6/x86_64/soci-3.2.1-1.el6.x86_64.rpm
- `soci-mysql-3.2.1-1.el6.x86_64.rpm` from ftp://ftp.univie.ac.at/systems/linux/fedora/epel/6/x86_64/soci-mysql-3.2.1-1.el6.x86_64.rpm

- sshpass-1.05-1.el6.x86_64.rpm from ftp://ftp.univie.ac.at/systems/linux/fedora/epel/6/x86_64/sshpass-1.05-1.el6.x86_64.rpm
- mapr-ecosystem-20140617.rpm.tgz from <http://archive.mapr.com/releases/ecosystem/redhat/mapr-ecosystem-20140808.rpm.tgz>
- mapr-v3.1.1GA.rpm.tgz from <http://archive.mapr.com/releases/v3.1.1/redhat/mapr-v3.1.1GA.rpm.tgz>

Installation of User Defined Software Post Hadoop Cluster Creation

Cisco UCS Director Express for Big Data provides an option to add user defined installation packages (RPMs) post Hadoop distribution specific to a version. In Cisco UCS Director Express for Big Data, you cannot install additional Hadoop related software other than what is required for the selected type of Hadoop distribution when creating an instant Hadoop cluster or customizing a Hadoop cluster.

To install user defined Hadoop related software, you can mention a list of RPMs in the userrpmlist.txt file, which can be located at /var/www/html/<hadoop_distribution_version>/userrpmlist.txt in the Baremetal Agent server. For example, /var/www/html/Cloudera_5.0.1/userrpmlist.txt.

Adding a New Red Hat Version for Hadoop Cluster

-
- Step 1** Create a new directory RHEL x.x to contain the new Red Hat version operating system software under /opt/cnsaroot/images.
- Step 2** Create a symbolic link to the newly created directory /opt/cnsaroot/images/RHELx.x at /var/www/html (ln -s /opt/cnsaroot/images/RHELx.x /var/www/html).
- Step 3** Copy Red Hat ISO contents into /opt/cnsaroot/images/RHELx.x.
- Step 4** Copy Red Hat specific image files such as TRANS.TBL, boot.msg, initrd.img, isolinux.cfg, splash.jpg, vmlinuz, boot.cat, grub.conf, isolinux.bin, memtest, vesamenu.c32 that can be located in the Red Hat ISO directory /opt/cnsaroot/images/RHELx.x/isolinux/ into /opt/cnsaroot/RHELx.x.
- Step 5** Copy boot templates from /opt/cnsaroot/templates/RHEL6.4/* to your required Red Hat version /opt/cnsaroot/templates/RHELx.x/. Modify ks.cfg template of RHEL 6.4 to point to RHELx.x.
- Step 6** To verify that the new Red Hat version (operating system software) is available in the Cisco UCS Director Express for Big Data server, perform the following:
- a) Log in to the Cisco UCS Director Express for Big Data user interface.
 - b) On the menu bar, choose **Administration > Physical Accounts**.
 - c) Click the **Bare Metal Agents** tab.
- You can find the new Red Hat version listed in the **Image Catalogs** column of the **Bare Metal Agents** report.
-

Configuring the Network Interface using Shelladmin

This procedure is optional.

-
- Step 1** Log into the Cisco UCS Director Express for Big Data VM console with the following credentials:
- a) User—shelladmin
 - b) Password—changeme
- If you have already logged into the shelladmin and changed the default password, use your new password instead. After you have logged in, you can choose `Change shelladmin password` to change the default password.
- Step 2** Choose `Configure Network Interface`.
- Step 3** At the `Do you want to Configure static IP [y/n]` prompt, enter one of the following choices:
- If DHCP is enabled, enter D (IP addresses are assigned automatically)
 - To configure static IP, enter S, and then choose the interface you want to configure at the next prompt followed by the option to select IPV4 or IPV6. This will be followed by the confirmation of the interface selected and the version of IP for which you select Y to continue. Then enter the following details:
 - IP address
 - Netmask
 - Gateway
 - DNS Server 1
 - DNS Server 2
- Step 4** Confirm when prompted.
-

Configuring the DHCP Server for a Baremetal Agent Account

**Note**

For a multi-home DHCP configuration, use this procedure to configure the first subnet for the DHCP server. For the remaining subnets, you must manually edit the DHCP configuration file (`/etc/dhcpd.conf`).

Before You Begin

To provide required DHCP services, ensure that at least one DHCP server is located in the same PXE VLAN as Baremetal Agent and configure that DHCP server with an appropriate IP address range. The DHCP server, together with the TFTP server, are used to communicate with a PXE server.

-
- Step 1** On the menu bar, choose **Administration > Physical Accounts**.
- Step 2** Click the **Bare Metal Agents** tab.
- Step 3** Click the row for the Baremetal Agent account for which you want to configure the DHCP server.
- Step 4** Click **Service Status** to verify that services for the Baremetal Agent account are stopped.
- Step 5** Click **Configure DHCP**.
- Step 6** In the **Configure DHCP** dialog box, complete the following fields and click **Submit**.

- **DHCP Subnet**
- **DHCP Netmask**
- **DHCP Start IP**
- **DHCP End IP**
- **Router IP Address**

The DHCP IP address assignments are updated, and the DHCP service is restarted.

- Step 7** Click the row for the Baremetal Agent account and click **Start Services**.
- Step 8** After the services have started, do the following:
- Verify that the status of the account in the **Status** column is Active.
 - Verify that the **Enabled Services** column shows that all services are running. If this status indicates that one or more services are stopped, verify the configuration of your DHCP server and try again.
 - Click **Service Status** to verify that the status of all expected services are up.
 - Network Services status in the Baremetal Agent appliance
 - Database connectivity status from the Baremetal Agent appliance

What to Do Next

Set up PXE boot requests.



Network Configuration for Cisco UCS Director Express Baremetal Agent

This chapter contains the following sections:

- [About the Network Configuration Options, page 13](#)
- [Single Network for Management and PXE, page 13](#)
- [Separate Networks for Management and PXE, page 14](#)

About the Network Configuration Options

You can choose between the following network configuration options for Cisco UCS Director Express for Big Data Baremetal Agent:

- Single network for management and Preboot Execution Environment (PXE)
- Separate networks for management and PXE

Choose the network configuration option that best meets the requirements of your environment.

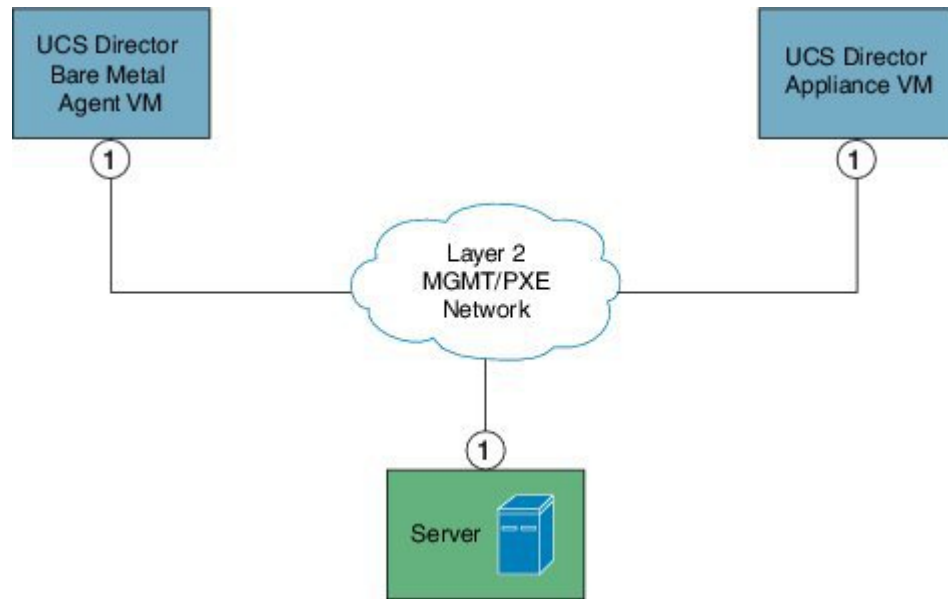
Single Network for Management and PXE

We recommend that you choose this network configuration option if your environment permits the following to be hosted on the same network interface and Layer 2 network (see the following figure):

- Services provided by Baremetal Agent, such as DHCP, TFTP, and HTTP

- Management traffic between Baremetal Agent and Cisco UCS Director Express for Big Data or other devices and appliances

Figure 1: Sample Topology for a Single Network



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Prerequisites and Assumptions for a Single Network Configuration

If you plan to configure Baremetal Agent with a single network configuration, ensure that your environment meets the following prerequisites and assumptions:

- Cisco UCS Director Express for Big Data has been installed and the network interface configured, as described in the appropriate [Cisco UCS Director Express for Big Data installation guide](#).
- Cisco UCS Director Express for Big Data is reachable through a web browser and you can log in.
- Baremetal Agent has been installed, as described in the [Cisco UCS Director Express for Big Data Baremetal Agent Installation and Configuration Guide](#) and no additional configuration has been performed.
- The required single Management and PXE VLAN is provisioned and available as a virtual port group or port profile that virtual machines (VMs) can be attached to or leverage.

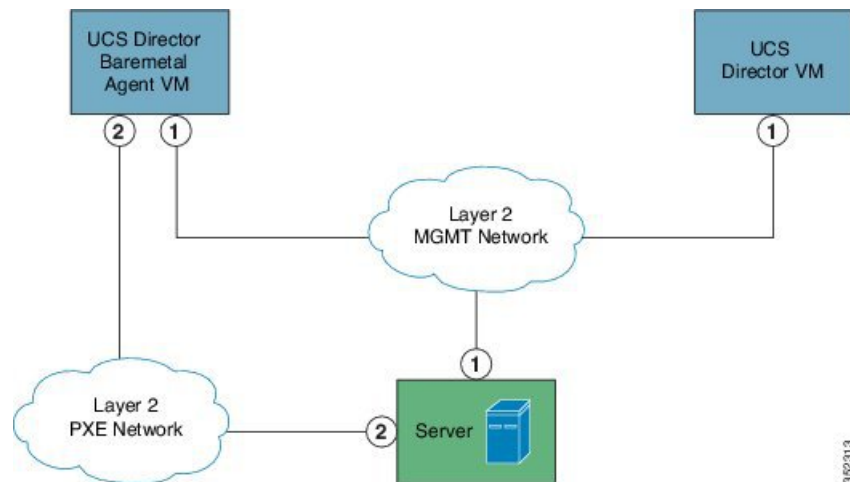
Separate Networks for Management and PXE

We recommend that you choose this network configuration option if your environment does not permit the following to be hosted on the same network interface and Layer 2 network (see the following figure):

- On the PXE network, services provided by Baremetal Agent, such as DHCP, TFTP, and HTTP

- On the Management network, traffic between Baremetal Agent and Cisco UCS Director Express for Big Data or other devices and appliances

Figure 2: Sample Topology for Separate PXE and Management Networks



Prerequisites and Assumptions for a Separate Network Configuration

If you plan to configure Baremetal Agent with a separate network configuration, ensure that your environment meets the following prerequisites and assumptions:

- Cisco UCS Director Express for Big Data has been installed and the network interface configured, as described in the appropriate [Cisco UCS Director Express for Big Data installation guide](#).
- Cisco UCS Director Express for Big Data Baremetal Agent is reachable through a web browser and you can log in.
- Baremetal Agent has been installed, as described in the [Cisco UCS Director Express for Big Data Baremetal Agent Installation and Configuration Guide](#), and no additional configuration has been performed.
- The following networks are provisioned and available as a virtual port group or port profile that VMs can be attached to or leverage:
 - Management (MGMT) network—Used for traffic between Baremetal Agent and Cisco UCS Director Express for Big Data Baremetal Agent
 - PXE network—Used for PXE services traffic, such as DHCP, HTTP, and TFTP

