



## CHAPTER 9

# Provisioning NAT/PAT Support

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This chapter describes the steps required to configure the Hosted UCS platform when a Cisco NAT/PAT router or firewall connects the IP phones and the VOSS USM server. This functionality was tested in Hosted UCS Release 5.1(b), Maintenance Release 1 (MR1). This chapter includes the following sections:

- [Support for NAT/PAT, page 9-1](#)
- [Provisioning Unified CM to Support NAT/PAT, page 9-3](#)
- [Provisioning USM to Support NAT/PAT, page 9-5](#)

## Support for NAT/PAT

This section describes support for NAT/PAT through autoregistration of IP phones when VOSS USM and the DHCP server are connected by a Cisco router or firewall providing NAT/PAT services. It includes the following topics:

- [Support for NAT/PAT Through Autoregistration of IP Phones, page 9-1](#)
- [Supported Scenarios for DHCP Services, page 9-2](#)
- [How IP Phone Autoregistration Provides NAT/PAT Support, page 9-3](#)
- [Limitations in Support for NAT/PAT, page 9-3](#)

## Support for NAT/PAT Through Autoregistration of IP Phones

In Hosted UCS deployments before Release 5.1(b), MR1, DHCP services were always managed directly by VOSS USM. USM depended on IP address information from the DHCP server to determine the location of phones, and this was a dependency for the USM AutoMove feature.

When USM manages DHCP services, Hosted UCS supports a centralized pool of DHCP servers for each customer. Two customer locations in different subnets connected to a common PAT router cannot be supported because USM associates every location with an IP address subnet. As a workaround, separate IP address pools can be created on the PAT router. However, if the DHCP server and USM server are separated by a NAT/PAT router, this scenario is not supported.



### Note

If two locations share the same subnet, phones cannot auto-register using the shared subnet. Configuration of shared subnets through the USM GUI is disabled in Release 5.1(b), MR1, but may still occur using bulk loaders.

Hosted UCS Release 5.1(b), MR1, now supports DHCP services that are *not* managed by USM. This allows the DHCP server to be separated from the USM server by a Cisco NAT/PAT device, such as a Cisco IOS software router, PIX firewall, or Adaptive Security Appliance (ASA). In this scenario, information required for the USM AutoMove feature is received through the syslog messages provided by the Unified CM Server.

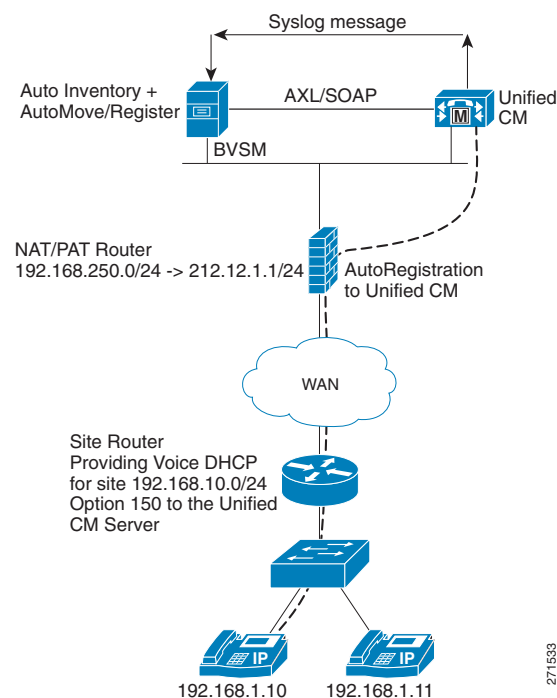
## Supported Scenarios for DHCP Services

USM now supports DHCP services in the following scenarios, using auto-registration provided by the Unified CM server:

- DHCP services managed by USM, running on the USM server
- DHCP services managed by USM, running on an external server
- DHCP services *unmanaged* by USM, running on an external server
- DHCP services unmanaged by USM, running on an external server separated by a Cisco NAT/PAT device (see [Figure 1](#)).

Scenarios that are still unsupported are described in “[Limitations in Support for NAT/PAT](#)” section on [page 9-3](#).

**Figure 1** *Unmanaged DHCP with Support for NAT/PAT (IP Phone Autoregistration)*



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## How IP Phone Autoregistration Provides NAT/PAT Support

As shown in [Figure 1](#), when the USM server receives a syslog message from Unified CM, the AutoReg service picks it up from the log and triggers the AutoCCMNewPhone transaction in USM. This transaction performs the following steps:

1. The transaction looks up the MAC address in the phone inventory and if the phone is missing, adds the phone to the inventory at the provider level.
2. If USM has not identified a location for the phone, the transaction initiates an AutoMove transaction to move the phone to the correct location in an unregistered state.
3. If the IP address received in the syslog message from Unified CM does not match the IP address in USM, the transaction updates the USM database with the new IP address.
4. If the phone is not registered in the location and the Auto-register option is selected, the transaction registers the phone.

This completes the transaction and the phone is fully registered in USM with an allocated extension number.

USM performs all four steps when a new phone is added and Auto-register is turned on for the location. If the IP address for an existing phone is changed, only Step 3 occurs.

## Limitations in Support for NAT/PAT

When the DHCP service runs on an external server and is *managed* by USM, the DHCP server and the USM server *cannot* be separated by a NAT/PAT device.

Currently, overlapping IP addresses are supported only if a separate DHCP server is used for each customer.

When USM manages the DHCP server, customer locations in different subnets connected to a common PAT router are not supported because USM associates every location with an IP address subnet. As a workaround, separate IP address pools can be created on the PAT router. However, if the DHCP server and USM server are separated by a NAT/PAT router, this scenario is not supported.

## Provisioning Unified CM to Support NAT/PAT

This section describes the configuration required to provision the Unified CM server to support IP phones connected to the USM server through a Cisco NAT/PAT device. It includes the following topics:

- [Auto-registration, page 9-3](#)
- [Configuring Auto-registration, page 9-4](#)

## Auto-registration

Auto-registration automatically assigns directory numbers to new devices as they connect to the IP telephony network. When auto-registration is enabled, a range of directory numbers is specified so that Cisco Unified CM can assign an unused number to each new phone that is connected to the network. As new phones connect to the network, Cisco Unified CM assigns the next available directory number in the specified range. After a directory number is assigned to an auto-registered phone, the phone is moved to a new location, and its directory number remains the same. This task is accomplished by sending the

Unified CM syslog messages to the USM server. This automatically triggers a transaction that moves the phone to the location, as explained in the [“How IP Phone Autoregistration Provides NAT/PAT Support”](#) section on page 9-3.

## Configuring Auto-registration

To configure auto-registration on the Unified CM server, complete the following steps:

### Procedure

- Step 1** Connect to the Unified CM server that you need to configure.
- Step 2** Choose **System > Cisco Unified CallManager**.
- Step 3** The system displays the screen shown in [Figure 9-2](#).

**Figure 9-2** Auto-registration – Unified CM Configuration

The screenshot shows the 'Cisco Unified CallManager Configuration' page. The 'Status' section indicates 'Status: Ready'. The 'Cisco Unified CallManager Information' section shows 'Cisco Unified CallManager: 10.131.5.2 (used by 7135 devices)'. The 'Server Information' section includes fields for 'CTI ID' (1), 'Cisco Unified CallManager Server\*' (10.131.5.2), 'Cisco Unified CallManager Name\*' (10.131.5.2), and 'Description' (E5C1P). The 'Auto-registration Information' section contains fields for 'Starting Directory Number\*' (1000), 'Ending Directory Number\*' (100000), 'Partition' (a dropdown menu showing '< None >'), and 'External Phone Number Mask'. A 'Find' button is next to the Partition dropdown. At the bottom, there is a checkbox labeled 'Auto-registration Disabled on this Cisco Unified CallManager' which is currently unchecked.

- Step 4** Make sure that **Auto-registration Disabled on this Cisco Unified CallManager** is unchecked. Perform this step for all the Unified CM servers.
- Step 5** Choose **System > Cisco Unified Call Manager Group**.
- Step 6** Enter the group used in the Name field and check **Auto-registration Cisco Unified CallManager Group**.
- Step 7** Choose **System > Enterprise Parameters Configuration** screen.
- Step 8** Choose the correct protocol (SIP or SCCP) from the **Auto-registration Phone Control Protocol** pull-down selection list.

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**Note**

Perform this step for Unified CM 5.1 and above. Unified CM 4.X supports only the SCCP protocol.

- Step 9** To direct Unified CM Syslog Messages to the USM Server, select **Cisco Unified CallManager > Alarm Configuration**.
- Step 10** In the Remote Syslogs section, type the IP address of the USM server in the Server Name field.
- Step 11** Click **Save**.
- 

## Provisioning USM to Support NAT/PAT

This section describes the configuration required for the USM server when it is connected to IP phones by a Cisco NAT/PAT device. It includes the following topics:

- [Configuring USM Webmin, page 9-5](#)
- [USM Provider Configuration, page 9-8](#)
- [USM Customer Configuration, page 9-9](#)
- [USM Location Administration, page 9-9](#)

## Configuring USM Webmin

To complete the configuration required using USM Webmin, complete the following steps:

**Procedure**

- 
- Step 1** Access USM Webmin.
- Step 2** Choose **VossManager Tools > VossManager configuration editor**.  
The system displays the screen shown in [Figure 9-3](#).

Figure 9-3 USM Webmin Syslog Configuration

The screenshot shows the USM Webmin Syslog Configuration page. The left sidebar contains a tree view with categories like VossManager Tools, Systems, Servers, Networking, Hardware, Cluster, BVSM Tools, Others, and Logout. The main content area is titled 'Syslog Configuration' and includes the following fields:

- LAN port eth0:** IP of system on the customer network (10.120.5.60), broadcast address on customer network (10.120.5.255), netmask on customer network (255.255.255.0), default route to customer network (10.120.5.1), and Maximum number of BVSM engines in this cluster (Nagios monitoring) (0).
- IP Address of external SNMP Trap receiver:** (empty field)
- SNMP TRAP community:** (empty field)
- SNMPv3 user:** (empty field)
- SNMPv3 password:** (empty field)
- IP address of syslog server (if remote syslog support is required):** (empty field)
- IP address(es) [comma separated] of time servers (NTP - required for IP Dir systems):** (1.1.1.1)
- IP address of external host to 'ping' (detects eth0 network issues):** (empty field)
- IP address of Email relay server:** (empty field)
- IP address(es) [comma separated] of DNS forwarders:** (empty field)
- email address to receive alert notifications (blank if no alerts to be given):** (support@visionoss.com)
- email address alert notifications come from (blank uses default):** (city5vossdir1@ciscc.com)
- Name or IP address of EverFresh software site:** (everfresh.visionoss.com)
- Console Banner:** (city5vossdir1)
- LAN port eth0: Optional settings for internal Management network:** IP of system on the management network (empty field), broadcast address on management network (empty field), netmask on management network (empty field).
- AutoStart PostgreSQL replication (slony):** (No)
- Accept syslog events from external systems (like Call Manager):** (Yes)
- Buttons:** Save Configuration, Apply Configuration.

**Step 3** Choose **Yes** from the **Accept syslog events from external systems (like call Manager)** pull-down selection list.

**Step 4** Choose **USM Tools > USM Auto Inventory and Move Phones**.

**Step 5** In the Logfile Path field, type the following path:

`/data/intdhcp/allmessages`

**Step 6** Click **Start** and **Auto-start**.

**Step 7** To reboot the USM server, select **USM Tools > USM environment tuneup tool**.



**Note** After making changes to the USM server configuration, you must reboot the server to enable the changes.

- Step 8** Click **Reboot**.  
The USM server reboots and the new configuration is enabled.
- Step 9** To verify correct syslog configuration for the USM server, establish an SSH session to the USM server using the administrator username/password.
- Step 10** To display the messages received by the USM server, enter the following command:
- ```
cd /data/intdhcp/  
tail -f allmessages
```
- Step 11** To test the configuration, reset a phone on the Unified CM server, and reenter the **tail -f allmessages** command.
- Step 12** Verify that the syslog message generated after resetting the phone on the Unified CM server has been received by the USM server.
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## Configuring DHCP Services on an External Server

To configure DHCP services running on an external server, complete the following steps on the webmin of the external DHCP server:

### Procedure

- 
- Step 1** Choose **Voss ManagerTools > VossManager Configuration**.
- Step 2** Select **IP Director + Telephony DHCP (Primary)** from the **Select functional role of this machine** pull-down selection list.
- Step 3** Click **Save Configuration** and **Apply Configuration** to save and apply the configuration.
- Step 4** Choose **USM Tools > USM Auto Inventory and Move Phones**.
- Step 5** In the USM URL or IP address, type the IP address or URL for the USM server.
- Step 6** Click **Save** and **Start** to save the settings and start the AutoMove feature.
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## USM DHCP Configuration

The configuration for a DHCP server managed by USM is similar whether it runs on the USM server or on an external server. However, you use the IP address of the USM server if the DHCP service is running on the USM server machine. You use the IP address of the external server if the DHCP service is running on a different machine.

[Figure 9-4](#) illustrates the screen used in the USM GUI to configure the DHCP service.

Figure 9-4 USM DHCP Configuration

Manager DHCP Server

Ref: [/bvsrm/ptdhcpmgrt/getISCserver.cgi]

|          |                    |                  |                 |                      |      |                           |
|----------|--------------------|------------------|-----------------|----------------------|------|---------------------------|
| Provider | Reseller           | Customer         | Division        | Location             | User | Role                      |
| BT       | city5.reseller.new | city5-customer-1 | city5-cust1div1 | City5-cust1-loc1-New | bvsm | Internal System SuperUser |

DHCP Server Details:-

Attributes

Host Name

BVSM-ENT5

Description

BVSM-ENT5 DHCP SERVER

Service Status

In Service

IP Address

10.120.5.62

Config User Name

dhcp

Config Password

Path and name of config file

/data/extdhcp/etc/dhcp/dhcpd.conf

Path and name of leases file

/data/extdhcp/var/lib/dhcp/dhcpd.leases

Version

ISC : 3.0.x

Manual configuration Mode? (Use for Un-Managed Clusters)

☐

Email address for Manual activation

Network Monitoring active?

☐

Modify

Load

Synchronize

Delete

Test

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Make sure, once the DHCP server is defined on USM, the server is Loaded and Synchronized.

## USM Provider Configuration

To configure the USM server to receive Auto-register requests from the Unified CM server, complete the following steps:

Procedure

- Step 1
- Choose **Setup Tools > Global Settings > AutoCCMNewPhoneProvider**.
- Step 2
- Choose the provider to which the Auto-register daemon reports.
- Step 3
- Choose **Setup Tools > Global Settings > PAT-IP-Reuse**.
- Step 4
- Enable the **Current Setting** checkbox.  
This setting is used when phones register with the same IP address (PAT).
- Step 5
- Choose **Provider > Select a provider > Preferences > ProviderAllowAutoPhoneInventory**.



- Step 6** Enable the **Current Setting** checkbox.  
This causes USM to automatically add phones discovered through Auto-registration to the Phone Inventory.

## USM Customer Configuration

To complete the Customer configuration required on the USM server, complete the following steps:

### Procedure

- Step 1** Choose the customer for which you want to enable the AutoMoveCustomer option.  
The system displays the screen shown in [Figure 9-5](#).

**Figure 9-5** *Customer Management*

help

## Customer Management

Ref: [/bvsmt/iptcustmgt/getcustomer.cgi]

| Provider | Reseller           | Customer         | User  | Role                      |
|----------|--------------------|------------------|-------|---------------------------|
| BT       | city5-reseller-new | city5-customer-1 | bvsmt | Internal System SuperUser |

Details:-

Advanced Mgt.

Name city5-customer-1 Preferences

Extended Name

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- Step 2** Click **Preferences**.
- Step 3** Click **AutoMoveCustomer**.
- Step 4** Enable the **Current Setting** checkbox.
- Step 5** On the Preferences and Settings screen, click **XML-PhoneAutoRegistration**.
- Step 6** Enable the **Current Setting** checkbox.
- Step 7** On the Preferences and Settings screen, click **ShowCorporateDir**.
- Step 8** Enable the **Current Setting** checkbox.

## USM Location Administration

- Step 1** Choose the Location for which you need to enable the AutoMove feature.

- Step 2** Click **Preferences** and select the **AutoFeatureLocation** option from the Preferences and Settings: Location screen.
  - Step 3** Choose the appropriate feature group, such as **COS1International24Hour**.
  - Step 4** From the Preferences and Settings: Location screen, select the **AutoMoveLocation** option.
  - Step 5** Enable the **Current Setting** checkbox.
  - Step 6** From the Preferences and Settings: Location screen, select the **AutoRegister** option.
  - Step 7** Enable the **Current Setting** checkbox.
  - Step 8** From the Preferences and Settings: Location screen, select the **AutoRegisterLowestLocation** option.
  - Step 9** In the Current Setting field, type the starting phone extension number used on the Unified CM server.
  - Step 10** Save the configuration changes and reboot the USM server to enable the new configuration.
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