Managing Legacy PBX Support

Legacy PBX support lets the Hosted Unified Communications Services platform environment support call flows to and from PBXs and for the required Cisco PGW configuration to be provisioned by USM. Media gateways can be connected to PBXs using PRI Q.931, PRI QSIG, or DPNSS, and the signalling is reliably backhauled via the media gateway to the Cisco PGW. Various ISR and non-ISR routers are supported.

This chapter includes the following sections:

Defining IOS Devices

In the Hosted UCS environment for legacy PBX support, BVSM needs the information about what type of media gateways are connected to the PBX to provision the Cisco PGW. The BVSM administrator defines an IOS device (type, network modules, and interface cards). This information is later used to add and configure the media gateways.

Ensure that you are adding IOS device components to the correct provider. To get to the provider level, choose **Provider Administration > Providers** and choose a provider.

The name of the provider appears on the screen.

Adding IOS Device Types

To add an IOS device type, perform the following steps:

Procedure

Step 1   Choose **Setup Tools > Vendor Tools**.

Step 2   Click **Add**.

Step 3   Click **Add** for Transit Connected MGCP Legacy PBX Gateway .

Step 4   From the Details menu, enter the following:

- Host Name—<Host name of the IOS Device>; for example, **e2qsig**

- Description—<IOSDeviceTypeDesc>; for example, **City2 QSIG legacy PBX gateway**

- Country—Select <Country>; for example, **United Kingdom**

- Owner—Select <Provider>; for example, **UKprovider**

- Uncheck Single Location Only check box **C3845**.

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> **Note**   If you enable Single Location Only, the IOS device can be used in the selected location only. Single Legacy PBX gateway ports can be allocated to different unmanaged locations which require PBX support. Hence, unselect Single Location Only check box.

Step 5   Under Connectivity Details, enter the following:

- IP Address—<EthInterface IP Address>; for example, **10.190.2.40**

- IP Address (alternate): <Alternate IP Address>; for example, **10.191.2.40**

- IP Domain—<Domain name>; for example, **ipcbuemea.cisco.com**

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> **Note**   Domain name should be same as hostname of the IOS device. This is due to USM issue in which only domain name is taken to create PGW switch trunk MGCP endpoint, which does not match with gateway MGCP endpoint name. Hence, gateway MGCP registration fails

- Config Password—Enter <IOS device config password>; for example, **cisco**

- Enable Password—Enter <IOS device enable password>; for example, **cisco**

Step 6   Click **Finish.**

Repeat this procedure for all IOS device types.

Adding Gateway

To add a Media Gateway, do the following:

Procedure

Step 1   Choose **Network > IOS Devices**.

Step 2   Click the IOS Device; for example, **e2qsig.**

Step 3   From Device Roles menu, click **Add on Gateway**.

Step 4   From the Gateway Details menu, enter the following:

- Name—<GW hostname>; for example, **e2qsig**

- Description—<GW description>; for example, **City2 QSIG legacy PBX gateway**

- Select Protocol—for example **MGCP**

- Click **Next**.

- Select Device— <Transit Switch: PGW-ENT2 version 9.7.3>

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> **Note**   In Hosted UCS 7.1(a), PGW 9.8(1) is also supported apart from PGW 9.6.1 and 9.7.3.

Step 5   Click **Next.**

Step 6   From the Gateway Functions menu, ensure **Legacy** is enabled for location

Step 7   Click **Add**.

Repeat this procedure for all IOS device network modules.

Add and Configure Ports

To add and configure gateway ports:

Step 1   Choose **Network > IOS Devices**.

Step 2   Click the IOS Device, for example **e2qsig**.

Step 3   Click the Gateway under Gateway Details, for example **e2qsig**.

Step 4   Click the **Gateway Hardware Configuration,** under Interface Details.

Step 5   From Legacy Ports menu, click Add Port and enter the following:

- Port Type—Select <PortType>; for example, **E1**

- Port Number—<Slot/SubUnit/Port>; for example, **1/0/0**

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> **Note**   If the E1 port configured on the Gateway has 2-tuple (ex. 1/0), then some times the Channel ID mismatch happens as the DCHAN configured on the PGW side is set to 3-tuple value by default. Hence, make sure that the E1 port configuration should have 3-tuple value (ex. 1/0/0) "Slot/subunit/port" when you face issues with the following PGW signaling services are not in service.
> **IPFASPATH** and **DCHAN** for qsig/q931 backhaul signalling.

- Port Description—<Description>; for example **E1 Port on e2qsig**

Step 6   Click **Add**.

Step 7   Click Configure on the added port under Legacy Ports, enter the following:

- Port Description—<Description>; for example, **E1 Port on e2qsig**

- Under Port Configuration, Framing—Select <Framing>; for example, **Non CRC4**

- Clock Source—for example, **Line**

- Line Coding—<line Coding type>; for example, **HDB3**
- ISDN Switch Type—Select <SwitchType>; for example, **primary-qsig**
- ISDN Side—Select <SwitchSide>; for example, **Network**

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> **Note**   Hosted UCS side is always meant to be network side by default.

Step 8   Click **Add.**

Repeat this for all Gateway ports configuration

Using Unmanaged PBX Devices

This section describes how PBXs are defined in USM. The PBX is created as an unmanaged PBX. This unmanaged PBX device is only used as a parent component for the location. It also describes how to create a hardware group that contains only the unmanaged PBX and the Cisco PGW that is used to connect to the PBX gateway. No Unified CM clusters should be added to this hardware group.

Ensure that you are adding unmanaged PBXs and the Cisco PGW unmanaged PBX hardware groups to the correct provider. To get to the provider level, choose **Provider Administration > Providers** and choose a provider.

Adding Unmanaged PBXs

To define an unmanaged PBX, perform the following steps:

Procedure

Step 1   Choose **Network > PBX devices**.

Step 2   Click **Add**.

Step 3   Click **Add** next to UnmanagedPBX (Unmanaged PBX).

Step 4   From the Details menu, enter the following:

- Host Name—<*uniquename*>; for example, **cus1unmqsigpbx1**
- Description—<*UnmanagedPBXesc*>; for example, **Customer 1 Unmanaged QSIG PBX 1**
- Country—<*CountrywherePBXis*>; for example, **United Kingdom**
- E-mail Address—<*emailaddress*>

Step 5   Click **Add**.

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> **Note**   Hostname of the unmanaged PBX device must be unique across all device types available in USM.

Repeat this procedure for all required unmanaged PBXs.

Adding a Cisco PGW Unmanaged PBX Hardware Group

To add a hardware group, perform the following steps:

Procedure

Step 1   Choose **Network > Hardware Groups**.

Step 2   Click **Add**.

Step 3   From the Hardware Group Details menu, enter the following:

- Name—*<uniquename>*; for example, **pgw2-e2qsig-hwgrp**
- Description—*<hwgrpdesc>*; for example, **City 2 "Unmanaged QSIG PBX - PGW" Hardware**
- **Group Customer 1**
- Limit usage of this Hardware Group to—**Any Action**

Step 4   From the Available Transit Switches menu, choose the required Cisco PGW; for example, **PGW-ENT2**.

Step 5   From the Available PBX Systems menu, choose the required unmanaged PBX; for example, **cus1unmqsigpbx1**.

Repeat this procedure for all unmanaged PBXs.

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> **Note**   Ensure that only one Cisco PGW and one unmanaged PBX is selected, for USM to provision the correct components.

Adding Unmanaged PBX Locations

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> **Note**   If you did not create a customer division, customer, or reseller for the unmanaged PBX location, go back and complete steps described in Adding Resellers, page 4-5, Managing Customers, page 4-5, or Adding Divisions, page 4-10, before proceeding.

The PGW-Unmanaged PBX hardware group is used when an unmanaged PBX location is added. This ensures that BVSM provisions only the Cisco PGW during the AddLocation transaction. The unmanaged PBX location is used only to move/associate E.164 numbers to the PBX.

Ensure that you are adding unmanaged PBX locations for the correct customer division. The name of the reseller is shown on the screen, as shown in Figure 5-1.

Figure 5-1   *Adding Unmanaged PBX Locations—Division Level (UKDivision1)*

Provider	Reseller	Customer	Division
UKProvider	UKReseller1	UKCustomer1	UKDivision1

To create an unmanaged PBX location, perform the following steps:

Procedure

Step 1   Choose **General Administration > Locations**.

Step 2   Click **Add**.

Step 3   From the Details menu, add the following:

- Location Name—<*LocationName*>; for example, **unmqsigpbxcus1loc1**

- Address—<*Address*>

- City—<*City*>

- Country—<*Country*>; for example, **UK**

- TimeZone—<*Area/Location*>; for example, **Europe/Londo**n

- Post/Zip Code—<*Post/Zip Code*>

- Contact Name—<*ContactName*>

- Location Type—<TypeofLocation>, Select Unmanaged Location

Step 4   Click **Next >>**.

Step 5   From the Details menu, add the following:

- Hardware Group—<unmpbxlocochwgrp>; for example, **pgw2-e2qsig-hwgrp**

- PBX Template—Default

Step 6   From the Dial Plan menu, add the following:

- Site Code—<*LocSiteCode*>; for example, **131**

- Dial this to get an outside line—<*PSTNaccessprefix*>; for example, **9**

- Select extension number length—<*ExtLength*>; for example, **3**

- Default Area Code—<*DefAreaCode*>; for example, **1402**

Step 7   From the Please Select Required Themes menu, add the following:

- Default branding of User Interface—**Default GUI branding**

- Click **Default GUI branding**.

Step 8   Click **Next >>**.

Step 9   From the Line Number menu, enter the required number of lines for internal extensions; for example, **50**.

Step 10   Click **Add**.

Repeat this procedure for all required locations.

Creating an E.164 Inventory

To create an inventory of E.164 numbers for unmanaged PBX locations, the administrator first needs to define area codes, and then add a range of numbers for the specific area code. Together, they give a range of E.164 numbers that are later assigned to unmanaged PBX locations.

Add Area Codes

To add an Area Code, do the following:

Step 1 Choose **Resources > E164 Inventory.**

Step 2 Select a Country for which you want to add an Area Code.

Step 3 Click **Next.**

Step 4 Click **Area Code Mgt.**

Step 5 Click **Add.**

Step 6 From Enter Area Code menu, enter the following

- National Area Code—<areacode>; for example, **1631**

Step 7 Click **Add.**

Repeat this for all Area Codes.

Add Number Range

To add a Number Range, do the following:

Step 1 Choose **Resources > E164 Inventory.**

Step 2 Select a Country for which you want to add a Number Range.

Step 3 Click **Next.**

Step 4 Select National Area Code—<areacode>, for example **1631.**

Step 5 Click **Next**.

Step 6 Click **Add Number Range**.

Step 7 Under Details, enter the following:

- Start of number Range: <startofnumberrange>; for example, **131000**
- End of number Range: <endofnumberrange>; for example, **131019**

Step 8 Click **Add**.

Repeat this for all required number ranges and for all area codes.

Move E.164 Number Inventory

To move a range of E.164 Numbers to an Unmanaged PBX Location:

Step 1 Choose **Resources > E164 Inventory.**

Step 2 Select a Country for which you want to move the Number Range.

Step 3 Click **Next.**

Step 4   Select National Area Code—<areacode>; for example, **1631.**

Step 5   Click **Next.**

Step 6   Click Move Number Range.

Step 7   Under Details, enter the following:

- Select Location—<requiredlocation>; for example,
  UKReseller1 : UKCustomer1 : UKDivision1 : unmqsigpbxcus1loc1

- Start of number Range—<startofnumberrange>; for example, **1631131000**

- End of number Range—<endofnumberrange>; for example, **1631131019**

Step 8   Click Move.

Repeat this for all required unmanaged PBX locations

Adding PSTN Published Numbers

After the PSTN published number is configured, when a call from a legacy PBX phone is destined to the PSTN via the central gateway (basic or call forwarded), the CgPN and the redirecting number are replaced with the PSTN published number.

To add a PSTN published number, see Adding PSTN Published Numbers, page 4-15.

Adding Emergency Published Numbers

The emergency published number is required to correctly route emergency calls. After the emergency published number is configured, when an emergency calls is placed, the CgPN is replaced with the emergency published number. For the procedure, see Adding Emergency Published Numbers, page 4-15.

This procedure updates both USM and Cisco PGW.

Repeat this procedure for all required unmanaged PBX locations.

Assigning Range of E.164 Numbers to Internal Numbers

For a range of internal extensions, the USM administrator can assign a range of E.164 numbers. These can then be assigned to a legacy PBX phone, so that users can make calls to the PSTN from those extensions.

For the procedure, see Assigning Range of E.164 Numbers to Internal Numbers, page 4-16. This procedure updates both USM and Cisco PGW.

Note   From Hosted UCS 6.1(a), USM invokes the PGW TimesTen driver and uses the TimesTen Input in the AssocaiteFNN transaction (AssociateFNN-UnmanagedPBX script) of the PGW_TimesTen_Any model worksheet to create an import file and transfer it to the PGW, where it invokes the HUCSprovx10 PGW script and inserts the associations into the PGW TimesTen database.

Repeat this procedure for all required unmanaged PBX locations.

Configure Media Gateway and PGW

To configure IOS media gateway and PGW for PBX support, the administrator needs to:

- Allocate Gateway Port to Unmanaged Location
- Activate Legacy Gateway

Allocate Gateway Port to Unmanaged Location

To allocate ports, do the following:

Step 1 Choose **Network > IOS Devices.**

Step 2 Click the IOS Device, for example **e2qsig.**

Step 3 Click the Gateway under Gateway Details, for example **e2qsig**.

Step 4 Under the legacy interfaces section on the IOS Gateway main page, Click **Port Allocation.**

Step 5 Under the legacy Port Allocation section Unallocated Ports, on the **IOS Gateway main page**

- Select Location—The unmanaged PBX location; for example, **unmqsigpbxcus1loc1**
- Allocate—Check the check box on the port to allocation; for example, **1/0/0**

Step 6 Click Allocate

Repeat this for all required Media Gateways.

Activate Legacy Gateway

Note Activating legacy gateway interface for PBX support requires both master and slave PGW IP address details. Hence, ensure that both master and slave PGW details are available in USM for the PGW under **Network > Transit Switches**.

In Hosted UCS 7.1(a), the gateway port activation provisions the gateway and PGW for legacy PBX support. To activate the port do the following:

Step 1 Navigate to the Unmanaged location, for example **unmqsigpbxcus1loc1**

Step 2 Choose **Location Administration > Telephony > Legacy Gateways.**

Step 3 Under Location Details, enter the following

- Select **MGCP** as the Gateway Protocol.
- Click **Next >>**
- Call Limit—<Call limit>; for example, **31**

Step 4 Under Location Trunk Details, enter the following:

Default DN—<LocationDefaultDN>; for example, **131001**

Own Routing Number—<RoutingNumber>; for example, **131001** (For DPNSS only)

Step 5 Under Legacy Interface details, enter the following:

- Tick the interface to be activated under Available Interfaces
- Enter the Priority—<TrunkpriorityonPGW>; for example 1

Step 6 Click Submit.

Repeat this for all required Gateway interfaces to be activated.

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> **Note** After a Gateway or E1 has been provisioned into the PGW, USM does not put the associated functions into service. Similarly with deleting, USM does not take the required functions out of service which will allow the E1 or Gateway to be removed from the PGW. The service state must be manipulated manually on the PGW.

Verify QSIG signalling backhaul service status on PGW

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> **Note** Signalling service name or links may vary depending on the signalling protocol. Below steps are applicable to QSIG/Q931 signalling protocols only.

After provisioning E1 port, do the following on PGW to ensure QSIG backhaul signalling services are up:

Step 1 Set the IP signalling links into In Service (IS) state. On the PGW MML prompt, select USM provisioned IP links and set their state to IS.

- PGW-ENT2 mml > set-iplnk:iplnk1-X:IS
- PGW-ENT2 mml > set-iplnk:iplnk2-X:IS

Where 'X' is the Gateway ID which can be obtained from USM "Gateway Hardware Configuration" page for that media gateway.

Step 2 Ensure that following Q931 back haul signalling services are up on the PGW.

a. To check IPFAS signalling link, use the following mml command on PGW:

- PGW-ENT2 mml > rtrv-dest:ipfas-XY:

Where X is the Gateway ID and Y is E1 port ID (Slot/SubUnit/Port). For example,

- PGW-ENT2M mml> rtrv-dest:ipfas-8100:
- MGC-01 - Media Gateway Controller 2010-07-08 10:20:37.370 BST
- M RTRV

```
"ipfas-8100:PKG=ISDNPRI,ASSOC=SWITCHED,PST=IS,SST=RSTO"
;
```
- PST=IS indicates that the IPFAS signalling link is In Service

b. To check Dchannel status, use the following mml command on PGW

- PGW-ENT2 mml > rtrv-dchan:dchan-XY:

Where X is the Gateway ID and Y is E1 port ID (Slot/SubUnit/Port). For example,

- PGW-ENT2M mml> rtrv-dchan:dchan-8100:

- MGC-01 - Media Gateway Controller 2010-07-08 10:29:08.060 BST

- M RTRV

```
"dchan-8100:ipfas-8100,LID=0:IS"
/* Dchannel-8100 */
;
```

- LID=0:IS indicates that PRI Dchannel is In Service.

When removing legacy gateway configuration, the following commands are required to be done on PGW before removing gateway E1 trunk configuration:

```
set-iplnk:iplnk1-X:OOS
set-iplnk:iplnk2-X:OOS
set-iproute:ipr-X:OOS
set-dest:ipfas-XY:OOS
```

Where X is the Gateway ID and Y is E1 port ID (Slot/SubUnit/Port).