



**Cisco EGW 2200**

**IP Telephony Solution Reference Network Design (SRND)**

**EGW 2200 - Release 1.1**

This document describes some deployment scenarios and configuration recommendations for the EGW 2200 with Cisco CallManager and Cisco Unity.

**Modification History**

Rev.	Date	Originator	Comment
1	April 2005	Morneault	<ul style="list-style-type: none"><li>• Initial Version</li></ul>
2	May 2005	Morneault	<ul style="list-style-type: none"><li>• Updated with feedback from EGW documentation team</li></ul>
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			<ul style="list-style-type: none"><li>•</li></ul>

<b>1</b>	<b>PURPOSE .....</b>	<b>5</b>
<b>2</b>	<b>DEPLOYMENT SCENARIOS .....</b>	<b>5</b>
2.1	SINGLE-SITE CENTRALIZED .....	5
2.1.1	<i>Voice Mail Integration</i> .....	6
2.2	MULTI-SITE WAN WITH CENTRALIZED CALL PROCESSING .....	6
2.3	MULTI-SITE WAN WITH DISTRIBUTED CALL PROCESSING .....	8
2.4	CLUSTERING OVER THE IP WAN .....	9
<b>3</b>	<b>COMPONENT PROVISIONING.....</b>	<b>11</b>
3.1	CISCO CALLMANAGER.....	11
3.2	CISCO GATEKEEPER .....	11
3.3	CISCO MEDIA GATEWAY .....	12
3.4	UNITY.....	13
<b>4</b>	<b>SINGLE-SITE PROVISIONING EXAMPLE.....</b>	<b>14</b>
4.1	EGW INSTALLATION .....	18
4.2	NEXT HOP ROUTERS.....	19
4.3	IP ROUTES .....	19
4.4	LOCAL DPNSS MEDIA GATEWAY.....	20
4.5	REMOTE DPNSS MEDIA GATEWAY .....	22
4.6	ROUTE PLANS.....	25
4.7	DIAL PLAN .....	27
4.8	H.323 INFORMATION .....	28
4.9	ADD CTI MANAGER .....	30
4.10	ADD AXL SERVER INFORMATION .....	31
4.11	ADD UNITY INTERFACE.....	32
4.12	APPLY DIAL PLAN TO MEDIA GATEWAYS.....	34
4.13	CHECKING EGW STATUS .....	34
<b>5</b>	<b>CLUSTERING OVER THE WAN PROVISIONING EXAMPLE .....</b>	<b>35</b>
5.1	EGW HOST ACTIVE PREFERENCE (INITIALIZATION TIME) .....	35
5.2	EGW BEHAVIOR IF WAN FAILS .....	35
5.3	EGW BEHAVIOR WHEN WAN RECOVERS .....	35
5.4	CALL LIMITING AND CODEC SELECTION .....	35
<b>6</b>	<b>EGW 2200 FEATURE LIMITATIONS.....</b>	<b>43</b>
<b>7</b>	<b>EGW 2200 CAPACITY .....</b>	<b>43</b>
<b>8</b>	<b>QOS.....</b>	<b>43</b>
<b>9</b>	<b>SECURITY.....</b>	<b>43</b>

**DEFINITIONS**

<b>Acronym</b>	<b>Definition</b>
API	Application Programming Interface
BH	Backhaul
CSPS	Cisco SIP Proxy Server
CTI	Computer Telephony Interface
DID	Direct Inward Dial
DPNSS	Digital Private Network Signaling System (BTNR 188)
DSCP	Differentiated Services Code Point
DUA	DPNSS User Adaptation
EGW	Enterprise Gateway (the EGW 2200 product)
FTP	File Transfer Protocol
IUA	ISDN User Adaptation
MGCP	Media Gateway Control Protocol
OS	Operating System
QoS	Quality of Service
RAI	Resource Availability Indicator
RAS	Registration Admission and Status
SCTP	Stream Control Transmission Protocol
SFTP	Secure FTP
SIP	Session Initiation Protocol
SRND	Solution Reference Network Design
SRST	Survivable Remote Site Telephony

## 1 PURPOSE

This document describes some Cisco EGW 2200 deployment scenarios and tries to bring to light some issues related to different deployment options. In addition, it provides recommendations and suggestions for how to configure the EGW 2200 and other components.

Before reading this document, one should familiarize themselves with the EGW 2200 documentation set.

<http://www.cisco.com/iamewg/index.htm>

Specifically, the EGW 2200 Applications and EGW 2200 Overview should be reviewed.

[http://www.cisco.com/iamewg/planning/planning\\_solutionoverview.htm](http://www.cisco.com/iamewg/planning/planning_solutionoverview.htm)

<http://www.cisco.com/univercd/cc/td/doc/product/access/sc/nirvdoc/plannirv/psegwovr.htm>

## 2 DEPLOYMENT SCENARIOS

This document discusses some possible configuration examples in detail noting potential drawbacks and issues. It considers EGW 2200 deployment in the three Cisco CallManager deployment models: centralized, centralized with clustering over WAN and distributed. It takes into account remote PBXs.

### 2.1 Single-site Centralized

Figure 1 provides an example configuration of the EGW 2200 deployed in a Single-site Centralized model. With the Single-Site model, the EGW will be deployed at the site along side the Cisco CallManager. The EGW can be connected to one or more DPNSS PBX(s).

In this scenario, it may be common for DPNSS PBX(s) to be deployed at remote sites. For instance, the CallManager cluster is deployed at a new facility (first step towards moving to IPT in the Enterprise). This new Cisco CallManager site needs to be networked into other sites that have existing DPNSS PBXs. In this case, the Media Gateway(s) will be deployed at the remote sites and connected to the EGW via a WAN. The WAN between the central and remote sites must follow the guidelines provided in the IPT SRND for Cisco CallManager.

[http://www.cisco.com/en/US/products/sw/voicesw/ps556/products\\_implementation\\_design\\_guide\\_book09186a008044714e.html](http://www.cisco.com/en/US/products/sw/voicesw/ps556/products_implementation_design_guide_book09186a008044714e.html)

Ideally, the WAN bandwidth will be sufficient for G.711 codec support across the WAN. For low bandwidth WANs, the EGW 2200 will need to be configured to request G.729 codec support for WAN calls. Refer to Section 4.5 for codec selection on a Media Gateway basis. Additionally, the EGW 2200 may have to support CAC (Call Limiting) on the WAN. Refer to Section 4.5 for setting a call limit on a per Media Gateway basis. Note that the Call Limit applies to the number of incoming / outgoing calls on the gateway.

The PSTN connectivity (DID trunk if one exists) will most likely be into a PBX. There may also be a need for local PSTN connectivity for the Cisco CallManager cluster. Currently, the best practice for single-site is to host PSTN connectivity on a MGCP GW connected to Cisco CallManager. The EGW 2200 can also act as the PSTN GW. There is at least one advantage to using the EGW:

- Conditional Routing support (i.e. Time of Day)

There are some disadvantages to consider also:

- Cost of the additional GW
- Call Survivability (because interface between EGW to Cisco CallManager is H.323)

An H.225 Gatekeeper controlled trunk can be used between Cisco CallManager and the EGW. As of EGW 1.1.2 (7), the Gatekeeper is optional.

### 2.1.1 Voice Mail Integration

The EGW can be used to integrate the Cisco CallManager cluster with legacy Voice Mail (a means for MWI is supported across the H.225 trunk). Further, the EGW can be used to integrate the legacy PBXs with Unity Voice Mail hosted at the central site. Figure 1 shows integration with Cisco Unity via SIP integration. Note that dual integration (SCCP to Cisco CallManager and SIP to EGW) must be used when Unity is deployed with CallManager and the EGW 2200.

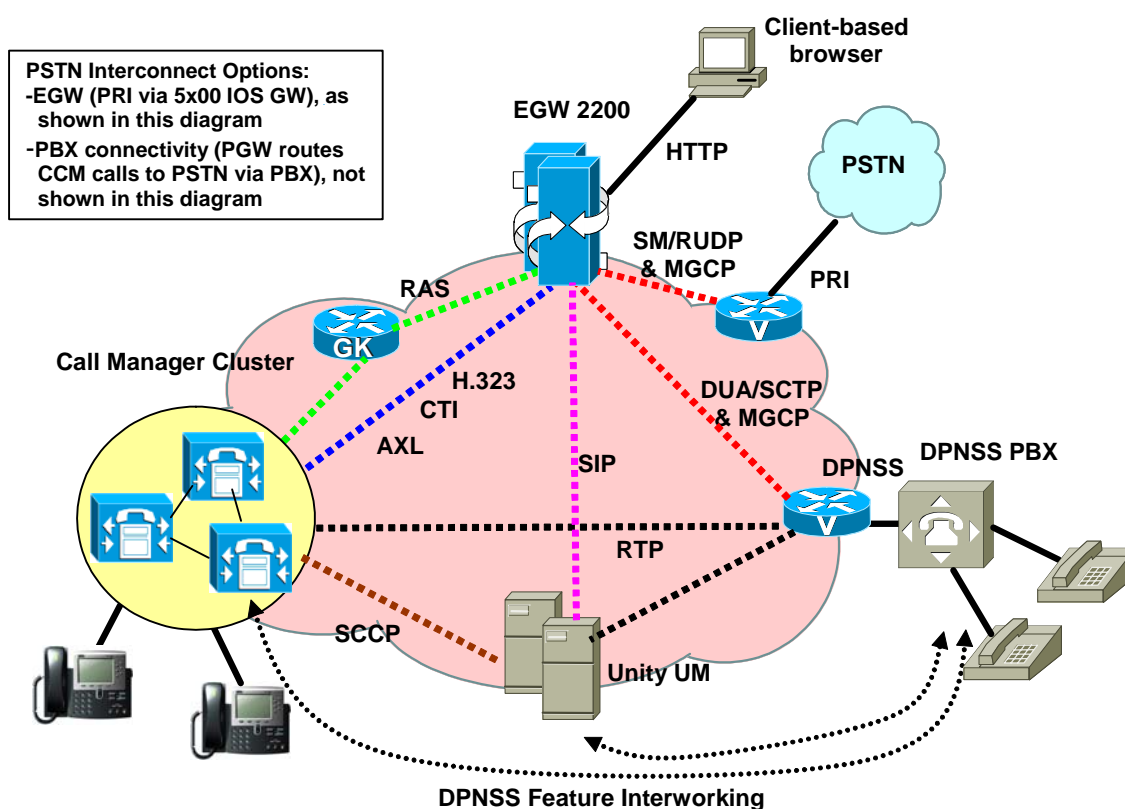


Figure 1 Example of an EGW in a Single Site Deployment

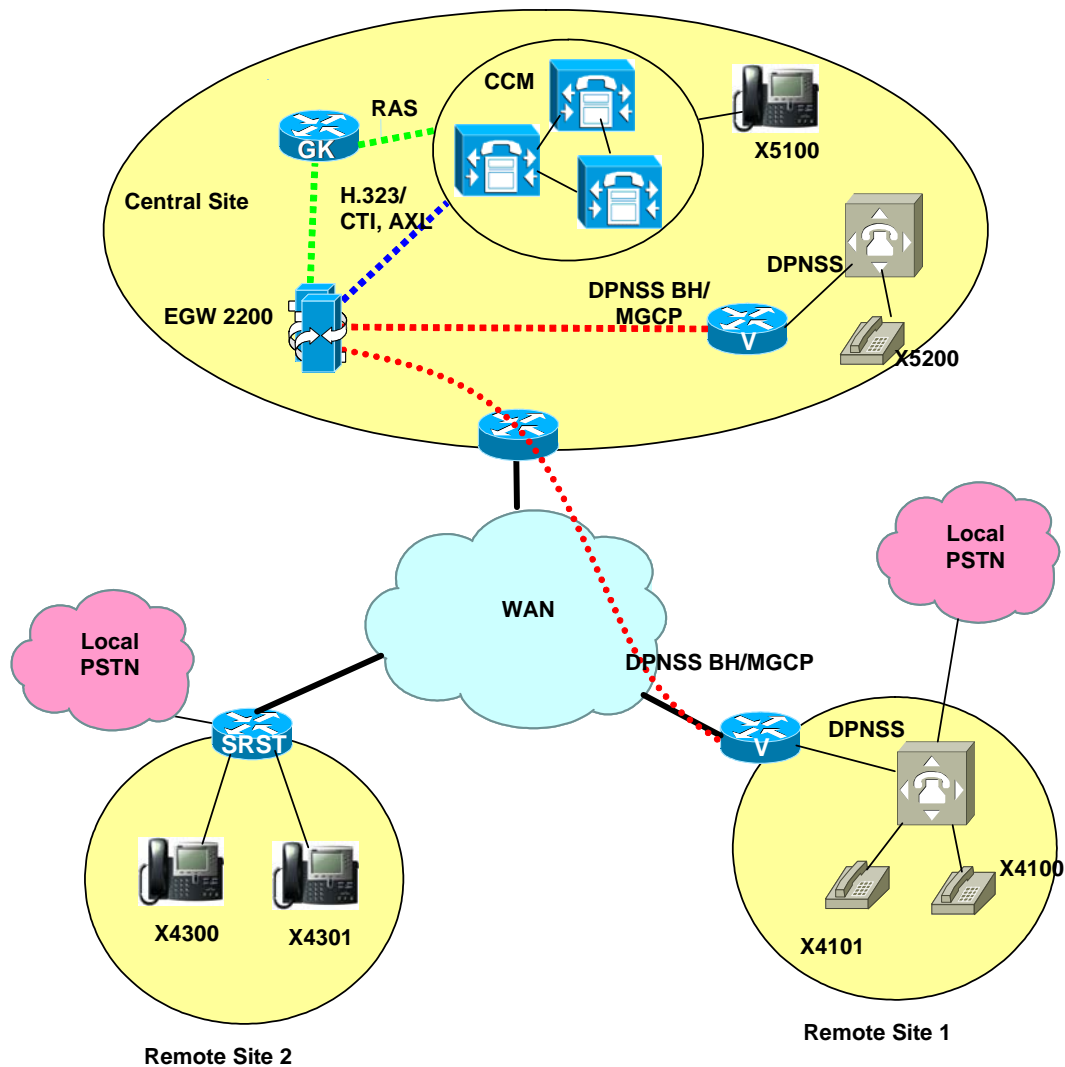
## 2.2 Multi-Site WAN with Centralized Call Processing

Figure 2 represents a multi-site deployment with a centralized Call Processing. It is expected that the EGW would be deployed at the central site with the Cisco CallManager cluster. An H.225 Gatekeeper-controlled trunk can be used between Cisco CallManager and the EGW, but as of EGW 1.1.2 (7) the Gatekeeper is optional. If a Gatekeeper is not used, then the Cisco CallManager can be configured with one or two H.323 Gateway connections (one per EGW host for duplex EGW) to communicate with the EGW. The two H.323 Gateways can be put into a

Cisco CallManager Route Plan so that outgoing traffic can be loadshared across the two Active HSIs in a duplex EGW. *Note: the non-Gatekeeper Intercluster Trunk is not supported for this configuration.*

The DPNSS PBX(s) may be deployed at the central site or remote sites.

Not shown in this figure is the connectivity to the PSTN since this topic is handled in the IPT SRND. It is recommended that the DPNSS PBXs at remote sites be connected to the PSTN for local calls and in case connectivity to the EGW fails.



**Figure 2 Example of an EGW in Cisco CallManager Multi-site Centralized Deployment**

In the example provided in Figure 2, the CallManager will be responsible for CAC and codec selection for Remote Site 2 and the EGW 2200 will be responsible for Remote Site 1. The CAC would be provisioned on the EGW at the Media Gateway basis for the Media Gateway that fronts the PBX at Remote Site 1. The codec selection would be

provisioned in the Media Gateway MGCP properties panel. Refer to Section 4.5 for more information.

## **2.3 Multi-Site WAN with Distributed Call Processing**

A distributed scenario consists of Cisco CallManager clusters at multiple sites with Inter-cluster Trunks connecting the sites. In addition, each Cisco CallManager site may have some number of remote sites connected. Figure 3 represents a multi-site deployment with distributed Cisco CallManager clusters. As shown in the diagram, there must be an EGW per Cisco CallManager cluster. Also note that the PBXs are tied to a particular site due to their connectivity to the EGW. Calls can be made between a PBX phone in Site A to a PBX or Cisco CallManager phone in Site B. But, some features such as CallBack and Extension Status will only work within a site. For instance, a PBX phone in Site A could not invoke Callback to a PBX or Cisco CallManager phone in Site B. The Gatekeeper would perform routing and, if configured, CAC functions.

Note that this configuration has a limitation. There will not be DPNSS feature transparency between PBXs connected to different EGWs. Feature Transparency will only be supported between DPNSS PBXs connected to a single EGW. For example, a call from PBX in Site A would go from the EGW 2200 to the Cisco CallManager cluster in Site B and then to the EGW in Site B.

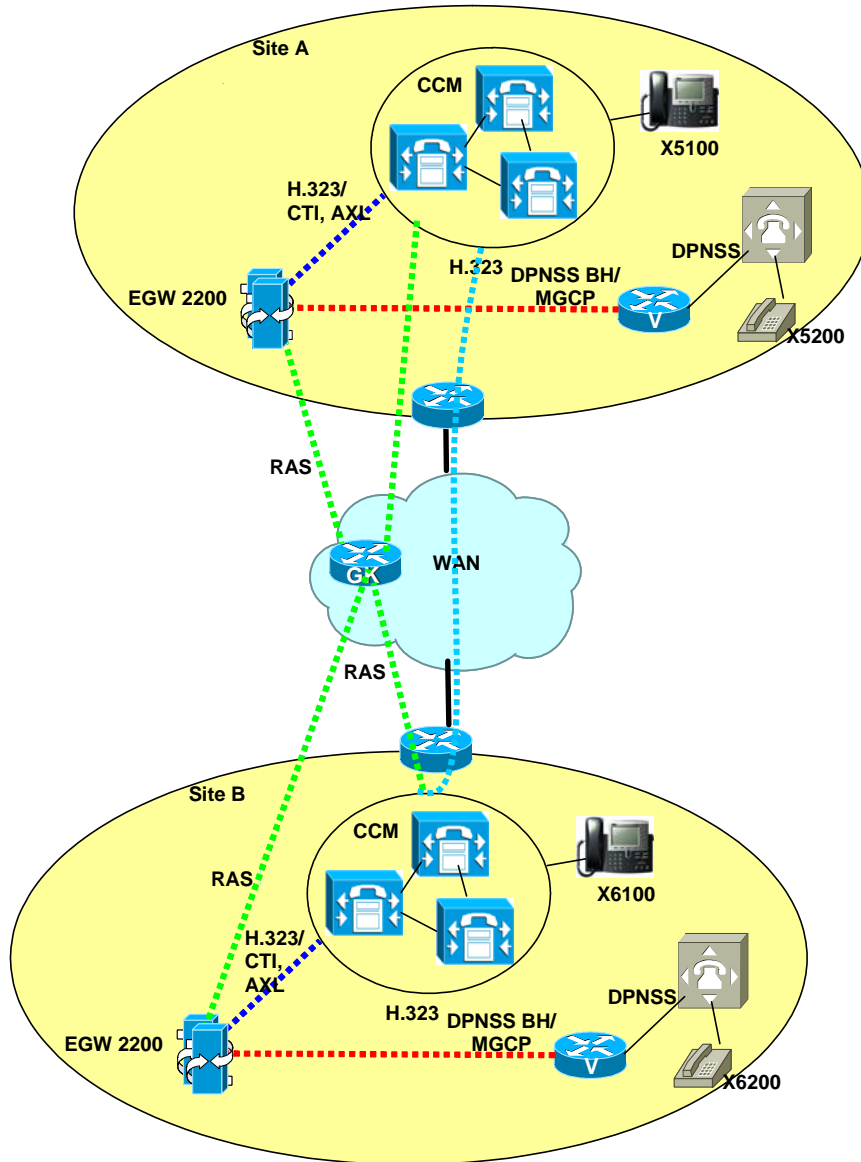


Figure 3 Example of an EGW in Cisco CallManager Multi-site Distributed Deployment

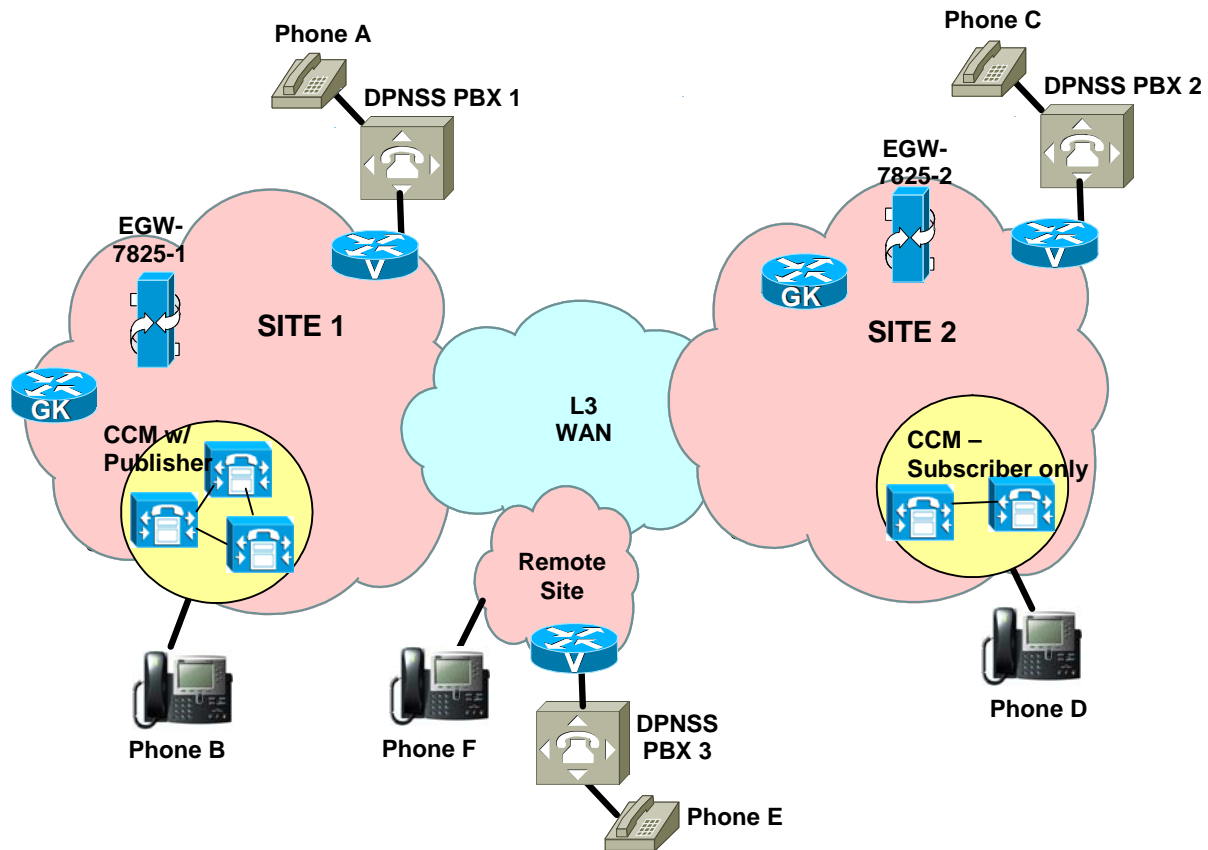
## 2.4 Clustering over the IP WAN

Clustering over the IP WAN provides a means to deploy single site over multiple sites connected by an IP WAN with QoS enabled. For this deployment, the EGW is deployed in a duplex configuration with one box at one site and the other box at another site. However, the following conditions must be met:

- The WAN must be fully redundant
- The WAN must be low latency (i.e. less than 40 msec one way delay)
- The WAN must be QoS-enabled

Figure 4 provides an example of the EGW 2200 deployed in the Cluster over the WAN configuration. In this

diagram, there are three sites: two main sites and one remote site. The EGW hosts are split between the two main sites. Each site has a PBX connected to the EGW via a MGCP-controlled GW. Full feature transparency is supported between the PBXs since they are all connected to a single EGW 2200.



**Figure 4 Example of an EGW in Cisco CallManager Clustering over the WAN Deployment**

Section 5 of this document discusses the CAC and codec issues related to this deployment option.

### 3 COMPONENT PROVISIONING

This section provides recommendations for how to configure other components in the solution to communicate with the EGW 2200. These recommendations only refer to the configuration data that is specific to the EGW.

#### 3.1 Cisco CallManager

The CallManager must be provisioned to communicate with the EGW using H.323. If a Gatekeeper is deployed in the solution, a H.225 Gatekeeper-controlled trunk should be provisioned. If no Gatekeeper is deployed in the solution, two H.323 Gateways should be added on the CallManager each with an IP address of the Active and Standby EGW hosts. These two H.323 Gateways should be listed in a Route Plan in order to provide for load-sharing across the HSIs on the EGW hosts.

If the deployment requires the EGW to perform CallBack between the DPNSS PBX and CallManager, then the CallBack feature must be disabled on the CallManager. To disable the CallBack feature on CallManager, deactivate "Extended Functions" on the Services page. In addition, the Cisco CallManager administrator needs to enable the Call Back softkey on in the phone template for the "Ring Out" call state for Cisco CallManager users that are allowed to use this feature. The CallBack softkey must not be configured for the "On Hook" call state since the EGW does not support querying CallBack status.

When doing capacity planning for Cisco CallManager, you will have to account for the following items:

1. Number of calls per second on H.323 interface
2. Number of outstanding Callbacks (each in-process Callback is equivalent to a CTI call)

#### 3.2 Cisco Gatekeeper

The Cisco Gatekeeper is an optional piece of the solution as of EGW 1.1.2 patch 3. The Gatekeeper is useful for load-balancing traffic across the CallManager hosts and across the HSI component on duplex EGW hosts. In addition, the EGW does support the RAI message for indicating congestion which can be used to offload H.323 calls from one EGW host to the other.

There is very minimal configuration required for the Gatekeeper. An example of the minimal provisioning is shown below:

```
gatekeeper
zone local HSI GK cisco.com 10.82.83.215
no shutdown
```

This provisioning information must align with the information on the EGW H.323 panel (see next section for configuration example). After configuring the Gatekeeper and the EGW H.323 information, it is a good idea to verify that the EGW has properly registered with the Gatekeeper. Refer to the following document to diagnose registration issues:

[Troubleshooting Gatekeeper Registration Issues \[IP Telephony/Voice over IP \(VoIP\)\] - Cisco Systems](#)

Note that the Gatekeeper can also be used for Call Admission Control (CAC), etc. Thus, more provisioning may be required given a customer network.

### 3.3 Cisco Media Gateway

The Media Gateway requires QSIG, PRI NI-2 or DPNSS protocol backhaul support and MGCP. Both of these must be configured. First, the Media Gateway should be provisioned for MGCP for each controller port that is connected to a PBX via a T1 or E1.

```
controller E1 1/0
  framing NO-CRC4
  pri-group timeslots 1-31 service mgcp
  description controller E1 1 for DPNSS connected to PBX loop1
```

Note that no clocking information should be set on the controller.

Next, the MGCP information needs to be configured. This example shows a single E1 port being used (port 1/0). For each E1 port used, the controller will have to be configured for “service mgcp”

```
!
ip host egw <list of egw addresses>
!
mgcp
mgcp call-agent egw service-type mgcp version 1.0
mgcp dtmf-relay voip codec all mode nte-ca
mgcp vad
mgcp package-capability rtp-package
mgcp package-capability dtmf-package
mgcp package-capability gm-package
!
mgcp profile default

controller e1 1/0
  framing NO-CRC4
  pri-group timeslots 1-31 service mgcp
  description E1 connected to Siemens PBX
```

For DPNSS, the DPNSS User Adaptation Layer (DUA) and Stream Control Transmission Protocol (SCTP) are used to backhaul the DPNSS call processing messages to the EGW. Since DUA is a minor variant of IUA (ISDN User Adaptation), the IUA IOS command set is used to provision the signaling backhaul. An example is provided below:

```
iua
  AS dpnss-gw 10.82.81.17 10.82.80.17 9900
  ASP EGWa AS dpnss-gw 10.82.81.60 10.82.80.60 9900
  ASP EGWb AS dpnss-gw 10.82.81.61 10.82.80.61 9900
```

In this example, both the DPNSS GW and the duplex EGW hosts are multi-homed (both have connectivity on the 10.82.80 and 10.82.81 VLANs). Note that the IP address and port information must match the values configured on the EGW. Finally, the serial interface will have to be bound to the IUA backhaul configuration for Layer 3 processing.

```
interface Serial1/0:15
  no ip address
  no logging event link-status
  isdn switch-type primary-dpnss
  isdn incoming-voice voice
  isdn bind-l3 iua-backhaul dpnss-gw
  isdn dpnss pbxA
```

```

isdn bchan-number-order ascending
no cdp enable

```

*Note: If the controller has not been provisioned for “service mgcp”, the “isdn bind-l3” option for “iua-backhaul” will not be available.*

*Note: If the interface is configured to be the pbxA side, the DPNSS PBX must be pbxB side. In IOS, there is no command “isdn dpnss pbxB” since this is the default.*

For QSIG or PRI NI-2, Session Manager and Reliable UDP (RUDP) are used to backhaul the call processing messages to the EGW. An example is provided below:

```

Backhaul-session-manager
set EGW client ft      (Note: “nft” would be used for simplex EGW)
group egw-host-1 set EGW
group egw-host-2 set EGW
session group egw-host-1 10.82.81.60 7000 10.82.81.17 7000 1
session group egw-host-1 10.82.80.60 7000 10.82.80.17 7000 1
session group egw-host-2 10.82.81.61 7000 10.82.81.17 7000 1
session group egw-host-1 10.82.80.61 7000 10.82.80.17 7000 1

```

In this example, both the QSIG or PRI NI-2 GW and the duplex EGW hosts are multi-homed (both have connectivity on the 10.82.80 and 10.82.81 VLANs). Note that the IP address and port information must match the values configured on the EGW. Finally, the serial interface will have to be bound to the backhaul configuration for Layer 3 processing.

```

interface Serial1/0:15
no ip address
no logging event link-status
isdn switch-type primary-qsig
isdn protocol-emulate network
isdn incoming-voice voice
isdn bind-l3 backhaul EGW
isdn bchan-number-order ascending
no isdn T309-enable
no cdp enable

```

*Note: If the controller has not been provisioned for “service mgcp”, the “isdn bind-l3” option for “backhaul” will not be available.*

*Note: If the interface is configured to be the network side, the QSIG/PRI NI-2 PBX must be user side or vice versa.*

### 3.4 Unity

Cisco Unity must be configured with a SIP integration for the EGW 2200. The configuration is described in detail in the EGW 2200 Integration guide for Unity:

[http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod\\_configuration\\_guide09186a008021f6ca.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod_configuration_guide09186a008021f6ca.html)

In addition, there is an integration guide available for using the EGW 2200 to provide inter-working of Cisco Unity with the Avaya S8700. Please refer to the following document:

[http://www.cisco.com/application/pdf/en/us/guest/products/ps5938/c1072/Cisco\\_CallManagerigration\\_09186a0080414065.pdf](http://www.cisco.com/application/pdf/en/us/guest/products/ps5938/c1072/Cisco_CallManagerigration_09186a0080414065.pdf)

## 4 SINGLE-SITE PROVISIONING EXAMPLE

This section provides a provisioning example for a basic single-site configuration. The configuration is provided in Figure 5. The information for this configuration is provided in Tables below that are pulled from the EGW 2200 Planning Worksheet:

[http://www.cisco.com/iamew/planning/planning\\_prov.htm](http://www.cisco.com/iamew/planning/planning_prov.htm)

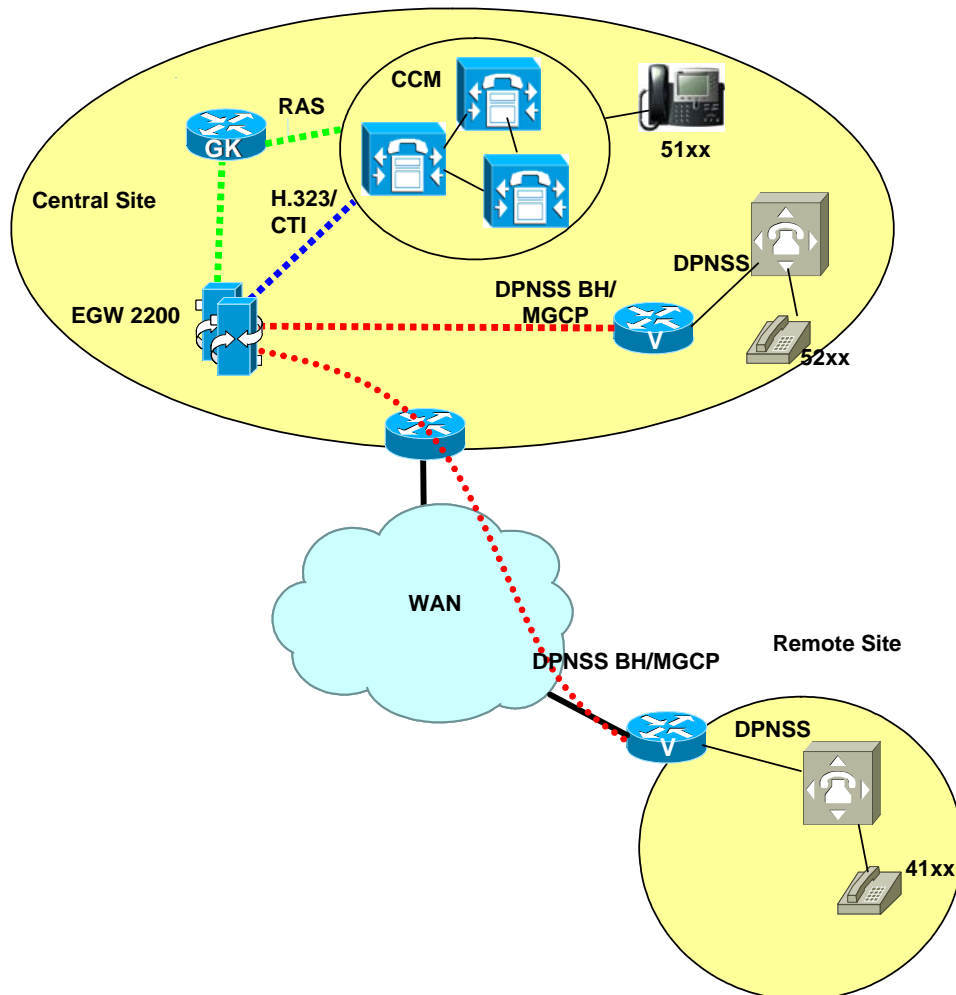


Figure 5 Single-Site Configuration Example

Field / Property	Your Information Goes Here	Instructions
EGW Local Primary IP Address	10.82.80.60 / 24	Specify the primary IP address, Ethernet 0, of the local EGW.
EGW Local Secondary IP Address	10.82.81.60 / 24	Specify the primary IP address, Ethernet 1, of the local EGW.

Field / Property	Your Information Goes Here	Instructions
EGW Peer Primary IP Address	10.82.80.61 / 24	(If you are using fault tolerant configuration) Specify the primary IP address, Ethernet 0, of the peer EGW.
EGW Peer Secondary IP Address	10.82.81.61 / 24	(If you are using fault tolerant configuration) Specify the primary IP address, Ethernet 1, of the peer EGW.

### H.323

Field / Property	Your Information Goes Here	Instructions
Gatekeeper Name	GK1	Name of the gatekeeper as provisioned on the gatekeeper.
Gatekeeper IP Address	10.82.80.40 / 24	Gatekeeper IP address.
Gatekeeper Port	1720	Gatekeeper port.
Terminal Alias	egw23@cisco.com	
Node ID	egw23	

### CTI Managers

Field / Property	Your Information Goes Here	Instructions
CTI Manager	ctimgr1	
Description	CTI Connection to Cisco CallManager Publisher	
CTI Manager Version	5.0	For Cisco CallManager 4.0, the CTI manager version is 5.0. For Cisco CallManager 4.1, the CTI manager version is 6.0.
IP Address	10.82.80.10	IP address of Cisco CallManager publisher

Field / Property	Your Information Goes Here	Instructions
CTI Manager	Ctimgr2	
Description	CTI Connection to Cisco CallManager Subscriber	
CTI Manager Version	5.0	For Cisco CallManager 4.0, the CTI manager version is 5.0. For Cisco CallManager 4.1, the CTI manager version is 6.0.
IP Address	10.82.80.11	IP address of Cisco CallManager subscriber

**AXL Servers**

<b>Field / Property</b>	<b>Your Information Goes Here</b>	<b>Instructions</b>
AXL Server Name	axlsrv1	
Description	AXL connection to Cisco CallManager Publisher	
IP Address	10.82.80.10	IP address of Cisco CallManager Publisher
Port	80	
AXL Server Username		This is the Windows administrator account username
AXL Server Password		This is the Windows administrator account password

<b>Field / Property</b>	<b>Your Information Goes Here</b>	<b>Instructions</b>
AXL Server Name	Axlsrv2	
Description	AXL connection to Cisco CallManager Subscriber	
IP Address	10.82.80.11	IP address of Cisco CallManager Subscriber
Port	80	
AXL Server Username		This is the Windows administrator account username
AXL Server Password		This is the Windows administrator account password

**Media Gateways**

<b>Field / Property</b>	<b>Your Information Goes Here</b>	<b>Instructions</b>
Name	V2651a	Choose a name for the gateway (up to 10 characters). Local.
Description	DPNSS GW - local	Provide a description (up to 20 characters). Local.
Gateway Type (Platform)	C2600	What type of gateway (platform hardware) is it? See Cisco EGW Administration online help for the list of supported gateways.
Protocol Variant	DPNSS	Will this gateway be connected to a DPNSS, QSIG or PRI ISDN PBX?
First IP Address	10.82.80.50	Do you want the EGW to communicate to this gateway using the EGW's Primary IP Address? If so, what is the corresponding IP address on the gateway? See Guidelines for IP Address Provisioning below.
Second IP Address	10.82.81.50	Do you want the EGW to communicate to this gateway using the EGW's Secondary IP address? If so, what is the corresponding IP address on the gateway?
Gateway Host Name	V2651a	Enter the name for this gateway that was assigned at the time of its configuration. This entry must match the host name

Field / Property	Your Information Goes Here	Instructions
		configured on the gateway. If the gateway configuration defined an IP Domain Name, the Gateway Host Name definition must include both the Hostname and IP Domain Name, concatenated, for example: gateway1.cisco.com
MGCP Port	2427	Defaults to 2427
Session Set/Association Port	9900	This field's function depends on the protocol variant you chose in above. Session set defaults to 3000. Association Port defaults to 9900.

Field / Property	Your Information Goes Here	Instructions
Name	V2651b	Choose a name for the gateway (up to 10 characters). Local.
Description	DPNSS GW - remote	Provide a description (up to 20 characters). Local.
Gateway Type (Platform)	C2600	What type of gateway (platform hardware) is it? See Cisco EGW Administration online help for the list of supported gateways.
Protocol Variant	DPNSS	Will this gateway be connected to a DPNSS, QSIG or PRI ISDN PBX?
First IP Address	10.48.84.50	Do you want the EGW to communicate to this gateway using the EGW's Primary IP Address? If so, what is the corresponding IP address on the gateway? See Guidelines for IP Address Provisioning below.
Second IP Address		Do you want the EGW to communicate to this gateway using the EGW's Secondary IP address? If so, what is the corresponding IP address on the gateway?
Gateway Host Name	V2651b	Enter the name for this gateway that was assigned at the time of its configuration. This entry must match the host name configured on the gateway.  If the gateway configuration defined an IP Domain Name, the Gateway Host Name definition must include both the Hostname and IP Domain Name, concatenated, for example: gateway1.cisco.com
MGCP Port	2427	Defaults to 2427
Session Set/Association Port	9901	This field's function depends on the protocol variant you chose in above. Session set defaults to 3000. Association Port defaults to 9900.

**Table 1 Single-Site Configuration Example Provisioning Data**

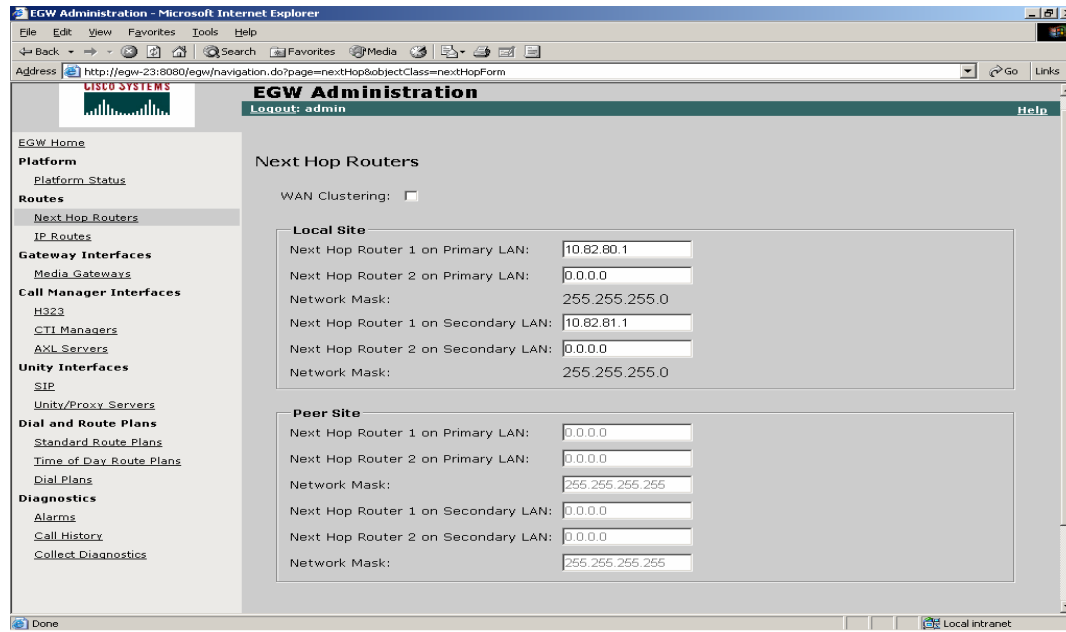
## **4.1 EGW Installation**

During installation of the EGW product, there are several items that must be configured including local IP address(es), DNS server address, Virtual IP address(es), NTP Server IP address, etc.

*Note: The virtual IP address(es) are an optional feature for use with integration with Cisco Unity.*

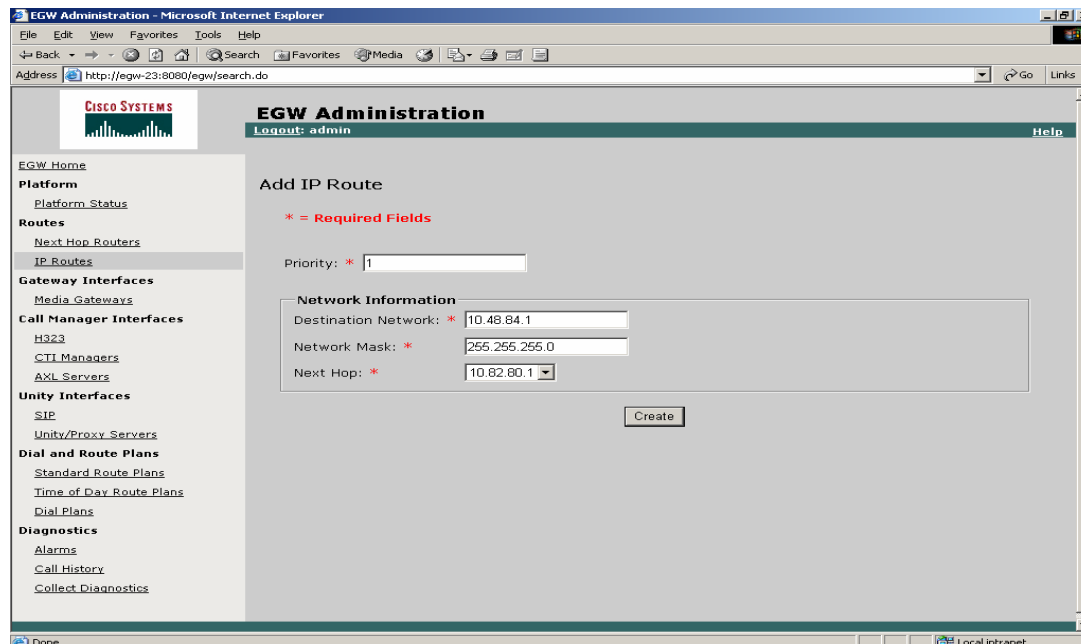
## 4.2 Next Hop Routers

Since there is a remote Media Gateway, it is necessary to provision the next hop router for the remote gateway. Two next hop routers are defined since the EGW is multi-homed. The figure below provides an example of the provisioning panel.



## 4.3 IP Routes

Next the IP routes to the non-local subnets must be defined. The figure below provides an example of the provisioning panel.



## 4.4 Local DPNSS Media Gateway

Add the local DPNSS Media Gateway by selecting the Media Gateway link in the navigation area. Then, select “Add New” to create a new gateway. The figure below shows the information filled in for this Media Gateway. Note that the first remote IP address must be reachable from the EGW Primary IP address and the second remote IP address must be reachable from the EGW Secondary IP address. It is recommended to keep the default port set to 9900 as this is the default on the Media Gateway also.

The screenshot shows the 'EGW Administration' web interface in Microsoft Internet Explorer. The browser address bar shows 'http://egw-23:8080/egw/search.do'. The page title is 'EGW Administration' with a 'Logout: admin' link and a 'Help' link. The left navigation menu includes: EGW Home, Platform (Platform Status), Routes (Next Hop Routers, IP Routes), Gateway Interfaces (Media Gateways), Call Manager Interfaces (H323, CTI Managers, AXL Servers), Unity Interfaces (SIP, Unity/Proxy Servers), Dial and Route Plans (Standard Route Plans, Time of Day Route Plans, Dial Plans), and Diagnostics (Alarms, Call History, Collect Diagnostics). The main content area is titled 'Add New Gateway' and contains the following configuration fields:

- Name:** \* v2651a
- Description:** \* DPNSS GW - local
- Gateway Type:** \* C2600
- Protocol Variant:** \* DPNSS\_BTNR188

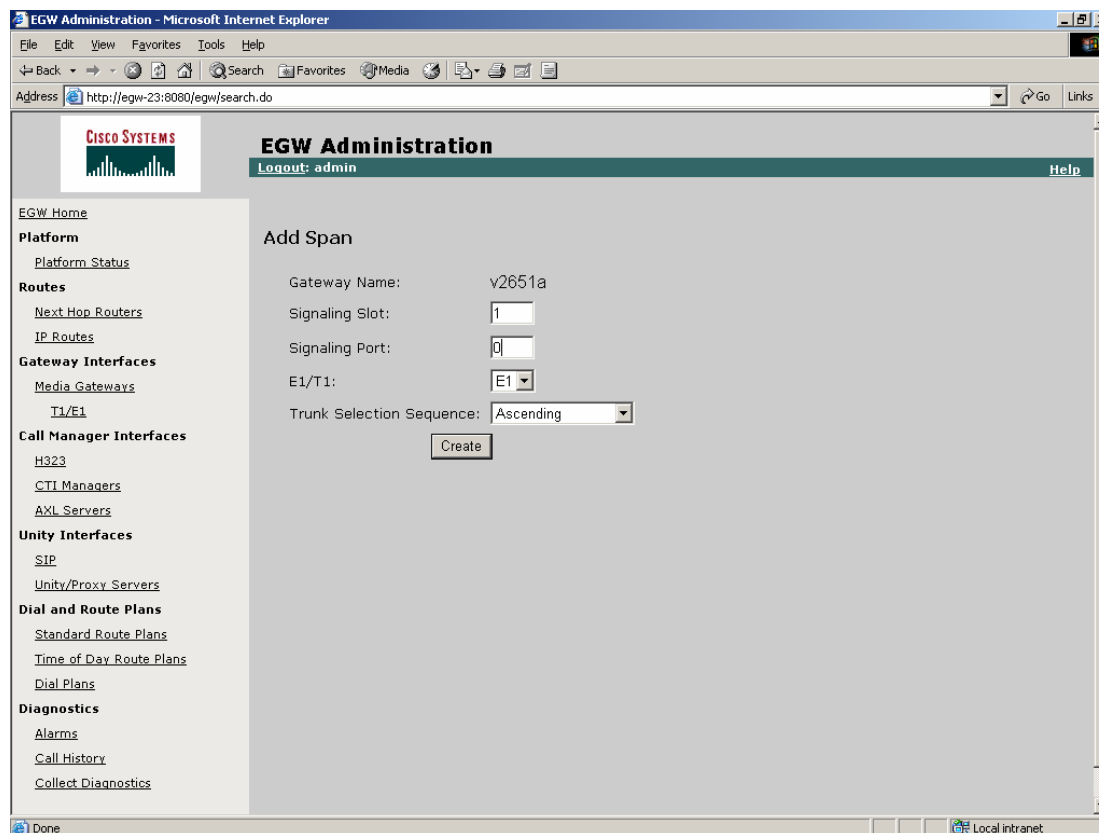
**Network Information**

- First IP Address:** \$ 10.82.80.50
- Second IP Address:** \$ 10.82.81.50
- Gateway Host Name(Inc. Domain if needed):** \* v2651a
- MGCP Port:** \* 2427
- Session Set/Association Port:** \* 9900

**DUA/SCTP Properties**

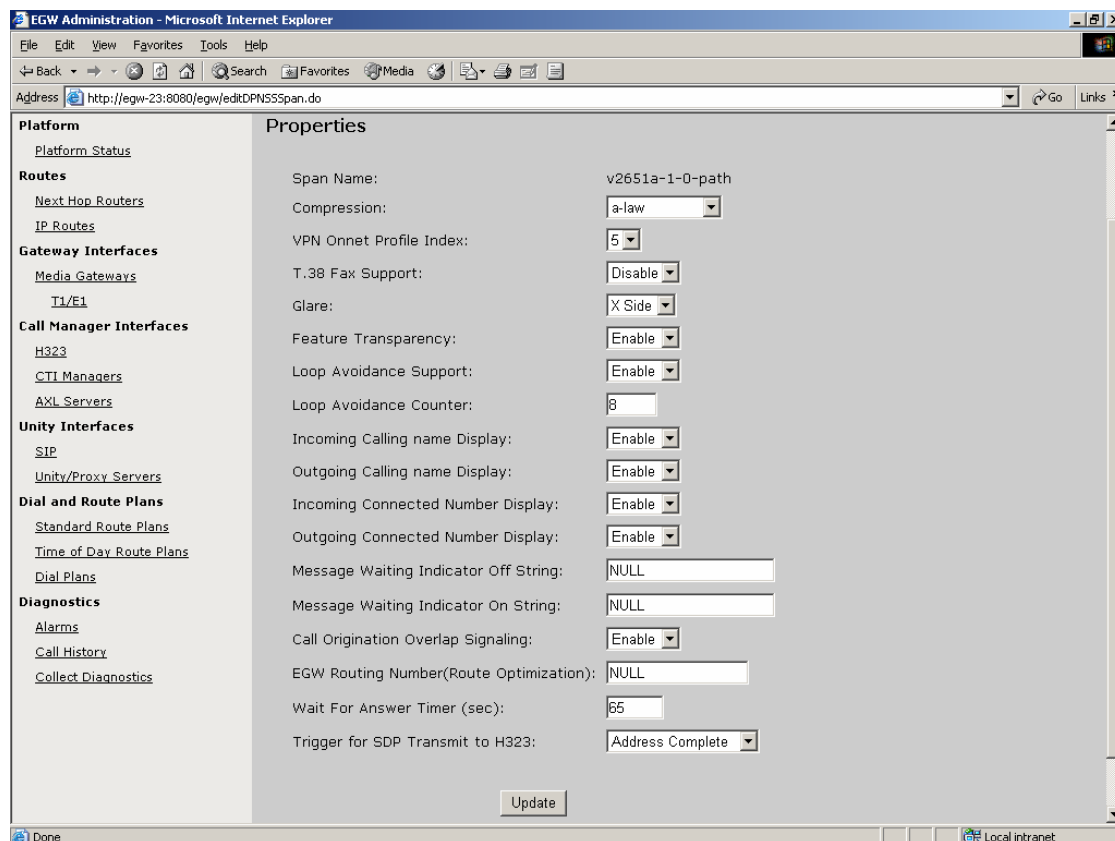
- Maximum Retransmission Timer:** \* 3000
- Heartbeat Timeout:** \* 2000
- Maximum Retransmissions to Peer Destination:** \* 3

Now, it is time to add the T1/E1 interface for this gateway. First, select the gateway. Then, select “T1/E1” in the navigation area. The configuration information indicates that the E1 is connected to controller 1/0 in the 2651 Media Gateway so the slot will be “1” and the port will be “0”. The Trunk Selection Sequence should be set to the opposite of the PBX in order to avoid glare. For instance, if the PBX is set for Descending, the EGW should be set for Ascending for this E1.



After configuring the E1 span, the E1span should be selected in order to tailor the DPNSS properties for this E1. Select “details.....” for this E1 span, then scroll to the bottom of the panel and select “Properties”. Figure x shows the DPNSS properties panel. There are a few properties that need to be considered at a minimum:

- Glare – This property defaults to “X side” on the EGW. It needs to be coordinated with the setting on the PBX. If the PBX is set to “X side”, the setting must be changed to “Y side” on the EGW.
- Message Waiting Indicator On and Off Strings – These strings must be configured if EGW is providing support for MWI on/off from Unity to the DPNSS PBX. These strings are PBX vendor specific.
- EGW Routing Number – This property must be set to a unique value in order for Route Optimization to work. The DPNSS PBX will have its own Routing Number. The DPNSS PBX Routing Number must be configured in the EGW Dial Plan with a route to the PBX.
- Call Origination Overlap Signaling – Overlap signaling is defaulted to ENABLED. This parameter setting needs to be consistent with the DPNSS PBX setting. If overlap dialing is not being used, this parameter should be set to DISABLED.
- T.38 Fax Support – If T.38 fax support is desired, this can be ENABLED for T.38 fax support for DPNSS-to-DPNSS and DPNSS-to-CallManager (CallManager 4.1 only) calls. Note: For DPNSS-to-CallManager, T.38 fax also needs to be enabled on the H.323 panel (see Section 4.8).



## 4.5 Remote DPNSS Media Gateway

When adding the remote Media Gateway, the Association Port will have to be changed from the default setting. In this example, it is incremented to 9901. The reason is that the default port 9900 was provisioned for multi-homing with both of the local IP addresses. Since, the SCTP association to this Media Gateway is singly-homed, a different port will have to be used. Note that this requires the local and remote ports to be set to 9901 when provisioning the IUA information on the Media Gateway.

In this example, we want to limit the bandwidth used across the WAN by setting a Call Limit against the Media Gateway and by forcing all calls to the gateway to use the G.729 codec. The Call Limit label is applied when creating the gateway as shown in the figure below.

**EGW Administration - Microsoft Internet Explorer**

File Edit View Favorites Tools Help

Address <http://egw-23:8080/egw/search.do>

**Routes**

- Next Hop Routers
- IP Routes

**Gateway Interfaces**

- Media Gateways

**Call Manager Interfaces**

- H323
- CTI Managers
- AXL Servers

**Unity Interfaces**

- SIP
- Unity/Proxy Servers

**Dial and Route Plans**

- Standard Route Plans
- Time of Day Route Plans
- Dial Plans

**Diagnostics**

- Alarms
- Call History
- Collect Diagnostics

**\* = Required Fields**

**\$ = See online help for details**

Name: \*

Description: \*

Gateway Type: \*

Protocol Variant: \*

**Network Information**

First IP Address: \$

Second IP Address: \$

Gateway Host Name(Inc. Domain if needed): \*

MGCP Port: \*

Session Set/Association Port: \*

**DUA/SCTP Properties**

Maximum Retransmission Timer: \*

Heartbeat Timeout: \*

Maximum Retransmissions to Peer Destination: \*

Maximum Retransmissions to all Destinations: \*

**Call Limiting**

Limit(number of calls)

Done Local intranet

After the gateway has been added, the MGCP properties can be selected to set the codec preference. To get to the properties panel, select the gateway. Then, scroll to the bottom of the panel and select “Properties”. The properties panel provides a means to provision MGCP properties. To change the code preference, change the “Gateway Default Codec” value to G.729. Further, make certain that the packetization is set the same on the EGW H.323 panel, the Media Gateway and CallManager for the G.729 codec.

The screenshot shows the EGW Administration web interface in Microsoft Internet Explorer. The address bar displays `http://egw-23:8080/egw/editGateway.do`. The page title is "EGW Administration" with a "Logout: admin" link and a "Help" link. The left sidebar contains a navigation menu with categories: EGW Home, Platform, Routes, Gateway Interfaces (Media Gateways, T1/E1), Call Manager Interfaces (H323, CTI Managers, AXL Servers), Unity Interfaces (SIP, Unity/Proxy Servers), Dial and Route Plans (Standard Route Plans, Time of Day Route Plans, Dial Plans), and Diagnostics (Alarms, Call History, Collect Diagnostics). The main content area is titled "Properties" and shows the following configuration for gateway v2651b:

- Gateway Name: v2651b
- Audit On State Change to IS:  Enable
- Gateway Default Codec: G.729
- Gateway Protocol Version: MGCP 1.0
- Initialize Endpoint:  Enable
- MGCP Retransmit Count: 3
- MGCP Retransmit Timer: 2000

An "Update" button is located at the bottom of the configuration area.

Next, the T1/E1 span must be added for the gateway. In this example, the E1 is connected to controller 1/1 so the signaling slot is "1" and the signaling port is "1".

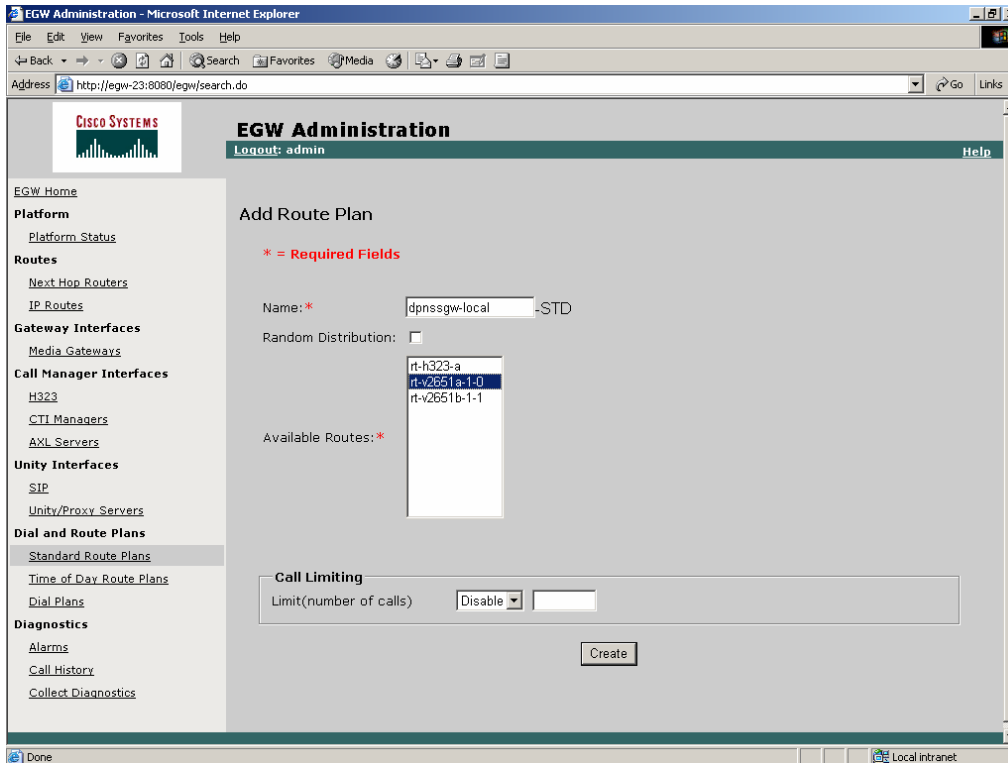
The screenshot shows the EGW Administration web interface in Microsoft Internet Explorer. The address bar displays `http://egw-23:8080/egw/search.do`. The page title is "EGW Administration" with a "Logout: admin" link and a "Help" link. The left sidebar is identical to the previous screenshot. The main content area is titled "Add Span" and shows the following configuration for gateway v2651b:

- Gateway Name: v2651b
- Signaling Slot: 1
- Signaling Port: 1
- E1/T1: E1
- Trunk Selection Sequence: Ascending

A "Create" button is located at the bottom of the configuration area.

## 4.6 Route Plans

Route Plans must be added for the local Media Gateway E1 span, the remote Media Gateway E1 span and the H.323 interface to CallManager as shown in the three figures below respectively. Note that a Call Limit label can be applied to the Route Plan. This would be another way calls could be limited to the remote Media Gateway (versus placing the Call Limit label on the Media Gateway itself).



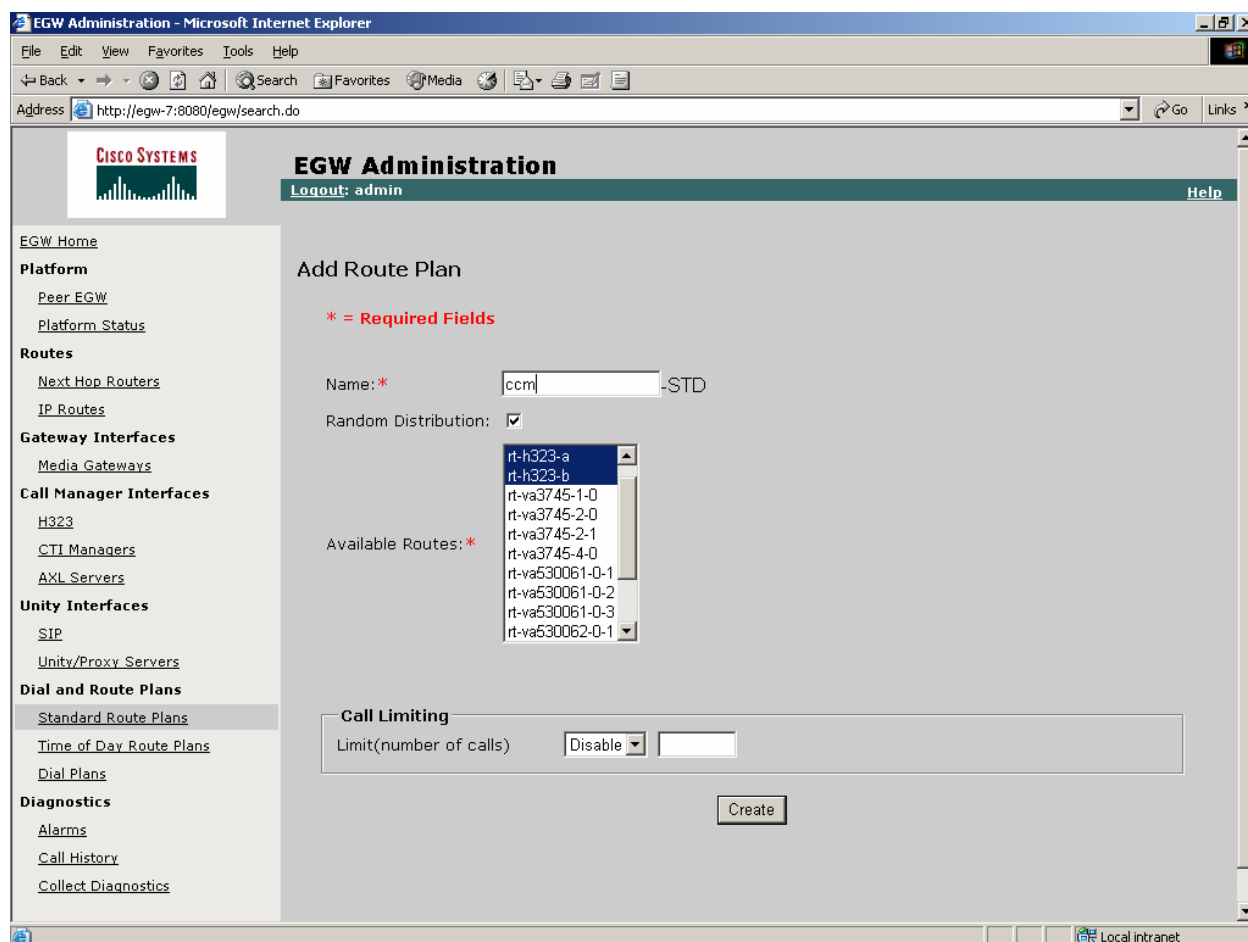
The screenshot shows the Cisco EGW Administration web interface in Microsoft Internet Explorer. The browser's address bar displays `http://egw-23:8080/egw/addRoutePlan.do`. The page title is "EGW Administration" with a "Logout: admin" link and a "Help" link. A left-hand navigation menu lists various sections: EGW Home, Platform, Routes, Gateway Interfaces, Call Manager Interfaces, Unity Interfaces, Dial and Route Plans, and Diagnostics. The "Dial and Route Plans" section is currently selected, showing "Standard Route Plans" as the active sub-section.

The main content area is titled "Add Route Plan" and displays a success message: "Route plan created successfully". Below this, a red asterisk indicates required fields. The form includes the following elements:

- Name:** A text input field containing "dpnssgw-remote" followed by "-STD".
- Random Distribution:** An unchecked checkbox.
- Available Routes:** A dropdown menu with three options: "rt-h323-a", "rt-v2651a-1-0", and "rt-v2651b-1-1".
- Call Limiting:** A section with a "Limit(number of calls)" label, a dropdown menu set to "Disable", and an empty text input field.
- Create:** A button at the bottom right of the form.

The browser's status bar at the bottom shows "Done" and "Local intranet".

Two H.323 routes need to be selected to be in a single Route Plan. Further, the “Random Distribution” option should be selected in order to support load-sharing.



## 4.7 Dial Plan

The EGW 2200 supports the creation of multiple dial plans. A dial plan can be applied per Media Gateway, H.323 (Cisco CallManager) and SIP (Cisco Unity) interfaces. The dial plan is analyzed on call origination to determine if any digit manipulation must be done and to make a routing decision. The dial plan can also be used to make codec selections.

Since this is a simple configuration, only a single dial plan is required. For this Enterprise, a 4-digit dialing plan is used. All 41xx numbers go to the remote site DPNSS PBX. All 51xx numbers go to Cisco CallManager and all 52xx numbers go to the local site DPNSS PBX. Therefore, the dial plan needs three entries for Called Numbers. A match on the first two dialed digits is sufficient to determine the final routing choice. Finally, the Routing Number for the DPNSS PBX needs to be configured if the Route Optimization feature is desired.

If the Voice Mail system for the IP phones had been in the DPNSS network, the Cisco CallManager MWI On / Off Numbers would have to be provisioned. Refer to the following documentation for more information:

[http://www.cisco.com/en/US/products/sw/voicesw/ps556/products\\_administration\\_guide\\_chapter09186a00802deacb.html](http://www.cisco.com/en/US/products/sw/voicesw/ps556/products_administration_guide_chapter09186a00802deacb.html)

However, in this case, the Voice Mail is provided by Cisco Unity so these fields are left empty.

**\* = Required Fields**

Name: \*

**CCM MWI**

CCM MWI On Number:

CCM MWI Off Number:

**Calling Numbers**

Digit String	Digits to Remove	Prefix Digit String
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

[Add more numbers](#)

**Called Numbers**

Digit String	Route Plan	Show All Details
<input type="text" value="41"/>	<input type="text" value="dpnssgw-remote-st"/>	<a href="#">Show Details</a>
<input type="text" value="51"/>	<input type="text" value="ccm-std"/>	<a href="#">Show Details</a>
<input type="text" value="52"/>	<input type="text" value="dpnssgw-local-std"/>	<a href="#">Show Details</a>

## 4.8 H.323 Information

Next, the EGW 2200 needs to be configured to communicate with the Gatekeeper. The Gatekeeper name and IP address must match the Gatekeeper configuration. Also, it is convenient to configure the Terminal Alias to be the fully-qualified domain name of the EGW host and the Node ID to be the domain name of the EGW host (in this example the EGW host is egw23@cisco.com).

Note that you may want to Enable the RAI option (default is DISABLED).

Fax and modem calls are supported by pass-through by default. If T.38 fax is desired for DPNSS-to-CallManager calls, this parameter can be ENABLED for interworking with CallManager 4.1 (T.38 is not supported on CallManager 4.0). If ENABLED, then the T.38 property on the T1/E1 span must also be ENABLED (see Section 4.4).

In addition, the same H.323 information must be provisioned on the Standby EGW host. The configuration panel should look the same except for the Terminal Alias and Node ID parameters. The Terminal Alias should be the fully-qualified domain name of the Standby EGW host and the Node ID should be the host name of the Standby EGW host.

EGW Administration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://egw-23:8080/egw/navigation.do?page=editH323

**CISCO SYSTEMS**

**EGW Administration**

Logout: admin Help

EGW Home

**Platform**

[Platform Status](#)

**Routes**

[Next Hop Routers](#)

[IP Routes](#)

**Gateway Interfaces**

[Media Gateways](#)

**Call Manager Interfaces**

[H323](#)

[CTI Managers](#)

[AXL Servers](#)

**Unity Interfaces**

[SIP](#)

[Unity/Proxy Servers](#)

**Dial and Route Plans**

[Standard Route Plans](#)

[Time of Day Route Plans](#)

[Dial Plans](#)

**Diagnostics**

[Alarms](#)

[Call History](#)

[Collect Diagnostics](#)

**H323**

\* = Required Fields

H323 Mode: Gatekeeper Mode

**Gatekeeper Mode Details**

Gatekeeper Name: \* gk1

Gatekeeper IP Address: \* 10.82.80.40

Gatekeeper Port: \* 1719

Terminal Alias: \* egw23@cisco.com

Node ID: \* EGW23

**H323 Interface**

RAI Support: Enable

Notify Enabled: Disable

Screening/Presentation: Disable

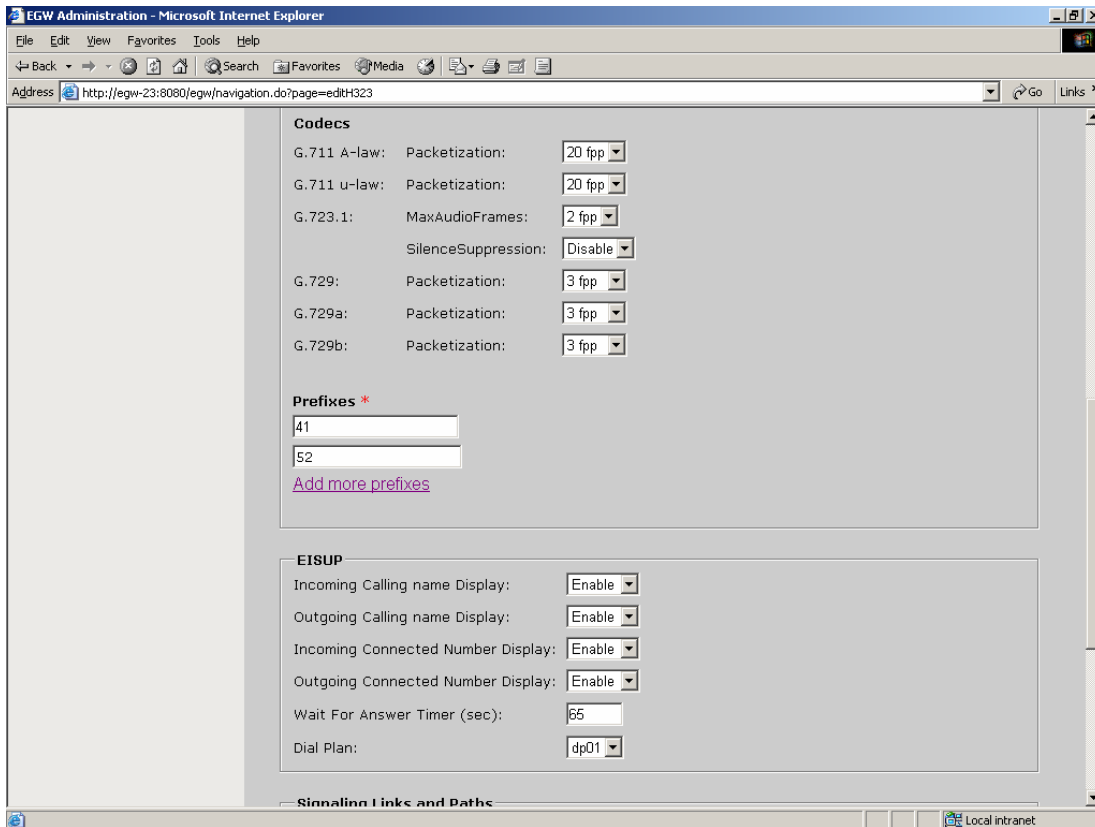
T.38 Fax Support: Disable

Redirecting Number: Disable

DTMF Support Direction: TX

Done Local intranet

In addition, the digit prefixes (for the TDM extensions) and the Dial Plan must be added lower in the panel as shown in the figure below which shows the bottom half of the H.323 panel.



## 4.9 Add CTI Manager

The EGW comes pre-provisioned with one CTI Manager “link”. If there is no need to support inter-working of the Callback or Extension Status supplementary services, the CTI Manager information does not need to be updated.

Select IP address of one Cisco CallManager host. Then select the correct version: Version 5.0 is for Cisco CallManager 4.0.x and Version 6.0 is for Cisco CallManager 4.1. Finally, make sure the signaling status is set to “In Service”

EGW Administration - Microsoft Internet Explorer

Address: http://egw-23:8080/egw/search.do

EGW Home

Platform

Platform Status

Routes

Next Hop Routers

IP Routes

Gateway Interfaces

Media Gateways

Call Manager Interfaces

H323

CTI Managers

AXL Servers

Unity Interfaces

SIP

Unity/Proxy Servers

Dial and Route Plans

Standard Route Plans

Time of Day Route Plans

Dial Plans

Diagnostics

Alarms

Call History

Collect Diagnostics

### Update CTI Manager

\* = Required Fields  
\$ = See online help for details

CTI Manager: ctimgr1

Description: \*

CTI Manager Version: \*

Signalling Status:

Call Trace[30 minutes]: \$

**Network Information**

CTI Manager IP Address: \*

Port: 2748

**Properties**

CallBack Timeout when Next Used (min):

CallBack Timeout when Next Free (min):

Maximum Callbacks queued:

Next, it is highly recommended that another CTI Manager be added to another Cisco CallManager host for redundancy. The information will be the same except for the CTI Manager IP address (in this example, the Cisco CallManager IP address would be for the Subscriber: 10.82.80.11).

Note: Only one CTI Manager link is used at a time (no load-sharing). If the CTI Manager link fails, there is a ~90 second lag before the second CTI Manager link comes In-Service.

## 4.10 Add AXL Server Information

The EGW comes pre-provisioned with one AXL Server. If there is no need to support inter-working of the Callback or Extension Status supplementary services, the AXL Server information does not need to be updated. The AXL username and password are the Windows username and password of the Cisco CallManager host.

Next, it is highly recommended that another AXL Server be added to another Cisco CallManager host for redundancy. The information will be the same except for the AXL Server IP address (in this example, the Cisco CallManager IP address would be for the Subscriber: 10.82.80.11).

**EGW Administration**  
Logout: admin Help

**Update AXL Server**

\* = Required Fields  
\$ = See online help for details

AXL Server Name: axlsvr1  
Description: \* axlsvr1  
Signalling Status (axlsvr1): In Service  
Call Trace[30 minutes]: \$ OFF

**Network Information**

AXL Server IP Address: \* 10.82.80.10  
Port: 80  
AXL Server Username: \* administrator  
AXL Server Password: \* \*\*\*\*\*  
Re-type Password: \* \*\*\*\*\*

Update

## 4.11 Add Unity Interface

The SIP interface is used to communicate with Cisco Unity. The EGW DNS name and Dial Plan information have to be added to the SIP interface panel as shown in the figure below.

**EGW Administration**  
Logout: admin Help

**SIP**

\* = Required Fields

Dial Plan:

Enable Virtual IP Address: false

**Links**

Transport Link 1 (sip-link1):

Transport Link 2 (sip-link2):

Call Trace[30 minutes]:

**Properties**

MGCdomain:

**Call Limiting**

Limit(number of calls)

Next add information for Cisco Unity or Cisco SIP Proxy Server (CSPS). Note that this configuration does not have a CSPS so this panel would contain the DNS name or IP address of Cisco Unity. *Note: Use of the DNS name is required for Unity failover support.*

**EGW Administration**  
Logout: admin Help

**Add New Unity/Proxy Server**

\* = Required Fields

Server Name: \*

DNS Name or IP Address: \*

SIP Port Number: \*

SIP Version:

## 4.12 Apply Dial Plan to Media Gateways

Finally, the Dial Plan has to be applied to the Media Gateways. It could not be applied to the Media Gateways when they were created because the T1/E1 spans did not exist to create the Route Plans which are used in the Dial Plan.

The screenshot shows the 'Update Gateway Configuration' page in the EGW Administration web interface. The browser window title is 'EGW Administration - Microsoft Internet Explorer'. The address bar shows 'http://egw-23:8080/egw/search.do'. The page is logged in as 'admin'. The left-hand navigation menu includes sections like Platform, Routes, Gateway Interfaces (with Media Gateways selected), Call Manager Interfaces, Unity Interfaces, and Dial and Route Plans. The main configuration area is titled 'Update Gateway Configuration' and contains the following fields:

- Name: v2651a
- Description: \* dpnss gw
- Gateway Type: C2600
- Protocol Variant: DPNSS\_BTNR188
- Dial Plan: dp01

The 'Network Information' section includes:

- First IP Address: \$ 10.82.80.105
- Second IP Address: \$ 10.82.81.105
- Gateway Host Name(Inc. Domain if needed): v2651a
- MGCP Port: 2427
- Session Set/Association Port: 9900

The 'Links' section includes 'MGCP Status' with two dropdown menus:

- Transport Link 1(v2651a-mgcp-ip1): In Service
- Transport Link 2(v2651a-mgcp-ip2): In Service

## 4.13 Checking EGW Status

After all of the components have been provisioned, it is time to bring the EGW into service. Below is a list of items to check:

1. Check the Media Gateway Links are "In Service". The Link status includes the MGCP and Backhaul Status.
2. Check the status of the E1 spans on the Media Gateways. If the MGCP link(s) are "In Service", the Trunk Status should be "CNX\_IS" for all 31 trunks. The Signaling Path State should be "In Service". The Signaling Path State is equivalent to the Layer 2 status of the DPNSS link. If the Signaling Path State remains "Out of Service" after commanding it "In Service", you should review the configuration on the Media Gateway. You can also do the following ....
3. Check to see if the CallManager and EGW have registered their prefixes with the Gatekeeper.
4. If the CTI and AXL components were configured, verify that they are "In Service".
5. Finally, verify that the SIP links are "In Service".

Once all the links are "In Service", a test call can be placed between the DPNSS PBX and Cisco CallManager.

## 5 CLUSTERING OVER THE WAN PROVISIONING EXAMPLE

This section expands on the basic provisioning example in the previous section by providing some additional guidelines for provisioning the EGW for the Clustering over the WAN deployment model. It focuses in on provisioning examples for

### 5.1 EGW Host Active Preference (Initialization Time)

Both EGW hosts of the duplex pair will be installed from the base software then upgraded to the latest patch. At this point, they will both be “Active”. Then, the Nexthop IP address of the local and peer will be configured on one of the EGW hosts. This host will reboot automatically. The next step is to set the fault tolerance on that EGW host (after it has rebooted) by setting the peer IP address information. This EGW host will again reboot and will come back up in the “Active” platform state. The peer EGW host will then reboot and will come back up in the “Standby” platform state.

### 5.2 EGW Behavior If WAN Fails

If the WAN fails, the two EGW hosts will no longer be able to communicate. Thus, the Active EGW will no longer be able to “talk” to the HSI on the Standby EGW. The established calls homed to that HSI should remain up. The EGW host that became Active last will remain Active. The other EGW host will transition to Standby and all of its in-progress and established calls will be dropped.

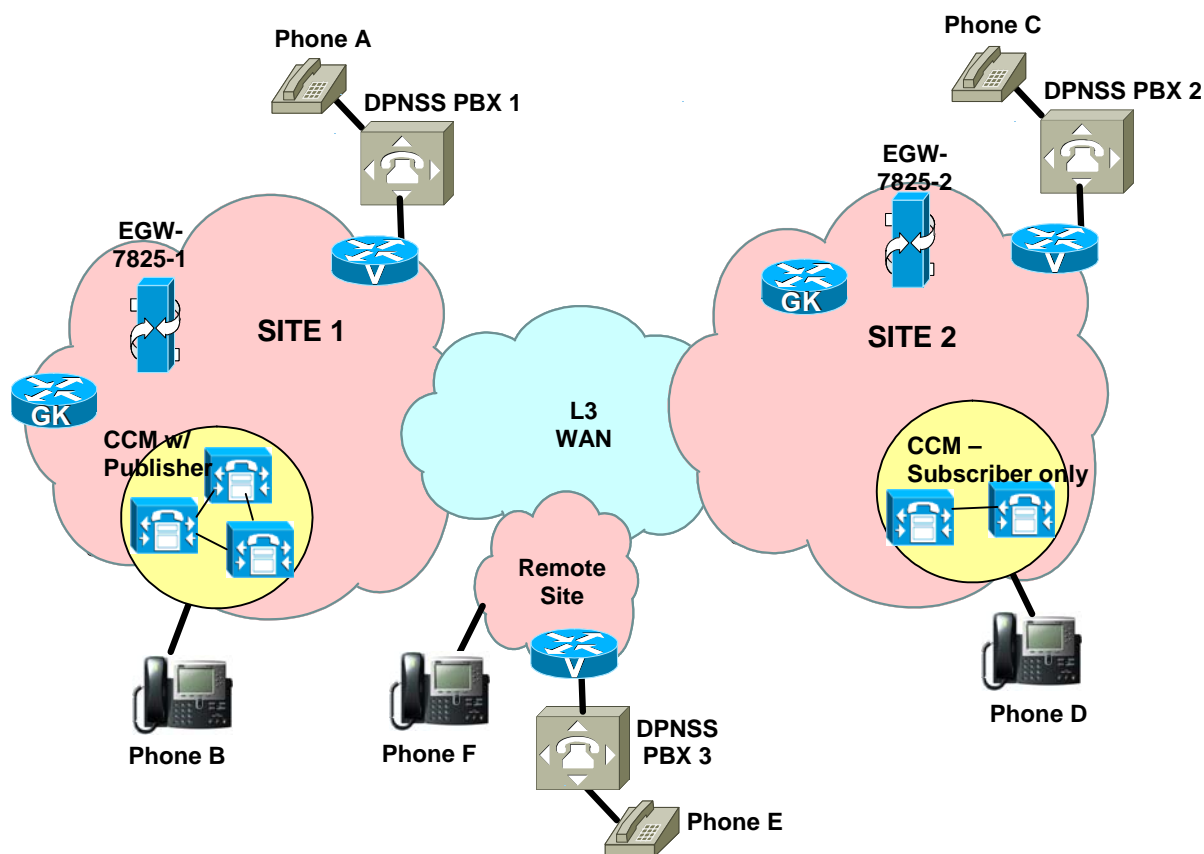
### 5.3 EGW Behavior When WAN Recovers

When the WAN recovers, the EGW host that became Active last will remain Active. The other EGW host will transition to Standby and all of its in-progress and established calls will be dropped.

If the operator does not want that behavior, they can shutdown the EGW that last became Active before the WAN recovers.

### 5.4 Call Limiting and Codec Selection

Some customers will have sufficient bandwidth in the WAN between their sites so Call Admission Control (CAC) / Call Limiting and low bandwidth codecs (i.e. G.729) are not a factor. Other customers may not be concerned about CAC, but would like to keep bandwidth use to a minimum (i.e. use G.729 for all calls across the WAN). And, of course, some customers will want to make use of CAC and low bandwidth codecs in the WAN. The following diagram provides an example deployment scenario that is useful for discussing the implications of CAC and codec selection for Clustering over the WAN.



In this topology, there are three sites: two main sites and one remote site. Each site has a PBX connected to the EGW via a MGCP-controlled GW. The EGW pair is split between the two main sites.

For this example, it is required to use the G.729 codec for calls across the WAN in order to conserve bandwidth. Further, it is required to use Call Admission Control (CAC) to ensure the number of calls across the WAN does not exceed defined thresholds. Within each site there are no bandwidth restrictions and G.711 codec is used for each call and does not contribute to any bandwidth calculation.

First, the customer will have to decide how many active calls can exist in the WAN. Then, they have to determine what percentage will be of the following types:

PBX1 <-> PBX2  
 PBX1 <-> PBX3  
 PBX1 <-> CallManager Phones Site 2  
 PBX1 <-> CallManager Phones Remote Site  
 CallManager Phones Site 1 <-> CallManager Phones Site 2  
 CallManager Phones Site 1 <-> CallManager Phones Site 3  
 CallManager Phones Site 2 <-> CallManager Phones Site 3

For this example, we'll assume 100 total active calls with the following percentages of calls across the WAN:

PBX1 <-> PBX2	10%
PBX1 <-> PBX3	4%
PBX1 <-> CallManager Phones Site 2	14%
PBX1 <-> CallManager Phones Remote Site	4%
PBX2 <-> CallManager Phones Site 2	14%

PBX2 <-> PBX3	4%
PBX2 <-> CallManager Phones Remote Site	4%
PBX3 <-> CallManager Phones Site 1	4%
PBX3 <-> CallManager Phones Site 2	4%
CallManager Phones Site 1 <-> CallManager Phones Site 2	30%
CallManager Phones Site 1 <-> CallManager Phones Site 3	4%
CallManager Phones Site 2 <-> CallManager Phones Site 3	4%
	----
Total	100%

For calls originated from the PBXs, the EGW will be responsible for the codec selection and CAC determination. These decisions need to be based on the destination (Route). For calls across the WAN, the EGW needs to force use of the G.729 codec and count the call against the Call Limiting threshold. For calls within a site, there is no need for bandwidth restrictions, therefore; a G.711 codec would be selected. For calls originated from Cisco CallManager, Cisco CallManager will be responsible for CAC.

The table below provides a list of call types and the codec and CAC decisions required.

Call type	Codec Selection	CAC
Call from phone A to B	G.711	Not Required
Call from phone A to C	G.729	EGW Applies Call Limit
Call from phone A to D	G.729	EGW Applies Call Limit
Call from phone A to E	G.729	EGW Applies Call Limit
Call from phone A to F	G.729	EGW Applies Call Limit
Call from phone B to A	G.711	Not Required
Call from phone B to C	G.729	Cisco CallManager Applies Call Limit
Call from phone B to D	G.729	Cisco CallManager Applies Call Limit
Call from phone B to E	G.729	Cisco CallManager Applies Call Limit
Call from phone B to F	G.729	Cisco CallManager Applies Call Limit
Call from phone C to A	G.729	EGW Applies Call Limit
Call from phone C to B	G.729	EGW Applies Call Limit
Call from phone C to D	G.711	Not Required
Call from phone C to E	G.729	EGW Applies Call Limit

Call from phone C to F	G.729	EGW Applies Call Limit
Call from phone D to A	G.729	Cisco CallManager Applies Call Limit
Call from phone D to B	G.729	Cisco CallManager Applies Call Limit
Call from phone D to C	G.711	Not Required
Call from phone D to E	G.729	Cisco CallManager Applies Call Limit
Call from phone D to F	G.729	Cisco CallManager Applies Call Limit
Call from phone E to A	G.729	EGW Applies Call Limit
Call from phone E to B	G.729	EGW Applies Call Limit
Call from phone E to C	G.729	EGW Applies Call Limit
Call from phone E to D	G.729	EGW Applies Call Limit
Call from phone E to F	G.711	Not Required
Call from phone F to A	G.729	Cisco CallManager Applies Call Limit
Call from phone F to B	G.729	Cisco CallManager Applies Call Limit
Call from phone F to C	G.729	Cisco CallManager Applies Call Limit
Call from phone F to D	G.729	Cisco CallManager Applies Call Limit
Call from phone F to E	G.711	Not Required

Here is an example. Calls between sites will be required to use the G.729 codec. Further, there will be limits on the number of calls between sites to avoid using too much bandwidth. Cisco CallManager will use its CAC mechanism for calls originating from CallManager. The EGW will use its CAC mechanism (Call Limiting) for calls originating from PBXs connected to its MGCP-controlled gateways.

For this example, let's say that the following extensions are configured:

<b>SITE 1</b>	
PBX	43xx

Cisco CallManager	44xx 45xx
----------------------	--------------

<b>SITE 2</b>	
PBX	53xx
Cisco CallManager	54xx
<b>SITE 3</b>	
PBX	63xx
Cisco CallManager	64xx

On the EGW, there will be a Dial Plan per Media Gateway. This enables the ability to control codec and call limits. For call limits, it is necessary to create multiple Route Plans per Route in order to apply call limit labels on a Route basis.

Origination	Termination	Route Plan Name	Route Plan Includes	Max Number of Calls
PBX – Site 1	CallManager – Site 1	pbx1-ccm1-std	H.323 route	No Limit
PBX – Site 1	PBX – Site 2	pbx1-pbx2-std	All Routes (E1s) defined for PBX 2	5
PBX – Site 1	CallManager – Site 2	pbx1-ccm2-std	H.323 route	7
PBX – Site 1	PBX – Site 3	pbx1-pbx3-std	All Routes (E1s) defined for PBX 3	2
PBX – Site 1	CallManager – Site 3	pbx1-ccm3-std	H.323 route	2
PBX – Site 2	CallManager – Site 2	pbx2-ccm2-std	H.323 route	No Limit
PBX – Site 2	PBX – Site 1	pbx2-pbx1-std	All Routes (E1s) defined for PBX 1	5

PBX – Site 2	CallManager – Site 1	pbx2-ccm1-std	H.323 route	7
PBX – Site 2	PBX – Site 3	pbx2-pbx3-std	All Routes (E1s) defined for PBX 3	2
PBX – Site 2	CallManager – Site 3	pbx2-ccm3-std	H.323 route	2
PBX – Site 3	PBX – Site 1	pbx3-pbx1-std	All Routes (E1s) defined for PBX 1	2
PBX – Site 3	CallManager – Site 1	pbx3-ccm1-std	H.323 route	2
PBX – Site 3	CallManager – Site 2	pbx3-ccm2-std	H.323 route	2
PBX – Site 3	PBX – Site 2	pbx2-pbx3-std	All Routes (E1s) defined for PBX 2	2

Based on these codec and Call Limit information, the Called Numbers in the Dial Plan for PBX1 are shown in the following table. Further, Figure x provides an example of how they would be provisioning on the EGW GUI Dial Plan panel.

Called Number	Codec	Route Plan
44xx	N/A	pbx1-ccm1-std
45xx		
53xx	G.729	pbx1-pbx2-std
54xx	G.729	pbx1-ccm2-std
63xx	G.729	pbx1-pbx2-std
64xx	G.729	pbx1-ccm2-std

The screenshot shows a web browser window titled "EGW Administration - Microsoft Internet Explorer". The address bar contains "http://egw-23:8080/egw/search.do". The main content area is titled "Called Numbers" and contains a table with three rows of configuration data. Each row includes a "Digit String" field, a "Route Plan" dropdown menu, and a set of configuration options: "Digits to Remove", "Prefix Digit String", "CCM MWI" checkbox, "Min Digits", "Max Digits", and "Codec" dropdown menu. The first row has Digit String "44", Route Plan "pbx1-ccm1-std", and Codec "Auto". The second row has Digit String "45", Route Plan "pbx1-ccm1-std", and Codec "Auto". The third row has Digit String "53", Route Plan "pbx1-pbx2-std", and Codec "G.729". There are "Show All Details" and "Hide Details" links for each row. The browser's status bar at the bottom shows "Done" and "Local intranet".

Digit String	Route Plan	Digits to Remove	Prefix Digit String	CCM MWI	Min Digits	Max Digits	Codec
44	pbx1-ccm1-std			<input type="checkbox"/>	1	20	Auto
45	pbx1-ccm1-std			<input type="checkbox"/>	1	20	Auto
53	pbx1-pbx2-std			<input type="checkbox"/>	1	20	G.729

The screenshot shows a web browser window titled "EGW Administration - Microsoft Internet Explorer". The address bar contains "http://egw-23:8080/egw/search.do". The main content area is titled "Called Numbers" and contains a table with three rows of configuration data. Each row includes a "Digit String" field, a "Route Plan" dropdown menu, and a set of configuration options: "Digits to Remove", "Prefix Digit String", "CCM MWI" checkbox, "Min Digits", "Max Digits", and "Codec" dropdown menu. The first row has Digit String "54" and Route Plan "pbx1-ccm2-std". The second row has Digit String "63" and Route Plan "pbx1-pbx3-std". The third row has Digit String "64" and Route Plan "pbx1-ccm3-std". There are "Show All Details" and "Hide Details" links for each row. The browser status bar at the bottom shows "Error on page." and "Local intranet".

Digit String	Route Plan	Details
54	pbx1-ccm2-std	<a href="#">Show All Details</a> <a href="#">Hide Details</a>
63	pbx1-pbx3-std	<a href="#">Hide Details</a>
64	pbx1-ccm3-std	<a href="#">Hide Details</a>

## 6 EGW 2200 FEATURE LIMITATIONS

The EGW 2200 provides a list of DPNSS and QSIG features supported by the EGW 2200 for the supported applications. In addition, the limitations are listed. Please refer to the following document for DPNSS feature caveats:

[http://www.cisco.com/univercd/cc/td/doc/product/access/sc/nirvdoc/plannirv/ac\\_dpfr.htm](http://www.cisco.com/univercd/cc/td/doc/product/access/sc/nirvdoc/plannirv/ac_dpfr.htm)

Please refer to the following document for QSIG feature caveats:

[http://www.cisco.com/univercd/cc/td/doc/product/access/sc/nirvdoc/plannirv/ac\\_qsig.htm](http://www.cisco.com/univercd/cc/td/doc/product/access/sc/nirvdoc/plannirv/ac_qsig.htm)

## 7 EGW 2200 CAPACITY

Refer to the EGW 2200 Interactive Design tool that is available on the Cisco internal EGW 2200 product web page. This tool will be available externally soon.

## 8 QOS

The Network Infrastructure chapter of the IPT SRND for Cisco CallManager recommends the use of DSCP CS3 for voice control signaling. As of the EGW 1.1.2 (7) release, the EGW 2200 defaults all signaling traffic to be marked with this DSCP value. In the future, the EGW 2200 will be enhanced so that the DSCP value can be provisioned for voice control signaling traffic.

## 9 SECURITY

For the EGW 2200, please follow recommendations in the IPT SRND for Cisco CallManager. There are no new requirements for best practices specific to the EGW 2200. Security is provided through appliance-like nature. All unused services such as telnet are disabled. Only sftp and ssh client services are available (no sftp or ssh daemon running). The console provides limited shell with a command line interface for Platform.

In addition, the EGW 2200 supports the iptables firewall software. The configuration is set up during installation and cannot be provisioned at this time.