



Cisco Analog Gateways Network Survivability Deployment Options

(VG3XX, VG224, VG204XM and VG202XM)

Written By:
Bob Sayle
Tony Banuelos
Chinmayee Rathi

Table of Contents

Introduction	3
Routed Survivability.....	4
Configuration.....	4
Routed Survivability Option 1 - MGCP GW	5
Routed Survivability Option 2 - SCCP GW	21
Show Commands	37
Test Procedure	39
Debugging Tips	41
Running Configuration.....	42
Bridged Survivability	47
Configuration.....	47
Show Commands	63
Test Procedure	65
Debugging Tips	66
Running Configuration.....	67

Introduction

The Cisco VG series Analog Voice Gateways enable an IP telephony solution to continue using traditional analog devices while taking advantage of the productivity afforded by IP infrastructure. The Cisco VG series are Cisco IOS software-based analog phone gateways. They connect analog phones, fax machines, modems, and speakerphones to an enterprise voice system based on Cisco Unified Communications Manager (CUCM). The tight integration with the IP-based phone system is advantageous for increased manageability, scalability, and cost-effectiveness. Businesses can also use the Cisco VG series with Cisco Unified Communications Manager Express (CME) or Cisco Unified Communications Manager to effectively augment an integrated services router (ISR) environment.

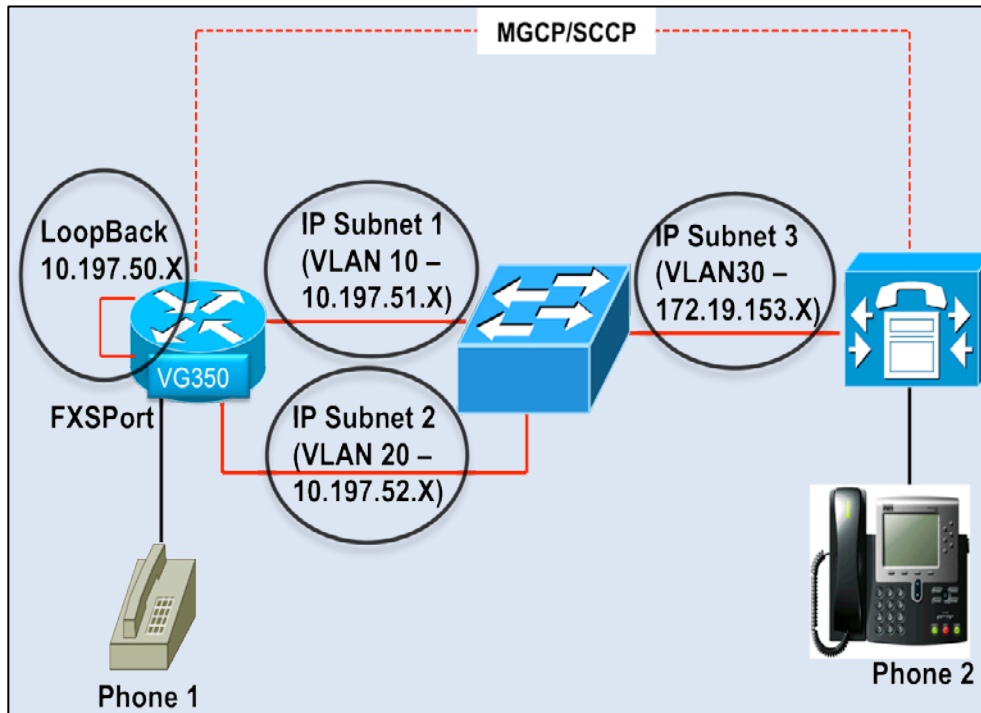
In this application note we are going to talk about the network survivability options that can be provided when you deploy a VG series in your network. There are two redundancy options available for VG deployments:

- Routed survivability, where the VG could use either MGCP or SCCP signaling to CUCM and leverages L3 equal cost multi-pathing (ECMP) for fast link failover.
- Bridged survivability, where the VG uses SCCP signaling to CUCM and relies on spanning tree for link failover.

By providing redundancy, there is always at least one active link to the call control agent, which could be a CUCM or CME, to preserve active calls in case of link failure.

Routed Survivability

Routed survivability uses the VGs capability to be controlled as an MGCP or SCCP gateway and use L3 ECMP for fast link failover. The VG registers itself to the CUCM as an MGCP or SCCP gateway and uses its physical connections to create redundant paths. The VG's loopback interface is used to register to the CUCM. Because the loopback interface is virtual, it always stays active. In case a physical link fails, the VG remains registered to the CUCM and preserves active calls by switching them to a redundant port.



Configuration

Overview

1. Create three IP subnets on the switch.
 2. Connect the gigabit interfaces on the VG to subnets 1 and 2.
 3. Connect CUCM to subnet 3.
 4. Create a loopback interface on the VG. This is the interface used by the VG to register itself as an MGCP or SCCP gateway to the CUCM.
 5. Enable MGCP or SCCP on the VG.
 6. Enable EIGRP on the switch and the VG.
- After the topology converges there will be redundant paths to the CUCM. Now if a port on the VG loses connectivity, active calls switch to the other link and are preserved.

Routed Survivability Option 1 – MGCP GW

On the VG350:

Step 1 – Configure IP addresses for the physical Ethernet interfaces.

```
VG350(config)#interface GigabitEthernet0/1
VG350(config-if)#ip address 10.197.51.2 255.255.255.0
VG350(config-if)#no shut
VG350(config-if)#exit
VG350(config)#interface GigabitEthernet0/2
VG350(config-if)#ip address 10.197.52.2 255.255.255.0
VG350(config-if)#no shut
```

Step 2 – Configure a loopback interface.

```
VG350(config)#
VG350(config)#interface Loopback0
VG350(config-if)#ip address 10.197.50.2 255.255.255.0
VG350(config-if)#no shut
```

Step 3 – Enable EIGRP.¹

```
VG350(config)#router eigrp 20
VG350(config-router)#network 10.0.0.0
VG350(config-router)#eigrp stub connected summary
```

Step 4 – Create a hostname mapping for the CUCM.

```
VG350(config)#ip host CUCM90 172.19.153.139
```

¹ The VG needs to advertise the 10.X.X.X IP subnets that are connected to the switch so enable EIGRP for this network.

Step 5.1 – Enable MGCP.

```
VG350(config)#mgcp
VG350(config)#mgcp call-agent CUCM90 2427 service-type mgcp version 0.1
VG350(config)#mgcp bind control source-interface Loopback0
VG350(config)#mgcp bind media source-interface Loopback0
VG350(config)#ccm-manager mgcp
```

Explanation:

1. 'mgcp call-agent CUCM90 2427 service-type mgcp version 0.1'
 - Specifies the call agent's name or IP address. This example uses 'CUCM90' as the call agent name.
 - Specifies call agent address UDP port number. For MGCP the standard port number is 2427.
 - Specifies the 'service-type' as 'MGCP'.
 - Specifies the version as '0.1'.
2. 'mgcp bind control source-interface Loopback0'
 - Binds the control traffic to the loopback interface, which is why this interface is used to register to the CUCM.
3. 'mgcp bind media source-interface Loopback0'
 - Binds the media traffic to the loopback interface.
4. 'ccm-manager mgcp'
 - Enables Call Manager Application in MGCP mode.

Step 5.2 – Configure analog ports to use MGCP.

```
VG350(config)#dial-peer voice 1000 pots
VG350(config-dial-peer)#service MGCPAPP
VG350(config-dial-peer)#port 4/0/25
```

Explanation:

1. 'service MGCPAPP'
 - Enables MGCP application on the dial peer.
 - Configuration tip – 'MGCPAPP' is case sensitive.

Configuration Tip:

- Dial peer needs to be created for every port and this can be done with ease using the 'dial peer group' CLI enhancement.

```
VG350(config)#dial-peer group 1
VG350(config-dial-peer)#service MGCPAPP
VG350(config-dial-peer)#port 4/0/0 -71 1
```

On the switch:

Step 1 – Configure three IP subnets.

Step 1.1 – Add VLANs in the database.

```
Switch#vlan database
Switch(vlan)#vlan 10
VLAN 10 added:
  Name: VLAN0010
Switch(vlan)#vlan 20
VLAN 20 added:
  Name: VLAN0020
Switch(vlan)#vlan 30
VLAN 30 added:
  Name: VLAN0030
```

Step 1.2 – Create SVIs for the VLANs created previously.

```
Switch(config)#interface Vlan10
Switch(config-if)#ip address 10.197.51.1 255.255.255.0
Switch(config-if)#exit
Switch(config)#interface Vlan20
Switch(config-if)# ip address 10.197.52.1 255.255.255.0
Switch(config)#interface Vlan30
Switch(config-if)# ip address 172.19.153.1 255.255.255.0
```

Step 1.3 – Add switch ports to the VLANs.

```
Switch(config)#interface FastEthernet0/1
Switch(config-if)#switchport host
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/2
Switch(config-if)#switchport host
Switch(config-if)#switchport access vlan 20
Switch(config)#interface FastEthernet0/3
Switch(config-if)#switchport host
Switch(config-if)#switchport access vlan 30
Switch(config-if)#exit
```

Step 2 – Enable EIGRP.²

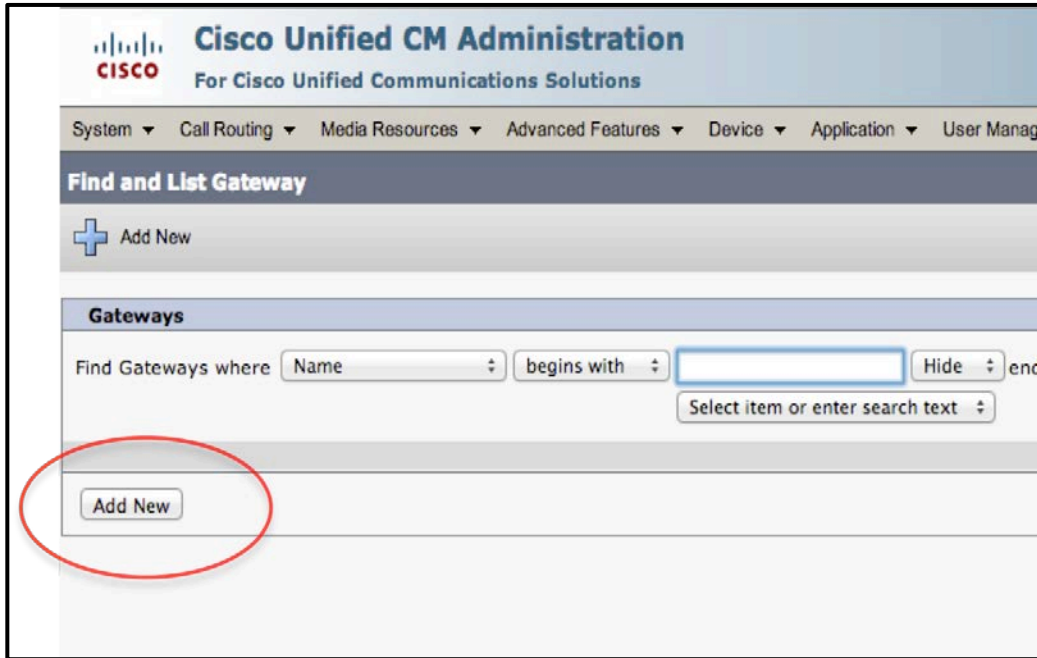
```
Switch(config)#router eigrp 20
Switch(config-router)# network 10.0.0.0
Switch(config-router)# network 172.19.0.0
```

² The switch needs to advertise the 10.X.X.X IP subnets connected to the VG and the 172.19.X.X subnet connected to the CUCM so enable EIGRP for these two networks.

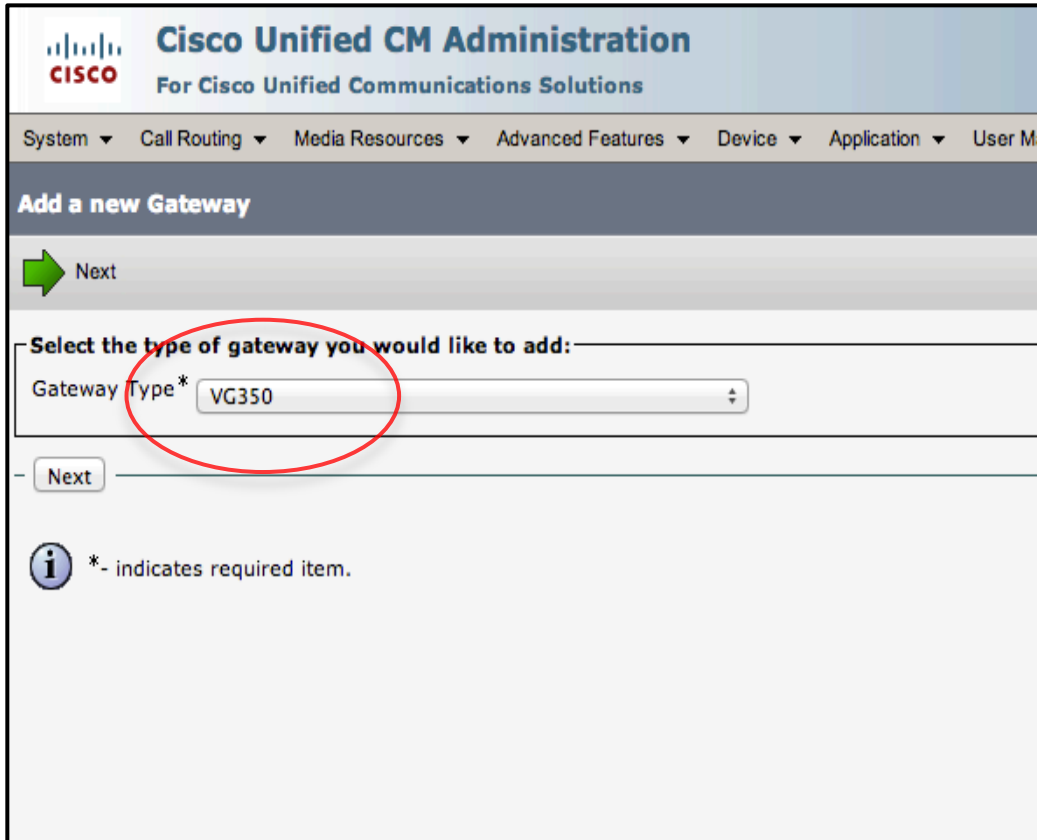
On the CUCM:

Step 1 – Register the VG350 as an MGCP gateway.

Step 1.1 – Device -> Gateway -> Add New




Step 1.2 – Select Gateway Type as 'VG350' and press 'Next'.



Cisco Unified CM Administration
For Cisco Unified Communications Solutions


System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾ User Ma

Add a new Gateway

 Next

Select the type of gateway you would like to add: _____

Gateway Type*

 *- indicates required item.

Step 1.3 – Select Protocol as ‘MGCP’ and press ‘Next’.

The screenshot shows the Cisco Unified CM Administration interface for adding a new gateway. The page title is "Add a new Gateway". A green arrow labeled "Next" is visible. The "Gateway Type" is set to "VG350" and the "Protocol" is set to "MGCP". A red circle highlights the "MGCP" selection in the protocol dropdown menu. A "Change Gateway type" button is located to the right of the gateway type field. A "Next" button is at the bottom left. An information icon and the text "*- indicates required item." are at the bottom left.

Cisco Unified CM Administration
For Cisco Unified Communications Solutions

System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾ User Mana

Add a new Gateway

Next

Select the type of gateway you would like to add:

Gateway Type: VG350 Change Gateway type

Protocol*: MGCP

Next

i *- indicates required item.

Step 1.4 – Add the ‘Domain Name’ and the ‘Cisco Unified Communications Manager Group’. In this example it is set to ‘Default’.

The screenshot shows the Cisco Unified CM Administration interface for Gateway Configuration. The page title is "Cisco Unified CM Administration For Cisco Unified Communications Solutions". The navigation menu includes System, Call Routing, Media Resources, Advanced Features, Device, Application, User Management, and Bulk Administration. The main section is "Gateway Configuration" with a "Save" button. The "Status" section shows "Status: Ready". The "Gateway Details" section includes:

Product	VG350
Protocol	MGCP
⚠ Device is not trusted	
Domain Name*	<input type="text" value="VG350"/>
Description	<input type="text" value="VG350"/>
Cisco Unified Communications Manager Group*	<input type="text" value="Default"/>

The "Domain Name" and "Cisco Unified Communications Manager Group" fields are circled in red. The "Configured Slots, VICs and Endpoints" section shows three slots, each with a dropdown menu set to "< None >".

Leave the other properties to their default values. ‘Save’ the profile and ‘Apply the Configuration’.

Step 2 – Configure the network module on the MGCP gateway.

Step 2.1 – Select the appropriate slot. This example uses ‘Slot 4’ in ‘Analog’ mode.

The screenshot displays the Cisco Unified CM Administration interface for Gateway Configuration. At the top, the Cisco logo and title 'Cisco Unified CM Administration' are visible, along with the subtitle 'For Cisco Unified Communications Solutions'. A navigation menu includes System, Call Routing, Media Resources, Advanced Features, Device, Application, and User Management. The main heading is 'Gateway Configuration'. Below this, there are action buttons: Save, Delete, Reset, Apply Config, and Add New. A dropdown menu for 'Cisco Unified Communications Manager Group*' is set to 'Default'. The 'Configured Slots, VICs and Endpoints' section lists five slots, each with a dropdown menu. Slot 4 is selected with 'ANALOG' and is circled in red. The 'Product Specific Configuration Layout' section is currently empty, indicated by a question mark icon.

Save' the profile and 'Apply the Configuration'.

Step 2.2 – Select the appropriate ‘Subunit’. This example uses Subunit 0 to ‘SM-D-72FXS’.

The screenshot shows the Cisco Unified CM Administration interface. At the top, there is a navigation menu with options: System, Call Routing, Media Resources, Advanced Features, Device, and Application. Below this is the 'Gateway Configuration' section, which includes buttons for Save, Delete, Reset, Apply Config, and Add New. The main configuration area is titled 'Configured Slots, VICs and Endpoints' and contains five rows for Slot 0 through Slot 4. Each row has a dropdown menu for the module type. Slot 4 is currently set to 'ANALOG'. Below the Slot 4 module type, there is a 'Subunit 0' dropdown menu, which is highlighted with a red circle and contains the value 'SM-D-72FXS'. Below the configuration area is the 'Product Specific Configuration Layout' section, which currently displays a question mark icon.

‘Save’ the profile and ‘Apply the Configuration’

Step 3 – Configure the analog port.

Step 3.1 – Select the appropriate port and click on it. This example uses 'Port 4/25'.

The screenshot displays the Cisco Unified CM Administration interface for Gateway Configuration. The page title is "Cisco Unified CM Administration" with the Cisco logo. Below the title is a navigation menu with options: System, Call Routing, Media Resources, Advanced Features, Device, Application, User Management, and Bulk Admin. The main heading is "Gateway Configuration". Below this heading are several action buttons: Save, Delete, Reset, Apply Config, and Add New. The main content area is titled "Configured Slots, VICs and Endpoints". It shows a list of modules in slots 0 through 4. Slot 4 is configured with an "ANALOG" module. Under Slot 4, there is a "Subunit 0" dropdown menu set to "SM-D-72FXS". Below this, a grid of endpoints is displayed, each with a question mark icon. The endpoint "4/25" is circled in red. The grid shows endpoints from 4/0 to 4/71 in increments of 1.

Module in Slot 0	Module in Slot 1	Module in Slot 2	Module in Slot 3	Module in Slot 4
< None >	< None >	< None >	< None >	ANALOG
				Subunit 0: SM-D-72FXS
				4/ 0, 4/ 1, 4/ 2, 4/ 3, 4/ 4, 4/ 5
				4/ 6, 4/ 7, 4/ 8, 4/ 9, 4/10, 4/11
				4/12, 4/13, 4/14, 4/15, 4/16, 4/17
				4/18, 4/19, 4/20, 4/21, 4/22, 4/23
				4/24, 4/25, 4/26, 4/27, 4/28, 4/29
				4/30, 4/31, 4/32, 4/33, 4/34, 4/35
				4/36, 4/37, 4/38, 4/39, 4/40, 4/41
				4/42, 4/43, 4/44, 4/45, 4/46, 4/47
				4/48, 4/49, 4/50, 4/51, 4/52, 4/53
				4/54, 4/55, 4/56, 4/57, 4/58, 4/59
				4/60, 4/61, 4/62, 4/63, 4/64, 4/65
				4/66, 4/67, 4/68, 4/69, 4/70, 4/71

Step 3.2 – Select 'Loop Start' and click 'Next'.

Cisco Unified CM Administration
For Cisco Unified Communications Solutions

System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾

Gateway Configuration

Next

Status

Status: Ready

Port Selection

Port Type *


*- indicates required item.

Step 3.3 – Configure the appropriate ‘Device Pool’ and ‘Attendant DN’.


Cisco Unified CM Administration
For Cisco Unified Communications Solutions

System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾ User Man...


Gateway Configuration

 Save

Status

 Status: Ready

Device Information

Product	Cisco MGCP FXS Port
Gateway	VG350-Crathi
Device Protocol	Analog Access
 Device is not trusted	
End-Point Name *	AALN/S4/SU0/0@VG350-Crathi
Description	<input type="text" value="AALN/S4/SU0/0@VG350-Crathi"/>
Device Pool *	<input type="text" value="Default"/>
Common Device Configuration	<input type="text" value="< None >"/>
Media Resource Group List	<input type="text" value="< None >"/>

Hot line Device
 Device is trusted

Multilevel Precedence and Preemption (MLPP) Information

MLPP Domain

MLPP Indication Not available on this device
MLPP Preemption Not available on this device

Port Information (Loop Start)

Port Direction*

Attendant DN*

Prefix DN

Unattended Port

Leave the other properties to their default values. 'Save' the profile and 'Apply the Configuration'.

Step 3.4 – Add the 'Directory Number Information'. Click on 'Line [1] – Add a new DN'.

The screenshot displays the Cisco Unified CM Administration interface for Gateway Configuration. At the top, the Cisco logo and title 'Cisco Unified CM Administration For Cisco Unified Communications Solutions' are visible. Below this is a navigation menu with tabs for System, Call Routing, Media Resources, Advanced Features, Device, Application, and User Management. The main content area is titled 'Gateway Configuration' and includes a toolbar with icons for Save, Delete, Reset, Apply Config, and Add New. A 'Status' section shows an 'Add successful' message. The 'Directory Number Information' section contains a link 'Line [1] - Add a new DN' which is circled in red. To the right, the 'Device Information' section lists various fields: Product, Gateway, Device Protocol, a warning 'Device is not trusted', Registration, IP Address, End-Point Name *, Description, Device Pool*, Common Device Configuration, and Media Resource Group List.

Now configure the 'Directory Number'.

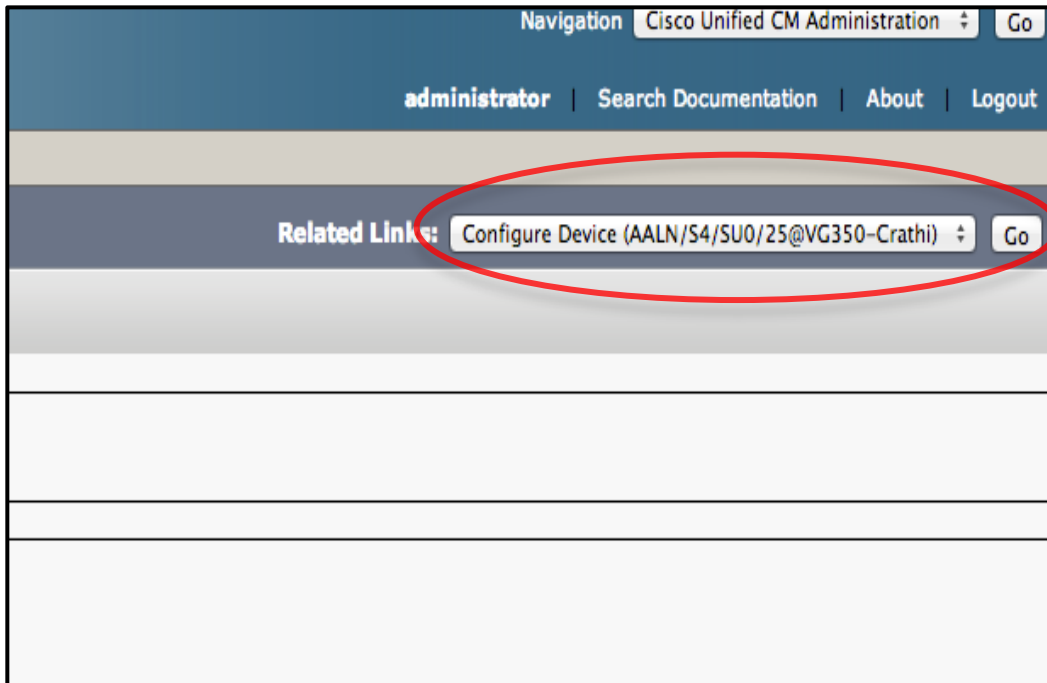
The screenshot shows the Cisco Unified CM Administration interface for configuring a Directory Number. The page title is "Cisco Unified CM Administration For Cisco Unified Communications Solutions". The navigation menu includes System, Call Routing, Media Resources, Advanced Features, Device, Application, and User Management. The main heading is "Directory Number Configuration". Below the heading are action buttons: Save, Delete, Reset, Apply Config, and Add New. A status message indicates that the configuration has refreshed due to a directory number change. The "Directory Number Information" section contains the following fields:

- Directory Number*: 2000 (highlighted with a red circle)
- Route Partition: < None >
- Description: (empty)
- Alerting Name: (empty)
- ASCII Alerting Name: (empty)
- Associated Devices: AALN/S4/SU0/25@VG350-Crathi
- Dissociate Devices: (empty)

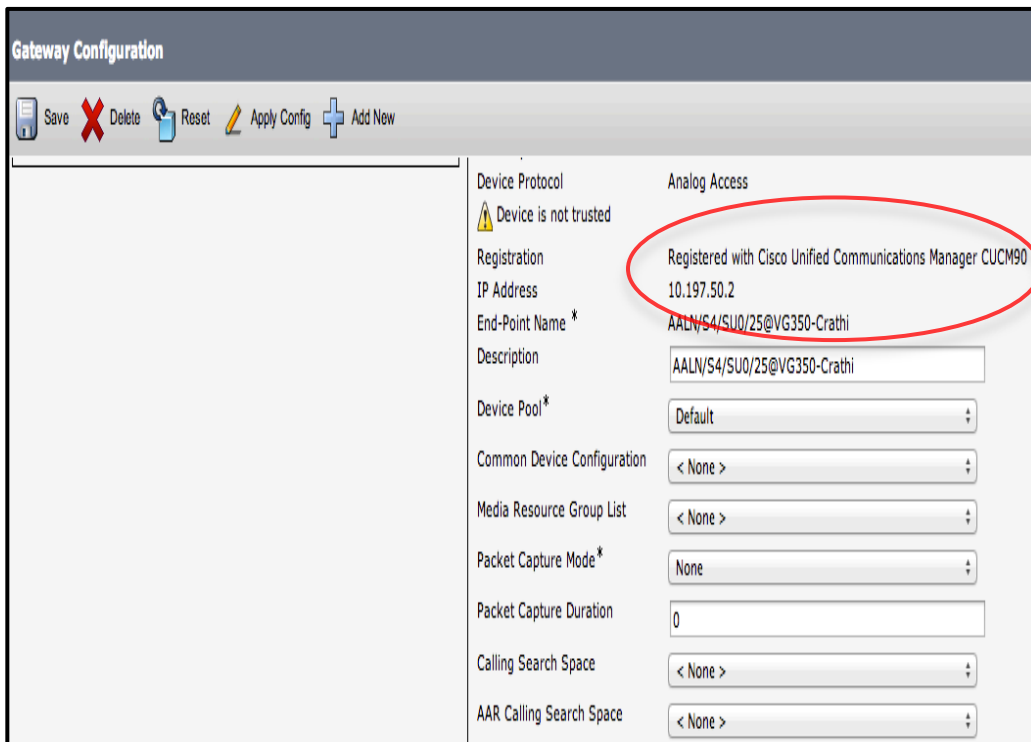
Buttons for "Edit Device" and "Edit Line Appearance" are located to the right of the Associated Devices field.

Leave the other properties to their default values. 'Save' the profile and 'Apply the Configuration'.

Step 3.5 – Go back to the port page to check that the port is registered to the CUCM.



Ensure that the port is 'Registered with Cisco Unified Communications Manager'.



Routed Survivability Option 2 – SCCP GW:

On the VG350:

Step 1 – Configure IP addresses for the physical Ethernet interfaces.

```
VG350(config)#interface GigabitEthernet0/1
VG350(config-if)#ip address 10.197.51.2 255.255.255.0
VG350(config-if)#no shut
VG350(config-if)#exit
VG350(config)#interface GigabitEthernet0/2
VG350(config-if)#ip address 10.197.52.2 255.255.255.0
VG350(config-if)#no shut
```

Step 2 – Configure a loopback interface.

```
VG350(config)#
VG350(config)#interface Loopback0
VG350(config-if)#ip address 10.197.50.2 255.255.255.0
VG350(config-if)#no shut
```

Step 3 – Enable EIGRP.³

```
VG350(config)#router eigrp 20
VG350(config-router)#network 10.0.0.0
VG350(config-router)#eigrp stub connected summary
```

Step 4 – Create a hostname mapping for the CUCM.

```
VG350(config)#ip host CUCM90 172.19.153.139
```

³ The VG needs to advertise the 10.X.X.X IP subnets that are connected to the switch so enable EIGRP for this network.

Step 5.1 – Enable SCCP.

```
VG350(config)#sccp local Loopback0
VG350(config)#sccp ccm 172.19.153.139 identifier 1 version 7.0
VG350(config)#sccp
VG350(config)#sccp ccm group 1
VG350(config-sccp-ccm)#associate ccm 1 priority 1
VG350(config-sccp-ccm)#bind interface Loopback0
VG350(config-sccp-ccm)#exit
```

Explanation:

1. 'sccp local Loopback0'
 - Forces SCCP to use the Loopback0 interface for its communication to the CUCM.
2. 'sccp ccm 172.19.153.139 identifier 1 version 7.0'
 - Specifies the call agent's IP address. This example uses '172.19.153.139'.
 - Specifies the call agent's identifier. This example uses '1'.
 - Specifies the call agent's version. This example uses '7'.
3. 'sccp ccm group 1'
 - Creates a SCCP group with identifier '1'.
4. 'associate ccm 1 priority 1'
 - Under the 'sccp ccm group 1', associate a CUCM with priority 1.
5. 'bind interface Loopback0'
 - Under the 'sccp ccm group 1', binds the Loopback0 interface to the SCCP group.

Step 5.2 – Enable SCCP control of analog ports.

```
VG350(config)#stcapp ccm-group 1
VG350(config)#stcapp
```

Explanation:

1. 'stcapp ccm-group 1'
 - Specifies the STCAPP Call Manager group id. This example uses '1'.
2. 'stcapp'
 - Starts the SCCP Telephony Control Application.

Step 5.3 – Configure analog port to use SCCP.

```
VG350(config)#dial-peer voice 1 pots
VG350(config-dial-peer)#service stcapp
VG350(config-dial-peer)#port 4/0/24
```

Explanation:

1. 'service stcapp'
 - Enables 'stcapp' service on the dial peer.

Configuration Tip:

- Dial peer needs to be created for every port and this can be done easily using the 'dial peer group' CLI enhancement.

```
VG350(config)#dial-peer group 1
VG350(config-dial-peer)#service stcapp
VG350(config-dial-peer)#port 4/0/0 -71 1
```

Step 5.4 – Configure analog port.

```
VG350(config)#voice-port 4/0/24
VG350(config-voiceport)#timeouts ringing infinity
```

On the switch:

Step 1 – Configure three IP subnets.

Step 1.1 – Add VLANs in the database.

```
Switch#vlan database
Switch(vlan)#vlan 10
VLAN 10 added:
  Name: VLAN0010
Switch(vlan)#vlan 20
VLAN 20 added:
  Name: VLAN0020
Switch(vlan)#vlan 30
VLAN 30 added:
  Name: VLAN0030
```

Step 1.2 – Create SVIs for the VLANs created previously.

```
Switch(config)#interface Vlan10
Switch(config-if)#ip address 10.197.51.1 255.255.255.0
Switch(config-if)#exit
Switch(config)#interface Vlan20
Switch(config-if)# ip address 10.197.52.1 255.255.255.0
Switch(config)#interface Vlan30
Switch(config-if)# ip address 172.19.153.1 255.255.255.0
```

Step 1.3 – Add switch ports to the VLANs.

```
Switch(config)#interface FastEthernet0/1
Switch(config-if)#switchport host
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/2
Switch(config-if)#switchport host
Switch(config-if)#switchport access vlan 20
Switch(config)#interface FastEthernet0/3
Switch(config-if)#switchport host
Switch(config-if)#switchport access vlan 30
Switch(config-if)#exit
```

Step 2 – Enable EIGRP.⁴

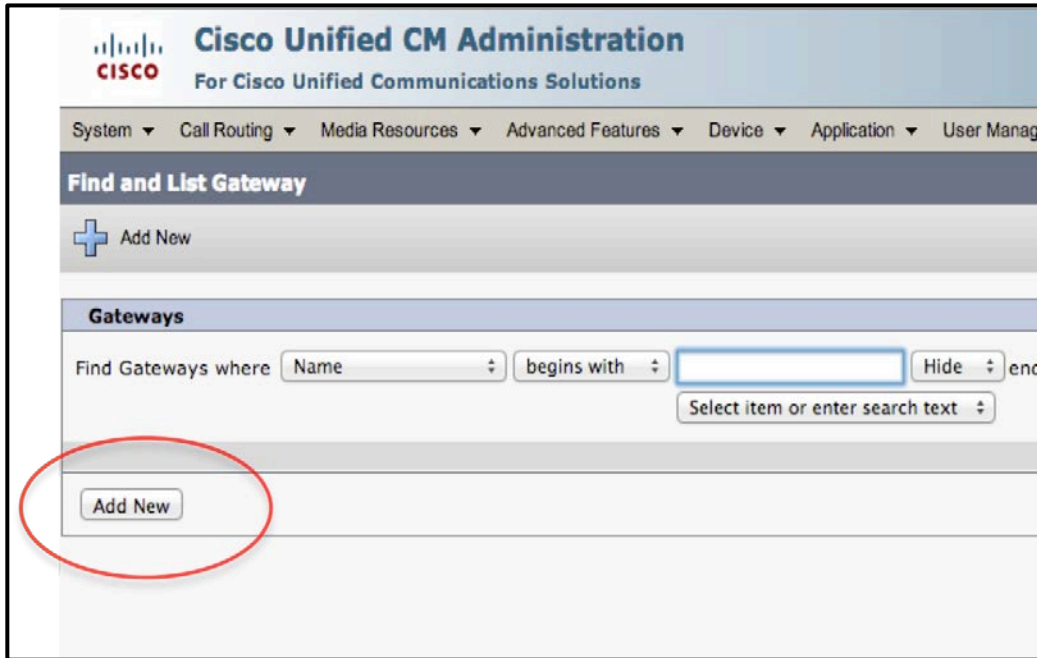
```
Switch(config)#router eigrp 20
Switch(config-router)# network 10.0.0.0
Switch(config-router)# network 172.19.0.0
```

⁴ The switch needs to advertise the 10.X.X.X IP subnets connected to the VG and the 172.19.X.X subnet connected to the CUCM so enable EIGRP for these two networks.

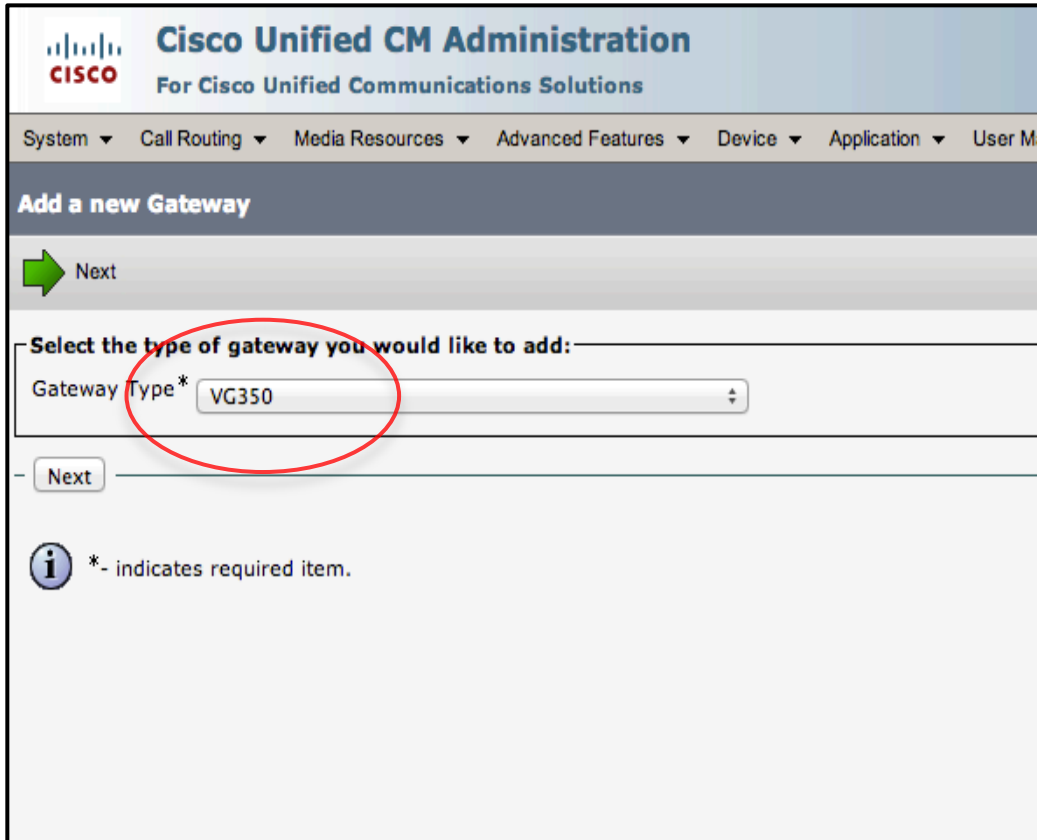
On the CUCM:

Step 1 – Register the VG350 as an SCCP gateway.

Step 1.1 – Device -> Gateway -> Add New




Step 1.2 – Select Gateway Type as ‘VG350’ and press ‘Next’.



Cisco Unified CM Administration
For Cisco Unified Communications Solutions


System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾ User Ma

Add a new Gateway

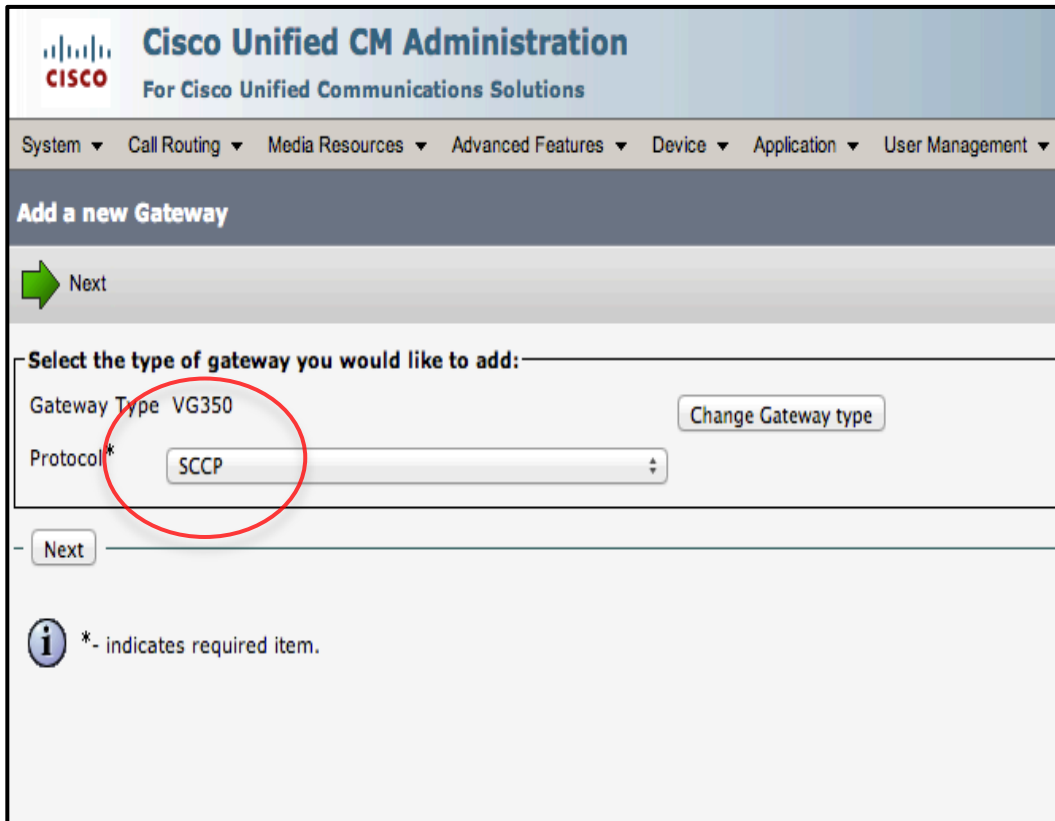
 Next

Select the type of gateway you would like to add: _____

Gateway Type*

 *- indicates required item.


Step 1.3 – Select Protocol as ‘SCCP’ and press ‘Next’.



Cisco Unified CM Administration
For Cisco Unified Communications Solutions

System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾ User Management ▾

Add a new Gateway


 Next

Select the type of gateway you would like to add:

Gateway Type VG350 Change Gateway type

Protocol* SCCP

Next

 *- indicates required item.

Step 1.4 – Add the last 10 characters of the VG’s Gigabit 0/0’s MAC address into the ‘MAC address’ field. In this example, the VG350’s Gigabit 0/0 address is 111122221111, therefore, ‘1122221111’ is entered. Set the ‘Cisco Unified Communications Manager Group’. In this example it is set to ‘Default’.

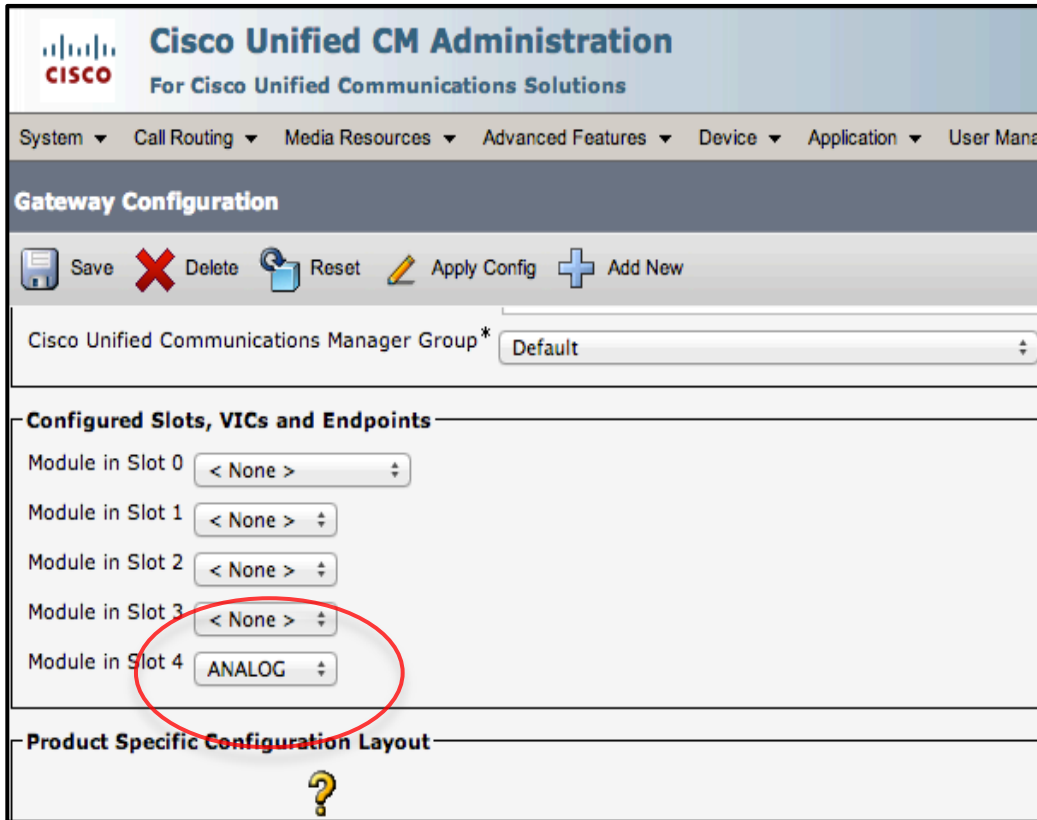
The screenshot shows the Cisco Unified CM Administration interface for Gateway Configuration. The page title is "Cisco Unified CM Administration For Cisco Unified Communications Solutions". The navigation menu includes System, Call Routing, Media Resources, Advanced Features, Device, Application, and User Manager. The main section is "Gateway Configuration" with a "Save" button. The "Status" section shows "Status: Ready". The "Gateway Details" section includes: Product (VG350), Gateway (New), Protocol (SCCP), a warning "Device is not trusted", Mac Address (Last 10 Characters)* (1122221111), Description (SKIGW1122221111), and Cisco Unified Communications Manager Group* (Default). The "Configured Slots, VICs and Endpoints" section shows five slots, all set to "< None >". The "Product Specific Configuration Layout" section is partially visible at the bottom.

Leave the other properties to their default values. ‘Save’ the profile and ‘Apply the Configuration’.

Note: The VG will use the GE0/0 MAC address to create the SCCP MAC address identity (last 10 characters of the MAC address) This device id is used at layer7 (SCCP) to register the device on CUCM, no matter which L2/L3 interface is forwarding the SCCP signaling packet.

Step 2 – Configure the network module on the SCCP gateway.

Step 2.1 – Select the appropriate slot. This example uses ‘Slot 4’ in ‘Analog’ mode.



‘Save’ the profile and ‘Apply the Configuration’.

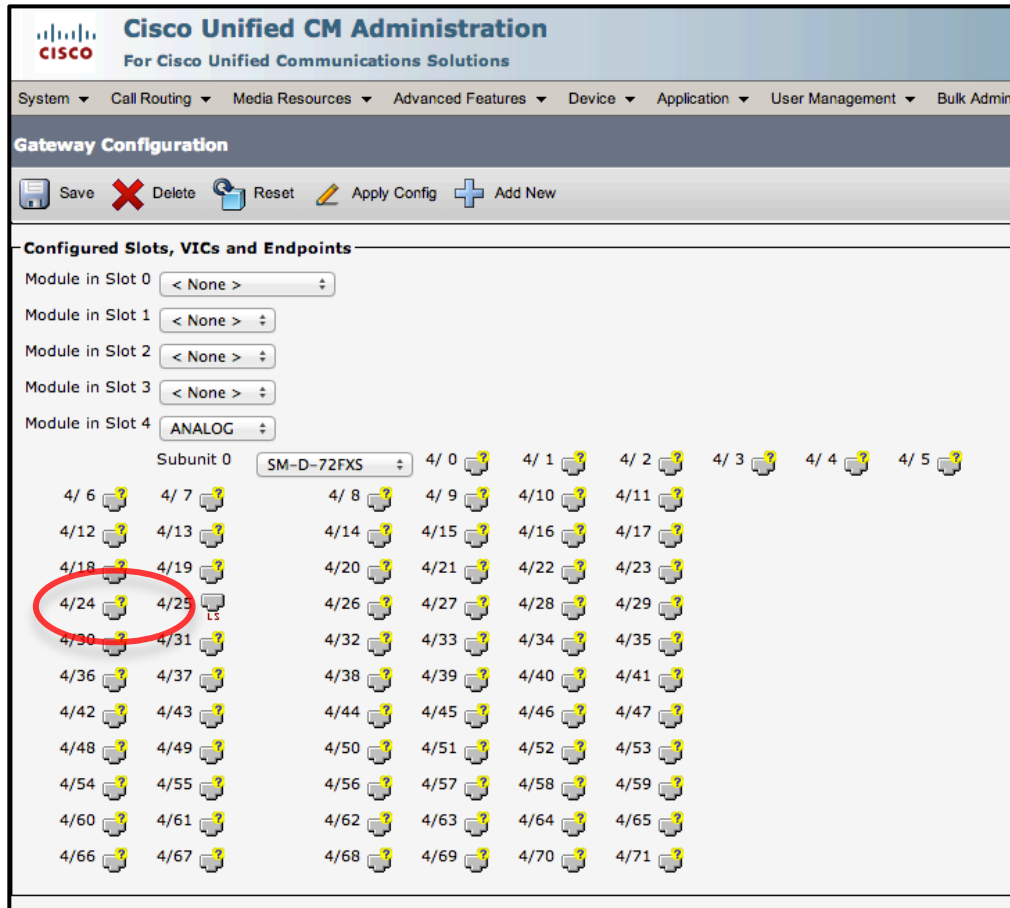
Step 2.2 – Select the appropriate ‘Subunit’. This example uses Subunit 0 to ‘SM-D-72FXS’.

The screenshot shows the Cisco Unified CM Administration interface. At the top, there is a navigation menu with options: System, Call Routing, Media Resources, Advanced Features, Device, and Application. Below this is the 'Gateway Configuration' section, which includes a toolbar with icons for Save, Delete, Reset, Apply Config, and Add New. The main configuration area is divided into two sections: 'Configured Slots, VICs and Endpoints' and 'Product Specific Configuration Layout'. In the 'Configured Slots, VICs and Endpoints' section, there are five rows for 'Module in Slot 0' through 'Module in Slot 4'. The 'Module in Slot 4' dropdown is set to 'ANALOG'. Below this, the 'Subunit 0' dropdown is highlighted with a red circle and contains the value 'SM-D-72FXS'. The 'Product Specific Configuration Layout' section contains a question mark icon.

‘Save’ the profile and ‘Apply the Configuration’.

Step 3 – Configure the analog port.

Step 3.1 – Select the appropriate port and click on it. This example uses ‘Port 4/24’.



Step 3.2 – Set the appropriate values for:

- ‘Device Trust Mode’, this example uses ‘Not Trusted’.
- ‘Device pool’, this example uses ‘Not Trusted’.
- ‘Phone Button Template’, this example uses ‘Standard Analog’.
- ‘Device Mobility Mode’, this example uses ‘Off’.
- ‘Owner’, this example uses ‘Anonymous’.
- ‘Device Security Profile’, this example uses ‘Analog Phone – Standard SCCP Non-Secure Profile’.

Leave the other properties to their default values. ‘Save’ the profile and ‘Apply the Configuration’.



Cisco Unified CM Administration

For Cisco Unified Communications Solutions

System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾ User Management ▾

Phone Configuration

Save

Status

Status: Ready

Phone Type

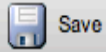
Product Type: Analog Phone
Device Protocol: SCCP

Device Information

Device Trust Mode*	<input type="text" value="Not Trusted"/>
MAC Address*	<input type="text" value="1122221111818"/>
Description	<input type="text" value="AN1122221111818"/>
Device Pool*	<input type="text" value="Default"/>
Common Device Configuration	<input type="text" value="< None >"/>
Phone Button Template*	<input type="text" value="Standard Analog"/>
Common Phone Profile*	<input type="text" value="Standard Common Phone Profile"/>
Calling Search Space	<input type="text" value="< None >"/>
AAR Calling Search Space	<input type="text" value="< None >"/>
Media Resource Group List	<input type="text" value="< None >"/>
Location*	<input type="text" value="Hub_None"/>
AAR Group	<input type="text" value="< None >"/>
User Locale	<input type="text" value="< None >"/>
Network Locale	<input type="text" value="< None >"/>
Device Mobility Mode*	<input type="text" value="Off"/>
Owner	<input type="radio"/> User <input checked="" type="radio"/> Anonymous (Public/Shared Space)



Phone Configuration



Use Device Pool Calling Party Transformation CSS (Device Mobility Related Information)

Protocol Specific Information


Packet Capture Mode*	None ▾
Packet Capture Duration	<input type="text"/>
BLF Presence Group*	Standard Presence group ▾
Device Security Profile*	Analog Phone - Standard SCCP Non-Secure Profile ▾
SUBSCRIBE Calling Search Space	< None > ▾
<input type="checkbox"/> Unattended Port	

MLPP Information

Step 3.3 – Add the ‘Directory Number Information’. Click on ‘Line [1] – Add a new DN’.


The screenshot displays the Cisco Unified CM Administration web interface. At the top, the navigation menu includes System, Call Routing, Media Resources, Advanced Features, Device, Application, and User Management. The main heading is 'Phone Configuration'. Below this, there are icons for Save, Delete, Reset, Apply Config, and Add New. A status message indicates 'Add successful'. The 'Association Information' section is circled in red and contains a 'Modify Button Items' button and a link for 'Line [1] - Add a new DN'. The 'Phone Type' section shows 'Product Type: Analog Phone' and 'Device Protocol: SCCP'. The 'Device Information' section lists various attributes: Registration (Unknown), IP Address (Unknown), Device is Active (checked), Device Trust Mode* (Not Trusted), MAC Address* (ADBEEF112818), and Description (ANADBEEF112818).

Now configure the ‘Directory Number’, this example uses ‘1000’. Leave the other properties to their default values. ‘Save’ the profile and ‘Apply the Configuration’.


 **Cisco Unified CM Administration**
For Cisco Unified Communications Solutions

System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾

Directory Number Configuration

 Save

Status

 Directory Number Configuration has refreshed due to a directory number change. Please

Directory Number Information

Directory Number*

Route Partition

Description

Alerting Name

ASCII Alerting Name

Active

Step 3.4 – Go back to the port page to check that the port is registered to the CUCM.

Navigation Cisco Unified CM Administration

administrator | [Search Documentation](#) | [About](#) | [Logout](#)

Related Links:

Ensure that the port is 'Registered with Cisco Unified Communications Manager'.

Phone Type	
Product Type:	Analog Phone
Device Protocol:	SCCP
Device Information	
Registration	Registered with Cisco Unified Communications Manager CUCM90
IP Address	10.197.49.2
<input checked="" type="checkbox"/> Device is Active	
Device Trust Mode *	Not Trusted

Show Commands

On the VG350:

VG350#show ip eigrp neighbors

EIGRP-IPv4 Neighbors for AS(20)

H	Address	Interface (sec)	Hold (ms)	Uptime Cnt	SRTT Num	RTO	Q	Seq
1	10.197.51.1	Gi0/1	13	04:36:33	1	4500	0	167
0	10.197.52.1	Gi0/2	12	04:40:02	5	100	0	169

VG350#show ip eigrp topology

EIGRP-IPv4 Topology Table for AS(20)/ID(10.197.50.2)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
r - reply Status, s - sia Status

P 172.19.153.0/24, 2 successors, FD is 30976

via 10.197.51.1 (30976/28416), GigabitEthernet0/1

via 10.197.52.1 (30976/28416), GigabitEthernet0/2

Redundant paths to
CUCM

VG350#show ip route

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
 E1 - OSPF external type 1, E2 - OSPF external type 2
 i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
 ia - IS-IS inter area, * - candidate default, U - per-user static route
 o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
 a - application route
 + - replicated route, % - next hop override

Gateway of last resort is not set

```

10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C   10.197.50.0/24 is directly connected, Loopback0
L   10.197.50.2/32 is directly connected, Loopback0
C   10.197.51.0/24 is directly connected, GigabitEthernet0/1
L   10.197.51.2/32 is directly connected, GigabitEthernet0/1
C   10.197.52.0/24 is directly connected, GigabitEthernet0/2
L   10.197.52.2/32 is directly connected, GigabitEthernet0/2
20.0.0.0/30 is subnetted, 1 subnets
D   20.20.20.0 [90/28416] via 10.197.52.1, 04:44:33, GigabitEthernet0/2
    [90/28416] via 10.197.51.1, 04:44:33, GigabitEthernet0/1
172.19.0.0/16 is variably subnetted, 8 subnets, 2 masks
D   172.19.153.0/24
    [90/30976] via 10.197.52.1, 04:44:33, GigabitEthernet0/2
    [90/30976] via 10.197.51.1, 04:44:33, GigabitEthernet0/1
  
```

Redundant
paths to
CUCM

On the switch:**Switch#show ip eigrp neighbors**

EIGRP-IPv4 Neighbors for AS(20)

H	Address	Interface (sec)	Hold (ms)	Uptime Cnt	SRTT Num	RTO	Q	Seq
2	10.197.51.2	V110	10	04:52:23	1	200	0	48
1	10.197.52.2	V120	14	04:55:52	331	1986	0	46

Switch#show ip eigrp topology

EIGRP-IPv4 Topology Table for AS(20)/ID(172.19.153.27)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
r - reply Status, s - sia Status

P 10.197.50.0/24, 2 successors, FD is 130816
via 10.197.51.2 (130816/128256), Vlan51
via 10.197.52.2 (130816/128256), Vlan52

Redundant
paths to
VG350

Switch#show ip route

Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2

i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2

ia - IS-IS inter area, * - candidate default, U - per-user static route

o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

D 10.197.50.0 [90/130816] via 10.197.52.2, 04:54:40, Vlan20
[90/130816] via 10.197.51.2, 04:54:40, Vlan10

Redundant
paths to
VG350

Test Procedure

Step 1 – Call Phone 2 from Phone 1. Both interfaces on the VG350 are active and the call starts on Gig 0/1.

VG350#show call active voice

Telephony call-legs: 1

SIP call-legs: 0

H323 call-legs: 0

Call agent controlled call-legs: 1

SCCP call-legs: 0

Multicast call-legs: 0

Total call-legs: 2

The call between Phone 1
and Phone 2 is active.

```
VG350#show ip interface brief
```

Interface	IP-Address	OK?	Method	Status	
GigabitEthernet0/1	10.197.51.2	YES	NVRAM	up	up
GigabitEthernet0/2	10.197.52.2	YES	NVRAM	up	up
Loopback0	10.197.50.2	YES	NVRAM	up	up

Step 2 – Shutdown Gig 0/1 and notice that the EIGRP topology changes. The following messages are seen on the VG350.

```
VG350#
*Feb 7 21:22:11.565: %LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/1, changed state to down
*Feb 7 21:22:12.565: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed
state to down
*Feb 7 21:22:12.565: %DUAL-5-NBRCHANGE: EIGRP-IPv4 20: Neighbor
10.197.51.1 (GigabitEthernet0/1) is down: interface down
```

```
VG350#show ip eigrp topology
EIGRP-IPv4 Topology Table for AS(20)/ID(10.197.50.2)
Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
r - reply Status, s - sia Status

P 172.19.153.0/24, 1 successors, FD is 30976
via 10.197.52.1 (30976/28416), GigabitEthernet0/2
```

VG350 still has one active path to the CUCM and the call gets routed on to this active link.

```
VG350#show call active voice
Telephony call-legs: 1
SIP call-legs: 0
H323 call-legs: 0
Call agent controlled call-legs: 1
SCCP call-legs: 0
Multicast call-legs: 0
Total call-legs: 2
```

The call is active on the VG350 even after the first link Gig0/1 went down.

VG350#show ip eigrp neighbors

EIGRP-IPv4 Neighbors for AS(20)

H	Address	Interface	Hold	Uptime	SRTT	RTO	Q	Seq
		(sec)	(ms)	Cnt	Num			
0	10.197.52.1	Gi0/2	13	00:02:03	6	100	0	159

VG350#show ip route

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2

i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2

ia - IS-IS inter area, * - candidate default, U - per-user static route

o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks

```
D    172.19.153.0/24
     [90/28672] via 10.197.52.1, 00:00:29, GigabitEthernet0/2
```

VG350 still has one active path to the CUCM and the call gets routed on to this active link.

Notice there is still an active link to the CUCM and the call seamlessly switches to the stand-by connection when the first link goes down. The link switching takes a second and is almost transparent to the end user, thus providing a seamless call experience.

Debugging Tips**MGCP**

1. Domain names on the CUCM should match the hostname of the VG350.
2. The MGCP version on the CUCM should match the MGCP version of the VG350.

SCCP

1. To register the VG to the CUCM, the last ten character's of the interface Gig0/0, no matter which interfaces you are using or even if Gig0/0 is down.

Running Configuration

MGCP

VG350

```
!  
hostname VG350  
!  
!  
interface Loopback0  
ip address 10.197.50.2 255.255.255.0  
!  
!  
interface GigabitEthernet0/1  
ip address 10.197.51.2 255.255.255.0  
duplex auto  
speed auto  
!  
interface GigabitEthernet0/2  
ip address 10.197.52.2 255.255.255.0  
duplex auto  
speed auto  
!  
!  
router eigrp 20  
network 10.0.0.0  
eigrp stub connected summary  
!  
ip forward-protocol nd  
!  
!  
voice-port 4/0/25  
!  
mgcp  
mgcp call-agent CUCM90 2427 service-type mgcp version 0.1  
mgcp rtp unreachable timeout 1000 action notify  
mgcp modem passthrough voip mode nse  
mgcp package-capability rtp-package  
mgcp package-capability sst-package  
mgcp package-capability pre-package  
no mgcp package-capability res-package  
no mgcp timer receive-rtcp  
mgcp sdp simple  
mgcp fax t38 inhibit  
mgcp bind control source-interface Loopback0
```

```
mgcp bind media source-interface Loopback0
mgcp behavior rsip-range tgcp-only
mgcp behavior comedia-role none
mgcp behavior comedia-check-media-src disable
mgcp behavior comedia-sdp-force disable
!
mgcp profile default
!
!
ccm-manager music-on-hold
!
ccm-manager mgcp
no ccm-manager fax protocol cisco
!
dial-peer voice 2000 pots
service mgcpapp
port 4/0/25
!
!
end
```

SCCP

VG350

```
Current configuration : 3669 bytes
!
hostname VG350-Crathi
!
stcapp ccm-group 1
stcapp
!
stcapp supplementary-services
port 4/0/24
fallback-dn 1000
!
!
!
interface Loopback0
ip address 10.197.50.2 255.255.255.0
!
!
interface GigabitEthernet0/1
ip address 10.197.51.2 255.255.255.0
duplex auto
speed auto
```

```
!  
interface GigabitEthernet0/2  
ip address 10.197.52.2 255.255.255.0  
duplex auto  
speed auto  
!  
!  
router eigrp 20  
network 10.0.0.0  
eigrp stub connected summary  
!  
ip forward-protocol nd  
!  
!  
no ip http server  
no ip http secure-server  
!  
!  
!  
control-plane  
!  
voice-port 0/0/0  
!  
voice-port 0/0/1  
!  
voice-port 4/0/23  
!  
voice-port 4/0/24  
timeouts ringing infinity  
!  
voice-port 4/0/25  
!  
!  
sccp local Loopback0  
sccp ccm 172.19.153.139 identifier 1 version 7.0  
sccp  
!  
sccp ccm group 1  
bind interface Loopback0  
associate ccm 1 priority 1  
!  
dial-peer voice 1 pots  
service stcapp  
port 4/0/24  
!  
!
```

```
login
transport input all
!
scheduler allocate 20000 1000
!
end
```

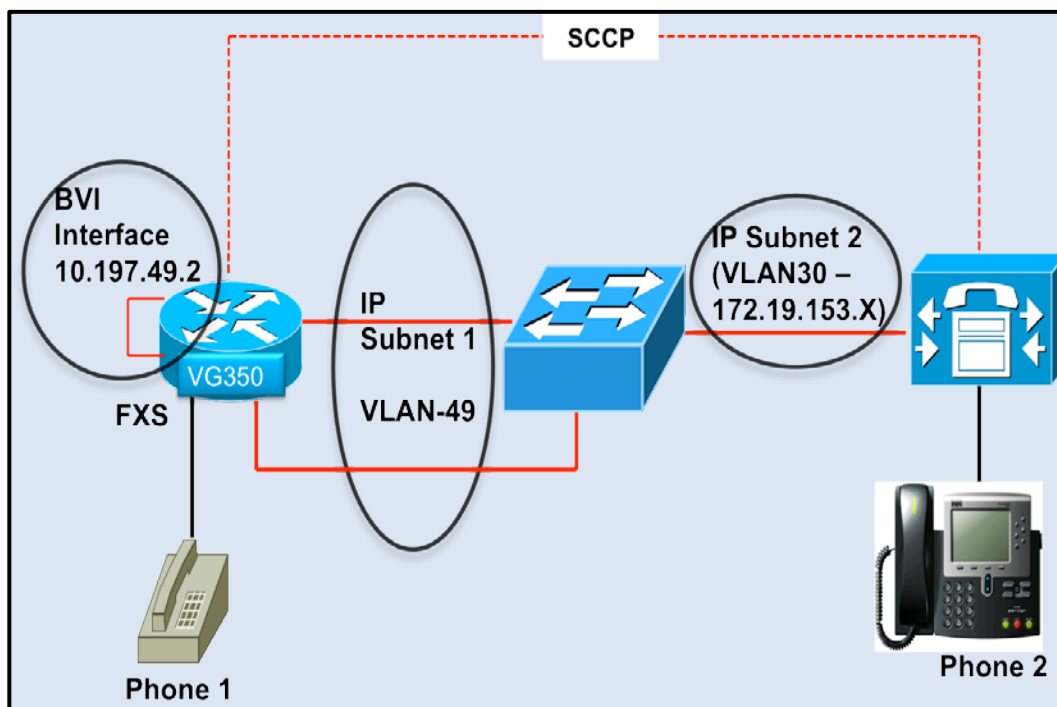
Switch

```
!
hostname Switch
!
!
!
!
no aaa new-model
system mtu routing 1500
ip routing
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
!
!
!
interface FastEthernet0/1
switchport host
switchport access vlan 10
!
interface FastEthernet0/2
switchport host
switchport access vlan 20
!
interface FastEthernet0/3
switchport host
switchport access vlan 30
!
interface Vlan1
no ip address
!
interface Vlan10
ip address 10.197.51.1 255.255.255.0
!
```

```
interface Vlan20
ip address 10.197.52.1 255.255.255.0
!
interface Vlan30
ip address 172.19.153.1 255.255.255.0
!
router eigrp 20
network 10.0.0.0
network 172.19.0.0
!
!
end
```

Bridged Survivability

Bridged survivability uses the VG's capability to be controlled as an SCCP gateway and utilizes Spanning Tree Protocol for the link failover. The VG registers itself to the CUCM as an SCCP gateway and uses its physical connections to create redundant paths. The VG's BVI interface's MAC address is used to register to the CUCM. Because the BVI interface is virtual, in case a physical link fails, the VG switches to the standby physical link to remain registered to the CUCM and preserve active calls.



Configuration

Overview

1. Create two IP subnets on the switch.
2. Create a BVI interface on the VG. This is the interface used by the VG to register itself as an SCCP gateway to the CUCM.
3. Enable STP on the switch.
4. Enable bridging and STP on the VG and bind the gigabit interfaces to the configured bridge group.
5. Enable SCCP on the VG.
6. Connect the gigabit interfaces on the VG to subnet 1.
7. Connect CUCM to subnet 2.

8. Enable EIGRP on the switch and the VG for routing.

After the VG registers as a SCCP gateway, there will be redundant paths to the CUCM. Now if a link on the VG loses connectivity, active calls switch to the other link and are preserved.

On the VG350:

Step 1 – Enable bridging.

```
VG350#conf t
VG350(config)#bridge irb
```

Step 2 – Create a bridge group.

```
VG350(config)#bridge 49 priority 65535
VG350(config)#bridge 49 protocol ieee
VG350(config)#bridge 49 route ip
```

Configuration Tip:

- The bridge group ID should match the VLAN on the switch, for example here ID is '49'.
- Be sure not to become the root bridge, set the bridge group's priority to '65535'.

Step 3 – Create a BVI interface. Assign it a MAC and IP address.

```
VG350(config)#interface BVI49
VG350(config-if)#mac-address 1111.2222.1111
VG350(config-if)#ip address 10.197.49.2 255.255.255.0
```

Configuration Tip:

- The BVI interface's ID should match the bridge group ID, for example here the bridge group ID is '49' and therefore the BVI Interface is 'BVI49'.
- Assign a static MAC address to the BVI interface otherwise the auto generated address is inherited from one of the physical interfaces and when this link goes down the BVI is not able to transmit traffic, even if the stand-by link is active.

Step 4 – Bind gigabit interfaces to the bridge group.


```
VG350(config)#interface GigabitEthernet0/1
VG350(config-if)#no ip address
VG350(config-if)#bridge-group 49
VG350(config)#interface GigabitEthernet0/2
VG350(config-if)#no ip address
VG350(config-if)#bridge-group 49
```

Step 5 – Enable SCCP.

```
VG350(config)#sccp local BVI49
VG350(config)#sccp ccm 172.19.153.139 identifier 1 version 7.0
VG350(config)#sccp
VG350(config)#sccp ccm group 1
VG350(config-sccp-ccm)#associate ccm 1 priority 1
VG350(config-sccp-ccm)#bind interface BVI49
VG350(config-sccp-ccm)#exit
```

Explanation:

1. 'sccp local BVI49'
 - Forces SCCP to use the BVI interface for its communication to the CUCM.
2. 'sccp ccm 172.19.153.139 identifier 1 version 7.0'
 - Specifies the call agent's IP address. This example uses '172.19.153.139'.
 - Specifies the call agent's identifier. This example uses '1'.
 - Specifies the call agent's version. This example uses '7'.
3. 'sccp ccm group 1'
 - Creates a SCCP group with identifier '1'.
4. 'associate ccm 1 priority 1'
 - Under the 'sccp ccm group 1', associate a CUCM with priority 1.
5. 'bind interface BVI49'
 - Under the 'sccp ccm group 1', binds the BVI interface to the SCCP group.

Step 6 – Enable SCCP control of analog ports.

```
VG350(config)#stcapp ccm-group 1
VG350(config)#stcapp
```

Explanation:

1. 'stcapp ccm-group 1'
 - Specifies the STCAPP Call Manager group id. This example uses '1'.
2. 'stcapp'
 - Starts the SCCP Telephony Control Application.

Step 7 – Configure analog port to use SCCP.

```
VG350(config)#dial-peer voice 1 pots
VG350(config-dial-peer)#service stcapp
VG350(config-dial-peer)#port 4/0/24
```

Explanation:

1. 'service stcapp'
 - Enables 'stcapp' service on the dial peer.

Configuration Tip:

- Dial peer needs to be created for every port and this can be done easily using the 'dial peer group' CLI enhancement.

```
VG350(config)#dial-peer group 1
VG350(config-dial-peer)#service stcapp
VG350(config-dial-peer)#port 4/0/0 -71 1
```

Step 8 – Configure analog port.

```
VG350(config)#voice-port 4/0/24
VG350(config-voiceport)#timeouts ringing infinity
```

Step 9 – Enable EIGRP.⁵

```
VG350(config)#router eigrp 20
VG350(config-router)#network 10.0.0.0
VG350(config-router)#eigrp stub connected summary
```

⁵ The VG needs to advertise the 10.X.X.X IP subnets that are connected to the switch so enable EIGRP for this network.

On the switch:

Step 1 – Configure two IP subnets.

Step 1.1 – Add VLANs in the database.

```
Switch#vlan database
Switch(vlan)#vlan 49
VLAN 49 added:
  Name: VLAN0040
Switch(vlan)#vlan 30
VLAN 30 added:
  Name: VLAN0030
```

Step 1.2 – Create SVIs for the VLANs created previously.

```
Switch(config)#interface Vlan49
Switch(config-if)#ip address 10.197.49.1 255.255.255.0
Switch(config-if)#exit
Switch(config)#interface Vlan30
Switch(config-if)# ip address 172.19.153.0 255.255.255.0
```

Step 1.3 – Enable spanning tree for VLAN49.

```
Switch(config)#spanning-tree vlan 49 priority 24576
```

Step 1.4 – Add switch ports to VLAN49 and enable STP on these ports.

```
Switch(config)#interface FastEthernet0/1
Switch(config-if)#switchport host
Switch(config-if)#switchport access vlan 49
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/2
Switch(config-if)#switchport host
Switch(config-if)#switchport access vlan 49
```

Step 1.4 – Add the switch port connecting to the CUCM on VLAN30.

```
Switch(config)#interface FastEthernet0/3
Switch(config-if)#switchport host
Switch(config-if)#switchport access vlan 30
Switch(config-if)#exit
```

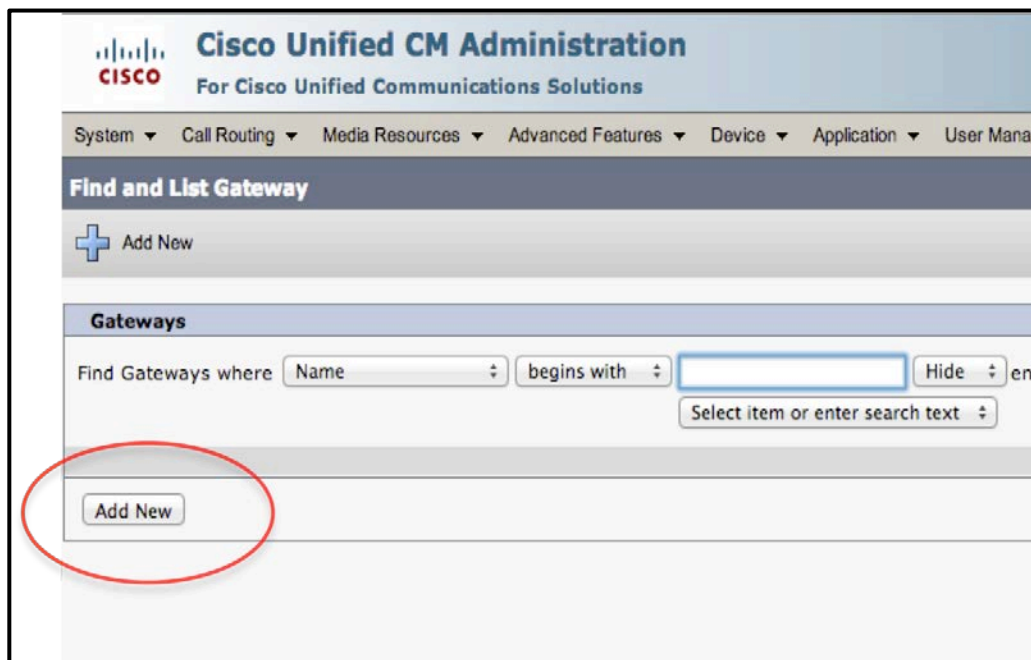
Step 2 – Enable EIGRP.⁶

```
Switch(config)#router eigrp 20  
Switch(config-router)# network 10.0.0.0  
Switch(config-router)# network 172.19.0.0
```

On the CUCM:

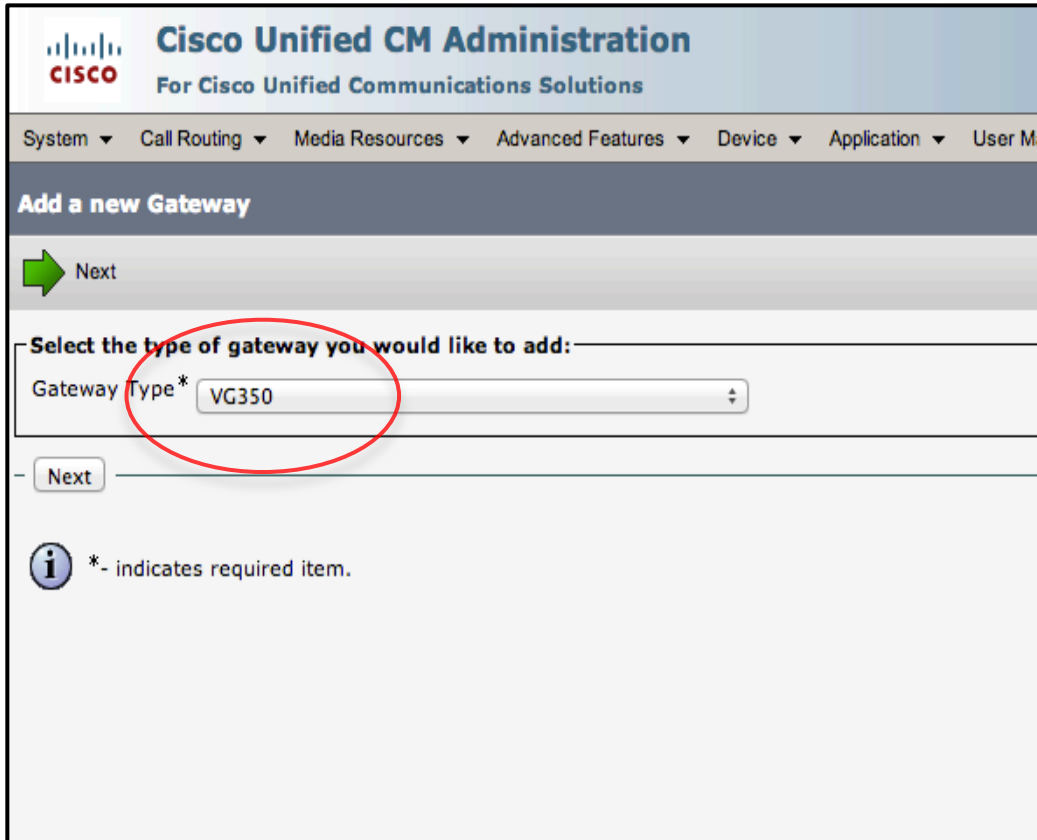
Step 1 – Register the VG350 as an SCCP gateway.

Step 1.1 – Device -> Gateway -> Add New



⁶ The switch needs to advertise the 10.X.X.X IP subnets connected to the VG and the 172.19.X.X subnet connected to the CUCM so enable EIGRP for these two networks.


Step 1.2 – Select Gateway Type as ‘VG350’ and press ‘Next’.



Cisco Unified CM Administration
For Cisco Unified Communications Solutions


System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾ User Ma

Add a new Gateway

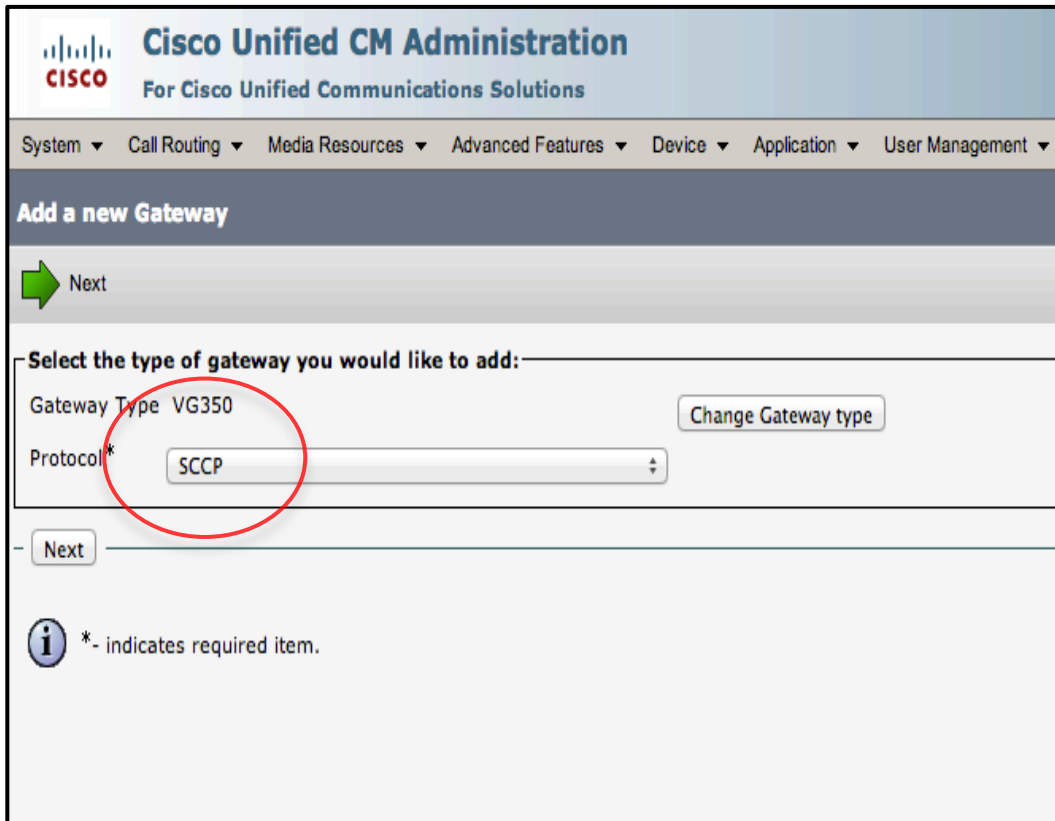
 Next

Select the type of gateway you would like to add: _____

Gateway Type*

 *- indicates required item.


Step 1.3 – Select Protocol as ‘SCCP’ and press ‘Next’.



Cisco Unified CM Administration
For Cisco Unified Communications Solutions

System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾ User Management ▾

Add a new Gateway


 Next

Select the type of gateway you would like to add:

Gateway Type VG350 Change Gateway type

Protocol* SCCP

Next

 *- indicates required item.

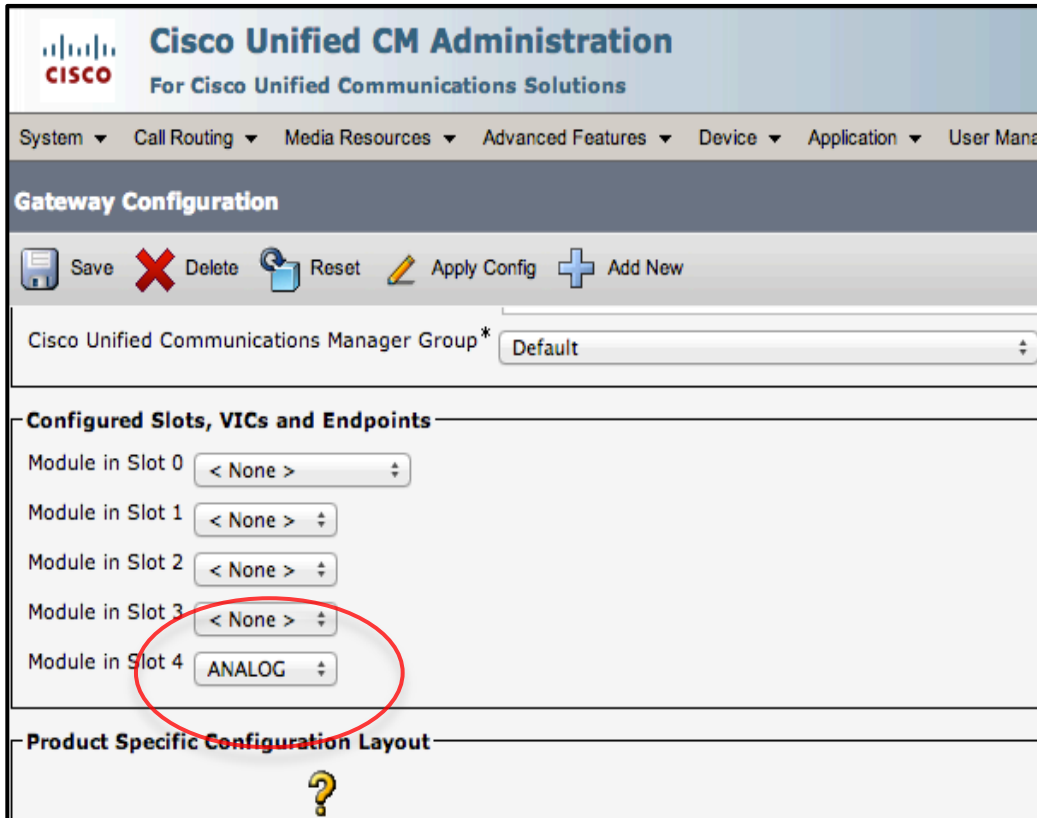
Step 1.4 – Add the last 10 digits of the VG’s BVI MAC address into the ‘MAC address’ field. In this example, the VG350’s BVI address is set to 111122221111, therefore, ‘1122221111’ is entered. Set the ‘Cisco Unified Communications Manager Group’. In this example it is set to ‘Default’.

The screenshot shows the Cisco Unified CM Administration interface for Gateway Configuration. The page title is "Cisco Unified CM Administration For Cisco Unified Communications Solutions". The navigation menu includes System, Call Routing, Media Resources, Advanced Features, Device, Application, and User Manager. The main section is "Gateway Configuration" with a "Save" button. The "Status" section shows "Status: Ready". The "Gateway Details" section includes: Product (VG350), Gateway (New), Protocol (SCCP), a warning "Device is not trusted", Mac Address (Last 10 Characters)* (1122221111), Description (SKIGW1122221111), and Cisco Unified Communications Manager Group* (Default). The "Configured Slots, VICs and Endpoints" section shows five slots, each with a "< None >" dropdown. The "Product Specific Configuration Layout" section is partially visible at the bottom.

Leave the other properties to their default values. ‘Save’ the profile and ‘Apply the Configuration’.

Step 2 – Configure the network module on the SCCP gateway.

Step 2.1 – Select the appropriate slot. This example uses ‘Slot 4’ in ‘Analog’ mode.



'Save' the profile and 'Apply the Configuration'.

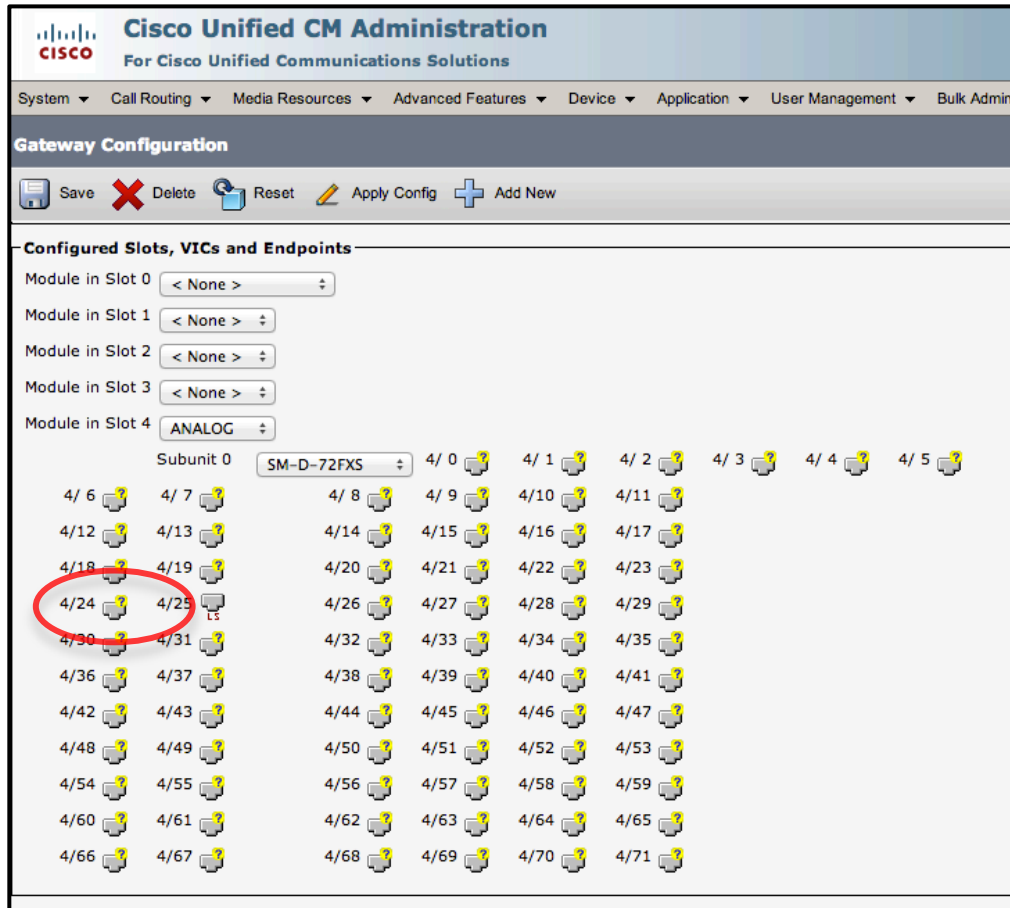
Step 2.2 – Select the appropriate ‘Subunit’. This example uses Subunit 0 to ‘SM-D-72FXS’.

The screenshot shows the Cisco Unified CM Administration interface. At the top, there is a navigation menu with options: System, Call Routing, Media Resources, Advanced Features, Device, and Application. Below this is the 'Gateway Configuration' section, which includes buttons for Save, Delete, Reset, Apply Config, and Add New. The main configuration area is titled 'Configured Slots, VICs and Endpoints' and contains five rows for Slot 0 through Slot 4. Each row has a dropdown menu for the module type. Slot 4 is currently set to 'ANALOG'. Below the Slot 4 module dropdown, there is a 'Subunit 0' dropdown menu, which is highlighted with a red circle and set to 'SM-D-72FXS'. Below the configuration area is the 'Product Specific Configuration Layout' section, which contains a question mark icon.

‘Save’ the profile and ‘Apply the Configuration’.

Step 3 – Configure the analog port.

Step 3.1 – Select the appropriate port and click on it. This example uses ‘Port 4/24’.



Step 3.2 – Set the appropriate values for:

- ‘Device Trust Mode’, this example uses ‘Not Trusted’.
- ‘Device pool’, this example uses ‘Not Trusted’.
- ‘Phone Button Template’, this example uses ‘Standard Analog’.
- ‘Device Mobility Mode’, this example uses ‘Off’.
- ‘Owner’, this example uses ‘Anonymous’.
- ‘Device Security Profile’, this example uses ‘Analog Phone – Standard SCCP Non-Secure Profile’.

Leave the other properties to their default values. ‘Save’ the profile and ‘Apply the Configuration’.



Cisco Unified CM Administration

For Cisco Unified Communications Solutions

System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾ User Management ▾

Phone Configuration

Save

Status

Status: Ready

Phone Type

Product Type: Analog Phone
Device Protocol: SCCP

Device Information

Device Trust Mode*	<input type="text" value="Not Trusted"/>
MAC Address*	<input type="text" value="1122221111818"/>
Description	<input type="text" value="AN1122221111818"/>
Device Pool*	<input type="text" value="Default"/>
Common Device Configuration	<input type="text" value="< None >"/>
Phone Button Template*	<input type="text" value="Standard Analog"/>
Common Phone Profile*	<input type="text" value="Standard Common Phone Profile"/>
Calling Search Space	<input type="text" value="< None >"/>
AAR Calling Search Space	<input type="text" value="< None >"/>
Media Resource Group List	<input type="text" value="< None >"/>
Location*	<input type="text" value="Hub_None"/>
AAR Group	<input type="text" value="< None >"/>
User Locale	<input type="text" value="< None >"/>
Network Locale	<input type="text" value="< None >"/>
Device Mobility Mode*	<input type="text" value="Off"/>
Owner	<input type="radio"/> User <input checked="" type="radio"/> Anonymous (Public/Shared Space)



Cisco Unified CM Administration

For Cisco Unified Communications Solutions

System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾

Phone Configuration



Save

Use Device Pool Calling Party Transformation CSS (Device Mobility Related Information)

Protocol Specific Information

Packet Capture Mode*	None ▾
Packet Capture Duration	<input type="text"/>
BLF Presence Group*	Standard Presence group ▾
Device Security Profile*	Analog Phone - Standard SCCP Non-Secure Profile ▾
SUBSCRIBE Calling Search Space	< None > ▾


Unattended Port

MLPP Information

Step 3.3 – Add the ‘Directory Number Information’. Click on ‘Line [1] – Add a new DN’.


The screenshot displays the Cisco Unified CM Administration web interface. At the top, the navigation menu includes System, Call Routing, Media Resources, Advanced Features, Device, Application, and User Management. The main heading is 'Phone Configuration'. Below this, there are action buttons: Save, Delete, Reset, Apply Config, and Add New. A status message indicates 'Add successful'. The 'Association Information' section is circled in red and contains a 'Modify Button Items' button and a link for 'Line [1] - Add a new DN'. The 'Phone Type' section shows 'Product Type: Analog Phone' and 'Device Protocol: SCCP'. The 'Device Information' section lists various attributes: Registration (Unknown), IP Address (Unknown), Device is Active (checked), Device Trust Mode* (Not Trusted), MAC Address* (ADBEEF112818), and Description (ANADBEEF112818).

Now configure the ‘Directory Number’, this example uses ‘1000’. Leave the other properties to their default values. ‘Save’ the profile and ‘Apply the Configuration’.


 **Cisco Unified CM Administration**
For Cisco Unified Communications Solutions

System ▾ Call Routing ▾ Media Resources ▾ Advanced Features ▾ Device ▾ Application ▾

Directory Number Configuration

 Save

Status

 Directory Number Configuration has refreshed due to a directory number change. Please

Directory Number Information

Directory Number*

Route Partition

Description

Alerting Name

ASCII Alerting Name

Active

Step 3.4 – Go back to the port page to check that the port is registered to the CUCM.

Navigation Cisco Unified CM Administration Go

administrator | Search Documentation | About | Logout

Related Links:

Ensure that the port is 'Registered with Cisco Unified Communications Manager'.

Phone Type	
Product Type:	Analog Phone
Device Protocol:	SCCP
Device Information	
Registration	Registered with Cisco Unified Communications Manager CUCM90
IP Address	10.197.49.2
<input checked="" type="checkbox"/> Device is Active	
Device Trust Mode*	Not Trusted

Show Commands

On the VG350:

```
VG350#show interface BVI49
BVI49 is up, line protocol is up
Hardware is BVI, address is 1111.2222.1111 (bia 0000.0000.0000)
Internet address is 10.197.49.2/24
MTU 1500 bytes, BW 100000 Kbit/sec, DLY 5000 usec,
  reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
```

Static Address gets assigned to the BVI interface.

```
VG350#show sccp
SCCP Admin State: UP
Gateway Local Interface: BVI49
  IPv4 Address: 10.197.49.2
  Port Number: 2000
IP Precedence: 5
User Masked Codec list: None
Call Manager: 172.19.153.139, Port Number: 2000
Priority: N/A, Version: 7.0, Identifier: 1
Trustpoint: N/A

Alg_Phone Oper State: ACTIVE - Cause Code: NONE
Active Call Manager: 172.19.153.139, Port Number: 2000
TCP Link Status: CONNECTED, Device Name: AN1122221111818
```

VG registers to the CUCM as SCCP endpoint, using the BVI interface.

VG350#show spanning-tree 49

Bridge group 49 is executing the ieee compatible Spanning Tree protocol

Bridge Identifier has priority 65535, address 2c54.2d20.3b81

Configured hello time 2, max age 20, forward delay 15

Current root has priority 32817, address 0016.47be.8b80

Root port is 6 (GigabitEthernet0/1), cost of root path is 19

Topology change flag not set, detected flag not set

Number of topology changes 0 last change occurred 03:23:19 ago

Times: hold 1, topology change 35, notification 2

hello 2, max age 20, forward delay 15

Timers: hello 0, topology change 0, notification 0, aging 300

Port 6 (GigabitEthernet0/1) of Bridge group 49 is forwarding

Port path cost 19, Port priority 128, Port Identifier 128.6.

Designated root has priority 32817, address 0016.47be.8b80

Designated bridge has priority 32817, address 0016.47be.8b80

Designated port id is 128.34, designated path cost 0

Timers: message age 1, forward delay 0, hold 0

Number of transitions to forwarding state: 1

BPDU: sent 0, received 6085

Port 7 (GigabitEthernet0/2) of Bridge group 49 is blocking

Port path cost 19, Port priority 128, Port Identifier 128.7.

Designated root has priority 32817, address 0016.47be.8b80

Designated bridge has priority 32817, address 0016.47be.8b80

Designated port id is 128.35, designated path cost 0

Timers: message age 1, forward delay 0, hold 0

Number of transitions to forwarding state: 0

BPDU: sent 0, received 6085

Gig0/1 is
the
forwarding
port.

Gig0/2 is
the blocking
port.

On the switch:

```
Switch#show spanning-tree vlan 49

VLAN0049
Spanning tree enabled protocol ieee
Root ID Priority 24625
  Address 0016.47be.8b80
  This bridge is the root
  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 24625 (priority 24576 sys-id-ext 49)
  Address 0016.47be.8b80
  Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
  Aging Time 300 sec

Interface      Role Sts Cost    Prio.Nbr Type
-----
Fa0/30         Desg FWD 19     128.34 P2p Edge
Fa0/31         Desg FWD 19     128.35 P2p Edge
```

Ports in STP

Test Procedure

Step 1 – Call Phone 2 from Phone 1. Both interfaces on the VG350 are active and the call starts on Gig 0/1.

```
VG350#show call active voice
Telephony call-legs: 1
SIP call-legs: 0
H323 call-legs: 0
Call agent controlled call-legs: 1
SCCP call-legs: 0
Multicast call-legs: 0
Total call-legs: 2
```

The call between Phone 1 and Phone 2 is active.

```
VG350-Crathi#show spanning-tree 49
Bridge group 49 is executing the ieee compatible Spanning Tree protocol
Bridge Identifier has priority 65535, address 2c54.2d20.3b81

Port 6 (GigabitEthernet0/1) of Bridge group 49 is forwarding
Port 7 (GigabitEthernet0/2) of Bridge group 49 is blocking
```

Gig0/1 is in forwarding state

```
VG350#show ip int bri
```

Interface	IP-Address	OK?	Method	Status	
Protocol					
GigabitEthernet0/1	10.197.51.2	YES	NVRAM	up	up
GigabitEthernet0/2	10.197.52.2	YES	NVRAM	up	up
Loopback0	10.197.50.2	YES	NVRAM	up	up

Step 2 – Shutdown Gig 0/1 and notice that the EIGRP topology changes. The following messages are seen on the VG350.

```
VG350#show spanning-tree 49
```

.....

Port 6 (GigabitEthernet0/1) of Bridge group 49 is down

Port 7 (GigabitEthernet0/2) of Bridge group 49 is forwarding

Gig0/2 is in forwarding state

```
VG350#show call active voice
```

Telephony call-legs: 1
SIP call-legs: 0
H323 call-legs: 0
Call agent controlled call-legs: 1
SCCP call-legs: 0
Multicast call-legs: 0
Total call-legs: 2

The call between Phone 1 and Phone 2 is still active.

Notice that when Gig0/1 goes down, Gig0/2 becomes the forwarding port and the BVI interface uses this physical link to communicate with the CUCM. The call switches to the stand-by connection when the first link goes down. The link switching takes about thirty seconds to switch over, during this time no audio can be heard until the network re-converges. Once the network re-converges audio is resumed.

Warning – When Gig0/1 comes back up, the call loses audio again for about thirty seconds until the Gig0/1 gets in the forwarding state. During this time no new calls can be made either. Once Gig 0/1 is in the forwarding state the call regains audio and new calls can be placed successfully.

Debugging Tips

SCCP

1. Make sure you enter the last ten digits of the BVI interface's MAC address in the SCCP gateway configuration on the CUCM.

Running Configuration

VG350

Current configuration : 3669 bytes

```
!  
hostname VG350-Crathi  
!  
stcapp ccm-group 1  
stcapp  
!  
stcapp supplementary-services  
port 4/0/24  
fallback-dn 1000  
!  
!  
bridge irb  
!  
interface GigabitEthernet0/1  
no ip address  
duplex auto  
speed auto  
bridge-group 49  
!  
interface GigabitEthernet0/2  
no ip address  
duplex auto  
speed auto  
bridge-group 49  
!  
interface BVI49  
mac-address 1111.2222.1111  
ip address 10.197.49.2 255.255.255.0  
!  
!  
router eigrp 20  
network 10.0.0.0  
eigrp stub connected summary  
!  
ip forward-protocol nd
```

```
!  
!  
no ip http server  
no ip http secure-server  
!  
!  
!  
control-plane  
!  
bridge 49 priority 65535  
bridge 49 protocol ieee  
bridge 49 route ip  
!  
voice-port 0/0/0  
!  
voice-port 0/0/1  
!  
voice-port 4/0/23  
!  
voice-port 4/0/24  
timeouts ringing infinity  
!  
voice-port 4/0/25  
!  
!  
sccp local BVI49  
sccp ccm 172.19.153.139 identifier 1 version 7.0  
sccp  
!  
sccp ccm group 1  
bind interface BVI49  
associate ccm 1 priority 1  
!  
dial-peer voice 1 pots  
service stcapp  
port 4/0/24  
!  
!  
login  
transport input all  
!  
scheduler allocate 20000 1000  
!  
end
```

Switch

Current configuration : 4528 bytes

```
!  
version 12.2  
no service pad  
!  
hostname Switch  
!  
!  
spanning-tree mode pvst  
spanning-tree extend system-id  
spanning-tree vlan 49 priority 24576  
!  
vlan internal allocation policy ascending  
!  
!  
!  
!  
interface FastEthernet0/1  
  switchport access vlan 49  
  switchport host  
  spanning-tree portfast  
!  
interface FastEthernet0/2  
  switchport access vlan 49  
  switchport host  
  spanning-tree portfast  
!  
interface FastEthernet0/3  
  switchport access vlan 30  
  switchport mode access  
!  
interface Vlan49  
  ip address 10.197.49.1 255.255.255.0  
!  
interface Vlan30  
  ip address 172.19.153.1 255.255.255.0  
!  
router eigrp 20  
  network 10.0.0.0  
  network 172.19.0.0  
!  
line con 0  
  exec-timeout 0 0
```

```
line vty 0 4  
login  
line vty 5 15  
login  
!  
end
```