Pexip Infinity and Cisco VCS

Deployment Guide

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Introduction

The Cisco TelePresence Video Communication Server (VCS) is a SIP/H.323 registrar and call control device. This guide describes how to integrate the Pexip Infinity solution within a deployment based around the VCS, using the VCS to route calls to configured conferences on potentially geographically distributed Pexip Conferencing Nodes.

Prerequisites and limitations

Cisco VCS

This guide assumes that the VCS deployment is already configured for routing calls within the domain.

Pexip Infinity does not register to a VCS. Instead, you must create a neighbor zone on the VCS for each group of Conferencing Nodes in a location. We strongly recommend that both H.323 and SIP are enabled within these zones to avoid unnecessary interworking on the VCS.

Pexip Infinity

This guide assumes that you are familiar with VCS.

It assumes that Pexip Infinity and VCS have been deployed successfully, configured with basic settings (such as an IP address, DNS and NTP servers) and are able to route calls. It also assumes that Pexip Infinity has been configured with Virtual Meeting Rooms and associated aliases appropriate to your dial plan. For complete information on how to configure your Pexip Infinity solution, see the Pexip Infinity technical documentation website at docs.pexip.com.

Dial plan and conference aliases

The examples used in this guide assume a dial plan where all Virtual Meeting Room aliases are in one of the following two formats:

- meet.<name>@example.com
- 555<extension>@example.com

It assumes that a Virtual Meeting Room, named **meet.alice**, has been configured with two aliases: **meet.alice@example.com** and **555123@example.com**.

Note that Pexip Infinity supports aliases that include a domain (e.g. **555123@example.com**), as well as aliases without a domain (e.g. just **555123**). To match a received destination alias that includes a domain, the aliases configured within Pexip Infinity must also include the same domain. If an alias configured on Pexip Infinity does not include a domain:

- calls to **<alias>** without any domain portion (e.g. **555123**) will be matched
- calls to **<alias>@<IPaddress>** (e.g. **555123@192.0.2.0**) will be matched
- calls to **<alias>@<domain>** (e.g. **555123@example.com**) will not be matched.

Domains must be configured explicitly on Virtual Meeting Room aliases. Depending on your dial plan, you may need to configure the VCS's search rules and/or transforms to ensure the Virtual Meeting Room aliases are in the expected format when received by Pexip Infinity.

Pexip Infinity configuration

In these steps, you configure Pexip Infinity to use VCS as the SIP proxy and H.323 gatekeeper for outbound calls. It involves:

- Adding a SIP proxy
- Adding an H.323 gatekeeper
- Assigning the SIP proxy and H.323 gatekeeper to a location

Adding a SIP proxy

To add VCS as a SIP proxy:

1. Go to **Call Control > SIP Proxies**.
2. Select **Add SIP proxy**.
3. Complete the following fields:

Name	Enter the name you want to use to refer to this SIP proxy. This example uses **VCS**.
Description	Enter a description of the SIP proxy. This example uses **SIP proxy to VCS**.
Address	Enter the IP address or FQDN of the VCS.
Port / Transport	Depending on your security policy, select either: ◦ **Port** of ***5060*** and **Transport** of ***TCP*** ◦ **Port** of ***5061*** and **Transport** of ***TLS***

4. Select **Save**.

Adding an H.323 gatekeeper

To add VCS as an H.323 gatekeeper:

1. Go to **Call Control > H.323 Gatekeepers**.
2. Select **Add H.323 gatekeeper**.
3. Complete the following fields:

Name	Enter the name you want to use to refer to this H.323 gatekeeper. This example uses **VCS**
Description	Enter a description of the H.323 gatekeeper. This example uses **H.323 gatekeeper to VCS**.
Address	Enter the IP address or FQDN of the VCS.
Port	Leave as the default **1719**.

4. Select **Save**.

Assigning the SIP proxy and H.323 gatekeeper to a location

This is only required if the VCS is the only route for outgoing calls from Pexip Infinity for the location.

To nominate VCS as the SIP proxy and H.323 gatekeeper to be used for outbound calls from a Pexip Infinity location:

1. Go to **Platform > Locations**.
2. Select the location.
3. From the **H.323 gatekeeper** drop-down menu, select the name of the H.323 gatekeeper added earlier (**VCS** in this example).
4. From the **SIP proxy** drop-down menu, select the name of the SIP proxy added earlier (**VCS** in this example).
5. Select **Save**.

Basic VCS configuration

This section describes the basic configuration required for integrating one VCS (or VCS cluster) and one Pexip Infinity location, by creating a new zone and configuring a search rule.

Create a new zone

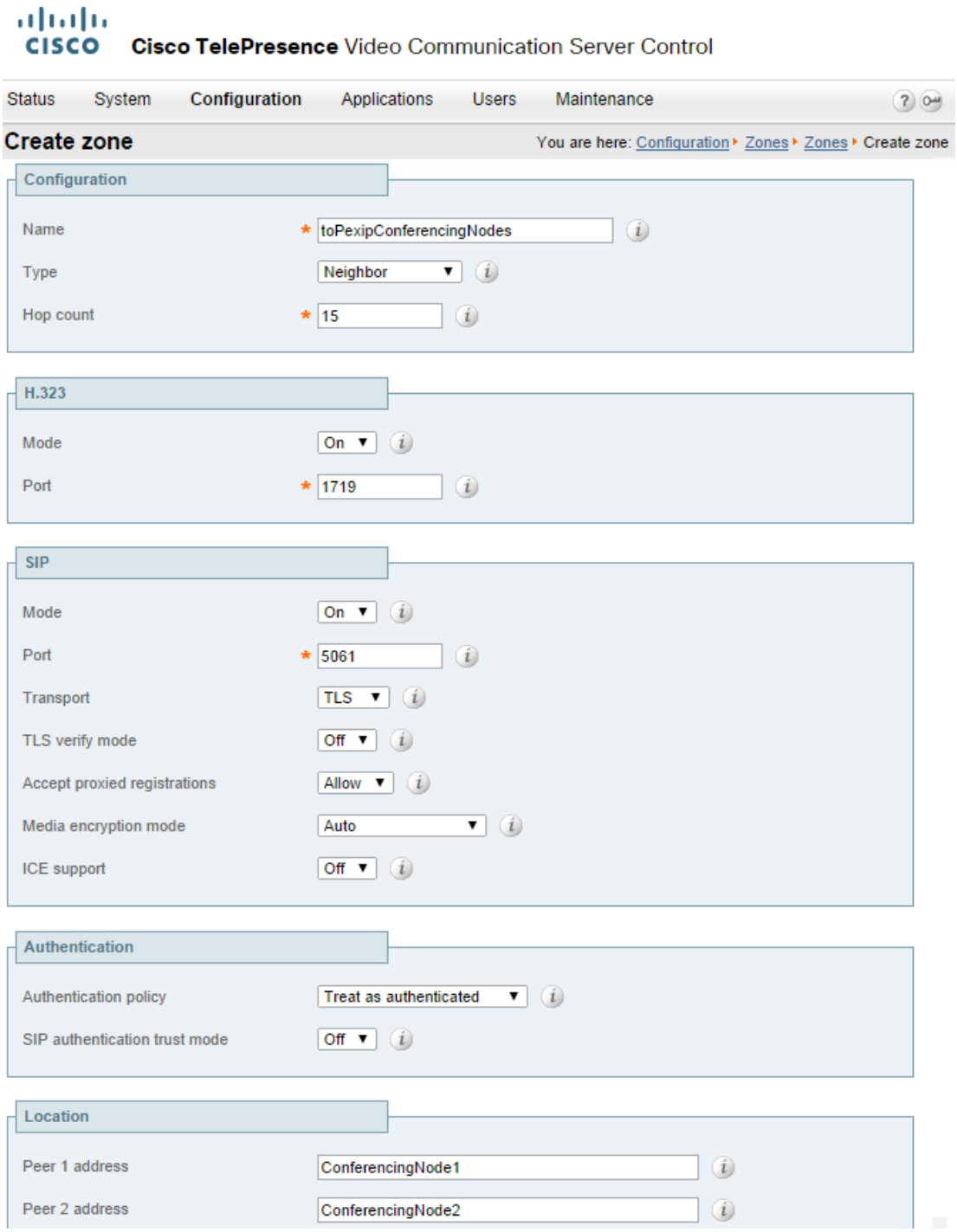
The Pexip Infinity solution is integrated with any standard H.323 gatekeeper or SIP proxy through a neighbor/trunk relationship. For calls to route appropriately to Pexip Infinity, the following configuration parameters must be set on the Cisco VCS:

1. Create a new neighbor zone specifically for the Pexip Infinity location.
2. Enable **H.323** communication and configure **port 1719** to allow H.323 calls to be routed natively to the Pexip Infinity Conferencing Node(s).
3. Enable **SIP** communications over **TLS** and **port 5061** for encrypted signaling (or **TCP** and **port 5060** for unencrypted signaling), to allow SIP calls to flow natively to the Pexip Infinity Conferencing Node(s).
4. Configure the **Authentication policy** appropriately, depending on the deployment architecture.

   If authentication is enabled within the network, we recommend using ***Treat As Authenticated***. However, from version 6, Conferencing Nodes can provide authentication credentials for SIP (but not H.323). To configure the credentials used by Pexip Infinity for SIP authentication challenges, go to **Call Control > SIP Credentials**. The realm presented by the VCS is the <System host name>.<Domain name> of the VCS performing the challenge.
5. In the **Peer addresses** fields, list the IP addresses or DNS names of the Pexip Infinity Conferencing Nodes in the location.

   If there is more than one Conferencing Node in the location, all Conferencing Node addresses should be included in the Peer addresses fields. The VCS will round-robin through these addresses when routing calls. DNS names can also be used here.

   Up to six Conferencing Nodes can be configured in this way. However, the Pexip Infinity platform can support many more Conferencing Nodes per location. If a Conferencing Node has insufficient resource available to handle media processing, this task will be seamlessly delegated to another Conferencing Node in the location (this does not necessarily need to be one of the Conferencing Nodes configured on the neighbor zone). Note, however, that for any one conference there can be a maximum of three Conferencing Nodes per location used to handle the media.
6. Click **Create zone** to create the zone on the VCS. Validate that the relevant H.323 and SIP zone status becomes active.



Creating a zone on the VCS

More comprehensive documentation of advanced VCS configuration can be found in the Cisco VCS Administrator Guide. Steps necessary for VCS configuration will vary from version to version. Cisco maintains a comprehensive repository of VCS documentation for the current major software release as well as for older software releases on their website: http://www.cisco.com/en/US/products/ps11337/products_installation_and_configuration_guides_list.html.

Create zone search rule(s)

After the zone is created, dialing rules must be configured to allow appropriate calls to route from the call control infrastructure to the Pexip Infinity Conferencing Nodes.

To do this, from the VCS **Search Rules** page, create a new search rule routing to the newly-created Pexip Infinity zone, specific to the deployment's dial plan. Because of the flexibility afforded in the VCS dialing plan, it is not possible to prescribe exact steps necessary for each installation. Some examples are provided below.

Numeric prefix dialing

If using a numeric prefix is a desired means of routing appropriate calls to Pexip Infinity (e.g. 9 + conference digits), the following parameters must be set:

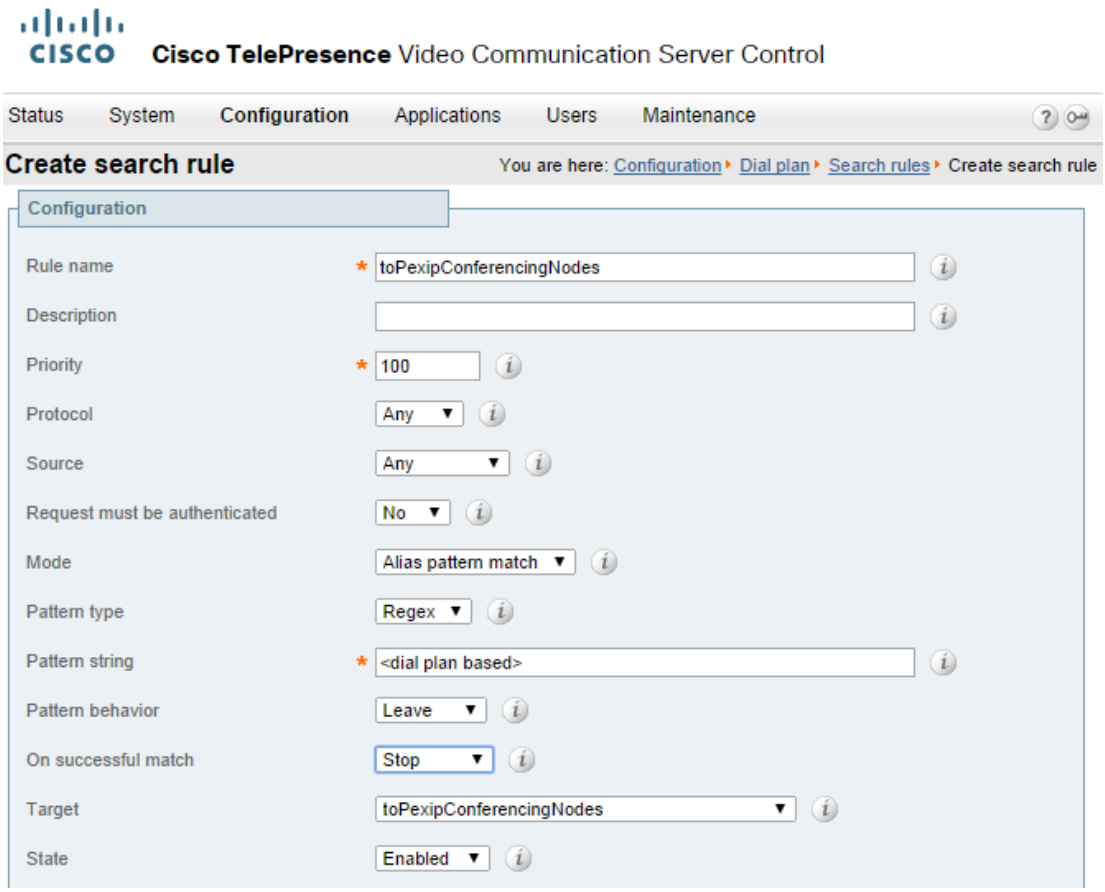
Field	Setting
Rule name	<Name for the rule>
Description	Route calls to Pexip Infinity
Priority	<This will vary depending on existing dial plan; default = 100>
Protocol	Any
Source	Any
Request must be authenticated	No
Mode	Alias pattern match
Pattern type	Prefix
Pattern string	<Dial plan specific; e.g. "9">
Pattern behavior	<Leave or Strip, depending on desired behavior>
On successful match	Stop
Target	<Zone name for the Pexip Infinity Conferencing Node>
State	Enabled

Regex pattern match

A regex pattern will offer an increased level of matching and control over the pattern being used within the dial plan. Depending on the desired behavior, a regex string may be the most appropriate way to dictate the strings desired for the Pexip Conferencing Node. The following example will route any aliases beginning with **meet.** at the **example.com** domain to the newly configured neighbor zone.

Field	Setting
Rule name	<Name for the rule>
Description	Route calls to Pexip Infinity
Priority	<This will vary depending on existing dial plan; default = 100>
Protocol	Any
Source	Any
Request must be authenticated	No
Mode	Alias pattern match

Field	Setting
Pattern type	Regex
Pattern string	<Dial plan specific; e.g. **meet\..*@example.com.***>
Pattern behavior	<Leave or Replace, depending on desired behavior>
On successful match	Stop
Target	<Zone name for the Pexip Infinity Conferencing Node>
State	Enabled



Example regex pattern match search rule

Testing the deployment

To confirm that you have successfully integrated Pexip Infinity and VCS, you need to test that endpoints registered to VCS can make calls to, and receive calls from, the Pexip Infinity platform.

Calls to Pexip Infinity

- From a SIP endpoint registered to VCS, place a call to one of your Pexip Infinity Virtual Meeting Room aliases. Use at least one other endpoint to place a call to the same Virtual Meeting Room. In this example, you would call **meet.alice@example.com**.
- Each endpoint should connect to the Virtual Meeting Room and be able to send and receive audio and video from all of the other participants.

Calls from Pexip Infinity

There are a number of ways that Pexip Infinity Conferencing Nodes can be prompted to make outbound calls. For a full list, see Automatically dialing out to a participant from a conference and Manually dialing out to a participant from a conference. For the purposes of this test, we will place the call manually using the Administrator interface, as follows:

1. From the Pexip Infinity Administrator interface, go to **Services > Virtual Meeting Rooms** and select the name of the Virtual Meeting Room from which you want to place the call. In this example we select **meet.alice**.
2. At the bottom left of the screen, select **Dial out to participant**.
3. Complete the following fields:

Field	Description
System location	Select the system location to which the Conferencing Node that you added as a belongs.
Service alias	This lists all of the aliases that have been configured for the selected Virtual Meeting Room or Virtual Auditorium. The participant will see the incoming call as coming from the selected alias.
Destination alias	The alias of the endpoint that you want to dial.
Protocol	

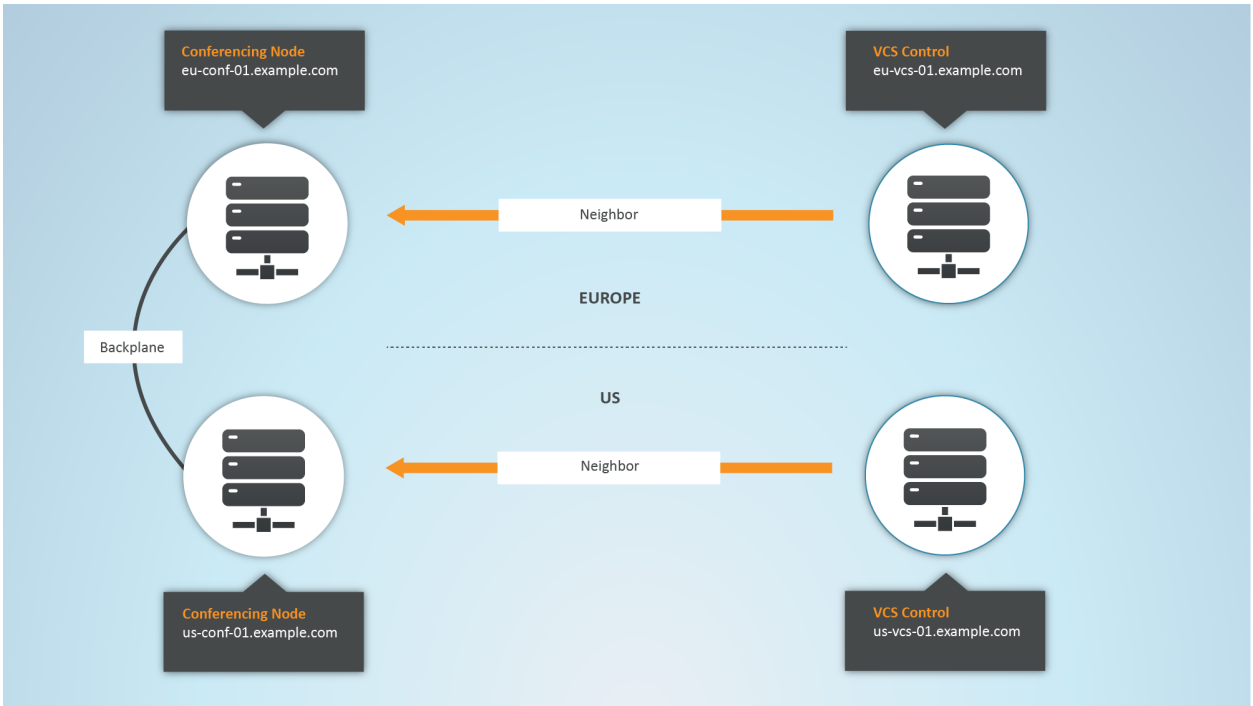
4. Select **Dial out to participant**.

The call should be received by the destination endpoint, with the call showing as coming from the selected alias. On answer, the endpoint should connect to the selected Virtual Meeting Room and be able to send and receive audio and video from all of the other participants.

Geographic distribution

The Pexip Infinity solution allows for Conferencing Nodes to be deployed in a geographically distributed manner to take advantage of bandwidth savings and help ensure the highest possible call quality. From the perspective of a VCS, geographic distribution can take different forms, depending on the infrastructure available internal to the deployment. For illustrative purposes, this deployment guide describes a **multiple zone** configuration and a **multiple subzone** configuration.

Multiple zones



Example deployment with 2 VCS zones and 2 Conferencing Nodes

If multiple VCSs are dispersed throughout a WAN, call routing to Conferencing Nodes should be considered independently for each zone. The Pexip Infinity solution will ensure, for calls where more than one Conferencing Node is involved, that there is an appropriate connection between them.

In the illustrated case that follows, Conferencing Nodes are deployed in Europe and North America, the North America local VCS will route all calls destined for the Pexip Infinity solution directly to the local North America Conferencing Node. Similarly, all calls local to the European VCS would be routed directly to the European Conferencing Node.

Configuration of the VCSs within a network will be similar to the initial example in this deployment, with the only difference being that each of the geographic locales will be routed specifically to the local Conferencing Node. If there are multiple Conferencing Nodes in each location, then as before this can be configured on the VCS neighbor zone, and the VCS will round-robin between these nodes.

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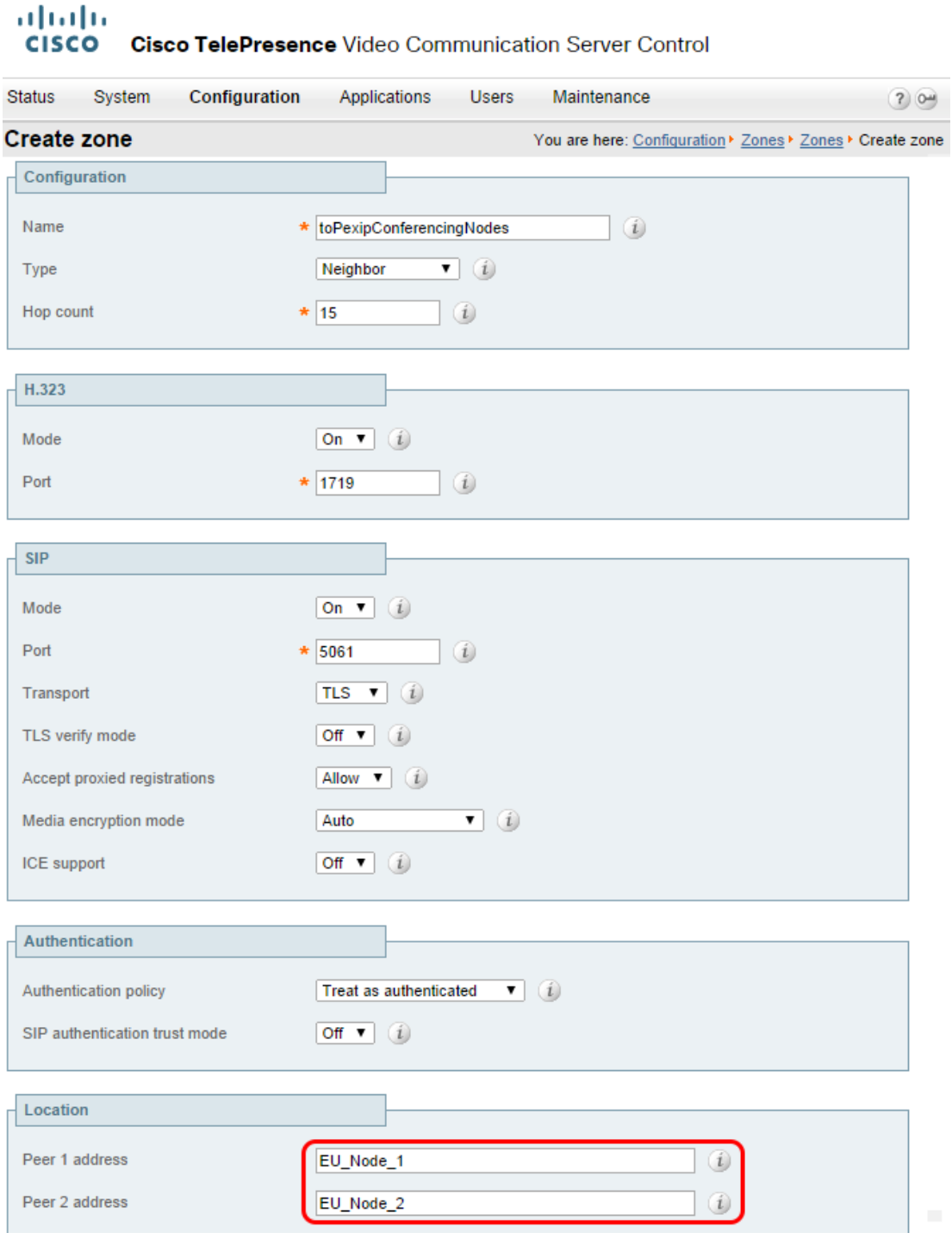
EU-specific configuration

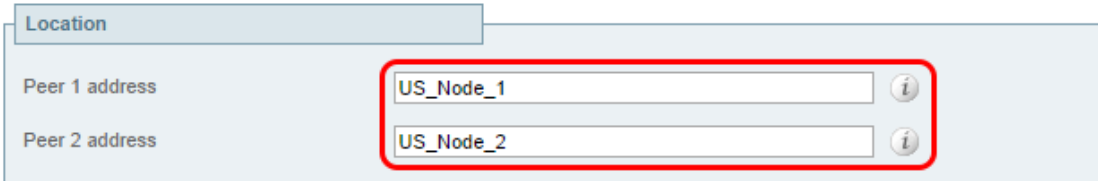
The example screen shot shown below offers an example of how a European-specific VCS could be configured to route appropriate calls to two local Conferencing Nodes named **EU_Node_1** and **EU_Node_2**.



EU-specific zone configuration

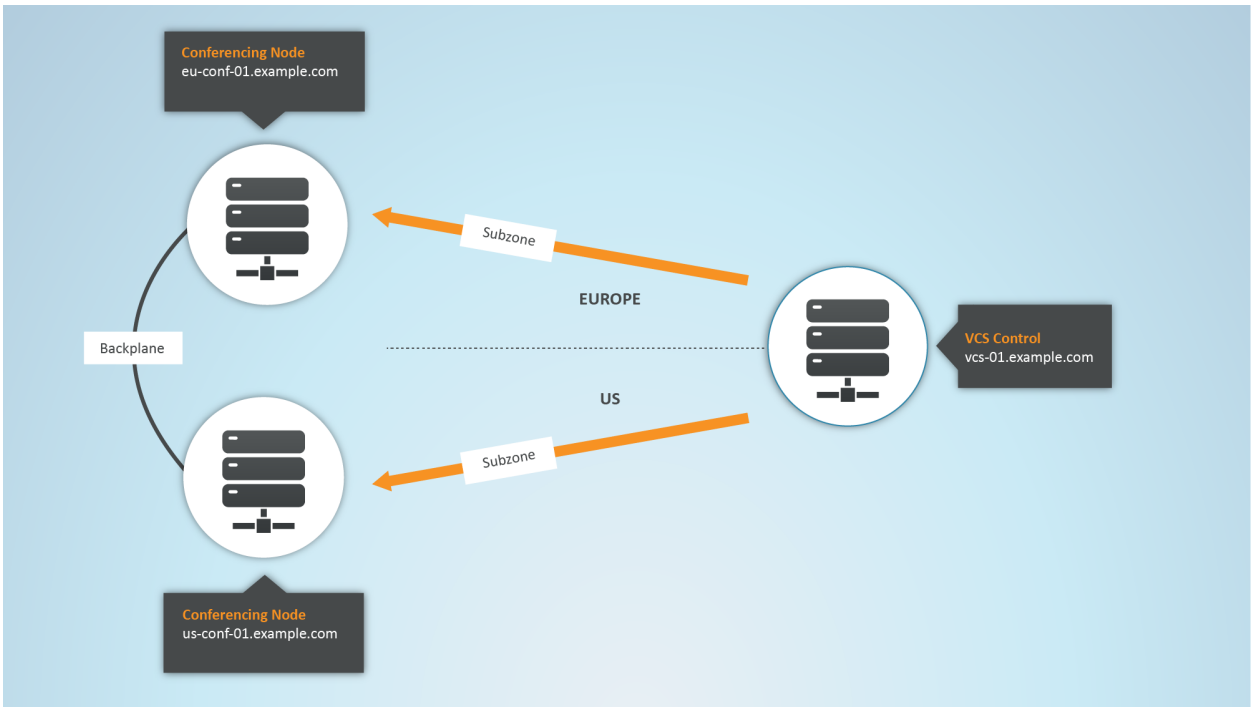
North America-specific configuration

The North America-specific VCS could then be configured to route appropriate calls to its local Conferencing Nodes. The zone configuration settings will be the same as for the European zone except in this case the peer addresses will refer to Conferencing Nodes located in the US, for example **US_Node_1** and **US_Node_2**.



North America-specific zone configuration

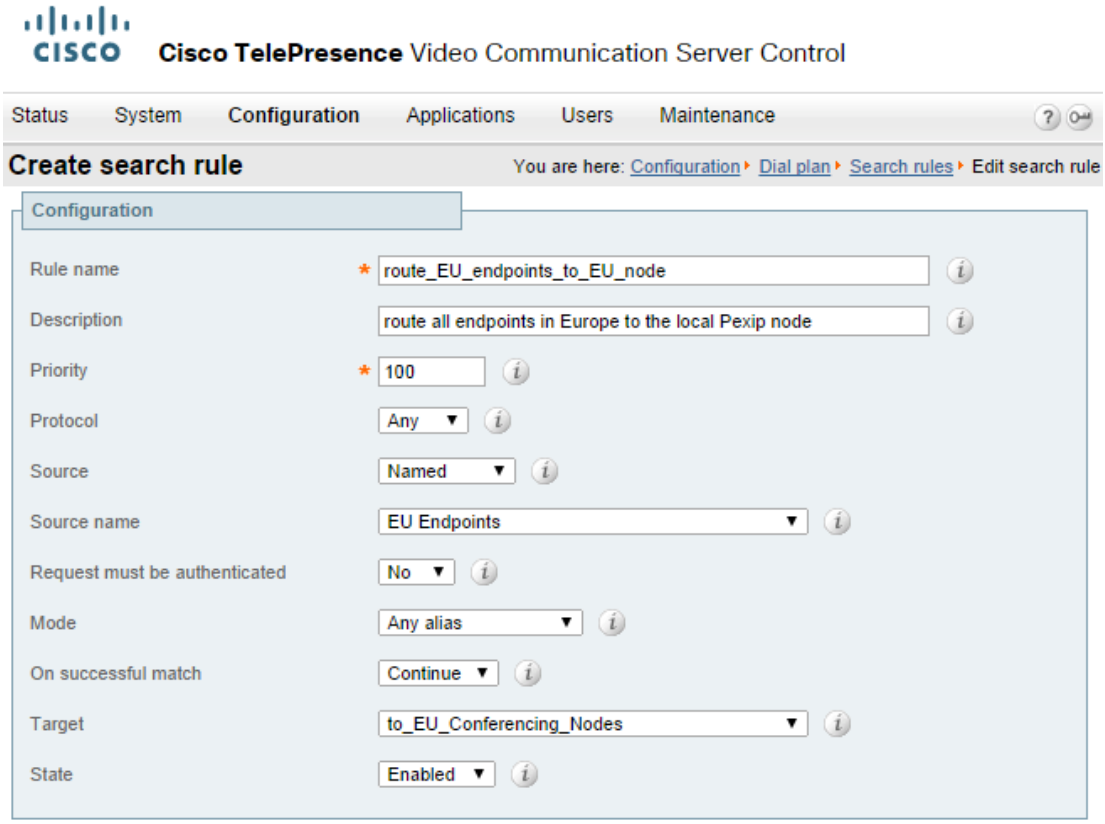
Single zone, multiple subzones



Example deployment with 1 zone with multiple subzones, and 2 Conferencing Nodes

As the diagram above illustrates, distribution of multiple Pexip Conferencing Nodes from a single VCS can still leverage the bandwidth savings associated with geographic call routing. Instead of routing calls by independent VCSs as was described in the previous example, routing will occur based on subzones within the single VCS. Specifically, calls originating from EU-based endpoints (and contained within a classifying subzone) will be routed to the EU Conferencing Node; calls originating from endpoints in North America (and contained within a classifying subzone) will be routed to the North American Conferencing Node; and so on.

Although the zone setup will be similar to that of the previous example, search rules will differ from the localized VCS configuration. In this example, the configured call source will need to be "Named" and include the name of the subzone containing the location-specific endpoints. An example of an EU-specific search rule is shown below.



Example search rule routing calls from a specific subzone to a specific Conferencing Node

Using Multiway with Pexip Infinity

Multiway™ is a Cisco TelePresence feature that allows an endpoint user to transfer an established point-to-point call to an MCU, so that more participants can join the conference.

If your deployment includes endpoints that support Cisco TelePresence Multiway, you can configure these endpoints to use Pexip Infinity Virtual Meeting Rooms for Multiway conferences.

For full information on Multiway, see the *Cisco TelePresence Multiway Deployment Guide* (http://www.cisco.com/c/en/us/support/unified-communications/telepresence-video-communication-server-vcs/products-installation-and-configuration-guides-list.html).

Example scenario

The sections below describe how to enable the following example scenario:

- Alice makes a point-to-point call to Bob.
- They want to include Charlie in the conversation, so Alice puts Bob on hold, calls Charlie, and then **Joins** the calls together.
- All 3 participants are dialed in to a Virtual Meeting Room on Pexip Infinity.

Configuring endpoints using xConfiguration commands

The xConfiguration commands used to enable Multiway vary depending on the endpoint. Below are example commands for some more common endpoints, showing how to configure them with the alias **meet.alice@example.com**.

E20

```
xConfiguration SystemUnit MultiwayURI: "meet.alice@example.com"
```

MXP

```
xConfiguration Multipoint Mode: Multiway
xConfiguration Multipoint MultiwayURI: "meet.alice@example.com"
```

T150

```
xConfiguration Multipoint MultiwayURI: "meet.alice@example.com"
```

Deployments using VCS Conference Factory

The VCS Conference Factory application dynamically generates a unique conference alias for the Multiway conference. When the VCS Conference Factory application is used for Multiway, all endpoints must be configured with the same Multiway alias. When this alias is dialed by the initiating endpoint, it creates a query to the VCS for the alias that will be used for the conference. The VCS generates an alias based on its Conference Factory configuration, and all endpoints then dial this alias to access the Virtual Meeting Room. This means that all possible aliases that could be generated by the VCS must be configured on Pexip Infinity and each must be associated with a unique Virtual Meeting Room.

Endpoint configuration

All endpoints must be configured with the same Multiway alias. In this example, they are all configured to use the alias **pexip.multiway**.

VCS configuration

In this example, we will configure the VCS to generate aliases in the range **multiway1@example.com** to **multiway9@example.com** whenever a Multiway call is initiated. Note that a range of 9 is for example purposes only and is too small for most deployments.

On the VCS, go to **Applications > Conference Factory** and configure it as follows:

Field	Setting
Mode	On
Alias	pexip.multiway
Template	multiway%%@example.com
Number range start	1
Number range end	9

Pexip Infinity configuration

On Pexip Infinity, we create 9 Virtual Meeting Rooms specifically for use by Multiway, and to each we assign one of the 9 aliases.

We could do this manually for each alias by going to **Services > Virtual Meeting Rooms** and selecting **Add Virtual Meeting Room**. However, we can also use Pexip Infinity's importing configuration feature, so instead we select **Import**, and import the following CSV file:

```
multiway1,,,,,multiway1@example.com,
multiway2,,,,,multiway2@example.com,
multiway3,,,,,multiway3@example.com,
multiway4,,,,,multiway4@example.com,
multiway5,,,,,multiway5@example.com,
multiway6,,,,,multiway6@example.com,
multiway7,,,,,multiway7@example.com,
multiway8,,,,,multiway8@example.com,
multiway9,,,,,multiway9@example.com,
```

This creates a Virtual Meeting Room with the name **multiway1** and an alias of **multiway1@example.com**; another with the name **multiway2** and an alias of **multiway2@example.com**; and so on for all 9 aliases.