Cisco TelePresenceConductor Clustering with Cisco VCS (B2BUA)

Deployment Guide

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TelePresence Conductor XC4.2

Cisco VCS X8.5.3

Contents

Introduction

About Cisco TelePresence Conductor Clustering

Clusters of Cisco TelePresence Conductors are used to provide redundancy in the rare case of the failure of an individual TelePresence Conductor (for example, due to a network or power outage). Each TelePresence Conductor is a peer of the other TelePresence Conductors in the cluster.

The process to create clusters of TelePresence Conductors depends upon whether the TelePresence Conductor cluster is communicating with a Cisco Video Communications Server (Cisco VCS) or a Cisco Unified Communications Manager (Unified CM).

If the call control platform is the Cisco VCS and this has been configured to use the TelePresence Conductor, the configuration and conference status data is shared between all peers in the TelePresence Conductor cluster. When the Cisco VCS detects that one TelePresence Conductor has failed, it automatically contacts a different TelePresence Conductor, which responds exactly as the failed one would. This process is transparent to the user and offers virtually no interruption in service.

Connections between a TelePresence Conductor cluster and Cisco TMSPE behave differently. In Cisco TMS you can specify only a single TelePresence Conductor peer. If that peer fails you must manually add a different TelePresence Conductor peer.

About this Document

This document assumes that one standalone TelePresence Conductor has already been configured to work with a Cisco VCS and conference bridges according to the *Cisco TelePresence Conductor with Cisco VCS (B2BUA) Deployment Guide*. This document provides details on how to extend the deployment with Cisco VCS using the TelePresence Conductor's back-to-back user agent (B2BUA) to use a cluster of up to two TelePresence Conductors.

The topics covered in this document are:

- Creating an initial cluster peer
- Adding a peer to a cluster
- Removing a TelePresence Conductor peer
- Upgrading a cluster of TelePresence Conductors

Related Documentation

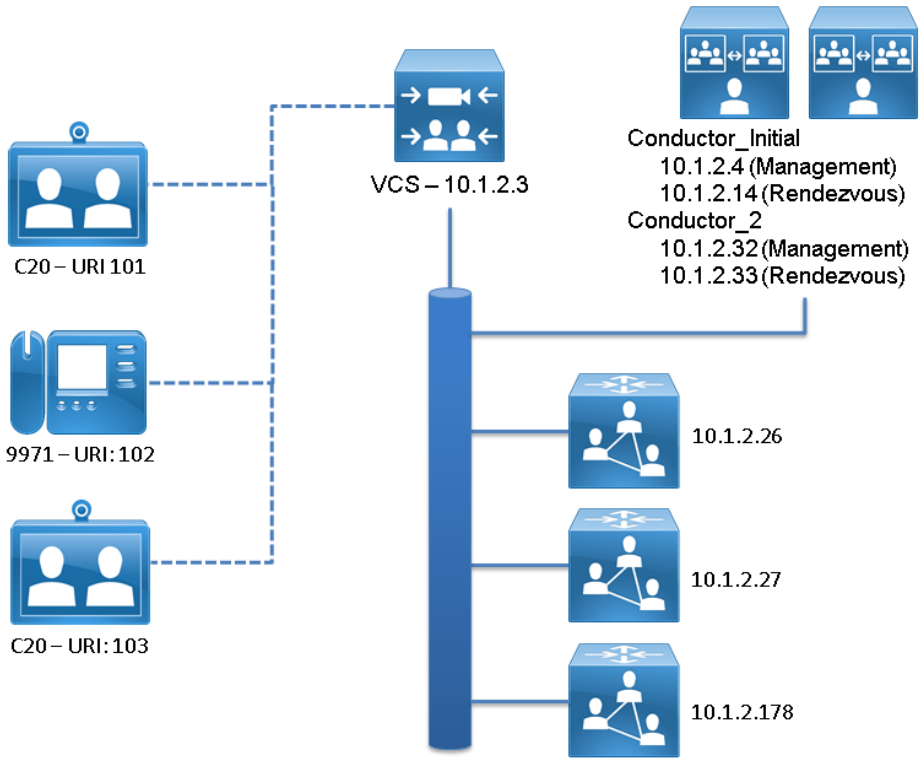
For more information on how to integrate a TelePresence Conductor cluster with a Cisco VCS in a deployment using the Cisco VCS's external policy server interface see *Cisco TelePresence Conductor Clustering with Cisco VCS (Policy Service) Deployment Guide*.

For more information on how to integrate a TelePresence Conductor cluster with Unified CM see *Cisco TelePresence Conductor Clustering with Cisco Unified CM Deployment Guide*.

For more information on how to deploy Cisco VCS, TelePresence Conductor, and the conference bridges in an end-to-end secure network see *Cisco TelePresence Conductor with Cisco VCS (B2BUA) Deployment Guide*.

Example Network Deployment

This document uses the example network shown in the diagram below as the basis for the deployment configuration described.



Cisco VCS

The Cisco Video Communications Server (Cisco VCS) acts as a call processor for video devices. It has a built in Gatekeeper, SIP Registrar, performs IPv4 to IPv6 conversions, performs H323 to SIP and SIP to H323 interworking, and provides H460 firewall traversal support. The Cisco VCS works with other infrastructure devices in the network to process the calling requests and direct or route them to the appropriate destination.

Conference Bridges

Conference bridges are network devices that enable multipoint conferences for endpoints by decoding and re-encoding the streams from the different endpoints and sending a single stream to each endpoint. This version of the TelePresence Conductor supports the conference bridge types TelePresence MCU and TelePresence Server.

Endpoints

Endpoints are devices that receive and make video calls. They can be software clients on PCs and Macs such as Jabber Video, desktop endpoints such as the 9971 and EX90, or room systems such as the MX300.

Creating a TelePresence Conductor Cluster

Prerequisites

Before starting the configuration, ensure you have met the following criteria:

- Each TelePresence Conductor that is supposed to be added to the cluster must be running the same version of XC software. See *Cisco TelePresence Conductor Administrator Guide* for information on upgrading a TelePresence Conductor.
- If using full capacity TelePresence Conductors, Cisco recommends a maximum of two peers in a clustered deployment and all peers must be full capacity versions.
  Note: If you currently deploy three-node clusters, you should consider removing a node. Cisco may discontinue the ability to add a third node to a cluster in a future software release
- If using TelePresence Conductor Select, up to two peers can be clustered and both peers must be a TelePresence Conductor Select.
- One TelePresence Conductor, the Cisco VCS and the conference bridges must be configured according to the *Cisco TelePresence Conductor with Cisco VCS (B2BUA) Deployment Guide*.
- The remaining TelePresence Conductor peers must be configured according to the tasks in section "Configuring the TelePresence Conductor" in the *Cisco TelePresence Conductor with Cisco VCS (B2BUA) Deployment Guide*.
- All TelePresence Conductor cluster peers must be configured to use either the same NTP servers, or NTP servers that are very closely synchronized. The NTP servers can be viewed and configured on the **Time** page (**System > Time**).
- All TelePresence Conductor cluster peers must have one unique IP address for management plus one unique additional IP address for all Cisco VCS rendezvous conferences.
- If peers are deployed on different LANs, there must be sufficient connectivity between the networks to ensure a low degree of latency between the peers - a maximum delay of 15ms one way, 30ms round-trip.
- For information on the ports that must be open between the TelePresence Conductor peers see Appendix 1: IP Ports and Protocols, page 17.
- All TelePresence Conductor cluster peers must be reachable using HTTPS from the Cisco VCS(s) from which they are going to receive conferencing requests.
- Conference bridges in use by TelePresence Conductor must be reachable over HTTPS and/or HTTP on a per-conference-bridge basis.
- We highly recommend that you take a backup on the initial cluster peer before adding it to the cluster.

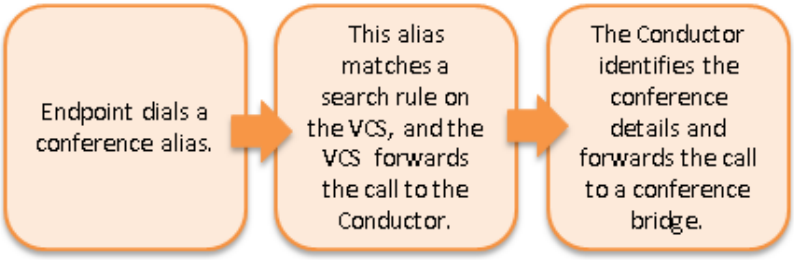
Note: The total license capacity of Personal Multiparty (PMP) or Shared Multiparty (SMP) license option keys in a cluster is the sum of the individual PMP or SMP keys configured on each peer in the cluster.

Integration Overview

The Cisco TelePresence Conductor integrates tightly with the Cisco TelePresence Video Communication Server (Cisco VCS).

The Cisco VCS receives calls from its registered endpoints and routes the calls via a SIP trunk to the TelePresence Conductor's back-to-back user agent (B2BUA). The SIP trunk can be set up between the Cisco VCS and a single TelePresence Conductor or a cluster of up to two TelePresence Conductors.

The diagram below explains the call flow including the relationship between the Cisco VCS and TelePresence Conductor:



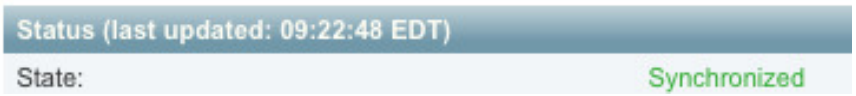
The following tasks in this document will focus on what needs to be configured on the TelePresence Conductor to create the initial peer of a cluster, add an additional peer to the cluster, and how to remove a peer from the cluster.

Creating an Initial Cluster Peer

Task 1: Checking configuration

1. Decide which TelePresence Conductor is to be the initial peer. For the purposes of this example, we shall refer to this peer as **Conductor_Initial**.

   Note: The configuration of this system will be shared with all other peers as they are added to the cluster, unless the configuration is peer-specific. For information on which configuration is peer-specific see Peer-specific Configuration, page 15.
2. Ensure that no other TelePresence Conductor is using **Conductor_Initial**'s IP address in their clustering peers list. To do this:
   a. Log into every TelePresence Conductor as a user with administrator rights.
   b. Go to **System > Clustering**.
   c. Ensure that all **Peer X IP address** fields (x = 1, 2, and 3) on this page do not have **Conductor_Initial**'s IP address. If they do, delete that Peer IP address.
   d. Click **Save**.
   e. Go to **Maintenance > Restart options**.
   f. Click **Restart**.
3. Log into **Conductor_Initial** as a user with administrator rights.
4. Ensure that **Conductor_Initial** has a valid and working NTP server configured:
   a. Go to **System > Time**.
   b. In the **Status** section at the bottom of the page, the **State** should be *Synchronized*:



5. Ensure that **Conductor_Initial** has at least one valid DNS server configured.

   Go to **System > DNS** to verify DNS settings.
6. Ensure that **Conductor_Initial** has the correct **Domain name** and **System host name** configured.

   Note: <System host name>.<domain name> = FQDN of this TelePresence Conductor.

   Go to **System > DNS** to verify DNS settings.

7. Ensure that **Conductor_Initial** has no other TelePresence Conductor peers configured on this system:
   a. Go to **System > Clustering**.
   b. Ensure that all **Peer x IP address** fields (x = 1, 2, and 3) on this page are blank. If not, delete any entries.
   c. Click **Save**.
8. Ensure that **Conductor_Initial** has no Cluster pre-shared key configured:
   a. Go to **System > Clustering**.
   b. If a value is in **Cluster pre-shared key** field, delete the entry.
   c. Click **Save**.
   d. Go to **Maintenance > Restart options**.
   e. Click **Restart**.

Task 2: Configuring IP addresses

1. On **Conductor_Initial**, go to **System > Clustering**.
2. Enter the following values in the relevant fields:

Field	Values
Cluster pre-shared key	Enter a password (this will be the same for all peers).
Peer 1 IP address	Enter the IP address of this Conductor peer, **Conductor_Initial** (this is the initial peer in the cluster from which the initial configuration will be replicated from to all other peers in the cluster).
Peer 2 IP address	Leave blank at this point in the configuration.
Peer 3 IP address	Leave blank at this point in the configuration.

3. Click **Save**.
4. Go to **Maintenance > Restart options**.
5. Click **Restart**.
6. Log into **Conductor_Initial** as a user with administrator rights.
7. Go to **System > Clustering**.
8. Verify that it says 'This system' in green next to the peer 1 IP address.

Adding a Peer to a Cluster

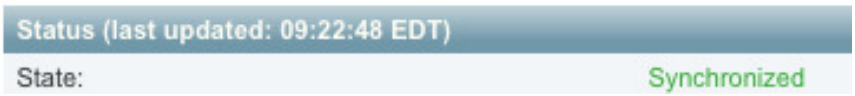
Task 3: Configuring the cluster to accept the new peer

On each existing cluster peer (i.e. the initial peer and any other peer that has already been added to the cluster):

1. Log into the initialTelePresence Conductor, **Conductor_Initial**, as a user with administrator rights.
2. Go to **System > Clustering**.
3. In the **Peer 2 IP address** field, enter the new peer's IP address. For the purposes of this example we shall refer to this peer as **Conductor_2**.
4. Click **Save**.
5. It is normal for the peer to not show as 'Active' yet at this stage of the configuration process.
6. Go to **Maintenance > Restart options**.
7. Click **Restart**.

Task 4: Checking configuration

1. Log into the new peer, **Conductor_2**, as a user with administrator rights.
2. Ensure that **Conductor_2** has a valid and working NTP server configured:
   a. Go to **System > Time**.
   b. In the **Status** section at the bottom of the page, the **State** should be *Synchronized*:

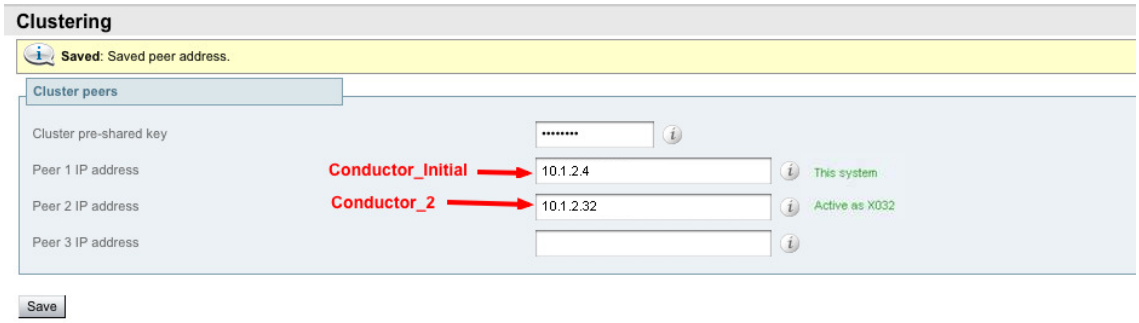


3. Ensure that **Conductor_2** has at least one valid DNS server configured.
   Go to **System > DNS** to verify DNS settings.
4. Ensure that **Conductor_2** has the correct **Domain name** and **System host name** configured:
   Note: <System host name>.<domain name> = FQDN of this TelePresence Conductor.
   Go to **System > DNS** to verify DNS settings.
5. Ensure that **Conductor_2** has no other TelePresence Conductor peers configured on this system:
   a. Go to **System > Clustering**.
   b. Ensure that all **Peer x IP address** fields on this page are blank. If not, delete any entries and click **Save**.
6. Ensure that **Conductor_2** has no **Cluster pre-shared key** configured:
   a. Go to the **Clustering** page (**System > Clustering**).
   b. If a value is in **Cluster pre-shared key** field, delete the entry.
   c. Click **Save**.
   d. Go to **Maintenance > Restart options**.
   e. Click **Restart**.

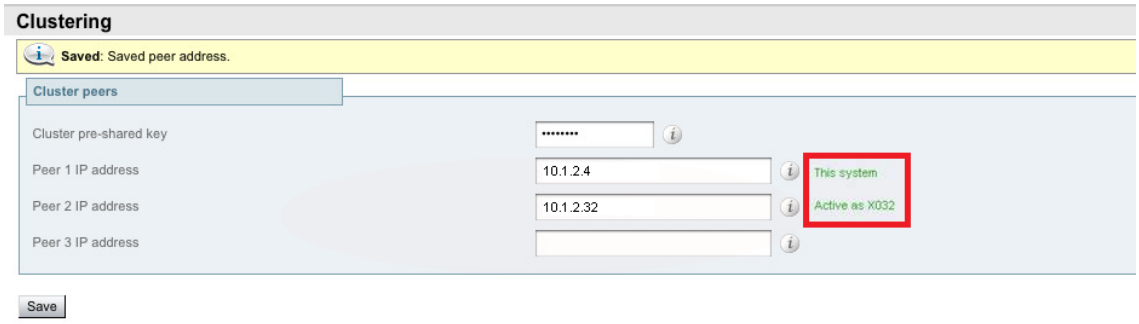
Task 5: Configuring the new peer to join the cluster

1. On this peer, go to the **Clustering** page (**System > Clustering**).
2. In the **Cluster pre-shared key** field, enter the same password that was used for the initial peer, **Conductor_Initial**.
3. In the **Peer 1 IP address** field, enter the IP address of the initial peer, **Conductor_Initial**.

4. In the **Peer 2 IP address** field, enter the IP addresses of the local TelePresence Conductor, **Conductor_2**.



5. Click **Save**.
6. Go to **Maintenance > Restart options**.
7. Click **Restart**.
8. Log into **Conductor_2** as a user with administrator rights.
9. Go to **System > Clustering**.
10. Verify that it says 'This system' in green next to peer 1 and 'Active as xxx' in green next to peer 2.

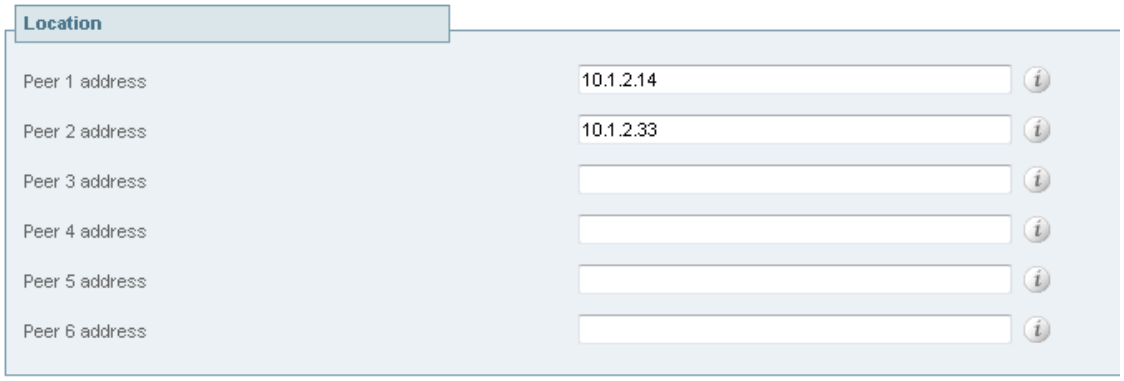


Task 6: Configuring the Cisco VCS to use the new cluster peer

For every Cisco VCS that communicates with the TelePresence Conductor cluster directly:

1. Log into the Cisco VCS (or if the Cisco VCS is clustered, the master Cisco VCS in the cluster) as a user with administrator privileges.
2. Go to **Configuration > Zones > Zones**.
3. Select the neighbor zone that you created for TelePresence Conductor in the *Cisco TelePresence Conductor with Cisco VCS (B2BUA) Deployment Guide*.

4. In the uppermost blank **Peer x address** field (x = 1, 2, or 3), enter the additional IP address for Cisco VCS rendezvous conferences (not the management IP address) of the TelePresence Conductor peer you have added to the cluster.



5. Click **Save**.

Note: In a Conductor cluster, when one of the cluster peers regains network connectivity after losing it, the bridges may become unavailable for up to 5-6 minutes, as shown in the conference bridge status. After this unavailable period, the bridge services are restored and calls can be made.

Creating a System Backup

To create a backup of TelePresence Conductor system data:

1. Go to **Maintenance > Backup and restore**.
2. Optionally, enter an **Encryption password** with which to encrypt the backup file.

   If a password is specified, the same password will be required to restore the file.
3. Click **Create system backup file**.
4. After the backup file has been prepared, a pop-up window appears and prompts you to save the file (the exact wording depends on your browser). The default name is in the format:
   <software version>_<hardware serial number>_<date>_<time>_backup.tar.gz.

   (The file extension is normally **.tar.gz.enc** if an encryption password is specified. However, if you use Internet Explorer to create an encrypted backup file, the filename extension will be **.tar.gz.gz** by default. These different filename extensions have no operational impact; you can create and restore encrypted backup files using any supported browser.)

   The preparation of the system backup file may take several minutes. Do not navigate away from this page while the file is being prepared.
5. Save the file to a designated location.

Log files are not included in the system backup file.

Note: A system backup can only be restored to the peer from which the backup was taken.

For more information see *Cisco TelePresence Conductor Administrator Guide* or the TelePresence Conductor's online help.

Removing a TelePresence Conductor Peer

Task 1: Placing the peer in standalone mode

Before removing a live peer from a cluster, you must place the peer in standalone mode so that it no longer communicates with other peers in the cluster. If the peer is out of service and can no longer be accessed, you do not need to place it in standalone mode. However, you must still follow the instructions to remove it from the cluster in the next section:Task 2: Updating all other peers in the cluster, page 12.

To place a peer into standalone mode:

1. Log in to the peer to be removed from the cluster as a user with administrator privileges.
2. Go to **System > Clustering**..
3. Delete the **Cluster pre-shared key**value.
4. Delete all entries from the **Peer IP address** fields.
5. Click **Save**.
6. Go to **Maintenance > Restart options**.
7. Click **Restart**. When the TelePresence Conductor has restarted, it will be in standalone mode
8. Log in to the TelePresence Conductor as a user with administrator privileges.
9. Go to **Conference configuration > Conference bridges**.
10. Delete all conference bridge entries.
11. Log into the Cisco VCS (or if the Cisco VCS is clustered the master Cisco VCS in the cluster) as a user with administrator privileges.
12. Go to **Configuration > Zones > Zones**.
13. Click on the neighbor zone for the TelePresence Conductor cluster.
14. From the relevant **Peer x address** (x = 1, 2, or 3) field, delete the IP address of the TelePresence Conductor that is being placed in standalone mode.
15. Click **Save**.

Task 2: Updating all other peers in the cluster

After the peer to be removed has been placed in standalone mode (or if the peer is out of service and cannot be contacted), you must update all other peers in the cluster so they no longer consider the removed peer to be part of their cluster.

To do this, on each remaining peer in the TelePresence Conductor cluster:

1. Go to **System > Clustering**.).
2. From the relevant **Peer x IP address** field (x = 1, 2, or 3), delete the IP address of the peer that has been removed from the cluster.
3. Click **Save**.
4. Repeat these steps on each remaining peer.

Upgrading a Cluster of TelePresence Conductors

The process described here is essentially disbanding, upgrading and then reclustering a cluster of TelePresence Conductors. In order to prevent downtime, one peer in the cluster is upgraded separately to the others, so that there is always at least one peer active and able to service conference requests from the Cisco VCSs until all peers have been upgraded and re-clustered.

Task 1: Reconfiguring the Cisco VCS

This task involves choosing one peer in the cluster to be the last to be upgraded. This cluster peer will service conference requests from the Cisco VCSs until the other peers have been upgraded and re-clustered.

For every Cisco VCS that communicates directly with TelePresence Conductor:

1. Go to the Cisco VCS web interface and log in as a user with administrator privileges.
2. Go to **Configuration > Zones > Zones**.
3. Click **View/Edit** for the TelePresence Conductor neighbor zone.
4. Delete all but one of the **Peer x addresses** (x = 1, 2, and 3), leaving only the address of the peer to be upgraded last.
5. Click **Save**.

Task 2: Removing the peers from the cluster

The purpose of this task is to remove from the cluster all the TelePresence Conductor peers that are going to be upgraded first.

For each peer in the cluster that is to be upgraded first, complete the steps outlined in Task 1: Placing the peer in standalone mode, page 12 and Task 2: Updating all other peers in the cluster, page 12.

Task 3: Upgrading the peers that have been removed from the cluster

For each TelePresence Conductor peer that has been removed from the cluster:

1. Log in as a user with administrator privileges.
2. Go to **Maintenance > Upgrade**.
3. Click **Browse** and select the TelePresence Conductor software image.
4. Click **Upgrade**.
5. Follow the onscreen prompts.

Task 4: Re-clustering the upgraded peer(s)

If you have only one upgraded peer (i.e. you started with a cluster of two) follow the tasks outlined in Creating an Initial Cluster Peer, page 7.

If you have two upgraded peers (i.e. you started with a cluster of three):

1. For the first peer, follow the tasks outlined in Creating an Initial Cluster Peer, page 7, then
2. For the second peer, follow the tasks outlined in Adding a Peer to a Cluster, page 9.

Task 5: Configuring the Cisco VCS(s) to point at the upgraded TelePresence Conductor peer(s)

For every Cisco VCS that communicates directly with TelePresence Conductor:

1. Go to the Cisco VCS web interface and log in as a user with administrator privileges.
2. Go to **Configuration > Zones > Zones**.
3. Select the TelePresence Conductor neighbor zone.
4. Delete the **Peer x address** (x = 1, 2, or 3) of the peer that has not been upgraded, and insert the addresses of the peers that have been upgraded.
5. Click **Save**.

Task 6: Upgrading the remaining cluster peer

On the TelePresence Conductor peer that has not been upgraded:

1. Go to the web interface and log in as a user with administrator privileges.
2. Go to the **Clustering** page (**System > Clustering**).
3. Delete the **Cluster pre-shared key** value.
4. Delete all entries from the **Peer IP address** fields.
5. Click **Save**.
6. Go to **Maintenance > Restart options**.
7. Click **Restart**. When the TelePresence Conductor has restarted, it will be in standalone mode.
8. Log in as user with administrator privileges.
9. Go to **Maintenance > Upgrade**.
10. Click **Browse** and select the TelePresence Conductor software image.
11. Click **Upgrade**.
12. Follow the onscreen prompts.

Task 7: Adding the remaining peer back into the cluster

Follow the tasks outlined in Adding a Peer to a Cluster, page 9.

Peer-specific Configuration

Most items of configuration are applied to all peers in a cluster. However, the following items must be specified separately on each cluster peer.

Cluster Configuration

The list of Peer IP addresses (including the peer's own IP address) that make up the cluster has to be specified on each peer and they **must** be identical on each peer (the order in which they appear is not important).

The cluster pre-shared key has to be specified on each peer and **must** be identical for all peers.

Ethernet

The Ethernet speed is specific to each peer. Each peer may have slightly different requirements for the connection to their Ethernet switch.

IP

Note: Never change the Primary LAN 1 IP address of a TelePresence Conductor that is part of a cluster. The only IP settings that can be changed when the system is part of a cluster are the additional IPv4 addresses.

The IPv4 address is specific to each peer. It **must** be different for each peer in the cluster.

The IPv4 subnet mask is specific to each peer. It can be different for each peer in the cluster.

The IPv4 gateway is specific to each peer. Each peer can use a different gateway.

Any additional IPv4 addresses added for use with Unified CM must be different for each peer in the cluster.

System Host Name and Domain

The system host name is specific to each peer. We recommend that it is different for each peer in the cluster so that you can easily identify each system.

The DNS domain name is specific to each peer.

DNS Servers

DNS servers are specific to each peer. Each peer can use a different set of DNS servers.

Time

The NTP servers are specific to each peer. Each peer may use one or more different NTP servers.

The time zone is specific to each peer. Each peer may have a different local time.

SNMP

SNMP settings are specific to each peer. They can be different for each peer.

Logging

The **Event Log** and **Configuration Log** on each peer will only report activity for the local TelePresence Conductor.

The list of remote syslog servers is specific to each peer. We recommend that you set up a remote syslog server to which the logs of all peers can be sent. This will allow you to have a global view of activity across all peers in the cluster.

Security Certificates

The Trusted CA Certificate and Server Certificate used by the TelePresence Conductor are specific to each peer. They must be uploaded individually on each peer.

Administration Access

The SSH service and LCD panel settings are specific to each peer. They can be different for each peer.

Root account Password

The password for the root account is specific to each peer. Each peer may have a different password, and for security reasons we recommend that they do.

Note: The username and password for the administrator account is shared across peers.

Locations

All ad hoc or rendezvous IP addresses assigned to Locations must be different for each peer in the cluster.

Troubleshooting

Unable to Cluster the TelePresence Conductor

When running a TelePresence Conductor without a valid release key (as TelePresence Conductor Essentials) clustering is not supported. Contact your Cisco account representative to obtain release key and option keys.

Appendix 1: IP Ports and Protocols

External Firewalls Between Peers

It is unusual to have any sort of external firewall between cluster peers, but if there is, the IP protocols and ports that must be open between each and every TelePresence Conductor peer in the cluster are listed below.

For cluster communications between TelePresence Conductor peers:

- TCP port 4371 is used for cluster recovery (over TLS)
- TCP port 4372 is used for cluster database synchronization (over TLS)

Firewall Rules on the Peers

If you are using the TelePresence Conductor's built-in **Firewall rules** feature, make sure that your rules allow the following connections:

Table 1 Clustering Connections

Purpose	Protocol	Source	Port	Destination	Port
Cluster communication	TCP/TLS	Other peers	Ephemeral	This peer	4372
Cluster recovery	TCP/TLS	Other peers	Ephemeral	This peer	4371

Document Revision History

The following table summarizes the changes that have been applied to this document.

Date	Description
January 2017	Appendix 1 updated
December 2016	Note added to page 11 for issue CSCux92083.
June 2016	Updated for release XC4.2.
June 2015	Updated for release XC3.1.
March 2015	Added information about connections between Cisco TMSPE and TelePresence Conductor
January 2015	Updated for release XC3.0. Added information on MTU size.
September 2014	Updated for XC2.4
April 2014	Updated for XC2.3
December 2013	Updated the IP ports and protocols section
October 2013	Updated the Prerequisites section with changes introduced in XC2.2.1
August 2013	Updated for XC2.2
May 2013	Initial release

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