



Creating and managing an MCU cluster

MCU 4.1

Deployment Guide

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Introduction

This deployment guide describes the main features, system requirements, setup and management of a Cisco TelePresence MCU MSE 8510 cluster. A cluster is a group of three blades on the same MSE chassis linked together to behave as a single unit that provides the combined port count of all the blades in the cluster. A larger port count provides flexibility, meaning either conferences with more participants or several smaller conferences.

Each HD+ participant requires four media port licenses. Each HD participant requires two media port licenses. For example, on an MSE 8510 cluster of three blades each with 20 port licenses, the cluster can have either 30 HD ports or 15 HD+ ports and the master can allocate them to participants in conferences as necessary. This could be one large conference, or several smaller conferences. Note that in a cluster of MSE 8510 blades, SD ports are not available. To configure media ports on the MCU go to **Settings > Media ports**.

You can have multiple clusters in one MSE chassis. For example, you could have four clusters of two blades, or two clusters of three blades. A single chassis can also host two types of clusters; an MCU MSE 8510 cluster, and TS 8710 cluster, if required.

Note: Clustering with slot 10 is currently not supported; therefore the maximum number of three blade clusters is two.

In a cluster there are two types of blades; the master blade and up to two slave blades.

Master blades

All of the port licenses allocated to all the blades in a cluster are "inherited" by the master blade; all ports in the cluster are controlled by the master. Therefore, after you have configured a cluster, you must control conferences, Call Detail Records (CDRs), preconfigured endpoints, etc. through the master using either its web interface or through its API. All calls to the cluster are made through the master.

Slave blades

Slave blades do not display the full MCU MSE 8510 blade web interface. Only certain settings are available, such as network configuration, logging, and upgrading. Similarly, a slave blade will only respond to a subset of API methods. For more information, refer to the relevant API documentation (available on <http://www.tandberg.com/support/video-conferencing-documentation.jsp>).

System requirements

The following system requirements are needed for running an MCU MSE 8510 cluster.

Cisco TelePresence Supervisor MSE 8050 (Supervisor)

- ▶ Software version 2.1 or later.

For more information on upgrading the Supervisor, see [Upgrading the Supervisor](#) later in this document.

MCU MSE 8510 blade

- ▶ Software version 4.1 or later.
- ▶ *Cluster support* feature key.

For more information on upgrading the MCU MSE 8510, see [Upgrading the MCU MSE 8510 blade](#) later in this document.

General

- ▶ All blades in the cluster must be running the same version of software.

Note: To upgrade the blades in a cluster, first upload the new software images to each blade in the cluster and then restart the master. The slaves will automatically restart and the upgrade will be completed.

Recommendations

- ▶ A 1000Mb/s connection.

Creating a new cluster

The process of setting up an MCU MSE 8510 blade cluster consists of the following steps. Each step is described in a separate section. Note that the following process has to be followed in the order of the steps given below. Failure to do so may result in a non-functioning cluster. The instructions below begin with installing a new set of MCU MSE 8510 blades. If you already have the hardware installed and configured, start at [Allocating port licenses](#).

Before setting up an MCU cluster, Cisco recommends that you familiarize yourself with the [Limitations](#) section of this document.

Overview of the process

- ▶ [Setting up the hardware](#)
- ▶ [Configuring initial MCU MSE 8510 blade settings](#)
- ▶ [Allocating port licenses](#)
- ▶ [Backing up the configuration](#)
- ▶ [Upgrading the Supervisor](#)
- ▶ [Upgrading the MCU MSE 8510 blade](#)
- ▶ [Installing the feature keys](#)
- ▶ [Configuring the Supervisor](#)
- ▶ [Configuring MCU MSE 8510 blades](#)

Setting up the hardware

The MSE8000 chassis has ten slots for blades. Use the following procedure to install blades into the slots.



CAUTION:

- ▶ You must install either a blade or a blanking blade in each of the ten slots in the MSE 8000 chassis.
- ▶ The Supervisor blade must be installed into slot 1 of the MSE 8000 chassis.
- ▶ Clustering with a blade in slot 10 is currently not supported.

To install the blades:

1. Remove the blade or blanking blade from the slot into which you are going to install the MCU MSE 8510 blade:
 - a. Using a No. 1 Phillips screwdriver, loosen the screws in the retaining latches with an anti-clockwise quarter turn.
 - b. Open both retaining latches on the front of the blade or blanking blade. When open, a retaining latch is at a 90° angle perpendicular to the front of the blade.
 - c. Slide out the blade or blanking blade.
2. Open both retaining latches on the front of the blade. When open, a retaining latch is at a 90° angle perpendicular to the front of the blade.

3. Slide the MCU MSE 8510 blade into a blade slot until it stops.
4. Simultaneously close both retaining latches on the blade (thereby engaging the connectors to the rear of the blade) to secure in the chassis.
5. Using a No. 1 Phillips screwdriver, tighten the screws in the retaining latches with a clockwise quarter turn.
6. Repeat steps 1 to 5 for each MCU MSE 8510 blade and blanking blade until every slot in the chassis is installed with either a blade or a blanking blade.

The power is connected automatically as soon as you close the latches. The LCD panel displays messages as parts are checked and eventually you see "Waiting for application to boot".

Connecting to an Ethernet Port

Connect an Ethernet cable from Ethernet Port A or B to an Ethernet switch (rather than a hub, to minimize interference from other devices on the network). The Ethernet port is a 10/100/1000 Mbps auto-sensing connection.

When clustered, a slave blade must be connected to an Ethernet port for upgrade purposes; however, the port is not used to transfer media.



CAUTION: Ethernet Ports C and D may not be supported in the software supplied with your blade. Do not connect to these ports unless the web interface allows you to configure them. Do not connect multiple ports to the same subnet unless instructed to do so by the web interface.

Configuring Ethernet Port settings

The default setting for the MCU MSE 8510 blade Ethernet ports is auto-sensing mode. If the switch ports to which you connect the MCU MSE 8510 blade are not also set to auto-sensing mode, then you need to configure the MCU MSE 8510 blade Ethernet ports to use the same speed and duplex mode. For example, either configure both ends of the link to be auto-sensing or configure both ends to operate at the same speed and duplex.



CAUTION: To establish a 1000Mbps connection, both ends of the link must be configured as auto-sensing.

To configure Ethernet Port A or B, log in to the Supervisor's web interface and go to **Hardware > Blades**. For more information about configuring the port, refer to the online help accessible from the Supervisor's web interface.

Assigning an IP address to the MCU MSE 8510 blade

You can use the Supervisor's web interface to configure the IP addresses of all blades installed in the MSE 8000. Note that all blades are supplied with DHCP enabled and therefore the MCU MSE 8510 blade will attempt to find an IP address. The LCD panel will show the IP address allocated. You can either keep this setting or assign static IP addresses to a blade from the Supervisor's web interface. To view or configure the IP address of the MCU MSE 8510 blade, log in to the Supervisor and go to **Hardware > Blades**. To access the web interface of the MCU MSE 8510 blade, go to **Hardware > Blades** and click the IP address of that blade.

Configuring initial MCU MSE 8510 blade settings

Logging in to the MCU MSE 8510 blade

The Cisco TelePresence MCU web interface is used for administering the MCU device, managing conferences, users, and pre-defined endpoints. You can also perform many conference-related tasks using the web interface that you cannot do otherwise.

All blade and cluster administration is performed via the web interface.

To log in to the web interface of the MCU MSE 8510 blade:

1. Log in to the Supervisor's web interface.
2. Go to **Hardware > Blades** and click the IP address of the MCU MSE 8510 blade.
3. Click **Log in**, and enter the user name `admin` with no password.



CAUTION: It is recommended that you change the admin account to use a password as soon as possible. To do that, go to **Users**, click the admin link, and provide the required user information.

Allocating port licenses

Port licenses are used to increase the number of ports that are licensed without requiring new hardware (up to the maximum available on a particular blade type). For more information on port licenses, see the Online Help topic 'Displaying the port license summary', or the [Knowledge Base](#).

To use the port licenses, you must allocate them to the slots of the chassis. You can allocate the port licenses as you want to the slots in the cluster (either all to the slot housing the master, or distributed between the slots in the cluster). It is recommended that you divide your port licenses across the blades in the cluster.



CAUTION: You will see a warning when allocating all the port licenses to the master blade.



CAUTION: You can allocate more port licenses than the port capacity (for example, if you are updating the port allocation in anticipation of swapping blades). This can be done for a blade that you intend to be the master, however this is not recommended.

To allocate port licenses to blades:

1. On the Supervisor, go to **Port licenses**.
2. Click on the link for the type of port license that you want to allocate (for clustering this will be Media port licenses).
3. For **New allocation**, enter the number of licenses to allocate to each slot.
4. Click **Update allocation**.

It is possible to allocate all your licenses to the slot housing the blade that will become the master, or to divide them up amongst the slave blades. Regardless of the allocation to each blade, the cluster will act as a single system with the combined number of port licenses.

Backing up the configuration

It is good practice to back up the configuration of your Supervisor or MCU before performing an upgrade or major setup change.

Note that when you make a blade a slave its configuration is retained. Therefore, when you disband a cluster the slave blade automatically reverts to its previous configuration. However, it is recommended that you take a backup of the configuration of all blades and the Supervisor before upgrading and creating a cluster.

To back up your configuration:

1. Go to Settings > Upgrade.
2. Under the Backup and restore section, click Save backup file.
3. Save the resulting "configuration.xml" file to a secure location.

Upgrading the Supervisor

The Supervisor blade must be running software version 2.1 or later. If you are running a previous version of software, follow the instructions below to upgrade your Supervisor blade.



IMPORTANT: You **must** back up your configuration **before** upgrading to software version 2.1.

You must also remember the administrator user name and password for the backup configuration. You will need these if you ever need to make use of this backup file.

Release 2.0 introduced the ability to back up via the web interface. If the Supervisor is currently running a software version earlier than 2.0 you must use FTP to back up the configuration before upgrading. Backing up the Supervisor is described in the online help which is accessible from the web interface of the Supervisor.

To upgrade the Supervisor software:

1. Go to **Settings > Upgrade**.
2. Check the **Current version** of the main software image to verify the currently installed version.
3. Log on to the [support pages](#) to identify whether a more recent image is available.
4. Download the latest available image and save it to a local hard drive.
5. Unzip the image file.
6. Log on to the Supervisor web browser interface.
7. Go to **Settings > Upgrade**.
8. Click **Browse** to locate the unzipped file on your hard drive.
9. Click **Upload software image**. The browser begins uploading the file to the Supervisor, and a new browser window opens to indicate the progress of the upload. When finished, the browser window refreshes and indicates that the "Main image upgrade completed."
10. The upgrade status displays in the **Supervisor software upgrade status** field.
11. Restart the Supervisor.

Upgrading the MCU MSE 8510 blade

Both master and slave blades need to be running software version 4.1 or later.



IMPORTANT:

- ▶ If you are using Call Detail Records (CDRs) for billing, auditing or any other purpose, before you upgrade to this release, you must download and save your current CDR data. If you downgrade from this release to any older version, the MCU might delete all existing CDRs.
- ▶ The MCU MSE 8510 blade must be running boot loader version 1.0(0.2) to ensure compatibility with software versions later than 2.4. To see which version of application and boot loader you are running, go to **Settings > Upgrade**. See [Upgrading MCU MSE 8510 boot loader software](#).

To upgrade the MCU MSE 8510 blade software:

1. Unzip the image file.
2. Browse to the IP address of the MCU using a web browser.
3. Log in as an administrator.
4. Go to the **Settings > Upgrade** page.
5. In the Main software image section, type in, or browse to the location of the software image file.
6. Click **Upload software image**.
7. A progress bar is displayed in a separate pop-up window while the web browser uploads the file to the MCU or MCU MSE blade. This takes some time – dependent on your network connection. Do not move your web browser away from the Upgrade software page or refresh this page during the upload process; otherwise, it will abort.

After a number of minutes, the web browser refreshes automatically and displays “Main image upload completed successfully”.

8. Click **Close Status window**.
9. In the changed Upgrade page, click **Shut down MCU**.
10. Click **Confirm MCU shutdown**.
11. When shutdown has completed, click **Restart MCU and upgrade**.
12. When prompted, confirm the restart. The unit will reboot and upgrade itself – this may take up to 25 minutes to complete.

Notes:

- ▶ This upgrade may take up to 25 minutes to complete.
- ▶ MCU software version 4.1 is only compatible with Cisco Conference Director software version 1.2(1.2).
- ▶ If you have been logged out due to inactivity, log in again and click **Restart MCU and upgrade** on the **Shutdown** page.

Upgrading MCU MSE 8510 boot loader software

If your MCU MSE 8510 blade is not already running boot loader version 1.0(0.2), first upgrade the application software to the latest release and then upload the boot loader to your 8510 blade. Follow this procedure:

1. Download the boot loader image from [ftp://ftp.tandberg.com/pub/software/mse_8000/media_blade_8510/boot_loader/bootldr_8510_1.0\(0.2\).img](ftp://ftp.tandberg.com/pub/software/mse_8000/media_blade_8510/boot_loader/bootldr_8510_1.0(0.2).img)
2. Upgrade the application software (see [Upgrading the MCU MSE 8510 blade](#) above for instructions).
3. After your MCU MSE 8510 blade has rebooted, go to the web interface of your MCU MSE 8510 blade. Go to **Status**. The *Software version* field will show the version of the software to which you have upgraded the MCU.
4. Go to **Settings > Upgrade**.
5. Under *Loader software*, click **Browse...** and locate the `bootldr_8510_1.0(0.2).img` file extracted in Step 1. Click **Upload software image**.
6. Restart the MCU MSE 8510 blade.
7. Go to **Settings > Upgrade**. The boot loader version will show 1.0(0.2) as the current version.

Installing the feature keys

Before you can create a cluster you need to install the *Cluster support* feature key on each of the blades you want to cluster together. To obtain the feature keys, contact your reseller.

To install the *Cluster support* feature key:

1. Go to Settings > Upgrade.
2. In the Activation code field, enter the code given to you by your reseller.
3. Click Update features.

Encryption

To access the web interface of any blade in a cluster using HTTPS, that blade must have the *Encryption* feature key installed.

To encrypt calls made through a cluster, the *Encryption* feature key only needs to be installed on the master blade, as the master blade controls all calls.

To obtain the *Encryption* feature key, contact your reseller.

Configuring the Supervisor

You can configure clustering using the web interface of the Supervisor. You cannot make any clustering configuration changes through either the web interface of the MCU or through its API.

To configure clustering:

1. On the Supervisor, go to Clustering > Configuration.
2. Ensure that the blades you want to cluster together are running the same software version and that the *Cluster support* feature key is present.
3. Select the blade to be the master by selecting *master* from the Change settings drop-down list.
4. Select the blades to be the slaves by selecting *slave of slot <slot number>* from the Change settings drop-down list.
5. Click Review changes.
6. A new page displays with the details of your new cluster, along with any previously configured clusters. If the configuration is correct, click Apply changes. To make further changes, click Return to configuration.
7. The Clustering > Summary page is displayed. For some blades, the Supervisor may display a Shutdown button. If this is the case, use this button to restart the blade.

Configuring MCU MSE 8510 blades

There is no specific configuration that needs to be done to start running a clustered conference.

Note: Configured conferences, endpoints, and users on the slave blades are not automatically transferred to the master blade. To continue using pre-configured conferences, endpoints, or users on the master blade you will need to configure them on the master blade. See the online help for more information.

A conference created on the master blade will automatically use the resources available from its slaves. To check the available port count and conference status, go to **Status > Conferences**.

Configuring media ports settings

A clustered MCU has the following port capacity modes:

- ▶ HD+ mode supports high definition video participants at up to 1080p at 30fps.
- ▶ HD mode supports high definition video participants at up to 720p at 30fps.

Each HD+ participant requires four media port licenses. Each HD participant requires two media port licenses. Each SD participant requires only one media port license. A clustered MCU does not support SD mode.

To change the media port capacity mode, go to **Settings > Media ports**. For Media port mode, select either HD or HD+. The selected option is detailed below.

Media port allocation	
Media port mode	HD ▾
Selected option	
High definition plus video ports	0
High definition video ports	60
Dedicated streaming and content ports	60
Additional audio ports	60

Managing a cluster

The functionalities of an MCU cluster are the same as those of a standalone MCU.

Overview

- ▶ [Displaying an overview of the cluster status](#)
 - [On the Supervisor](#)
 - [On the master MCU](#)
- ▶ [Functionality on slave blades](#)
- ▶ [Functionality on the master blade](#)
- ▶ [Reconfiguring a cluster](#)

Displaying an overview of the cluster status

On the Supervisor

On the Supervisor, go to **Clustering**.

The clustering summary page provides an overview of clustering on the MSE 8000. There is one table per cluster, and a table for unclustered blades.

For both clusters and unclustered blades you can see:

- ▶ The slots used.
- ▶ Types of blades in the cluster.
- ▶ Software version.
- ▶ The role (that is, master or slave).
- ▶ Blade status.
- ▶ Warnings.

Cluster: Codian MSE 8510					
Slot	Type	Version	Role	Status	Cluster warnings
2	Codian MSE 8510	4.1(1.24)	Master	Blade OK	-
4	Codian MSE 8510	4.1(1.24)	Slave	Blade OK	-
6	Codian MSE 8510	4.1(1.24)	Slave	Blade OK	-

The clustering summary page also provides a link to the cluster configuration page. To configure a cluster, click **Configuration**.

On the master MCU

On the MCU, go to Status > Cluster.

The cluster page provides an overview of the cluster. You can see:

- ▶ The slots used.
- ▶ The IP addresses of the slave blades.

- ▶ Blade status.
- ▶ Software version.
- ▶ Media processing load.
- ▶ Port licenses assigned to each blade.

Slot	IP	Status	Software version	Media processing load	Port licenses
2	Master blade	OK	4.1(1.24)	0% (video-0%, audio-0%)	80
3	10.3.234.153	OK	4.1(1.24)	0% (video-0%, audio-0%)	80
4	10.3.234.154	OK	4.1(1.24)	0% (video-0%, audio-0%)	80

To check the available port count and conference status, go to **Status > Conferences**. This page displays the total number of available ports and how many ports are in use. In many cases, the values displayed on this page are shown in the format **A (B) / C**; this represents:

- ▶ **A** – the current value of this statistic.
- ▶ **B** – the maximum achieved value of this statistic (since last reset).
- ▶ **C** – the maximum allowable number for this statistic (this varies by MCU model and cluster size).

Conference status	
Active conferences	11
Active auto attendants	0
Completed conferences	2859
Completed auto attendants	0
Active conference participants	60
Previous conference participants	10575
Active streaming viewers	0 (0) / 100
TCP streaming viewers	0 (0) / 50
ConferenceMe users connected	0 (0) / 12
Video ports in use	60 (60) / 60
Audio-only ports in use	0 (1) / 60
Streaming and content ports in use	0 (0) / 60

Note: Clustering has no effect on the number of ports that can be used for ConferenceMe and Streaming participants. For example, the maximum number of ConferenceMe participants on a standalone MCU is 12. When three blades are clustered together, the maximum number of ConferenceMe participants is still 12.

Functionality on slave blades

You can still log in to the web interface of slave blades, however functionality is limited. From the web interface of a slave blade you can:

- ▶ Check blade status by going to **Status**.
- ▶ Configure network settings by going to **Network**.
- ▶ Configure a subset of user interface, time, and security settings by going to **Settings**.
- ▶ Add, delete, or change configured users by going to **Users**.

When you are logged in to a slave blade, an orange “slave blade” message appears on the top of all pages.

Functionality on the master blade

The master blade functions as a standalone MCU does.

See the online help for information on configuring the MCU, creating conferences, and all other administrative tasks.

Reconfiguring a cluster

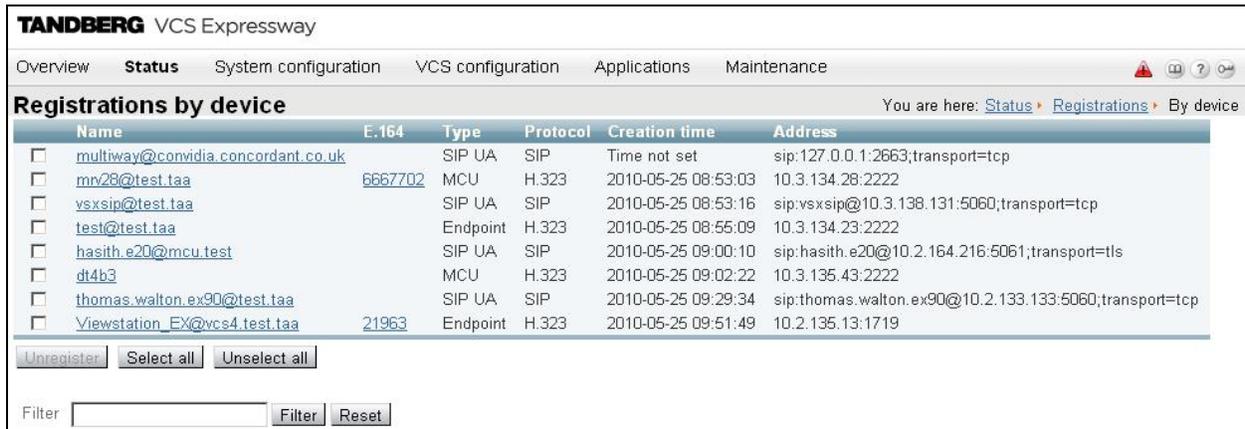
To reconfigure a cluster to use different blades, follow the instructions detailed above in [Configuring the Supervisor](#). Note that when you reconfigure a cluster, you will be prompted to restart the blades in the cluster.

To change the allocation of port licenses, follow the instructions detailed above in [Allocating port licenses](#)

Configuring the Cisco VCS

You can use a cluster of MCUs with a Cisco TelePresence Video Communication Server (Cisco VCS) as you would a standalone MCU. To do this, only the master needs to be registered.

The Cisco VCS will not indicate that it is a clustered blade. The type will continue to show “MCU”.



The screenshot shows the TANDBERG VCS Expressway web interface. The top navigation bar includes 'Overview', 'Status', 'System configuration', 'VCS configuration', 'Applications', and 'Maintenance'. The main content area is titled 'Registrations by device' and displays a table of registered devices. Below the table are buttons for 'Unregister', 'Select all', and 'Unselect all', and a filter section with a text input and 'Filter' and 'Reset' buttons.

Name	E.164	Type	Protocol	Creation time	Address
<input type="checkbox"/> multiway@convidia.concordant.co.uk		SIP UA	SIP	Time not set	sip:127.0.0.1:2663;transport=tcp
<input type="checkbox"/> mv28@test.taa	6867702	MCU	H.323	2010-05-25 08:53:03	10.3.134.28:2222
<input type="checkbox"/> vsxsip@test.taa		SIP UA	SIP	2010-05-25 08:53:16	sip:vsxsip@10.3.138.131:5060;transport=tcp
<input type="checkbox"/> test@test.taa		Endpoint	H.323	2010-05-25 08:55:09	10.3.134.23:2222
<input type="checkbox"/> hasith.e20@mcu.test		SIP UA	SIP	2010-05-25 09:00:10	sip:hasith.e20@10.2.164.216:5061;transport=tls
<input type="checkbox"/> dt4b3		MCU	H.323	2010-05-25 09:02:22	10.3.135.43:2222
<input type="checkbox"/> thomas.walton.ex90@test.taa		SIP UA	SIP	2010-05-25 09:29:34	sip:thomas.walton.ex90@10.2.133.133:5060;transport=tcp
<input type="checkbox"/> Viewstation_EX@vcs4.test.taa	21963	Endpoint	H.323	2010-05-25 09:51:49	10.2.135.13:1719

For more information, see the [Cisco VCS Administrator Guide](#) and Cisco VCS Online Help.

Configuring Cisco TMS

You can manage a cluster of MCUs through the Cisco TelePresence Management Suite (Cisco TMS) as you would a standalone MCU. To do this, only the master needs to be registered.



IMPORTANT: Issues exist when registering slave blades with the Cisco TelePresence Management Suite (Cisco TMS). To prevent issues:

- ▶ Do not add new slave blades to Cisco TMS.
 - ▶ Any existing blades registered to Cisco TMS that are later configured as slaves must be completely removed from Cisco TMS. See [Removing slave blades from Cisco TMS](#) below. This means that you will need to reconfigure any scheduled conferences that were configured on a slave blade to now be run on the master.
-

Removing slave blades from Cisco TMS

MCU MSE 8510 blades that you intend to be slaves in a cluster need to be completely removed from Cisco TMS to prevent errors.

To do this:

1. Log in to Cisco TMS.
2. Go to **Systems > Purge Systems**.
3. Select the slave blades you wish to delete.
4. Click **Purge Systems**.

Configuring master blades with Cisco TMS

There is no specific configuration needed to add a new master blade to Cisco TMS. However, any existing blades registered to Cisco TMS that are later configured as a master will not have their increased port count recognized until you force a refresh on Cisco TMS.

To do this:

1. Log in to Cisco TMS.
2. Go to **Systems > Navigator**.
3. Click on your blade in the left hand pane.
4. Go to **Settings**.
5. Click **Force Refresh**.

Cisco TMS will refresh and the Max Number of Video Calls will increase to show the increased port count.

Call Settings			
Maximum IP Bandwidth:	330240	E164 Alias:	5100, 5101, 5102, 5103, 5104, 5105, 5106, 5107, 5108, 5109, 5110, 5111, 5112, 5113, 5114, 5115, 5116, 5117, 5118, 5119, 5120, 5121, 5122, 5123, 5124, 5125, 5126, 5127, 5128, 5129, 5130, 5131, 5132, 5133, 5134, 5135, 5136, 5137, 5138, 5139, 5140, 5141, 5142, 5143, 5144, 5145, 5146, 5147, 5148, 5149, 5150, 5151, 5152, 5153, 5154, 5155, 5156, 5157, 5158, 5159
Max Number of Video Calls:	40		

Force Refresh



CAUTION: If you have a slave blade registered with Cisco TMS, TMS fails to recognize the reduced port count, even after a force refresh.

Limitations

Blades in slot 10

Release 4.1 does not support clustering a blade in slot 10 of the chassis.

References

The following is a list of documents referenced or related to this document.

- ▶ Cisco TelePresence MCU MSE 8510 Getting Started Guide
- ▶ Cisco TelePresence Supervisor MSE 8050 Getting Started Guide
- ▶ Cisco TelePresence Management Suite Administrator Guide
- ▶ Cisco TelePresence VCS Administrator Guide

All Cisco TelePresence documentation can be found on the website <http://www.tandberg.com/support/video-conferencing-documentation.jsp>.

For advice from the technical support team on all Cisco TelePresence products, see the [Knowledge Base](#).

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