



# Network Multipoint Design Guide

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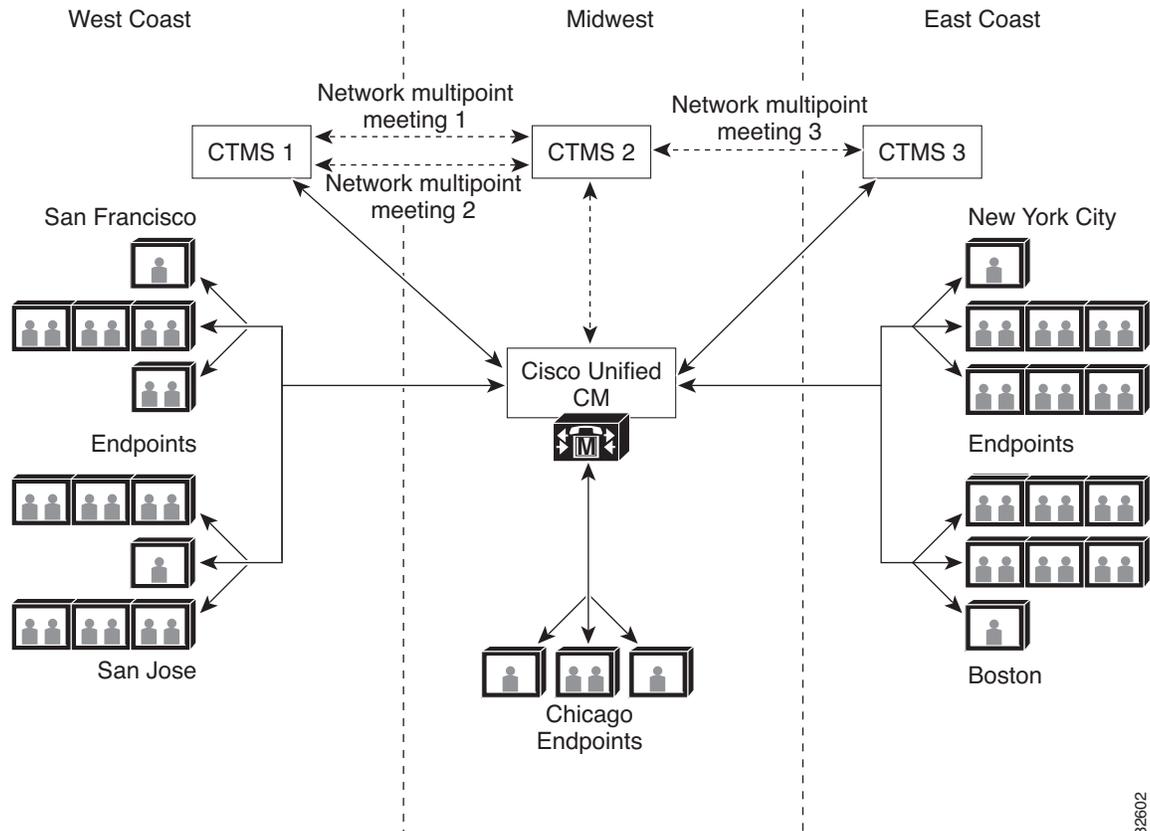
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## Network Multipoint Overview

Multiple CTMS devices can be deployed in a Cisco TelePresence topology. During a static meeting, the network multipoint feature allows a maximum of two CTMS devices to support endpoints in the meeting.

At any given time, each CTMS can support multiple network multipoint meetings simultaneously with one or more of the other CTMS devices in the topology. For example, the Cisco TelePresence topology shown in [Figure 1](#) includes three CTMS devices: CTMS 1, CTMS 2, and CTMS 3. CTMS 2 is simultaneously supporting two network multipoint meetings with CTMS 1 and one with CTMS 3.

**Figure 1** Sample Cisco TelePresence Topology—CTMS Functionality in Network Multipoint Meetings



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The support of two CTMS devices during a network multipoint meeting provides these benefits:

- The number of endpoints that can potentially join the meeting increases from 48 to a maximum of 90 segments. (The network multipoint link consumes  $X$  segments per CTMS. For more information, see the [“What Is Supported”](#) section on page 3.)
- The workload and amount of required bandwidth is distributed from one to two CTMS devices.
- The strategic deployment of CTMS devices to support frequently used endpoints in key geographical areas reduces the number of expensive WAN links.

The transition of a static meeting a network multipoint meeting is made dynamically as the meeting begins. From the perspective of the meeting participants, the experience of attending a network multipoint meeting is the same as attending a non-network multipoint meeting.

For conceptual information about network multipoint meetings, see the [“Understanding How Network Multipoint Meetings Work”](#) section on page 18.

# Audience

To successfully deploy the network multipoint feature, these responsibilities must be assumed:

- A network administrator must deploy the CTMS devices in strategic locations throughout the Cisco TelePresence topology.
- A CTMS administrator must fully understand the network multipoint feature, how it works, and its benefits.
- A Cisco Unified Communications Manager (CM) administrator must set up network multipoint-specific partitions, calling search spaces (CSSs), route patterns, and Session Initiation Protocol (SIP) trunks in Unified CM.

**Note**

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In some organizations, one person handles both CTMS and Unified CM administrator roles. For the sake of clarity and brevity, this document assumes that two people handle these roles.

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Although the CTMS administrator does not have to configure any network multipoint-specific parameters on the CTMS devices, this person must be the focal point of the network multipoint deployment/setup and work closely with the network and Unified CM administrators.

## What Is Supported

### Supported Hardware and Software

- Cisco UCS C210 M2 server running CTMS release 1.8 (or later)
- Cisco MCS-7845-XX (XX = H2, I2, and I3) running CTMS release 1.8 (or later)
- Cisco TelePresence System release 1.X.X endpoints registered with one of the following Unified CM releases:
  - To support interop meetings with CTS 1.8 and Cisco TelePresence endpoints running TC version 5.0: version 8.6.1
  - To support non-interop meetings with CTS 1.X.X endpoints only: versions 7.1.5, 8.5.1, and 8.6.1
- These endpoints running software release TC 5.0 (or later):
  - Cisco TelePresence C Series
  - Cisco TelePresence EX Series
  - Cisco TelePresence MX200

These endpoints can be registered with Unified CM version 8.6.1 (or later) or Cisco TelePresence Video Communication Server (VCS) Control X6.1 or X7.0 (or later). If they are registered with VCS Control, some additional setup in Unified CM is required as described in [“Additional Setup For Cisco TelePresence TC 5.0 Endpoints Registered With VCS Control” section on page 12](#).

**Note**

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For more information on endpoint types that can be supported during network multipoint meetings, guidelines for configuring Supported Endpoint Types, and the expected video quality during network multipoint meetings, see the [“Understanding How Supported Endpoint Types Affects Network Multipoint Meetings” section on page 20](#).

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- Partitions, CSSs, route patterns, and SIP trunks for the support of network multipoint meetings must be set up on one or more Unified CM servers running one of the following releases:
  - To support interop meetings with CTS 1.8 and Cisco TelePresence endpoints running TC version 5.0: version 8.6.1
  - To support non-interop meetings with CTS 1.X.X endpoints only: versions 7.1.5, 8.5.1, and 8.6.1

#### Supported CTMS Devices in a Cisco TelePresence Topology

- The number of CTMS devices that can be deployed in a Cisco TelePresence topology is unlimited. However, for information on optimizing the number and location of CTMS devices deployed in a topology, see the [“Deploying CTMS Devices In the Cisco TelePresence Topology”](#) section on page 7.

#### Supported Network Multipoint Functionality

- Static meetings can transition from a static meeting to network multipoint meeting and back to a static meeting.
- A maximum of two CTMS devices can support a network multipoint meeting.
- A CTMS can support multiple network multipoint meetings simultaneously with one or more other CTMS devices. For an example of this functionality, see the [“Network Multipoint Overview”](#) section on page 1.
- During a network multipoint meeting, each CTMS supports 48 segments minus the segments required for the network multipoint link.

The Maximum Presentation Bit Rate parameter setting for a static meeting determines the number of segments required for the network multipoint link. If the setting is 30 frames per second (FPS), the number of required segments is 4 per CTMS. If the setting is 5 or 1 FPS, the number is 3 per CTMS. As a result, the maximum number of segments supported for a network multipoint link is either 88 or 90, respectively.




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**Note** When defining a static meeting, the Maximum Endpoints parameter does not affect the number of segments required for the network multipoint link.

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To understand how the maximum number of segments are calculated, see the following equations. After the maximum number of segments is used, additional endpoints are not allowed to join the meeting.

#### 88 Segments (Maximum Presentation Bit Rate Set At 30 FPS)

48 segments x 2 CTMS devices = 96 segments - 8 segments = 88 segments

The two CTMS devices use 4 segments per device for a total of 8 segments.

#### 90 Segments (Maximum Presentation Bit Rate Set At 5 or 1 FPS)

48 segments x 2 CTMS devices = 96 segments - 6 segments = 90 segments

The two CTMS devices use 3 segments per device for a total of 6 segments.

### Supported Features

- These aspects of a network multipoint meeting function the same as for a non-network multipoint meeting:
  - Meeting participants can view the list of all participants from the CTS phone UI by touching the More > Mtng Ctrl softkeys, then selecting the Participant List option.
  - A meeting participant can share data or video content from their computer (presentation).
- The Director Controls, Event Recording, and Boardroom Mode Event Controls as well as Media Snapshot are supported during a network multipoint meeting. These features function the same during a network multipoint meeting as they do during a non-network multipoint meeting with the exceptions described in the [“How Event Controls Work In Network Multipoint Meetings” section on page 22](#).
- Inter-company meetings

## Limitations

### Hardware Limitations

Network multipoint is not supported on a Cisco TelePresence Commercial Express Solution running the CTMS application.

### Interoperability Limitations

To interoperate with Cisco TelePresence endpoints running version TC 5.0 (and later) in network multipoint meetings, CTS 1.8 is the minimum required endpoint version. CTS 1.7.x and older endpoints are not supported in this scenario and must be upgraded to CTS 1.8 or later.

### Network Multipoint Meeting Limitations

- Network multipoint meetings cannot be secure meetings.
- If a third CTMS device tries to connect to the host CTMS, also known as the *rendezvous point*, during a network multipoint meeting, the connection will not be allowed.

### Feature Limitations

- Scheduled and ad hoc meetings are not yet supported.
- The VIP and Auto Lecture Mode Event Controls are not supported during a network multipoint meeting. For information on the other Event Controls and how they are supported during a network multipoint meeting, see the [“How Event Controls Work In Network Multipoint Meetings” section on page 22](#).
- The video announce feature is supported during a network multipoint meeting, but the level of support is limited to local endpoints only. For example, if CTMS 1 and CTMS 2 are supporting a network multipoint meeting and an endpoint supported by CTMS 1 joins the meeting, the video announcement is transmitted only to endpoints supported by CTMS 1. The distribution of the announcement to remote endpoints supported by CTMS 2 occurs only if the network multipoint link is transmitting the current active video.

# Network Multipoint Deployment and Setup

You do not need to perform any network multipoint-specific configuration of the CTMS devices. However, we assume that you have set up these elements, which are required for network multipoint meetings:

- A route pattern on each CTMS that will support static meetings that can transition to network multipoint meetings. For guidelines on setting up route patterns, see the “[Using Route Patterns With Wildcards For Non-Network Multipoint and Network Multipoint Meetings](#)” section on page 12.
- Static meeting(s) as needed on each CTMS.
- Supported Endpoint Types on each CTMS that will support network multipoint meetings. For more information on this parameter, see the “[Understanding How Supported Endpoint Types Affects Network Multipoint Meetings](#)” section on page 20.

The successful deployment of network multipoint meetings requires planning and setup in Unified CM. [Table 1](#) provides a high-level summary of the network multipoint setup tasks.

**Table 1** High-Level Summary of Network Multipoint Setup Tasks

Task	Task	Who Should Handle Task	Where to Find Information
1	Deploy the CTMS devices in the Cisco TelePresence topology.	CTMS administrator and network administrator	<a href="#">Deploying CTMS Devices In the Cisco TelePresence Topology, page 7</a>
2	Route calls to the closest CTMS by setting up partitions, calling search spaces (CSSs), route patterns, and SIP trunks in Unified CM.	CTMS administrator and Unified CM administrator	<a href="#">Understanding the Role of Partitions, Calling Search Spaces, and Route Patterns in Network Multipoint Meetings, page 8</a> <a href="#">Setting Up Unified CM Items for Network Multipoint Meetings, page 10</a>
3	<b>Note</b> Perform this task only if your Cisco TelePresence topology includes TC version 5.0 endpoints registered with VCS Control.  Set up communication between VCS Control and a CTMS.	CTMS administrator and Unified CM administrator	<a href="#">Additional Setup For Cisco TelePresence TC 5.0 Endpoints Registered With VCS Control, page 12</a>
4	Verify that network multipoint is functioning properly by starting a test network multipoint meeting.	CTMS administrator	<a href="#">Verifying that Network Multipoint Is Functioning Properly, page 15</a> <a href="#">Troubleshooting Network Multipoint Issues, page 25</a>
5	<b>Note</b> Perform this task only if planning to use the Event Recording feature during a network multipoint meeting.  Route calls from a CTRS directly to the CTMS functioning as the rendezvous point by setting up Event Recording-specific partitions, CSS, and route patterns.	CTMS administrator and network administrator	<a href="#">Creating Event Recording-Specific Unified CM Setup for Network Multipoint Meetings, page 16</a>

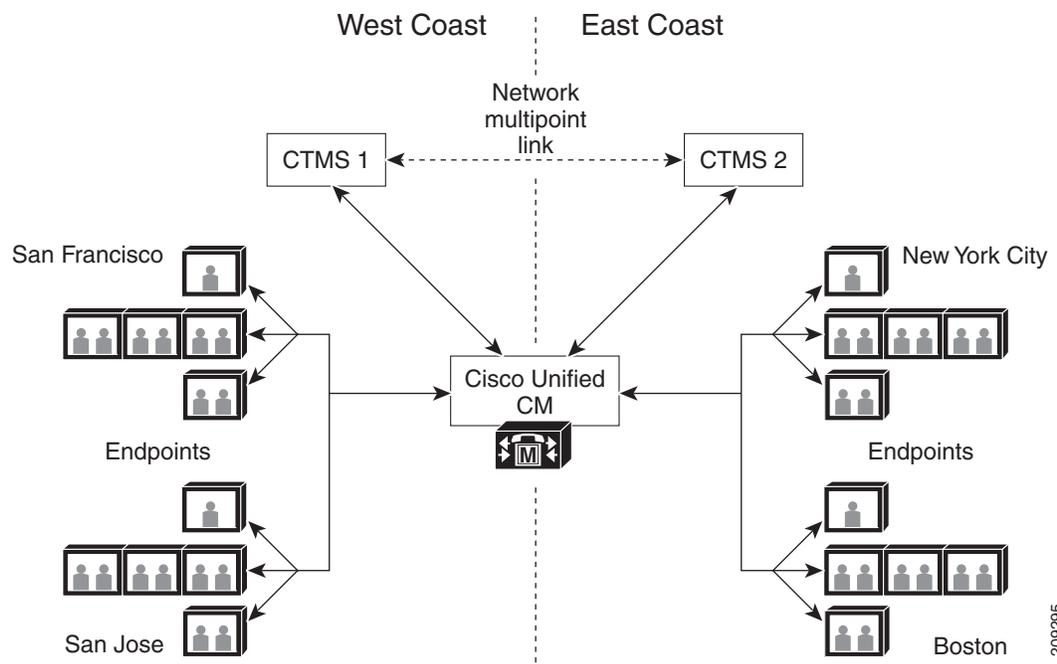
## Deploying CTMS Devices In the Cisco TelePresence Topology

To maximize the benefits of network multipoint, you must work with the network administrator to plan where to place each CTMS device in the Cisco TelePresence topology. We recommend using these guidelines:

- Divide your Cisco TelePresence topology into geographical areas, each of which includes a significant number of endpoints.
- When planning each area, do the following:
  - Ensure that the endpoints are evenly distributed throughout the area.
  - Determine the number of CTMS devices to deploy in an area. Ideally, each CTMS should support a maximum of 48 segments, which is the CTMS device's resource capacity.
  - Determine from which endpoints meeting participants most frequently dial into meetings, and place a CTMS in close proximity.
  - If deploying an additional CTMS, place this CTMS in a location that is central to the remaining endpoints.
- Between the CTMS devices and their endpoints, set up WAN links.
- Between the CTMS devices, set up a WAN link.

In the sample Cisco TelePresence topology shown in [Figure 2](#), the topology is divided into two geographical areas: the West and East Coasts of the United States.

**Figure 2** *Sample Cisco TelePresence Topology—Geographical Areas*

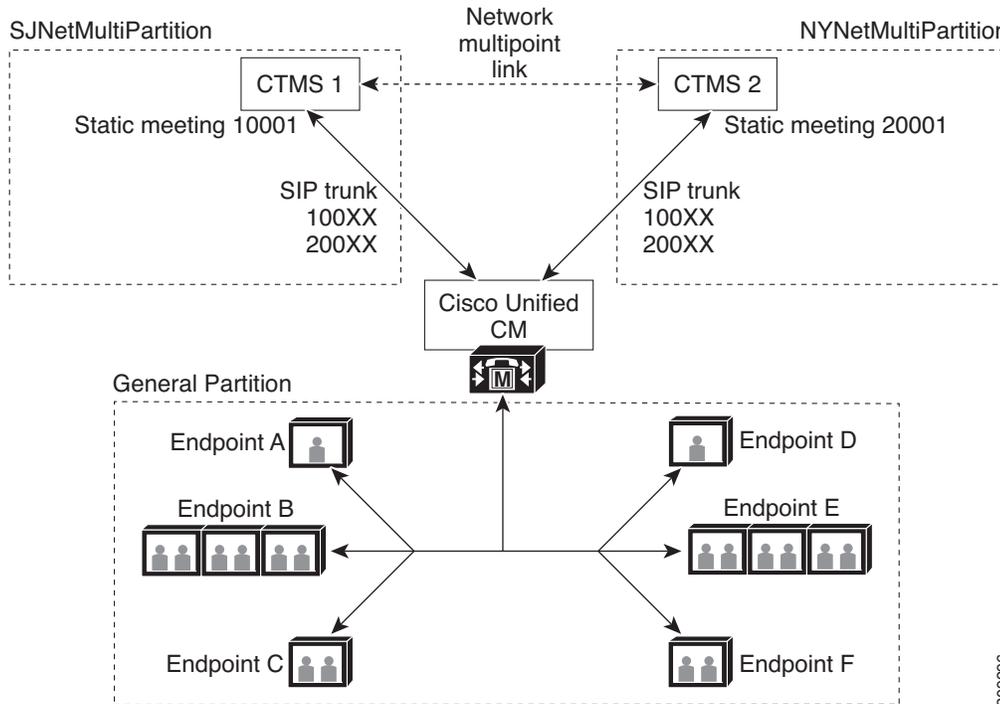


In each area, one CTMS is deployed and supports geographically dispersed endpoints. However, each endpoint should have a CTMS within a reasonable proximity for support.

## Understanding the Role of Partitions, Calling Search Spaces, and Route Patterns in Network Multipoint Meetings

The basic Cisco TelePresence topology shown in [Figure 3](#) includes endpoints in San Jose and New York City that frequently participate in meetings. Originally, only CTMS 1 was deployed in the San Jose area. To reduce the number of expensive WAN links established during meetings and the workload for CTMS 1, CTMS 2 was deployed in the New York area.

**Figure 3** Sample Cisco TelePresence Topology—Understanding Unified CM Setup



To support network multipoint meetings in this topology, the following items must be set up in Unified CM:

- **Partitions**—We use partitions to divide the Cisco TelePresence topology into logical subsets based on location. Each partition contains route patterns and routes, which determine how to route calls from endpoints.
- **Calling search spaces (CSSs)**—A CSS is an ordered list of partitions that Unified CM systematically analyzes to determine how to route a call.
- **Route patterns**—A route pattern is a string of digits and optional wildcards that enable Unified CM to route calls from endpoints to a specified CTMS.
- **SIP trunks**—A SIP trunk is used for communication between Unified CM and a CTMS.

The purpose of the Unified CM setup is to route calls from endpoints to the closest CTMS in the topology. In the sample topology shown in [Figure 3](#), CTMS 1 is the closest CTMS for endpoints A, B, and C, and CTMS 2 is the closest CTMS for endpoints, D, E, and F.

[Table 2](#) outlines a recommended network multipoint setup for the two areas.

**Table 2** *Sample Unified CM Setup For Network Multipoint Meetings*

Area	Partition	CSS	SIP Trunk	Route Patterns
SJ	SJNetMultiPartition	SJNetMultiCSS includes SJNetMultiPartition	Mapped to CTMS 1, and specifies NYNetMultiCSS, which handles non-local calls	100XX, which is assigned to SJNetMultiPartition and SIP trunk for CTMS 1 200XX, which is assigned to SJNetMultiPartition and SIP trunk for CTMS 1
NY	NYNetMultiPartition	NYNetMultiCSS includes NYNetMultiPartition	Mapped to CTMS 2, and specifies SJNetMultiCSS, which handles non-local calls	100XX, which is assigned to NYNetMultiPartition and SIP trunk for CTMS 2 200XX, which is assigned to NYNetMultiPartition and SIP trunk for CTMS 2

Note that the endpoints shown in [Figure 3](#) are not included in SJNetMultiPartition and NYNetMultiPartition. We recommend that endpoints are included in a general partition that is not network multipoint-specific or are not included in a partition. This recommended setup preserves the ability of each endpoint to directly dial all other endpoints in the topology regardless of geographical location.

**Note**

The route patterns described in [Table 2](#) route calls from endpoints to the closest CTMS. They are not meant to route calls from CTMS devices to other CTMS devices or endpoints.

Given the sample Unified CM setup in [Table 2](#), here is a functional overview of how network multipoint works in this topology:

- For a static meeting created on CTMS 1 and with the access number 10001:
  - If endpoint A dials 10001, CTMS 1 receives the call and places it on hold because that endpoint is the first participant in the meeting. If endpoints B and C subsequently dial 10001, they join endpoint A in the meeting.
  - If endpoints D, E, or F dial 10001, CTMS 2 receives the call and determines that the call is not local, so it assumes the call is a network multipoint call and directs the call back to Unified CM. Unified CM then uses NYNetMultiCSS, which is assigned to the CTMS 1 SIP trunk. Based on the SJNetMultiPartition, which is included in NYNetMultiCSS and the 100XX route pattern, the call is routed to CTMS 1, the network multipoint link is established, and the endpoints supported by CTMS 2 join the meeting.
- For a static meeting created on CTMS 2 and with the access number of 20001:
  - If endpoint D dials 20001, CTMS 2 receives the call and places it on hold because that endpoint is the first participant in the meeting. If endpoints E and F subsequently dial 20001, these endpoints joins endpoint D in the meeting.
  - If endpoints A, B, or C dial 20001, CTMS 1 receives the call and determines that the call is not local, so it assumes the call is a network multipoint call and directs the call back to Unified CM. Unified CM then uses the SJNetMultiCSS, which is assigned to the CTMS 2 SIP trunk. Based on the NYNetMultiPartition, which is included in SJNetMultiCSS and the 200XX route pattern, the call is routed to CTMS 2, the network multipoint link is established, and the endpoints supported by CTMS 1 join the meeting.

Although the Cisco TelePresence topology and the Unified CM setup described in this section are basic, the setup scales to more complex topologies that include more endpoints, CTMS devices, geographical areas, and Unified CM servers. As the topology changes and the need for network multipoint meetings increase, more partitions, CSSs, route patterns, and SIP trunks can be added to Unified CM and more static meetings created on the CTMS devices as needed.

Also, the sample Unified CM setup discussed in this section can be integrated into an existing topology where partitions, CSSs, and route patterns already exist, or deployed in a new topology.

## Setting Up Unified CM Items for Network Multipoint Meetings

To support network multipoint meetings, partitions, CSSs, route patterns, and SIP trunks must be set up in Unified CM.

We make these assumptions about the Unified CM administrator, who is responsible for this setup:

- They understand and have previously set up partitions, CSSs, route patterns, and SIP trunks.
- They have worked with the CTMS administrator and understand the setup required for network multipoint meetings.

[Table 3](#) summarizes the Unified CM setup tasks.

**Note**

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Before performing the tasks in [Table 3](#), we assume that the CTMS administrator has already set up a route pattern on each CTMS that supports static meetings that can transition to network multipoint meetings, and if they have not already, will set up static meeting(s) as needed on each CTMS.

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**Table 3** Unified CM Setup Required For Network Multipoint Meetings

Task No.	Task	Notes
1	Create partition(s) for your Cisco TelePresence topology.	We recommend setting up a partition for each geographical area that will participate in network multipoint meetings.
2	Create CSS(es).	<ul style="list-style-type: none"> <li>We recommend setting up one CSS for each partition created in Task 1.</li> <li>For each CSS, include the appropriate partition created in Task 1 at the top of the Selected Partitions list.</li> </ul>
3	For each CTMS, create one SIP trunk that provides this functionality: <ul style="list-style-type: none"> <li>Allows devices to call the trunk (outbound)</li> <li>Allows the CTMS to call other CTMS devices (inbound)</li> </ul>	In the Trunk Configuration page, the following fields must be configured for network multipoint support: <ul style="list-style-type: none"> <li>In the Inbound Calls section, the Calling Search Space field must include a CSS that routes a non-local call to one of the other CTMS devices that supports network multipoint meetings in the topology.</li> <li>In the SIP Information section, the Destination Address field must include the IP address of the CTMS.</li> </ul> A trunk can have multiple route patterns assigned to it. For example, if you are setting up CTMS 1, and the topology also includes CTMS 2 and CTMS 3, to which you want to route non-local calls, the CSS specified for CTMS 1 must be able to reach the route patterns of CTMS 2 and CTMS 3.
4	For each CTMS, create a route pattern for each partition created in task 1.  <b>Note</b> If you intend to set up a route pattern with wildcards for use with both non-network multipoint and network multipoint meetings, see the “ <a href="#">Using Route Patterns With Wildcards For Non-Network Multipoint and Network Multipoint Meetings</a> ” section on page 12 for important guidelines.	For each route pattern, these fields must be configured for network multipoint support: <ul style="list-style-type: none"> <li>Route Pattern—Specify a range of access numbers for static meetings on the CTMS. For example, 100XX.</li> <li>Route Partition—Specify a partition created in Task 1.</li> <li>Gateway/Route List—Specify a SIP trunk for a CTMS to which non-local calls can be routed.</li> <li>Route Option—Select “Route this pattern”.</li> </ul> For example, if you are working on CTMS 1 on which the route pattern 100XX was previously configured and you have set up three partitions, create three 100XX route patterns, each of which specifies one of the partitions.
5	For each endpoint that should be able to join a network multipoint meeting, set the partition and/or CSS to which you want to endpoint to be a part.	<ul style="list-style-type: none"> <li>In Unified CM, filter the phones by directory number and systematically perform this setup on the desired endpoints.</li> <li>You must perform this setup on both the phone and codec.</li> <li>You can specify the partition and/or CSS at the device or line level.</li> </ul>

For complete information about Unified CM, see the *Cisco Unified Communications Manager Configuration Guide for the Cisco TelePresence System* at this location:

[http://www.cisco.com/en/US/partner/docs/telepresence/cucm\\_cts/cucm\\_cts\\_admin\\_book/guide/cucm\\_cts\\_admin.html](http://www.cisco.com/en/US/partner/docs/telepresence/cucm_cts/cucm_cts_admin_book/guide/cucm_cts_admin.html)

## Using Route Patterns With Wildcards For Non-Network Multipoint and Network Multipoint Meetings

When setting up a route pattern, you can specify numbers along with one or more wildcards, for example, 100XX, which establishes a range of patterns from 10000 through 10099. If any of the patterns in this range are used as a static call-in number, the resulting meeting can become a network multipoint meeting.

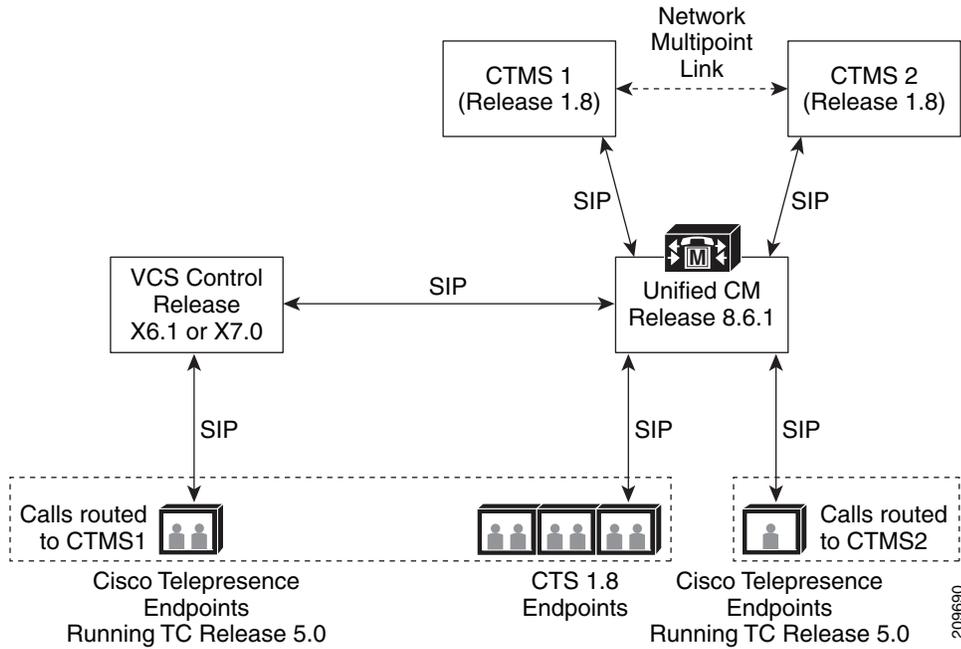
If you want to set up a route pattern with wildcards and use the range of patterns for both non-network multipoint and network multipoint meetings, we recommend using these guidelines to avoid issues:

- Set up the route pattern with wildcard characters, for example 100XX, in Unified CM.
- Set up the Route Pattern Start and Route Pattern End parameters, for example, 10000 and 10099, respectively, in the Configure > System Settings page/Route Pattern tab in the CTMS Administrative UI.
- Split the range established by the route pattern, and use part of the range exclusively for non-network multipoint meetings and the other part exclusively for network multipoint meetings. For example, you could use 10000 through 10049 for non-network multipoint meetings, and 10050 through 10099 for network multipoint meetings.
- When creating static meetings in the Manage > Static Meetings page in the CTMS Administrative UI, for the Subject parameter, you can specify “Non-network multipoint meeting” or “Network multipoint meeting” as appropriate. For example, if creating a static meeting with the access number of 10051, you could specify “Network multipoint meeting.”

## Additional Setup For Cisco TelePresence TC 5.0 Endpoints Registered With VCS Control

Cisco TelePresence TC release 5.0 endpoints registered with Cisco TelePresence Video Communication Server (VCS) Control version X6.1 or X7.0, as shown in [Figure 4](#), can participate in network multipoint meetings.

**Figure 4** Sample Cisco TelePresence Topology Including Cisco TelePresence TC 5.0 Endpoints Registered With VCS Control



To enable communication between the Cisco TelePresence TC 5.0 endpoints and CTMS 1, as shown in [Figure 4](#), some additional setup in Unified CM and VCS Control is required. [Table 4](#) outlines the additional Unified CM setup that must be performed, while [Table 5](#) outlines the VCS Control setup. The order in which the Unified CM and VCS Control setup are performed does not matter.

**Table 4** Additional Unified CM Setup for Cisco TelePresence TC 5.0 Endpoints Registered With VCS Control

Task No.	Task	Notes
1	Create a SIP trunk for communication between Unified CM and the VCS Control with which Cisco TelePresence TC 5.0 endpoints are registered.	<p>In the Trunk Configuration page, the following fields must be configured for TC 5.0 endpoint support:</p> <ul style="list-style-type: none"> <li>In the Inbound Calls section, the Calling Search Space field must include a CSS that routes a call from a TC 5.0 endpoint registered with VCS Control to a CTMS.</li> <li>In the SIP Information section, the Destination Address field must include the IP address of each VCS Control server in a cluster.</li> </ul> <p><b>Note</b> Regardless of the setting of the SIP Trunk Security Profile parameter, network multipoint meeting will be non-secure because secure network multipoint meetings are not supported.</p>
2	Create a route pattern to support the manual addition of the TC 5.0 endpoints from a CTMS. (From the CTMS Administrative UI, you can manually add endpoints from the Active Meeting dialog box/Meeting Settings tab.)	<p>In the Route Pattern Configuration page, the following fields must be configured for TC 5.0 endpoint support:</p> <ul style="list-style-type: none"> <li>For the Gateway/Route List parameter, select the SIP trunk in created in task 1.</li> <li>For the Call Classification parameter, select OnNet.</li> </ul>

**Table 5** VCS Control Setup for Cisco TelePresence TC 5.0 Endpoints

Task No.	Task	Notes
1	Create a zone for communication between the VCS Control with which Cisco TelePresence TC 5.0 endpoints are registered and Unified CM.	<p>In the Create Zone page, the following fields must be configured for TC 5.0 endpoint support:</p> <ul style="list-style-type: none"> <li>For the Type parameter, select Neighbor.</li> <li>In the SIP panel, the Mode parameter should be set to On.</li> <li>In the Location panel, specify a single address for a single Unified CM or an address for each Unified CM in a cluster.</li> <li>In the Advanced panel, the Zone profile should be set to Cisco Unified Communications Manager.</li> </ul>
2	Create a search rule.	<p>In the Create Search Rule page, the following field must be configured for TC 5.0 endpoint support:</p> <ul style="list-style-type: none"> <li>For the Target parameter, select the zone that was created in task 1.</li> </ul>

## Verifying that Network Multipoint Is Functioning Properly

You can verify that network multipoint is functioning properly by starting a test static meeting into which endpoints supported by two CTMS devices join the meeting. After the meeting starts, you can access the Active Meeting Settings dialog box from each CTMS supporting the meeting.

Use the following procedure:

- Step 1** After the meeting starts, log into the CTMS Administrative UI of one of the CTMS devices.
- Step 2** Click **Manage > Active Meetings** in the left navigation.
- Step 3** In the Active Meetings page, check the box next to the meeting you want to verify, and click **Edit**.

Figure 5 displays a sample Active Meeting Settings dialog box.

**Figure 5** Verifying Network Multipoint—Sample Active Meeting Settings Dialog Box

- Step 4** In the Active Meeting Settings dialog box, check the following fields:
  - Meeting Information:
    - Type—Verify that the meeting type displayed is “Static (Network Multipoint Meeting).”
  - Remote CTMS—Verify that the other CTMS that supports the meeting is displayed and that the hostname that displays matches the actual CTMS.

- Local Endpoints—Verify that all endpoints supported by the local CTMS are displayed. For definitions of local and remote CTMS devices, see the “[CTMS Roles During a Network Multipoint Meeting](#)” section on page 19.

**Step 5** To verify the same fields for the remote CTMS, click the link that appears in the Remote CTMS field. In the CTMS Administrative login page for the remote CTMS, enter the username and password, then repeat [Step 2](#) through [Step 4](#).

**Step 6** If the meeting is not a network multipoint meeting or there are issues with the CTMS devices or endpoints, go to the “[Troubleshooting Network Multipoint Issues](#)” section on page 25.

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For a description of the fields in the Active Meetings page and Active Meeting Settings dialog box, see the “Managing CTMS Meetings” chapter in the *Cisco TelePresence Multipoint Switch Release 1.8 Administration Guide*, which you can access at this location:

[http://www.cisco.com/en/US/products/ps7315/prod\\_maintenance\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps7315/prod_maintenance_guides_list.html)

## Creating Event Recording-Specific Unified CM Setup for Network Multipoint Meetings

The Event Recording feature enables you to record scripted corporate events, such as company meetings. A CTRS running release 1.8 (or later) records the event, while a CTMS running release 1.8 (or later) manages the recording session. For more information about Event Recording, see the *Cisco TelePresence Multipoint Switch Release 1.8 Administration Guide*, which you can access at this location:

[http://www.cisco.com/en/US/products/ps7315/prod\\_maintenance\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps7315/prod_maintenance_guides_list.html)

When used during a network multipoint meeting, Event Recording must be set up on the CTMS that functions as the rendezvous point. In addition, after the event controller logs in to initiate a recording session with the CTRS, the call must be routed directly to the rendezvous point instead of through the leaf CTMS. To ensure that the call is routed directly to the rendezvous point, the following Event Recording-specific setup must be created in Unified CM.

- One Event Recording-specific partition for each CTMS.
- One Event Recording-specific calling search space (CSS)
- One Event Recording-specific route pattern for each CTMS

The example in [Table 6](#) assumes the following:

- One instance of Unified CM is deployed in the network multipoint topology.
- Only one Event Recording-specific Unified CM setup is required for all CTRS devices deployed in the network multipoint topology.

[Table 6](#) summarizes the Unified CM setup tasks.

**Table 6** Required Unified CM Setup For Event Recording During Network Multipoint Meetings

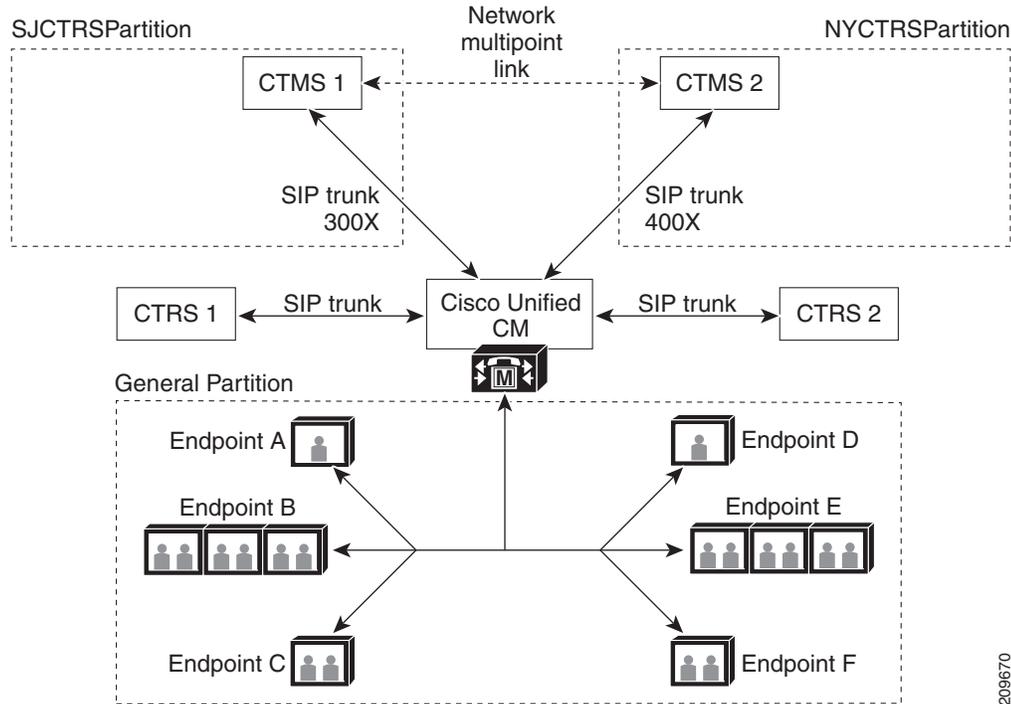
Task No.	Task	Notes
1	Create an Event Recording-specific partition for each CTMS that can function as an rendezvous point during a network multipoint meeting.	–
2	Create an Event Recording-specific CSS.	In the CSS, include each partition created in Task 1 in the Selected Partitions list.
3	For each CTMS, create an Event Recording-specific route pattern.	<p>For each route pattern, these fields must be configured for Event Recording support:</p> <ul style="list-style-type: none"> <li>Route Pattern—Specify a range of access numbers for Event Recording sessions on the CTMS. For example, 100XX.</li> <li>Route Partition—Specify the partition created for the CTMS in Task 1.</li> <li>Gateway/Route List—Specify the SIP trunk for the CTMS to which non-local calls can be routed.</li> <li>Route Option—Select “Route this pattern”.</li> </ul> <p><b>Note</b> If not already done, we assume that the CTMS administrator will set up a corresponding route pattern on each CTMS.</p>
4	In the existing SIP trunk for each CTRS, create a mapping to the Event Recording-specific CSS.	In the Trunk Configuration page, Inbound Calls section, the Calling Search Space field must include the CSS created in Task 2 so that non-local calls from the CTRS are routed to the CTMS that is functioning as the rendezvous point in the network multipoint meeting.
5	Reset the SIP trunk for all CTRS devices.	Resetting the SIP trunks activates the new Event Recording-specific Unified CM setup.

**Note**

For each CTMS device that is subsequently added to the network multipoint/Event Recording topology, repeat task 3 (create a route pattern) in [Table 6](#).

[Figure 6](#) displays a sample topology for which an Event Recording-specific setup is created in Unified CM. [Table 7](#) outlines the Unified CM setup.

**Figure 6** Sample Network Multipoint Topology In Which Event Recording Used



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**Table 7** Sample Unified CM Setup For Network Multipoint Meetings

Event Recording-Specific Partition	Event Recording-Specific CSS	Event Recording-Specific Route Patterns	Existing CTRS SIP Trunk
SJCTRSPartition	CTRS CSS, which includes: <ul style="list-style-type: none"> <li>SJCTRSPartition</li> <li>NYCTRSPartition</li> </ul>	300X, which is assigned to SJCTRSPartition and SIP trunk for CTMS 1	From CTRS 1 SIP trunk, add mapping to CTRS CSS
NYCTRSPartition		400X, which is assigned to NYCTRSPartition and SIP trunk for CTMS 2	From CTRS 2 SIP trunk, add mapping to CTRS CSS

## Understanding How Network Multipoint Meetings Work

These topics provide more information about what happens during network multipoint meetings:

- [Starting and Joining Network Multipoint Meetings, page 19](#)
- [Resources, page 19](#)
- [CTMS Roles During a Network Multipoint Meeting, page 19](#)
- [Understanding Local and Remote CTMS Devices, page 20](#)
- [Understanding How Supported Endpoint Types Affects Network Multipoint Meetings, page 20](#)
- [How Event Controls Work In Network Multipoint Meetings, page 22](#)

## Starting and Joining Network Multipoint Meetings

As with joining any static meeting, meeting participants must dial the static call-in number from their endpoints.

The transition from a static meeting to a static/network multipoint meeting occurs if an endpoint in a different area than the CTMS on which the static meeting was created, also known as the host CTMS or *rendezvous point*, dials into the meeting.

For example, if the meeting was created on CTMS 1, and endpoint D dials into the meeting, the call is routed to the closest CTMS, in this case, CTMS 2. After CTMS 2 determines that the meeting is not a local meeting, it directs the call back to Unified CM. As a result of the network multipoint-specific setup, Unified CM routes the call to CTMS 1, the network multipoint link is established, and the endpoints supported by CTMS 2 join the meeting.

Likewise, if endpoint D departs from the meeting, and CTMS 2 is not supporting any other endpoints, the network multipoint link is brought down, and the meeting transitions to a non-network multipoint meeting.

If an endpoint supported by a third CTMS, for example, CTMS 3, dials into the meeting while the network multipoint link is established between CTMS 1 and CTMS 2, the endpoint is not allowed into the meeting.

The transition to and from a network multipoint meeting is dynamic, and meeting participants are unaware of the transition.

## Resources

Static meetings are best-effort and rely on available unscheduled resources on the CTMS. This functionality is the same whether the meeting is a non-network multipoint or network multipoint meeting. However, in a network multipoint meeting, resources must be available on both participating CTMS devices.

If the host CTMS or rendezvous point does not have sufficient resources, endpoints that try to join the meeting after the resources are depleted are not allowed to join. If the other CTMS that supports the meeting, also known as the *leaf CTMS*, does not have sufficient resources, endpoints from the area it supports are not allowed to join.

Another consequence of the participating CTMS devices running out of resources is that no additional static or ad hoc meetings can be initiated on those devices.

## CTMS Roles During a Network Multipoint Meeting

During a network multipoint meeting, one of CTMS devices that support the meeting functions as a *rendezvous point*, while the other functions as the *leaf CTMS*. The rendezvous point is the CTMS on which the static meeting is created, while the leaf CTMS is at the other end of the network multipoint link.

During a network multipoint meeting, the rendezvous point has additional responsibilities such as initially distributing the meeting state and assigning a unique meeting identifier to the leaf CTMS.

## Understanding Local and Remote CTMS Devices

When configuring or monitoring a CTMS using the CTMS Administrative UI or command-line interface (CLI), this device is known as the *local CTMS*. The CTMS at the other end of the network multipoint link is the *remote CTMS*.

In addition, endpoints supported by the local CTMS are known as *local endpoints*, while endpoints supported by the remote CTMS are *remote endpoints*.

This terminology is used in this document as well as in network multipoint-related topics in the *Cisco TelePresence Multipoint Switch Release 1.8 Administration Guide*. You can access the *Cisco TelePresence Multipoint Switch Release 1.8 Administration Guide* at this location:

[http://www.cisco.com/en/US/products/ps7315/prod\\_maintenance\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps7315/prod_maintenance_guides_list.html)

## Understanding How Supported Endpoint Types Affects Network Multipoint Meetings

In CTMS release 1.8, Supported Endpoint Types in the Manage > Default Meeting Settings page as shown in [Figure 7](#) is introduced. With Supported Endpoint Types, you can control the endpoint types that are supported in Cisco TelePresence multipoint and network multipoint meetings managed by a particular CTMS. With the default setting (CTS endpoints only), only these endpoints are supported:

- CTS 1.6.x, 1.7.x and 1.8 endpoints, where *x* is the latest maintenance release
- Video conferencing endpoints supported by Cisco MXE version 1.3.101 (and later)

For information about the latest maintenance releases, see the *Cisco TelePresence System Software Compatibility Matrix*, which you can access at this location:

[http://www.cisco.com/en/US/products/ps8332/products\\_device\\_support\\_tables\\_list.html](http://www.cisco.com/en/US/products/ps8332/products_device_support_tables_list.html)

**Figure 7** Default Meeting Settings Page—Supported Endpoint Types

The screenshot shows the 'Default Meeting Settings' page with the following configuration options:

- Switching Policy:**  Room  Speaker
- Supported Endpoint Types:**  CTS endpoints only  Cisco TelePresence TC 5.0 (and later) and CTS 1.8 (and later) endpoints
- Maximum Endpoints:**
- Video Announce:**  Yes  No
- Quality:**
- Allow Downspeed:**  Yes  No
- Idle Meeting Termination Enabled:**  Yes  No
- Idle Meeting Termination Time (minutes):**
- Dial Suffix for HD Interoperability:**

Buttons: Apply, Cancel

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Optionally, you can select “Cisco TelePresence TC 5.0 (and later) and CTS 1.8 (and later) endpoints,” which supports the following endpoints:

- Cisco TelePresence EX Series, C Series, and MX200 endpoints running TC software version 5.0 (and later)
- CTS 1.8 (and later) endpoints
- Video conferencing endpoints supported by the Cisco MXE version 1.3.101 (and later)

**Note**

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To interoperate with Cisco TelePresence TC 5.0 (and later) endpoints in multipoint and network multipoint meetings, CTS 1.8 is the minimum required endpoint version. CTS 1.7.x and older endpoints are not supported in this scenario and must be upgraded to CTS 1.8 or later.

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While interoperating with Cisco TelePresence TC 5.0 (and later) endpoints in multipoint and network multipoint meetings, all supported endpoint types have full audio and video capabilities.

We provide these guidelines for setting this parameter to support network multipoint meetings:

- The two CTMS devices that support the network multipoint meeting must have the same Supported Endpoint Types setting. If they have different settings, the network multipoint link between the devices cannot be established. As a result, the endpoints supported by their respective CTMS devices remain in separate meetings.
- To support Cisco TelePresence TC release 5.0 (and later) endpoints in network multipoint meetings, the following are required:
  - If the endpoints that interoperate in these network multipoint meetings are registered to Unified CM, the Unified CM version must be 8.6.1 (or later).
  - The Supported Endpoint Types on both CTMS devices supporting the meetings must be set to “Cisco TelePresence TC 5.0 (and later) and CTS 1.8 (and later) endpoints.”

For CTMS release 1.8, the following endpoints running TC release 5.0 (and later) software are supported in network multipoint meetings: Cisco TelePresence C Series, Cisco TelePresence EX Series, and Cisco TelePresence MX200.

**Note**

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To interoperate with Cisco TelePresence endpoints running version TC 5.0 (and later) in network multipoint meetings, CTS 1.8 is the minimum required endpoint version. CTS 1.7.x and older endpoints are not supported in this scenario and must be upgraded to CTS 1.8 or later.

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- If your network multipoint topology implements Unified CM version 8.5.1, the network multipoint meetings can support only CTS 1.6.x, 1.7.x and 1.8 endpoints and video conferencing endpoints supported by Cisco MXE version 1.3.101. Therefore, the Supported Endpoint Types must be set to “CTS endpoints only.”
- Changing the parameter setting can impact active meetings. To minimize any impact, we recommend changing the setting when there are few or no active meetings.

The Supported Endpoint Types setting has the following effect on endpoint video quality during a network multipoint meeting:

- If Supported Endpoint Types is set to “CTS endpoints only” on each CTMS, all CTS endpoints participate with the video quality of 1080p.
- If Supported Endpoint Types is set to “Cisco TelePresence TC 5.0 (and later) and CTS 1.8 (and later) endpoints” on each CTMS and only CTS 1.8 endpoints participate, the video quality is 1080p.

- If Supported Endpoint Types is set to “Cisco TelePresence TC 5.0 (and later) and CTS 1.8 (and later) endpoints” on each CTMS and both Cisco TelePresence TC 5.0 (and later) and CTS 1.8 endpoints participate, the video quality of all endpoints is 720p.

For more information on the impact of changing the Supported Endpoint Types setting as well as what happens when multiple CTMS devices have different settings, see the *Cisco TelePresence Multipoint Switch Release 1.8 Administration Guide*, which you can access at this location:

[http://www.cisco.com/en/US/products/ps7315/prod\\_maintenance\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps7315/prod_maintenance_guides_list.html)

## How Event Controls Work In Network Multipoint Meetings

CTMS release 1.8 supports these Event Controls, which control the video and audio in active meetings:

- VIP Mode
- Auto Lecture Mode
- Director Controls
- Event Recording
- Boardroom Mode

It also supports Media Snapshot, which provides a means of verifying that the Event Controls are working as expected.

[Table 8](#) describes the Event Control functionality that is supported during a network multipoint meeting.



### Note

In [Table 8](#), the terms “local” and “remote” are used in conjunction with “CTMS” and “endpoints.” “Local CTMS” refers to the CTMS that you are currently configuring or monitoring using the CTMS Administrative UI. Endpoints supported by the local CTMS are referred to as “local endpoints.”

From the perspective of the local CTMS, the CTMS at the other end of the network multipoint link is the “remote CTMS.” Endpoints supported by the remote CTMS are referred to as “remote endpoints.”

**Table 8** *Event Control Functionality During a Network Multipoint Meeting*

<b>Event Control</b>	<b>Feature Summary</b>	<b>Support During a Network Multipoint Meeting</b>
VIP Mode	An endpoint can be designated as the VIP. Depending on the configuration, the VIP can be broadcast to other participating endpoints for the entire meeting or the VIP's endpoint can switch between endpoints with active speakers.	Not supported. If the Active Meeting Settings dialog box is accessed on the host or local CTMS devices during a network multipoint meeting, the VIP and Auto Lecture Mode- related attributes are not configurable.  However, either of these modes could be enabled during a non-network multipoint meeting, and the meeting could dynamically transition to a network multipoint meeting, then back to a non-network multipoint meeting. If this scenario occurs, the VIP or Auto Lecture functionality would be disabled and would remain disabled even if the meeting transitions back to a non-network multipoint meeting. If desired, you can reenable VIP or Auto Lecture Mode in the Active Meeting Settings dialog box.
Auto Lecture Mode	After a dominant speaker (the lecturer) is established, the lecturer sees all participants in the meeting scroll across the display for a configured interval. The other meeting participants see the lecturer.	

Table 8 Event Control Functionality During a Network Multipoint Meeting (continued)

Event Control	Feature Summary	Support During a Network Multipoint Meeting
Director Controls	By carefully scripting a meeting beforehand, an event organizer can determine what participants view and hear in an active meeting. As the event begins, the event organizer sets the sources and destinations for video and audio and can modify the settings throughout the meeting.	<p>Supported with these general differences:</p> <ul style="list-style-type: none"> <li>To control all endpoints in a meeting, this feature must be enabled and set up on each CTMS that supports the meeting.</li> <li>The link between two CTMS devices, also known as the network multipoint link, uses three segments of resources per CTMS. In the Director Control dialog box, these three segments are depicted as the equivalent of a triple-segment endpoint for each CTMS and can be set as a source that can be locked, or a destination. The audio and video can also be controlled for these segments. However, any mapping or locking that is set up applies only to local endpoints.</li> </ul> <p>After a network multipoint link is established with the local CTMS, the Director Controls function as described in “Managing CTMS Meetings” chapter of the <i>Cisco TelePresence Multipoint Switch Release 1.8 Administration Guide</i>, which you can access at this location:  <a href="http://www.cisco.com/en/US/products/ps7315/prod_maintenance_guides_list.html">http://www.cisco.com/en/US/products/ps7315/prod_maintenance_guides_list.html</a></p> <p>However, these functional differences exist:</p> <ul style="list-style-type: none"> <li>Source and destination mapping/video switching lock—If a segment of the network multipoint link is set as a source and locked, the video that appears to the mapped destinations may switch amongst the active speakers at the remote endpoints even though the source is locked.</li> </ul> <p><b>Note</b> If the functionality described in the above bullet is undesired, we recommend performing this setup on the remote CTMS: setting a local endpoint as the source, a segment of the network multipoint link as the destination, and locking the source.</p> <ul style="list-style-type: none"> <li>Media controls—The audio and video controls established on a particular CTMS, for example, CTMS 1, apply only to local endpoints supported by CTMS 1. Controls for the remote endpoints not supported by CTMS 1 must be established at the other CTMS, for example, CTMS 2, that supports the meeting.</li> <li>Active speaker video switching—If active speaker video switching is disabled on a particular CTMS, for example, CTMS 1, the disabled setting applies only to local endpoints supported by CTMS 1. Video from remote endpoints transmitted by the network multipoint link may still be switched unless the switching is disabled on the remote CTMS, for example, CTMS 2, also or the network multipoint link on CTMS 2 is locked.</li> </ul>

Table 8 Event Control Functionality During a Network Multipoint Meeting (continued)

Event Control	Feature Summary	Support During a Network Multipoint Meeting
Event Recording	With Event Recording, you can create recordings of meetings with multiple video and audio streams, choosing which streams to record. This feature is useful for recording scripted corporate events, such as company meetings. A CTRS running release 1.8 records the event, while the CTMS manages the recording session.	Supported with these differences: <ul style="list-style-type: none"> <li>Event Recording must be set up on the CTMS on which the static meeting was created or rendezvous point.</li> <li>To ensure that Event Recording works properly during a network multipoint meeting, additional setup in Unified CM is required. For more information, see the “<a href="#">Creating Event Recording-Specific Unified CM Setup for Network Multipoint Meetings</a>” section on page 16.</li> <li>If selecting an endpoint segment as the video source, the endpoint must be supported by the rendezvous point.</li> </ul>
Boardroom Mode	A CTS 3xxx endpoint can be designated as the meeting boardroom, while any other endpoint segment is designated as the meeting presenter. In the boardroom, the center segment displays the presenter. The left and right segments switch in non-presenter participants normally.	Supported with these differences: <ul style="list-style-type: none"> <li>The boardroom and presenter must be supported by the same CTMS, and Boardroom Mode must be enabled on that particular CTMS. The participants on the remote CTMS can only view the meeting.</li> <li>In the Boardroom dialog box, the network multipoint link is depicted as the equivalent of a triple-segment endpoint for each CTMS. You cannot designate these segments as the boardroom or presenter.</li> </ul>
Media Snapshot	Provides a snapshot of how media are distributed to endpoints in an active meeting. This snapshot is a quick way to verify the Event Control settings.	Supported with these differences: <ul style="list-style-type: none"> <li>The snapshot captured on a particular CTMS includes information for endpoints that are supported by that CTMS only. To get information about the endpoints supported by the other CTMS, you must capture a snapshot from that CTMS.</li> <li>The link between the two CTMS devices, also known as the network multipoint link, uses three segments of resources per CTMS. In the Media Snapshot dialog box, these three segments are depicted as the equivalent of a triple-segment endpoint for each CTMS.</li> </ul>

For complete information about the Event Controls in Table 8, see the *Cisco TelePresence Multipoint Switch Release 1.8 Administration Guide*, which you can access at this location:

[http://www.cisco.com/en/US/products/ps7315/prod\\_maintenance\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps7315/prod_maintenance_guides_list.html)

## Troubleshooting Network Multipoint Issues

If you experience an issue related to network multipoint, use the following checklists to help you troubleshoot and resolve it.

### If the meeting is not a network multipoint meeting and it should be:

- Verify that endpoints from two geographical areas are dialed into the meeting.
- Verify that each CTMS is operational and running software version 1.8 or later.

- Verify that the endpoints in the meeting are supported. For a list of supported endpoints, see the [“What Is Supported” section on page 3](#).
- Verify that the Unified CM version is 8.6.1 if Supported Endpoint Types is set to “Cisco TelePresence TC 5.0 (and later) and CTS 1.8 (and later) endpoints.” For more information on Supported Endpoint Types, see the [“Understanding How Supported Endpoint Types Affects Network Multipoint Meetings” section on page 20](#).
- Verify that the meeting is a static meeting.
- Verify that the static call-in number maps to a route pattern established for network multipoint meetings. For more information, see the [“Using Route Patterns With Wildcards For Non-Network Multipoint and Network Multipoint Meetings” section on page 12](#).
- Work with the Unified CM administrator to verify the following:
  - That the Unified CM version in which the partitions, CSSs, route patterns, and SIP trunk were set up is version 8.5 or later.
  - That the partitions, CSSs, route patterns, and SIP trunks set up for network multipoint are set up properly and functioning as expected.
- Verify that each CTMS has the same setting for the Supported Endpoint Types parameter in the Manage > Default Meeting Settings page of the CTMS Administrative UI. If each CTMS has a different setting, the network multipoint link cannot be established during the meeting. For more information on Supported Endpoint Types, see the [“Understanding How Supported Endpoint Types Affects Network Multipoint Meetings” section on page 20](#).
- Verify that Cisco TelePresence TC version 5.0 endpoints registered with VCS Control have been set up to communicate with the appropriate CTMS. For more information, see the [“Additional Setup For Cisco TelePresence TC 5.0 Endpoints Registered With VCS Control” section on page 12](#).

**If some endpoints are not shown in the Active Meeting Settings dialog box or are supported by a different CTMS than expected:**

- Endpoints that try to join a network multipoint meeting after the maximum number of segments is exceeded are not allowed to join the meeting. If your meeting includes several endpoints that might cause the maximum number to be exceeded, remove some of the endpoints.

For more information on the maximum number of segments supported, see the [“What Is Supported” section on page 3](#).

- Work with the Unified CM administrator to verify that the partition and/or CSS specified for each endpoint (both phone and codec) is what you expected.

**If Event Recording during a network multipoint meeting is not working:**

- Verify that you have set up the needed elements in Unified CM. For more information, see the [“Creating Event Recording-Specific Unified CM Setup for Network Multipoint Meetings” section on page 16](#).