



APPENDIX **B**

Organization Bandwidth, Endpoint Capacity, Protocols and Bridge Selection

This appendix describes some key Cisco TelePresence Exchange System concepts in further depth. See the following sections:

- [Comparing Organization Ports and Segments of Capacity, page B-1](#)
- [Understanding Media Profiles and Bridge Selection, page B-5](#)
- [Protocol Used for Dial-Out Calls At Attend Time, page B-8](#)
- [Protocol Used for Dial-In Calls At Attend Time, page B-8](#)

Comparing Organization Ports and Segments of Capacity

The Cisco TelePresence Exchange System product has two differing concepts which are often confused with each other. The official terminology which is used here and in the documentation set is “ports of organization bandwidth” and “segments of capacity.” The following sections describe the two concepts in further detail:

- [Ports and Bandwidth, page B-1](#)
- [Segments and Capacity, page B-2](#)

Ports and Bandwidth

The term “port” is generally used in Cisco TelePresence Exchange System terminology to indicate a measure of the amount of network bandwidth consumed by an active endpoint, in telepresence traffic between the endpoint organization and the Cisco TelePresence Exchange System.

When you create an organization in the Cisco TelePresence Exchange System, you specify a value for the Max Ports setting, which determines the sum total amount of bandwidth that the organization's endpoints can consume at a given time.

When you schedule a Meet-Me meeting, you typically add one or more provisioned endpoints to the meeting, and you may add unprovisioned endpoints as well. When adding a provisioned or unprovisioned endpoint to the meeting, you specify the organization to which the endpoint belongs, and you can also specify the number of ports of organization bandwidth used by the endpoint. The system counts these ports toward the Max Ports value defined for the organization for the meeting time slot. If

adding the endpoint to the scheduled meeting would cause the associated organization to exceed its Max Ports value for the given time slot, the meeting scheduling will fail with an error message indicating that the organization bandwidth is exceeded.

Remote meetings function similarly to Meet-Me meetings—you can choose to reserve bandwidth towards the organization to which the endpoint belongs when scheduling the meeting.

The system only checks the organization bandwidth when you are scheduling or modifying a meeting before it has started—it does not enforce organization bandwidth at attend time. For this reason, Rendezvous meetings, which cannot have endpoint participants added at scheduling time, do not affect the bandwidth calculation for an organization.

The system does not allow you to reserve ports of organization bandwidth for the endpoints in a two-party direct meeting because this type of meeting is direct dialed between the endpoints. You schedule a two-party direct meeting in the system only in order to provide One-Button-to-Push support for the endpoints.

Placing limits on organization bandwidth at scheduling time is optional, and you can define a “port” of bandwidth according to actual endpoint traffic consumption in your network. You may choose to use the number of screens of each endpoint as your unit of measurement for the amount of bandwidth that the endpoint utilizes, or some other measure. Or you may choose to bypass the organization bandwidth management entirely by always specifying 0 (in the administration console) or null (in API calls) for the endpoint bandwidth, effectively disabling the feature.

Segments and Capacity

Capacity is a concept which refers to the amount of resources reserved or consumed on the multipoint media bridge that is hosting the meeting. The Cisco TelePresence Exchange System documentation set generally uses the term segment as a measure of the amount of capacity allocated to or used by an endpoint on a media bridge during a meeting time frame, although occasionally the term ports or ports/segments is used.

See the following sections for details on how the system reserves, allocates, and de-allocates capacity:

- [Capacity Reservation Calculation for Meet-Me Meetings, page B-2](#)
- [Capacity Reservation Calculation for Rendezvous Meetings, page B-4](#)
- [Capacity Reservation and Allocation for Meet-Me and Rendezvous Meetings, page B-4](#)
- [Capacity Usage at Attend Time, page B-5](#)
- [Capacity De-allocation, page B-5](#)

Capacity Reservation Calculation for Meet-Me Meetings

When you add a provisioned endpoint to a Meet-Me meeting, in many cases, the Cisco TelePresence Exchange System assumes that the quantity of segments required for the endpoint is equal to the number of screens specified in the media profile associated with the endpoint. There are exceptions, however, depending on the type of bridge that will host the meeting and the scenario (dial in or dial out, whether the endpoint supports 30 FPS presentation sharing, and whether or not the organization of the endpoint has the Minimize Capacity check box checked).

[Table B-1](#) describes the capacity calculations that the Cisco TelePresence Exchange System makes for a Meet-Me call. The table also shows the number of segments that the system reserves in cases where no media profile can be matched to the endpoint. (For more information on bridge selection based on media profiles, see the [“Understanding Media Profiles and Bridge Selection” section on page B-5.](#))

Table B-1 **Endpoint Capacity Reserved for Meet-Me Calls at Scheduling Time**

Type of Call	Scenario for Determining Number of Screens	Bridge Type	Number of Segments Reserved
Provisioned Endpoint—Dial In	The system determines the number of screens (n) from the media profile of the provisioned endpoint.	CTMS	n ^{1,3}
		TPS (MSE 8710)	n ²
		MSE 8510	1
Provisioned Endpoint—Dial Out	The system determines the number of screens (n) from the media profile of the provisioned endpoint.	CTMS	n ³
		TPS (MSE 8710)	n
		MSE 8510	1
Unprovisioned Endpoint—Dial In	The system is unable to determine the number of screens, and instead uses the MeetMe Default Screens parameter (d) on the System > Global Configuration window.	CTMS	d + 1 ¹
		TPS (MSE 8710)	d ²
		MSE 8510	1
Unprovisioned Endpoint—Dial Out	You specify a media profile for the endpoint when you configure Guest Dial Out. The number of screens (n) is based on the number of screens configured for the media profile.	CTMS	n ³
		TPS (MSE 8710)	n
		MSE 8510	1
	You do not specify a media profile for the endpoint when you configure Guest Dial Out. The system is unable to determine the number of screens.	CTMS	2
		TPS (MSE 8710)	1
		MSE 8510	1
Remote Endpoint	The system is unable to determine the number of screens.	CTMS	4
		TPS (MSE 8710)	3
		MSE 8510	1

1. If the organization to which the endpoint belongs has Minimize Capacity unchecked, four segments are reserved on the CTMS for dial in.
2. If the organization to which the endpoint belongs has Minimize Capacity unchecked, three segments are reserved on the TPS for dial in.
3. An additional segment is reserved if the associated endpoint or media profile supports 30 FPS presentation sharing, making the total number of reserved segments n+1.


Note

The Cisco TelePresence System endpoints require Software Version 1.8 in order to be supported on the Cisco TelePresence MCU MSE 8510. Three-screen H.323 endpoints are not supported on the MSE 8510.

For unprovisioned endpoints, the system will estimate a number of segments to reserve based on the bridge type if the endpoint is configured for dial in. If the endpoint is configured for Guest Dial Out, you can choose a media profile to apply to the endpoint. If you specify a media profile, the system will reserve the number of screens configured in the media profile.

The MeetMe Default Screens global setting on the System Settings > Global Configuration page allows you control over the number of segments that the system reserves for unprovisioned endpoints that do not have a media profile associated with them (in other words, for dial-in calls or for dial-out situations where no media profile is specified by the meeting scheduler). In these cases, if the meeting is hosted on a CTMS bridge, the system reserves a number of segments equal to the value MeetMe Default Screens plus one additional segment (the additional segment is to account for the possibility of 30 FPS presentation sharing). If the meeting is hosted on a TPS bridge, the system reserves a number of

segments equal to the value of MeetMe Default Screens. The system always reserves one screen for these endpoints on an MSE 8510 bridge. Note that lowering the MeetMe Default Screens value may cause capacity problems on the bridge if unprovisioned endpoints with more screens than are reserved join the meeting.

For each remote endpoint that you add to the Meet-Me meeting, the system reserves 4 segments on a CTMS, 3 segments on a TPS, or 1 segment on an MSE 8510.

You can also add additional capacity to the Meet-Me meeting by specifying a number for the Additional Capacity field. This quantity is added directly to the total capacity reserved for all the endpoints as described above.

Capacity Reservation Calculation for Rendezvous Meetings

When you create a Rendezvous meeting, you cannot add provisioned or unprovisioned endpoint participants. For this reason, the Cisco TelePresence Exchange System uses a combination of other fields on the meeting scheduling page to determine the amount of capacity to reserve for the meeting.

The combination is based on the type of bridge on which the meeting will be hosted, the value in the Number of Endpoints field, the value of MeetMe Default Screens on the System > Global Configuration window, and the value in the Additional Capacity field. For a Rendezvous meeting, the system determines the type of bridge to use based on the capabilities required by the media profile(s) that you select for the Additional Media Profiles field. (For more information on bridge selection based on media profiles, see the [“Understanding Media Profiles and Bridge Selection” section on page B-5.](#))

The system multiplies the value that you specify for Number of Endpoints by a fixed number of segments for the type of bridge (MeetMe Default Screens + 1 for CTMS, MeetMe Default Screens for TPS, and 1 for MSE 8510). This gives a “worst-case” estimation assuming that all endpoints that join will use the same amount of bandwidth. The system then adds the value of the Additional Capacity field on to the total. For example, if you specify a value of 5 for Number of Endpoints, a value of 2 for Additional Capacity, MeetMe Default Screens is set to the default value of 3, and the meeting is hosted on CTMS, the system will reserve $5 * (3+1) + 2 = 22$ segments for the meeting. Thus, if you want more fine-grained control than the “worst-case” assumption, or if you want to add capacity in a smaller multiple, you can use the Additional Capacity field.



Note

At attend time, the system does not limit the actual number of endpoints that can join the Rendezvous meeting based on the Number of Endpoints field. As long as the reserved capacity is available, more endpoints can join if the endpoints have fewer screens than the “worst-case” scenario accounted for in the calculation.

Capacity Reservation and Allocation for Meet-Me and Rendezvous Meetings

The Cisco TelePresence Exchange System calculates the total capacity to reserve for a Meet-Me or Rendezvous meeting at the time you schedule or create the meeting. The point in time at which the system actually allocates the amount of resources determined by the capacity calculation for a meeting on a specific bridge depends on an additional factor for the meeting: whether the level of service of the reservation type chosen for the meeting is best-effort or guaranteed, as follows:

- **Best-effort**—When the first participant attempts to join the meeting, the system allocates all of the resources for the meeting.
- **Guaranteed**—The system allocates all of the resources for the meeting up to 15 minutes before the scheduled start of the meeting. (For a guaranteed Rendezvous meeting, the system pre-allocates the resources and does not de-allocate them unless the meeting is cancelled.)

Capacity Usage at Attend Time

When an endpoint joins a Meet-Me meeting at or after the meeting start time, or when the first participant joins a new instance of a Rendezvous meeting, the Cisco TelePresence Exchange System deducts a number of segments for the endpoint from the total reserved capacity calculated for the meeting, as shown in [Table B-2](#).

Table B-2 *Endpoint Capacity Allocated for Meet-Me Calls at Attend Time*

Endpoint Type	Scenario for Determining Number of Screens	Bridge Type	Number of Segments Allocated
Provisioned	The system determines the number of screens (n) from the media profile of the provisioned endpoint.	CTMS	n + 1
		TPS (MSE 8710)	n
		MSE 8510	1
Unprovisioned or remote	The system is unable to determine the number of screens, and instead uses the MeetMe Default Screens parameter on the System > Global Configuration window (d).	CTMS	d + 1
		TPS (MSE 8710)	d
		MSE 8510	1

For example, when a provisioned one-screen endpoint joins a Meet-Me meeting at or after the meeting start time, the Cisco TelePresence Exchange System deducts two segments from the total reserved capacity calculated for the meeting if the meeting is hosted on a CTMS bridge, or one segment if the meeting is hosted on a TPS or MSE 8510. If the value of MeetMe Default Screens is set to three (the default), an unprovisioned or remote endpoint joining the meeting will cause the system to deduct 4 segments from the remaining capacity if the meeting is hosted on CTMS, three segments on TPS, or one segment on MSE 8510.

If the remaining capacity for the meeting is less than the capacity to be deducted for an endpoint that is attempting to join the meeting, the system will not allow the endpoint to join.

Capacity De-allocation

The point in time at which the Cisco TelePresence Exchange System de-allocates the resources that have been allocated for the meeting also depends on the level of service of the reservation type chosen for the meeting:

- **Best-effort**—When the last participant leaves the meeting, the system de-allocates the resources.
- **Guaranteed**—The system de-allocates the resources at the scheduled end time, regardless of whether all participants have left the meeting. For guaranteed Rendezvous meetings, the bridge resources are never de-allocated.

Understanding Media Profiles and Bridge Selection

When you provision an endpoint in the Cisco TelePresence Exchange System, you select a media profile for the endpoint. The media profile specifies the set of protocols that the endpoint supports. Each type of media bridge (CTMS, TPS or MSE 8510) supports a certain set of protocols as well.

When you invite one or more endpoints to a Meet-Me meeting, the system tries to find a common denominator between the protocols supported by the media profiles of the endpoints and the protocols supported for each bridge type. (You can also specify Additional Media Profiles so that the system takes into account the protocol capabilities required by any additional remote endpoints or unprovisioned endpoints that may dial in. Or, in the case of a Rendezvous meeting, you must specify one or more media profiles directly by using the Additional Media Profiles field so that the system can choose the correct bridge type.) In some cases, more than one bridge may have the required capabilities to host a meeting, in which case, CTX tries the bridge types sequentially in a defined order. If the first bridge type that the system tries does not have sufficient resources available, the system attempts to allocate resources from another bridge type that supports the same capabilities. The system considers CTMS resources to be the “cheapest” and MSE 8710 the most “expensive” and attempts to allocate resources from the cheapest capable bridge type first.

The system supports the following protocols for each bridge type.

Cisco TelePresence Multipoint Switch (CTMS)¹	TIP or MUX
TPS (Cisco TelePresence Server MSE 8710)²	SIP, TIP, MUX, H.323, ISDN ³
Cisco TelePresence MCU MSE 8510²	SIP, H.323, ISDN ³

1. Cisco TelePresence Multipoint Switch version 1.8 required. (Version 1.8.1 is recommended.)

2. Cisco TelePresence Server version 4.2(1.50) with MSE version 4.2(1.50) required.

3. ISDN over H.323; requires Cisco TelePresence ISDN GW MSE 8321.

The system can use a mixture of protocols within a meeting on a bridge, except in the case of the CTMS, which requires that all endpoints use the same protocol (either TIP or MUX).

[Table B-3](#) lists the types of pre-defined media profiles, the protocols supported by each, and the associated bridge selection order.

Table B-3 Pre-Defined Endpoint Media Profiles and Associated Bridge Selection Order

Endpoint/Media Profile	Screens	Supported Media Protocol(s)	Bridge Selection Order
CTS Software Release 1.8 (Native Interop) with: <ul style="list-style-type: none"> CTS-500 CTS-1000 CTS-1100 CTS-1300 	1	MUX, TIP, SIP	CTMS, then MSE 8510, then MSE 8710
CTS Software Release 1.7 with: <ul style="list-style-type: none"> CTS-500 CTS-1000 CTS-1100 CTS-1300 	1	MUX	CTMS, then MSE 8710
CTS Software Release 1.8 (Native Interop) with: <ul style="list-style-type: none"> CTS-3000 CTS-3200 	3	MUX, TIP, SIP	CTMS, then MSE 8710

Table B-3 Pre-Defined Endpoint Media Profiles and Associated Bridge Selection Order (continued)

Endpoint/Media Profile	Screens	Supported Media Protocol(s)	Bridge Selection Order
CTS Software Release 1.7 with: <ul style="list-style-type: none"> CTS-3000 CTS-3200 	3	MUX	CTMS, then MSE 8710
<ul style="list-style-type: none"> Tandberg C-series Tandberg EX-series 	1	TIP, SIP, H.323	CTMS, then MSE 8510, then MSE 8710
Tandberg T3	3	H.323	MSE 8710
Generic H.323	1	H.323	MSE 8510, then MSE 8710
Generic ISDN	1	ISDN	MSE 8510, then MSE 8710
Generic SIP	1	SIP	MSE 8510, then MSE 8710

The system includes pre-defined media profiles for various endpoints, and you can add additional media profiles. For the Cisco TelePresence System endpoints, the pre-defined media profiles that correspond to CTS Release 1.8 capabilities have “(Native Interop)” in the name and description fields. If you are using CTS Release 1.7 on a Cisco TelePresence System endpoint, use the pre-defined media profile that does not have this additional text in the name.

Meet-Me Meeting Bridge Selection Example

Consider an example where only single-screen CTS endpoints using Native Interop media profiles are added to a Meet-Me meeting. In this case, the system will first try to reserve a CTMS resource for the meeting. If, however, an additional media profile is added for generic H.323, then the system will try to reserve an MSE 8510 resource. If a Tandberg T3 media profile is also added, the system will try to reserve a TPS resource.

Meet-Me Meeting Guest Dial-Out and Bridge Selection

When you schedule a Meet-Me meeting, you can specify unprovisioned endpoints and have the system dial out to add to the meeting when it starts. When you check the Guest Dial Out check box, you have the option of configuring the media profile for the endpoint.

[Table B-4](#) lists the bridge selection order for Guest Dial Out, based on the protocol type. In this table, the media profile column refers to any selected media profile that includes the number of screens and protocols listed; for example, the first row of the table would be used if the media profile specifies one screen and supports SIP, H.323 or ISDN. If no media profile is specified, the last row in the table is used.

Table B-4 Guest Dial-Out Bridge Selection Order

Media Profile	Screens	Supported Media Protocol(s)	Bridge Selection Order
Guest Dial Out with SIP/H.323/ISDN	1	SIP, H.323, ISDN	CTMS, then MSE 8510, then MSE 8710
Guest Dial Out with SIP/H.323/ISDN	3	SIP, H.323, ISDN	MSE 8710
Guest Dial Out with TIP	1	TIP	MSE 8510, then MSE 8710

Table B-4 Guest Dial-Out Bridge Selection Order (continued)

Media Profile	Screens	Supported Media Protocol(s)	Bridge Selection Order
Guest Dial Out with TIP	3	TIP	MSE 8510, then MSE 8710
Guest Dial Out, no media profile	1	H.323	MSE 8510, then MSE 8710

Determining the Actual Bridge Type Reserved for a Meeting

You can determine the type of bridge that is hosting the meeting once the meeting has been scheduled by finding the meeting in the Collaboration Services > Meetings list, clicking on the meeting ID, and clicking the Meet-me Info tab. The Bridge Resource Type field displays the type.

Protocol Used for Dial-Out Calls At Attend Time

The protocol that the Cisco TelePresence Exchange System uses when dialing out to an endpoint depends on the bridge in use for the meeting, as follows.

Cisco TelePresence Multipoint Switch (CTMS)	TIP and MUX share a common capability negotiation mechanism, and the bridge determines the protocol to use independently. MUX is the default if the media profile of the first endpoint supports both protocols. If the media profile of an endpoint only supports one of the protocols, existing endpoints will try to renegotiate to use that protocol.
Cisco TelePresence Server MCU MSE 8510	The system attempts to dial out using a protocol that is supported by the media profile of the endpoint. If more than one protocol is specified in the media profile, the system tries a supported protocol in the following order: H.323, SIP, ISDN. For example, for an endpoint with a media profile that supports SIP and ISDN, the system would first attempt to dial out by using SIP.
Cisco TelePresence Server MSE 8710	The system attempts to dial out using a protocol that is supported by the media profile of the endpoint. If more than one protocol is specified in the media profile, the system tries a supported protocol in the following order: H.323, TIP, MUX, SIP, ISDN. For example, for an endpoint with a media profile that supports SIP and ISDN, the system would first attempt to dial out by using SIP.

Protocol Used for Dial-In Calls At Attend Time

The protocol that the Cisco TelePresence Exchange System uses when an endpoint dials in also depends on the bridge in use for the meeting, as follows. (H.323 and ISDN are not supported for dial-in.)

Cisco TelePresence Multipoint Switch (CTMS)	TIP and MUX share a common capability negotiation mechanism, so the bridge determines the protocol to use independently. MUX is the default if the first endpoint supports both protocols. If an endpoint only supports one of the protocols, that protocol is used, and existing endpoints will try to renegotiate to use this protocol.
Cisco TelePresence Server MCU MSE 8510	The Cisco TelePresence Exchange System only supports SIP for dial-in with the MSE 8510, so this protocol is always chosen.
Cisco TelePresence Server MSE 8710	The Cisco TelePresence Exchange System checks to see if the endpoint that is dialing in is provisioned for the meeting. If so, and if the endpoint supports MUX or TIP, the bridge will negotiate one of these two protocols. If the endpoint is unprovisioned, the system checks the route the endpoint dialed in on. If the Endpoint Type for this route is set to CTS, the bridge will negotiate MUX or TIP. Otherwise, the bridge will attempt to negotiate SIP, MUX or TIP. (Endpoints running CTS 1.7 and earlier versions do not have the capability to negotiate between SIP and MUX or TIP, so if the Endpoint Type for the route is set to BOTH or INTEROP, the call will fail for these endpoints.)

