

Using CESoPSN Bundles to Group DSOs on IP Circuits

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PART 1

Overview

- Using Bundles to Create Logical Configurations for Physical Interfaces
Overview on page 3
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CHAPTER 1

Using Bundles to Create Logical Configurations for Physical Interfaces Overview

- Types of Bundles Overview on page 3
- Interface Naming Conventions for the CTP Series on page 4

Types of Bundles Overview

Table 1 on page 3 shows the typical application for each bundle type, and lists the interfaces that each type of bundle supports.

Table 1: Bundle Types and Supported Interfaces

Bundle Type	Generally Used For	Interface Types Supported
CTP (circuit-to-packet)	Connecting legacy serial interfaces to the IP network	<ul style="list-style-type: none">• CTP150<ul style="list-style-type: none">• Serial interface• T1/E1 interface• CTP2000<ul style="list-style-type: none">• Serial interface• Serial interface with T1/E1 daughter card• Serial interface with 4WTO daughter card• Serial interface with IRIG-B daughter card• T1/E1 interface
SAToP (structure-agnostic TDM over IP)	Connecting single T1 or E1 interfaces to an IP network	<ul style="list-style-type: none">• CTP150<ul style="list-style-type: none">• T1/E1 interface• CTP2000<ul style="list-style-type: none">• Serial interface with T1/E1 daughter card• T1/E1 interface

Table 1: Bundle Types and Supported Interfaces (*continued*)

Bundle Type	Generally Used For	Interface Types Supported
CESoPSN (circuit emulation services over a packet-switched network)	Grouping multiple DS0s to one IP circuit	<ul style="list-style-type: none"> CTP2000 <ul style="list-style-type: none"> T1/E1 interface with unused DS0s CTP150 <ul style="list-style-type: none"> T1/E1 interface with unused DS0s <p>An unused DS0 is a DS0 not assigned to another bundle. When a CESoPSN bundle is attached to a port, by default all unused DS0s are assigned to the bundle.</p>
VCOMP (voice compression)	Grouping multiple analog circuits (channels) into one IP circuit	<ul style="list-style-type: none"> CTP2000 <ul style="list-style-type: none"> T1/E1 interface 4W-E&M interface Voice compression module

Interface Naming Conventions for the CTP Series

In the CTP software, interfaces are specified in the format:

type-slot/port

where

type—Type of interface. A 2-character abbreviation.

slot—Slot number on the CTP device.

port—Port number on the CTP device.

If the interface module has a daughter card installed, the interface format is as follows:

type-slot/port w/daughter-card

Table 2: Interface Type Specifiers

Interface Type	Type Specifier
4WE&M	4w
4WTO	4w
E1	e1
2W-FXO	fo
2W-FSX	fs
IRIG	irig
Serial	se

Table 2: Interface Type Specifiers (*continued*)

Interface Type	Type Specifier
T1	t1
T1E1	t1e1

CHAPTER 2

CESoPSN Bundle Overview

- CESoPSN Bundle Overview on page 7
- Providing QoS for CTP Bundles by Using Service Type Overview on page 7

CESoPSN Bundle Overview

A CESoPSN bundle represents an IP circuit emulation flow. With CESoPSN bundles, you can group multiple DS0s on one IP circuit, and you can have more than one circuit emulation IP flow created from a single physical interface. For example, some DS0 channels from a T1 interface can go in an IP flow to destination A, and other DS0 channels from that same T1 interface can go to destination B. This feature allows for payload optimization.

CESoPSN bundles comply with *RFC 5086, Structure-Aware Time Division Multiplexed (TDM) Circuit Emulation Service over Packet Switched Network (CESoPSN), December 2007*. RFC-5086 defines a standard for transporting multiple bundles of DS0s from a single physical interface to different network destinations.

CESoPSN bundles are supported on CTP2000 and CTP150 T1/E1 interfaces with unused DS0s. An unused DS0 is a DS0 not assigned to another bundle. When you create a CESoPSN bundle all unused DS0s are assigned to the bundle by default.

CESoPSN bundles support the following signaling:

- T1 interfaces support channel-associated signaling (CAS).
- E1 interfaces support CAS and common channel signaling (CCS).

Providing QoS for CTP Bundles by Using Service Type Overview

In IP networks, the IP flow is typically classified based on the Differentiated Services Code Point (DSCP) setting in the type of service (TOS) byte of the IP header. DSCP is a scalable solution for classifying flows in a large IP network based on the class of service desired on specific IP traffic flows.

With the CTP device, you can configure DSCP settings for each circuit's IP flow. For example, some circuits could be configured for the expedited forwarding (EF) class. When the network routers receive this EF-marked flow from the CTP device, they place the marked traffic into a high priority queue, enabling this traffic to be serviced before

lower priority traffic. As an EF-marked flow traverses the IP network, routers can use its classification to provide the flow a more predictable level of performance across the network

When you configure the service type of a bundle, you specify the ToS byte to be used in IP headers of packets sent from the CTP device to the IP network. The ToS setting is applied to circuits created by the bundle for which the service type is configured.

Table 3 on page 8 shows the mapping for each DSCP class and setting to the ToS setting that you configure as the service type for a bundle. The EF class (ToS setting 184) is commonly used for circuit traffic.

Table 3: DSCP Classes and Service Type

DSCP Class	DSCP Setting	ToS Setting
CS7	56	224
CS6	48	192
EF	46	184
CS5	40	160
AF43	38	152
AF42	36	144
AF41	34	136
CS4	32	128
AF33	30	120
AF32	28	112
AF31	26	104
CS3	24	96
AF23	22	88
AF22	20	80
AF21	18	72
CS2	16	64
AF13	13	52
AF12	12	48

Table 3: DSCP Classes and Service Type (*continued*)

DSCP Class	DSCP Setting	ToS Setting
AF11	10	40
CS1	8	32

- Related Documentation**
- [Configuring IP Parameters for CTP Bundles \(CTPView\)](#)
 - [Configuring IP Parameters for CTP Bundles \(CTP Menu\)](#)

PART 2

Configuration

- Adding Bundles on page 13
- Configuring CESoPSN Bundles (CTP Menu) on page 15
- Configuring CESoPSN Bundles (CTPView) on page 25

CHAPTER 3

Adding Bundles

- Adding a Bundle (CTPView) on page 13
- Adding a Bundle (CTP Menu) on page 13

Adding a Bundle (CTPView)

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.
- Connect the CTPView server to the CTP device for which you want to configure bundles.
- Disable the bundle before you modify the bundle options.

To add a bundle using CTPView:

1. In the side pane, select **Bundle > Configuration**.
2. Run your mouse over the **Open Add Bundles Display** bar.
3. Under **New Bndl Number**, select a bundle number.
4. Under the type of bundle you want to add, select a source port, and click the button for the type of bundle.
5. Enter the parameters, and **Click to Submit Bundle AND Port Changes**.

Adding a Bundle (CTP Menu)

To add a bundle using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.
2. Select the type of bundle that you want to configure.
3. Enter **add** to add a new bundle.
4. Select the port you want to attach the bundle to.

CHAPTER 4

Configuring CESoPSN Bundles (CTP Menu)

- Configuring T1 and E1 Port Parameters for CESoPSN Bundles (CTP Menu) on page 15
- Configuring DS0 Time Slots for CESoPSN Bundles (CTP Menu) on page 17
- Configuring IP Parameters for CESoPSN Bundles on CTP2000 Devices (CTP Menu) on page 18
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Configuring T1 and E1 Port Parameters for CESoPSN Bundles (CTP Menu)

This topic describes how to configure port parameters for T1/E1 interfaces.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure port parameters for T1/E1 interfaces for CESoPSN bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.
2. Select **3) CESoPSN**.
3. Select a bundle from the list.

If you select an active bundle, you are prompted to disable the bundle before configuring it.
4. Select **3) Port Config**.
5. Follow the onscreen instructions, and configure the options as described in Table 4 on page 16.

The options vary depending on whether the bundle is T1 or E1.

Table 4: CESoPSN Bundle T1/E1 Port Parameter Settings in the CTP Menu

Field	Function	Your Action
Port descriptor	Specifies a description for the port.	Enter a description of up to 62 alphanumeric characters. Do not use the following characters: (; ' ")]
Type	Specifies the type of interface. The type of interface that you select affects the default packet size and buffer sizes for the bundle.	Select one: <ul style="list-style-type: none"> • T1 • E1
Option (for T1)	Specifies the T1 encoding method used on this bundle.	Select one: <ul style="list-style-type: none"> • B8ZS • AMI
Option (for E1)	For E1 interfaces, configure the termination to work with either coax or RJ-48.	Select one: <ul style="list-style-type: none"> • RJ48 • COAX
BuildOut	For T1 interfaces, specifies the line buildout.	Select one: <ul style="list-style-type: none"> • 0) ~133 ft • 1) ~266 ft • 2) ~399 ft • 3) ~533 ft • 4) ~655 ft • 5) ~7.5dB CSU • 6) ~15dB CSU • 7) ~22.5dB CSU
Clock synthesizer	The following clock synthesizer settings are set by the software, and you cannot change them: <ul style="list-style-type: none"> • For T1, the clock synthesizer is set to 1544 KHz. • For E1 the clock synthesizer is set to 2048 KHz. 	

Table 4: CESoPSN Bundle T1/E1 Port Parameter Settings in the CTP Menu (*continued*)

Field	Function	Your Action
Clock Config	Specifies the type of clocking for the port.	<p>Select one:</p> <ul style="list-style-type: none"> CTP is Clock Source—The PBX either returns the clock received from the CTP or it returns a clock that is traceable to the same source as the CTP node clock reference. You typically use this configuration when you configure the CTP device with a clock reference input. CTP is Loop Timed—The PBX provides the clock and the CTP returns the same clock to the PBX. You typically use this configuration when the PBX has the more accurate clock source. You can configure the far end of the circuit with adaptive clocking to recover this clock if necessary. CTP is Clock Source (Adaptive End)—The PBX returns the clock received from the CTP, and the CTP uses the adaptive recovered clock. You typically use this configuration when the CTP does not have a reference input and the PBX typically requires clock from the distant PBX. <p>On CTP150 devices, If you set clocking to CTP is Clock Source (Adaptive End), the first bundle activated on the interface is assigned as the adaptive master bundle on which the transmit clock is adjusted. This bundle is also the last bundle to be deactivated on the interface.</p>
Signal	For T1 interfaces, specifies whether or not CAS signaling is used.	<p>Enter one:</p> <ul style="list-style-type: none"> On—Signaling is on. Off—Signaling is off.

**Related
Documentation**

- CESoPSN Bundle Overview on page 7
- Configuring IP Parameters for CESoPSN Bundles on CTP2000 Devices (CTP Menu) on page 18

Configuring DSO Time Slots for CESoPSN Bundles (CTP Menu)

This topic describes how to configure the DSO time slots used by the bundle. By default, all unused DSOs are attached to a bundle. An unused DSO is a DSO not assigned to another bundle.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure time slots for CESoPSN bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.
2. Select **3) CESoPSN**.
3. Select a bundle from the list.

If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **2) Config** to configure the bundle.
5. Configure the options as described in Table 5 on page 18.

Table 5: CESoPSN Bundle DSO Time Slot Settings in the CTP Menu

Field	Function	Your Action
Time Slots	Specifies the time slots assigned to this bundle. The number of time slots that you select affects the default packet size and packet buffer set size for the bundle.	Enter the number of the time slots that you want to configure for the bundle. <ul style="list-style-type: none"> To enter a list of time slots, separate the list with commas. To enter a range of time slots, separate the range with a hyphen (-).

Related Documentation

- CESoPSN Bundle Overview on page 7
- Configuring IP Parameters for CESoPSN Bundles on CTP2000 Devices (CTP Menu) on page 18

Configuring IP Parameters for CESoPSN Bundles on CTP2000 Devices (CTP Menu)

The CTP software uses the IP parameters to create IP packets.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure IP parameters for CESoPSN bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.
2. Select **3) CESoPSN**.
3. Select a bundle from the list.

If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **2) Config** to configure the bundle.
5. Configure the options as described in Table 6 on page 18.

Table 6: CESoPSN Bundle IP Parameter Settings on CTP2000 Devices in the CTP Menu

Field	Function	Your Action
Destination IP	Specifies the name and IP address of the remote CTP device.	Enter the address of the remote CTP device.

Table 6: CESoPSN Bundle IP Parameter Settings on CTP2000 Devices in the CTP Menu (*continued*)

Field	Function	Your Action
Source UDP port	<p>Specifies the source UDP port.</p> <p>The source UDP port is used as the circuit identifier; you must configure both circuit endpoints to use the same UDP port. The UDP port must be unique on the CTP device. You will not be able to activate a port if another port is using the same source UDP port number.</p>	Enter a number from 1 through 65535.
Max Buffer (ms)	<p>Specifies the maximum buffer size.</p> <p>The maximum buffer size setting is based on the number of packets in the buffer and the number of milliseconds that it takes the packets to go through the buffer. For example, a setting of 10.000 ms - 2 packets means that it will take 10 ms for 2 packets to go through the buffer.</p> <p>We recommend that you use the default setting unless you require changes because of network performance.</p>	<p>Select a buffer size. The software displays a list of possible buffer sizes. The list varies depending on the type of interface (T1 or E1), and the type of signaling (CSS or CAS).</p> <p>For example, the following are the available buffer sizes for an E1 interface with CSS signaling:</p> <ul style="list-style-type: none"> • 10.000 ms 2 packets • 20.000 ms 4 packets • 40.000 ms 8 packets • 80.000 ms 16 packets • 160.000 ms 32 packets • 320.000 ms 64 packets • 640.000 ms 128 packets
Pkt Buffer Set (ms)	<p>Specifies the buffer size when the circuit enters a running state.</p> <p>The CTP software calculates a default setting based on the type of interface (T1 or E1), the type of signaling (CSS or CAS), and the packet size.</p> <p>We recommend that you use the default setting unless you require changes because of network performance.</p>	<p>Enter a number from the range displayed on the screen.</p> <p>This number must be divisible by the packet size. If you enter a number that is not divisible by the packet size, the software changes the setting to the closest number that is divisible by the packet size.</p>

Table 6: CESoPSN Bundle IP Parameter Settings on CTP2000 Devices in the CTP Menu (*continued*)

Field	Function	Your Action
Packet Size	<p>Specifies the size of IP packets that are created from data received at the port.</p> <p>The CTP software calculates a default packet size based on the number of time slots configured, the type of interface (T1 or E1), and the type of signaling (CSS or CAS).</p> <p>We recommend that you use the default setting unless you require changes because of network performance.</p> <p>If you choose to change the signaling, use the following guidelines:</p> <ul style="list-style-type: none"> For CSS signaling, the packet size must be divisible by the number of time slots. For CAS signaling, use the following formula: $\text{packet size} = \text{number-of-slots} * 24 + \text{signaling-size}$ <p>where</p> $\text{signaling-size} = \text{number-of-slots}/2 + \text{number-of-slots}\%2$ <p>frames-per-packet for E1 = 16</p> <p>frames-per-packet for T1 = 24</p>	Enter a packet size.
Service Type	<p>Specifies the ToS byte to be used in the IP headers of packets sent from the CTP device to the IP network.</p> <p>For a mapping of ToS byte values to DSCP classes and settings, see "Providing QoS for CTP Bundles by Using Service Type Overview" on page 7.</p> <p>You do not need to set the ToS value to the same value on local and remote bundles.</p>	Enter a number from 0 through 255.
Time to Live	<p>Specifies the maximum number of router hops that a packet can traverse. The CTP device sets the TTL value in IP packets that it sends to the IP network. The IP network does not alter or optimize the packet routing based on the TTL setting. You do not need to set the same TTL value on local and remote ports.</p>	Enter a number from 0 through 255.
Bundle Description	Specifies identifying information about the bundle.	Type a description for the bundle.

Related Documentation • CESoPSN Bundle Overview on page 7

Configuring IP Parameters for CESoPSN Bundles on CTP150 Devices (CTP Menu)

The CTP software uses the IP parameters to create IP packets.

Default buffer settings for CESoPSN bundles on CTP150 devices are calculated as follows:

- If the packet size is less than 3 ms of payload, set the buffers as follows:
 - Minimum buffer=8 ms
 - Maximum buffer=12 ms
 - Packet buffer set=16 ms
- If the packet size is greater than 3 ms of payload, set the buffers as follows:
 - Minimum buffer=1 (packet time)
 - Maximum buffer=2 (packet time)
 - Packet buffer set=3 (packet time)

For example, if the packet size is 80 bytes with one channel in the bundle and signaling is off, one packet time is calculated as:

$$80/8=10 \text{ ms}$$

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure IP parameters for CESoPSN bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.
2. Select **3) CESoPSN**.
3. Select a bundle from the list.

If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **2) Config** to configure the bundle.
5. Configure the options as described in Table 7 on page 21.

Table 7: CESoPSN Bundle IP Parameter Settings on CTP150 Devices in the CTP Menu

Field	Function	Your Action
Destination IP	Specifies the name and IP address of the remote CTP device.	Enter the address of the remote CTP device.
Source UDP port	Specifies the source UDP port. The source UDP port is used as the circuit identifier; you must configure both circuit endpoints to use the same UDP port. The UDP port must be unique on the CTP device. You will not be able to activate a port if another port is using the same source UDP port number.	Enter a number from 1 through 65535.

Table 7: CESoPSN Bundle IP Parameter Settings on CTP150 Devices in the CTP Menu (*continued*)

Field	Function	Your Action
Min Buffer (ms)	<p>Specifies the minimum buffer size.</p> <p>We recommend that you use the default setting unless you require changes because of network performance.</p>	Enter the number of milliseconds. The number that you can enter varies depending on the type of interface and signaling.
Max Buffer (ms)	<p>Specifies the maximum buffer size.</p> <p>We recommend that you use the default setting unless you require changes because of network performance.</p>	Enter the number of milliseconds. The number that you can enter varies depending on the type of interface and signaling.
Pkt Buffer Set (ms)	<p>Specifies the buffer size when the circuit enters a running state (the start buffer fill).</p> <p>We recommend that you use the default setting unless you require changes because of network performance.</p>	Enter the number of milliseconds. The number that you can enter varies depending on the type of interface and signaling.
Packet Size	<p>Specifies the size of IP packets that is created from data received at the port.</p> <p>The CTP software calculates a default packet size based on the number of time slots configured, the type of interface (T1 or E1), and the type of signaling (CSS or CAS).</p> <p>We recommend that you use the default setting unless you require changes because of network performance.</p> <p>If you choose to change the signaling, use the following guidelines:</p> <ul style="list-style-type: none"> For CSS signaling, the packet size must be divisible by the number of time slots. For CAS signaling, use the following formula: $\text{packet size} = \text{number-of-slots} * 24 + \text{signaling-size}$ <p>where</p> $\text{signaling-size} = \text{number-of-slots}/2 + \text{number-of-slots}\%2$ <p>frames-per-packet for E1 = 16</p> <p>frames-per-packet for T1 = 24</p> 	Enter a packet size.
Service Type	<p>Specifies the ToS byte to be used in the IP headers of packets sent from the CTP device to the IP network.</p> <p>For a mapping of ToS byte values to DSCP classes and settings, see “Providing QoS for CTP Bundles by Using Service Type Overview” on page 7.</p> <p>You do not need to set the ToS value to the same value on local and remote bundles.</p>	Enter a number from 0 through 255.
Time to Live	<p>Specifies the maximum number of router hops that a packet can traverse. The CTP device sets the TTL value in IP packets that it sends to the IP network. The IP network does not alter or optimize the packet routing based on the TTL setting. You do not need to set the same TTL value on local and remote ports.</p>	Enter a number from 0 through 255.

Table 7: CESoPSN Bundle IP Parameter Settings on CTP150 Devices in the CTP Menu (*continued*)

Field	Function	Your Action
Bundle Description	Specifies identifying information about the bundle.	Type a description for the bundle.

Related Documentation

- CESoPSN Bundle Overview on page 7

Configuring the Missing Packet Fill Pattern for CESoPSN Bundles on CTP150 Devices (CTP Menu)

This topic describes how to specify the fill pattern that the CPT device inserts when IP packets are dropped.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure the missing packet fill pattern for CESoPSN bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.
2. Select **3) CESoPSN**.
3. Select a bundle from the list.
If you select an active bundle, you are prompted to disable the bundle before configuring it.
4. Select **2) Config**.
5. Select **10) Advanced Options**.
6. Configure option **3) Missing pkt fill pattern** as described in Table 8 on page 23.

Table 8: CESoPSN Bundle Missing Packet Fill Pattern Parameter Setting in the CTP Menu

Field	Function	Your Action
Missing pkt fill pattern	Specifies the data that the CTP device inserts into the circuit bit stream when an IP packet is dropped. The number of bits inserted is equal to the number of bits in the missed packet. This data insertion method prevents a loss of bit count integrity to attached circuit devices and encryptors.	Enter two hexadecimal digits. You must enter a value other than ff. This field does not require the 0x characters.

Configuring Circuit Restart Parameters for CESoPSN Bundles on CTP150 Devices (CTP Menu)

This topic describes how to configure advanced options that are related to circuit restart. Set these parameters to the same values on the local and remote CTP devices.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure circuit restart parameters using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.
2. Select **3) CESoPSN**.
3. Select a bundle from the list.

If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **2) Config**.
5. Select **10) Advanced Options**.
6. Configure the options as described in Table 9 on page 24.

Table 9: CESoPSN Bundle Advanced Options Parameter Settings for Circuit Startup in the CTP Menu

Field	Function	Your Action
Consecutive pkts loss to starve	Specifies how many consecutive circuit packets the IP network must drop before the CTP device restarts the circuit. We recommend that you set the parameter to a larger value when the IP network uses packet-encrypting devices. These devices cause momentary interruption in packet flows when encryption keys are updated.	Enter a number from 1 through 64.
In sequence pkts after starve	Specifies the number of in-sequence packets the CTP device must receive after a starvation before the circuit transitions from in-sync to running.	Enter a number from 1 through 64.

CHAPTER 5

Configuring CESoPSN Bundles (CTPView)

- Configuring T1 and E1 Port Parameters for CESoPSN Bundles (CTPView) on page 25
- Configuring DS0 Time Slots for CESoPSN Bundles (CTPView) on page 27
- Configuring IP Parameters for CESoPSN Bundles on CTP2000 Devices (CTPView) on page 28
- Configuring IP Parameters for CESoPSN Bundles on CTP150 Devices (CTPView) on page 31
- Configuring the Missing Packet Fill Pattern for CESoPSN Bundles on CTP150 Devices (CTPView) on page 33
- Configuring Circuit Restart Parameters for CESoPSN Bundles on CTP150 Devices (CTPView) on page 34

Configuring T1 and E1 Port Parameters for CESoPSN Bundles (CTPView)

This topic describes how to configure port parameters for T1/E1 interfaces.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.
- Connect the CTPView server to the CTP device for which you want to configure bundles.
- Disable the bundle before you modify the bundle options.

To configure T1 and E1 port parameters using CTPView:

1. In the side pane, select **Bundle > Configuration**.
2. Run your mouse over the **Display and Select an Existing Bundle** bar.
3. In the table of bundles, select the bundle that you want to modify.
4. Under **Port Options**, configure the parameters described in Table 10 on page 26.

The options vary depending on whether the bundle is T1 or E1.

5. Click **Click to Submit Bundle AND Port Changes**.

Table 10: CESoPSN Bundle T1 and E1 Port Parameter Settings in CTPView

Field	Function	Your Action
Port Description	Specifies a description for the port.	Enter a description of up to 62 alphanumeric characters. Do not use the following characters: (; ' ")]
T1/E1 Choice	Specifies the type of interface. The type of interface that you select affects the default packet size and buffer sizes for the bundle.	Select one: <ul style="list-style-type: none"> • T1 • E1
T1 Line Coding	For T1 interfaces, specifies the T1 encoding method used on this bundle.	Select one: <ul style="list-style-type: none"> • B8ZS • AMI
E1 Connector Type	For E1 interfaces, configure the termination to work with either coax or RJ-48.	Select one: <ul style="list-style-type: none"> • RJ48 • COAX
Line Buildout	For T1 interfaces, specifies the line buildout.	Select one: <ul style="list-style-type: none"> • ~133 ft • ~266 ft • ~399 ft • ~533 ft • ~655 ft • -7.5dB CSU • -15dB CSU • -22.5dBCSU
Signaling	For T1 interfaces, specifies whether or not CAS signaling is used.	Select one: <ul style="list-style-type: none"> • On—Signaling is on. • Off—Signaling is off.

Table 10: CESoPSN Bundle T1 and E1 Port Parameter Settings in CTPView (*continued*)

Field	Function	Your Action
Clock Cfg	Specifies the type of clocking for the port.	<p>Select one:</p> <ul style="list-style-type: none"> CTP is Clock Source—The PBX either returns the clock received from the CTP or it returns a clock that is traceable to the same source as the CTP node clock reference. You typically use this configuration when you configure the CTP device with a clock reference input. CTP is Looped Timed—The PBX provides the clock and the CTP returns the same clock to the PBX. You typically use this configuration when the PBX has the more accurate clock source. You can configure the far end of the circuit with adaptive clocking to recover this clock if necessary. CTP is Clock Source – Adap—The PBX returns the clock received from the CTP, and the CTP uses the adaptive recovered clock. You typically use this configuration when the CTP does not have a reference input and the PBX typically requires clock from the distant PBX. <p>On CTP150 devices, If you set clocking to CTP is Clock Source – Adap, the first bundle activated on the interface is assigned as the adaptive master bundle on which the transmit clock is adjusted. This bundle is also the last bundle to be deactivated on the interface.</p>

- Related Documentation**
- CESoPSN Bundle Overview on page 7
 - Configuring IP Parameters for CESoPSN Bundles on CTP2000 Devices (CTPView) on page 28

Configuring DS0 Time Slots for CESoPSN Bundles (CTPView)

This topic describes how to configure the DS0 time slots used by the bundle. By default, all unused DS0s are attached to a bundle. An unused DS0 is a DS0 not assigned to another bundle.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.
- Connect the CTPView server to the CTP device for which you want to configure bundles.
- Disable the bundle before you modify the bundle options.

To configure time slots for CESoPSN bundles using CTPView:

1. In the side pane, select **Bundle > Configuration**.
2. Run your mouse over the **Display and Select an Existing Bundle** bar.
3. In the table of bundles, select the bundle that you want to modify.
4. Under **Bundle Options**, configure the parameters described in Table 11 on page 28, and click **Click to Submit Bundle AND Port Changes**.

Table 11: CESoPSN Bundle DSO Time Slot Settings in CTPView

Field	Function	Your Action
Time Slots [Selected are green.]	<p>Specifies the time slots that are assigned to the bundle.</p> <p>The number of time slots that you select affects the default packet size and packet buffer set size for the bundle.</p>	Click on a time slot to select it for the bundle. Green time slots are selected. Gray time slots are not selected.

- Related Documentation**
- CESoPSN Bundle Overview on page 7
 - Configuring IP Parameters for CESoPSN Bundles on CTP2000 Devices (CTPView) on page 28

Configuring IP Parameters for CESoPSN Bundles on CTP2000 Devices (CTPView)

The CTP software uses the IP parameters to create IP packets.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.
- Connect the CTPView server to the CTP device for which you want to configure bundles.
- Disable the bundle before you modify the bundle options.

To configure IP parameters for CESoPSN bundles using CTPView:

1. In the side pane, select **Bundle > Configuration**.
2. Run your mouse over the **Display and Select an Existing Bundle** bar.
3. In the table of bundles, select the bundle that you want to modify.
4. Under **Bundle Options**, configure the parameters described in Table 12 on page 28, and click **Click to Submit Bundle AND Port Changes**.

Table 12: CESoPSN Bundle IP Parameter Settings on CTP2000 Devices in CTPView

Field	Function	Your Action
Bundle Description	Specifies identifying information about the bundle.	Type a description for the bundle.
State	Specifies whether the bundle is active or disabled.	Select DISABLED or ACTIVE.
Remote Address	Specifies the name and IP address of the remote CTP device.	<p>In the first field, select the CTP device.</p> <p>In the second field, select an interface on the CTP device.</p>

Table 12: CESoPSN Bundle IP Parameter Settings on CTP2000 Devices in CTPView (*continued*)

Field	Function	Your Action
Packet Size	<p>Specifies the size of IP packets that are created from data received at the port.</p> <p>The CTP software calculates a default packet size based on the number of time slots configured, the type of interface (T1 or E1), and the type of signaling (CSS or CAS).</p> <p>We recommend that you use the default setting unless you require changes because of network performance.</p> <p>If you choose to change the signaling, use the following guidelines:</p> <ul style="list-style-type: none"> For CSS signaling, the packet size must be divisible by the number of time slots. For CAS signaling, use the following formula: $\text{packet size} = \text{number-of-slots} * 24 + \text{signaling-size}$ <p>where</p> $\text{signaling-size} = \text{number-of-slots}/2 + \text{number-of-slots}\%2$ <p>frames-per-packet for E1 = 16</p> <p>frames-per-packet for T1 = 24</p> 	Enter a packet size.
Service Type	<p>Specifies the ToS byte to be used in the IP headers of packets sent from the CTP device to the IP network.</p> <p>For a mapping of ToS byte values to DSCP classes and settings, see "Providing QoS for CTP Bundles by Using Service Type Overview" on page 7.</p> <p>You do not need to set the ToS value to the same value on local and remote bundles.</p>	Enter a number from 0 through 255.
Time to Live	<p>Specifies the maximum number of router hops that a packet can traverse. The CTP device sets the TTL value in IP packets that it sends to the IP network. Based on the TTL setting, the IP network does not alter or optimize the packet routing. You do not need to set the same TTL value on local and remote ports.</p>	Enter a number from 0 through 255.
Source UDP Port	<p>Specifies the source UDP port.</p> <p>The source UDP port is used as the circuit identifier; you must configure both circuit endpoints to use the same UDP port. The UDP port must be unique on the CTP device. You will not be able to activate a port if another port is using the same source UDP port number.</p>	Enter a number from 1 through 65535.

Table 12: CESoPSN Bundle IP Parameter Settings on CTP2000 Devices in CTPView (*continued*)

Field	Function	Your Action
Max Buffer	<p>Specifies the maximum buffer size.</p> <p>The maximum buffer size setting is based on the number of packets in the buffer and the number of milliseconds that it takes the packets to go through the buffer. For example, a setting of 10 ms with a packet equivalent of 2 means that it will take 10 ms for 2 packets to go through the buffer.</p> <p>The CTP software calculates a default buffer size based on the type of interface (T1 or E1), and the type of signaling (CSS or CAS).</p> <p>We recommend that you use the default setting unless you require changes because of network performance.</p>	<p>Enter the number of milliseconds. The number that you can enter varies depending on the type of interface and signaling. When you enter a number, the software adjusts the number to the closest acceptable number, and it displays the packet equivalent.</p> <p>When you enter the number of milliseconds, the software displays the packet equivalent, which is the number of packets that can go through the buffer within the number of milliseconds.</p>
Buffer Set	<p>Specifies the buffer size when the circuit enters a running state.</p> <p>The CTP software calculates a default setting based on the type of interface (T1 or E1) the type of signaling (CSS or CAS), and the packet size.</p> <p>We recommend that you use the default setting unless you require changes because of network performance.</p>	<p>Enter the number of milliseconds. The number must be divisible by the packet size. If you enter a number that is not divisible by the packet size, the software changes the setting to the closest number that is divisible by the packet size.</p> <p>When you enter the number of milliseconds, the software displays the packet equivalent, which is the number of packets that can go through the buffer within the number of milliseconds.</p>
Bundle Description	Specifies identifying information about the bundle.	Type a description for the bundle.

Related Documentation • CESoPSN Bundle Overview on page 7

Configuring IP Parameters for CESoPSN Bundles on CTP150 Devices (CTPView)

The CTP software uses the IP parameters to create IP packets.

Default buffer settings for CESoPSN bundles on CTP150 devices are calculated as follows:

- If the packet size is less than 3 ms of payload, set the buffers as follows:
 - Minimum buffer=8 ms
 - Maximum buffer=12 ms
 - Packet buffer set=16 ms
- If the packet size is greater than 3 ms of payload, set the buffers as follows:
 - Minimum buffer=1 (packet time)
 - Maximum buffer=2 (packet time)
 - Packet buffer set=3 (packet time)

For example, if the packet size is 80 bytes with one channel in the bundle and signaling is off, one packet time is calculated as:

$$80/8=10 \text{ ms}$$

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.
- Connect the CTPView server to the CTP device for which you want to configure bundles.
- Disable the bundle before you modify the bundle options.

To configure IP parameters for CESoPSN bundles using CTPView:

1. In the side pane, select **Bundle > Configuration**.
2. Run your mouse over the **Display and Select an Existing Bundle** bar.
3. In the table of bundles, select the bundle that you want to modify.
4. Under **Bundle Options**, configure the parameters described in Table 13 on page 31, and click **Click to Submit Bundle AND Port Changes**.

Table 13: CESoPSN Bundle IP Parameter Settings on CTP150 Devices in CTPView

Field	Function	Your Action
Bundle Description	Specifies identifying information about the bundle.	Type a description for the bundle.
State	Specifies whether the bundle is active or disabled.	Select DISABLED or ACTIVE.

Table 13: CESoPSN Bundle IP Parameter Settings on CTP150 Devices in CTPView (*continued*)

Field	Function	Your Action
Remote Address	Specifies the name and IP address of the remote CTP device.	In the first field, select the CTP device. In the second field, select an interface on the CTP device.
Packet Size	<p>Specifies the size of IP packets that are created from data received at the port.</p> <p>The CTP software calculates a default packet size based on the number of time slots configured, the type of interface (T1 or E1), and the type of signaling (CSS or CAS).</p> <p>We recommend that you use the default setting unless you require changes because of network performance.</p> <p>If you choose to change the signaling, use the following guidelines:</p> <ul style="list-style-type: none"> For CSS signaling, the packet size must be divisible by the number of time slots. For CAS signaling, use the following formula: $\text{packet size} = \text{number-of-slots} * 24 + \text{signaling-size}$ where $\text{signaling-size} = \text{number-of-slots}/2 + \text{number-of-slots}\%2$ $\text{frames-per-packet for E1} = 16$ $\text{frames-per-packet for T1} = 24$ 	Enter a packet size.
Service Type	<p>Specifies the ToS byte to be used in the IP headers of packets sent from the CTP device to the IP network.</p> <p>For a mapping of ToS byte values to DSCP classes and settings, see "Providing QoS for CTP Bundles by Using Service Type Overview" on page 7.</p> <p>You do not need to set the ToS value to the same value on local and remote bundles.</p>	Enter a number from 0 through 255.
Time to Live	Specifies the maximum number of router hops that a packet can traverse. The CTP device sets the TTL value in IP packets that it sends to the IP network. The IP network does not alter or optimize the packet routing based on the TTL setting. You do not need to set the same TTL value on local and remote ports.	Enter a number from 0 through 255.
Source UDP Port	<p>Specifies the source UDP port.</p> <p>The source UDP port is used as the circuit identifier; you must configure both circuit endpoints to use the same UDP port. The UDP port must be unique on the CTP device. You will not be able to activate a port if another port is using the same source UDP port number.</p>	Enter a number from 1 through 65535.

Table 13: CESoPSN Bundle IP Parameter Settings on CTP150 Devices in CTPView (*continued*)

Field	Function	Your Action
Min Buffer	Specifies the minimum buffer size.	Enter the number of milliseconds. The number that you can enter varies depending on the type of interface and signaling.
Max Buffer	Specifies the maximum buffer size. We recommend that you use the default setting unless you require changes because of network performance.	Enter the number of milliseconds. The number that you can enter varies depending on the type of interface and signaling.
Buffer Set	Specifies the buffer size when the circuit enters a running state. We recommend that you use the default setting unless you require changes because of network performance.	Enter the number of milliseconds. The number that you can enter varies depending on the type of interface and signaling.
Bundle Description	Specifies identifying information about the bundle.	Type a description for the bundle.

Related Documentation

- CESoPSN Bundle Overview on page 7

Configuring the Missing Packet Fill Pattern for CESoPSN Bundles on CTP150 Devices (CTPView)

This topic describes how to specify the fill pattern that the CPT device inserts when IP packets are dropped.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.
- Connect the CTPView server to the CTP device for which you want to configure bundles.
- Disable the bundle before you modify the bundle options.

To configure missing packet fill pattern for CESoPSN bundles using CTPView:

1. In the side pane, select **Bundle > Configuration**.
2. Run your mouse over the **Display and Select an Existing Bundle** bar.
3. In the table of bundles, select the bundle that you want to modify.
4. Under **Bundle Options**, place a check mark in the **Advanced Options** show check box to display advanced parameters, configure the parameters described in Table 14 on page 34, and click **Click to Submit Bundle AND Port Changes**.

Table 14: CESoPSN Bundle Missing Packet Fill Pattern Parameter Setting in CTPView

Field	Function	Your Action
Missing Packet Fill Pattern	<p>Specifies the data that the CTP device inserts into the circuit bit stream when an IP packet is dropped. The number of bits inserted is equal to the number of bits in the missed packet.</p> <p>This data insertion method prevents a loss of bit count integrity to attached circuit devices and encryptors.</p>	Enter two hexadecimal digits. You must enter a value other than ff. This field does not require the 0x characters.

Configuring Circuit Restart Parameters for CESoPSN Bundles on CTP150 Devices (CTPView)

This topic describes how to configure advanced options that are related to circuit restart. Set these parameters to the same values on the local and remote CTP devices.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.
- Connect the CTPView server to the CTP device for which you want to configure bundles.
- Disable the bundle before you modify the bundle options.

To configure missing packet fill pattern for CESoPSN bundles using CTPView:

1. In the side pane, select **Bundle > Configuration**.
2. Run your mouse over the **Display and Select an Existing Bundle** bar.
3. In the table of bundles, select the bundle that you want to modify.
4. Under **Bundle Options**, place a check mark in the **Advanced Options** show check box to display advanced parameters, and configure the parameters described in Table 15 on page 34, and click **Click to Submit Bundle AND Port Changes**.

Table 15: CESoPSN Bundle Advanced Options Parameter Settings for Circuit Startup in the CTPView

Field	Function	Your Action
Consecutive Pkt Loss To Starvation	<p>Specifies how many consecutive circuit packets the IP network must drop before the CTP device restarts the circuit.</p> <p>We recommend that you set the parameter to a larger value when the IP network uses packet-encrypting devices. These devices cause momentary interruption in packet flows when encryption keys are updated.</p>	Enter a number from 1 through 64.
InSync Pkts After Starvation	Specifies the number of in-sequence packets the CTP device must receive after a starvation before the circuit transitions from in-sync to running.	Enter a number from 1 through 64.