

# CTP Series Circuit to Packet Platform

Redundancy in the CTP Network

Release

6.1



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## CHAPTER 1

# CTP Redundancy Overview

- Redundancy Features Overview on page 1
- Ethernet Interface Failover Overview on page 2
- Route Management Redundancy Overview on page 2
- Bundle Failover Between CTP Devices at Alternate Sites Overview on page 2
- Bundle Failover Between CTP Devices at the Same Site Overview on page 3
- Bundle Failover Between CTP Devices at Both the Local and Remote Site Overview on page 5
- Packet Redundancy Overview on page 6

## Redundancy Features Overview

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The CTP series provides the following redundancy features:

- Ethernet interface failover—If the default Ethernet interface fails, the CTP device fails over to the next unconfigured Ethernet interface.
- Route management redundancy—If the next-hop gateway (the router) becomes unreachable, the CTP device uses configured static routes to a next-hop gateway on a different network.
- Bundle failover between CTP devices at alternate sites—If a bundle circuit fails and the CTP device becomes unreachable, the CTP device fails over to a CTP device at an alternate site.
- Bundle failover between CTP devices at the same site—If a bundle circuit fails and the CTP device becomes unreachable, the CTP device fails over to a redundant CTP device that is connected to the failed device by a Y cable.
- Bundle failover between CTP devices at both the local and remote sites—If a bundle circuit fails and a CTP device at either the local or remote site becomes unreachable, the CTP devices fail over to bundles configured on the redundant CTP devices. At each site, two CTP devices are connected to the customer equipment with a Y cable.
- Packet redundancy—If packets are lost because of transmission errors, the packet protector feature can enable a possible recovery scenario.

- Related Documentation**
- [Ethernet Interface Failover Overview on page 2](#)
  - [Route Management Redundancy Overview on page 2](#)
  - [Bundle Failover Between CTP Devices at Alternate Sites Overview on page 2](#)
  - [Bundle Failover Between CTP Devices at the Same Site Overview on page 3](#)
  - [Bundle Failover Between CTP Devices at Both the Local and Remote Site Overview on page 5](#)
  - [Packet Redundancy Overview on page 6](#)

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## Ethernet Interface Failover Overview

When the CTP device sends traffic over the IP network, it aggregates the traffic over its Ethernet interfaces. When you configure your Ethernet interfaces, you specify which Ethernet interface is the default Ethernet interface. In the AutoSwitch configuration, you can enable failover on the default Ethernet interface. If the default Ethernet interface goes down, the CTP device switches to the next unconfigured Ethernet interface.

- Related Documentation**
- [Enabling Ethernet Interface Failover \(CTPView\) on page 9](#)

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## Route Management Redundancy Overview

Route management redundancy provides redundancy in case the next-hop gateway (the router) becomes unreachable.

When you configure your Ethernet interfaces, you specify a default next-hop gateway (router) in your default Ethernet interface configuration. You can then configure additional Ethernet interfaces with static routes to different next-hop gateways. The CTP device monitors the reachability of the next-hop gateway. If the gateway becomes unreachable, the CTP software removes the configured static route to the gateway from its routing table.

- Related Documentation**
- [Configuring Route Management Redundancy on page 10](#)

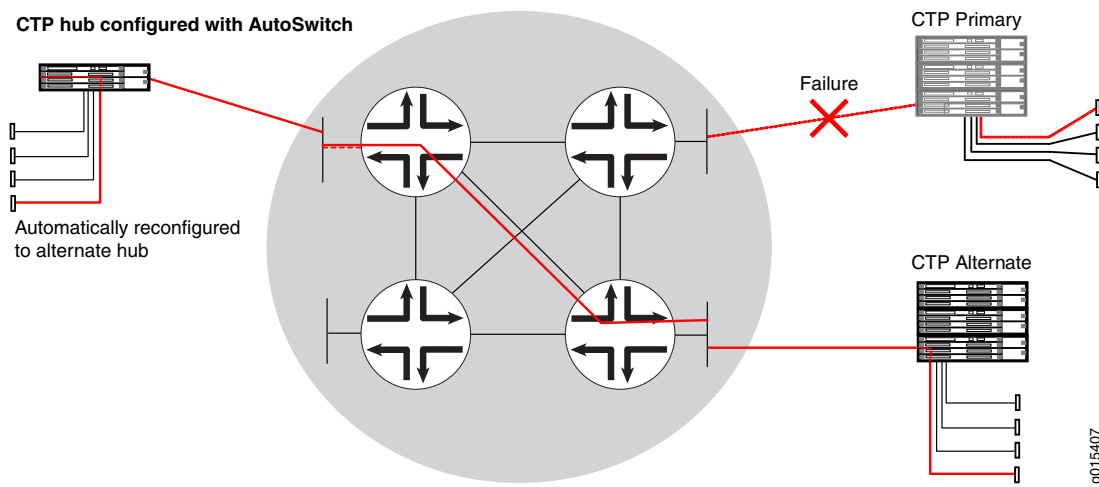
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## Bundle Failover Between CTP Devices at Alternate Sites Overview

If a bundle circuit fails and the CTP device becomes unreachable, the CTP device can use the AutoSwitch feature to switch between primary and secondary devices.

As shown in Figure 1 on page 3, you can use this feature to automatically switch circuits from a primary site to an alternate site if a failure occurs. Automatic switching between alternate sites allows communications to be quickly restored in the event of a major site outage, as might occur with a power failure.

Figure 1: Using Autoswitch to Back Up Bundles



For each bundle, you can have a primary and a secondary remote circuit. When you enable AutoSwitch for a bundle, it monitors the status of circuits created by the bundle. If a circuit fails to operate, the CTP software switches over to the secondary circuit on an alternate CTP device.

As shown in Figure 1 on page 3, you configure AutoSwitch at the CTP hub.

#### Related Documentation

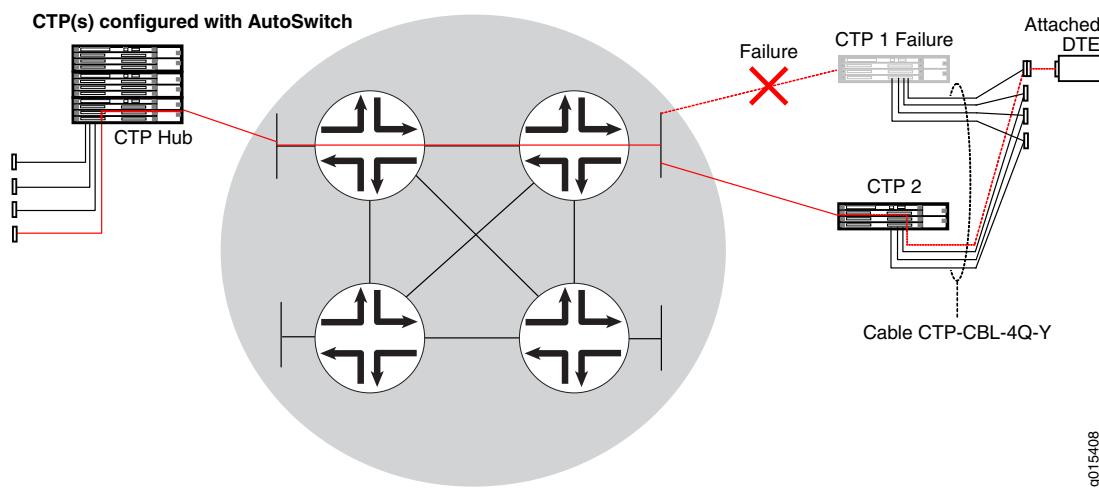
- Configuring Bundle Failover Between CTP Devices at Alternate Sites (CTPView) on page 12
- Checking Primary and Secondary AutoSwitch Connections for Bundles (CTPView) on page 25

## Bundle Failover Between CTP Devices at the Same Site Overview

Y-cable redundancy provides bundle failover using CTP devices at the same site. It provides a way to back up a CTP device with a redundant device at the same site, which increases circuit availability to a site (typically a remote site). The purpose of this redundancy scheme is to maximize network availability by providing complete hardware redundancy that protects from failures that include the network, chassis, processor, power supplies, and the interface module. It quickly restores communications when a system is not reachable or has failed, and is especially valuable at locations that do not have maintenance personnel or spare parts.

As shown in Figure 2 on page 4, during a network or equipment failure, the affected circuit is switched to a co-located alternate CTP device and port. The process of switching the circuit to the redundant system is controlled by the AutoSwitch feature running at the hub CTP system. You need to configure AutoSwitch at the CTP hub location.

Figure 2: Autoswitch with Y-Cable Redundancy



To use this feature, you use a Y cable to connect the active and standby CTP devices. With this feature enabled, the active CTP device passes data and generates keepalive messages with the standby CTP device over the Y-cable. If a failure occurs, the standby CTP device becomes active and transmits data on the circuit.

### Requirements for Y-Cable Redundancy

Keep the following in mind when you use Y-cable redundancy:

- Y-cable redundancy is supported only on serial interfaces. The serial interface cannot have a T1/E1 daughter card installed.
- This feature requires a special Y cable. The Y cable provides control leads between the two CTP devices in addition to the standard signal, clock, and data leads connected to the attached device. There is one Y cable for CTP2000 devices and another Y cable for CTP150 devices. Therefore, you must use the same platform type at each site.
- The Y cable is short to maintain signal quality. The two CTP devices connected to the Y cable must be in close proximity to each other.
- To run diagnostics on a nonactive bundle attached to a Y cable without introducing data errors on the active bundle, Y-cable redundancy must be configured, and you cannot have a daughter card installed.

### Clocking Supported with Y-Cable Redundancy

Y-cable redundancy is supported with the following clock configurations:

- Configured rate without external TX clock (TT).
- Configured rate with external TX clock (TT).
- All clocked with external TX clock (TT).
- Adaptive clocking with internal clock.
- Adaptive clocking with external TX clock (TT).

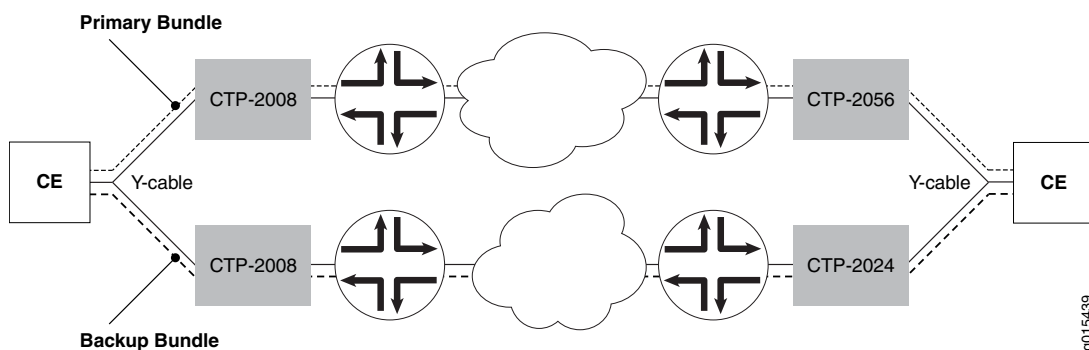
**Related Documentation**

- [Configuring Bundle Failover Between CTP Devices at the Same Site on page 14](#)

## Bundle Failover Between CTP Devices at Both the Local and Remote Site Overview

You can use Y cables at both the local and remote sites to provide a redundant path for bundles. As shown in Figure 3 on page 5, you use a Y cable to connect two CTP devices to the customer equipment (CE) at both sites. You then create a primary bundle between one pair of CTP devices, and you create a backup bundle between a second pair of CTP devices.

**Figure 3: Y-Cable Redundancy at Both the Local and Remote Sites**



### How Bundle Failover Between CTP Devices at Both the Local and Remote Sites Works

Under normal conditions, both the primary and backup bundles are in the running state and are consuming bandwidth. Under these conditions, the primary bundle is carrying the data between the CEs.

If the primary bundle goes down or is no longer in the running state, the CTP devices switch over to the backup bundle, and the backup bundle carries the data. The time that it takes for the switchover to occur depends on the bundle configuration. The switchover time for a typical 1 MHz circuit is less than one second.

When the primary bundle returns to the running state, the CTP devices switch back to the primary bundle, and the primary bundle begins carrying data.

### Requirements for Y-Cable Redundancy

Keep the following in mind when you use Y-cable redundancy:

- Y-cable redundancy is supported only on serial interfaces. The serial interface cannot have a T1/E1 daughter card installed.
- This feature requires a special Y cable. The Y cable provides control leads between the two CTP devices in addition to the standard signal, clock, and data leads connected to the attached device. There is one Y cable for CTP2000 devices and another Y cable for CTP150 devices. Therefore, you must use the same platform type at each site.

- The Y cable is short to maintain signal quality. The two CTP devices connected to the Y cable must be in close proximity to each other.
- To run diagnostics on a nonactive bundle attached to a Y cable without introducing data errors on the active bundle, Y-cable redundancy must be configured, and you cannot have a daughter card installed.

### Clocking Supported with Y-Cable Redundancy

Y-cable redundancy is supported with the following clock configurations:

- Configured rate without external TX clock (TT).
- Configured rate with external TX clock (TT).
- All clocked with external TX clock (TT).
- Adaptive clocking with internal clock.
- Adaptive clocking with external TX clock (TT).

#### Related Documentation

- [Configuring Bundle Failover Between CTP Devices at Both the Local and Remote Sites \(CTP Menu\)](#) on page 20
- [Configuring Bundle Failover Between CTP Devices at Both the Local and Remote Sites \(CTPView\)](#) on page 19

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## Packet Redundancy Overview

The packet protection feature increases circuit quality and reliability in IP networks that have significant packet loss.

With this feature, each circuit has IP packet redundancy to enable error-free transmission of packets. The packet protector creates and transmits duplicate packets to the IP network. The receiving CTP device processes the redundant packets.

You can set up the packet protector to create and transmit one-for-one duplicate packets to the IP network or to create and transmit duplicate XOR packets. Creating and transmitting one-for-one duplicate packets uses 100% additional bandwidth. Creating and transmitting duplicate XOR packets uses only 50% additional bandwidth.

To use this feature, you configure packet protection on CTP, SAToP, or CESoPSN bundles. You can specify whether each end of the connection sends and receives duplicate packets, and you can specify the type of duplicate packet.

### Setting Buffer Sizes When You Use Cloned XOR Packets

When you use cloned XOR packets, you must set your buffer sizes so that they are large enough to accommodate three packets. You can use the following formula to determine the correct buffer size:

$$3 / [\text{circuit speed} / (8 * \text{packet size})]$$

OR

$$((\text{circuit speed} / \text{packet size}) / 8) = \text{packets per second}$$

For example, a circuit with a speed of 9.6 kbps and 32-byte packets needs a minimum buffer set point that is greater than 80 ms:

$(9600/32)/8=37.5$  packets per second  
 $1/37.5 = 26.67 \text{ ms} * 3 = 80 \text{ ms}$

**Related  
Documentation**

- [Configuring Packet Redundancy for Circuits \(CTPView\)](#) on page 21
- [Configuring Packet Redundancy for Circuits \(CTP Menu\)](#) on page 22





## CHAPTER 2

# Configuring CTP Redundancy

- Enabling Ethernet Interface Failover (CTPView) on page 9
- Configuring Route Management Redundancy on page 10
- Configuring Bundle Failover Between CTP Devices at Alternate Sites (CTPView) on page 12
- Configuring Bundle Failover Between CTP Devices at the Same Site on page 14
- Configuring Bundle Failover Between CTP Devices at Both the Local and Remote Sites (CTPView) on page 19
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- Configuring Packet Redundancy for Circuits (CTP Menu) on page 22

### Enabling Ethernet Interface Failover (CTPView)

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This topic describes how to enable the use of Ethernet failover. You can configure this feature only in 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 this feature.

To enable Ethernet failover using CTPView:

1. In the side pane, select **System > Configuration**.
2. Set the **AutoSwitch Daemon** parameter to Enabled.
3. Click **AutoSwitch**.
4. Under **AutoSwitch Ethernet Failover Settings**, configure the parameters described in Table 1 on page 10, and click **Submit Settings**.

Table 1: AutoSwitch Ethernet Failover Settings in CTPView

Field	Function	Your Action
Use	Specifies whether or not Ethernet failover is enabled for an Ethernet interface.  If this feature is enabled and the active Ethernet interface goes down, the CTP device switches to an alternate Ethernet interface.	Select one: <ul style="list-style-type: none"> <li>• Yes—Ethernet failover is enabled.</li> <li>• No—Ethernet failover is not enabled.</li> </ul>

**Related Documentation**

- Ethernet Interface Failover Overview on page 2

## Configuring Route Management Redundancy

Route management redundancy requires the following:

- Two Ethernet interfaces that are configured for different networks. One is the default interface that contains the default gateway configuration. The second interface provides static routes that use a different next-hop gateway.
- A virtual IP address for the CTP device. To create a list of the virtual IP addresses that will be associated with the CTP device, select **Node > Maintenance > Configure Virtual IPs**, and follow the instructions on the pane. You can create up to 56 virtual IP addresses.
- CTP bundle circuits that use route redundancy should have direct drive disabled to allow for asymmetric routing. See *Configuring IP Forwarding for CTP Bundles (CTPView)* or *Configuring IP Forwarding for CTP Bundles (CTP Menu)*.

To set up route management redundancy, perform the following tasks:

1. Configuring the Default Ethernet Interface (CTP Menu) on page 10
2. Configuring an Ethernet Interface with Static Routes (CTP Menu) on page 11
3. Enabling Route Management Redundancy (CTPView) on page 12

### Configuring the Default Ethernet Interface (CTP Menu)

You are required to reboot the CTP device when you finish this configuration procedure.

To configure the default Ethernet interface using the CTP Menu:

1. From the Main menu, select **5) Node Operations**.
2. Select **3) Configure network settings**.
3. Select **2) IPv4 Configuration** or **3) IPv6 Configuration**.
4. Follow the onscreen instructions to select and specify a default Ethernet interface.
5. Configure the options as described in Table 2 on page 11.

Do not add a route to the default Ethernet interface.

Table 2: Ethernet Interface Parameter Settings in the CTP Menu

Field	Function	Your Action
Please input the hostname	Specifies the hostname for the CTP device.	Enter a name.
Please input the ip/ipv6	Specifies the IP address of the Ethernet interface.	Enter an IP address.
Please input the netmask	For IPv4 interfaces, specifies the network mask.	Enter the network mask.
Please input the gateway	On the default Ethernet interface, specifies the IP address of the default next-hop gateway, which is the Ethernet interface on the router.	Enter an IP address.
Please input the mtu in bytes	Specifies the maximum transmission unit (MTU) for the Ethernet interface.	For IPv4 networks, enter a number from 64 through 1500.  For IPv6 networks, enter a number of at least 1280.

### Configuring an Ethernet Interface with Static Routes (CTP Menu)

Configure an Ethernet interface on a network that is different from the default Ethernet interface, and add static routes to the interface configuration.

You are required to reboot the CTP device when you finish this configuration procedure.

To configure static routes for Ethernet interfaces using the CTP Menu:

1. From the Main menu, select **5) Node Operations**.
2. Select **3) Configure network settings**.
3. Select **2) IPv4 Configuration** or **3) IPv6 Configuration**.
4. Follow the onscreen instructions to select a second Ethernet interface to activate on boot, and configure the options as described in Table 3 on page 11.

Table 3: Ethernet Parameter Settings in the CTP Menu

Field	Function	Your Action
Please input the ip/ipv6	Specifies the IP address of the Ethernet interface.	Enter an IP address.
Please input the netmask	For IPv4 interfaces, specifies the network mask.	Enter the network mask.
Please input the mtu in bytes	Specifies the maximum transmission unit (MTU) for the Ethernet interface.	For IPv4 networks, enter a number from 64 through 1500.  For IPv6 networks, enter a number of at least 1280.
Add route to interface eth	Specifies whether or not to add static routes to the Ethernet configuration.	Specify <b>yes</b> .
How many routes would you like to add to eth0?	Specifies the number of static routes to add to your Ethernet interface configuration.	Enter a number between 0 and 3.

Table 3: Ethernet Parameter Settings in the CTP Menu (*continued*)

Field	Function	Your Action
Please input the network	Specifies the IP address of the static route to the next-hop gateway.	Enter an IP address.
Please input the number of bits in the netmask	For IPv4 networks, specifies the IP mask of the Ethernet interface.	Enter an IP mask.
Please input the gateway	Specifies the IP address of the next-hop gateway (the router).	Enter an IP address.

### Enabling Route Management Redundancy (CTPView)

This topic describes how to enable the route redundancy management feature.

To enable route management redundancy using CTPView:

1. In the side pane, select **System > Configuration**.
2. Set the **AutoSwitch Daemon** parameter to Enabled.
3. Click **AutoSwitch**.
4. Under **AutoSwitch Ethernet Failover Settings**, configure the parameters described in Table 4 on page 12, and click **Submit Settings**.

Table 4: Route Management Redundancy Settings in CTPView

Field	Function	Your Action
Route Management Redundancy	Enables or disables route management redundancy	Select one: <ul style="list-style-type: none"> <li>• Enabled</li> <li>• Disabled</li> </ul>
Check Period	<p>This parameter is under the AutoSwitch Bundle Failover Settings configuration in CTPView.</p> <p>Specifies the frequency with which the CTP software runs a reachability check. For example, if the check period is set for 30, the CTP software verifies whether the next-hop is reachable once every 30 seconds.</p>	Select the number of seconds.

**Related Documentation**

- Route Management Redundancy Overview on page 2

### Configuring Bundle Failover Between CTP Devices at Alternate Sites (CTPView)

This topic describes how to configure AutoSwitch for bundle failover. You can configure the AutoSwitch feature only with 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 this feature.

To configure AutoSwitch using CTPView:

1. In the side pane, select **System > Configuration**.
2. Set the **AutoSwitch Daemon** parameter to Enabled.
3. Click **Autoswitch**.
4. (Optional) You can update the network interface device (NID) information for all CTP devices that are reachable in the network. To do so, click **Update NID info** in the **Remote Host Settings** row.
5. Configure the parameters under **AutoSwitch Bundle Failover Settings** as described in Table 5 on page 13, and click **Submit Settings**.

**Table 5: AutoSwitch Parameter Settings in CTPView**

Field	Function	Your Action
Status	Specifies whether the AutoSwitch feature is enabled or disabled on the bundle.	<p>Select one:</p> <ul style="list-style-type: none"> <li>• Disabled—AutoSwitch is disabled for this bundle.</li> <li>• Enabled—AutoSwitch is enabled for this bundle.</li> </ul>
Switch Count	<p>Specifies how many consecutive checks are required without a circuit being established before the circuit is switched over to an alternate circuit.</p> <p>The combination of the switch count value and the check period value determines the rate of the switchover.</p>	<p>Select the number of checks.</p> <p>We recommend that you configure the Switch Count and Check Period to values that prevent the circuit from switching in the event of a short transient outage.</p>
Check Period	<p>Specifies the time between the checking of ports to determine the circuit status.</p> <p>The combination of the switch count value and the check period value determines the rate of the switchover.</p>	<p>Select the number of seconds.</p> <p>We recommend that you configure the Switch Count and Check Period to values that prevent the circuit from switching in the event of a short transient outage.</p>
AutoSwitch Primary	Specifies the CTP device that is used as the primary device to fail over to. Also specifies the circuit ID and interface that are used on the device.	<p>To specify the primary device:</p> <ol style="list-style-type: none"> <li>1. Click the box under AutoSwitch Primary, and select a group. A list of CTP devices within the group appears.</li> <li>2. Select a CTP device. A list of the circuit IDs configured on the CTP device appears.</li> <li>3. Select a circuit ID. A list of interfaces configured with the circuit ID appears.</li> <li>4. Select an interface.</li> </ol>

Table 5: AutoSwitch Parameter Settings in CTPView (*continued*)

Field	Function	Your Action
AutoSwitch Secondary	Specifies the CTP device that is used as the secondary device to fail over to. Also specifies the circuit ID and interface that are used on the device.	<p>To specify the secondary device:</p> <ol style="list-style-type: none"> <li>Click the box under AutoSwitch Primary, and select a group. A list of CTP devices within the group appears.</li> <li>Select a CTP device. A list of the circuit IDs configured on the CTP device appears.</li> <li>Select a circuit ID. A list of interfaces configured with the circuit ID appears.</li> <li>Select an interface.</li> </ol>
Secondary Revert	Specifies whether or not the CTP device periodically checks the connectivity to the AutoSwitch primary device after a switchover to the secondary device.	<p>Select one:</p> <ul style="list-style-type: none"> <li>Disabled—The CTP device does not check the connectivity to the primary device.</li> <li>Enabled—The CTP device checks the connectivity to the primary CTP device after a switchover. If the primary device becomes available, the CTP device reconnects to the primary CTP device.</li> </ul>

- Related Documentation**
- Bundle Failover Between CTP Devices at Alternate Sites Overview on page 2
  - Checking Primary and Secondary AutoSwitch Connections for Bundles (CTPView) on page 25

## Configuring Bundle Failover Between CTP Devices at the Same Site

To configure bundle failover between CTP devices at the same site that are connected by a Y cable, perform the tasks below. You can configure Y-cable redundancy for the bundle with either CTPView or CTP Menu. You can configure AutoSwitch only with CTPView.

1. Configuring Y-Cable Redundancy for the Bundle (CTPView) on page 15
2. Configuring Y-Cable Redundancy for the Bundle (CTP Menu) on page 16
3. AutoSwitch for Bundle Failover (CTPView) on page 16

## Configuring Y-Cable Redundancy for the Bundle (CTPView)

When you configure Y-cable redundancy, you can use different redundant port numbers if the devices are using the same port on the 100-pin connector. For example, a Y cable 100-pin connector could be attached to ports 0-3 on the first CTP device, with the second connector attached to ports 8-11 on the second device. The redundant ports would be P0/P8, P1/P9, P2/P10 and P3/P11 on the first and second CTP devices, respectively.

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 Y-cable redundancy by 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**, place a check mark in the **Advanced Options Show** check box to display advanced parameters, and configure the parameters described in Table 6 on page 15.
5. Click **Click to Submit Bundle AND Port Changes**.
6. Configure AutoSwitch settings for bundle failover. See “Configuring Bundle Failover Between CTP Devices at Alternate Sites (CTPView)” on page 12.

**Table 6: Y-Cable Settings in CTPView**

Field	Function	Your Action
Y Cable Redundancy	Specifies whether or not a redundant Y cable is installed on the CTP device.	Select ENABLED or DISABLED.

## Configuring Y-Cable Redundancy for the Bundle (CTP Menu)

When you configure Y-cable redundancy, you can use different redundant port numbers if the devices are using the same port on the 100-pin connector. For example, a Y cable 100-pin connector could be attached to ports 0-3 on the first CTP device, with the second connector attached to ports 8-11 on the second device. The redundant ports would be P0/P8, P1/P9, P2/P10 and P3/P11 on the first and second CTP devices, respectively.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure Y-cable redundancy for CTP bundles by using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.
2. Select **1) CTP**.
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. Select **4) Advanced Options**.
6. Configure the options as described in Table 7 on page 16.
7. Configure AutoSwitch settings for bundle failover. See “Configuring Bundle Failover Between CTP Devices at Alternate Sites (CTPView)” on page 12.

**Table 7: Y-Cable Settings in the CTP Menu**

Field	Function	Your Action
Y cable redundancy	Specifies whether or not a redundant Y cable is installed on the CTP device.	Select y or n.

## AutoSwitch for Bundle Failover (CTPView)

This topic describes how to configure AutoSwitch for bundle failover. You can configure the AutoSwitch feature only with 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 this feature.

To configure AutoSwitch by using CTPView:

1. In the side pane, select **System > Configuration**.
2. Set the **AutoSwitch Daemon** parameter to Enabled.



3. Click **Autoswitch**.
4. (Optional) You can update the network interface device (NID) information for all CTP devices that are reachable in the network. To do so, click **Update NID info** in the **Remote Host Settings** row.
5. Configure the parameters under **AutoSwitch Bundle Failover Settings** as described in Table 8 on page 17, and click **Submit Settings**.

Table 8: AutoSwitch Parameter Settings in CTPView

Field	Function	Your Action
Status	Specifies whether the AutoSwitch feature is enabled or disabled on the bundle.	<p>Select one:</p> <ul style="list-style-type: none"> <li>• Disabled—AutoSwitch is disabled for this bundle.</li> <li>• Enabled—AutoSwitch is enabled for this bundle.</li> </ul>
Switch Count	<p>Specifies how many consecutive checks are required without a circuit being established before the circuit is switched over to an alternate circuit.</p> <p>The combination of the switch count value and the check period value determines the rate of the switchover.</p>	<p>Select the number of checks.</p> <p>We recommend that you configure the Switch Count and Check Period to values that prevent the circuit from switching in the event of a short transient outage.</p>
Check Period	<p>Specifies the time between the checking of ports to determine the circuit status.</p> <p>The combination of the switch count value and the check period value determines the rate of the switchover.</p>	<p>Select the number of seconds.</p> <p>We recommend that you configure the Switch Count and Check Period to values that prevent the circuit from switching in the event of a short transient outage.</p>
AutoSwitch Primary	Specifies the CTP device that is used as the primary device to fail over to. Also specifies the circuit ID and interface that are used on the device.	<p>To specify the primary device:</p> <ol style="list-style-type: none"> <li>1. Click the box under AutoSwitch Primary, and select a group. A list of CTP devices within the group appears.</li> <li>2. Select a CTP device. A list of the circuit IDs configured on the CTP device appears.</li> <li>3. Select a circuit ID. A list of interfaces configured with the circuit ID appears.</li> <li>4. Select an interface.</li> </ol>

Table 8: AutoSwitch Parameter Settings in CTPView (*continued*)

Field	Function	Your Action
AutoSwitch Secondary	Specifies the CTP device that is used as the secondary device to fail over to. Also specifies the circuit ID and interface that are used on the device.	<p>To specify the secondary device:</p> <ol style="list-style-type: none"> <li>Click the box under AutoSwitch Primary, and select a group. A list of CTP devices within the group appears.</li> <li>Select a CTP device. A list of the circuit IDs configured on the CTP device appears.</li> <li>Select a circuit ID. A list of interfaces configured with the circuit ID appears.</li> <li>Select an interface.</li> </ol>
Secondary Revert	Specifies whether or not the CTP device periodically checks the connectivity to the AutoSwitch primary device after a switchover to the secondary device.	<p>Select one:</p> <ul style="list-style-type: none"> <li>Disabled—The CTP device does not check the connectivity to the primary device.</li> <li>Enabled—The CTP device checks the connectivity to the primary CTP device after a switchover. If the primary device becomes available, the CTP device reconnects to the primary CTP device.</li> </ul>

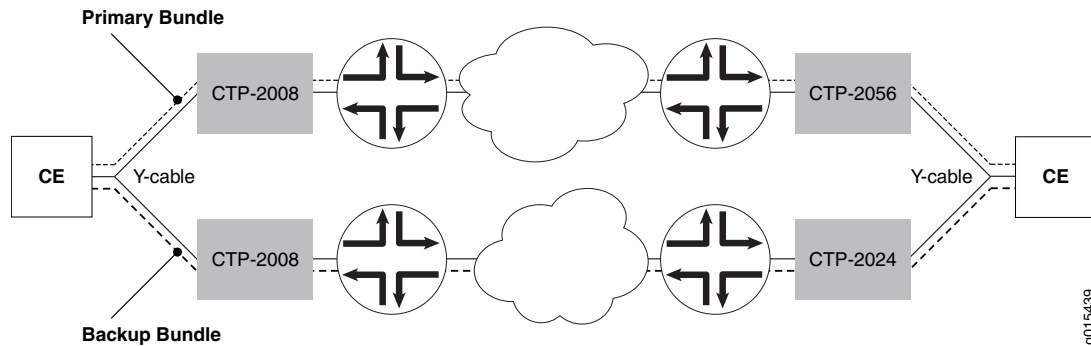
**Related Documentation**

- [Bundle Failover Between CTP Devices at the Same Site Overview on page 3](#)

## Configuring Bundle Failover Between CTP Devices at Both the Local and Remote Sites (CTPView)

To set up Y-cable redundancy at both the local and remote sites, you configure two bundles—a master bundle and a backup bundle. Each bundle follows a different path between the two sites, as shown in Figure 4 on page 19.

Figure 4: Y-Cable Redundancy at Both the Local and Remote Sites



When you configure Y-cable redundancy, you can use different redundant port numbers if the devices are using the same port on the 100-pin connector. For example, a Y cable 100-pin connector could be attached to ports 0-3 on the first CTP device, with the second connector attached to ports 8-11 on the second device. The redundant ports would be P0/P8, P1/P9, P2/P10, and P3/P11 on the first and second CTP devices, respectively.

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 master and backup CTP bundles for Y-cable redundancy by 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**, place a check mark in the **Advanced Options Show** check box to display advanced parameters, and configure the parameters described in Table 9 on page 19.
5. Click **Click to Submit Bundle AND Port Changes**.

Table 9: Y-Cable Settings in CTPView

Field	Function	Your Action
Y Cable Redundancy	Specifies whether or not a redundant Y cable is installed on the CTP device.	Select ENABLED or DISABLED.

Table 9: Y-Cable Settings in CTPView (*continued*)

Field	Function	Your Action
Y Cable Redundancy Master	Specify whether or not this bundle is the master bundle.	Select one: <ul style="list-style-type: none"> <li>ENABLED—This bundle is the master bundle.</li> <li>DISABLED—This bundle is the backup bundle.</li> </ul>

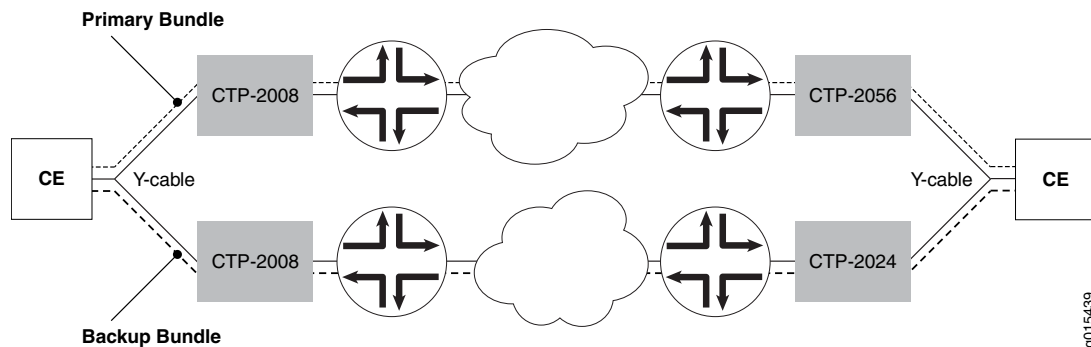
**Related Documentation**

- Bundle Failover Between CTP Devices at Both the Local and Remote Site Overview on page 5

## Configuring Bundle Failover Between CTP Devices at Both the Local and Remote Sites (CTP Menu)

To set up Y-cable redundancy at both the local and remote sites, you configure two bundles—a master bundle and a backup bundle. Each bundle follows a different path between the two sites, as shown in Figure 5 on page 20.

Figure 5: Y-Cable Redundancy at Both the Local and Remote Sites



When you configure Y-cable redundancy, you can use different redundant port numbers if the devices are using the same port on the 100-pin connector. For example, a Y cable 100-pin connector could be attached to ports 0–3 on the first CTP device, with the second connector attached to ports 8–11 on the second device. The redundant ports would be P0/P8, P1/P9, P2/P10, and P3/P11 on the first and second CTP devices, respectively.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure Y-cable redundancy for CTP bundles by using the CTP Menu:

- From the Main Menu, select **1) Bundle Operations**.
- Select **1) CTP**.
- Select a bundle from the list.

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

- Select **3) Port Config**.

5. Select **4) Advanced Options**.
6. Configure the options as described in Table 10 on page 21.

Table 10: Y-Cable Settings in the CTP Menu

Field	Function	Your Action
Y cable redundancy	Specifies whether or not a redundant Y cable is installed on the CTP device.  Enable this parameter for both primary and backup bundles.	Select y or n.
Y cable master	Specify whether or not this bundle is the master bundle.	Select y or n.

**Related  
Documentation**

- Bundle Failover Between CTP Devices at Both the Local and Remote Site Overview on page 5

## Configuring Packet Redundancy for Circuits (CTPView)

The packet protector feature transmits one-for-one duplicate packets into the IP network, which enables a possible recovery scenario in the event of lost IP packets caused by transmission errors.

You can configure this feature on CTP, SAToP, and CESoPSN bundles.

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 this feature.

To configure packet redundancy 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 11 on page 22.
5. Click **Click to Submit Bundle AND Port Changes**.

Table 11: Packet Redundancy Parameter Settings in CTPView

Field	Function	Your Action
Packet Protector	<p>Specifies whether the CTP device sends and/or receives cloned (duplicated packets).</p> <p>This option is useful in networks where you expect significant IP packet loss.</p> <p>You need to configure the packet protector so that the setting at one end of the bundle corresponds with the setting at the other end of the bundle.</p> <p>For example, if you configure the local bundle to send cloned packets to the network, configure the remote bundle to expect cloned packets from the network.</p>	<p>Select:</p> <ul style="list-style-type: none"> <li>Disabled—The CTP device does not send cloned packets over the IP network, and it ignores cloned packets that it receives.</li> <li>Send cloned pkts to NET—The CTP device sends duplicated packets over the IP network.</li> <li>Expect cloned pkts from NET—The CTP device uses cloned packets that it receives when the IP network drops the original packet. If the device receives both the original and cloned packets, it ignores the cloned packet.</li> <li>Send &amp; expect cloned pkts—The CTP device sends duplicated packets over the IP network. The CTP device uses cloned packets that it receives when the IP network drops the original packet.</li> <li>Send delayed cloned packets to NET—The CTP device sends duplicated packets after the interpacket delay of the circuit.</li> <li>Send delayed &amp; expect cloned packets—The CTP device sends duplicated packets after the interpacket delay of the circuit. The CTP device uses cloned packets that it receives when the IP network drops the original packet.</li> <li>Expect cloned XOR packets—The CTP device uses cloned XOR packets that it receives when the IP network drops the original packet to regenerate the missing packet. If the device receives both the original and cloned XOR packets, it ignores the cloned packet.</li> <li>Send &amp; expect cloned XOR packets—The CTP device sends duplicated XOR packets over the IP network. The CTP device uses cloned XOR packets that it receives to regenerate missing packets when the IP network drops the original packet.</li> </ul>

**Related Documentation**

- Packet Redundancy Overview on page 6

## Configuring Packet Redundancy for Circuits (CTP Menu)

The packet protector feature transmits one-for-one duplicate packets into the IP network, which enables a possible recovery scenario in the event of lost IP packets caused by transmission errors.

You can configure this feature on CTP, SAToP, and CESoPSN bundles.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure redundancy 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. 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 **9) Packet Protector(tm)** as described in Table 12 on page 23.

**Table 12: Packet Redundancy Parameter Settings in the CTP Menu**

Field	Function	Your Action
Packet Protector	<p>Specifies whether the CTP device sends and/or receives cloned (duplicated) packets.</p> <p>This option is useful in networks where you expect significant IP packet loss.</p> <p>You need to configure the packet protector so that the setting at one end of the bundle corresponds with the setting at the other end of the bundle.</p> <p>For example, if you configure the local bundle to send cloned packets to the network, configure the remote bundle to expect cloned packets from the network.</p>	<p>Select:</p> <ul style="list-style-type: none"> <li>• Disable packet protector—The CTP device does not send cloned packets over the IP network, and it ignores cloned packets that it receives.</li> <li>• Send cloned packets to NET—The CTP device sends duplicated packets over the IP network.</li> <li>• Expect cloned packets from NET—The CTP device uses cloned packets that it receives when the IP network drops the original packet. If the device receives both the original and cloned packets, it ignores the cloned packet.</li> <li>• Send and expect cloned packets—The CTP device sends duplicated packets over the IP network. The CTP device uses cloned packets that it receives when the IP network drops the original packet.</li> <li>• Send delayed cloned packets to NET—The CTP device sends duplicated packets after the interpacket delay of the circuit.</li> <li>• Send delayed &amp; expect cloned packets—The CTP device sends duplicated packets after the interpacket delay of the circuit. The CTP device uses cloned packets that it receives when the IP network drops the original packet.</li> <li>• Expect cloned XOR packets—The CTP device uses cloned XOR packets that it receives when the IP network drops the original packet to regenerate the missing packet. If the device receives both the original and cloned XOR packets, it ignores the cloned packet.</li> <li>• Send &amp; expect cloned XOR packets—The CTP device sends duplicated XOR packets over the IP network. The CTP device uses cloned XOR packets that it receives to regenerate missing packets when the IP network drops the original packet.</li> </ul>

**Related Documentation**

- Packet Redundancy Overview on page 6





## CHAPTER 3

# Administration

- Checking Primary and Secondary AutoSwitch Connections for Bundles (CTPView) on page 25

### Checking Primary and Secondary AutoSwitch Connections for Bundles (CTPView)

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You can test the connection between a CTP device running AutoSwitch and its primary and secondary circuits.

Before you begin:

- Log in to the CTPView software at least at the Net\_Admin level.
- Connect the CTPView server to the CTP device on which you want to use this feature.

To test connections to primary and secondary circuits using CTPView:

1. In the side pane, select **System > Configuration**.
2. Click **AutoSwitch**.
3. Under **Connection Check**, you have the option of verifying all connections or verifying specific connections.
  - To verify all connections, under **Connection Check**, click **ALL**.
  - To verify connections for a specific primary or secondary circuit, click **Test** under the **Primary Host** and **Secondary Host** columns.

During the test, the buttons turn blue and display **Testing**. The results of the test are displayed inside the buttons, and the background color around the buttons either turns green for success or red for failure.

#### Related Documentation

- Bundle Failover Between CTP Devices at Alternate Sites Overview on page 2
- Configuring Bundle Failover Between CTP Devices at Alternate Sites (CTPView) on page 12

