JUNIPER NETWORKS | Engineering Simplicity

CTP Layer 2 Bridging

Published
2023-09-01

Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, California 94089
USA
408-745-2000
www.juniper.net

CTP Layer 2 Bridging

The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at https://support.juniper.net/support/eula/. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

Table of Contents

About This Guide

1

PART

Overview

CHAPTER 1

CTP Layer 2 Bridging Overview

IN THIS CHAPTER

CTP Layer 2 Bridging Overview

CTP layer 2 bridging mode is used to aggregate many serial interfaces into one or several Ethernet interfaces. Each physical serial interface on the CTP chassis maps to a separate Ethernet VLAN interface on the destination router. Aggregation is supported on a port-by-port basis, and other ports on the same node can be used for circuit emulation.

In layer 2 bridging mode, packets are extracted from the line on the serial interface. This is in contrast to circuit emulation mode where every bit on the serial interface is received (regardless of content) and formed into packets

You can use the CTP CLI menu to configure these interfaces. Layer 2 bridging is supported on CTPView release 3.1 and later.

RELATED DOCUMENTATION

Enabling Ports for Layer 2 Bridging | 6

Configuring Layer 2 Bridging Port Parameters | 9

Options for Layer 2 Bridging Ports | 12

Packet Performance and Throttling

Because there is no way to prevent large numbers of small packets from arriving at the packet-bearing serial (PBS) interfaces, policing is performed on the CTP system. Bridged packets are identified and throttled before they exit the CTP system onto the Ethernet line, and offending packets are dropped.

This action is done with a throttling mechanism implemented in the serial driver. At the beginning of every second, the driver is deposited with a fixed number of tokens. For each token, a packet may be received by the driver and sent to the system for forwarding. After the tokens have been used up, no more packets may be received, and any subsequent packets that arrive are discarded (and the dropped counter incremented). At the beginning of the next second, that driver receives another allotment of tokens, and packet reception resumes. If there are any unused tokens at the end of the second, they are discarded.

The overall bridged packet forwarding budget of a CTP2000 system is 25,000 packets/sec.

RELATED DOCUMENTATION

CTP Layer 2 Bridging Overview | 2

Packet Bridging Requirements | 3

Packet Bridging Requirements

For packet bridging to work properly, it is important to have an attached router on the Ethernet side that provides advanced functions. Specifically, the router should support:

- VLAN tagging for particular IP addresses/subnets—To support the routing function in the CTP system.
- Per-VLAN bandwidth shaping—To avoid overloading the CTP bridged Ethernet-to-serial link with too much bandwidth. Otherwise, packets will eventually be dropped because the serial packet driver to the line will not be able to accept the packet.
- Per-VLAN pps shaping—To avoid overloading the CTP system with too high of a packet rate.

RELATED DOCUMENTATION

CTP Layer 2 Bridging Overview | 2

Configuring Layer 2 Bridging Port Parameters | 9

2

PART

Configuration

CHAPTER 2

Configuring CTP Layer 2 Bridging

IN THIS CHAPTER

Enabling Ports for Layer 2 Bridging

You must enable layer 2 bridging for a port (select its operational mode) before you can configure its layer 2 bridging parameters.

To enable ports for layer 2 bridging:

1. From the CTP Main menu, select **5) Node Operations** menu.

```
================================================================================
= (nova_45 06/06/08 21:43:33 GMT) | CTP Main Menu
================================================================================
Please select a number from the following list:
-----------------------------------
0) Exit to Shell
1) Bundle Operations
2) Node Synchronization
3) Node Summary
4) Node Diagnostics
5) Node Operations
6) Save Database to Flash
------------ Your choice [5]:
```

2. On the Node Operations menu, select **3) Configure network settings**.

```
================================================================================
= (nova_45 06/06/08 21:47:24 GMT) | Node Operations Menu
================================================================================
Please select a number from the following list:
-----------------------------------
0) Back to Previous Menu
1) Change Node Date/Time
2) Display network settings
3) Configure network settings
4) Initialize Database
5) Ping IP address
6) Traceroute IP address
7) ssh to another host
8) System descriptor field:
9) Reboot Node
10) Powerdown Node
11) Display ethernet media
12) Config ethernet media
13) Set your password
14) System port speed range: 0 kHz - 12288 kHz
15) Config security profile
------------ Your choice [0]: 3
```

3. In the Network Configuration menu, select **11) Config port operational mode (CE/PBS/bridge)**.

```
================================================================================
= (nova_45 06/06/08 21:49:05 GMT) | Network Configuration Menu
================================================================================
Please select a number from the following list:
-----------------------------------
0) Back to Previous Menu
1) Supported Protocols: IPv4 only
2) IPv4 Configuration
3) IPv6 Configuration
4) Virtual IP addresses
5) OAM port (IPv4): 16
6) Data packet protocol: 47
7) OAM port (IPv6): 32
8) VLAN Configuration
9) Current Configuration (active on reboot)
```

```
10) Port operations (PBS/bridge)
11) Config port operational mode (CE/PBS/bridge)
------------ Your choice [0]: 11
***
*** You are about to modify a system parameter that will require
*** a system reboot when complete.
***
*** If you decide to continue, the system will automatically
*** reboot upon leaving these menus.
***
*** Note: If these parameters are changed incorrectly,
*** system may not be reachable via the network
*** after the system reboots.
***
Are you sure? y[n]:
```

4. Type **Y** and press Enter twice.

   A list of available ports is displayed in the Configure Port Operational Mode menu.

> **NOTE**: After you have configured port types, you must exit to the top-level CTP Main menu so that the CTP system can reboot and your changes can be applied.

```
*** Please note, changing the operation of a port will clear the database
*** for that port. All parameters for the port will be set to defaults.
*** Existing settings will be lost.
Hit Carriage Return to Continue...
================================================================================
= (nova_45 06/06/08 21:57:10 GMT) | Configure Port Operational Mode
================================================================================
PBS or bridging operation is limited to the following ports:
Port 0 operational mode: Bridged
Port 1 operational mode: Circuit-emulation
Port 2 operational mode: Circuit-emulation
Port 3 operational mode: Circuit-emulation
Port 4 operational mode: Circuit-emulation
Port 5 operational mode: Circuit-emulation
Port 6 operational mode: Routed (PBS)
Port 7 operational mode: Routed (PBS)
Please input a port to configure, <rtn> to exit: 2
```

5. Enter the number of the port you want to change and press Enter.

```
================================================================================
= (nova_45 06/06/08 22:02:56 GMT) | Operational Mode for Port se-0/2
================================================================================
Please select a number from the following list:
-----------------------------------
0) Circuit-emulation
1) Routed (PBS)
2) Bridged
------------ Your choice [0]:
```

6. Choose the port type.

> **NOTE**: Although you can set up Routed (PBS), it is not yet supported.

7. To change more ports, repeat Steps 4-5, or press Enter to finish.
8. Select **0) Back to Previous Menu** until the Reboot warning message appears.

RELATED DOCUMENTATION

- CTP Layer 2 Bridging Overview | 2
- Configuring Layer 2 Bridging Port Parameters | 9
- Options for Layer 2 Bridging Ports | 12

Configuring Layer 2 Bridging Port Parameters

Before you configure layer 2 bridging port parameters, you must configure the port's operational mode for serial aggregation. See "Enabling Ports for Layer 2 Bridging" on page 6.

To configure layer 2 bridging port parameters:

1. From the CTP Main menu, select **5) Node Operations** menu.

```
================================================================================
= (nova_45 06/06/08 21:43:33 GMT) | CTP Main Menu
================================================================================
Please select a number from the following list:
```

```
-----------------------------------
0) Exit to Shell
1) Bundle Operations
2) Node Synchronization
3) Node Summary
4) Node Diagnostics
5) Node Operations
6) Save Database to Flash
------------ Your choice [5]:
```

2. Select **3) Configure network settings**.

```
================================================================================
= (nova_45 06/06/08 21:47:24 GMT) | Node Operations Menu
================================================================================
Please select a number from the following list:
-----------------------------------
0) Back to Previous Menu
1) Change Node Date/Time
2) Display network settings
3) Configure network settings
4) Initialize Database
5) Ping IP address
6) Traceroute IP address
7) ssh to another host
8) System descriptor field:
9) Reboot Node
10) Powerdown Node
11) Display ethernet media
12) Config ethernet media
13) Set your password
14) System port speed range: 0 kHz - 12288 kHz
15) Config security profile
------------ Your choice [0]: 3
```

3. In the Network Configuration menu, select **10) Port operations (PBS/bridge)**.

```
================================================================================
= (nova_45 06/06/08 21:49:05 GMT) | Network Configuration Menu
================================================================================
Please select a number from the following list:
-----------------------------------
```

```
0) Back to Previous Menu
1) Supported Protocols: IPv4 only
2) IPv4 Configuration
3) IPv6 Configuration
4) Virtual IP addresses
5) OAM port (IPv4): 16
6) Data packet protocol: 47
7) OAM port (IPv6): 32
8) VLAN Configuration
9) Current Configuration (active on reboot)
10) Port operations (PBS/bridge)
11) Config port operational mode (CE/PBS/bridge)
---------- Your choice [0]: 10
```

4. Type the port you want to configure and press Enter.

```
Please choose from the following PBS/bridge ports:
0
6
7
[0]: 0
```

The Operations menu is displayed.

5. Select **2) Config** to configure the port.

```
================================================================================
= (nova_45 06/06/08 22:44:59 GMT) | Operations Menu for Port se-0/0
================================================================================
Please select a number from the following list:
-------------------------------------
0) Back to Previous Menu
1) Query
2) Config
3) Activate
4) Disable
5) Delete
6) Advanced...
---------- Your choice [2]:
```

6. Set encapsulation type, interface/VLAN, static destination MAC address, AutoMAC, AutoArp, and Cryto Resync parameters. See "Enabling Ports for Layer 2 Bridging" on page 6 for more information.

RELATED DOCUMENTATION

Options for Layer 2 Bridging Ports

IN THIS SECTION

You can configure the following parameters.

Encapsulation

CTP layer 2 bridging works with the following protocols: CISCO HDLC, PPP, and Frame Relay.

Cisco HDLC

After selecting Cisco HDLC, you can specify HDLC keepalive interval (range 1–100 seconds, default 10) and keepalive timeout values (range 1–30 seconds, default 30).

```
Select the encapsulation for this port.
Please select a number from the following list:
-------------------------------------
0) Cisco HDLC
1) PPP
2) Frame Relay
------------ Your choice [0]: 0
```

```
Enter the HDLC keepalive interval.
(1-100)[10]: 10

Enter the HDLC keepalive timeout.
(1-100)[30]: 30
```

PPP

There are no values to specify for PPP.

Frame Relay

After selecting Frame Relay, you can configure individual permanent virtual circuits (PVCs). Ethernet interface, AutoMAC, AutoARP, and static MAC options do not appear on the menu when Frame Relay encapsulation is selected because these options are configured per PVC.

```
Select the encapsulation for this port.
Please select a number from the following list:
-------------------------------------
0) Cisco HDLC
1) PPP
2) Frame Relay
------------ Your choice [2]: 2
```

Configuring LMI Settings and Timers

You can configure standard link management interface (LMI) settings by selecting **1) Configure LMI settings** from the Frame Relay Config menu. Configure LMI settings and timers by selecting the corresponding options.

```
Please select a number from the following list:
-------------------------------------
0) Back to Previous Menu
1) Configure LMI settings
2) Edit DLCI 301 - eth0.301
3) Edit DLCI 302 - eth0.302
4) Add a new DLCI configuration
------------ Your choice [0]: 1
```

```
Please select a number from the following list:
-----------------------------------
0) Back to Previous Menu
1) Frame-relay LMI type: ITU
2) Frame-relay interface mode: DTE
3) t391 DTE polling timer: 10
4) t392 DCE polling verification timer: 15
5) n391 DTE full status polling interval: 6
6) n392 DTE/DCE error threshold: 3
7) n393 DTE/DCE monitored event count: 4
------------ Your choice [0]:
```

Creating and Editing PVCs and DLCIs

From the Frame Relay Config menu, you can create and configure up to eight PVCs per Frame Relay interface. Normal bridge options can be configured on a per-DLCI basis. Each data-link connection identifier (DLCI) is bridged to a unique Ethernet VLAN.

To add a new PVC, choose **4) Add a new DLCI configuration**. After a DLCI is created, it is added to the option list, and the menu option numbers increment by one. To edit a DLCI, select the corresponding edit option for that interface. For example, to edit DLCI 301, select **2) Edit DLCI 301 - eth0.301**.

```
Please select a number from the following list:
-----------------------------------
0) Back to Previous Menu
1) Configure LMI settings
2) Edit DLCI 301 - eth0.301
3) Edit DLCI 302 - eth0.302
4) Add a new DLCI configuration
------------ Your choice [0]: 2
```

Deleting a PVC

To delete a PVC, you must first edit it and then select **1) Delete this PVC**.

```
Please select a number from the following list:
-----------------------------------
0) Back to Previous Menu
1) Delete this PVC
2) Frame-relay DLCI: 301
```

```
3) Interface/VLAN: eth0.301
4) AutoMAC: enabled
5) AutoARP: enabled
6) Static dst-MAC for TX: ffff.ffff.ffff
------------ Your choice [0]:
```

Interface/VLAN

Make the mapping, or bridge, between the serial and Ethernet interfaces by selecting **5) Interface/VLAN** from the Config menu. After selecting the bridge, you can enter the VLAN IDs on the Ethernet interface that will be mapped to the serial port.

```
Please select a number from the following list:
-------------------------------------
0) Back to Previous Menu
1) Port descriptor text:
2) Interface: RS-232/DCE/NRZ
3) Clock config: 128.000000 / Configured Rate, w/o Ext Tx Clk (TT)
4) Encapsulation: cisco-hdlc / interval=10 timeout=30
5) Interface/VLAN: eth0.200
6) AutoMAC: enabled
7) AutoARP: enabled
8) Static dst-MAC for TX: ffff.ffff.ffff
9) Advanced options...

------------ Your choice [0]: 5
Select the Ethernet interface to bridge this port to.
Please select a number from the following list:
-------------------------------------
0) Interface eth0
------------ Your choice [0]: 0

Enter the VLAN ID on interface eth0 to bridge this port to.
(1-4095)[200]: 200
```

Static Destination MAC Address

Any packets bridged from the serial interface to the Ethernet interface need to have an Ethernet header added. Because the destination MAC address is usually unknown, by default ffff.ffff.ffff is used. This

default guarantees that the attached router will see the packet. You can define the destination MAC address for packets sent out the Ethernet interface by using the static dst-MAC option.

To set the static destination MAC address, select **8) Static dst-MAC for TX** from the Config menu. Note that AutoMAC must be disabled before you set a static dst-MAC.

```
Please select a number from the following list:
-----------------------------------
0) Back to Previous Menu
1) Port descriptor text:
2) Interface: RS-232/DCE/NRZ
3) Clock config: 128.000000 / Configured Rate, w/o Ext Tx Clk (TT)
4) Encapsulation: cisco-hdlc / interval=10 timeout=30
5) Interface/VLAN: eth0.200
6) AutoMAC: disabled
7) AutoARP: enabled
8) Static dst-MAC for TX: ffff.ffff.ffff
9) Advanced options...
------------ Your choice [0]: 8
```

AutoMAC

If the Ethernet interface is directly connected to a router, the CTP chassis can dynamically learn the MAC address of the router if AutoMAC is enabled. AutoMAC works by listening for Address Resolution Protocol (ARP) packets from the router. When an ARP packet is received, the source MAC address is assumed to be the MAC address of the directly connected router, and thus the MAC address that the CTP should use as a destination in any frames bridged from the serial port.

WARNING: AutoMAC should be used only if the Ethernet router is directly connected to the CTP chassis. See other limitations below.

AutoMAC has the following limitations:

- Should be used only if the Ethernet router is directly connected to the CTP chassis.
- Works by assuming that every ARP packet seen belongs to the next-hop router.
- If there is a switch or other device on the same broadcast domain, AutoMAC should not be used. If enabled, AutoMAC constantly switches the destination MAC used by the CTP system between each of the various devices in the broadcast domain each time it sees an ARP from a different address than the MAC it is currently using.

To configure AutoMAC, select **6) AutoMAC** from the Config menu.

```
Please select a number from the following list:
-------------------------------------
0) Back to Previous Menu
1) Port descriptor text:
2) Interface: RS-232/DCE/NRZ
3) Clock config: 128.000000 / Configured Rate, w/o Ext Tx Clk (TT)
4) Encapsulation: cisco-hdlc / interval=10 timeout=30
5) Interface/VLAN: eth0.200
6) AutoMAC: enabled
7) AutoARP: enabled
8) Static dst-MAC for TX: ffff.ffff.ffff
9) Advanced options...
------------ Your choice [0]: 6

-------------------------------------
* * * NOTE * * *
The AutoMAC feature configures the CTP to automatically learn the MAC address
of the connected Ethernet router. All traffic bridged from the serial interface
will be sent to this MAC address. AutoMAC should only be used when a router is
directly connected to the Ethernet interface. If AutoMAC is enabled on an
Ethernet interface connected to a switch or other shared segment, the CTP will
learn multiple MAC addresses and may not use the correct address.
Please select a number from the following list:
-------------------------------------
0) Disable AutoMAC
1) Enable AutoMAC
------------ Your choice [1]:
```

AutoARP

Normally, the Ethernet-attached router sends ARP packets to find the MAC address for the IP address configured on the serial-attached router. However, the serial-attached router will not respond to ARP packets. You can configure a static ARP entry on the Ethernet-attached router with the MAC address of the CTP system, or you can use AutoARP.

AutoARP causes the CTP system to respond to any ARP packet with its own MAC address and configures the CTP system to automatically respond to all ARP requests received on the Ethernet VLAN interface for the bridge. AutoARP also sends IPv6 neighbor advertisements in response to any IPv6 neighbor solicitation.

WARNING: AutoARP should be used only when a router is directly connected to the Ethernet interface. If AutoARP is enabled on an Ethernet interface that connects to a switch or other shared segment, serious network disruption can occur.

AutoARP has the following limitations:

- AutoARP should be used only if the Ethernet router is directly connected to the CTP chassis.
- AutoARP works by assuming that every ARP packet seen belongs to the next-hop router.
- If there is a switch or other device on the same broadcast domain, AutoARP should not be used. If enabled, AutoARP responds to every ARP on the broadcast domain and disrupts communication between other devices on the network.

To configure AutoARP, select 7) AutoARP from the Config menu.

```
Please select a number from the following list:
-------------------------------------
0) Back to Previous Menu
1) Port descriptor text:
2) Interface: RS-232/DCE/NRZ
3) Clock config: 128.000000 / Configured Rate, w/o Ext Tx Clk (TT)
4) Encapsulation: cisco-hdlc / interval=10 timeout=30
5) Interface/VLAN: eth0.200
6) AutoMAC: enabled
7) AutoARP: enabled
8) Static dst-MAC for TX: ffff.ffff.ffff
9) Advanced options...
------------ Your choice [0]: 7

-------------------------------------
* * * WARNING * * *
The AutoARP feature configures the CTP to automatically respond to *ALL* ARP
requests received on the Ethernet VLAN interface for this bridge.
AutoARP should only be used when a router is directly connected to the Ethernet
interface. If AutoARP is enabled on an Ethernet interface that connects to a
switch or other shared segment, SERIOUS NETWORK DISRUPTION can occur.
Please select a number from the following list:
-------------------------------------
0) Disable AutoARP
```

```
1) Enable AutoARP
------------ Your choice [1]:
```

Advanced Options (Crypto Resync)

CTP chassis can be used with federally approved cryptographic (crypto) devices. You can configure synchronized (in-sync) and pulse crypto resynchronized (resync) options for use with these devices.

If an error occurs on a secure link, the crypto devices may get out of sync. When the CTP software detects that a crypto device is out of sync or that keepalives or LMI has been lost, it signals to the crypto device to resync by pulsing DSR and/or CTS.

You can configure how long the CTP software waits before requesting a resynchronization, set the pulse width, and set the pulse period of the resync request. You can also configure the direction of the pulse (0 to 1 or 1 to 0). (Other common terms for 0 are space, low, and on; and other commons terms for 1 are mark, high, and off). To disable the pulse, set the in-sync and pulse value to the same value.

- Crypto resync wait time—Time between loss of sync and the first pulse (range 1-60 seconds).
- Crypto resync pulse width—Time that the pulse is asserted (range 1–15 seconds).
- Crypto resync pulse period—Time between the beginnings of each pulse (range 1–1000 seconds). Should be greater than the pulse width; otherwise, the pulse will always be asserted.

To set crypto resync parameters, select **9) Advanced options** from the Config menu.

```
Please select a number from the following list:
-------------------------------------
0) Back to Previous Menu
1) Port descriptor text:
2) Interface: V.35/DCE/NRZ
3) Clock config: 128.000000 / Configured Rate, w/o Ext Tx Clk (TT)
4) Encapsulation: ppp
5) Interface/VLAN: eth0.201
6) AutoMAC: enabled
7) AutoARP: enabled
8) Static dst-MAC for TX: ffff.ffff.ffff
9) Advanced options...
------------ Your choice [4]: 9

=============================================================================
= (ctp 05/26/07 10:55:17 GMT) | Advanced Option Menu for PBS port 1
=============================================================================
```

```
Please select a number from the following list:
-------------------------------------
0) Back to Previous Menu
3) Crypto resync wait time: 4 sec
4) Crypto resync pulse width: 1 sec
5) Crypto resync pulse period: 8 sec
6) Crypto resync DSR in-sync value: 1 (mark/high/off)
7) Crypto resync DSR pulse value: 0 (space/low/on)
8) Crypto resync CTS in-sync value: 1 (mark/high/off)
9) Crypto resync CTS pulse value: 0 (space/low/on)
------------ Your choice [5]:
```

When you use a DTE cable, the DSR settings apply to DTR, and the CTS settings apply to RTS. Both signals are provided to allow for different requirements of the crypto device:

- DSR (DTR) provides an unbalanced signal
- CTS (RTS) provides a balanced signal

RELATED DOCUMENTATION

CTP Layer 2 Bridging Overview | 2

Enabling Ports for Layer 2 Bridging | 6

Configuring Layer 2 Bridging Port Parameters | 9

Port Query and Node Summary Examples

You can view port configuration settings by selecting Query Port from the Port Operations menu. This topic describes examples for Cisco HDLC configuration and Frame Relay configuration. Note that separate statistics are provided for each DLCI in the Frame Relay example.

The following output describes an example of Cisco HDLC configuration:

```
Detail query display for bridge port 2
================================================================================
General status:
    Device name: scc2
    Port admin state: ACTIVE
```

```
    Port link state: UP

Serial interface:
    Interface: EIA-530A/DCE/NRZ
    Clock Config: 1024.000000 / Configured Rate, w/o Ext Tx Clk (TT)
    Measured TT(Ext Clock): 1023.999600
    Encapsulation: CISCO HDLC
    HDLC keepalive status: up

Bridge configuration:
    Interface/VLAN: eth0.202
    AutoARP: enabled (1 ARP reply sent)
    AutoMAC: enabled
    Dst-MAC for TX pkts: 0012.1e71.85a1 (auto)

Statistics:
    Serial RX packets: 301 (53 pps)
    Serial TX packets: 302 (53 pps)
    Serial RX bytes: 16888 (23744 bps)
    Serial TX bytes: 16912 (23744 bps)
================================================================================

Time since last port counter clear: 0 wks, 0 days, 0 hrs, 0 mins 19 secs

Clear Port 2 Stats? y[n]:
```

The following output describes an example of Frame Relay configuration.

```
Detail query display for bridge port 2
================================================================================
General status:
    Device name: scc2
    Port admin state: ACTIVE
    Port link state: UP

Serial interface:
    Interface: EIA-530A/DCE/NRZ
    Clock Config: 1024.000000 / Configured Rate, w/o Ext Tx Clk (TT)
    Measured TT(Ext Clock): 1023.999600
    Encapsulation: FRAME RELAY
    Frame-relay LMI status: up
```

```
Bridge configuration:
    Frame-relay DLCI: 301 (active)
    Interface/VLAN: eth0.301
    AutoARP: enabled (1 ARP reply sent)
    AutoMAC: enabled
    Dst-MAC for TX pkts: 0012.1e71.85a1 (auto)

    Frame-relay DLCI: 302 (active)
    Interface/VLAN: eth0.302
    AutoARP: enabled (0 ARP replies sent)
    AutoMAC: enabled
    Dst-MAC for TX pkts: ffff.ffff.ffff

Statistics:
    DLCI 301:
        Serial RX packets: 4 (0 pps)
        Serial TX packets: 13 (0 pps)
        Serial RX bytes: 284 (0 bps)
        Serial TX bytes: 571 (0 bps)
    DLCI 302:
        Serial RX packets: 0 (0 pps)
        Serial TX packets: 0 (0 pps)
        Serial RX bytes: 0 (0 bps)
        Serial TX bytes: 0 (0 bps)
================================================================================
```

To see all configured bridge ports at once, select Option 3, **Node Summary**, from the main Config menu.

```
================================================================================
= (nova_45 06/06/08 23:22:51 GMT) | CTP Main Menu
================================================================================

Please select a number from the following list:
-----------------------------------
0) Exit to Shell
1) Bundle Operations
2) Node Synchronization
3) Node Summary
4) Node Diagnostics
5) Node Operations
6) Save Running Database to Flash
------------ Your choice [3]: 3
```

```
CTP Code version : 7.3R7-rc3 200914 (Compile Time 08:14:36 PM) , Flash: Single Image

>>>>> Circuit Emulation Ports <<<<<
Port Bndl BndlTyp RemAddr CID LCID RunState NtSz PortRate RCtr

================================================================================
se-0/1 -- NotCfgd N/A N/A N/A DISABLD N/A 1024.000000 0
se-0/2 1 CTP 10.0.0.1 2 2 NoSYNC 1024 1024.000000 0
se-0/3 -- NotCfgd N/A N/A N/A CfgFAIL N/A 12288.000000 0
se-0/4 -- NotCfgd N/A N/A N/A DISABLD N/A 1024.000000 0
se-0/5 -- NotCfgd N/A N/A N/A DISABLD N/A 1024.000000 0
================================================================================
Legend:
-------
C - Card on which port resides
p - Physical port on card
Bndl - Bundle number port is assigned to
BndlTyp - Bundle type
RemAddr - Remote address
CIDs - Bundle Type: CID : LCID
- CTP: Remote Circuit ID : Local Circuit ID
- SAToP: Source UDP Port : N/A
- CESoPSN: Source UDP Port : N/A
RunState - Bundle's local run state (i.e. DISABLD, NoSync, RUNNING, etc...)
NtSz - Configured packet size for NET bound packets
PortRate - Configured data rate towards network
RCtr - Bundle's local buffer recenter event counter

Hit Carriage Return to Continue...

>>>> PBS Interfaces <<<<<
Port Encap Inet Addr p-t-p Addr Status PortRate MTU
================================================================================
se-0/6 Cisco HDLC 0.0.0.0 0.0.0.0 DISABLED 1024.000000 1500
se-0/7 Cisco HDLC 0.0.0.0 0.0.0.0 DISABLED 1024.000000 1500
================================================================================

>>>>> Bridged Ports <<<<<
( pps/port allocation: 552375 pps )
Port/PVC Ethernet Encap Admin Link Proto Dest MAC
================================================================================
se-0/0 eth0.0 chdlc down down down ffff.ffff.ffff
```

```
================================================================================

Hit Carriage Return to Continue...

Bndl BndlTyp Port TS RemAddr CID LCID RunState NtSz IfSz RCtr
================================================================================
0 CTP se-0/3 N/A 10.0.0.1 3 3 CfgFAIL 1024 -- 0
1 CTP se-0/2 N/A 10.0.0.1 2 2 NoSYNC 1024 -- 0
================================================================================
Legend:
-------
Bndl - Bundle number port is assigned to
BndlTyp - Bundle type
Card - Local card with port.
Port - Local port on card.
TS - Time slot(s) in bundle.
RemAddr - Remote address.
CIDs - Bundle Type: CID : LCID
- CTP: Remote Circuit ID : Local Circuit ID
- SAToP: Source UDP Port : N/A
- CESoPSN: Source UDP Port : N/A
RunState - Bundle's local run state (i.e. DISABLD, NoSYNC, RUNNING, etc...)
NtSz - Configured packet size for NET bound packets
IfSz - Packet size for Interface bound packets
RCtr - Bundle's local buffer recenter event counter
```

RELATED DOCUMENTATION

- CTP Layer 2 Bridging Overview | 2
- Configuring Layer 2 Bridging Port Parameters | 9
- Options for Layer 2 Bridging Ports | 12

3

PART

Troubleshooting

Knowledge Base | 26

CHAPTER 3

Knowledge Base