CHAPTER 7

Configuring R2CP

After configuring the interfaces and verifying connectivity as described in Chapter 3, "Configuring the Interfaces," the next step is configuring the protocols for those interfaces.

Note R2CP is not available on the Cisco 5921 ESR.

Prerequisite Reading

Read the following chapters before selecting the appropriate protocol per interface:

- Chapter 5, "Introduction to Radio Aware Routing and MANET"

Note See Appendix A, "Command Reference" for detailed command reference.

R2CP Configuration

This chapter provides the following major sections for initiating, verifying, and managing all aspects of R2CP on an interface:

Configuring R2CP on the Router

When configuring R2CP on the router you must perform the following tasks:

- Configuring the Session Terminate ACK Timeout, page 7-8
- Configuring the Virtual Access Template Number, page 7-9

Note You must perform all tasks to properly configure R2CP on the router.

Configuring the Heartbeat Threshold

Perform this task to configure the heartbeat threshold on the router. The heartbeat threshold determines the number of heartbeats allowed by R2CP before declaring a failed association.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** [*type slot/port*]
4. **ip r2cp heartbeat-threshold** *count*
5. **exit**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**enable**
	
	Example:
	`Router> enable`
	`Router#`
		Enables privileged EXEC mode.
		• Enter your password if prompted.

Step 2	**configure terminal**
	
	Example:
	`Router# configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`Router(config)#`
		Enters global configuration mode.

Step 3	**interface** [*type slot/port*]
	
	Example:
	`Router(config)# interface fastEthernet 0/1`
	`Router(config-if)#`
		Enters interface configuration mode.

	Command or Action	Purpose

Step 4	**ip r2cp heartbeat-threshold** *count*
	
	Example:
	`Router(config-if)# ip r2cp heartbeat-threshold 3`
	`Router(config-if)#`
		Sets the heartbeat-threshold. The heartbeat-threshold ranges between 2 and 8.

Step 5	**exit**
	
	Example:
	`Router(config-if)# exit`
	`Router(config)#`
		Exits the current mode.

Configuring the Node Terminate ACK Threshold

Perform this task to configure the node terminate acknowledgement (ACK) threshold. You configure the node terminate acknowledgement threshold to set the number of missed and/or lost node acknowledgements performed before declaring the terminate effort complete.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** [*type slot/port*]
4. **ip r2cp node-terminate-ack-threshold** *value*
5. **exit**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**enable**
	
	Example:
	`Router> enable`
	`Router#`
		Enables privileged EXEC mode.
		• Enter your password if prompted.

Step 2	**configure terminal**
	
	Example:
	`Router# configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`Router(config)#`
		Enters global configuration mode.

	Command or Action	Purpose

Step 3	**interface** [*type slot/port*]
	
	Example:
	`Router(config)# interface fastEthernet 0/1`
	`Router(config-if)#`
		Enters interface configuration mode.

Step 4	**ip r2cp node-terminate-ack-threshold** *value*
	
	Example:
	`Router(config-if)# ip r2cp node-terminate-ack-threshold 2`
	`Router(config-if)#`
		Sets the node terminate acknowledgement (ACK) threshold. The node-terminate ACK threshold ranges between 1 and 5.

Step 5	**exit**
	
	Example:
	`Router(config-if)# exit`
	`Router(config)#`
		Exits the current mode.

Configuring the Node Terminate ACK Timeout

Perform this task to configure the node terminate acknowledgement timeout. You configure the node terminate acknowledgement timeout to set the duration allowed when waiting for the node terminate acknowledgement.

Note The duration of the node terminate acknowledgement timeout is set in milliseconds.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** [*type slot/port*]
4. **ip r2cp node-terminate-ack-timeout** *milliseconds*
5. **exit**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**enable**
	
	Example:
	`Router> enable`
	`Router#`
		Enables privileged EXEC mode.
		• Enter your password if prompted.

Step 2	**configure terminal**
	
	Example:
	`Router# configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`Router(config)#`
		Enters global configuration mode.

Step 3	**interface** [*type slot/port*]
	
	Example:
	`Router(config)# interface fastEthernet 0/1`
	`Router(config-if)#`
		Enters interface configuration mode.

Step 4	**ip r2cp node-terminate-ack-timeout** *milliseconds*
	
	Example:
	`Router(config-if)# ip r2cp`
	`node-terminate-ack-timeout 2200`
	`Router(config-if)#`
		Sets the node terminate acknowledgement timeout. The node-terminate ACK timeout ranges between 100 and 5000 milliseconds.

Step 5	**exit**
	
	Example:
	`Router(config-if)# exit`
	`Router(config)#`
		Exits the current mode.

Configuring the Port Number for the Server

Perform this task to configure the port number for the server. You configure the port number for the server to set the port number on which the server listens.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** [*type slot/port*]
4. **ip r2cp port** *number*
5. **exit**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**enable**
	
	Example:
	`Router> enable`
	`Router#`
		Enables privileged EXEC mode.
		• Enter your password if prompted.

Step 2	**configure terminal**
	
	Example:
	`Router# configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`Router(config)#`
		Enters global configuration mode.

Step 3	**interface** [*type slot/port*]
	
	Example:
	`Router(config)# interface fastEthernet 0/1`
	`Router(config-if)#`
		Enters interface configuration mode.

Step 4	**ip r2cp port** *number*
	
	Example:
	`Router(config-if)# ip r2cp port 5858`
	`Router(config-if)#`
		Sets the port number on which the server listens. The port number ranges between 1 and 65534.

Step 5	**exit**
	
	Example:
	`Router(config-if)# exit`
	`Router(config)#`
		Exits the current mode.

Configuring the Session Activity Timeout

Perform this task to configure the session activity timeout. You configure the session activity timeout to set a guard timer duration in order to catch stale sessions. The session activity timeout terminates when the timer expires.

Note The duration of the session activity timeout is set in seconds.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** [*type slot/port*]
4. **ip r2cp session-activity-timeout** *seconds*

5. **exit**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**enable**
	
	Example:
	`Router> enable`
	`Router#`
		Enables privileged EXEC mode.
		• Enter your password if prompted.

Step 2	**configure terminal**
	
	Example:
	`Router# configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`Router(config)#`
		Enters global configuration mode.

Step 3	**interface** [*type slot/port*]
	
	Example:
	`Router(config)# interface fastEthernet 0/1`
	`Router(config-if)#`
		Enters interface configuration mode.

Step 4	**ip r2cp session-activity-timeout** *seconds*
	
	Example:
	`Router(config-if)# ip r2cp`
	`session-activity-timeout 2`
	`Router(config-if)#`
		Sets the session activity timeout. The session activity guard timer ranges between 0 and 4 seconds.

Step 5	**exit**
	
	Example:
	`Router(config-if)# exit`
	`Router(config)#`
		Exits the current mode.

Configuring the Session Terminate ACK Threshold

Perform this task to configure the session terminate acknowledgement threshold. You configure the session terminate acknowledgement threshold to set the number of missed and/or lost session acknowledgements allowed before declaring the terminate effort complete.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** [*type slot/port*]
4. **ip r2cp session-terminate-ack-threshold** *value*
5. **exit**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**enable**
	
	Example:
	`Router> enable`
	`Router#`
		Enables privileged EXEC mode.
		• Enter your password if prompted.

Step 2	**configure terminal**
	
	Example:
	`Router# configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`Router(config)#`
		Enters global configuration mode.

Step 3	**interface** [*type slot/port*]
	
	Example:
	`Router(config)# interface fastEthernet 0/1`
	`Router(config-if)#`
		Enters interface configuration mode.

Step 4	**ip r2cp session-terminate-ack-threshold** *value*
	
	Example:
	`Router(config-if)# ip r2cp session-terminate-ack-threshold 4`
	`Router(config-if)#`
		Sets the threshold of missed session-terminate acknowledgements (ACKs). The session-terminate ACK threshold ranges between 1 and 5 sessions.

Step 5	**exit**
	
	Example:
	`Router(config-if)# exit`
	`Router(config)#`
		Exits the current mode.

Configuring the Session Terminate ACK Timeout

Perform this task to configure the session terminate acknowledgement timeout. You configure the session terminate acknowledgement timeout to set the time duration allowed when waiting for the session terminate acknowledgement.

Note The duration of the node terminate acknowledgement timeout is set in milliseconds.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** [*type slot/port*]

4. **ip r2cp session-terminate-ack-timeout** *milliseconds*
5. **exit**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**enable**
	
	Example:
	`Router> enable`
	`Router#`
		Enables privileged EXEC mode.
		• Enter your password if prompted.

Step 2	**configure terminal**
	
	Example:
	`Router# configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`Router(config)#`
		Enters global configuration mode.

Step 3	**interface** [*type slot/port*]
	
	Example:
	`Router(config)# interface fastEthernet 0/1`
	`Router(config-if)#`
		Enters interface configuration mode.

Step 4	**ip r2cp session-terminate-ack-timeout** *milliseconds*
	
	Example:
	`Router(config-if)# ip r2cp session-terminate-ack-timeout 2400`
	`Router(config-if)#`
		Sets the session-terminate ACK guard timer duration. The session-terminate ACK timeout ranges between 100 and 5000 milliseconds.

Step 5	**exit**
	
	Example:
	`Router(config-if)# exit`
	`Router(config)#`
		Exits the current mode.

Configuring the Virtual Access Template Number

Perform this task to configure the virtual access template number. You configure the virtual access template number to determine which virtual template to use when creating the virtual access interface.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** [*type slot/port*]
4. **ip r2cp virtual-template** *number*

5. **exit**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**enable**
	
	Example:
	`Router> enable`
	`Router#`
		Enables privileged EXEC mode.
		• Enter your password if prompted.

Step 2	**configure terminal**
	
	Example:
	`Router# configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`Router(config)#`
		Enters global configuration mode.

Step 3	**interface** [*type slot/port*]
	
	Example:
	`Router(config)# interface fastEthernet 0/1`
	`Router(config-if)#`
		Enters interface configuration mode.

Step 4	**ip r2cp virtual-template** *number*
	
	Example:
	`Router(config-if)# ip r2cp virtual-template 224`
	`Router(config-if)#`
		Sets the virtual access template number. The virtual access template number ranges between 0 and 21474883647.

Step 5	**exit**
	
	Example:
	`Router(config-if)# exit`
	`Router(config)#`
		Exits the current mode.

Verifying R2CP Configuration

The following procedures are available for verifying the R2CP configuration on the router:

- Displaying Radio Clients on an R2CP Interface, page 7-11
- Displaying R2CP Router Configuration, page 7-12
- Displaying Neighbors on an R2CP Interface, page 7-12

Note You can show general details related to Fast Ethernet, VLAN, and output modifiers for all R2CP clients.

Example

General R2CP Client Details

The following example shows how to display general radio client details:

```
Router> show r2cp clients ?
FastEthernet  FastEthernet IEEE 802.3
  Vlan          Vlan IEEE 802.1q
  |             Output modifiers
  <cr>
```

Displaying Radio Clients on an R2CP Interface

You show radio clients to exchange metric information with the radio for either all radio clients on all interfaces or for one radio client on a specific interface.

Examples

All Radio Clients on all Interfaces

The following example shows how to display all radio clients on all interfaces:

```
Router> show r2cp clients
R2CP Clients for all interfaces:

R2CP Clients for Interface FastEthernet0/1
R2CP Server IP=12.12.12.101:28672 Sock=1

R2CP Client ID=1 IP=12.12.12.7:5500
 node heartbeat missed count=0
 node heartbeat interval=5 seconds
 node heartbeat missed threshold=3
 node terminate ack missed count=0
 node terminate ack timeout=1000 milliseconds
 node terminate ack missed threshold=3
 session activity timeout=1 minutes
 session terminate ack timeout=1000 milliseconds
 session terminate ack missed threshold=3
No Virtual Template defined.
```

One Radio Client on a Specific Interface

The following example shows how to display one radio client on a specific interface:

```
Router> show r2cp fastEthernet 0/1
r2cp clients fastEthernet 0/1

R2CP Clients for Interface FastEthernet0/1
R2CP Server IP=12.12.12.101:28672 Sock=1

R2CP Client ID=1 IP=12.12.12.7:5500
 node heartbeat missed count=0
 node heartbeat interval=5 seconds
 node heartbeat missed threshold=3
 node terminate ack missed count=0
 node terminate ack timeout=1000 milliseconds
 node terminate ack missed threshold=3
 session activity timeout=1 minutes
 session terminate ack timeout=1000 milliseconds
 session terminate ack missed threshold=3
 No Virtual Template defined.
```

Displaying R2CP Router Configuration

You can display router configuration information details for the R2CP interface. These configuration details include the following components:

- Heartbeat threshold
- Node-terminate acknowledgement (ACK) threshold
- Node-terminate ACK timeout
- Port number
- Session-activity timeout
- Session-terminate ACK threshold
- Session-terminate ACK timeout
- Virtual-access template number

Example

Displaying R2CP Router Configuration

The following example shows how to display configuration details for the R2CP interface:

```
Router> show r2cp config
R2CP Configuration from FastEthernet0/1

R2CP Server IP=12.12.12.101:28672
 node heartbeat missed threshold=3
 node terminate ack timeout=2200 milliseconds
 node terminate ack missed threshold=2
 session activity timeout=3 minutes
 session terminate ack timeout=1000 milliseconds
 session terminate ack missed threshold=5
 virtual template=220
```

Displaying Neighbors on an R2CP Interface

You show neighbors on an R2CP interface to display information about the neighbors with which the radio can talk from a Layer 3, next-hop perspective. Show R2CP neighbors allows you to get metric data associated with a next-hop, so you can better understand the paths that the traffic is taking.

Example

Displaying Two Radio Neighbors/Sessions

This example shows how to display a configuration that includes two radio neighbors/sessions:

```
Router> show r2cp neighbors

R2CP Neighbors for all interfaces:

R2CP Neighbors for Interface FastEthernet0/1
R2CP Server IP=12.12.12.101:28672 Sock=1

  Global Session ID=101
 MAC Address: 1122.3344.5566
 Vlan ID: 0
```

```
Metrics:  rlq=100  resources=100  latency=10 milliseconds
          cdr=100000 Kbps  mdr=100000 Kbps
 Global Session ID=102
MAC Address: 2222.3344.5566
Vlan ID: 0
Metrics:  rlq=100  resources=100  latency=10 milliseconds
          cdr=100000 Kbps  mdr=100000 Kbps
```