Ethernet Routing Switch

8600/8800

Engineering

> Remote Port Mirroring Technical Configuration Guide

Avaya Data Solutions

Document Date: November 2010

Document Number: NN48500-605

Document Version: 1.1

© 2010 Avaya Inc.
All Rights Reserved.

Notices
While reasonable efforts have been made to ensure that the information in this document is complete and accurate at the time of printing, Avaya assumes no liability for any errors. Avaya reserves the right to make changes and corrections to the information in this document without the obligation to notify any person or organization of such changes.

Documentation disclaimer
Avaya shall not be responsible for any modifications, additions, or deletions to the original published version of this documentation unless such modifications, additions, or deletions were performed by Avaya. End User agree to indemnify and hold harmless Avaya, Avaya's agents, servants and employees against all claims, lawsuits, demands and judgments arising out of, or in connection with, subsequent modifications, additions or deletions to this documentation, to the extent made by End User.

Link disclaimer
Avaya is not responsible for the contents or reliability of any linked Web sites referenced within this site or documentation(s) provided by Avaya. Avaya is not responsible for the accuracy of any information, statement or content provided on these sites and does not necessarily endorse the products, services, or information described or offered within them. Avaya does not guarantee that these links will work all the time and has no control over the availability of the linked pages.

Warranty
Avaya provides a limited warranty on this product. Refer to your sales agreement to establish the terms of the limited warranty. In addition, Avaya's standard warranty language, as well as information regarding support for this product, while under warranty, is available to Avaya customers and other parties through the Avaya Support Web site: http://www.avaya.com/support
Please note that if you acquired the product from an authorized reseller, the warranty is provided to you by said reseller and not by Avaya.

Licenses
THE SOFTWARE LICENSE TERMS AVAILABLE ON THE AVAYA WEBSITE, HTTP://SUPPORT.AVAYA.COM/LICENSEINFO/ ARE APPLICABLE TO ANYONE WHO DOWNLOADS, USES AND/OR INSTALLS AVAYA SOFTWARE, PURCHASED FROM AVAYA INC., ANY AVAYA AFFILIATE, OR AN AUTHORIZED AVAYA RESELLER (AS APPLICABLE) UNDER A COMMERCIAL AGREEMENT WITH AVAYA OR AN AUTHORIZED AVAYA RESELLER. UNLESS OTHERWISE AGREED TO BY AVAYA IN WRITING, AVAYA DOES NOT EXTEND THIS LICENSE IF THE SOFTWARE WAS OBTAINED FROM ANYONE OTHER THAN AVAYA, AN AVAYA AFFILIATE OR AN AVAYA AUTHORIZED RESELLER, AND AVAYA RESERVES THE RIGHT TO TAKE LEGAL ACTION AGAINST YOU AND ANYONE ELSE USING OR SELLING THE SOFTWARE WITHOUT A LICENSE. BY INSTALLING, DOWNLOADING OR USING THE SOFTWARE, OR AUTHORIZING OTHERS TO DO SO, YOU, ON BEHALF OF YOURSELF AND THE ENTITY FOR WHOM YOU ARE INSTALLING, DOWNLOADING OR USING THE SOFTWARE (HEREINAFTER REFERRED TO INTERCHANGEABLY AS "YOU" AND "END USER"), AGREE TO THESE TERMS AND CONDITIONS AND CREATE A BINDING CONTRACT BETWEEN YOU AND AVAYA INC. OR THE APPLICABLE AVAYA AFFILIATE ("AVAYA").

Copyright
Except where expressly stated otherwise, no use should be made of the Documentation(s) and Product(s) provided by Avaya. All content in this documentation(s) and the product(s) provided by Avaya including the selection, arrangement and design of the content is owned either by Avaya or its licensors and is protected by copyright and other intellectual property laws including the sui generis rights relating to the protection of databases. You may not modify, copy, reproduce, republish, upload, post, transmit or distribute in any way any content, in whole or in part, including any code and software. Unauthorized reproduction, transmission, dissemination, storage, and or use without the express written consent of Avaya can be a criminal, as well as a civil offense under the applicable law.

Third Party Components
Certain software programs or portions thereof included in the Product may contain software distributed under third party agreements ("Third Party Components"), which may contain terms that expand or limit rights to use certain portions of the Product ("Third Party Terms"). Information regarding distributed Linux OS source code (for those Products that have distributed the Linux OS source code), and identifying the copyright holders of the Third Party Components and the Third Party Terms that apply to them is available on the Avaya Support Web site: http://support.avaya.com/Copyright.

Trademarks
The trademarks, logos and service marks ("Marks") displayed in this site, the documentation(s) and product(s) provided by Avaya are the registered or unregistered Marks of Avaya, its affiliates, or other third parties. Users are not permitted to use such Marks without prior written consent from Avaya or such third party which may own the Mark. Nothing contained in this site, the documentation(s) and product(s) should be construed as granting, by implication, estoppel, or otherwise, any license or right in and to the Marks without the express written permission of Avaya or the applicable third party. Avaya is a registered trademark of Avaya Inc. All non-Avaya trademarks are the property of their respective owners.

Downloading documents
For the most current versions of documentation, see the Avaya Support. Web site: http://www.avaya.com/support

Contact Avaya Support
Avaya provides a telephone number for you to use to report problems or to ask questions about your product. The support telephone number is 1-800-242-2121 in the United States. For additional support telephone numbers, see the Avaya Web site: http:// www.avaya.com/support.

Abstract

This document provides an overview on how to get configure Remote Port Mirror on the Ethernet Routing Switch 8600.

Revision Control

No	Date	Version	Revised By	Remarks
1	10/20/2003	1.0	JVE	Initial Draft
2	12/22/2010	1.1	K. Marshall	Rebranded Avaya

Table of Contents

Figures 5
Tables 6
1. Remote Mirroring 8
1.1 Remote Mirroring Overview 8
1.2 Remote Mirrored Packet Format 9
1.3 Remote Mirror Operation 9
2. Configuration Parameters 10
2.1 CLI 10
2.2 Hardware Requirements 11
2.3 Software Requirements and Dependencies 11
2.4 Limitations and Restrictions 11
3. Configuration Example 12
4. Appendix A – Configuration Files 14
5. Reference Documentation 17

Figures

Figure 1.1 – Remote Port Mirror 8
Figure 3.0 – Remote Port Mirror Example 12

Tables

Conventions

This section describes the text, image, and command conventions used in this document.

Symbols

Tip – Highlights a configuration or technical tip.

Note – Highlights important information to the reader.

Warning – Highlights important information about an action that may result in equipment damage, configuration or data loss.

Text

Bold text indicates emphasis.

Italic text in a Courier New font indicates text the user must enter or select in a menu item, button or command:

```
ERS5520-48T# show running-config
```

Output examples from Avaya devices are displayed in a Lucida Console font:

```
ERS5520-48T# show sys-info

Operation Mode:          Switch
MAC Address:             00-12-83-93-B0-00
PoE Module FW:           6370.4
Reset Count:             83
Last Reset Type:         Management Factory Reset
Power Status:            Primary Power
Autotopology:            Enabled
Pluggable Port 45:       None
Pluggable Port 46:       None
Pluggable Port 47:       None
Pluggable Port 48:       None
Base Unit Selection:     Non-base unit using rear-panel switch
sysDescr:                Ethernet Routing Switch 5520-48T-PWR
                         HW:02       FW:6.0.0.10  SW:v6.2.0.009
                         Mfg Date:12042004    HW Dev:H/W rev.02
```

1. Remote Mirroring

1.1 Remote Mirroring Overview

The port-mirroring feature can be used to analyze traffic flowing on a port. The Ethernet Routing Switch 8600 supports both ingress and egress port mirroring. Any packet ingressing or egressing a specified port is forwarded normally and a copy of the packet is sent out to the mirroring or destination port to be observed using a network analyzer.

With remote mirroring, mirrored traffic from any Ethernet Routing Switch 8600 switch in the network can be redirected to a remote switch to be analyzed. With this feature, you can monitor ports from different switches in the network using just one network analyzer. This is accomplished by encapsulating mirrored packets in a Remote Mirroring Encapsulation 'wrapper'. The encapsulated frame is bridged through the network via a separate port based VLAN to the remote mirroring termination port. The remote mirroring encapsulation 'wrapper' is 20-bytes in length and consists of a Layer 2 Destination Address, Layer 2 Source Address, Monitor Tag, Monitor EtherType, and Monitor Control. The original CRC-32 is stripped from the mirrored packet, and a new CRC-32 is computed over the entire encapsulated frame. Note that when the mirrored fame is 1522 bytes (1518 plus 4-byte 802.1p/q tag), the resulting maximum frame length is 1542 bytes. To support remote mirroring, all switches in the network must have the capability to handle a packet size up to 1542. At the termination point, the encapsulation header is removed before sending the packet out the port. The source port for remote mirroring is called Remote Mirroring Source (RMS) and the destination port is called Remote Mirroring Termination (RMT).

The remote mirroring feature uses a particular VLAN if the remote mirroring is enabled on Port Mirroring Destination Port. The VLAN ID configured will be set as the vlan-id in the Monitor Tag field of the remote mirrored packet. With this, the user can segregate the remote mirrored traffic to single VLAN in the entire network.

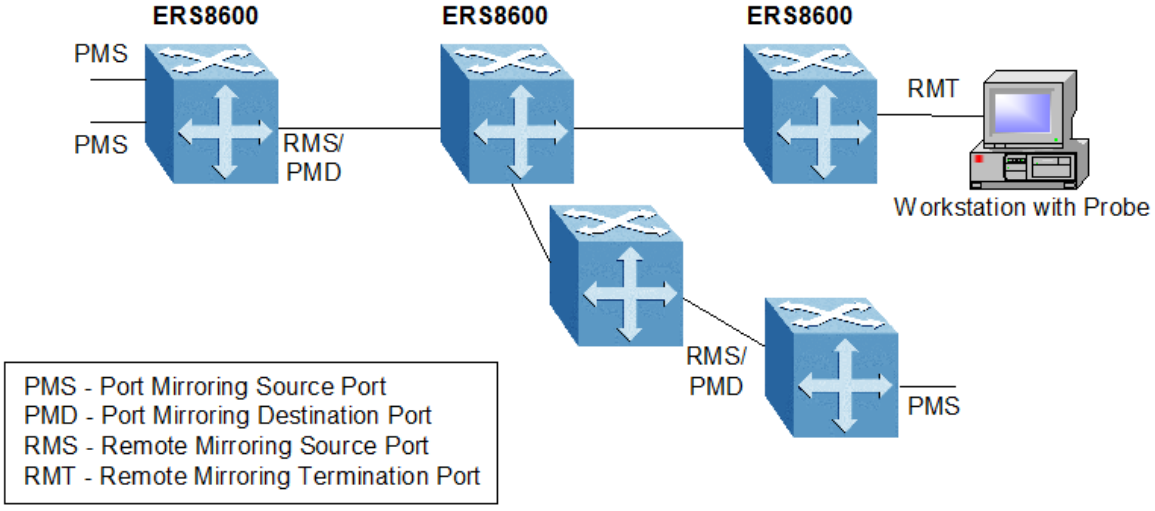

Figure 1.1 – Remote Port Mirror

1.2 Remote Mirrored Packet Format

6 Bytes	6 Bytes	4 Bytes	2 Bytes	2 Bytes	6 Bytes	6 Bytes	46 to 1506 Bytes	4 Bytes
Mirror DA	**Mirror SA**	**Mirror Tag**	**Mirror EtherType**	**Mirror Control**	**Original DA**	**Original SA**	**Mirrored Traffic**	**CRC-32**

The Mirror Destination Address (Mirror DA), Mirror Source Address (Mirror SA) and mirror EtherType are user configurable parameters under the port remote-mirroring command. In regards to the Mirror SA, the three least significant bits are derived from the MAC port number. The Mirror Tag field is generated from the “IEEE VLAN ID” configured under port remote-mirroring.

1.3 Remote Mirror Operation

Prior to sending traffic out on a RMS, the mirrored traffic will be encapsulated with a remote mirror wrapper. All remote mirrored packets sent out of RMS are always tagged with the remote mirroring tag.

When a RMT port receives an encapsulated frame from the switch fabric, it will strip off the Remote Mirroring Encapsulation as it is being transmitted on the port. Remote mirrored encapsulated frames are identified when the configured “remote mirroring destination mac Address” is detected as the “destination MAC address” in the packet. RMT will send dummy broadcast layer-2 packets with “remote mirroring destination mac” as source mac so that all nodes in the network can learn this mac address. This is sent every 10 secs (as the minimum value of FDB-aging timer is 10 secs). When a port is configured as RMT, a static FDB entry is added to channel all traffic destined for the remote mirroring destination mac to RMT port. When an RMT port is removed from all VLANs configured, the Remote mirroring feature on the port is disabled.

- Only RWA user will be allowed to configure Remote mirroring.
- Remote mirrored packets will be sent lowest priority (pBit value of 0).
- RMS port has to be a mirror destination port. Only mirrored packets will be remote mirrored.
- This check is not done when RMS is enabled on the port. No error message will be generated while RMS is configured on a port which is not a port mirroring destination port. If port mirroring is disabled, then no packets will be remote mirrored. Whenever user is using remote mirroring, user has to make sure that the port mirroring is enabled with RMS port as mirror destination Port.
- If RMS is a tagged port, then the remote mirroring packet will be sent with VLAN ID of that of mirrored packet (Original Packet).
- RMT has to be part of at least one port based VLAN.
- Packets will be captured as long as RMT is reachable.
- Whenever a user enables/disables remote mirroring, a Trap is sent to trap receiver and a SMP log message is generated stating that remote mirroring is enabled/disabled and the mode.

2. Configuration Parameters

2.1 CLI

The following command has been added for setting remote mirroring parameters under the configure ethernet heading.

```
ERS8600:6# config ethernet <slot/port> remote-mirroring
```

The following CLI commands are added:

```
enable <true|false> [mode <source|termination>] [srcmac <mac>] [dstmac <mac>]
[ether-type <ether-type>]
mode <source|termination>
srcmac <mac>
dstmac <mac>
ether-type <ether-type>
add-vlan-id <vlan-id>
remove-vlan-id <vlan-id>
info
```

mode: specifies whether the port is a RMT (mode = termination) or RMS (mode = source).

srcmac: used to set the source mac for the remote mirroring encapsulation. The packet will be sent out of RMS with source mac derived from this. The source mac of the encapsulated frame will contain first 45 bits of this Mac address. The three least significant bits are derived from the MAC port number of RMS. Mac address of the port is used as default value.

dstmac: used to set the destination mac for the remote mirroring encapsulation. The remote mirrored packet will be sent to this mac address. User configured dstmac is used only for RMS. For RMT, one of the unused Mac addresses from the switch Port Mac address range is used. To get the same dstmac for RMT across re-boot, this mac address is saved in configuration file and only when config file is restored, the dstmac of RMT is accepted from user.

ether-type: The ether-type of the remote mirrored packet. Default value is 0x8100.

vlan-id: Used only for RMT. The user has to specify which vlan the remote mirror destination mac belongs to. This has to be a port based VLAN. When the RMT port is removed from the last vlan in the list, RMT will be disabled from the port.

enable: enable/disable the feature on the port. When RMT is enabled, the following things are done:

- A FDB static entry for the dstmac is added. This is to send all the packets that are coming with remote mirroring dstmac to RMT port.
- Switch periodically (once in 10 secs) transmits broadcast layer 2 packets in the vlan added so that all nodes in the network can learn the dstmac.

Parameters can only be modified if remote mirroring is disabled.

This activity also modified the port mirroring CLI commands so that the user can set the IEEE VLAN ID used by remote mirroring packet.

```
ERS8600:6# config diag mirror-by-port <id>
```

The following command is modified:

PP8600A:6# create in-port <value> out-port <value> [mode <value>] [enable <value>] [remotemirroring-vlanid <vlan-id>]

Also a new CLI command is added:

```
ERS8600:6# remote-mirroring-vlanid <vlanid>
```

When remote-mirroring-vlanid is set, the remote mirrored packet will be sent with this vlan ID in the mirror Tag.

Also, added a new show command under node

Show port info

```
ERS8600:6# remote-mirroring [<port-num>] [mode <value>] [dstmac <value>]
[srcmac <value>] [vlan-id <value>]
```

This will display the remote mirroring related information of the port.

2.2 Hardware Requirements

For remote mirroring packets, the I/O card hardware should support port mirroring and remote mirroring. E-Series or M-Series cards are required to remotely capture Egress packets from a port.

2.3 Software Requirements and Dependencies

None

2.4 Limitations and Restrictions

1. Maximum of 16 RMTs can be configured in a switch.
2. RMT can be enabled in only one port in an octapid, i.e. using an 8648, 6 ports are used per octapid.
3. For a port to function as RMS, it has to be a destination Port of port mirroring. Octapid has a limitation of only one port as port mirror destination port. So RMS can be enabled in only one port in an octapid.

3. Configuration Example

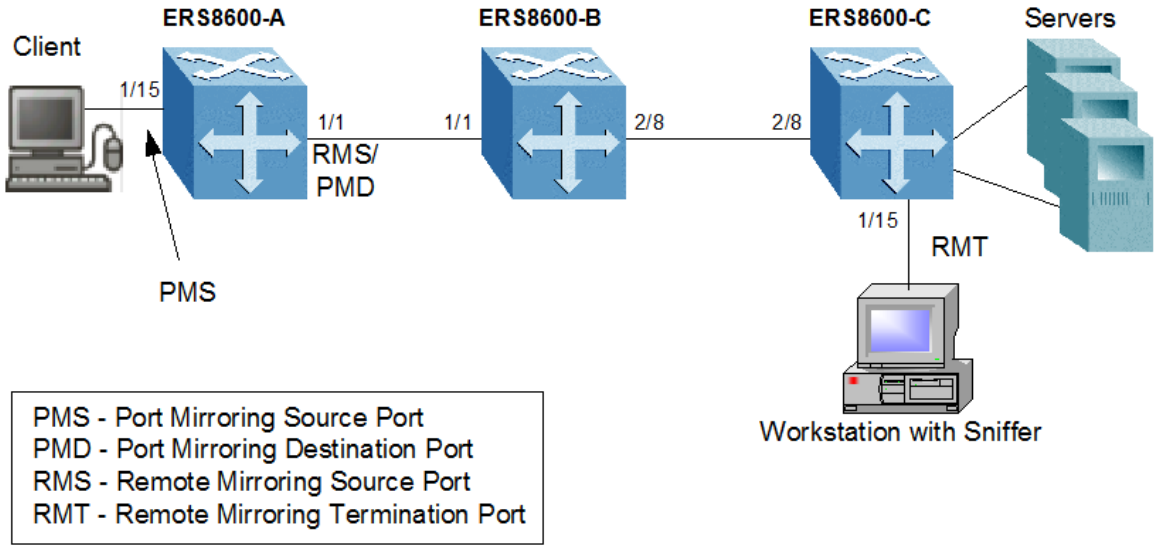

Figure 3.0 – Remote Port Mirror Example

ERS8600-A

a) Create a separate port based VLAN to channel the remote mirroring traffic in the network. In this example, we will use VLAN 10

```
ERS8600-A:5# config vlan 10 create byport 1
```

b) Add PMD port to VLAN 10

```
ERS8600-A:5# config vlan 10 ports add 1/1
```

c) Create port mirror with RMS as the destination port and add VLAN 10. The source port is the port from which packets need to be remotely mirrored.

```
ERS8600-A:5# config diag mirror-by-port 1 create in-port 1/15 out-port 1/1 mode
rx enable true remote-mirror-vlan-id 10
```

In this example, we picked rx mirror mode. If the Ethernet Routing Switch 8600 module is either an E-series or M-series, you can select both in addition to rx and tx.

d) Add the destination MAC for remote mirroring to the RMS port. This is the destination MAC address of the RMT port from switch PP8600-C

```
ERS8600-A:5# config ethernet 1/1 remote-mirroring create
```

```
ERS8600-A:5# config ethernet 1/1 remote-mirroring dstmac 00:e0:7b:82:9d:9c
```

e) Enable RMS

```
ERS8600-A:5# config ethernet 1/1 remote-mirroring enable true
```

ERS8600-B

For the PP8600-B switch, the remote packets are just bridged. The only thing we need to do on this switch is add VLAN 10 and add ports 1/1 and 2/8 to this VLAN.

a) Create VLAN 10

```
ERS8600-B:5# config vlan 10 create byport 1
```

b) Add ports to VLAN 10

```
ERS8600-B:5# config vlan 10 ports add 1/1,2/8
```

ERS8600-C

a) Create a separate port based VLAN to channel the remote mirroring traffic in the network. In this example, we will use VLAN 10

```
ERS8600-C:5# config vlan 10 create byport 1
```

b) Add the RMT ports and the port which remote mirrored packets enter the switch for VLAN 10

```
ERS8600-C:5# config vlan 10 ports add 1/15,2/8
```

c) Add VLAN to the RMT Ethernet port, in this example port 1/15.

```
ERS8600-C:5# config ethernet 1/15 remote-mirroring create
ERS8600-C:5# config ethernet 1/15 remote-mirroring add-vlan-id 10
ERS8600-C:5# config ethernet 1/15 remote-mirroring mode termination
ERS8600-C:5# config ethernet 1/15 remote-mirroring enable true
```

d) Get the destination MAC address of the RMT port. This is needed to configure RMS in the other switches

```
ERS8600-C:5# config ether 1/15 remote-mirroring info
port 1/15
        Enable = FALSE
        Mode = termination
        srcmac = 00:e0:7b:82:9c:0e
        dstmac = 00:e0:7b:82:9d:9c
        ether-type = 0x8103
        vlan-id-list = 10
```

4. Appendix A – Configuration Files

ERS8600-A

```
#
# PORT CONFIGURATION - PHASE I
#

ethernet 1/1 perform-tagging enable

#
# VLAN CONFIGURATION
#

vlan 1 ports remove 1/1-1/48,2/1-2/48 member portmember
vlan 10 create byport 1
vlan 10 ports remove 1/2-1/48,2/1-2/48 member portmember
vlan 10 ports add 1/1 member portmember

#
# PORT CONFIGURATION - PHASE II
#

ethernet 1/1 default-vlan-id 110
ethernet 1/1 stg 1 stp disable
ethernet 1/1 remote-mirroring create
ethernet 1/1 remote-mirroring dstmac 00:e0:7b:82:9d:9c
ethernet 1/1 remote-mirroring enable true

#
# DIAG CONFIGURATION
#

diag mirror-by-port 1 create in-port 1/15 out-port 1/1
diag mirror-by-port 1 remote-mirror-vlan-id 10
```

ERS8600-B

```
#
# PORT CONFIGURATION - PHASE I
#

ethernet 1/1 perform-tagging enable
ethernet 2/8 perform-tagging enable

#
# VLAN CONFIGURATION
#

vlan 1 ports remove 1/1-1/48,2/1-2/8,3/1-3/8 member portmember
vlan 10 create byport 1
vlan 10 ports remove 1/2-1/48,2/1-2/7,3/1-3/8 member portmember
vlan 10 ports add 1/1,2/8 member portmember


#
# PORT CONFIGURATION - PHASE II
#

ethernet 1/1 default-vlan-id 10
ethernet 2/8 default-vlan-id 10
```

ERS8600-C

```
#
# PORT CONFIGURATION - PHASE I
#

ethernet 2/8 perform-tagging enable



#
# VLAN CONFIGURATION
#

vlan 1 ports remove 1/1-1/48,2/1-2/8,3/1-3/8 member portmember
vlan 10 create byport 1
vlan 10 ports remove 1/1-1/14,1/16-1/48,2/1-2/7,3/1-3/8 member portmember
vlan 10 ports add 1/15,2/8 member portmember



#
# PORT CONFIGURATION - PHASE II
#

ethernet 1/15 stg 1 stp disable
ethernet 1/15 remote-mirroring create
ethernet 1/15 remote-mirroring mode termination
ethernet 1/15 remote-mirroring dstmac 00:e0:7b:82:9d:9c
ethernet 1/15 remote-mirroring add-vlan-id 10
ethernet 1/15 remote-mirroring enable true
ethernet 2/8 default-vlan-id 10
```

The dstmac will change depending on slot/port number.

5. Reference Documentation

Publication Number	Document Title
317177-A	Release Notes for the Ethernet Routing Switch 8600 Series Switch Release 3.7
317359-A	Using Diagnostic Tools (Release 3.7)

© 2010 Avaya Inc. All Rights Reserved.

Avaya and the Avaya Logo are trademarks of Avaya Inc. and are registered in the United States and other countries. All trademarks identified by ®, TM or SM are registered marks, trademarks, and service marks, respectively, of Avaya Inc. All other trademarks are the property of their respective owners. Avaya may also have trademark rights in other terms used herein. References to Avaya include the Nortel Enterprise business, which was acquired as of December 18, 2009.