



Horizon COMPACT Plus™

Wireless Ethernet
Release 1.0.1

Product Manual - Volume 4
Networking Features
Version 1.1

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Table of Contents

1.0	USER MANUAL STRUCTURE.....	1
2.0	ETHERNET OPERATION ADMINISTRATION AND MAINTENANCE (EOAM).....	3
2.1	EOAM FEATURES	3
3.0	LINK LAYER DISCOVERY PROTOCOL (LLDP).....	21
3.1	LLDP COMMANDS.....	21
3.1.1	GLOBAL COMMANDS	21
3.1.2	INTERFACING COMMANDS	22
3.1.3	SHOW COMMANDS.....	22
4.0	ETHERNET CONNECTIVITY FAULT MANAGEMENT (ECFM)	25
4.1	STEPS TO CONFIGURING ECFM.....	26
4.2	ECFM CONFIGURATION EXAMPLES.....	27
4.3	ECFM CLI COMMANDS LIST.....	35

Table of Figures

FIGURE 4-1 ECFM CONFIGURATION EXAMPLE 1.....	27
FIGURE 4-2 ECFM CONFIGURATION EXAMPLE 2.....	29
FIGURE 4-3 ECFM CONFIGURATION EXAMPLE 3.....	32

1.0 User Manual Structure

This manual is divided into four volumes:

- Volume 1 – Contains an overview of the product, basic configuration, installation and alignment procedures that are sufficient to set up a link and have it passing traffic
- Volume 2 – includes step-by-step configuration details for the advanced configuration features that are described briefly in Volume 1
- Volume 3 – contains a complete list of the frequency tables associated with the radio bands supported, and soon to be supported, by the Horizon Compact Plus
- Volume 4 – (This Volume) Contains configuration details relating to industry standard networking features.

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2.0 Ethernet Operation Administration and Maintenance (EOAM)

EOAM is a protocol for installing, monitoring, and troubleshooting metro Ethernet networks. Horizon Compact Plus supports the EOAM features as defined in IEEE 802.3ah with the exception of the hardware loopback feature. EOAM is a relatively slow protocol with modest bandwidth requirements. The frame transmission rate is limited to a maximum of 10 frames per second; therefore, the impact of OAM on normal operations is negligible. The EOAM frames cannot propagate beyond a single hop within an Ethernet network.

2.1 EOAM Features

Discovery - Identifies the devices in the network and the devices OAM capabilities.

Link Monitoring - Detects and indicates link events under a variety of conditions. The events include the following:

- Error Frame
- Error Frame Period
- Error Frame Seconds Summary
- HAAM and AAM up/down-switch
- RLS event

Remote Failure Indication - Slowly deteriorating quality is difficult to detect. EOAM provides a mechanism for an OAM entity to convey these failure conditions to its peer. The following failure conditions can be communicated:

Link Fault – The receiver detects loss of signal. This condition is sent once per second

Critical Event - An unspecified critical event has occurred. This type of event is vendor specific. The critical event is sent immediately and continuously.

Remote Loopback - An OAM entity can put its remote peer into software loopback mode.

Note that it is not possible to start a local EOAM loopback on a node that has a radio or network loopback already in operation.

Procedure 2-1

Configuring EOAM

Required Action	Steps
login	Log in as a NOC user.
set eoam	Enables or disables Ethernet Operation Administration and Maintenance (EOAM) processing globally on this device. The default is "off". Sequence: set eoam [on off] press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> Example: set eoam on press Enter To verify the setting, run the command – get eoam global information get eoam global information press Enter The system responds: <pre> Ethernet OAM has been enabled OUI configured is 1c:08:00 Error event OAMPDU resend count:1 </pre> Where Enabled means that eoam is on Disabled means that eoam is off
set eoam oui	Configure the Organization Unit Identifier (OUI). Sequence: set eoam oui [xx:yy:zz] press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> To verify the setting, run the command – get eoam global information set eoam oui 00:07:58 press Enter then get eoam global information press Enter The system responds: (Example) <pre> Ethernet OAM has been enabled OUI configured is 00:07:58 Error event OAMPDU resend count:1 </pre>

Required Action	Steps
set eoam link-monitor event-resend	Configure Error-Event Resend Count on this device. The default is 10. Sequence: set eoam link-monitor event-resend [count(1-10)] press Enter The system responds: <i>< no response ></i> The system returns <i>to the prompt -></i>. Example: set eoam link-monitor event-resend 10 press Enter To verify the setting, run the command – get eoam global information get eoam global information press Enter The system responds: (Example) <i>Ethernet OAM has been enabled</i> <i>OUI configured is 1c:08:00</i> <i>Error event OAMPDU resend count:10</i>
View current DragonWave eoam message mode	This command returns the current DragonWave eoam message mode. EOAM protocol can be used or it can be bypassed. Sequence: get eoam dwi-msg mode press Enter The system responds: <i>Eoam DWI specific msg mode: bypass-eoam</i>
Change the DragonWave eoam message mode	Use this command to change the current DragonWave eoam message mode. Either “bypass-eoam” or “eoam” can be selected. Selecting “bypass-eoam” sends the DragonWave eoam packets directly via the Ethernet layer. Selecting “eoam” sends packets through the eoam protocol layer. sequence: set eoam dwi-msg message mode [bypass-eoam eoam] Example: set eoam dwi-msg message mode eoam press Enter The system responds: <i>Eoam DWI specific msg mode is set to :eoam</i>
View current status of the eoam AAM message option. Note that if HAAM is enabled this command is still valid	Use this command to view the current status of the eoam message option for AAM or HAAM changes. Sequence: get aam eoam option press Enter The system responds: <i>Eoam option for AAM is: off</i>

Required Action	Steps
Change the current status of the eoam AAM message option. Note that if HAAM is enabled this command is still valid	This command enables or disables the option to send out an eoam message when AAM or HAAM up/down-switches modulation schemes. Sequence: set aam eoam option [on off] Example: set aam eoam option on press Enter The system responds: <i>Eoam option for AAM is set to :on</i>
View current status of the eoam RLS message option.	Use this command to view the current status of the eoam message option for RLS events. Sequence: get rls shutdown policy press Enter The system responds: <i>RLS shutdown notification policy: eoam-msg</i>
Change the current status of the eoam RLS message option.	This command enables or disables the option to send out an eoam message when an RLS event is triggered. Sequence: set rls shutdown policy [port-down eoam-msg] Example: set rls shutdown policy port-down press Enter The system responds: <i>RLS shutdown notification policy is set to :port-down</i>
set eoam fault-management	Start, enables or disables the eoam fault-management on the system. The default is "off". Sequence: set eoam fault-management [start on off] press Enter The system responds: <i>< no response ></i> The system returns <i>to the prompt -></i> . Example: set eoam fault-management start press Enter set eoam fault-management on press Enter To verify the setting, run the command : get eoam fault-management global information press Enter The system responds: (Example) <i>Fault-management module has been enabled</i>
set port eoam	Enable or disable EOAM on a port. The default is "off". Sequence: set port eoam port [port number] [on off] press Enter The system responds: <i>< no response ></i> The system returns <i>to the prompt -></i> . Example: set port eoam port 1 on press Enter

Required Action	Steps														
	To verify the setting, run the command : get port eoam local information press Enter The system responds: (Example) Eoam Local Information: <table><tr><th>Port</th><th>State</th><th>Mode</th><th>Status</th><th>LinkMonitor</th><th>ConfigRev</th><th>MaxPdu</th></tr><tr><td>P1</td><td>enable</td><td>active</td><td>Operational</td><td>enable</td><td>0</td><td>1518</td></tr></table> 	Port	State	Mode	Status	LinkMonitor	ConfigRev	MaxPdu	P1	enable	active	Operational	enable	0	1518
Port	State	Mode	Status	LinkMonitor	ConfigRev	MaxPdu									
P1	enable	active	Operational	enable	0	1518									
set port eoam mode	Configure EOAM mode in a port. The default is "active" Sequence: set port eoam mode [port <1-2>] [active passive] press Enter where active: Eoam node with active mode initiates the exchange of the information OAMPDUs for the discovery process to settle. Active device should not respond to OAM remote loopback commands and variable requests from a Passive peer. passive: Eoam node with passive mode does not initiate the discovery process. It reacts to the initiation of discovery process by Remote peer. Example: set port eoam mode port 1 active press Enter To verify the setting, run the command : get port eoam local information press Enter The system responds: (Example) Eoam Local Information: <table><tr><th>Port</th><th>State</th><th>Mode</th><th>Status</th><th>LinkMonitor</th><th>ConfigRev</th><th>MaxPdu</th></tr><tr><td>P1</td><td>enable</td><td>active</td><td>Operational</td><td>enable</td><td>0</td><td>1518</td></tr></table> 	Port	State	Mode	Status	LinkMonitor	ConfigRev	MaxPdu	P1	enable	active	Operational	enable	0	1518
Port	State	Mode	Status	LinkMonitor	ConfigRev	MaxPdu									
P1	enable	active	Operational	enable	0	1518									

Required Action	Steps																																				
set port eoam remote-loopback	Allows the user to enable or disable EOAM remote loopback, and to deny or permit EOAM remote loopback feature request from its peer. Sequence: set port eoam remote-loopback [port <1-2>] [on off deny permit] press Enter The system responds: < no response > The system returns to the prompt ->. Example #1: set port eoam remote-loopback port 1 permit press Enter To verify the setting, run the command – get eoam local information get eoam local information press Enter The system responds: (Example) <i>Eoam Functions Supported by Local:</i> <table><tr><th>Port</th><th>Remote Loopback</th><th>Link Event</th><th>UniDir</th><th>Variable Retrieval</th></tr><tr><td>P1</td><td>permit</td><td>enable</td><td>disable</td><td>enable</td></tr><tr><td>P2</td><td>deny</td><td>enable</td><td>disable</td><td>enable</td></tr></table> Example #2: set port eoam remote-loopback port 1 on press Enter To verify the setting, run the command – get eoam local information get eoam local information press Enter The system responds: (Example) <i>Eoam Local Information:</i> <table><tr><th>Port</th><th>State</th><th>Mode</th><th>Status</th><th>LinkMonitor</th><th>ConfigRev</th><th>MaxPdu</th></tr><tr><td>P1</td><td>enable</td><td>active</td><td>R-Loopback</td><td>enable</td><td>0</td><td>1518</td></tr><tr><td>P2</td><td>disable</td><td>active</td><td>Disabled</td><td>enable</td><td>0</td><td>1518</td></tr></table> Note: 1. To support Eoam loopback, system's Eoam fault management must be started and enabled. 2. HC ODU only supports Eoam Loopback on port 1. 3. EOAM discovery process must be in operational state before enabling EOAM remote loopback operation. 4. EOAM remote loopback must be set to 'permit' in order to process the loopback command from the remote end.	Port	Remote Loopback	Link Event	UniDir	Variable Retrieval	P1	permit	enable	disable	enable	P2	deny	enable	disable	enable	Port	State	Mode	Status	LinkMonitor	ConfigRev	MaxPdu	P1	enable	active	R-Loopback	enable	0	1518	P2	disable	active	Disabled	enable	0	1518
Port	Remote Loopback	Link Event	UniDir	Variable Retrieval																																	
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Port	State	Mode	Status	LinkMonitor	ConfigRev	MaxPdu																															
P1	enable	active	R-Loopback	enable	0	1518																															
P2	disable	active	Disabled	enable	0	1518																															

Required Action	Steps
set port eoam fault-management remote-loopback	Start Eoam loopback test with the specified packet number, packet size, test pattern, and wait time. Sequence: set port eoam fault-management remote-loopback [port <1-2>] [test] [count <no of packets(1-1000)>] [packet <size(64-1500)>] [pattern <hex_string(8)>] [wait-time <integer(1-10)>] press Enter Where port identifies a port number. Test triggers loopback test count identifies the number of loopback test packets. packet size identifies the packet's size. The range is from 64 to 1500. pattern identifies the pattern string to transmit. wait-time identifies the wait time (second) to receive the loopback packets. The system responds: <i>< no response ></i> The system returns <i>to the</i> prompt <i>-></i>. Example: set port eoam fault-management remote-loopback port 1 test count 20 packet 800 pattern 5050 wait-time 5 press Enter The system responds: <i>Transmitting....</i> <i>OAM Remote Loopback Test Pl: 20 transmitted, 20 received</i>

Required Action	Steps
set port eoam link-monitor	Enables or disables link events for EOAM monitoring. Sequence: set port eoam link-monitor [port <1-2>] [frame frame-period frame-sec-summary] [on off] press Enter Where port identifies a port number. Link monitor event type: frame : Frame Event is generated, when the number of frame errors exceeds a threshold within a given window defined by a period of time. (e.g. 10 frames in 1 second had errors) frame-period: Frame Period Event is generated, when the number of frame errors exceeds a threshold within a given window defined by a number of frames (e.g. 10 frames out of 10000 had errors). frame-sec-summary: Frame-secs-summary Event is generated, when the number of frame errors exceeds a threshold within a given time period (e.g. 10 frames seconds within the last 100 seconds). An error frame second is defined as a 1 second interval which has frame errors > 0. The system responds: <i>< no response ></i> The system returns <i>to the</i> prompt ->. Example: set port eoam link-monitor port 1 frame off press Enter To verify the setting, run the command: get port eoam event-notifications press Enter The system responds: (Example) <pre> Link Event Notifications ----- Frame Frame Frame secs Critical Dying Port Period Summary Event Gasp ----- P1 disable enable enable enable enable P2 enable enable enable enable enable </pre> Note: To support Eoam Link Monitor, system's Eoam fault management must be started and enabled.

Required Action	Steps																																										
set port eoam link-monitor default	Sets the link monitoring parameters threshold and window to the default value. Sequence: set port eoam link-monitor default [port <1-2>] [frame frame-period frame-sec-summary] [threshold window] press Enter The system responds: <i>< no response ></i> The system returns <i>to the</i> prompt <i>-></i>. Example: set port eoam link-monitor default port 1 frame threshold press Enter To verify the setting, run the command: get port local information press Enter The system responds: (Example) <i>Eoam Frame Period Event Configuration:</i> <table><tr><th><i>Port</i></th><th><i>ErrFrame Period Window</i></th><th><i>ErrFrame Period Threshold</i></th></tr><tr><td colspan="3"><i>-----</i></td></tr><tr><td><i>P1</i></td><td><i>10000000</i></td><td><i>1</i></td></tr><tr><td><i>P2</i></td><td><i>10000000</i></td><td><i>1</i></td></tr></table> <i>Eoam Frame Event Configuration:</i> <table><tr><th><i>Port</i></th><th><i>Errored Frame Window</i></th><th><i>Errored Frame Threshold</i></th></tr><tr><td colspan="3"><i>(100 msec)</i></td></tr><tr><td colspan="3"><i>-----</i></td></tr><tr><td><i>P1</i></td><td><i>10</i></td><td><i>1</i></td></tr><tr><td><i>P2</i></td><td><i>10</i></td><td><i>1</i></td></tr></table> <i>Eoam Frame Seconds Summary Event Configuration:</i> <table><tr><th><i>Port</i></th><th><i>ErrFrameSec Summary Window</i></th><th><i>ErrFrameSec Summary Threshold</i></th></tr><tr><td colspan="3"><i>(100 msec)</i></td></tr><tr><td colspan="3"><i>-----</i></td></tr><tr><td><i>P1</i></td><td><i>100</i></td><td><i>1</i></td></tr><tr><td><i>P2</i></td><td><i>100</i></td><td><i>1</i></td></tr></table>	<i>Port</i>	<i>ErrFrame Period Window</i>	<i>ErrFrame Period Threshold</i>	<i>-----</i>			<i>P1</i>	<i>10000000</i>	<i>1</i>	<i>P2</i>	<i>10000000</i>	<i>1</i>	<i>Port</i>	<i>Errored Frame Window</i>	<i>Errored Frame Threshold</i>	<i>(100 msec)</i>			<i>-----</i>			<i>P1</i>	<i>10</i>	<i>1</i>	<i>P2</i>	<i>10</i>	<i>1</i>	<i>Port</i>	<i>ErrFrameSec Summary Window</i>	<i>ErrFrameSec Summary Threshold</i>	<i>(100 msec)</i>			<i>-----</i>			<i>P1</i>	<i>100</i>	<i>1</i>	<i>P2</i>	<i>100</i>	<i>1</i>
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Required Action	Steps
set port eoam fault-management link-monitor action	Specifies the action for the link monitoring threshold crossing events received from local. The default is “none”. Sequence: set port eoam fault-management link-monitor action [port <1-2>] [frame frame-period frame-sec-summary] [none warning] press Enter The system responds: < no response > The system returns <i>to the</i> prompt ->. Example: set port eoam fault-management link-monitor action port 1 frame none press Enter To verify the setting, run the command: get port eoam fault-management config port 1 press Enter The system responds: (Example) <pre> Link Event Action ----- Port Frame Frame Frame secs Critical Dying Link MaxVar Period Summary Event Gasp Fault Req ----- P1 None warning warning warning warning warning 10 P2 warning warning warning warning warning warning 10 </pre>
set port eoam link-monitor window	Specifies the window size for link events for ethernet OAM link monitoring. Frame-period window size should be greater than threshold count. The default frame window size is 10; the default frame-period window size is 10000000. Sequence: set port eoam link-monitor window [port <1-2>] [frame <size(10 - 600)> frame-period <size(1100000 - 89000000)>]press Enter The system responds: < no response > The system returns <i>to the</i> prompt ->. Example: set port eoam link-monitor window port 1 frame 200 press Enter. To verify the setting, run the command: get port eoam local information press Enter The system responds: (Example) Eoam Frame Event Configuration: <pre> Port Errored Frame Window Errored Frame Threshold (100 msec) ----- P1 200 1 P2 10 1 </pre>

Required Action	Steps															
set port eoam link-monitor frame-sec-summary window	Specifies the window size for frame second summary. Window size should be greater than threshold count. The default is 100. Sequence: set port eoam link-monitor frame-sec-summary window [port <1-2>] [size<100 - 9000>] press Enter The system responds: < no response > The system returns to the prompt ->. Example: set port eoam link-monitor frame-sec-summary window port 1 400 press Enter. To verify the setting, run the command: get port eoam local information press Enter The system responds: (Example) <i>Eoam Frame Seconds Summary Event Configuration:</i> <table><tr><th>Port</th><th>ErrFrameSec Summary Window (100 msec)</th><th>ErrFrameSec Summary Threshold</th></tr><tr><td colspan="3">-----</td></tr><tr><td>P1</td><td>400</td><td>1</td></tr><tr><td>P2</td><td>100</td><td>1</td></tr><tr><td colspan="3">.....</td></tr></table>	Port	ErrFrameSec Summary Window (100 msec)	ErrFrameSec Summary Threshold	-----			P1	400	1	P2	100	1			
Port	ErrFrameSec Summary Window (100 msec)	ErrFrameSec Summary Threshold														

P1	400	1														
P2	100	1														
.....																
set port eoam link-monitor threshold	Specify the threshold for link events for Ethernet OAM link monitoring. Threshold count should be lesser than window size for frame-period The default frame threshold is 1; the default frame-period threshold is 1. Sequence: set port eoam link-monitor threshold [port <1-2>] [frame frame-period] [<count(1234..)>] press Enter The system responds: < no response > The system returns to the prompt ->. Example: set port eoam link-monitor threshold port 1 frame 5 press Enter. To verify the setting, run the command: get port eoam local information press Enter The system responds: (Example) Eoam Frame Event Configuration: <table><tr><th>Port</th><th>Errored Frame Window (100 msec)</th><th>Errored Frame Threshold</th></tr><tr><td colspan="3">-----</td></tr><tr><td>P1</td><td>100</td><td>5</td></tr><tr><td>P2</td><td>10</td><td>1</td></tr><tr><td colspan="3">.....</td></tr></table>	Port	Errored Frame Window (100 msec)	Errored Frame Threshold	-----			P1	100	5	P2	10	1			
Port	Errored Frame Window (100 msec)	Errored Frame Threshold														

P1	100	5														
P2	10	1														
.....																

Required Action	Steps															
set port eoam link-monitor frame-sec-summary threshold	Specify the threshold value for frame second summary. Threshold error count for frame seconds summary should be lesser than window size. The default is 1. Sequence: set port eoam link-monitor frame-sec-summary threshold [port <1-2>] [size<0 - 900>] press Enter The system responds: < no response > The system returns <i>to the</i> prompt ->. Example: set port eoam link-monitor frame-sec-summary threshold port 1 5 press Enter. To verify the setting, run the command: get port eoam local information press Enter The system responds: (Example) <i>Eoam Frame Seconds Summary Event Configuration:</i> <table><tr><th>Port</th><th>ErrFrameSec Summary Window</th><th>ErrFrameSec Summary Threshold (100 msec)</th></tr><tr><td>-----</td><td>-----</td><td>-----</td></tr><tr><td>P1</td><td>100</td><td>5</td></tr><tr><td>P2</td><td>100</td><td>1</td></tr><tr><td>.....</td><td></td><td></td></tr></table>	Port	ErrFrameSec Summary Window	ErrFrameSec Summary Threshold (100 msec)	-----	-----	-----	P1	100	5	P2	100	1			
Port	ErrFrameSec Summary Window	ErrFrameSec Summary Threshold (100 msec)														
-----	-----	-----														
P1	100	5														
P2	100	1														
.....																
set port eoam fault-management mib-variable count	Sets the maximum MIB variables that can be sent in one OAM variable request PDU. The default is 6. Sequence: set port eoam fault-management mib-variable count [port <1-2>] <count(1-100)> press Enter The system responds: < no response > The system returns <i>to the</i> prompt ->.															

Required Action	Steps																																																
set port eoam fault-management mib-request	Send MIB variable request to peer. Sequence: set port eoam fault-management mib-request [port <1-2>] <branchleaf:branchleaf:...> press Enter Where branch identifies variable branch derived from CMIP protocol encodings in ANSI/IEEE Std 802.3 Annex 30A. leaf identifies variable leaf derived from CMIP protocol encodings in ANSI/IEEE Std 802.3 Annex 30A.. Example: set port eoam fault-management mib-request port 1 7247:7333:7334 press Enter < no response > The system returns <i>to the</i> prompt ->. To verify the setting, run the command: get port eoam fault-management mib-variable response press Enter The system responds: (Example) <i>MIB variable responses received on interface P1</i> <pre>MIB Variable response: 1 -----</pre> <table><thead><tr><th>Branch</th><th>Leaf</th><th>Width/Indication</th><th>Value</th></tr><tr><th>-----</th><th>----</th><th>-----</th><th>-----</th></tr></thead><tbody><tr><td>07</td><td>00f7</td><td>04</td><td>01020000</td></tr><tr><td>07</td><td>014d</td><td>04</td><td>00000009</td></tr><tr><td>07</td><td>014e</td><td>01</td><td>0e</td></tr></tbody></table> Where: <table><thead><tr><th>SNMP</th><th>CMIP</th><th>CMIP</th><th></th></tr><tr><th>Oid</th><th>Branch</th><th>Leaf</th><th>Attribute</th></tr><tr><th>=====</th><th>=====</th><th>=====</th><th>=====</th></tr></thead><tbody><tr><td>1.3.6.1.2.1.158.1.2.1.3</td><td>7</td><td></td><td>247</td></tr><tr><td>aOARemoteVendorSpecificInfo</td><td></td><td></td><td></td></tr><tr><td>1.3.6.1.2.1.158.1.1.1.2</td><td>7</td><td>333</td><td>aOMDiscoveryState</td></tr><tr><td>1.3.6.1.2.1.158.1.1.1.6</td><td>7</td><td>334</td><td>aOAMLocalConfiguration</td></tr></tbody></table> Note: To support Eoam Mib Variable Request, system's Eoam fault management must be started and enabled.	Branch	Leaf	Width/Indication	Value	-----	----	-----	-----	07	00f7	04	01020000	07	014d	04	00000009	07	014e	01	0e	SNMP	CMIP	CMIP		Oid	Branch	Leaf	Attribute	=====	=====	=====	=====	1.3.6.1.2.1.158.1.2.1.3	7		247	aOARemoteVendorSpecificInfo				1.3.6.1.2.1.158.1.1.1.2	7	333	aOMDiscoveryState	1.3.6.1.2.1.158.1.1.1.6	7	334	aOAMLocalConfiguration
Branch	Leaf	Width/Indication	Value																																														
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07	00f7	04	01020000																																														
07	014d	04	00000009																																														
07	014e	01	0e																																														
SNMP	CMIP	CMIP																																															
Oid	Branch	Leaf	Attribute																																														
=====	=====	=====	=====																																														
1.3.6.1.2.1.158.1.2.1.3	7		247																																														
aOARemoteVendorSpecificInfo																																																	
1.3.6.1.2.1.158.1.1.1.2	7	333	aOMDiscoveryState																																														
1.3.6.1.2.1.158.1.1.1.6	7	334	aOAMLocalConfiguration																																														
get eoam global information	Displays ethernet OAM global information. Sequence: get eoam global information press Enter Example: get eoam global information press Enter The system responds: (Example) <i>Ethernet OAM has been enabled</i> <i>OUI configured is 00:07:58</i> <i>Error event OAMPDU resend count:10</i>																																																

Required Action	Steps
get eoam fault-management global information	Displays fault-management global information. Sequence: get eoam fault-management global information press Enter Example: get eoam fault-management global information press Enter The system responds: (Example) <i>Fault-management module has been enabled</i>
get port eoam event-log	Displays EOAM event logs. Sequence: get port eoam event-log [port <1-2>] press Enter Example: get port eoam event-log port 1 press Enter The system responds: <i>Port: P1</i> <i>Event: 1</i> <i>Location : Local</i> <i>Event Type : Link Fault Event</i> <i>Time (100ms) : 44 since local startup</i>
get port eoam event-notifications	Displays EOAM event notification's configuration. Sequence: get port eoam event-notifications [port <1-2>] press Enter Examples: get port eoam event-notifications port 1 press Enter The system responds: <i>Link Event Notifications</i> <pre> ----- Frame Frame Frame secs Critical Dying Port Period Summary Event Gasp ----- P1 enable enable enable enable enable P2 enable enable enable enable enable </pre>
get port eoam statistics	Displays EOAM statistics counter. Sequence: get port eoam statistics [port <1-2>] press Enter Examples: get port eoam statistics press Enter The system responds: <pre> Port InfoPduRx UniEventRx DupEventRx RLBCtrlRx VarReqRx VarResRx ----- P1 2667 0 0 0 0 1 P2 0 0 0 0 0 0 Port InfoPduTx UniEventTx DupEventTx RLBCtrlTx VarReqTx VarResTx ----- P1 2764 0 0 1 1 0 P2 0 0 0 0 0 0 Port OrgSpecRx UnknownRx OrgSpecTx UnknownTx FramesLost ----- P1 0 0 0 0 0 P2 0 0 0 0 0 </pre>

Required Action	Steps																																																															
get port eoam local information	Displays ethernet OAM local information. Sequence: get port eoam local information [port <1-2>] press Enter Examples: local information press Enter The system responds: <i>Eoam Local Information:</i> <table><tr><th>Port</th><th>State</th><th>Mode</th><th>Status</th><th>LinkMonitor</th><th>ConfigRev</th><th>MaxPdu</th></tr><tr><td>P1</td><td>enable</td><td>active</td><td>R-Loopback</td><td>enable</td><td>2</td><td>1518</td></tr><tr><td>P2</td><td>disable</td><td>active</td><td>Disabled</td><td>enable</td><td>0</td><td>1518</td></tr></table> <i>Eoam Functions Supported by Local:</i> <table><tr><th>Port</th><th>Remote Loopback</th><th>Link Event</th><th>UniDir</th><th>Variable Retrieval</th></tr><tr><td>P1</td><td>permit</td><td>enable</td><td>disable</td><td>enable</td></tr><tr><td>P2</td><td>deny</td><td>enable</td><td>disable</td><td>enable</td></tr></table> <i>Eoam Frame Period Event Configuration:</i> <table><tr><th>Port</th><th>ErrFrame Period Window</th><th>ErrFrame Period Threshold</th></tr><tr><td>P1</td><td>10000000</td><td>1</td></tr><tr><td>P2</td><td>10000000</td><td>1</td></tr></table> <i>Eoam Frame Event Configuration:</i> <table><tr><th>Port</th><th>Errored Frame Window (100 msec)</th><th>Errored Frame Threshold</th></tr><tr><td>P1</td><td>200</td><td>1</td></tr><tr><td>P2</td><td>10</td><td>1</td></tr></table> <i>Eoam Frame Seconds Summary Event Configuration:</i> <table><tr><th>Port</th><th>ErrFrameSec Summary Window (100 msec)</th><th>ErrFrameSec Summary Threshold</th></tr><tr><td>P1</td><td>100</td><td>1</td></tr><tr><td>P2</td><td>100</td><td>1</td></tr></table>	Port	State	Mode	Status	LinkMonitor	ConfigRev	MaxPdu	P1	enable	active	R-Loopback	enable	2	1518	P2	disable	active	Disabled	enable	0	1518	Port	Remote Loopback	Link Event	UniDir	Variable Retrieval	P1	permit	enable	disable	enable	P2	deny	enable	disable	enable	Port	ErrFrame Period Window	ErrFrame Period Threshold	P1	10000000	1	P2	10000000	1	Port	Errored Frame Window (100 msec)	Errored Frame Threshold	P1	200	1	P2	10	1	Port	ErrFrameSec Summary Window (100 msec)	ErrFrameSec Summary Threshold	P1	100	1	P2	100	1
Port	State	Mode	Status	LinkMonitor	ConfigRev	MaxPdu																																																										
P1	enable	active	R-Loopback	enable	2	1518																																																										
P2	disable	active	Disabled	enable	0	1518																																																										
Port	Remote Loopback	Link Event	UniDir	Variable Retrieval																																																												
P1	permit	enable	disable	enable																																																												
P2	deny	enable	disable	enable																																																												
Port	ErrFrame Period Window	ErrFrame Period Threshold																																																														
P1	10000000	1																																																														
P2	10000000	1																																																														
Port	Errored Frame Window (100 msec)	Errored Frame Threshold																																																														
P1	200	1																																																														
P2	10	1																																																														
Port	ErrFrameSec Summary Window (100 msec)	ErrFrameSec Summary Threshold																																																														
P1	100	1																																																														
P2	100	1																																																														

Required Action	Steps
get port eoam neighbour information	Displays EOAM neighbour information. Sequence: get port eoam neighbour information [port <1-2>] press Enter Example: get port eoam neighbour information press Enter The system responds: <pre> Port Mac Addr OUI VendorInfo Mode ConfigRev MaxPdu ----- P1 00:07:58:00:e7:86 1c:08:00 01020000 active 1 1518 P2 00:00:00:00:00:00 00:00:00 00000000 unknown 0 0 Port Remote Link UniDir Variable Loopback Event retrieval ----- P1 enable enable disable enable P2 disable disable disable disable </pre>
get port eoam fault-management config	Displays EOAM link event actions and max descriptors per variable request. Sequence: get port eoam fault-management config [port <1-2>] press Enter The system responds: <pre> ----- Port Frame Frame Frame secs Critical Dying Link MaxVar Port Period Summary Event Gasp Fault Req ----- P1 warning warning warning warning warning warning 10 P2 warning warning warning warning warning warning 10 </pre>
get port eoam fault-management remote-loopback	Displays EOAM loopback statistics. Sequence: get port eoam fault-management remote-loopback [port <1-2>] [current-session last-session] [detail] press Enter Example: get port eoam fault-management remote-loopback port 1 current-session detail press Enter The system responds: <pre> Port: P1 Loopback: Remote OAM in loopback mode Start: 13/05/2009 15:34:19.310 End: Still running Test pattern: 00005050 Test packet size: 800 Test wait-time: 5 Test packet count: 20 Test statistics: Test packets Rx: 20 Test packets Tx: 20 Test packets matched: 20 </pre>

Required Action	Steps
get port eoam fault-management mib-variable response	Displays MIB variable response. Sequence: get port eoam fault-management mib-variable response [port <1-2>] press Enter Example: get port eoam fault-management mib-variable response port 1 press Enter The system responds: <pre> MIB variable responses received on interface P1 MIB Variable response: 1 ----- Branch Leaf Width/Indication Value ----- 07 00f7 04 01020000 07 014d 04 00000009 07 014e 01 0e </pre>
clear port eoam statistics	Clears ethernet OAM statistics for all ports/specific port. If the port is not specified, it clears the statistics of both ports. Sequence: clear port eoam statistics [port <1-2>] press Enter Example: clear port eoam statistics press Enter To verify the setting, run the command: get port eoam statistics press Enter The system responds: (Example) <pre> Port InfoPduRx UniEventRx DupEventRx RLBCtrlRx VarReqRx VarResRx ----- P1 49 0 0 0 0 0 P2 0 0 0 0 0 0 Port InfoPduTx UniEventTx DupEventTx RLBCtrlTx VarReqTx VarResTx ----- P1 50 0 0 0 0 0 P2 0 0 0 0 0 0 Port OrgSpecRx UnknownRx OrgSpecTx UnknownTx FramesLost ----- P1 0 0 0 0 0 P2 0 0 0 0 0 </pre>

Required Action	Steps
clear port eoam config	Clears ethernet OAM local configuration for all ports/specific port.If the port is not specified, it clears the configuration of both ports. Sequence: clear port eoam config [port <1-2>] press Enter Example: clear port eoam config press Enter To verify the setting, run the command: get port eoam fault-management config press Enter The system responds: (Example) <pre> ----- Frame Frame Frame secs Critical Dying Link MaxVar Port Period Summary Event Gasp Fault Req ----- P1 warning warning warning warning warning warning 10 P2 warning warning warning warning warning warning 10 </pre>
clear port eoam event-log	Clears EOAM event logs.If port num is not specified, it clears the event logs of both ports. Sequence: clear port eoam event-log [port <1-2>] press Enter Example: clear port eoam event-log press Enter To verify the setting, run the command: get port eoam event-log press Enter <i>< no response ></i> The system only returns <i>to the prompt -></i>.
clear port eoam fault-management mib-variable response	Clears MIB variable response received from the peer. If port num. is not specified, it clears response on both ports. Sequence: clear port eoam fault-management mib-variable response [port <1-2>] press Enter Example: clear port eoam fault-management mib-variable response press Enter To verify the setting, run the command: get port eoam fault-management mib-variable response press Enter The system responds: <i>% Unable to get variable response table entry</i>
Save changes to MIB	Saves the MIB to RAM. Perform this command to save setting changes to non-volatile memory. Sequence: save mib press Enter The system responds: <i>MIB saved successfully</i>

3.0 Link Layer Discovery Protocol (LLDP)

The LLDP is a protocol used by network devices for advertising their identity, capabilities, and neighbours on an IEEE 802 local area network. The protocol is formally referred to by the IEEE as *Station and Media Access Control Connectivity Discovery* specified in standards document IEEE 802.1AB.

3.1 LLDP Commands

The LLDP command set can be divided into three groups:

- Global Commands
- Interfacing Commands
- Show Commands

Each group of commands is detailed below.

3.1.1 Global Commands

Command	Description
set lldp system {start stop}	Start LLDP on the system.
set lldp module {on off}	Enable or Disable LLDP on the system.
set lldp transmit-interval [<seconds(5-32768)>]	Sets the transmission interval (interval at which LLDP Data Units (LLDPDU) are transmitted) or sets it to the default value(30 seconds)
set lldp holdtime-multiplier [<value(2-10)>]	Sets the multiplier value (value which is used to calculate the Time-To-Live for the LLDP advertisements) or sets it to the default value (4).
set lldp reinitialization-delay [<seconds(1-10)>]	Sets the re-initialization delay (delay time taken by LLDP to re-initialize on any interface) or sets it to the default value (2 seconds).
set lldp tx-delay [<seconds(1-8192)>]	Sets the transmit delay (minimum amount of delay between successive LLDP frame transmissions) or sets it to the default value (2 seconds).
set lldp notification-interval [<seconds(5-3600)>]	Sets the notification interval (interval at which LLDP notifications are sent to NMS) or sets it to the default value (5 seconds).
set lldp chassis-id-subtype {chassis-comp <string(255)> if-alias port-comp <string(255)> mac-addr nw-addr if-name local-cfg<string(255)>}	Configures lldp chassis id subtype and chassis id value.
clear lldp counters	Clears LLDP transmit and receive statistics.
clear lldp table	Clears LLDP neighbors' information.

3.1.2 Interfacing Commands

Command	Description
set lldp interface admin {switchport <port-num> {transmit receive} {on off}}	Sets LLDP admin status on an interface to Transmit or Receive.
set lldp interface notification {switchport <port-num> } {[remote-table-chg][mis-configuration] off }	Enables/Disables LLDP trap notification on an interface.
set lldp interface tlv-select basic-tlv {switchport <port-num> } {[port-descr] [sys-name] [sys-descr] [sys-capab] [mgmt-addr {all ipv4 ipv6 <ip6_addr>}]} {on off }	Enables the basic Type–Length–Value (TLV) transmission on a given port.
set lldp interface port-id-subtype {switchport <port-num> } { if-alias port-comp <string(255)> mac-addr if-name local <string(255)> }	Configures lldp port id subtype and port id value.
set lldp interface tlv-select dot1tlv {switchport <port-num> } {[port-vlan-id] [protocol-vlan-id {all <vlan-id>}]} [vlan-name {all <vlan-id>}]} {on off }	Configure dot1 TLV types on a port.
set lldp interface tlv-select dot3tlv {switchport <port-num> } { [macphy-config] [link-aggregation] [max-framesize] } {on off }	Configure dot3 TLV types on a port.

3.1.3 Show Commands

Command	Description
get lldp global information	Displays LLDP global configuration details.
get lldp interface [switchport <portNum>]	Displays LLDP configuration details on a particular interface or all interfaces.
get lldp neighbors [chassis-id <string(255)> port-id <string(255)>] [<iftype> <ifnum>] [detail]	Displays information about neighbors learnt on an interface or all interfaces.
get lldp interface traffic [switchport <portNum>]	Displays LLDP counters, including the no. of frames sent, received, discarded, etc.
get lldp interface local {[switchport <portNum>] [mgmt-addr]}	Displays the current switch information that will be used to populate outbound LLDP advertisements for a specific interface or all interfaces.
get lldp errors	Displays the information about the errors like memory allocation failures, queue overflows, table overflows, etc.
get lldp statistics	Displays the LLDP remote table statistics information.

Procedure 3-1
Configuring LLDP

Required Action	Steps
login	Log in as a NOC user.
Enable the LLDP module	This command enables/disables LLDP on the system set lldp module [on/off] – Example : Sequence: set lldp module on press Enter System responds
Start LLDP	This command starts LLDP on the system set lldp system [start/stop] – Example: Sequence: set lldp system start press Enter System responds
Configure port	This command configures dot1 TLV types on a port. set lldp interface tlv-select dot1tlv {switchport <port-num>} {[port-vlan-id] [protocol-vlan-id {all <vlan-id>}]} [vlan-name {all <vlan-id>}]} {on off} Example: Sequence: set lldp interface tlv-select basic-tlv switchport 2 mgmt-addr all on press Enter System responds:

View neighbors

This command returns details about a specific neighbor of all neighbors.

get lldp neighbors [chassis-id <string(255)> port-id <string(255)>] [<iftype> <ifnum>] [detail]

The example displays all neighbors.

Sequence:

get lldp neighbors press Enter

System responds:

Capability Codes :
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Chassis ID	Local Intf	Hold-time	Capability	Port Id
-----	-----	-----	-----	-----
00:07:58:03:14:b0	P1	120		P1
00:07:58:03:14:b0	P5	120		P5

Total Entries Displayed : 2

Capability Codes :
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,

4.0 Ethernet Connectivity Fault Management (ECFM)

IEEE 802.1ag and ITU-T Y.1731 standards define mechanisms that provide Ethernet Connectivity Fault Management (ECFM). The fault management mechanisms defined by Y.1731 are basically the same as those for 802.1ag, but with subtle differences in the concept of the management domain and its association. ITU-T Y.1731 also defines performance monitoring mechanisms.

ECFM comprises a number of fault management mechanisms that work together to help administrators debug Ethernet networks. These are:

- connectivity check message (CCM)
- link trace message (LTM)
- loopback message (LBM)
- remote defect indication (RDI)
- alarm indication signal (AIS – supported by Y.1731 only)

The Y.1731 performance monitoring mechanisms include:

- frame loss measurement (LM)
- frame delay measurement (DM)
- throughput measurement

The Horizon Compact Plus supports the CCM, LTM, LBM, and RDI mechanisms of 802.1ag and Y.1731 mechanisms noted above. The AIS and performance monitoring mechanisms of Y.1731 are not supported. However Horizon Compact Plus will respond to DM messages.

ECFM is supported on any port of the Horizon Compact Plus.

Note that ECFM is not supported when any system redundancy option is configured.

Entering networking details of maintenance domains (MD), maintenance associations (MA), maintenance association intermediate points (MIP) and maintenance end points (MEP), into a database on various devices in an Ethernet network, allows operators to trace fault conditions throughout that network.

The Horizon Compact Plus is limited in the number of the above elements it can manage as follows:

- MD – 16
- MA – 32
- MEP – 60

There are four steps to configuring ECFM. Each step comprises the issuing of a number of CLI “set” commands. Some of these commands must be entered in a specific order for the configuration to be successful.

Section 4.1 shows the basic steps involved in configuring ECFM on the Horizon Compact.

Section 4.2 has configuration examples that show, in more detail, how to configure the Horizon Compact Plus for ECFM.

Section 0 contains all the CLI commands associated with ECFM, with a brief explanation of their function.

Note that ECFM uses a special MAC address that the network system discovers through connectivity check messages sent out by the CE's. This allows Loopback and Linktrace activities to be performed. Since the ECFM MAC address is auto discovered by the network system, there is no need to configure this address in the Horizon Compact. However, if you wish to determine what the Horizon Compact Plus ECFM MAC address is, use the CLI command ***get ecfm maintenance-point local***.

ECFM packets that are required to traverse the Horizon Compact Plus can be prioritized through the QoS system, if enabled (see Section **Error! Reference source not found. Error! Reference source not found.**).

4.1 Steps to Configuring ECFM

There are four steps to configuring ecfm. Each step comprises the issuing of a number of CLI “set” commands. Some of these commands must be entered in a specific order for the configuration to be successful.

The following table shows the steps and also indicates which commands within those steps relate to 802.1ag and Y.1731.

Configuring ECFM – Step 1	ECFM Commands	802.1ag	Y.1731
ECFM Global Setting	set ecfm on	✓	✓
	set ecfm y1731 on		✓
	set ecfm port 1 on	✓	✓
	set ecfm oui aa:bb:cc	✓	✓
	set ecfm error-log on		✓
	set ecfm start	✓	✓
	set ecfm mep crosscheck start-delay	✓	✓
	set ecfm traceroute cache on	✓	✓
	set ecfm traceroute cachesize	✓	✓
	set ecfm traceroute cache holdtime	✓	✓
	set ecfm mip ccm-database caching	✓	✓
	set ecfm mip ccm-database size	✓	✓
	set ecfm mip ccm-database holdtime	✓	✓
	set ecfm associate vlan-id	✓	✓

Configuring ECFM – Step 2	ECFM Commands	802.1ag	Y.1731
Define Domain, Service, and MEPs Note: The sequence, below, must be followed in this step: 1. Domain 2. Domain feature (archive-hold-time, mip-creation-criteria) 3. Service within the domain 4. Remote MEPs within the service	set ecfm default-domain vlan/global	✓	✓
	set ecfm domain DOMAIN-ONE	✓	✓
	set ecfm mip-creation-criteria	✓	✓
	set ecfm mep archive-hold-time	✓	✓
	set ecfm service	✓	✓
	set ecfm mep crosscheck	✓	✓
	set ecfm domain DOMAIN-TWO	✓	✓
	set ecfm mep archive-hold-time	✓	✓
	set ecfm service	✓	✓

	set ecfm mep crosscheck	✓	✓
--	-------------------------	---	---

Configuring ECFM – Step 3	ECFM Commands	802.1ag	Y.1731
Define local MEPs and MIPs Note: The sequence, below, must be followed in this step: 1. Local MEP 2. Features with this MEP	set ecfm mep level	✓	✓
	set ecfm mep-capability level		✓
	set ecfm ccm-unicast-mac		✓
	set ecfm mip level	✓	✓

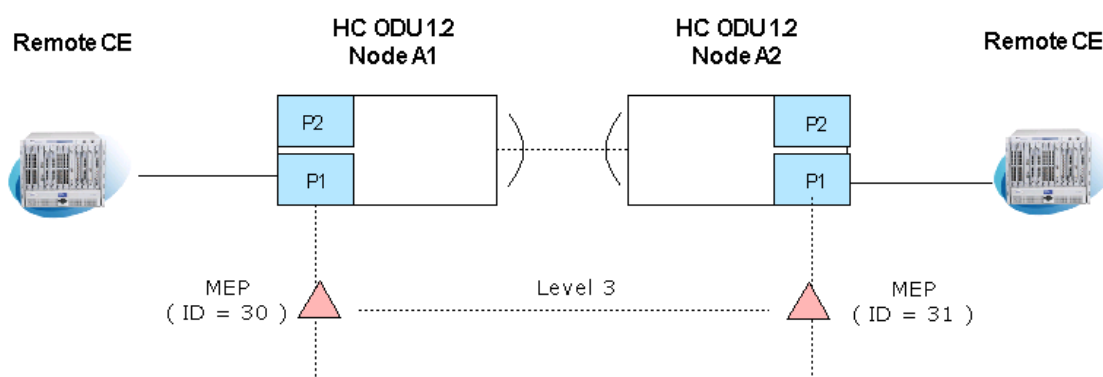
Configuring ECFM – Step 4	ECFM Commands	802.1ag	Y.1731
Define interval, and Start CCM transmitting.	set ecfm cc level	✓	✓
	set ecfm cc enable	✓	✓

4.2 ECFM Configuration Examples

Figure 4-1, Figure 4-2 and Figure 4-3 represent typical networks, which include Horizon Compact Plus wireless Ethernet links. The following configuration examples show how to configure ECFM in each of the Horizon Compact Plus nodes and refer to the parameters shown in the noted figures. Note that levels, mpid's and vlan ID's values shown in the examples are example values only. The values actually used will depend on the network to which you are connected.

Figure 4-1

ECFM Configuration Example 1



Node A1

Logon as the Super User or a NOC user and enter the commands and parameters shown below:

```
->set ecfm on
:
->set ecfm port 1 on
:
->set ecfm start
:
->set ecfm traceroute cache on
:
->set ecfm mip ccm-database caching enable
:
->set ecfm domain MD_3 level 3
domain-1:
->set ecfm service MA_3 vlan 1003
domain-1:
->set ecfm mep crosscheck mpid 30 vlan 1003
domain-1:
->set ecfm mep crosscheck mpid 31 vlan 1003
domain-1:
->
->set ecfm mep level 3 inward mpid 31 vlan 1003 active
mep-:
->set ecfm cc level 3 vlan 1003 interval ten-sec
Using vlan-list: 1003.
mep-:
->set ecfm cc enable level 3 vlan 1003
Using vlan-list: 1003.
mep-:
->save ecfmmb
```

Node A2

Logon as the Super User or a NOC user and enter the commands and parameters shown below:

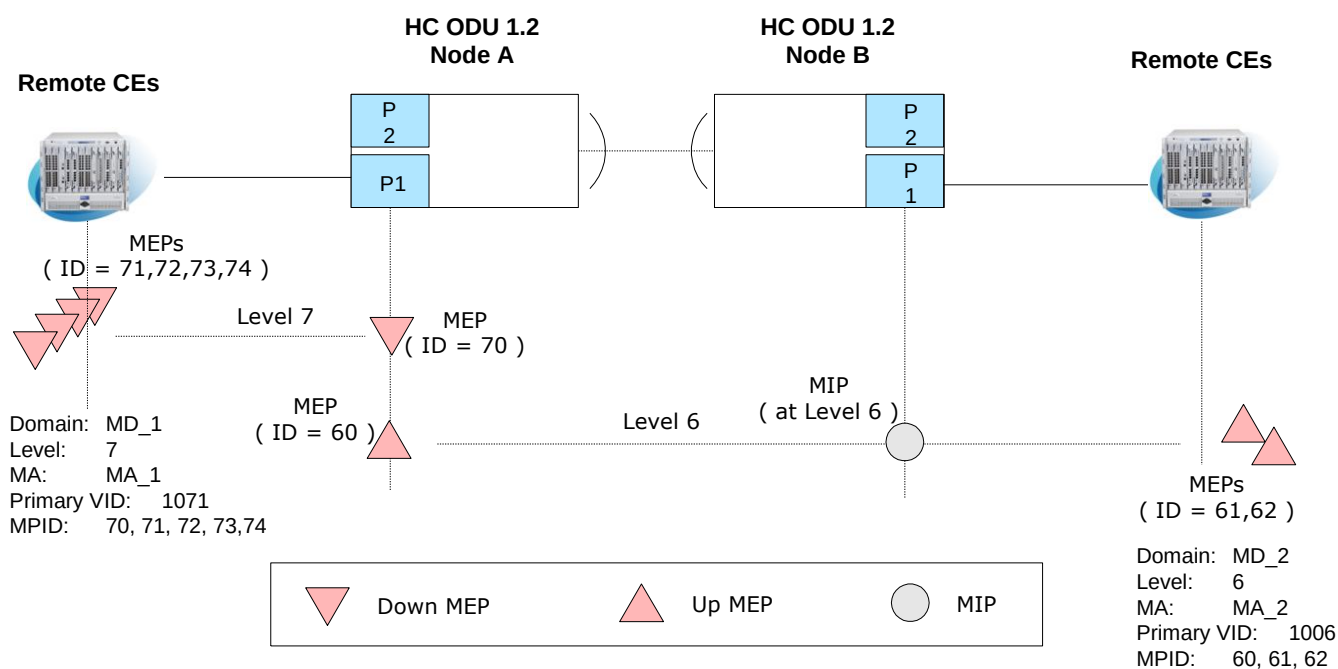
```
->set ecfm on
:
->set ecfm port 1 on
:
->set ecfm start
:
->set ecfm traceroute cache on
:
->set ecfm mip ccm-database caching enable
:
->set ecfm domain MD_3 level 3
domain-1:
->set ecfm service MA 3 vlan 1003
```

```

domain-1:
->set ecfm mep crosscheck mpid 30 vlan 1003
domain-1:
->set ecfm mep crosscheck mpid 31 vlan 1003
domain-1:
->set ecfm mep level 3 inward mpid 30 vlan 1003 active
mep-:
->set ecfm cc level 3 vlan 1003 interval ten-sec
Using vlan-list: 1003.
mep-:
->set ecfm cc enable level 3 vlan 1003
Using vlan-list: 1003.
mep-:
->save ecfmmib

```

Figure 4-2
ECFM Configuration Example 2



Node A

Logon as the Super User or a NOC user and enter the commands and parameters shown below:

```
->set ecfm on
:
->set ecfm port 1 on
:
->set ecfm start
:
->set ecfm traceroute cache on
:
->set ecfm mip ccm-database caching enable
:
->set ecfm domain MD_1 level 7
domain-1:
->set ecfm service MA_1 vlan 1071
domain-1:
->set ecfm mep crosscheck mpid 70 vlan 1071
domain-1:
->set ecfm mep crosscheck mpid 71 vlan 1071
domain-1:
->set ecfm mep crosscheck mpid 72 vlan 1071
domain-1:
->set ecfm mep crosscheck mpid 73 vlan 1071
domain-1:
->set ecfm mep crosscheck mpid 74 vlan 1071
domain-1:
->set ecfm domain MD_2 level 6
domain-2:
->set ecfm service MA_2 vlan 1006
domain-2:
->set ecfm mep crosscheck mpid 60 vlan 1006
domain-2:
->set ecfm mep crosscheck mpid 61 vlan 1006
domain-2:
->set ecfm mep crosscheck mpid 62 vlan 1006
domain-2:
->set ecfm mep level 7 mpid 70 vlan 1071 active
mep-:
->set ecfm mep level 6 inward mpid 60 vlan 1006 active
mep-:
->set ecfm cc level 7 vlan 1071 interval ten-sec
Using vlan-list: 1071.
mep-:
->set ecfm cc level 6 vlan 1006 interval ten-sec
Using vlan-list: 1006.
mep-:
->set ecfm cc enable level 7 vlan 1071
```

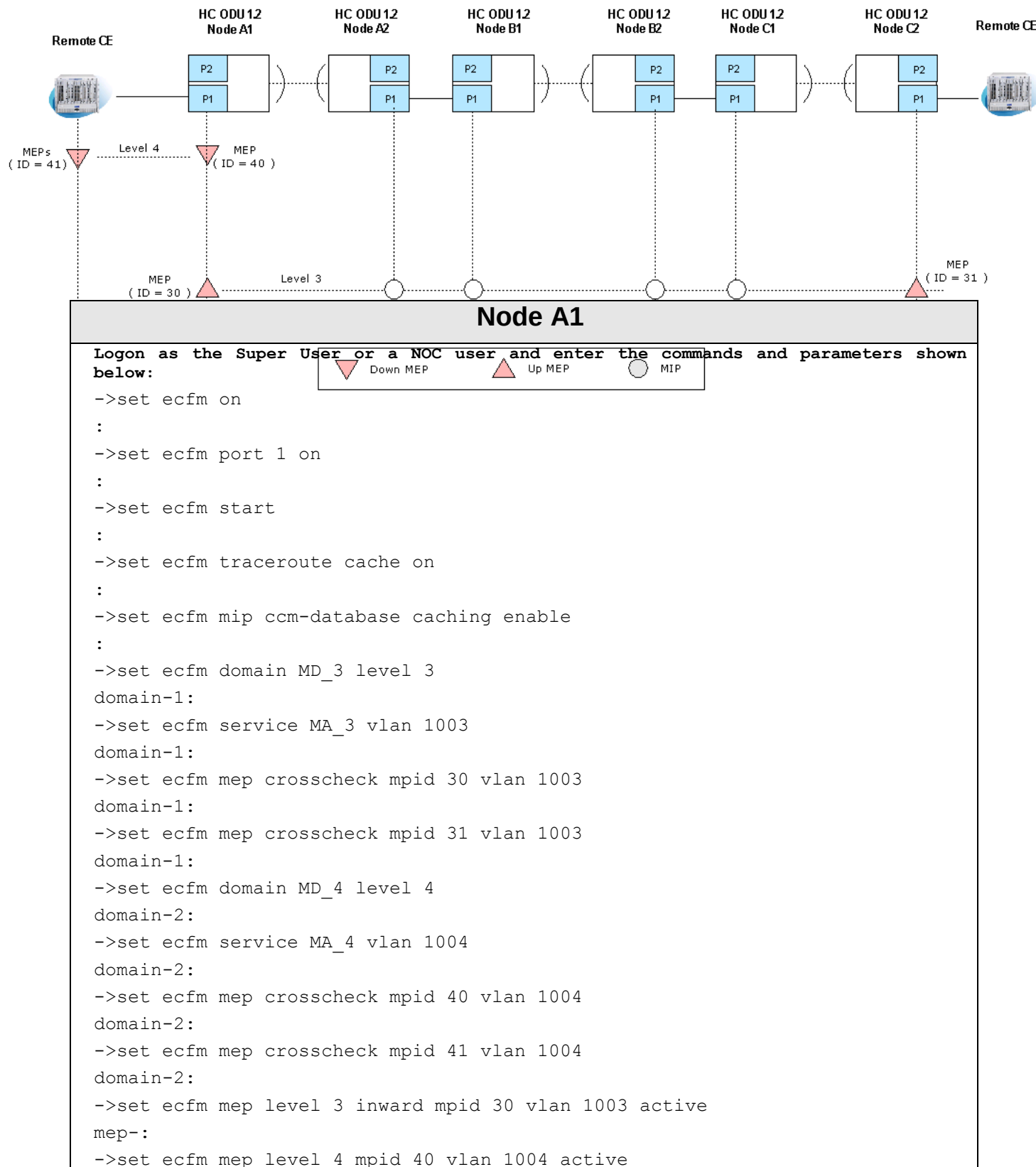
```
Using vlan-list: 1071.  
mep-:  
->set ecfm cc enable level 6 vlan 1006  
Using vlan-list: 1006.  
mep-:  
->save ecfmmib
```

Node B

Logon as the Super User or a NOC user and enter the commands and parameters shown below:

```
->set ecfm on  
:  
->set ecfm port 1 on  
:  
->set ecfm start  
:  
->set ecfm traceroute cache on  
:  
->set ecfm mip ccm-database caching enable  
:  
->set ecfm default-domain vlan 1006 level 6 mip-creation-criteria default  
:  
->set ecfm mip level 6 vlan 1006 active  
:  
->save ecfmmib
```

Figure 4-3
ECFM Configuration Example 3



```
mep-:
->set ecfm cc level 3 vlan 1003 interval ten-sec
Using vlan-list: 1003.
mep-:
->set ecfm cc level 4 vlan 1004 interval ten-sec
Using vlan-list: 1004.
mep-:
->set ecfm cc enable level 3 vlan 1003
Using vlan-list: 1003.
mep-:
->set ecfm cc enable level 4 vlan 1004
Using vlan-list: 1004.
mep-:
->save ecfmmib
```

Nodes A2, B1, B2, C1

Logon as the Super User or a NOC user and enter the commands and parameters shown below:

```
->set ecfm on
:
->set ecfm port 1 on
:
->set ecfm start
:
->set ecfm traceroute cache on
:
->set ecfm mip ccm-database caching enable
:
->set ecfm default-domain vlan 1003 level 3 mip-creation-criteria default
:
->set ecfm mip level 3 vlan 1003 active
:
->save ecfmmib
```

Node C2

Logon as the Super User or a NOC user and enter the commands and parameters shown below:

```
->set ecfm on
:
->set ecfm port 1 on
:
->set ecfm start
:
```

```
->set ecfm traceroute cache on
:
->set ecfm mip ccm-database caching enable
:
->set ecfm domain MD_3 level 3
domain-1:
->set ecfm service MA_3 vlan 1003
domain-1:
->set ecfm mep crosscheck mpid 30 vlan 1003
domain-1:
->set ecfm mep crosscheck mpid 31 vlan 1003
domain-1:
->set ecfm mep level 3 inward mpid 31 vlan 1003 active
mep-:
->set ecfm cc level 3 vlan 1003 interval ten-sec
Using vlan-list: 1003.
mep-:
->set ecfm cc enable level 3 vlan 1003
Using vlan-list: 1003.
mep-:
->save ecfmmib
```


4.3 ECFM CLI Commands List

ECFM CLI Command	Description
set ecfm	Enables or disables connectivity fault management (CFM) processing globally on this device. The default is "off". Sequence: set ecfm [on off] press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> Example: set ecfm on press Enter To verify the setting, run the command – get ecfm global information get ecfm global information press Enter The system responds: <pre>Configured OUI : 00:00:00 ecfm Status : Started, Enabled</pre> Where Enabled means that ecfm is on Disabled means that ecfm is off
set ecfm y1731	Enables(on) or disables(off) Y.1731 processing globally on a device. For Y.1731 to be enabled, ecfm should be enabled. When Y.1731 is off, ecfm default protocol is 802.1ag. Sequence: set ecfm y1731 [on off] press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i>

ECFM CLI Command	Description
set ecfm port	Sets the port number that subsequent ecfm commands will apply to. The default is "off". Sequence: set ecfm port [port number] [on off] press Enter The system responds: < no response > The system returns to the prompt ->. Note: HC ODU only supports ecfm functions on port-1. port number must be 1. To verify the setting, run the command – get ecfm port get ecfm port press Enter The system responds: <pre> ----- ecfm Status : Enabled LLC Encapsulation : Disabled MEPs Configured : 1 MIPs Configured : 1 </pre>
set ecfm oui	Configure the Organization Unit Identifier (OUI). Organizationally Unique Identifier (OUI) is a 24-bit number that is purchased from the Institute of Electrical and Electronics Engineers. Sequence: set ecfm oui [xx:yy:zz] press Enter The system responds: < no response > The system returns to the prompt ->. To verify the setting, run the command – get ecfm global information set ecfm oui 00:07:58 press Enter then get ecfm global information press Enter The system responds: <pre> Configured OUI : 00:07:58 (.....00:07:58 is the OUI belonging to DragonWave) </pre>
set ecfm error-log	This is Y.1731 command. Enables or disables the logging of Continuity Check errors that occurred on the device in the Error Log table and also sets the maximum size of the table. The default is "off". Sequence: set ecfm error-log [on off] [size <entries(1-4096)>] press Enter The system responds: < no response > The system returns to the prompt ->

ECFM CLI Command	Description
set ecfm start	Start the Ethernet CFM Module globally on the ODU. Sequence: set ecfm start press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> Example: set ecfm start press Enter To verify the setting, run the command – get ecfm global information get ecfm global information press Enter The system responds: <pre>Configured OUI : 00:00:00 ecfm Status : Started, Enabled</pre> Where Started : ecfm is started

ECFM CLI Command	Description										
set ecfm default-domain vlan	Sets the parameters of default Maintenance Domain (MD) Level, to control MHF creation at the VLAN Ids which are not attached to any Service (Maintenance Association) and SenderID TLV transmission by those MHFs. Sequence: set ecfm default-domain vlan <integer(1-4094)> ([level<integer(0-7)>][mip-creation-criteria {none explicit defer default}][sender-id-permission {none chassis manage chassis-mgt-address defer }]) press Enter Where vlan identifies a Vlan ID. Range of the integer values is from 1 to 4094 level identifies the maintenance domain's level. Range is from 0 to 7. mip-creation-criteria identifies value indicating, whether the management entity is able to create MHF for this default domain. The following values are allowed: • none • explicit • defer • default sender-id-permission identifies the value indicating, if anything is to be included in the sender ID TLV transmitted by the MIP created by the default Maintenance Domain. The following are the possible values: • none • chassis • manage • chassis-mgt-address • defer The system responds: < no response > The system returns to the prompt ->. To verify the setting, run the command: get ecfm default-domain press Enter The system responds: (Example) Default-domain parameters ----- Level : 0 MIP Creation Criteria : none SenderId Permission : none ----- <table><tr><th>Vlan</th><th>Level</th><th>Status</th><th>MIP-Creation criteria</th><th>SenderId Permission</th></tr><tr><td>1006</td><td>6</td><td>No MA</td><td>default</td><td>chassis-mgt</td></tr></table>	Vlan	Level	Status	MIP-Creation criteria	SenderId Permission	1006	6	No MA	default	chassis-mgt
Vlan	Level	Status	MIP-Creation criteria	SenderId Permission							
1006	6	No MA	default	chassis-mgt							

ECFM CLI Command	Description
set ecfm default-domain global	Defines or deletes a connectivity fault management (CFM) Maintenance Domain (MD) at a particular maintenance level and puts the device in Ethernet CFM configuration mode, where parameters specific to the maintenance domain can be set. Sequence: set ecfm default-domain global levelid <(0-7)> press Enter Where levelid identifies the maintenance domain's level. Range is from 0 to 7. The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> Example: set ecfm default-domain global levelid 7 press Enter To verify the setting, run the command: get ecfm default-domain press Enter The system responds: (Example) Default-domain parameters ----- Level : 7 MIP Creation Criteria : none SenderId Permission : none

ECFM CLI Command	Description
set ecfm mep crosscheck start-delay	To configure the number of CCMs to be missed, for which a device waits for the remote maintenance end points (MEPs) to come up. The default: the number is reset to the default value of 3. Sequence: set ecfm mep crosscheck start-delay {default} {start-delay<3-100>} press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> Example: set ecfm mep crosscheck start-delay 20 press Enter To verify the setting, run the command: get ecfm global information press Enter The system responds: (Example) ->get ecfm global information Configured OUI : 00:07:58 ecfm Status : Started, Enabled MIP CCM Database ----- Status : Enabled Size : 1000 entries Hold-time : 24 hours Traceroute Cache ----- Status : Enabled Size : 200 entries Hold-time : 150 minutes MIP Creation Dynamic Evaluation : Enabled Cross-Check Delay : 10 Enabled Traps ----- None

ECFM CLI Command	Description
set ecfm traceroute cache	Enables Linktrace replies (LTR) caching. The default: it is disabled. Sequence: set ecfm traceroute [on off] press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> To verify the setting, run the command: get ecfm global information press Enter The system responds: (Example) Traceroute Cache ----- Status : Enabled Size : 200 entries Hold-time : 150 minutes
set ecfm traceroute cachesize	Sets maximum size for the Linktrace reply (LTR) table. Traceroute caching should be enabled and cache should be empty. The default : Sequence: set ecfm traceroute cachesize {default <integer(1-4095)> } press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> Example: See the example in the command – set ecfm traceroute cache.
set ecfm traceroute cache holdtime	Sets Linktrace replies (LTR Table) maximum age. The default : hold time is 100 minutes. Sequence: set ecfm traceroute holdtime {default integer(1-65535)} press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> Example: See the example in the command – set ecfm traceroute cache .

ECFM CLI Command	Description
set ecfm mip ccm-database caching	Enable or disable Ethernet CFM MIP-CCM database caching. Sequence: set ecfm mip ccm-database caching {enable disable} press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> Example: set ecfm mip ccm-database caching enable press Enter To verify the setting, run the command: get ecfm global information press Enter The system responds: (Example) ->get ecfm global information Configured OUI : 00:07:58 ecfm Status : Started, Enabled MIP CCM Database ----- Status : Enabled Size : 1000 entries Hold-time : 24 hours
set ecfm mip ccm-database size	Sets the number of entries in the ecfm ccm-database, in hours. The default is 1000 entries. Sequence: set ecfm mip ccm-database size [<entries(1000-10000)>] press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> Example: See the example in the command – set ecfm mip ccm-database caching.

ECFM CLI Command	Description
set ecfm mip ccm-database hold-time	Sets the hold time for the ecfm ccm-database, in hours. The default is 24 hours. Sequence: set ecfm mip ccm-database holdtime [<hours>(24-48)] press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> Example: See the example in the command – set ecfm mip ccm-database caching.
set ecfm domain	Defines or selects a connectivity fault management (CFM) Maintenance Domain (MD) at a particular maintenance level, where parameters specific to the maintenance domain can be set. Sequence: set ecfm domain <domain-name(1..20)> level <level-id(0-7)> [delete] press Enter Where domain-name identifies the domain. Character string has a maximum limit of twenty characters. level identifies the maintenance domain's level. Range is from 0 to 7. Example: set ecfm domain test_md_1 level 1 press Enter The system responds: domain-1: -> Where domain-n: n is the domain index, which corresponds to the Index column entry in response to the get ecfm domain command. If there is no domain named test_md_1 and level is 1, the system will create a domain with the parameters: test_md_1 and 1. If a domain with this name already exists, but at a different level, the system will respond with an error message. If there is a domain that exists in the system with the same level, the system will select this domain as the current setting domain. It is necessary to use this command before calling the following commands: • set ecfm mip-creation-criteria • set ecfm service • set mep crosscheck mpid • set ecfm mep archive-hold-time Note: Horizon Compact Plus release 1.2 only supports character string type domain names.

ECFM CLI Command	Description																				
set ecfm mep archive-hold-time	Sets the amount of in minutes time such that information from a MEP is kept in the CC database before they are purged. Defaults set to 100 minutes. Sequence: set ecfm mep archive-hold-time {<minutes(100-65535) default } press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i> Example: set ecfm domain MD_level_7 level 7 press Enter set ecfm mep archive-hold-time 170 press Enter To verify the setting, run the command – get ecfm domain get ecfm domain press Enter The system responds: <table><tr><th>No</th><th>Domain</th><th>Index</th><th>Level</th><th>Services</th></tr><tr><td colspan="5">Archive (min)</td></tr><tr><td>1</td><td>MD_level_7</td><td>1</td><td>7</td><td>2</td></tr><tr><td></td><td></td><td></td><td></td><td>150</td></tr></table>	No	Domain	Index	Level	Services	Archive (min)					1	MD_level_7	1	7	2					150
No	Domain	Index	Level	Services																	
Archive (min)																					
1	MD_level_7	1	7	2																	
				150																	

ECFM CLI Command	Description
set ecfm service	Configures the provided Service (Maintenance Association) at the specified vlan. User can configure ICC and UMC when Y.1731 is enabled. Sequence: <pre>set ecfm service <[[config] <service_name> [{icc <icc_code> umc <umc_code>] [vlan <vlan-id(1-4094)>] [mip-creation-criteria {none default explicit defer}] [sender-id-permission {none chassis manage chassis-mgt-address defer}]]> <{delete <service_name> press Enter</pre> Where service_name identifies the maintenance association. Maximum limit of the Character string is up to 20 characters. icc_code identifies ITU carrier code. umc_code identifies Unique MEGID code. vlan-id specifics Vlan ID. mip-creation-criteria identifies value indicating, whether the management entity is able to create MHF for this default domain. The following values are allowed: • none • explicit • defer • default sender-id-permission identifies the value indicating, if anything is to be included in the sender ID TLV transmitted by the MIP created by the default Maintenance Domain. The following are the possible values: • none • chassis • manage • chassis-mgt-address • defer Examples: To creating a service with 802.1ag protocol: <pre>set ecfm service ma_one vlan 100 mip-creation-criteria default sender-id-permission none press Enter</pre> To creating a service with Y.1731 protocol: <pre>set ecfm service ma_one icc icc001 umc umc00 vlan 100 mip-creation-criteria default sender-id-permission none press Enter</pre> To verify the setting, run the command: get ecfm service Note: HC ODU 1.2 release only supports char-string type service name.

ECFM CLI Command	Description
set ecfm mep crosscheck mpid	Statically defines maintenance end point (MEP) or remote MEP. (MEP is defined in a list of MEPIDs of a service associated with a provided VLAN) Sequence: set ecfm mep crosscheck mpid <integer(1-8191)> [delete define] [vlan <integer(1-4094)>] press Enter Where mpid <integer(1-8191)> identifies MEP identifier. vlan <integer(1-4094)> specifies a Vlan ID Examples: To define a mep crosscheck / remote MEP set ecfm mep crosscheck mpid 70 vlan 100 press Enter To delete a mep crosscheck / remote MEP set ecfm mep crosscheck mpid 70 delete vlan 100 press Enter The system responds: < no response > The system returns to the prompt ->.
set ecfm mep level	Configures or deletes a local Maintenance end point (MEP) (Sets an port as a domain boundary (edge)by defining it as a MEP), and sets direction for the MEP.) Sequence: set ecfm mep level [<0-7>] [delete] [inward] [mpid <id(1-8191)>] [vlan<vlan-id(1-4094)>] [active] press Enter Where level [<0-7>] identifies the maintenance domain's level. Range is from 0 to 7. delete is to delete this local MEP. inward specifies the direction. By default, "outward" is created, that is "Down MEP". mpid <id(1-8191)> is the MEP identifier. vlan<vlan-id(1-4094)> specifies a Vlan ID. active specifies the MEP's operational status. By default, MEP is not active. The system responds: mep-: mep-: means that current input status is in the mep-status. This command is required before issuing one of the following commands: • set ecfm mep-capability level • set ecfm ccm-unicast-mac

ECFM CLI Command	Description
set ecfm mep-capability level	This is an Y.1731 command. Enable (on) or disable (off) the capabilities of all the MEPs in a MA at the level and vlan. Defaults to enable if on/off not specified. Sequence: <pre>set ecfm mep-capability level {<level-id(0-7)> level-list} [on off] [vlan {<vlan-id(1-4094)> vlan-list}][ping] [multicast-ping] [turnaround-delay] [rdi]) press Enter</pre> Where level {<level-id(0-7)>} identifies the maintenance domain's level. Range is from 0 to 7. level-list identifies a list of levels. [on off] is to enable(on) or disable(off) the MEP's capabilities. vlan {<vlan-id(1-4094)>} specifies a Vlan ID. vlan-list identifies a list of Vlan IDs. ping identifies that the loopback(ping) capability is enabled or disabled. The default capabilities include ping. multicast-ping identifies that the multicast loopback(ping) capability is enabled or disabled. turnaround-delay identifies that the two-way frame delay measurement capability is enabled or disabled. rdi identifies that the remote defect indication capability is enabled or disabled. The default capabilities include rdi. Example: <pre>set ecfm mep level 7 mpid 70 1071 active press Enter then set ecfm mep-capability level 7 vlan 1071 ping multicast-ping turnaround-delay rdi press Enter</pre> To verify the setting, run the command: <pre>get ecfm maintenance-points local detail mpid 70</pre> <pre>MPID: 70 MdLevel: 7 VLAN: 1071 Dir: Down ----- Out-Of-Service : Disabled RDI Capability : Enabled Loopback Capability : Enabled Multicast LBM Reception Capability : Enabled Multicast TST Reception Capability : Disabled One-Way DM Reception Capability : Disabled DMR Optional Fields : Enabled Delay Threshold : - AIS Capability : Disabled AIS Condition : Disabled LCK Condition : Disabled LCK Client Mac Address : 00:00:00:00:00:00 AIS Client Mac Address : 00:00:00:00:00:00 Near-End Loss Threshold : - Far-End Loss Threshold : -</pre>

ECFM CLI Command	Description
set ecfm ccm-unicast-mac	This is an Y.1731 command. Sets the destination mac-address for ecfm unicast Continuity Check Messages. Sequence: set ecfm ccm-unicast-mac [aa:bb:cc:dd:ee:ff] press Enter The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i>
set ecfm cc level	Sets parameter (CCM Interval) for continuity check messages (CCMs). The level ID and Vlan ID identifies the Service (Maintenance Association) to which the configuration applies. Sequence: set ecfm cc level {<level-id(0-7)> level-list} {<default > [vlan {<vlan-id(1-4094)> vlan-list}] [interval {ten-sec one-min ten-min}]} press Enter Where level {<level-id(0-7)>} identifies the maintenance domain's level. Range is from 0 to 7. level-list identifies a list of levels. vlan {<vlan-id(1-4094)>} specifies a Vlan ID. vlan-list identifies a list of Vlan IDs. interval identifies the time between CCM transmissions. The default interval is ten-sec. The following are the possible values: • ten-sec • one-min • ten-min The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i>

ECFM CLI Command	Description
set ecfm cc enable level	Enables or disables the transmission of continuity check messages (CCMs).The level ID and Vlan ID identifies the Maintenance End Points (MEPs)to which the configuration applies if Vlan is not specified, enables the transmission of CCMs at specified levels for Vlan unaware MEPs only. Sequence: set ecfm cc enable level [disable] {levelid level-list} [vlan {vlanid vlan-list}] press Enter Where level {<level-id(0-7) identifies the maintenance domain's level. Range is from 0 to 7. level-list identifies a list of domain levels. vlan {<vlan-id(1-4094)> specifics a Vlan ID. vlan-list identifies a list of Vlan IDs. The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i>
set ecfm mip dynamic evaluation	Enables or Disables the implicit evaluation and creation of a MIP. Note: This command is NOT supported in this HC ODU release.
set ecfm mip level	Configures a Maintenance intermediate point (MIP) at the specified level and vlan on an interface. active - makes MIP operationally active, by default MIP is configured as operationally active. Sequence: set ecfm mip level [delete] <level-id(0-7)> vlan <vlan-id(1-4094)> [active] press Enter Where level {<level-id(0-7) identifies the maintenance domain's level. Range is from 0 to 7. vlan {<vlan-id(1-4094)> specifics a Vlan ID. active specifies the MEP's operational status. By default, MIP is not active. The system responds: <i>< no response ></i> <i>The system returns to the prompt ->.</i>

ECFM CLI Command	Description
set ecfm associate vlan-id	Associate a list of Vlan-Ids to a Primary Vlan. Sequence: set ecfm associate vlan-id {vlan-id vlan-list} primary-vlan-id <vlan-id(1-4094)> press Enter Where associate vlan {<vlan-id(1-4094)> vlan-list} specifies a Vlan ID or a list of Vlan IDs to which Primary Vlan ID must be associated. primary-vlan-id identifies Primary Vlan ID. Example: set ecfm associate 1001,1002,1003,1004 primary-vlan-id 1071 The system responds: <i>< no response ></i> The system returns to the prompt ->.
save ecfmmib	Perform this command to save ecfm settings to FLASH. This command does not restart the system and does not put any new settings into effect. Sequence: save ecfmmib press Enter The system responds: Warning: This command could take up to 4 minutes to finish. Mib saved successfully. Note: To save ecfm settings, ecfm must be 'on' status. If ecfm is in 'off' status, no ecfm setting will be saved into the Flash.

ECFM CLI Command	Description
get ecfm configuration-errors	Displays the ecfm configuration-related errors (CFM leak, Conflicting VlanIds, Excessive Levels, etc). The default will show all port's error message if error configuration exists. Sequence: get ecfm configuration-errors vlan <vlan-id(1-4094)>] [interface <interface-id>] press Enter Where vlan {<vlan-id(1-4094)>} specifics a Vlan ID interface <interface-id> specifics a port number The system responds error message if error configuration exists. The ecfm configuration error type: • CFM Leak • Conflicting Vids • Excessive Levels • Overlapped Levels Example: ->get ecfm configuration-errors Configuration Errors ----- interface gigabitethernet: 0/1 VLAN : 1005 Excessive Levels ----- interface gigabitethernet: 0/1 VLAN : 1006 Excessive Levels ----- interface gigabitethernet: 0/1 VLAN : 1071 Excessive Levels

ECFM CLI Command	Description																																								
get ecfm default-domain	Displays the global Default-domain parameters along with the modified parameters corresponding to a VLAN. Sequence: get ecfm default-domain press Enter The system responds: Default-domain parameters ----- Level : 0 MIP Creation Criteria : none SenderId Permission : none ----- <table><tr><th>Vlan</th><th>Level</th><th>Status</th><th>MIP-Creation criteria</th><th>SenderId Permission</th></tr><tr><td>1006</td><td>6</td><td>No MA</td><td>default</td><td>chassis-mgt</td></tr></table> -----	Vlan	Level	Status	MIP-Creation criteria	SenderId Permission	1006	6	No MA	default	chassis-mgt																														
Vlan	Level	Status	MIP-Creation criteria	SenderId Permission																																					
1006	6	No MA	default	chassis-mgt																																					
get ecfm domain	Display information about the ecfm maintenance domain. Sequence: get ecfm domain [brief domain-number(1-32)] press Enter To show the domain's information: get ecfm domain press Enter The system responds; <table><tr><th>No</th><th>Domain Name</th><th>Index</th><th>Level</th><th>Services</th><th>Archive(min)</th></tr><tr><td>1</td><td>MD_level_7</td><td>1</td><td>7</td><td>2</td><td>200</td></tr><tr><td>2</td><td>MD_level_6</td><td>2</td><td>6</td><td>1</td><td>100</td></tr><tr><td>3</td><td>MD_level_4</td><td>3</td><td>4</td><td>1</td><td>100</td></tr></table> To show the 2nd domain's information: get ecfm domain 2 press Enter The system responds: Domain Name : MD_level_6 Index : 2 Level : 6 MHF Creation Criteria : none Sender Id Permission : none Total Services : 1 Vlan Crosscheck ServiceID 1006 Enabled MA_level_6 Crosscheck: <table><tr><th>MPID</th><th>Vlan</th><th>Type</th><th>Mep-Up</th></tr><tr><td>60</td><td>1006</td><td>Local</td><td>Yes</td></tr><tr><td>61</td><td>1006</td><td>Remote</td><td>No</td></tr><tr><td>62</td><td>1006</td><td>Remote</td><td>No</td></tr></table>	No	Domain Name	Index	Level	Services	Archive(min)	1	MD_level_7	1	7	2	200	2	MD_level_6	2	6	1	100	3	MD_level_4	3	4	1	100	MPID	Vlan	Type	Mep-Up	60	1006	Local	Yes	61	1006	Remote	No	62	1006	Remote	No
No	Domain Name	Index	Level	Services	Archive(min)																																				
1	MD_level_7	1	7	2	200																																				
2	MD_level_6	2	6	1	100																																				
3	MD_level_4	3	4	1	100																																				
MPID	Vlan	Type	Mep-Up																																						
60	1006	Local	Yes																																						
61	1006	Remote	No																																						
62	1006	Remote	No																																						

ECFM CLI Command	Description
get ecfm errors	Display continuity check error conditions logged on a device since it was last cleared. Sequence: get ecfm errors press Enter The system responds: <pre>MEP-ID : 70 Level VLAN RMEP-ID Current defect type ----- - 7 1071 71 CCM Life time expired 7 1071 72 CCM Life time expired 7 1071 73 CCM Life time expired 7 1071 74 CCM Life time expired</pre>
get ecfm error-log	This is an Y.1731 command. Displays the Error Log containing the information about the errors encountered on the MEP. Sequence: get ecfm error-log [domain <domain-name(1..20)> levelid<level-id(0-7)>] [unaware vlan <vlan-id(1-4094)>] press Enter Where domain identifies a domain levelid identifies the level of Maintenance Domain unware identifies the service with no Vlan vlan identifies a Vlan ID The system responds error logs if error exists. Example: ->get ecfm error-log <pre>MEP-ID : 51 Time Of Occurrence RMEP-ID Error Type Error Status ----- 21 Oct 2008 15:49:15 50 loss of continuity Entry 21 Oct 2008 15:51:54 50 loss of continuity Exit</pre>

ECFM CLI Command	Description
get ecfm global information	Displays ethernet CFM global information. Sequence: get ecfm global information press Enter The system responds: Configured OUI : 00:07:58 ecfm Status : Started, Enabled MIP CCM Database ----- Status : Enabled Size : 10000 entries Hold-time : 24 hours Traceroute Cache ----- Status : Enabled Size : 4095 entries Hold-time : 65535 minutes MIP Creation Dynamic Evaluation : Disabled Cross-Check Delay : 10 Enabled Traps ----- None

ECFM CLI Command	Description																																			
get ecfm loopback cache	Displays the Loopback transactions related information. Sequence: get ecfm loopback cache [brief] [level <level-id(0-7)>][unaware vlan <vlan-id(1-4094)>] press Enter Where level identifies the level of Maintenance Domain unware identifies the service with no Vlan vlan identifies a Vlan ID The system responds: (Example) ->get ecfm loopback cache Interface : gigabitethernet 0/1 MEP-ID : 40 Level : 4 VLAN-ID : 0 ping statistics with 00:10:94:00:00:11 <table><tr><th>source mac</th><th>bytesreceived</th><th>seq no</th><th>time to receive</th><th>error type</th></tr><tr><td>-----</td><td>-----</td><td>-----</td><td>-----</td><td>-----</td></tr><tr><td>00:10:94:00:00:11</td><td>30</td><td>0</td><td>50ms</td><td>none</td></tr><tr><td>00:10:94:00:00:11</td><td>30</td><td>1</td><td>50ms</td><td>none</td></tr><tr><td>00:10:94:00:00:11</td><td>30</td><td>2</td><td>50ms</td><td>none</td></tr><tr><td>00:10:94:00:00:11</td><td>30</td><td>3</td><td>50ms</td><td>none</td></tr><tr><td>00:10:94:00:00:11</td><td>30</td><td>4</td><td>50ms</td><td>none</td></tr></table> packets sent = 5, packets received = 5, packets lost = 0 (0.000% loss), unexpected received = 0, checksum errors = 0, bad messages received = 0, duplicates received = 0 rtt min/avg/max = 50/50/50 ms	source mac	bytesreceived	seq no	time to receive	error type	-----	-----	-----	-----	-----	00:10:94:00:00:11	30	0	50ms	none	00:10:94:00:00:11	30	1	50ms	none	00:10:94:00:00:11	30	2	50ms	none	00:10:94:00:00:11	30	3	50ms	none	00:10:94:00:00:11	30	4	50ms	none
source mac	bytesreceived	seq no	time to receive	error type																																
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00:10:94:00:00:11	30	0	50ms	none																																
00:10:94:00:00:11	30	1	50ms	none																																
00:10:94:00:00:11	30	2	50ms	none																																
00:10:94:00:00:11	30	3	50ms	none																																
00:10:94:00:00:11	30	4	50ms	none																																

ECFM CLI Command	Description
get ecfm maintenance-point local	Displays the brief information about maintenance points configured on a device. Sequence: get ecfm maintenance-point local [mep mip] [interface <interface-number>] domain <domain_name> level<id(0-7)>] press Enter Where mep mip identifies the maintenance point's type interface identifies the port number domain identifies a domain level identifies the level of Maintenance Domain The system responds: (Example) ->get ecfm maintenance-point local ----- -- MPID DomainName Level VLAN Type Port MAC CC- Status ServiceName Dir MP- Status ----- -- 40 MD_4 4 0 MEP 1 00:07:58:80:a3:37 Enabled MA_4 Down Active 60 MD_6 6 1006 MEP 1 00:07:58:80:a3:37 Enabled MA_6 Up Active 70 MD_7 7 1071 MEP 1 00:07:58:80:a3:37 Enabled MA_7_1 Down Active 700 MD_7 7 1101 MEP 1 00:07:58:80:a3:37 Enabled MA_7_2 Down Active

ECFM CLI Command	Description
get ecfm maintenance-points local detail	Displays the detailed information about the maintenance end points(MEP) locally configured on the device. The information includes thevarious MEPs capabilities, states, threshold values, etc. Sequence: <pre>get ecfm maintenance-points local detail {mpid<mepid(1-8092)> mac <aa:aa:aa:aa:aa:aa> [domain <domain_name> level<level-id(0-7)>] [unaware vlan <integer(1-4094)>] press Enter</pre> Where mpid identifies the MEP identifier mac identifies the MEP's mac address domain identifies a domain level identifies the level of Maintenance Domain unware identifies the service with no Vlan vlan identifies a Vlan ID Example: <pre>->get ecfm maintenance-points local detail mpid 70</pre> The system responds: (Example) <pre>MPID: 70 MdLevel: 7 VLAN: 1071 Dir: Down ----- Out-Of-Service : Disabled RDI Capability : Enabled Loopback Capability : Enabled Multicast LBM Reception Capability : Enabled Multicast TST Reception Capability : Disabled One-Way DM Reception Capability : Disabled DMR Optional Fields : Disabled Delay Threshold : - AIS Capability : Disabled AIS Condition : Disabled LCK Condition : Disabled LCK Client Mac Address : 00:00:00:00:00:00 AIS Client Mac Address : 00:00:00:00:00:00 Near-End Loss Threshold : - Far-End Loss Threshold : -</pre>

ECFM CLI Command	Description
get ecfm maintenance-points remote	Display brief information about remote MEPs. Sequence: get ecfm maintenance-points remote [domain <domain-name(1..20)> levelid <level-id(0-7)>] press Enter Where domain identifies a domain level identifies the level of Maintenance Domain The system responds: (Example) ->get ecfm maintenance-points remote levelid 7 RMPID MPID Vlan Domain Level Mep-Up 71 70 1071 MD_level_7 7 Yes 72 70 1071 MD_level_7 7 Yes 73 70 1071 MD_level_7 7 Yes 74 70 1071 MD_level_7 7 Yes
get ecfm maintenance-points remote crosscheck	Display details about the maintenance points configured statically in a List of MEPIDs (cross check list) of Service. Sequence: get ecfm maintenance-points remote crosscheck [mpid <id>] [domain <domain-name(1..20)> level <level-id(0-7)>] [unaware vlan<integer(1-8191)>][[domain <string(20)> level <integer(0-7)>]][[unaware vlan<integer(1-4094)>]] press Enter Where mpid identifies the MEP identifier domain identifies a domain level identifies the level of Maintenance Domain unware identifies the service with no Vlan vlan identifies a Vlan ID The system responds: (Example) ->get ecfm maintenance-points remote crosscheck mpid 71 RMPID MPID Level VLAN Mep-Up Remote Mac 71 70 7 1071 No 00:10:94:00:00:02
get ecfm maintenance-points remote detail	Display details about remote MEPs. Sequence: get ecfm maintenance-points remote detail {mpid id mac <aa:aa:aa:aa:aa:aa> } [domain <domain-name(1..20)> level <level-id(0-7)>] [unaware vlan<vlan-id(1-4094)>]] press Enter Where mpid identifies the MEP identifier mac identifies the MEP's mac address domain identifies a domain level identifies the level of Maintenance Domain unware identifies the service with no Vlan vlan identifies a Vlan ID

ECFM CLI Command	Description
get ecfm mip-ccm-database	Displays the ecfm MIP CCM Database. Sequence: get ecfm mip-ccm-database [vlanid <vlan-id(1-4094)>] [macaddress <aa:aa:aa:aa:aa:aa>] [port <port-id>] press Enter Where vlan identifies a Vlan ID mac identifies the MEP's mac address port identifies a port number The system responds: (Example) ->get ecfm mip-ccm-database ----- Vlan Mac Address Port ----- 1006 00:10:94:00:00:09 1 1006 00:10:94:00:00:0a 1

ECFM CLI Command	Description																																																																										
get ecfm service	Display information about Ethernet CFM Service (Maintenance Association). Sequence: get ecfm service [brief service-number(1-32)] press Enter Examples: To show service brief information: get ecfm service press Enter The system responds: <table><tr><th>No</th><th>ServiceName</th><th>Index</th><th>Primary-Vlan</th><th>Level</th><th>MEPs</th><th>CCM</th></tr><tr><td colspan="7">Interval</td></tr><tr><td>1</td><td>MA_7_1</td><td>1</td><td>1071</td><td>7</td><td>5</td><td>10 seconds</td></tr><tr><td>2</td><td>MA_7_2</td><td>2</td><td>1072</td><td>7</td><td>4</td><td>10 seconds</td></tr><tr><td>3</td><td>MA_y1731_6</td><td>1</td><td>1006</td><td>6</td><td>3</td><td>10 seconds</td></tr><tr><td>4</td><td>MA_y1731_5</td><td>1</td><td>1005</td><td>5</td><td>2</td><td>10 seconds</td></tr><tr><td>5</td><td>MA_y1731_4</td><td>1</td><td>0</td><td>4</td><td>5</td><td>10 seconds</td></tr></table> To show the 2nd service's information: get ecfm service 2 press Enter The system responds: Service Name : MA_7_2 Domain Name : MEG_y1731_7 Index : 2 Primary Vid : 1072 Level : 7 MHF Creation Criteria : defer Sender Id Permission : defer CC Role : fault management ICC Code : icc007 UMC Code : umc002 Total MEPs : 4 Primary Vlan Associations : 1101, 1102, 1103, 1104, 1105 Crosscheck status : Enabled Crosscheck: <table><tr><th>MPID</th><th>Vlan</th><th>Type</th><th>Mep-Up</th><th>Mac Address</th></tr><tr><td>700</td><td>1101</td><td>Local</td><td>Yes</td><td>00:07:58:00:a3:37</td></tr><tr><td>701</td><td>1101</td><td>Remote</td><td>No</td><td>Not learned</td></tr><tr><td>702</td><td>1101</td><td>Remote</td><td>No</td><td>Not learned</td></tr><tr><td>703</td><td>1101</td><td>Remote</td><td>No</td><td>Not learned</td></tr></table>	No	ServiceName	Index	Primary-Vlan	Level	MEPs	CCM	Interval							1	MA_7_1	1	1071	7	5	10 seconds	2	MA_7_2	2	1072	7	4	10 seconds	3	MA_y1731_6	1	1006	6	3	10 seconds	4	MA_y1731_5	1	1005	5	2	10 seconds	5	MA_y1731_4	1	0	4	5	10 seconds	MPID	Vlan	Type	Mep-Up	Mac Address	700	1101	Local	Yes	00:07:58:00:a3:37	701	1101	Remote	No	Not learned	702	1101	Remote	No	Not learned	703	1101	Remote	No	Not learned
No	ServiceName	Index	Primary-Vlan	Level	MEPs	CCM																																																																					
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1	MA_7_1	1	1071	7	5	10 seconds																																																																					
2	MA_7_2	2	1072	7	4	10 seconds																																																																					
3	MA_y1731_6	1	1006	6	3	10 seconds																																																																					
4	MA_y1731_5	1	1005	5	2	10 seconds																																																																					
5	MA_y1731_4	1	0	4	5	10 seconds																																																																					
MPID	Vlan	Type	Mep-Up	Mac Address																																																																							
700	1101	Local	Yes	00:07:58:00:a3:37																																																																							
701	1101	Remote	No	Not learned																																																																							
702	1101	Remote	No	Not learned																																																																							
703	1101	Remote	No	Not learned																																																																							

ECFM CLI Command	Description
get ecfm statistics	Displays ecfm statistics. Sequence: get ecfm statistics press Enter The system responds: (Example) <pre> ->get ecfm statistics ----- Global Counters ----- Memory Allocation Failed : 0 Buffer Allocation Failed : 0 Module was Enabled : 2 Module was Disabled : 1 No defect occurred in MEP : 1 RDI defect occurred in MEP : 74 MACStatus defect occurred in MEP : 0 Remote CCM defect occurred in MEP : 217 Error CCM defect occurred in MEP : 0 Xconn defect occurred in MEP : 0 ----- interface gigabitethernet 0/1 Counters ----- Transmitted CFM PDU :3160 Received CFM PDU :10076 Transmitted CCM PDU :3160 Received CCM PDU :7676 Transmitted LBM PDU :0 Received LBM PDU :0 Transmitted LBR PDU :0 Received LBR PDU :0 Transmitted LTM PDU :0 Received LTM PDU :0 Transmitted LTR PDU :0 Received LTR PDU :0 Transmitted EXM PDU :0 Received EXM PDU :0 Transmitted EXR PDU :0 Received EXR PDU :0 Bad CFM PDU Received : 0 CFM PDU Forwarded : 3188 CFM PDU Discarded : 0 CFM PDU Transmission Failures : 0 ----- MPID: 70 MdLevel: 7 VLAN: 1071 Dir: Down CCM PDU Transmitted : 792 LBR PDU Transmitted : 0 LBR PDU Received : 0 TST PDU Transmitted : 0 TST PDU Received : 0 Out-of-sequence CCM PDU Received : 11 Unexpected LTR PDU Received : 0 Out-of-order LBR PDU Received : 0 Bad LBR MSDU Received : 0 Bit-errored LBR PDU Received : 0 Bit-errored TST PDU Received : 0 </pre>

ECFM CLI Command	Description
get ecfm traceroute-cache	Display details about traceroute cache. (Traceroute cache displays LTR replies corresponding to each LTM transaction). Sequence: get ecfm traceroute-cache press Enter The system responds: (Example) ->get ecfm traceroute-cache LTR cache configured maximum size : 200 entries Traceroute to Macaddress 00:10:94:00:00:11 in domain MD_level_4 at level 4 with vlanId 0 <pre> ----- Hops Host Ingress MAC Ingress Action Relay Action Next Host Egress MAC Egress Action Fwd Status ----- 1 00:01:00:07:58:80:a3:37 - - RlyFDB 00:00:00:10:94:00:00:16 00:10:94:00:00:16 EgrOK Forwarded 2 00:00:00:10:94:00:00:16 - - RlyHit 00:00:00:10:94:00:00:11 00:10:94:00:00:11 EgrOK Terminal MEP </pre>

ECFM CLI Command	Description
get ecfm running config	Displays the "set ecfm" commands necessary to restore the current state of the database. This is for information purposes only, as the system will automatically save this information on a "save mib". Sequence: get ecfm running config press Enter The system responds: (Example) <pre>->get ecfm running config set ecfm on set ecfm port 1 on set ecfm start set ecfm traceroute cache on set ecfm mep archive-hold-time 200 set ecfm domain MD_level_7 level 7 set ecfm service MA_7_1 vlan 1071 set ecfm mep crosscheck mpid 70 vlan 1071 set ecfm mep crosscheck mpid 71 vlan 1071 set ecfm mep crosscheck mpid 72 vlan 1071 set ecfm mep crosscheck mpid 73 vlan 1071 set ecfm mep crosscheck mpid 74 vlan 1071 set ecfm mep level 7 mpid 70 vlan 1071 active set ecfm cc level 7 vlan 1071 interval ten-sec set ecfm cc enable level 7 vlan 1071</pre>
get ecfm port	Displays the ethernet CFM port-specific parameters. Sequence: get ecfm port [port-number] press Enter Example: get ecfm port press Enter The system responds: <pre>ecfm Status : Enabled LLC Encapsulation : Disabled MEPs Configured : 5 MIPs Configured : 0</pre>

ECFM CLI Command	Description
ecfm ping ethernet mac	Send unicast or multicast Loopback messages by providing the MAC Address of the MEP or MIP. Sequence: <pre>ecfm ping ethernet [mac {<aa:bb:bb:bb:bb:bb> multicast } {domain <domain-name(1..20)> level <level-id(0-7)>} [vlan <vlan-id(1-4094)>] [interface <interface-number>] [direction {inward outward}] [data-pattern <string> test-pattern null-signal-without-crc null-signal-with-crc prbs-without-crc prbs-with-crc] [size <pdu-size(64-1400)> variable-bytes] [interval <milliseconds(1-600000)>] [count <num_of_msgs(1-8192)>] [deadline <seconds(1-172800)>] [switch <string(32)>]</pre> Where mac identifies the destination Mac address mpid is the mepid of remote MEP. multicast identifies the multicast-type loopback message domain_name identifies the domain. level identifies domain's level vlan identifies the service's vlan id interface is the port number. In Horizon ODU, the default port is 1. direction {inward outward} specifies the MEP's direction. The default is outward. data-pattern <string> is the pattern string to transmit test-pattern is the pattern for loopback message. There are four types of test patterns: • null-signal-without-crc • null-signal-with-crc • prbs-without-crc • prbs-with-crc size <pdu-size(64-1400)> variable-bytes is to generate the loopback message with the fixed length or the variable size. interval <milliseconds(1-600000)> identifies the interval to send the loopback message. count <num_of_msgs(1-8192)> specifies the total number. deadline <seconds(1-172800)> identifies the expired time of the loopback message. Note: Mac Address of the MEP with specified target "mpid" must be learned prior to the execution of the command.

ECFM CLI Command	Description
ecfm ping ethernet mpid	Send unicast or multicast Loopback messages by providing MEPID of the destination MEP of the MEP or MIP. Sequence: ecfm ping ethernet mpid <id> {domain <domain-name(1..20)> level <level-id(0-7)>} [vlan <vlan-id(1-4094)>] [interface <interface-number>] [direction {inward outward}] [data-pattern <string>] [test-pattern null-signal-without-crc null-signal-with-crc prbs-without-crc prbs-with-crc] [size <pdu-size(64-1400)> variable-bytes] [interval <milliseconds(1-600000)>] [count <num_of_msgs(1-8192)>] [deadline <seconds(1-172800)>] [switch <string(32)>] Where mpid <id> identifies the MEP identifier of the remote MEP. Other parameters are same as those in the command - ecfm ping ethernet mac. Example: 1. 802.1ag example: ecfm ping ethernet mpid 41 level 4 count 5 System responds: Sending 5 Ethernet CFM loopback messages, timeout is 5 seconds Success rate is 100.0 percent 5/5 2. Y.1731 example: ecfm ping ethernet mpid 50 level 5 vlan 1005 count 5 System responds: PING 50 from 00:07:58:80:a3:c7 with 34(64) bytes of data. 80 bytes from 00:07:58:80:a3:37: seq_no=0 time=200 ms 80 bytes from 00:07:58:80:a3:37: seq_no=1 time=200 ms 80 bytes from 00:07:58:80:a3:37: seq_no=2 time=280 ms 80 bytes from 00:07:58:80:a3:37: seq_no=3 time=180 ms 80 bytes from 00:07:58:80:a3:37: seq_no=4 time=200 ms --- 50 ping statistics --- packets sent = 5, packets received = 5, packets lost = 0 (0.000% loss), unexpected received = 0, duplicates received = 0, bad received = 0, checksum errors = 0, rtt min/avg/max = 180/210/280 ms

ECFM CLI Command	Description
ecfm traceroute ethernet mac	Initiate Linktrace message by providing the MAC Address of the MEP or MIP. Sequence: ecfm traceroute ethernet mac <aa:aa:aa:aa:aa:aa> {domain <domain-name(1..20)> level <level-id(0-7)>} [vlan <vlan-id(1-4094)>] [time-to-live <tli-value(1-255)> press Enter Where mac <aa:aa:aa:aa:aa:aa> identifies the destination Mac address. domain <domain-name(1..20)> identifies the domain name. level <domain-name(1..20)> identifies the domain's level. vlan <vlan-id(1-4094)> identifies the service's vlan id. time-to-live <tli-value(1-255)> identifies TTL value. Note: Mac Address of the MEP with specified target "mpid" must be learned prior to the execution of the command.
ecfm traceroute ethernet mpid	Initiate Linktrace message by providing MEPID of the destination MEP of the MEP or MIP. Sequence: ecfm traceroute ethernet mpid <id> {domain <domain-name(1..20)> level <level-id(0-7)>} [vlan <vlan-id(1-4094)>] [time-to-live <tli-value(1-255)> Where mpid <id> identifies the MEP identifier of the remote MEP. Other parameters are same as those in the command - ecfm ping ethernet mac. The system responds: (Example) <pre>->ecfm traceroute ethernet mpid 41 level 4 Traceroute to Macaddress 00:10:94:00:00:11 in domain MD_level_4 at level 4 with vlanId 0 ----- - Hops Host Ingress MAC Ingress Action Relay Action Next Host Egress MAC Egress Action Fwd Status ----- - 1 00:01:00:07:58:80:a3:37 - - RlyFDB 00:00:00:10:94:00:00:16 00:10:94:00:00:16 EgrOK Forwarded 2 00:00:00:10:94:00:00:16 - - RlyHit 00:00:00:10:94:00:00:11 00:10:94:00:00:11 EgrOK Terminal MEP</pre>

ECFM CLI Command	Description
ecfm frame delay	Start or Stop the ecfm delay measurement calculations. Sequence: ecfm frame delay [start stop] type {one-way two-way } level <level-id(0-7)> [vlan <vlan-id(0-7)>] [port <port-num>] [direction {inward outward}]{mepid <mpid(1-8191)> mac <aa:aa:aa:aa:aa:aa> } [count<num_of_observations(1-8192)>] [interval <milliseconds(10-10000)>] [deadline <seconds(1-172800)>] [switchname <context_name>]] press Enter Where start stop is to start ot stop frame delay message type { two-way } identifies the two-way performance measurement level <level-id(0-7)> identifies the domain's level vlan <vlan-id(0-7)> identifies the service's vlan id port <port-num> identifies the port number direction {inward outward} specifies the direction of the local MEP. The default is "outward". mepid <mpid(1-8191)> identifies the identifier of the local MEP mac <aa:aa:aa:aa:aa:aa> identifies the target's Mac address count <num_of_observations(1-8192)> specifies the total number of frame delay messages. interval <milliseconds(10-10000)> specifies the interval of frame delay message deadline <seconds(1-172800)> identifies the expired time of the frame delay message. Note: Mac Address of the MEP with specified target "mpid" must be learned prior to the execution of the command. Run the command 'get ecfm frame delay buffer' to see the result of frame delay measurement, Example: ->ecfm frame delay start type two-way level 7 vlan 1007 mepid 71 count 5 interval 2000 ->get ecfm frame delay buffer Interface : gigabitethernet 0/1 MEP-ID : 222 Level : 2 VLAN-ID : 1002 peer mac-address frame-delay IFDV FDV 00:07:58:00:a3:c7 240.0ms 0.000ms 0.00ms 00:07:58:00:a3:c7 160.0ms 0.000ms 0.00ms --- 00:07:58:00:a3:37 frame delay statistics --- measurement timestamp = 10 Jul 2078 10:50:1, packets sent = 2, packets received = 2, frame delay average = 200.0ms, IFDV average = 0.000ms, FDV average = 0.000ms

ECFM CLI Command	Description
delete ecfmmib	Delete ecfm setting. Sequence: delete ecfmmib [newest both] press Enter Where newest means the newest ecfm setting; and both means both the previous ecfm setting and newest ecfm setting. System response: delete ecfmmib both Enter Y(Yes) or N(No) : press Y Absolutely sure? Enter Y(Yes) or N(No) : press Y again
clear ecfm errors	Clear continuity check error conditions logged on a device.. Sequence: clear ecfm errors [domain <domain-name(1..20)> levelid <level-id(0-7)>] press Enter
clear ecfm frame delay buffer	Clear the contents of the Frame Delay rolling buffer. This is an Y.1731 command. Sequence: clear ecfm frame delay buffer press Enter
clear ecfm loopback cache	Clear the contents of the Loopback Reply Cache. Sequence: clear ecfm loopback cache press Enter
clear ecfm maintenance-points remote	Clear the contents of continuity check database. Sequence: clear ecfm maintenance-points remote press Enter
clear ecfm mip-ccm-database	Clear the contents of MIP CCM Database. Sequence: clear ecfm mip-ccm-database press Enter
clear ecfm traceroute-cache	Clear the contents of ECFM traceroute cache. Sequence: clear ecfm traceroute-cache press Enter

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