Chapter 34: CFM

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34.1 CFM Overview

CFM (Connectivity Fault Management, the connectivity fault management protocol), definedby the IEEE 802.1ag standard is a Layer 2 link on the VLAN-based end to end OAM mechanism used to Carrier Ethernet fault management.

34.1.1 CFM Concepts

Concept	Remark
MD	Maintenancefieldindicates that even the fault detectionis covered through a network of its boundary is configured onaportrangedefined by the MEPs. Maintenance ofthe domain of "Maintain the domain name"to identify, according to network planning can be divided into eight levels. Between different domains can bemaintained adjacent toor nested, but can't cross,and the nesteddomain can only bemaintainedby the high-level domain to the lowlevel maintenancenested, that is, low-levelmaintenance ofthe domain mustbeincluded in the domainof high-level maintenance department.
Maintenance set	Within the maintenancedomain can be configured as neededto maintain multiple sets, eachset ismaintained withinsomemaintenance to maintainthe set point. Maintenanceset to "maintainthedomain name +maintenanceset name"to identify.

	Maintainset service on aVLAN, to maintainfocus on themaintenancepoint of sending packets of thebandarethe VLAN tag, at thesametime Maintainfocus onthe maintenancepoint can receive byMaintainfocus on its maintenancepointsentthe message.
Maintenance point	Maintenance points configured on a port, part of a maintenance set, can be divided into MEPs and MIPs two. (1)MEP IDin orderto maintainendpoint identity, whichdefinesthe scope andmaintenance ofthe domain boundary.MEP has a directional, sub-UPMEP and DOWN MEP for the two.MEP direction that themaintenance ofdomain relative to the location oftheport. DOWN MEP isthe port whereto send its message, UP MEPport whereit is not sent to themessage, butit isthe port to the device send its message. (2)Maintenance in themaintenance ofthe domainbetweenpointswithin thedepartment, not the mainaction issued CFMprotocol packets, but can handle andrespond to CFM protocol packets.

34.1.2 CFM Main Function

Connectivity fault detection based on a reasonable and effective application deployment and configuration over the network, its function is maintained in the configuration between points, as long as the following functions:

Function	Remark
Continuity detection	It is a proactive OAM functionality is used to detect the state to maintain connectivity between endpoints. Connectivity failure may be caused by equipment failure or

	configuration error.
Loopback	It is akind ofon-demandOAM functions for thelocaldevice and remote authenticationbetween enddevices connected state.
Link tracking	It is akind ofon-demandOAM functions for thelocal device todeterminethe path between the remote devices, in order to achieve the positioning of link failure.

34.2 Configure CFM

CFM function in the configuration before the network should carry the following plan:

- For the maintenance of the entire network to carry out sub-domain level, determine the level of maintenance of the domain boundary.
- Determine the maintenance of the domain name, the same domain on a different device to maintain the same name.
- Required monitoring of VLAN, determine the set of maintenance within the maintenance domain.
- Determine the maintenance set name, the same maintenance domain within the same set on different devices to maintain the same name.
- That the same maintenance domain within the same set of maintenance to maintain a list of endpoints in the different devices should remain the same.
- In the maintenance field and set the boundaries of the maintenance port on the endpoint should be planned maintenance, non-border or port equipment maintenance can be planned on a mid-point.
- After the completion of network planning, come line the following configuration.

34.2.1 CFM Configuration List

Configuration Task	Description	Detailed Configuration
Maintain Field Configuration	Required	34.2.2
Configuration and maintenance level domain name	Required	34.2.3
Configure to maintain set	Required	34.2.4
Configure name and the associated VLAN to maintain set	Required	34.2.5
Configure MEPs	Required	34.2.6
Configure Remote Maintenance endpoint	Required	34.2.7
Configure MIPs	Optional	34.2.8
Configure continuity detection	Required	34.2.9
Configure loopback	Optional	34.2.10
Configure link tracking	Optional	34.2.11
Display and maintenance of the CFM	Optional	34.2.12

34.2.2 Maintain Field Configuration

Operation	Command	Remarks
Enter global configuration mode	**system-view**	
Create a maintenance domain, and domain configuration into maintenance mode	**cfm md** *md-index*	

34.2.3 Configuration and Maintenance Level Domain Name

In order to distinguish between the various maintenance domain, you can specify a different domain for each maintenance of domain names, the name by the name of the format and content of two parts, the whole network a unique domain name is best; to display nested relationship between the maintenance domain, must also designated to maintain the domain level, only the level of maintenance of large domain nested level can only be a smallmaintenance domain.

Operation	Command	Remarks
Enter global configuration mode	**system-view**	
Domain configuration into maintenance mode	**cfm md** *md-index*	
Configuration without the maintenance of domain names, only the specified field level maintenance	**cfm md format none level** *md-level*	
Equipped with the maintenance of the domain name, and specify the domain name and level of maintenance	**cfm md format** { **dns-name** | **mac-uint** | **string** } **name** *md-name* **level** *md-level*	

34.2.4 Configure Maintain Set

Operation	Command	Remarks
Enter global configuration mode	**system-view**	
To maintainthe domainconfiguration	**cfm md** *md-index*	
mode to enter		
Created to maintain set, and enter the configuration mode set to maintain	**cfm ma ma-index**	

34.2.5 Configure Name and Associated VLAN to Maintain Set

In order to maintain the distinction between the various domains to maintain set, you can specify a different set for each to maintain the instance name, instance name, the name by thename of the format and content of two parts, the maintenance of set where the maintenance ofthe domain name plus the instance name must ensure that all network only.

Operation	Command	Remarks
Enter global configuration mode	**system-view**	
To maintainthe domainconfiguration mode to enter	**cfm md** *md-index*	
Enter the configuration mode set to maintain	**cfm ma ma-index**	
The name of the configuration set and maintain the VLAN associated with the main	**cfm ma format** { **primary-vid** | **string** | **uint16** | **vpn-id** } **name** *ma-name* **primary-vlan** *vlan-id*	

34.2.6 Configure MEPs

CFM is mainly reflected in the maintenance of a variety of endpoints operating on, the user can program the network port on the network configuration to maintain the boundary endpoints.

Operation	Command	Remarks
Enter global configuration mode	**system-view**	
To maintainthe domainconfiguration mode to enter	**cfm md** *md-index*	
Enter the configuration mode set to maintain	**cfm ma ma-index**	
Create a maintenance endpoint, and specify its associated port	**cfm mep** *mep-id* **direction** { **up** | **down** } [**primary-vlan** *vlan-id*] **interface ethernet** *port-id*	
Enable the state to maintain endpoint management	**cfm mep** *mep-id* **state** { **enable** | **disable** }	Required Default is off
CCMand configure the endpoint to send maintenance to use the priorityLTM	**cfm mep** *mep-id* **priority** *priority-id*	Optional Default priority is 0

34.2.7 Configure Remote Maintenance Endpoint

Remote maintenance end point is equivalent to the local maintenance of the end points, and inthe maintenance of concentration, in addition to the maintenance of the local endpoint, all other maintenance endpoints should be configured in the local endpoint for the remotemaintenance.

Operation	Command	Remarks
Enter global configuration mode	system-view	
To maintainthe domainconfiguration mode to enter	**cfm md** *md-index*	
Enter the configuration mode set to maintain	**cfm ma ma-index**	
Creating remote maintenance end point, and specify the end of its peer MEPs	**cfm rmep** *rmep-id* **mep** *mep-id*	

34.2.8 Configure MIPs

MIPs used to test the response of CFM message, the user can program the network device orin non-border ports configured to maintain the mid-point.

Operation	Command	Remarks
Enter global configuration mode	**system-view**	
To maintainthe domainconfiguration mode to enter	**cfm md** *md-index*	
Enter the configuration mode set to maintain	**cfm ma ma-index**	
Create a maintenance intermediate point, and specify its associated port	**cfm mip** *mip-id* **interface ethernet** *port-id*	

34.2.9 Configure Continuity Detection

Continuity detection through configuration, can be made to maintain interoperability betweenendpoint CCM packets to check the connectivity between these endpoints maintain state in order to achieve the link connectivity management.

Operation	Command	Remarks
Enter global configuration mode	**system-view**	
To maintainthe domainconfiguration mode to enter	**cfm md** *md-index*	
Enter the configuration mode set to maintain	**cfm ma ma-index**	
Configuration maintenance interval endpoint to send theCCM	**cfm cc interval** { **1** | **10** | **60** | **600** }	1s by default
Enable sending MEPccm	**cfm mep** *mep-id* **cc** { **enable** | **disable** }	Default is off

Caution:

Different devices at the same maintenance domain and maintain a centralized maintenanceendpoint, the sending time interval of CCM must be the same.

34.2.10 Configure Loopback

By Configure the loopback function, you can check the source to the target MEPs MEPs orMIPs link between the situations in order to achieve the link connectivity verification.

Operation	Command	Remarks
Enter global configuration mode	**system-view**	
To maintainthe domainconfiguration mode to enter	**cfm md** *md-index*	
Enter the configuration mode set to maintain	**cfm ma ma-index**	
Start loopback	**cfm loopback mep** *mep-id* { **dst-mac** *mac-address* | **dst-mep** *rmep-id* } [**priority** *pri-id* | **count** *pkt-num* | **length** *data-len* | *datapkt-data*]	

34.2.11 ConfigureLink Tracking

By Configure the link tracking, you can find the source to the target MEPs MEPs or maintenance intermediate point between the path in order to achieve the positioning of link failure.

Operation	Command	Remarks
Enter global configuration mode	**system-view**	
To maintainthe domainconfiguration mode to enter	**cfm md** *md-index*	
Enter the configuration mode set to maintain	**cfm ma ma-index**	
Start Tracking link	**cfm linktrace mep** *mep-id* { **dst-mac** *mac-address* | **dst-mep** *rmep-id }* [**timeout** *pkt-time* | **ttl** *pkt-ttl* | **flag** { *use-mpdb* | *unuse-mpdb* }]	

34.2.12 Display and Maintenance of CFM

After completing the above configuration, you can use the following command to display the CFM configuration.

Operation	Command	Remarks
The Maintenance domain information	display cfm md [md-index]	
The Maintenance Set Information	display cfm ma	
Display the end point of maintenance information	display cfm mp local	
Remote maintenance point information display	display cfm mp remote	
Display CCM statistics	display cfm cc	
Clear CCM statistics	clear cfm cc	
CCM database information display	display cfm cc database	
Clear CCM database information	clear cfm cc database	
CFM alarm information display	display cfm errors	