Ethernet OAM Link-Fault Management Overview

The growth of Ethernet as a large-scale networking technology has propelled the necessity for a new set of Operation, Administration, and Maintenance (OAM) protocols. Service provider networks are large and expansive, with the need for different communication operators to work in a combined way to deliver end-to-end services to enterprise users. With the constant growth in the demands of enterprise end users, the need to enhance the features and reliability of service provider Ethernet networks, especially in the areas of availability and mean time to repair (MTTR), is steadily increasing. Ethernet OAM is an enhancement that caters to tracking and resolving connectivity problems in circuits, thereby improving the competitiveness of the service provider.

As DSL access infrastructure in networks worldwide migrates from ATM to Ethernet-based connections, a requirement has evolved to enable Ethernet systems to offer the same set of capabilities as their ATM counterparts in the fields of scalability, provisioning, security, reliability, and manageability. A large difference exists between the ATM and Ethernet networks in the field of OAM. Currently, a comprehensive set of OAM mechanisms exist for ATM topologies to enable proactive monitoring of network health and troubleshooting of network errors. In the recent past, both the Metro Ethernet Forum (MEF) and the IEEE groups have developed OAM standards for Ethernet at both the MAC (802.3) and High Level Interface (802.1) layers.

Ethernet MAC-layer OAM defined in IEEE Standard 802.3ah describes link-based OAM mechanisms. These mechanisms improve the ability of a connected network element to monitor the health of the link and the peer system. This improved ability enables the connected network element to more quickly, proactively, and decisively react to deteriorating or failing conditions of the link. A primary advantage of 802.3ah OAM is to improve the member-link failover time of 802.3ad link aggregation groups (LAGs) that are supported on all E Series router models.

NOTE: Ethernet running on top of a layer 2 protocol, such as Ethernet over ATM, is not supported in OAM configurations.

The Ethernet OAM link fault management feature on routers running JUNOSe Software interoperates with JUNOS platforms that implement 802.3ah, such as M Series and MX Series routers (except M5 and M10 routers). Also, the OAM functionality integrates with physical-level redundancy hardware available on certain IOAs, and with 802.3ad link aggregation and link redundancy policies. The Ethernet OAM link fault management functionality enables internal signaling about OAM link fault mechanisms to other internal entities, such as the Ethernet application or the LAG bundle. The 802.3ah OAM capability enables any failure in the member links of a LAG bundle to be detected and notified. SNMP link up/down traps are generated for link up/down events that are triggered by OAM. OAM PDUs are assigned a higher priority than regular data packets.

Related Topics ■ OAM Feature Overview

- Ethernet OAM Link-Fault Management Platform Considerations
- Ethernet OAM Link-Fault Management References

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