

# 802.1ag/Y.1731 Service OAM

IEEE 802.3ah OAM is applied specifically to the physical link between an endpoint and a directly connected peer device, whereas IEEE 802.1ag Continuity Fault Management (CFM) takes this function to the next level and examines the logical flows, not only between directly connected links, but also across the path of any two points in an entire network. IEEE 802.1ag provides visibility into the VLAN traffic and uses special continuity check messages that are sent periodically from one endpoint to the other, checking availability of the connections. Link Trace is another on demand IEEE 802.3ag tool used by operators to trace the path towards a specific MAC address destination. This is in the form of a MAC layer traceroute, which allows the network operator to detect if a peer is available and what intermediate stations are between the endpoint and the detected peer on the network path. The endpoint and peer can then decide what is needed for fault isolation and diagnostics—including on demand loopbacks between specific devices. Once a method has been determined, it can then start a loopback between the two

end-points on the VLAN path. This provisioning allows users to generate specific per-VLAN continuity checking, loopback, and link trace frames. IEEE 802.1ag also defines the use of maintenance domains. These are simple network areas defined by the service provider in a hierarchical order that will be monitored. These areas or boundaries within the domain are further broken out into messages from one endpoint to the other, checking the availability of the connections.

The introduction of ITU Y.1731 Frame Delay (FD) and Frame Delay Variance (FDV)—requires peers to exchange timestamp information every time a peer handles a packet along the logical path. ITU Y.1731 defines both one-way and two-way frame delay. One-Way frame delay requires that there is a unified clock between the two endpoints and is measured in a single direction, such as upstream. The two-way frame delay is done with a round trip calculation and only requires a single clock at the source. Frame Delay (FD) is measured by an endpoint transmitting an SOAM frame periodically and having the destination peer report any variance upon receiving the frame.

## Features

- Far End Fault (FEF)
- Loopback
- Dying Gasp
- Critical Events
- Link Trace
- Discovery
- Per VLAN Continuity Checking
- AIS / RDI / TST
- FD - Frame Delay
- FDV - Frame Delay Variance
- Advanced Fault Isolation



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Frame Delay Variance (FDV) measures the changes or variance in the delays between different packets and determines an average calculation. FD and FDV helps in real-time to determine if the data path is adding excessive or unwanted time variances in each frame delivery. ITU Y.1731 also defines Far

End Fault (FEF), which uses an Alarm Indication Signal (AIS) for fault notifications. FEF is complementary to 802.1ag, and allows an end-point to asynchronously inform a peer of a fault condition across a network.

## Application

802.1ag is generally used to deliver SLA services to small businesses all the way up to large enterprise applications—for advanced fault isolation. This class also adds some logical flows and frame delay monitoring of Ethernet traffic to ensure SLA assurance.

