

ITU - Telecommunication Standardization Sector

LS13-26

QUESTIONS: 3/13

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TITLE: Information on OAM and protection switching for Ethernet-based networks

INFORMATION

TO: IEEE (802.3ah (EFM), 802.17 (RPR))

APPROVAL: Agreed to at ITU-T SG13 meeting

FOR: Information

DEADLINE: --

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ITU-T SG13, Q.3/13 would like to inform you that we initiated the study on OAM functions for optical Ethernet because there are no effective tools to detect and isolate defects occurs in Ethernet. Since the L2 VPN service (Transparent LAN Service) became quite popular in many countries, carriers will have serious problems if they cannot detect and isolate defects before the user complains.

We hope we can progress the work with close cooperation with you.

Attachment: Study items on OAM functions for Ethernet based networks

Attachment

Study items on OAM functions for Ethernet based networks

Description

Ethernet-based network became to be used widely by carriers/service providers to provide their services recently. Transparent LAN Service (TLS) is one of the typical services provided by Ethernet-based networks. Although this service became quite popular in many countries due to its capability to provide wide bandwidth at low cost, there are problems from operation and maintenance viewpoint since Ethernet-based network does not provide tools to detect defects, to recover services and isolate defects.

Problems

There are following problems due to lack of OAM functions of Ethernet-based networks

Defect detection

There is no tool to detect defects on services on end-to-end basis. Operators cannot take any action until the user complains. It leads to longer service interruption time and thus, service availability and user satisfaction becomes worse.

Degradation of throughput of layer 2 switches is observed in Ethernet-based networks which is difficult to detect. Operators cannot take any action until the user complains against this type of defect, either.

The Virtual LAN (VLAN) technology provides multipoint-to-multipoint mesh connectivity within VLANs. It is also difficult to detect defects in mesh network due to N^2 problem.

Service recovery

Link aggregation mechanism and spanning tree protocol could be used for service recovery. Link aggregation does not protect against route failures. Spanning tree protocol takes several minutes to recover the services. It is not possible to design bandwidth allocation with STP. Thus, current service recovery methods are not sufficient to maintain user satisfaction. In addition it is difficult for operators to grasp the effect of these service recovery methods.

Defect isolation

There are not hierarchical maintenance entities in Ethernet-based networks and thus defect isolation is difficult. To supplement this, operators need to analyze logs of layer 2 switches, which is neither powerful nor efficient. It takes time to isolate defects. Network stays to be fragile against additional defects until the defect is isolated.

It is difficult to isolate a defect in networks which provide multipoint-to-multipoint mesh connectivity. Analysis of logs of layer 2 switches are also needed to detect throughput degradation. As defect isolation takes long time, it leads to user dissatisfaction and loss of the trust of users.

Study items

Following study items are identified.

Clarification of requirements of network operators on OAM functions for Ethernet-based networks.

Methods to realize defect detection, service recovery and defect isolation need to be studied.

These methods needs to be applied to Ethernet-based networks that provide multipoint-to-multipoint mesh connectivity. Defects to be detected include throughput degradation of switches.

Clarification of relationships to OAM functions of other layer networks including MPLS.

Scalability issues of Ethernet-based networks including the consideration on VLAN and Ethernet over MPLS technologies.

Security issues.

Clarification of the trade-off between cost/complexity and realized OAM functions.
