

## **Question 10/15 – Interfaces, interworking, OAM, protection and equipment specifications for packet-based transport networks**

(Continuation of Question 10/15)

### **1 Motivation**

The continued explosive growth of the Internet, the standardisation of Ethernet rates beyond 400G, the standardisation of additional Ethernet rates below 100 Gbit/s, accommodation of other packet-based traffic, and the range of logical interfaces provided by FlexE that may or may not correspond to any existing Ethernet PHY rate, are key forces for packet transport network evolution. In order to ensure that packet-based transport networks maintain carrier-class performance, it is essential that network protection techniques continue to evolve, and relevant Recommendations are updated. Packet-based transport networks must also continue to provide the operation, administration and maintenance (OAM) capabilities that are essential to enabling carrier-class performance. Such networks are expected to support an increasingly wide variety of highly reliable and high-quality services, which also require effective network control and management. Such factors will drive the need for the revision of existing Recommendations as well as the development of new Recommendations for packet-based transport interfaces and equipment.

Under the responsibility of this Question, Recommendations will be developed to provide the specifications for packet-based equipment, OAM mechanisms, protection switching mechanisms, network interfaces, services, and domain interworking in packet transport networks. This activity will be conducted in close co-operation with related ITU-T Study Groups, IEEE, MEF, IETF and other SDOs, as necessary.

Existing Recommendations may need to be enhanced to take into account transport network control and management paradigms, such as Automatically Switched Optical Network (ASON) and SDN control of transport networks.

The area of responsibility under this Question includes the specification of:

- Equipment functions related to packet layer networks, including equipment functions related to access networks.
- Equipment functions for transport of data/packet traffic (e.g., Ethernet, IP, ATM, MPLS, MPLS-TP, Data Centre traffic).
- Power saving mechanisms for packet transport network equipment in the wider context of ICTs (Information and Communications Technologies).
- Packet transport OAM structures and methods.
- Specification of all protection switching processes related to packet transport networks.
- Network interface characteristics for the packet transport network.
- Packet data transport supervision.
- A framework for defining network-oriented characteristics of Ethernet services in alignment with industry requirements.

Recommendations related to packet transport technologies used in the access environment and not covered by other Questions of ITU-T SG15, are also covered by this Question.

The following major Recommendations in force at the time of approval of this Question, fall under its responsibility: G.8001/Y.1354, G.8011/Y.1307, G.8012/Y.1308, G.8012.1/Y.1308.1, G.8013/Y.1731, G.8021/Y.1341, G.8021.1/Y.1341.1, G.8031/Y.1342, G.8032/Y.1344, G.8101/Y.1355, G.8112/Y.1371, G.8113.1/Y.1372.1, G.8113.2/Y.1372.2, G.8121/Y.1381, G.8121.1/G.1381.1, G.8121.2/G.1381.2, G.8131/Y.1382, G.8132/Y.1383, G.8133, I.610, I.630, Y.1710, Y.1711, Y.1712, Y.1713, Y.1714, Y.1720 and Y.1730.

## 2 Question

– Study items to be considered include, but are not limited to:

- What packet transport interfaces and equipment functions must be specified to enable compatible packet transport equipment in metro and long-distance networks, including considerations regarding protection mechanisms and evolution of the optical transport network?
- What characteristics should be recommended for equipment for the transport of packet-based traffic such as Ethernet, MPLS-TP, MPLS, Data Centre traffic?

– Study items to be considered include, but are not limited to:

- Specifications of Equipment functions necessary for the transport of packet-based traffic such as Ethernet services, MPLS-TP, and Data Centre traffic.
- Enhancements required to the packet transport equipment and network protection Recommendations in order to meet the needs, including support for disaster recovery of:
  - Access networks.
  - Data Centre networks.
  - Cloud computing.
  - Mobile networks including IMT-2020/5G.
  - CBR clients.
  - Future networks.
- Network protection Recommendations to provide enhanced survivability capabilities.
- Clarification and resolution of technical issues in published and draft Recommendations.
- What equipment functions should be specified to allow power savings within packet transport networks?
- Clarification of requirements and mechanisms of OAM for packet transport networks. This includes study on end-to-end OAM support for packet-based ubiquitous networks. The OAM functions provide the capability for defect detection, defect localization, topology management and performance management. OAM functions should be able to be applied to point-to-point, point-to-multipoint and multipoint-to-multipoint networks.
- Clarification of generic OAM principles for connection-oriented packet-switched and connectionless packet switched networks.
- Clarification of generic OAM principles under interworking of different network technologies. This includes network interworking and service interworking scenarios.
- Continuation of work on the transport Ethernet equipment Recommendation G.8021/Y.1341 in cooperation with IEEE and MEF.
- Continuation of work on the transport Ethernet OAM Recommendation G.8013/Y.1731 in cooperation with IEEE and MEF.
- Continuation of work on the MPLS-TP OAM Recommendations in cooperation with IETF.
- Continuation of work on the Ethernet services and Network Interfaces Recommendations in cooperation with MEF.

### 3 Tasks

Tasks include, but are not limited to:

- Enhancements to, and refinements of, existing Recommendations on characteristics of packet transport network equipment functional blocks (G.8021/Y.1341, G.8021.1/Y.1341.1, G.8121/Y.1381, G.8121.1/G.1381.1, G.8121.2/G.1381.2).
- Enhancements to, and refinements of, existing Recommendations on OAM mechanisms for packet transport networks (G.8013/Y.1731, G.8113.1/Y.1371.1, G.8113.2/Y.1371.2).
- Preparation of Recommendations on OAM mechanisms including defect localization functions and performance measurement functions.
- Enhancement and improvement of linear and ring protection switching Recommendations for packet-based technologies.
- Further development of Ethernet service characteristics (G.8011/Y.1307).
- Further development of packet transport network interface specifications (G.8012/Y.1308, G.8112/Y.1371).

An up-to-date status of work under this Question is contained in the SG15 work programme ([https://www.itu.int/ITU-T/workprog/wp\\_search.aspx?sg=15](https://www.itu.int/ITU-T/workprog/wp_search.aspx?sg=15)).

### 4 Relationships

#### Recommendations:

- G.800, G.805, G.806, G.808, G.808.1, G.808.2, G.808.3, G.809, G.872, G.8010, G.8023, G.8051, G.8052, G.8052.1, G.8052.2, G.8110.1, G.8151, G.8152, G.8152.1, G.8152.2, G.7710, G.7711

#### Questions:

- Q4/15, Q11/15, Q12/15, Q13/15, Q14/15

#### Study Groups:

- ITU-T SG2 responsible for operational aspects
- ITU-T SG12 responsible for Ethernet and MPLS performance, QoS and QoE
- ITU-T SG13 responsible for future networks, with focus on IMT-2020, cloud computing and trusted network infrastructure

#### Other bodies:

- MEF on Ethernet services and network interfaces issues
- IEEE 802.1, 802.3 on Ethernet
- IETF working groups on OAM, MPLS transport, PW transport
- Broadband Forum on Ethernet and MPLS
- OIF on Flex Ethernet