

Related Recommendations

Related Recommendations are listed in the following table:

Category	Rec. number	Title
Network architecture	G.8010/Y.1306	Architecture of Ethernet layer networks
Services	G.8011/Y.1307	Ethernet over Transport – Ethernet services framework
	G.8011.1/Y.1307.1	Ethernet private line service
	G.8011.2/Y.1307.2	Ethernet virtual private line service
	G.8011.3/Y.1307.3 (planned)	Ethernet virtual private LAN service
	G.8011.4/Y.1307.4 (planned)	Ethernet virtual private rooted multipoint service
	G.8012/Y.1308	Ethernet UNI and Ethernet NNI
OAM	Y.1730	Requirements for OAM functions in Ethernet-based networks and Ethernet services
	Y.1731	OAM functions and mechanisms for Ethernet-based networks
Protection	G.8031/Y.1342	Ethernet linear protection switching
	G.8032/Y.1344	Ethernet ring protection switching
Equipment	G.8021/Y.1341	Characteristics of Ethernet transport network equipment functional blocks
Equipment management	G.8051/Y.1345	Management aspects of the Ethernet-over-Transport (EoT) capable network element
Terminology	G.8001/Y.1354	Terms and definitions for Ethernet frames over Transport (EoT)

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www.itu.int/ITU-T/publications/recs.html

EoT

ETHERNET OVER TRANSPORT

**Enhancement
of the Ethernet
technology
to be used in
the carrier class
environment**

ITU-T

workshops: www.itu.int/ITU-T/worksem/
e-flash and news: www.itu.int/ITU-T/news/
membership: www.itu.int/ITU-T/membership/
technology watch: www.itu.int/ITU-T/techwatch

Why Ethernet?

Ethernet has come to be used widely in network operators' backbones or metro area networks. Although Ethernet was originally designed to be used in a LAN environment, it has been enhanced in several aspects so that it can be used in network operators' networks. In addition, Ethernet can easily achieve multipoint-to-multipoint connectivity, which would require $n*(n-1)/2$ connections with an existing point-to-point connection-oriented transport technology.

ITU-T's work on Ethernet

ITU-T developed Recommendations for the enhancement of Ethernet in close cooperation with the IEEE 802.1 and 802.3 Working Groups. ITU-T's work area includes architecture, service description, operation, administration and maintenance (OAM), protection switching, equipment and management aspects.

Architecture

The architecture of Ethernet-based networks is described in Recommendation G.8010/Y.1306. It is based on Recommendations G.800, G.805 and G.809 and is aligned with IEEE 802.1 and 802.3 standards. It describes the Ethernet network layered structure, Ethernet MAC and PHY layer networks, Ethernet network management aspects and survivability aspects.

Services

Ethernet services are categorized into several types. Network topology can be categorized into point-to-point (line) or point-to-multipoint (LAN). Bandwidth assignment types can be dedicated or shared. Recommendations G.8011/Y.1307, G.8011.1/Y.1307.1, G.8011.2/Y.1307.2, G.8011.3/Y.1307.3 (planned) and G.8011.4/Y.1307.4 (planned) describe each type of service. Ethernet UNI and NNI specifications are described in G.8012/Y.1308.

OAM

Functions for detecting and localizing defects are important in the operation of large-scale networks. In addition, performance measurement and detection of degraded performance are also important. OAM functions for Ethernet are specified for these purposes. Recommendation Y.1730 specifies the requirements for OAM functions of Ethernet-based networks. Recommendation

Y.1731 specifies OAM functions for the detection and localization of defects, checking the network topology, measuring the performance (frame losses, bit errors and transmission delay) and other administrative purposes (e.g., indication of defect and out-of-service tests).

Protection switching

Reliability is one of the most important factors when Ethernet is used in carrier networks. To avoid service interruption under a failure condition, protection switching can be used. Recommendation G.8031/Y.1342 specifies Ethernet linear protection switching for this purpose. This function uses an alternative transmission line, which is called a protection transmission line, to protect the working transmission line. When the working transmission line fails, then it switches to the protection transmission line. This method is also widely used for synchronous digital hierarchy (SDH) and asynchronous transfer mode (ATM) networks. Recommendation G.8032/Y.1344 specifies Ethernet ring protection. One port in a ring is blocked so that each port can be connected to every other port without causing a loop in the ring. When a defect occurs, a port detecting the defect is blocked and then the originally blocked port is opened. In this way, connectivity is maintained.

Equipment

Describing the characteristics of the functional blocks of Ethernet transport network equipment is important from the operation and implementation point of view. Recommendation G.8021/Y.1341 describes supervision, processing for OAM, protection switching and other functions such as queuing, filtering and replication. It also describes Ethernet (ETH) layer functions, physical (PHY) layer functions and non-Ethernet (e.g. SDH, PDH, OTH and ATM) server-to-ETH adaptation functions. Management aspects of Ethernet transport network equipment are described in G.8051/Y.1345, which specifies the management functions for fault management, configuration management, performance monitoring and security management.

Terminology

For consistent use of terminology, definitions used by Ethernet-related Recommendations are brought together in Recommendation G.8001/Y.1306.

What is coming next?

ITU-T is also working on the issues below:

- OTN support for 40G/100G Ethernet
- Network architecture for emerging Ethernet-related technologies such as PBB (Provider Backbone Bridges: IEEE 802.1 ah) and PBB-TE (Provider Backbone Bridges – Traffic Engineering: IEEE 802.1 Qay)

ITU-T SG15 Question 3 is responsible for tracking and coordinating the development of Recommendations in the OTN area. For more detailed information, the "Optical Transport Networks and Technologies Standardization Work Plan" has been developed. See www.itu.int/ITU-T/studygroups/com15/otn