Standardization in ITU-T SG15

Hiroshi Ota
Advisor, ITU-T Study Group 15, TSB

AGENDA SESSION 1

Innovate | Discuss | Share

What are Standards

- Definitions, Categories of Standards
- Benefits of applying Standards
- Standards versus Regulations , International Standards versus National Standards
- Role of ICT Standards and key ICT Standards Organizations
- How are Standards created: Principles of Standard development
- World Standard Cooperation

How ITU-T develops Standards

- ITU - Who we are - Our Membership
- ITU-T Objectives , Open Standards
- ITU-T Standards in the Network, Study Groups and ITU-T Structure
- Work Item Life-cycle, Consensus based decision-making in ITU-T
- TAP, AAP, non normative texts
- Key Leadership roles

Standardization in ITU-T SG15

- Study Group 15 (SG15) mandate
- Lead Study Group
- SG15 Structure
- Working Parties and Questions highlights
- Key Recommendations and future work
- Cooperation with other SDOs

ITU-T Study Groups

SG2 - Operational aspects
SG3 - Economic & policy issues
SG5 - Environment, EMF & circular economy
SG9 - Broadband cable & TV
SG11 - Protocols, testing & combating counterfeiting
SG12 - Performance, QoS & QoE
SG13 - Future networks
SG15 - Transport, access & home
SG16 - Multimedia & digital technologies
SG17 - Security
SG20 - IoT, smart cities & communities

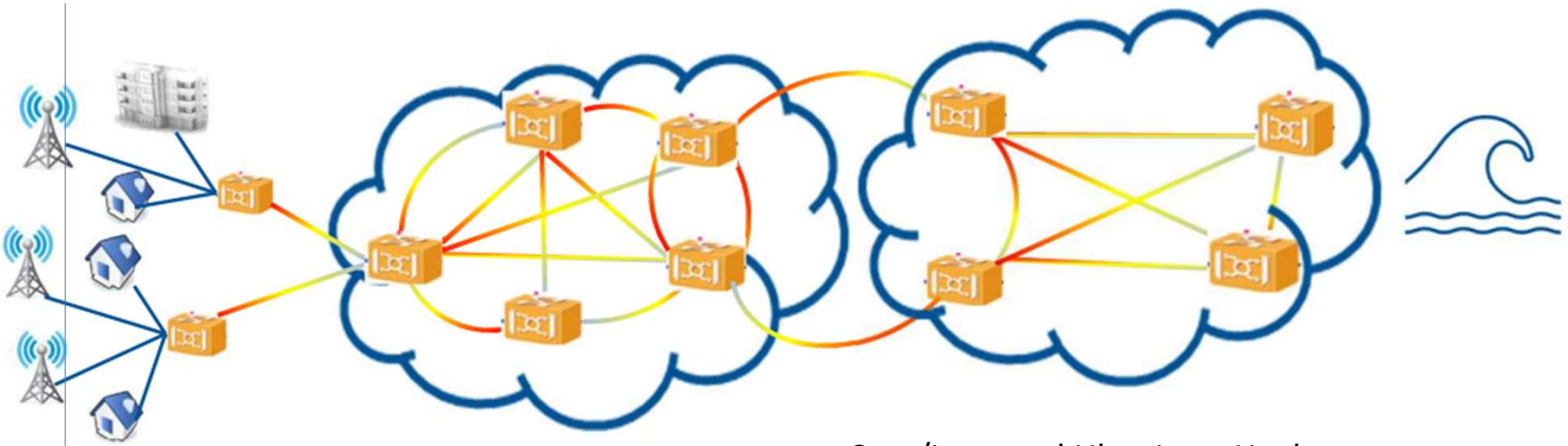
SG15 mandate

SG15 is responsible for the development of standards on:

- optical transport network
- optical access network
- home network and power utility network infrastructures
- Gigabit copper transmission
- equipment
- maintenance
- optical fibers and cables and their related installation
- management
- instrumentation and measurement techniques
- test
- control plane technologies

to enable the evolution toward intelligent transport networks, including the support of smart-grid applications

SG15 Standards in the Network



Working Parties

WP1/15: Transport aspects of access, home and smart grid networks
WP2/15: Optical technologies and physical infrastructures
WP3/15: Transport network characteristics

Lead Study Group Access Network Transport - Home Networking - Optical Technology

List of Questions

	Question Number	Question title
WP1	1/15	Coordination of Access and Home Network Transport Standards
	2/15	Optical systems for fibre access networks
	3/15	Technologies for in-premises networking and related access applications
	4/15	Broadband access over metallic conductors
WP2	5/15	Characteristics and test methods of optical fibres and cables, and installation guidance
	6/15	Characteristics of optical components, subsystems and systems for optical transport networks
	7/15	Connectivity, Operation and Maintenance of optical physical infrastructures
	8/15	Characteristics of optical fibre submarine cable systems
WP3	10/15	Interfaces, interworking, OAM, protection and equipment specifications for packet-based transport networks
	11/15	Signal structures, interfaces, equipment functions, protection and interworking for optical transport networks
	12/15	Transport network architectures
	13/15	Network synchronization and time distribution performance
	14/15	Management and control of transport systems and equipment

WP1 – Broadband Access

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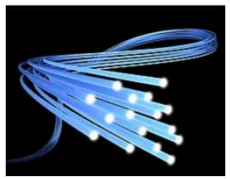
G.fast — Up to 2 Gbps copper access

MGfast — Next generation copper access 5-10 Gbps



Optical systems for access networks
Bidirectional P2P
XGS-PON, NG-PON2
50G-PON, WDM-PON

Continue collaboration with broadband forum

G.RoF — PON support for mobile front/backhaul, Radio over fiber

Fiber networking inside the premises

Free space optical home networking

G.fin — Fiber to the Room (FTTR)

G.Hn — G.hn and G.hn2 home networking over indoor phone, power, and coax wires >2 Gbps

Q2/15 – Optical systems for fibre access networks

- 50 Gigabit-capable Passive Optical Networks (HSP) (G.9804.x series)
- G Suppl. VHSP - Point to multipoint passive optical access system requirements and transmission technologies above 50 Gbit/s per wavelength
- 10 Gbit/s-capable symmetric PON systems; XGS-PON (G.9807.x series)
- Radio over Fiber systems (G.9803)
- Wavelength multiplexed point-to-multipoint 10-Gigabit-capable passive optical network
- PON support for slicing
- Higher-speed bidirectional, single fibre, point-to-point optical access system (G.9806)

Q3/15 – Technologies for in-premises networking and related access applications

- High speed fiber-based in-premises transceivers – “Fiber to the Room (FTTR)” (G.fin)
- Unified high-speed wire-line based home networking (G.hn) transceivers
- Evolution of G.hn up to 10 Gbps (G.hn2)
- High speed indoor free space optical networking (G.vlc)
- Support of UHD video service over G.hn (G.uvs)
- Narrowband power line communication for smart grid (G.990x series)

Q4/15 – Broadband access over metallic conductors

- Mgfast – optical class broadband access using existing metallic cables (G.971x series)
- G.fast – up to 2 Gb/s for short copper access lines (G.970x series)

WP2 – Optical Technologies

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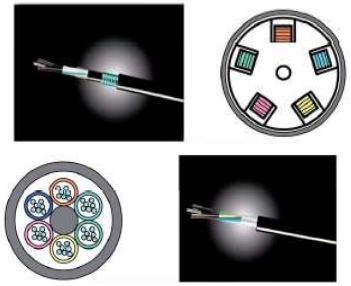
Optical Network Infrastructure

Disaster Management issues



Optical Fibre Technologies and Cables for easy and environmentally friendly outside plants

Multichannel bi-directional DWDM applications targeted at lower cost optical solutions for applications including mobile fronthaul and backhaul

100G and future higher-rate coherent multi-vendor interoperable interfaces

200G
400G

Short-reach (OTN client) 200G and 400G interfaces reusing components developed for Ethernet applications

25 Gbit/s optical interface for mobile optimized transport

Q5/15 – Characteristics and test methods of optical fibres and cables, and installation guidance

- Single-mode fibre Recommendations (G.652 and G.654)
- Optical fibre, cable and components for space division multiplexing transmission (TR.sdm)
- Characteristics of a bending-loss insensitive single-mode optical fibre and cable (G.657)
- Optical/electrical hybrid cables for access points (L.109.1 (ex. L.oehc))
- Optical fibre cables for duct and tunnel application (L.100)
- Optical fibre cables for direct surface application (L.110)
- Optical fibre cables for in-home applications (L.111)
- Criteria for optical fibre cable installation with minimal existing infrastructure (L.163)

Q6/15 – Characteristics of optical components, subsystems and systems for optical transport networks

- Amplified multichannel dense wavelength division multiplexing applications with single channel optical interfaces (G.698.2)
- Multichannel bi-directional DWDM applications with port agnostic single-channel optical interfaces (G.698.4)
- Multi-vendor interoperable optical interface specifications for mobile optimized applications at 25 Gbit/s. (G.698.1, G.698.2 and G.698.4)
- Multichannel WDM applications with single-channel optical interfaces in the O-band (G.owdm and G.owdm2)

Q7/15 – Connectivity, Operation and Maintenance of optical physical infrastructures

- Telecommunication infrastructure facility management (L.330)
- Cable identification for the construction and maintenance of optical fibre cable networks with optical sensing technique(L.316)
- Maintenance of telecommunication underground facilities (L.340/L.74)
- Requirements for Passive Optical Nodes: nodes for customer indoor premises (L.ncip)
- Topologies for optical access network (L.250/L.90)

Q8/15 - Characteristics of optical fibre submarine cable systems

- Transverse compatible DWDM applications for repeatered optical fibre submarine cable systems (G.977.1)
- Dedicated Scientific Sensing Submarine cable system (G.dsssc)
- SMART submarine cables – for both telecommunication and measurement (G.smart)

WP3 – Optical Transport Networks

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5G	Transport and synchronization supporting 5G mobile fronthaul and backhaul
MTN	G.mtn (metro transport network) for 5G optimized transport
	Architecture and other Transport SDN Aspects
BEYOND 400G	New “B400G” OTN interfaces, including the use of coherent G.698.2 interfaces
	Equipment & management specifications for OTN, Ethernet, MTN and MPLS-TP

Optical Transport Networks	Synchronization of packet networks and future OTN networks, e.g., beyond 400G
	Network survivability (protection and restoration)
	Management aspects of control and transport planes
	Core Information model enhancement for management of synchronization and optical media

Q10/15 – Interfaces, interworking, OAM, protection and equipment specifications for packet-based transport networks

- Network protection for Ethernet and MPLS-TP
- OAM functions for Ethernet and MPLS-TP
- Ethernet UNI and Ethernet NNI
- Interfaces for the MPLS-TP layer network
- Characteristics of Ethernet transport network and MPLS-TP equipment functional blocks
- Ethernet service characteristics

Q11/15 – Signal structures, interfaces, equipment functions, protection and interworking for optical transport networks

- Interfaces for various transport network technologies
- Interfaces for the OTN beyond 400 Gb/s (e.g., 800 Gb/s)
- Interfaces for MTN (Metro Transport Network)
- Path layer network for sub 1G services

Q12/15 – Transport network architectures

- Architecture of transport networks (digital network layers and media)
- Architecture of control and management, including transport SDN and use of AI/ML applications for transport operations
- Architecture for various transport network technologies including OTN beyond 400Gb/s and MTN (G.83xx series)

Q13/15 – Network synchronization and time distribution performance

- Network synchronization and time distribution performance
  - Active since the 90s (when work on sync for SDH started in SG13)
  - Timing Needs of the transport networks (e.g., OTN, MTN)
  - End Applications Timing Needs (e.g., 5G Base Stations)
- Distribution of Time-Phase and Frequency
  - Methods (e.g., over physical layer, via packets, GNSS)
  - Architectures
  - Clocks
  - PTP (IEEE 1588) profiles
  - Performance, Redundancy, Reliability, etc.
- Target Networks
  - Ethernet, IP-MPLS, OTN, xPON, MTN ...
- Cooperation
  - Other SG15 Questions, e.g.: Q11/15 (sync for/over OTN , MTN), Q14/15 (Sync Management), Q2/15, Q4/15 (Sync in the access), Q6/15 (sync in optical components, Fibers)
  - Other SDOs (IEEE1588, 3GPP, O-RAN, etc.)

Q14/15 – Management and control of transport systems and equipment

- Management and control of transport systems and equipment
  - Generic requirements and Technology-specific requirements for
    - OTN, Ethernet, MPLS-TP, MTN, Synchronization, Optical/Electrical media
- Management information/data model
  - Management-protocol-neutral information models specified in UML
  - Management-protocol-specific data models in YANG
    - Utilize automatic translation from UML to YANG
- SDN control of transport networks including the use of AI/ML

Collaboration with other organizations

SDO	Related SG15 Questions	Topics
BBF	Q2, Q3, Q4, Q14	G.fast, MGfast, xDSL and PON, YANG
CENELEC TC86A & TC86BXA	Q5, Q7	Optical fibers and cables, optical connectors & passive components
ETSI ISG F5G	Q2, Q3	PON, Fiber to the Room (FTTR)
IEC TC86 - SC86A	Q5	Optical Fibers and cables
IEC TC86 - SC86B	Q7, Q5	Optical connectors & passive components
IEEE 802.1	Q10, Q12, Q13, Q14	VLAN Bridging, OAM/CFM, Synchronization, Time Sensitive Network (TSN), Information modeling Issues, YANG
IEEE 802.3	Q2, Q6, Q11, Q12, Q14	OTN mappings for Ethernet, Optical characteristics of Ethernet modules used for OTN, PON, Information modeling Issues, YANG
IEEE 1588	Q13, Q14	Time Synchronization, Synchronization Management
FSAN	Q2	PON
MEF	Q10, Q11, Q14	Ethernet Services, OTN & Wavelength services, LSO
OIF Networking, IETF (CCAMP, TEAS, PCE), ONF	Q12, Q14	Optical Control Plane, SDN, Information modeling Issues, YANG
OIF PLL	Q6, Q11	Flex Ethernet, 400ZR, 800ZR


thank you
danke
謝謝
ngiyabonga
متشكرم
рахмат
teşekkür ederim
gracias
obrigado
merci
dziękuję
bedankt
sukriya
go raibh maith agat
kop khun krap
terima kasih
dakujem
arigatō
grazie
mochchakkeram
tapadh leat
спасибо
Баярлалаа
faafetai lava
dank je
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감사합니다
ευχαριστώ
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