

# **ITU-D Regional Development Forum for the Asia Pacific Region**

**“NGN and Broadband, Opportunities and Challenges”  
Yogyakarta, Indonesia, 27 – 29 July 2009**

## **ITU-T Standards development on NGN and Broadband**

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## Outline

- ITU-T standardization activity on NGN
  - Some basic concepts, topics and working directions
  - Mandates and study areas of SG13
  - Mandates and study areas of SG11
  
- ITU-T standardization activity on Broadband
  - Mandates and study areas of SG15

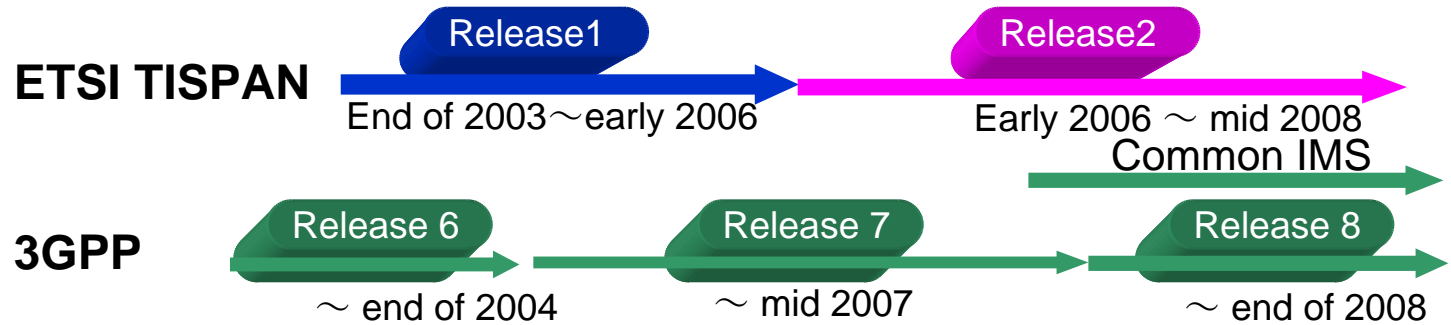
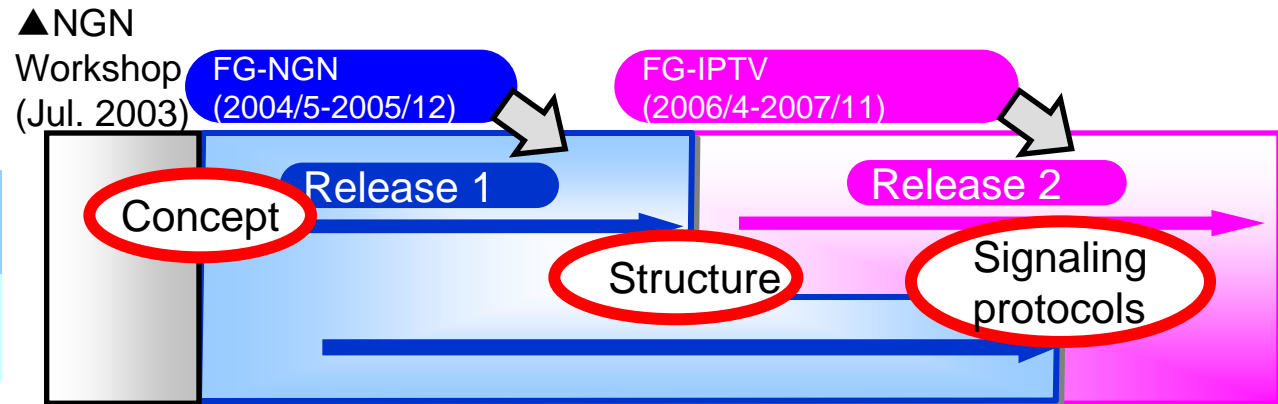
# ITU-T NGN standardization timeline

- 13 ITU-T Recommendations on NGN basic concepts published in July 2006
- ITU-T NGN Release 1 practically completed in January 2008
- More advanced services/features (IPTV, FMC etc.) currently under discussion



## ITU-T (NGN GSI)

- SG 13** NGN Service requirements and architecture
- SG 11** NGN Signaling protocols



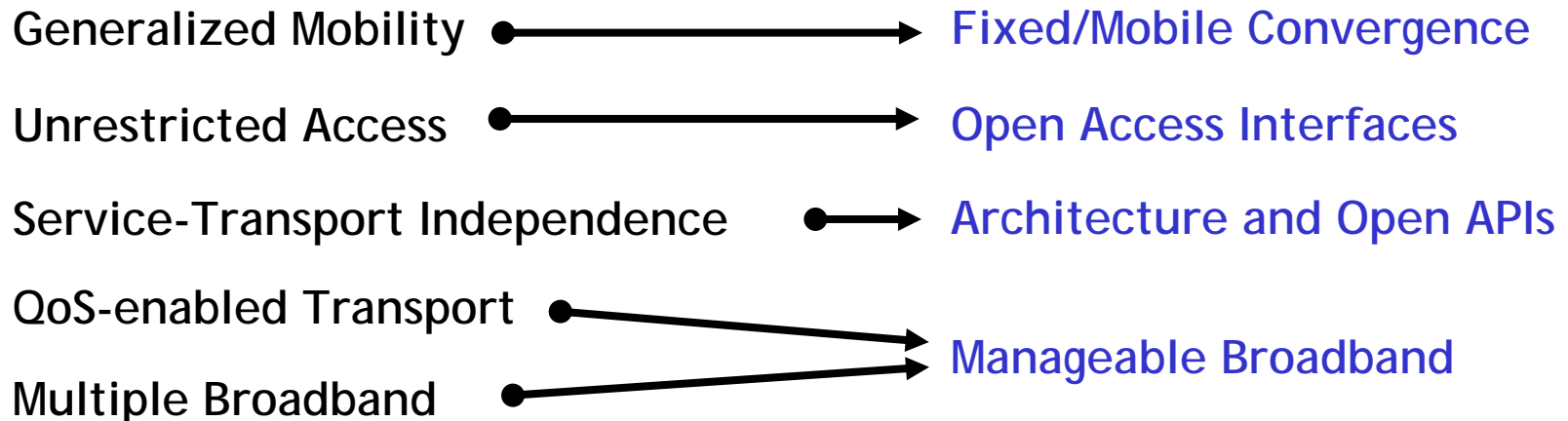
**IETF** ▲ SIP standard RFC3261 (Jun. 2002)

# NGN definition & basic features

Definition  
of NGN  
(Rec.  
Y.2001)

A NGN is a packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies.  
It enables unfettered access for users to networks and to competing service providers and/or services of their choice.  
It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.

## Target Standards areas



## Next Generation Services

- o From today's networks
  - Services are typically “vertically integrated”
  - Services require specific infrastructure components for their delivery
- o to NGN : flexible service creation and provisioning
  - Horizontal Convergence: services are no more vertically integrated
  - **Network functions are componentised**
  - **Standard “capabilities” as service enabling toolkit**
- o Key objectives in ITU-T NGN standardization
  - Not just a new voice network
  - *“Service level equal or better than in circuit-switched networks”*
  - **Services specified in terms of required “capabilities”**
  - Service definitions not an objective like in legacy world
    - Public Interest Services are a special case

**Service Shift as consequence of NGN service vs transport stratum separation**

## NGN Release 1 service objectives (Y.2000-series Sup.1 “NGN Rel.1 scope”)

### Services expected to be supported in NGN Release 1

- PSTN/ISDN Emulation services
- PSTN/ISDN Simulation services
- Multimedia services
- Data communication services (including VPNs)
- Public Interest Services
- NGN is not intended to preclude access to the Internet

*It's a Provider decision which services will be actually deployed*

### ITU-T NGN-GSI currently working on NGN Release 2

- Service scenarios, service and functional requirements and capabilities, architecture extensions, mechanisms and protocols
- « High level Rel.2 Requirements » determined in May 2009
- Rel.1 activity still ongoing (mainly on protocols)

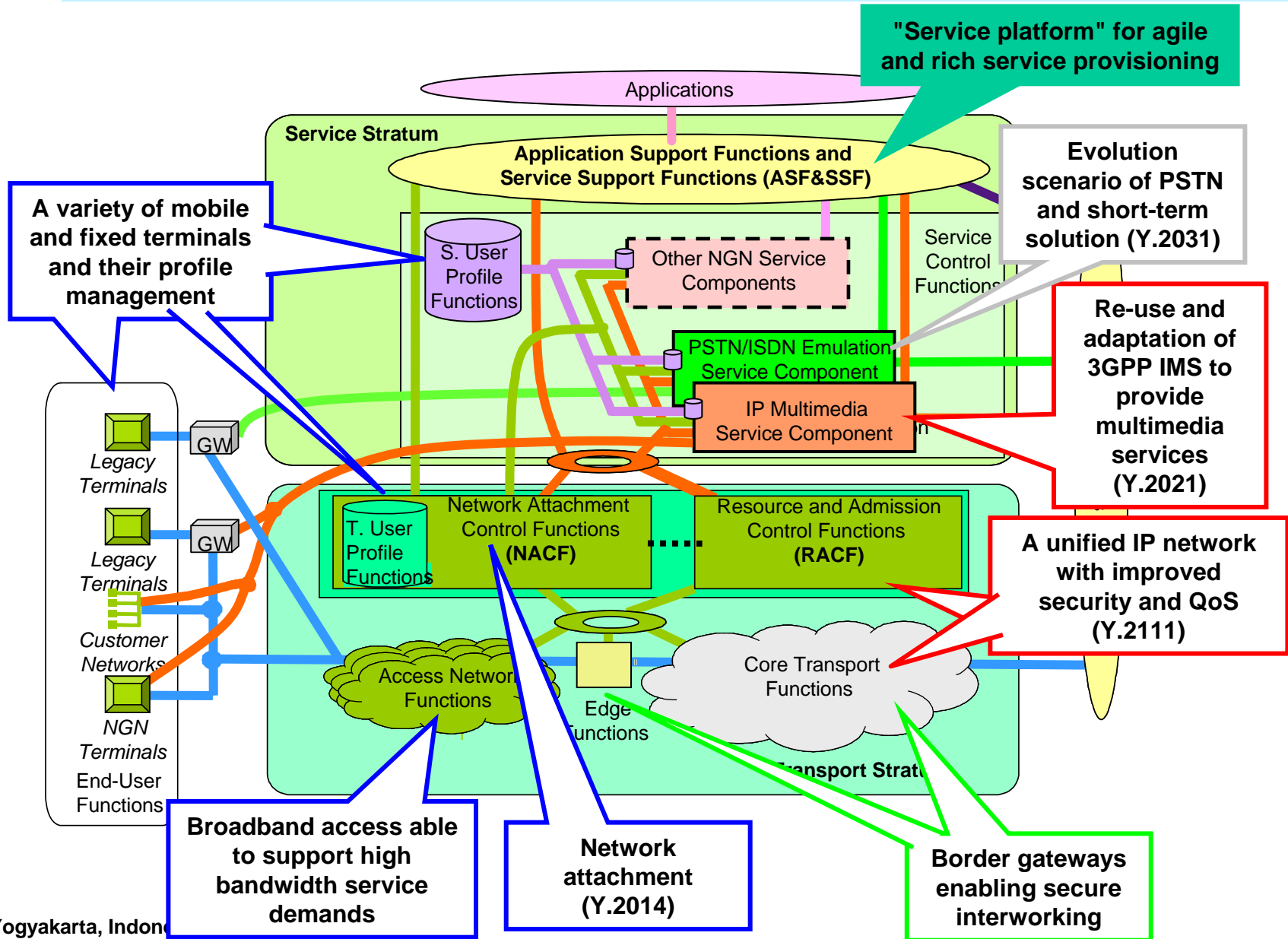
NOTE: “Release” concept under replacement with “Capability Set”

## NGN Release 2 service objectives (Y.2000-series Sup.7 "NGN Rel.2 scope")

### Services expected to be supported in NGN Release 2

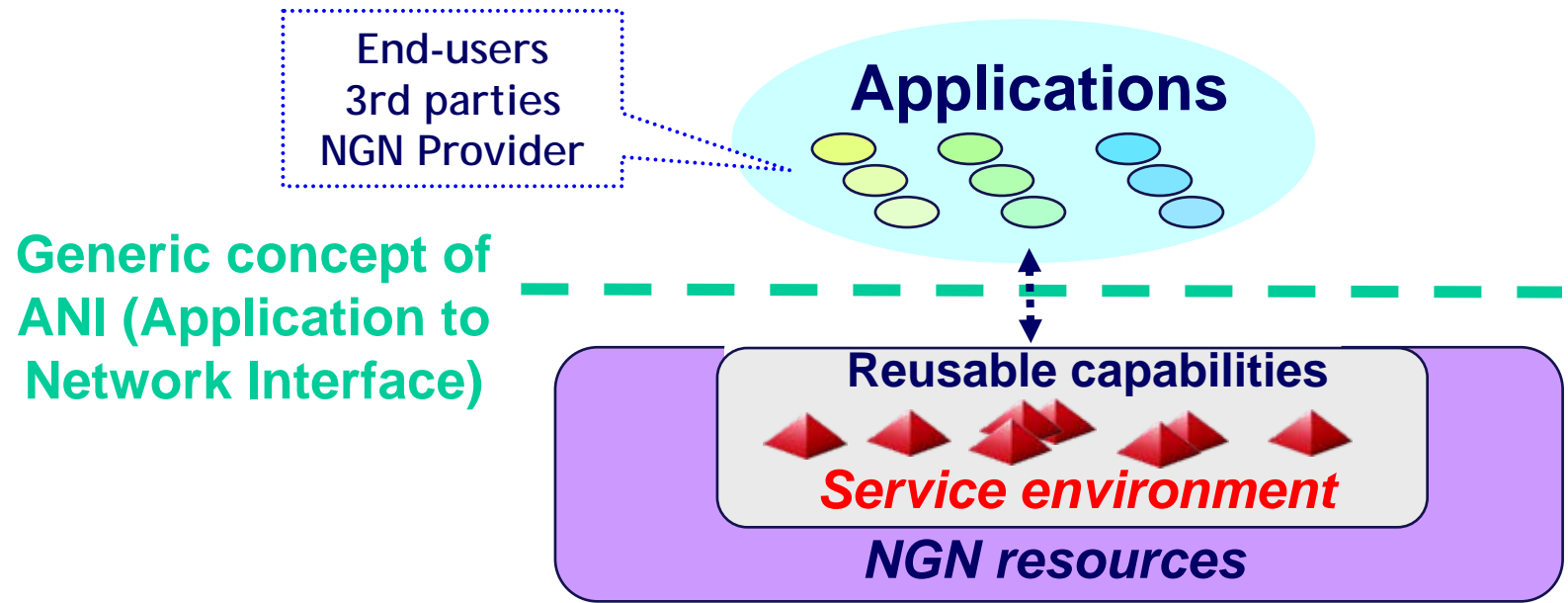
- IPTV services
- Managed delivery services
- NID related services
  - Services using tag-based identification
  - Ubiquitous Sensor Network services
- Additional multimedia services
  - Visual surveillance services
  - Multimedia communication centre services
- Enterprise services (NGN support of services for enterprises)
  - Virtual Leased Line, Business Trunking, Hosted services
- Home network services (support of services in home network environments)

# A "NGN components" view





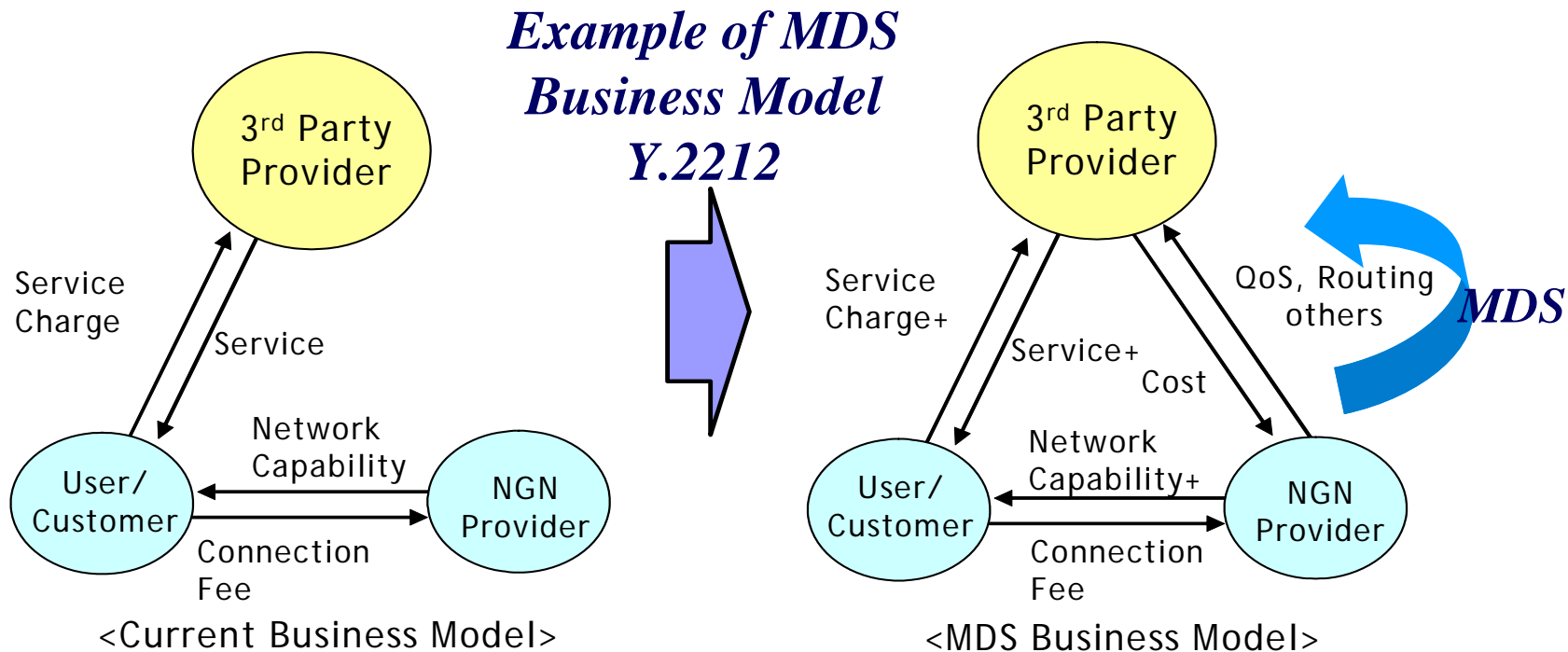
# Reusable “Capabilities”: towards an open service platform in NGN



- o Reusable set of “Capabilities” for reduced service development costs
- o **Open service environment** for flexible and agile service creation, execution and management
  - **(Open) service platform concept**
  - “Rapid change” is key for satisfying the changing customer needs
  - New business opportunities via an environment integrating applications and telecom infrastructure

## New NGN business models: 3rd Parties services

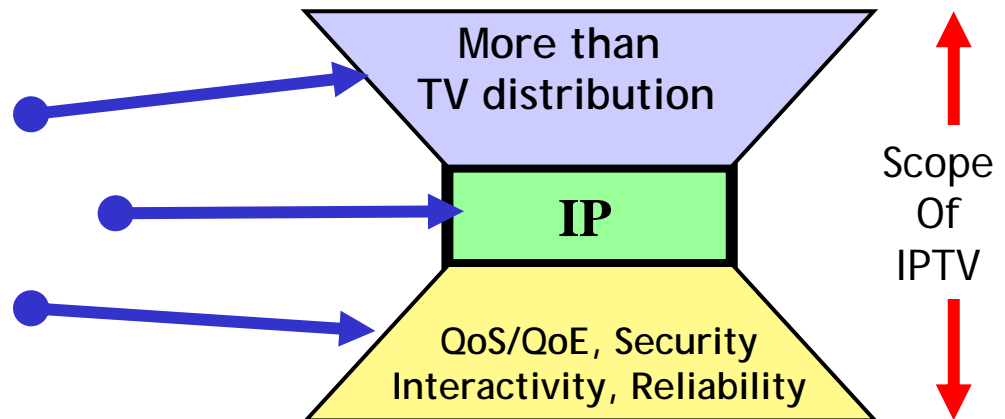
- NGN service control capabilities made available **via MDS** and **through ANI** by the NGN Provider to 3rd Party Providers and their customers
- 3rd Party Providers can offer enhanced services to their customers



**A win-win situation for both 3rd Party Provider and NGN Provider**

## A key differentiator of future NGN service offerings: IPTV

- Multimedia Services
- Over IP based networks
- Managed capabilities



### o IPTV definition

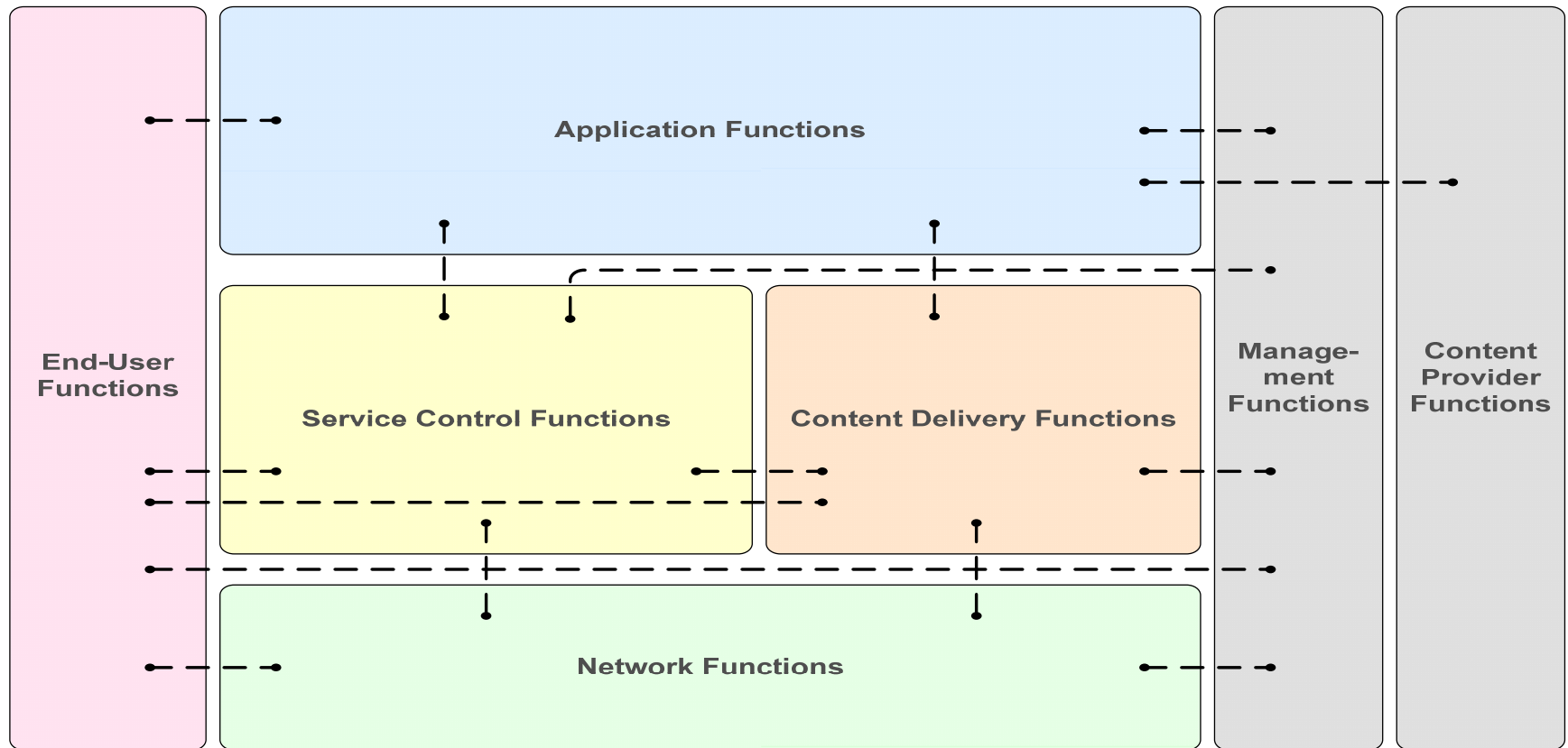
- “Multimedia services such as television/video/audio/text/graphics/data”
- “Delivered over IP-based networks managed to support the required level of QoS/QoE, security, interactivity and reliability”

### o Key features of IPTV

- Supportable by NGN
- Bi-directional networks
- Real time and non-real time service delivery

### o A large spectrum of IPTV services and business models

# IPTV Functional Architecture – Y.1910



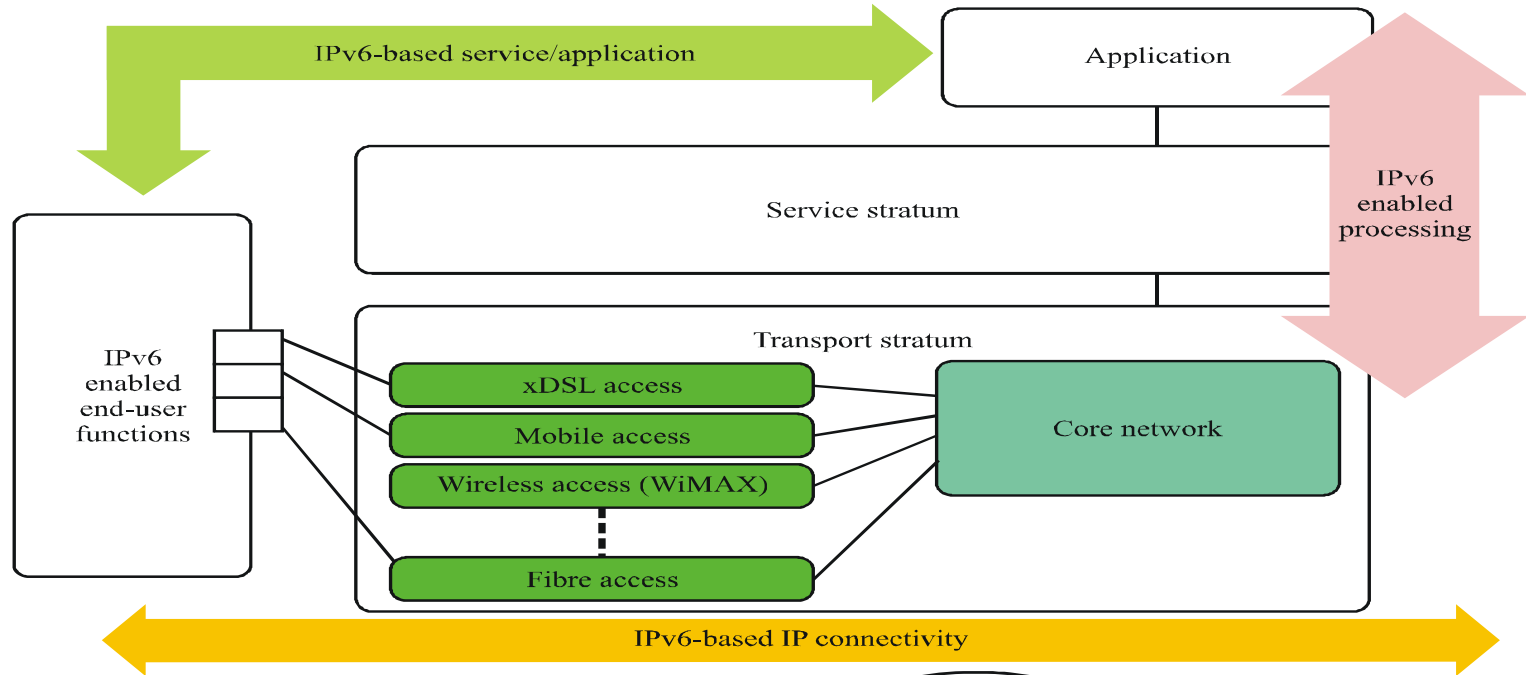
- Open interfaces to support multiple business models within an unified functional architecture
- Two approaches for NGN support: non-IMS based IPTV, IMS based IPTV

**ITU-T is engaged in the standardisation of interfaces between IPTV components**

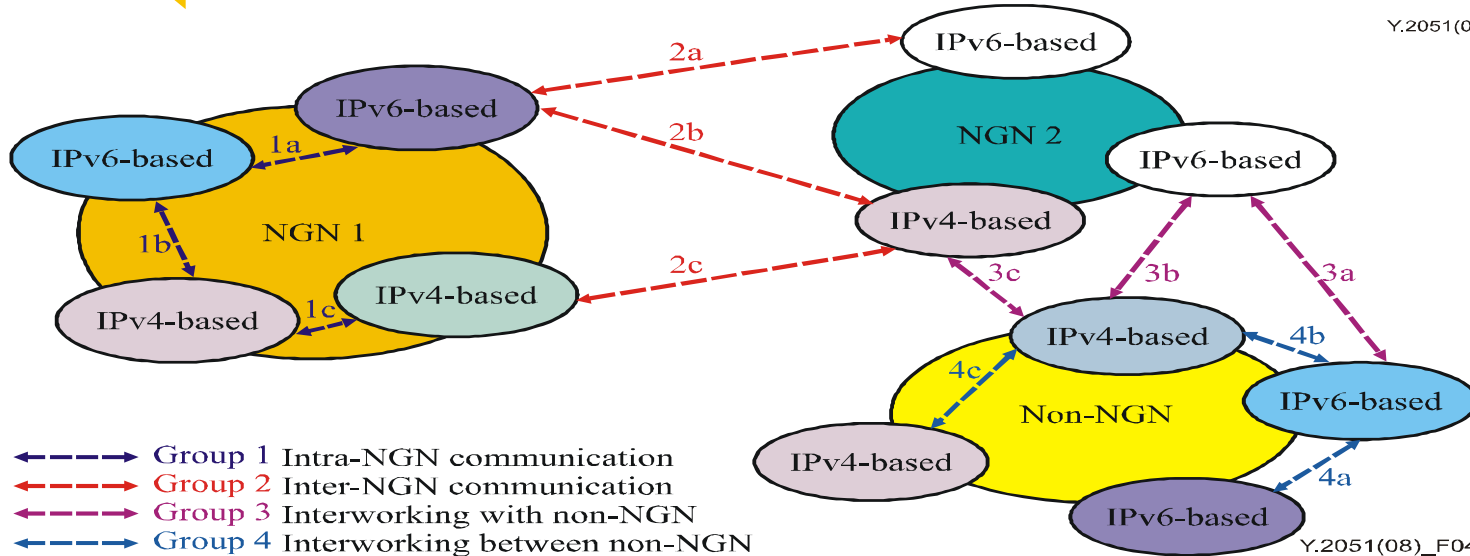
# ITU-T IPTV standardisation (IPTV-GSI)

- Global IPTV standards in various technical areas:
  - Services requirements
  - Architecture
  - QoS/QoE, traffic management mechanisms, performance monitoring
  - Security aspects
  - End systems and home networking
  - Middleware, applications & content platforms
- Ongoing collaboration with international and regional SDOs
  - ATIS IIF, DSL Forum, Home Gateway Initiative
  - DVB, ETSI TISPAN
  - (Open IPTV Forum)
- Global standards benefit operators and end-users
- Compliant products are key to global interoperability

# IPv6 based NGN



Y.2051(08)\_F02

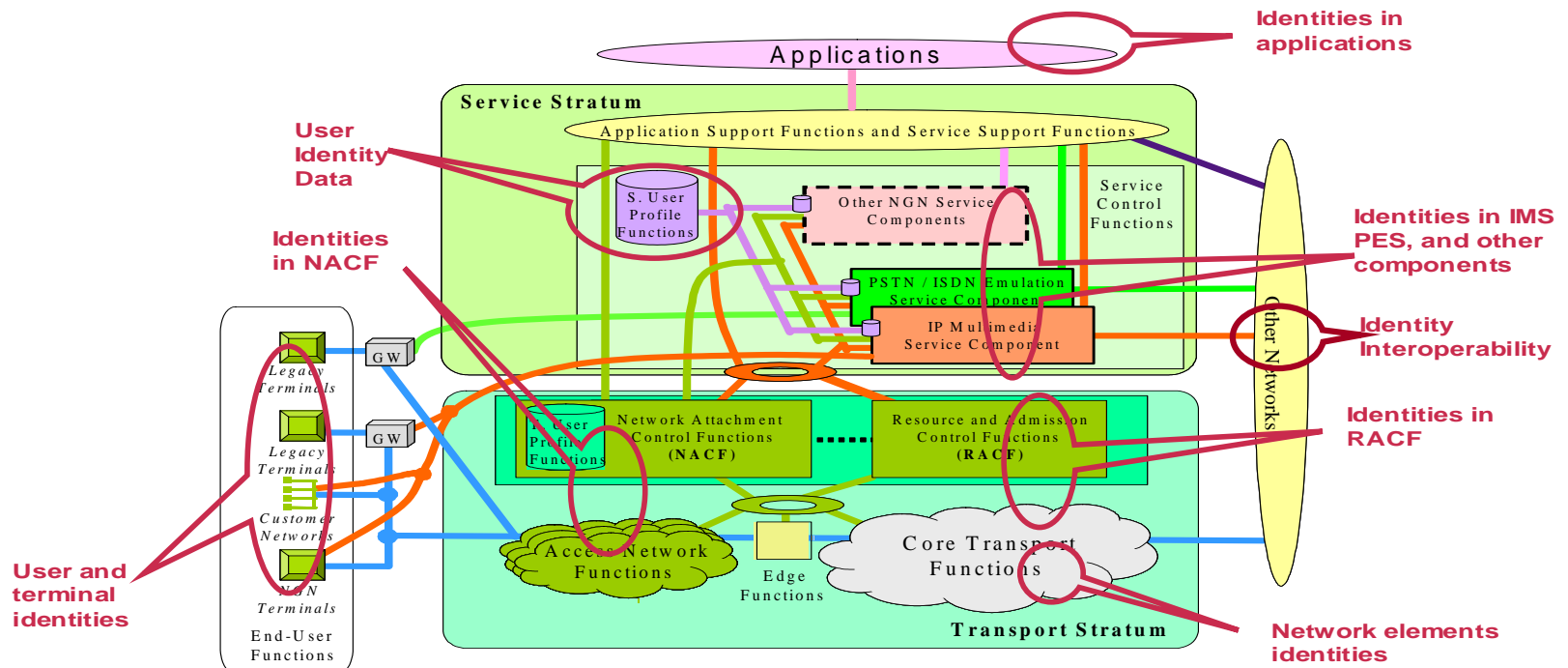


Y.2051(08)\_F04

- ↔ Group 1 Intra-NGN communication
- ↔ Group 2 Inter-NGN communication
- ↔ Group 3 Interworking with non-NGN
- ↔ Group 4 Interworking between non-NGN

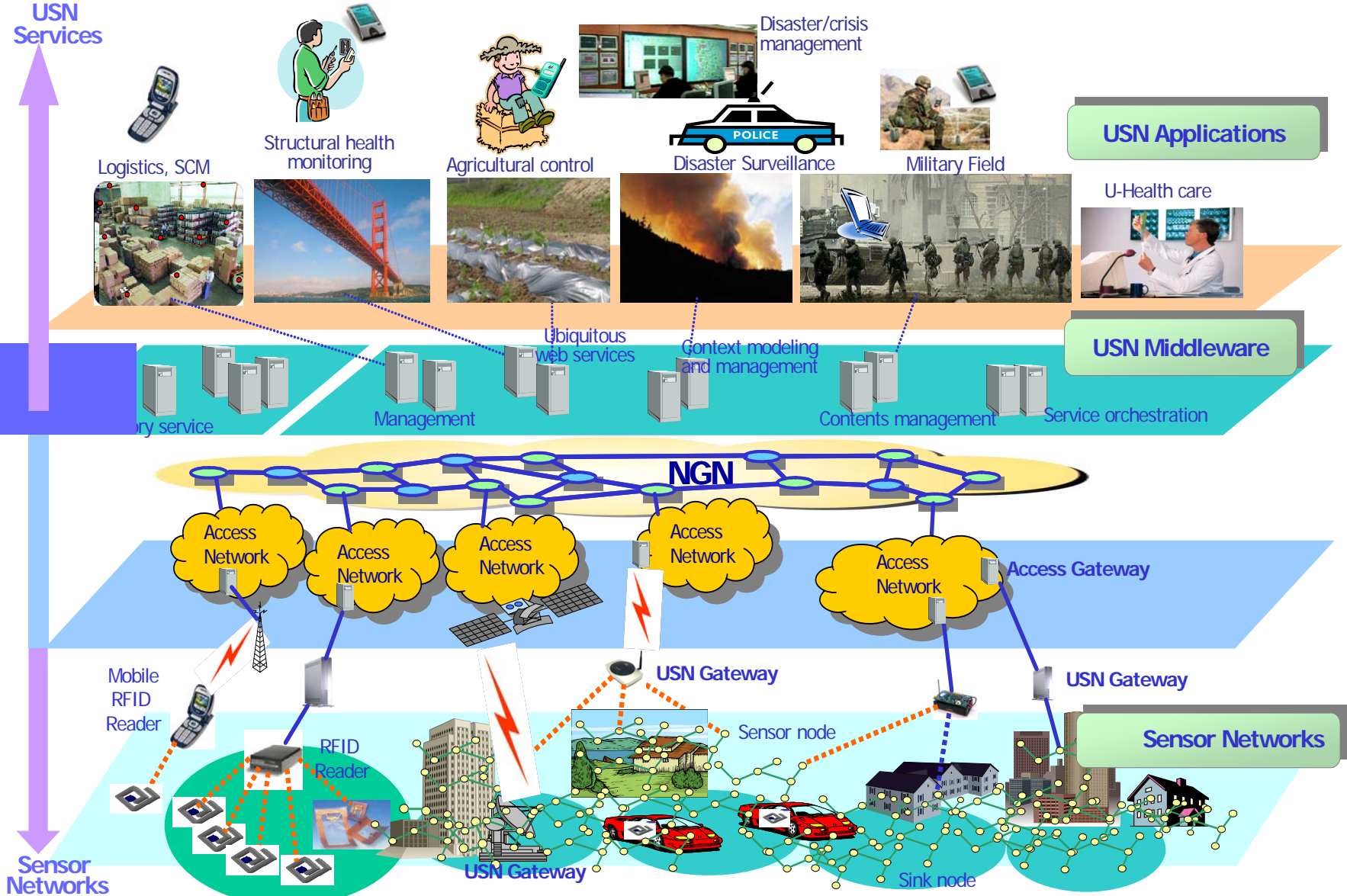
# Identity Management : a key NGN standardization activity (in cooperation with IdM-GSI)

- Multiple identity domains within the NGN architecture
  - Identities for devices, network elements, network components, applications, service providers etc.
- Identity information assurance, security and management are challenging



\* Note: Gateway (GW) may exist in either Transport Stratum or End-User Functions.

# Towards the Internet of things: Ubiquitous Sensor Networks (USN) services



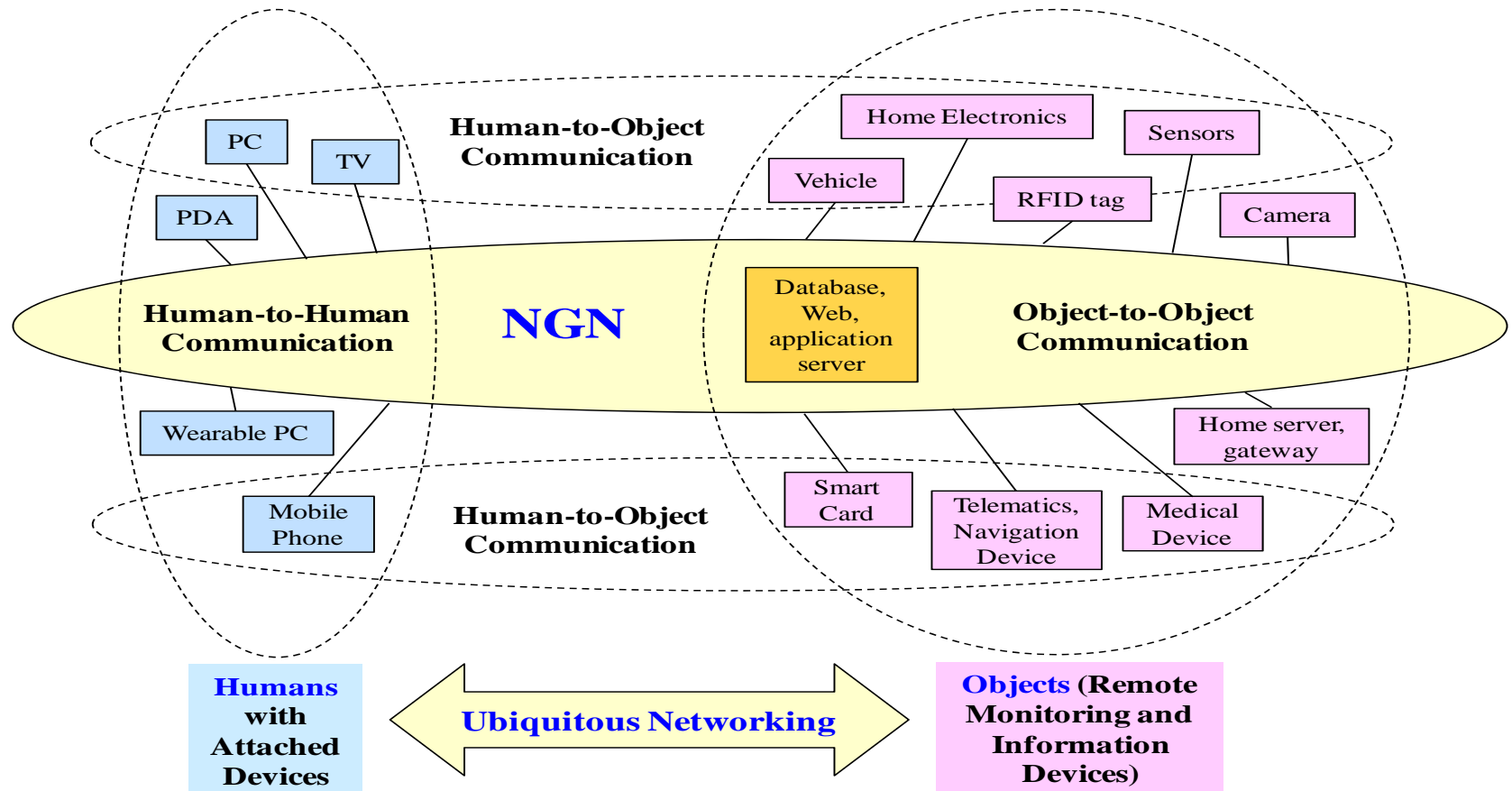


## NGN as network platform for USN services

- Ubiquitous Sensor Networks (USN) draft definition [Y.USN-reqts] : conceptual structured network delivering sensed information and knowledge services to anyone, anywhere and at anytime where the information and knowledge is developed via context awareness
- Flexibility is required to support a large number of potential applications (applications using tag-based identification (RFID etc.), combination of tags and sensors)
- USN services are key to the ITU-T initiative “ICT and climate change”
- A number of standardisation issues need to be worked out (NGN-GSI in cooperation with JCA-NID)

# “Ubiquitous networking” as future (NGN) target – work started in Jan 2009

- o Enabling “Any Service, Any Time, Any Where, Any Device” operations in NGN via enhanced capabilities
- o Support of human-to-human, but also human-to-machine and machine-to-machine communications



# Mandates of SG 13 [2009-2012]

SG13 was a NGN group

WTSA 2004

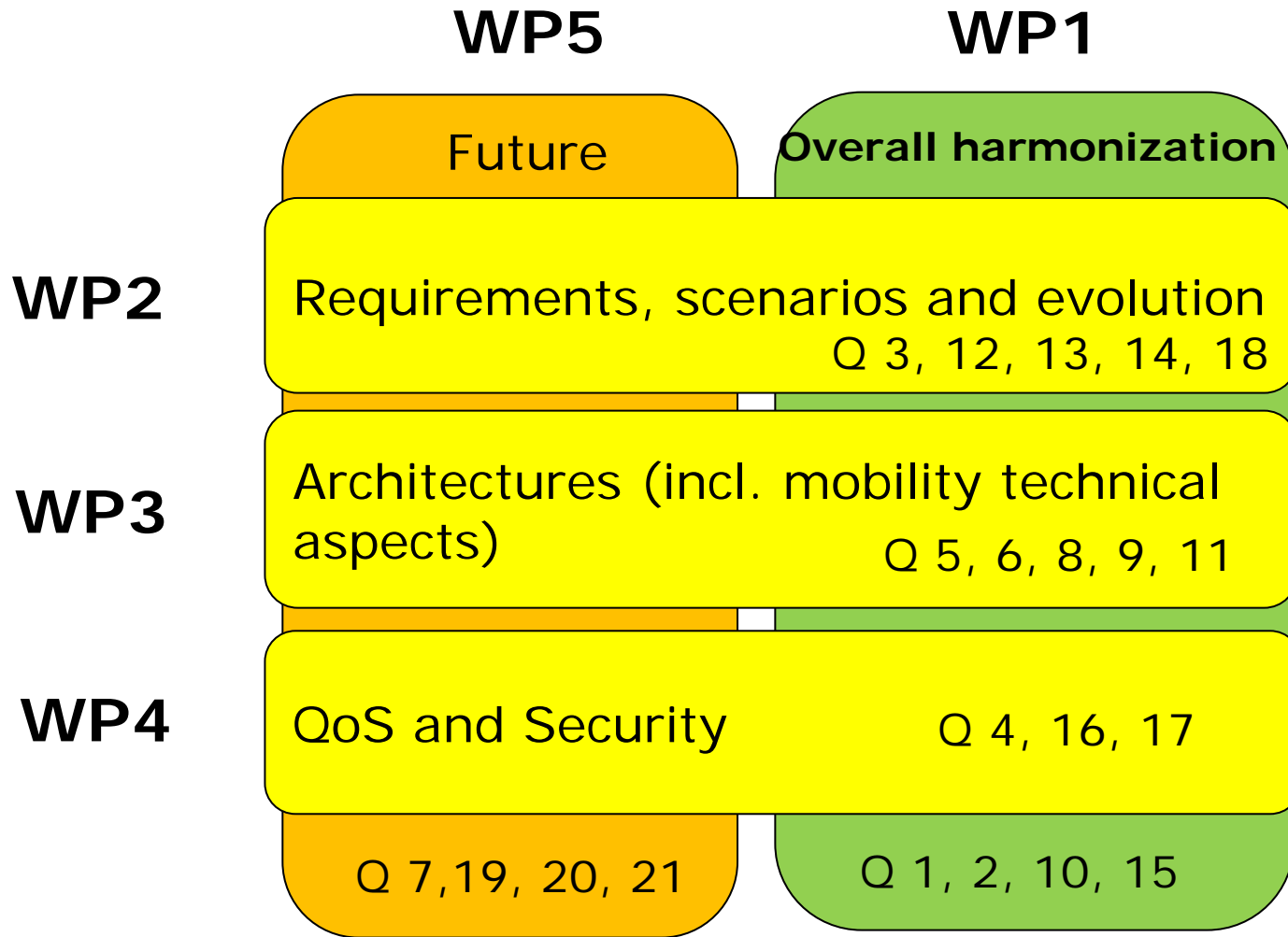
- Lead study group for NGN and Satellite

SG13 covers 'Future networks including mobile and NGN'

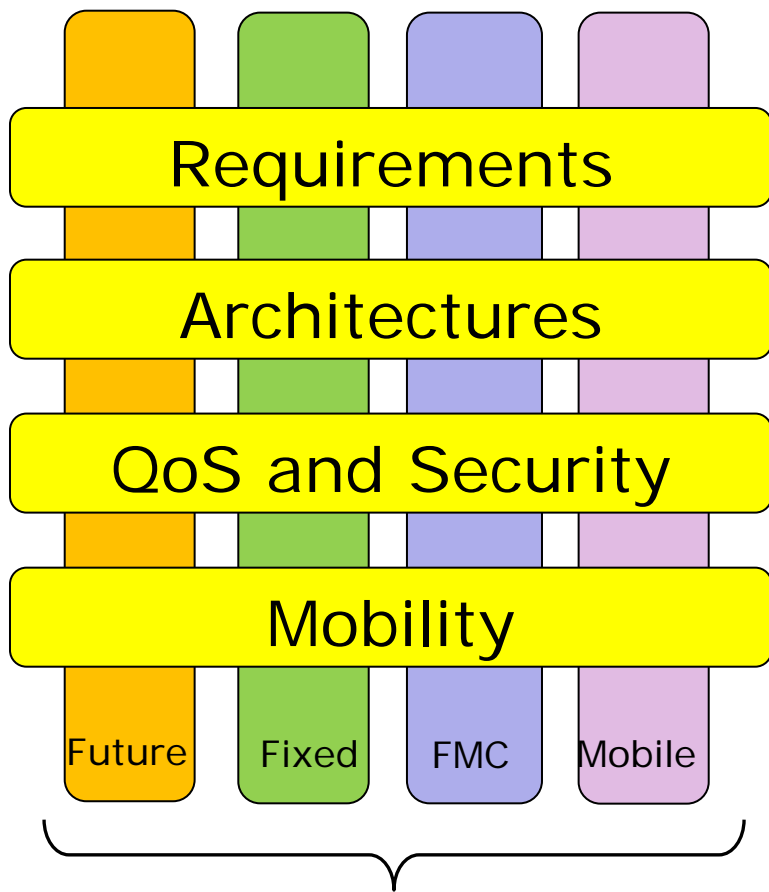
WTSA 2008

- Lead study group on **Future Networks and NGN**
- Lead study group on **Mobility Management and Fixed-Mobile Convergence**

# Configuration of SG13 Questions



## High level view of SG13 study areas



- NGN
- IPTV
- Open Environment
- Web based
- USN/RFID
- Ubiquitous Networking
- Climate Change
- Others

Infrastructural Frameworks

## Mandates of SG 11 [2009-2012]

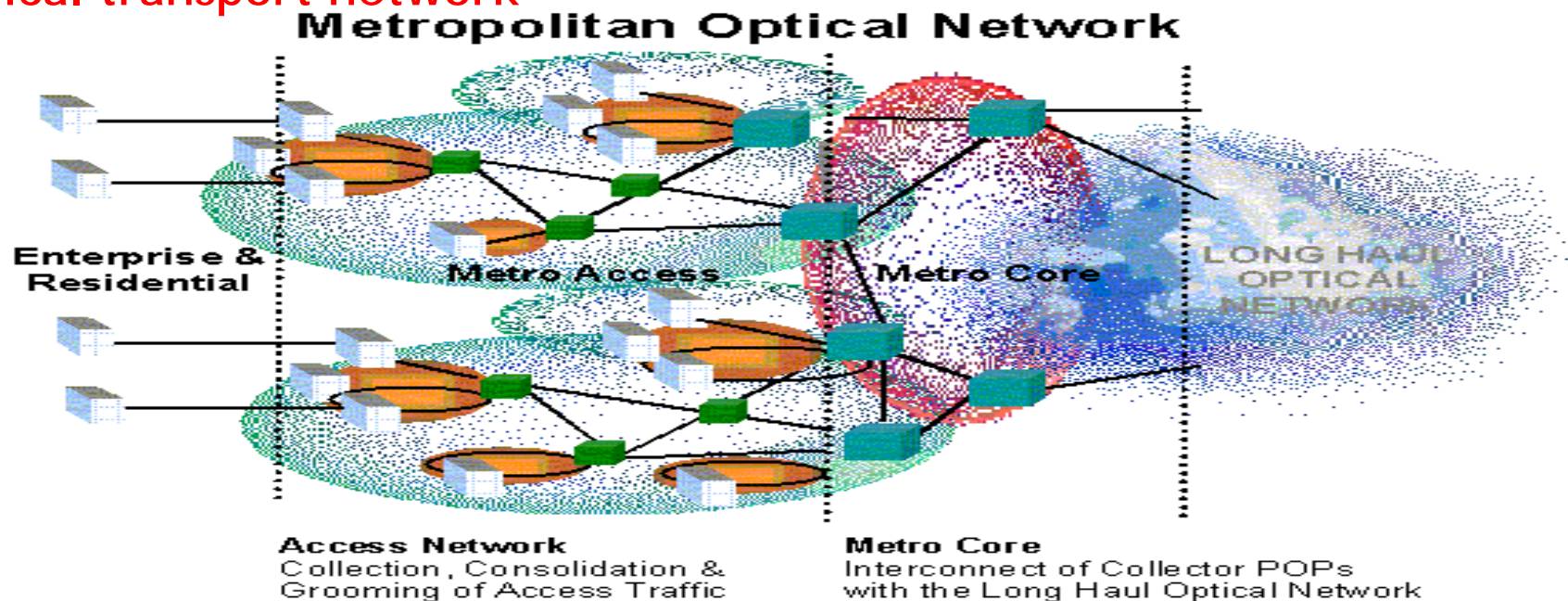
- o Responsible for studies relating to **signalling requirements and protocols**
  - Including for IP-based networks, **NGN**, mobility, some multimedia related signalling aspects, ad hoc networks, QoS, and internetwork signalling for ATM, N ISDN and PSTN networks
  - Including reference signalling architectures and **test specifications for NGN** and emerging networks (e.g., USN)
- o Lead study group on
  - **signalling and protocols**
  - **intelligent networks**
  - **test specifications**

## NGN achievements of SG11

- A significant number of NGN Protocol Set 1 related Recommendations is available
  - These Recommendations constitute a major reference to enable actual NGN implementations (Release 1)
  - Various Supplements have been published to document the corresponding NGN signalling requirements
- NGN Protocol Set 2 and more Recommendations continue to be developed in [2009-2012] study period
  - based on new requirements and feedback from NGN Release 1 implementations

# Mandates of SG 15 [2009-2012]

- Responsible for standards development for the international telecommunication transport network infrastructure
  - **optical transport networks and access network** infrastructures, systems, equipment, **optical fibres and cables**, and their related installation, maintenance, test, instrumentation and measurement techniques, and control plane technologies to enable the evolution toward intelligent transport networks
  - includes standards for the customer premises (**home networking**), **access**, **metropolitan** and **long haul** sections of communication networks
- Lead study group on **access network transport, optical technology and optical transport network**





# ITU-T SG 15 study areas and objectives

## **SG 15: Optical transport networks and access network infrastructures**

### **SG 15 common management policies**

- Promotion and workshops contribution
- Technology watch and technology innovation
- Network operator's requirements and market applications
- Bridging the standardization gap

### **Access networks and home networking**

#### **Access network transport**

- Home networking
- Enhancement of DSLs
- Future Optical access > 10Gb/s, WDM
- Cost effective broadband access solutions including XDSL/Fibre Hybrid systems
- Powering (including energy saving)

#### **Optical physical infrastructure**

**Coordination of studies on physical infrastructure characteristics and Transport technologies will be a key point for the success of these studies**

### **Metropolitan and long-haul networks**

#### **Transport network structure**

- Future packet-based transport architecture
- Future network structure and interfaces
- Carrier-class NW performance and timing issues
- High resiliency and OAM mechanism
- Network control plane & management elements

#### **Transport network technologies**

- Future metro/backbone network
- Ultra-high-speed transmission > 40 Gb/s
- DWDM high capacity transmission
- Key optical components (e.g. amplifiers)
- Full Photonic networking (AON: All Optical Network)

- Expanding the application of WDM
- New fibres and cables for Metro/access
- Better knowledge of the transmission characteristics of the existing fibres and cables

**Thank you for your  
attention**

**Questions ?**

# Backup

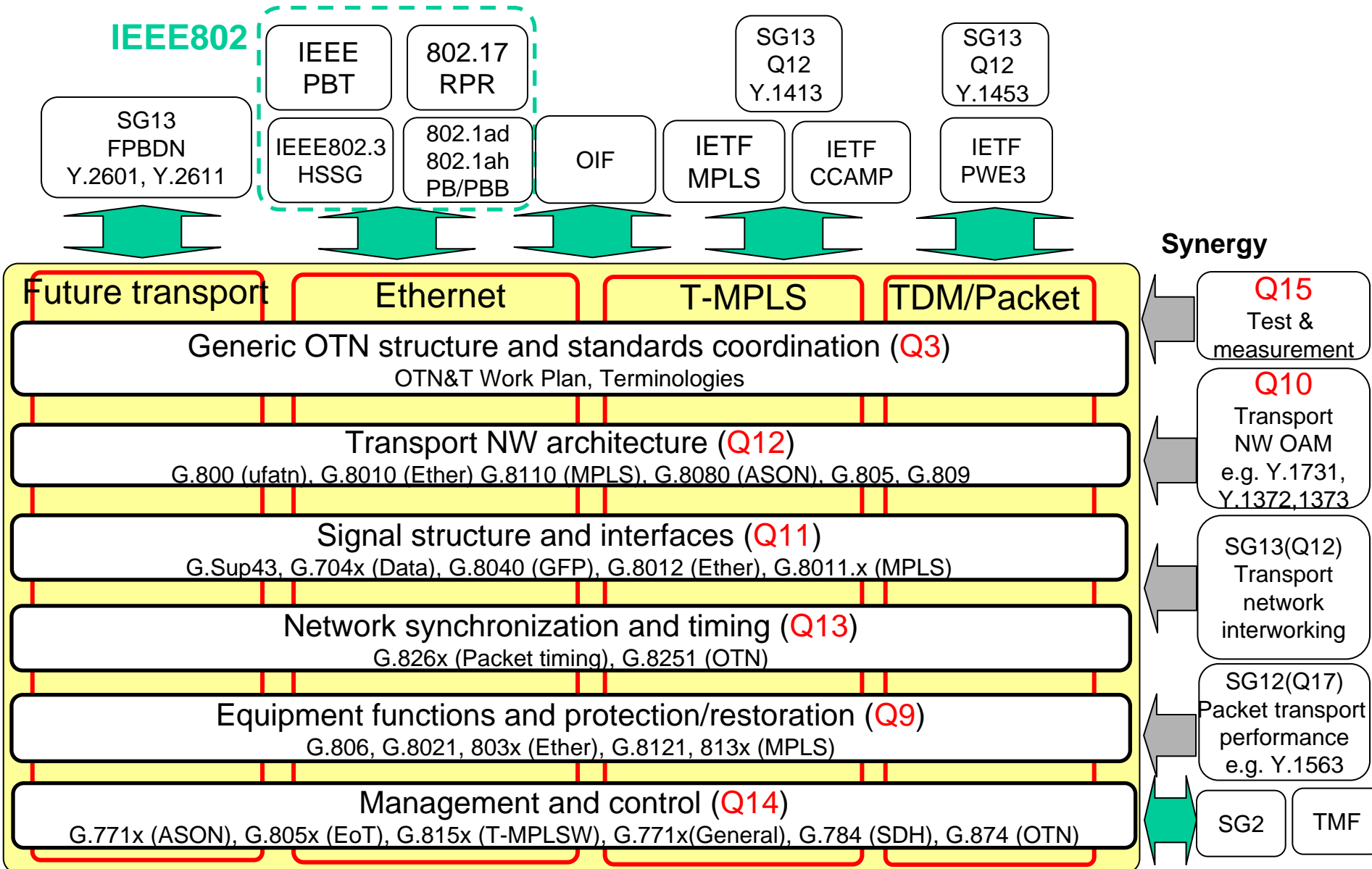
## NGN Recommendations: Y-series

Frameworks and functional architecture models	Y.2000-Y.2099
Quality of service and performance	Y.2100-Y.2199
Service aspects: Service capabilities and service architecture	Y.2200-Y.2249
Service aspects: Interoperability of services and networks in NGN	Y.2250-Y.2299
Numbering, naming and addressing	Y.2300-Y.2399
Network management	Y.2400-Y.2499
Network control architectures and protocols	Y.2500-Y.2599
Security	Y.2700-Y.2799
Generalized mobility	Y.2800-Y.2899

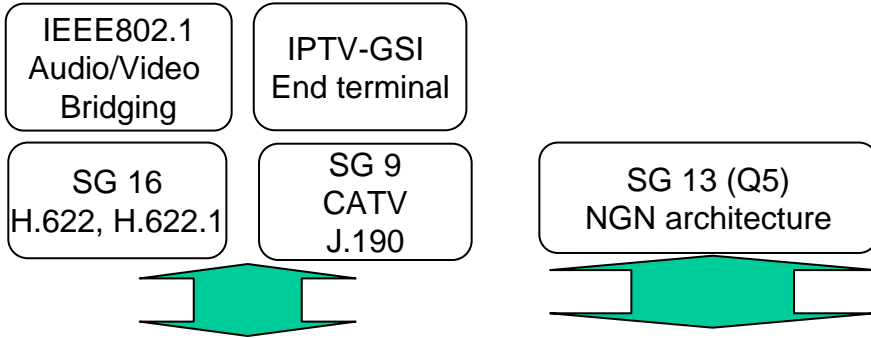
## NGN Recommendations: Q-series

General	Q.3000-Q.3029
Network signalling and control functional architecture	Q.3030-Q.3099
Network data organization within the NGN	Q.3100-Q.3129
Bearer control signalling	Q.3130-Q.3179
Signalling and control requirements and protocols to support attachment in NGN environments	Q.3200-Q.3249
Resource control protocols	Q.3300-Q.3369
Service and session control protocols	Q.3400-Q.3499
Service and session control protocols - supplementary services	Q.3600-Q.3649
NGN applications	Q.3700-Q.3849
Testing for NGN networks	Q.3900-Q.3999

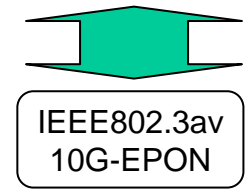
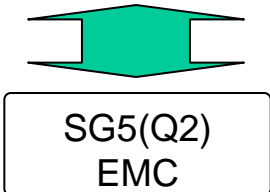
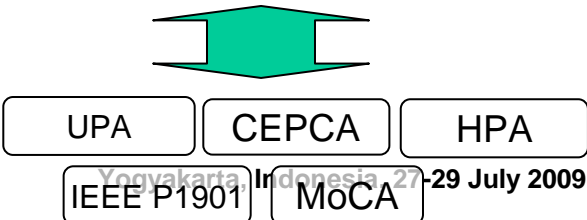
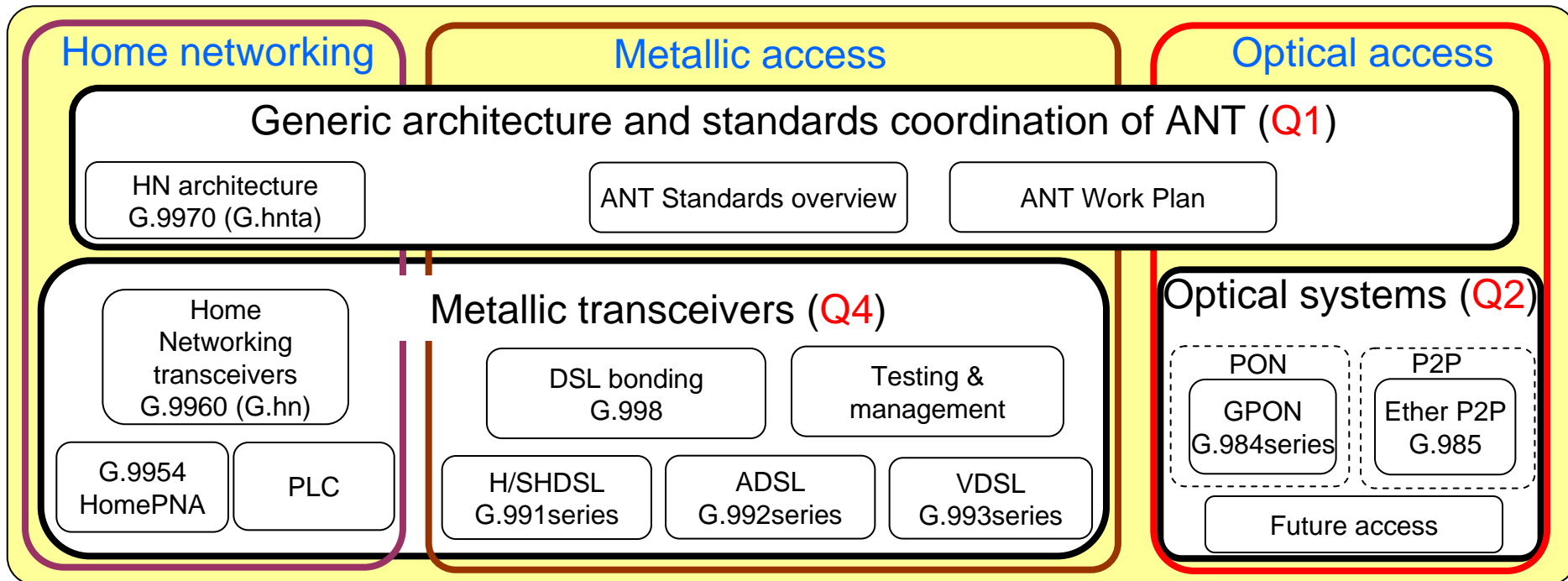
# Transport network structure



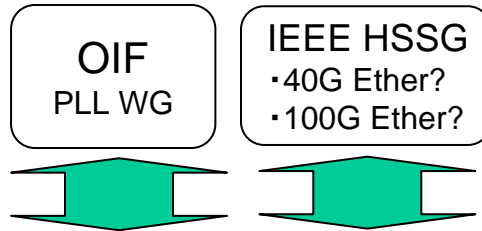
# Access network transport: ANT



**SG 15 study areas and hot topics**

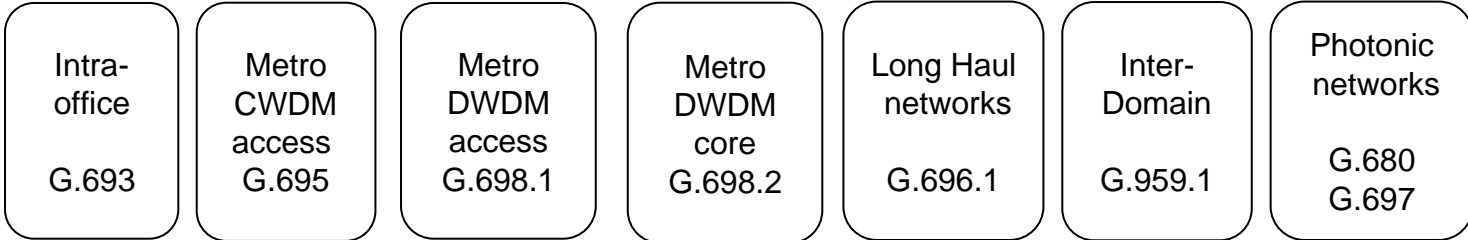


# Transport network technologies

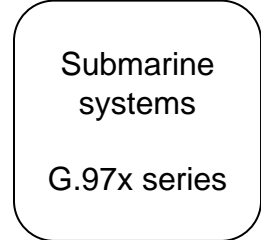


PLL WG: Physical and Link Layer Working Group  
HSSG: Higher Speed Study Group

## Terrestrial transport (Q6)



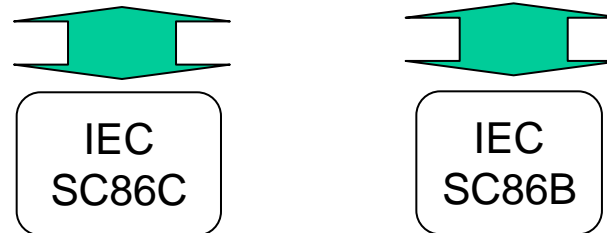
## Submarine transport (Q8)



## Transmission characteristics of optical components and sub-systems (Q7)

PMD & CD compensator(G.666 R G.667), Optical components (G.671)  
Amplifier (G.661, 662, 663, 665)

## SG 15 study areas and hot topics





# Optical physical infrastructure

Access network transport

Transport network technologies

**Coordination of studies on physical infrastructure characteristics and transport technologies will be a key point for the success of these studies.**

Optical fibres and cables (Q5)

**Definitions and test methods**

G.650

**Fibres for access network applications**

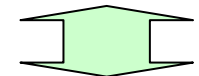
G.657, G.651.1

**Fibres for all terrestrial applications**

G.652, G.655, G.656

**Fibres for submarine applications**

G.654, G.978



IEC SC86A  
WG1 fibres  
WG3 cables

**SG 15 study areas and hot topics**