Overview of NGN

Chaesub LEE

Chairman of ITU-T SG13

Content

1. Overview of NGN
2. Services and Requirements
3. Functional Architecture
4. QoS, Security and Mobility
5. Impacts of NGN
6. Use cases of NGN

Definition of NGN

ITU-T

Rec.

Y.2001

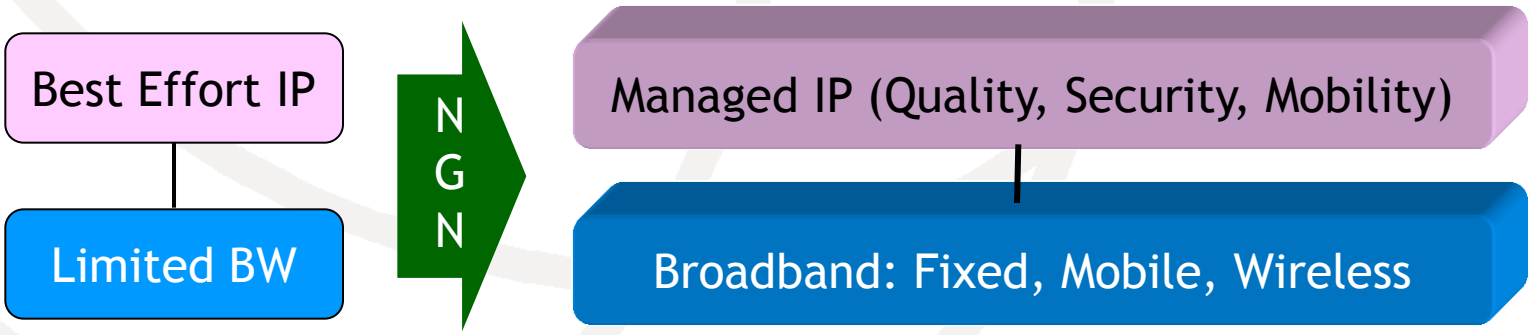
Next Generation Network (NGN):
a **packet-based** network able to provide telecommunication services and able to make use of **multiple broadband**, **QoS-enabled** transport technologies and in which **service-related functions** are **independent** from underlying **transport-related technologies.**

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.

Practical meaning of NGN

NGN is a Broadband Managed IP-based Network

- **NGN got benefits from today's broadband capabilities; over fixed, over mobile and over wireless**
- **NGN has capabilities to support managed features of IP based network, especially QoS, Security and Mobility**



Key Principles of NGN

- Open architecture: open to support service creation, service updating, and incorporation of service logic provision by third parties and also support “Distributed control” as well as enhanced security and protection.
- Independent provisioning: service provision process should be separated from network operation by using distributed, open control mechanism to promote competition.
- Multiplicity: The NGN functional architecture shall offer the configuration flexibility needed to support multiple access technologies.

Features of NGN

- Packet-based transfer;
- Separation of control functions among BC, call/session, and application/ service;
- Decoupling of service provision from transport;
- Support for a wide range of services based on service building blocks;
- Broadband capabilities with end-to-end QoS;
- Interworking with legacy networks via open interfaces;
- Generalized mobility;
- Unfettered access by users to different service providers;
- A variety of identification schemes;
- Unified service characteristics for the same service as perceived by the user;
- Converged services between fixed/mobile;
- Independence of service-related functions from underlying transport technologies;
- Support of multiple last mile technologies;
- Compliant with all regulatory requirements (e.g. emergency, privacy, lawful interception, etc.)

Next Generation Services

- From legacy networks
  - Services are typically “vertically integrated”
  - Services require specific infrastructure components for their delivery
- to NGN : flexible service creation and provisioning
  - Horizontal Convergence: services are no more vertically integrated
  - Network functions are componentised
  - New paradigm of standard “CAPABILITIES” as service enabling toolkit
- A new challenge for regulation
  - NGN moves the competition from lower layers to service layers

Services developments

Key objectives in NGN service developments

- Not just a new voice network
- *"Service level equal or better than in circuit-switched networks"*
- Services specified in terms of required "capabilities"
- Precise service definitions are not an objective like in legacy world
  - **Public Interest Services are a special case**

Services expected to be supported in NGN

- **Multimedia services**
- **Data communication services**
- **PSTN/ISDN Simulation services**
- **PSTN/ISDN Emulation services**
- **Public Interest Services**

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

Multimedia services: expansion of the service features

- Real-time Conversational Voice
- Point-to-point interactive multimedia, e.g. real-time voice/text/video
- Collaborative interactive communication, e.g. multimedia conferencing
- Push to talk over NGN
- Content delivery, e.g. Radio/Video streaming
- Broadcast services (relying on Multicast), e.g. emergency community notification
- Messaging, e.g. IM, SMS, MMS
- Location-based services, e.g. tour guide service
- Presence and general notification services
- Push-based services, e.g. MMS notification Information services
- Hosted and transit services for enterprises, e.g. IP Centrex
- 3GPP/3GPP2 OSA-based services

PSTN/ISDN Emulation and Simulation

In evolution path to NGN, NGN shall support:

- legacy terminal equipment (e.g. PSTN/ISDN phones)
- PSTN/ISDN-like capabilities

PSTN/ISDN Emulation

- From the end user perspective, the NGN "appears" supporting the same types of services offered by the existing PSTN/ISDN
- Legacy terminals are enabled to continue to use existing telecommunication services while connected to NGN

PSTN/ISDN Simulation

- NGN terminals in an NGN network are enabled to use PSTN/ISDN-like service capabilities
- But legacy terminals with terminal adaptations may be used too
- Implemented over IP-based control infrastructure (e.g. using SIP)

Regulatory and legal requirements: Public Interest Services

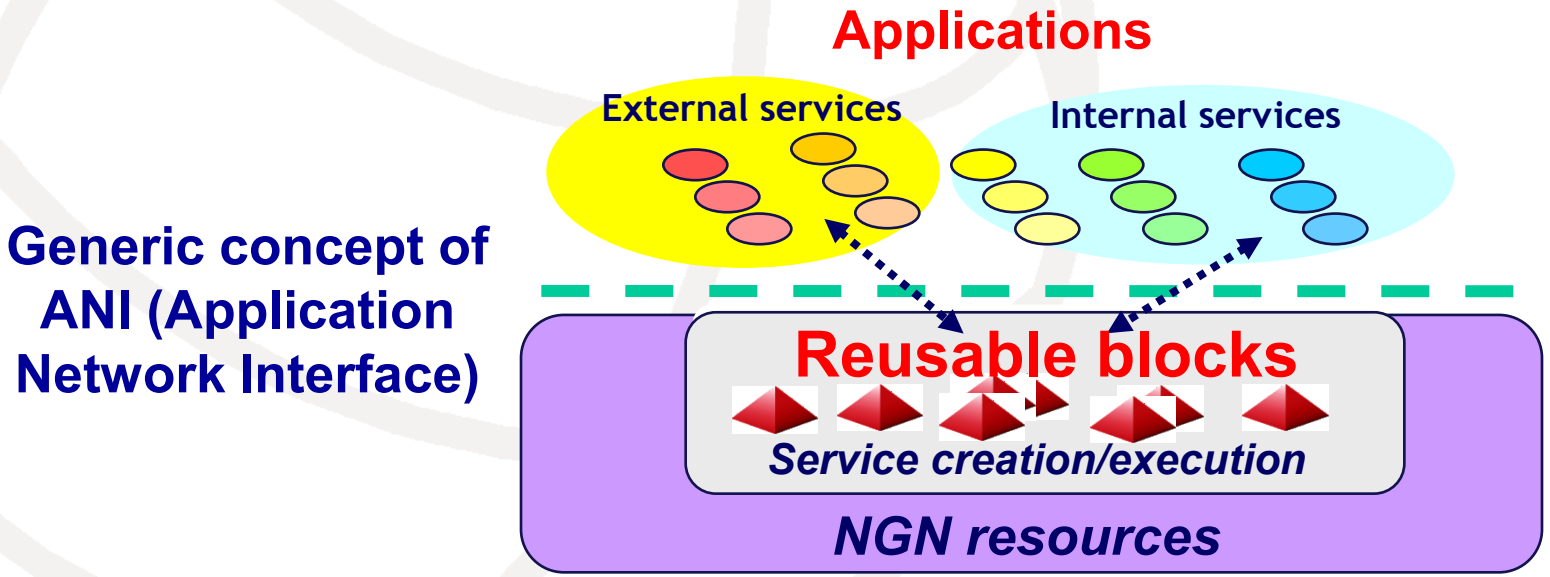
- Emergency telecommunications (including Early Warning)
  - individual-to-authority, e.g. calls to Emergency SP
  - authority-to-authority, e.g. TDR
  - Authority-to-individual, community notification services
- Support for users with disabilities
- Lawful Interception
- Service unbundling
- Number portability
- Network or Service Provider selection
- Prevention of unsolicited bulk telecommunications
- Malicious communication identification
- User identifier presentation and privacy

NGN **shall provide capabilities** for support of Public Interest Services required by regulations or laws of national or regional administrations and international treaties

The concept of "Capabilities" as re-usable building blocks for services and applications

A reusable set of Capabilities

- Functional groups within a SP's network, reusable by other services
- Interworking of functions for service execution & management
- may be used by services within a SP's network or outside
- support of multiple and future business models
  - Third Party Access, Externalisation, underlying capabilities versus service creation/execution environment capabilities

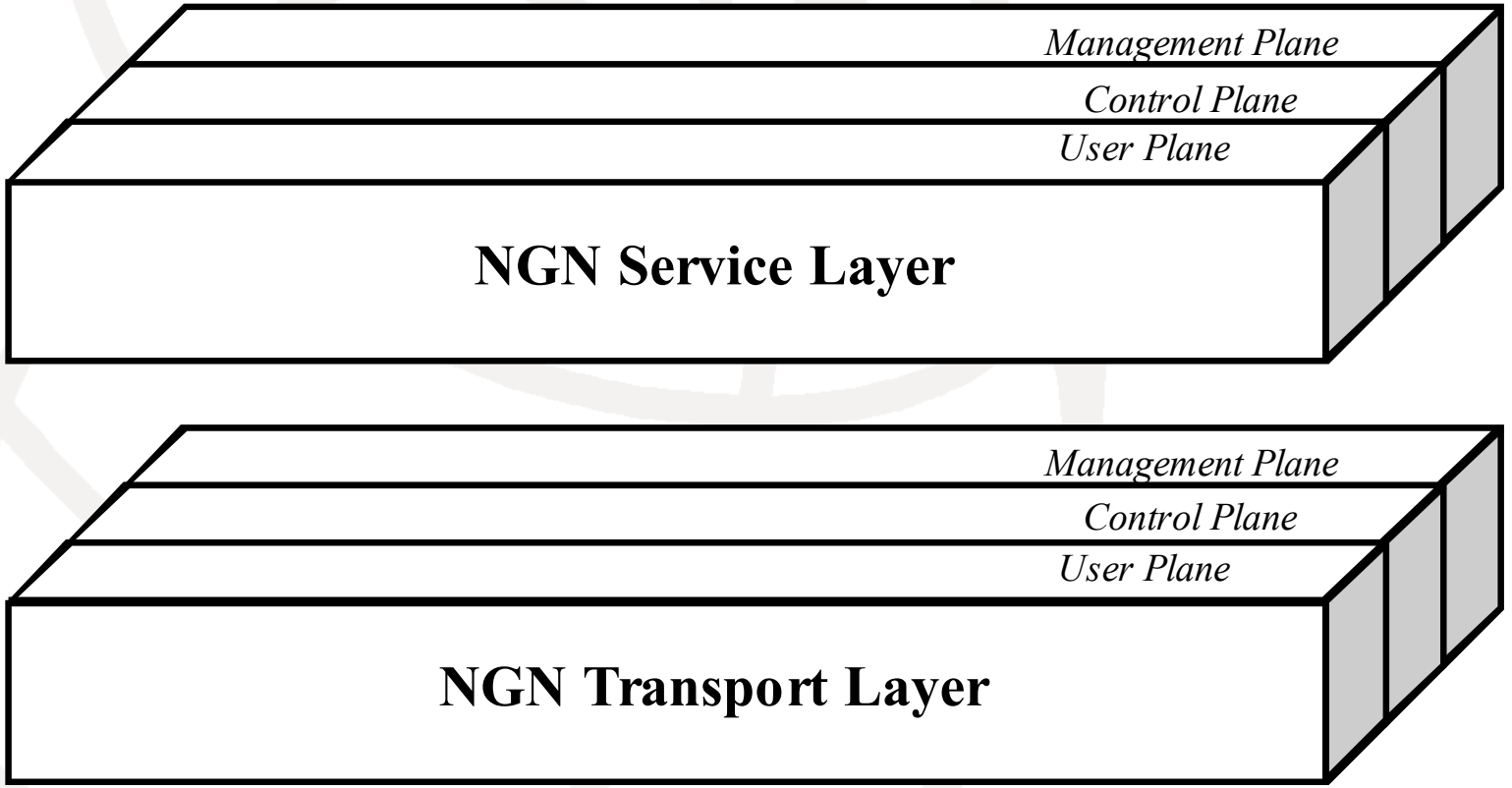


NGN Capabilities

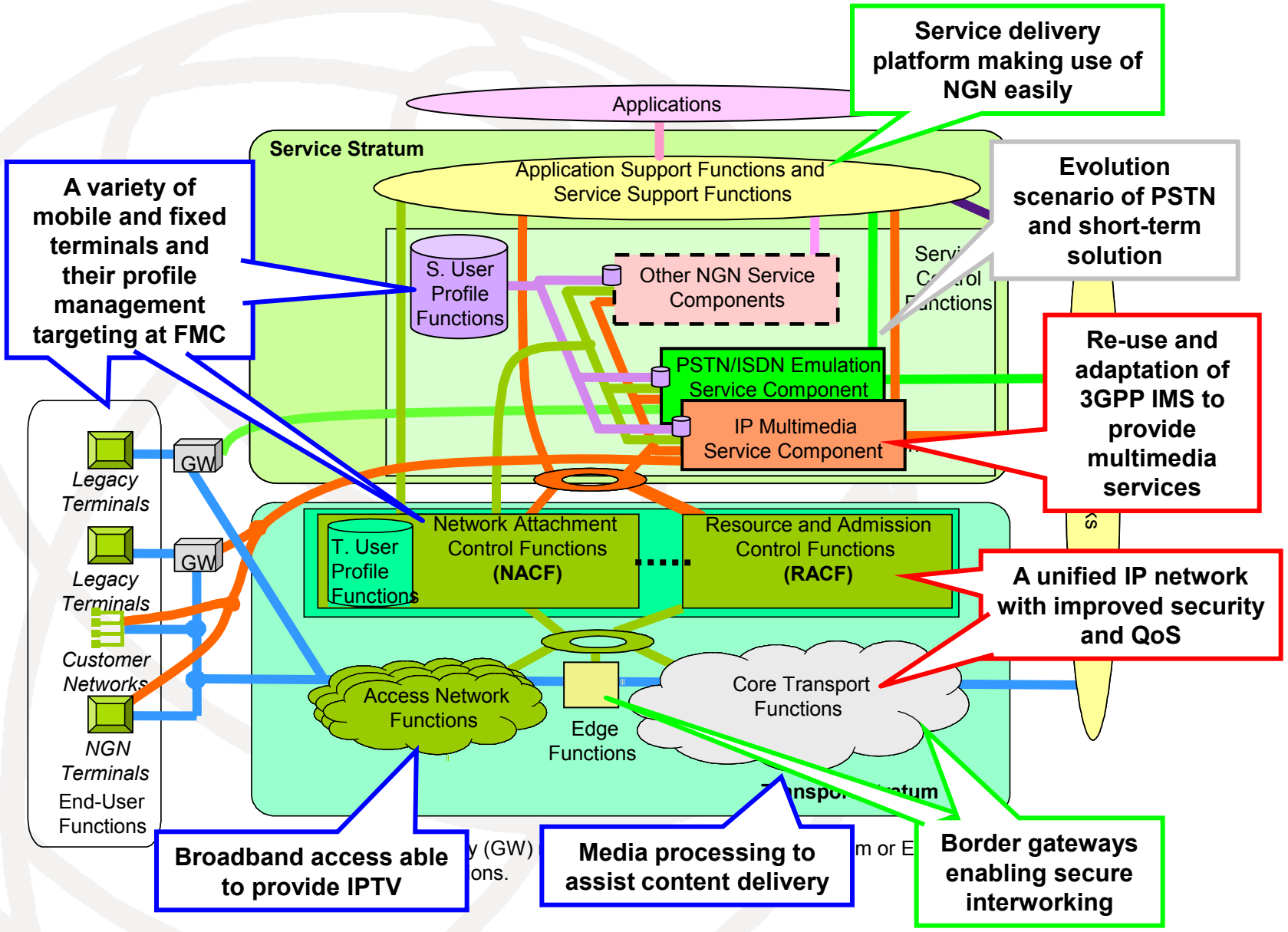
- Transport connectivity
- Communication modes
- Media resource management
- Codecs
- Access Networks and network attachment
- User networks
- Interconnection, Interoperability and Interworking
- Routing
- QoS
- Accounting and Charging
- Numbering, naming and addressing
- Identification, authentication and authorization
- Security
- Mobility management
- OAM
- Survivability
- Management
- Open Service Environment
- Profile management
- Policy management
- Service enablers
- PSTN/ISDN emulation and simulation
- Public Interest Services support
- Critical infrastructure protection
- Non disclosure of info across NNI
- Inter-provider exchange of user-related information

NGN Basic Reference Model

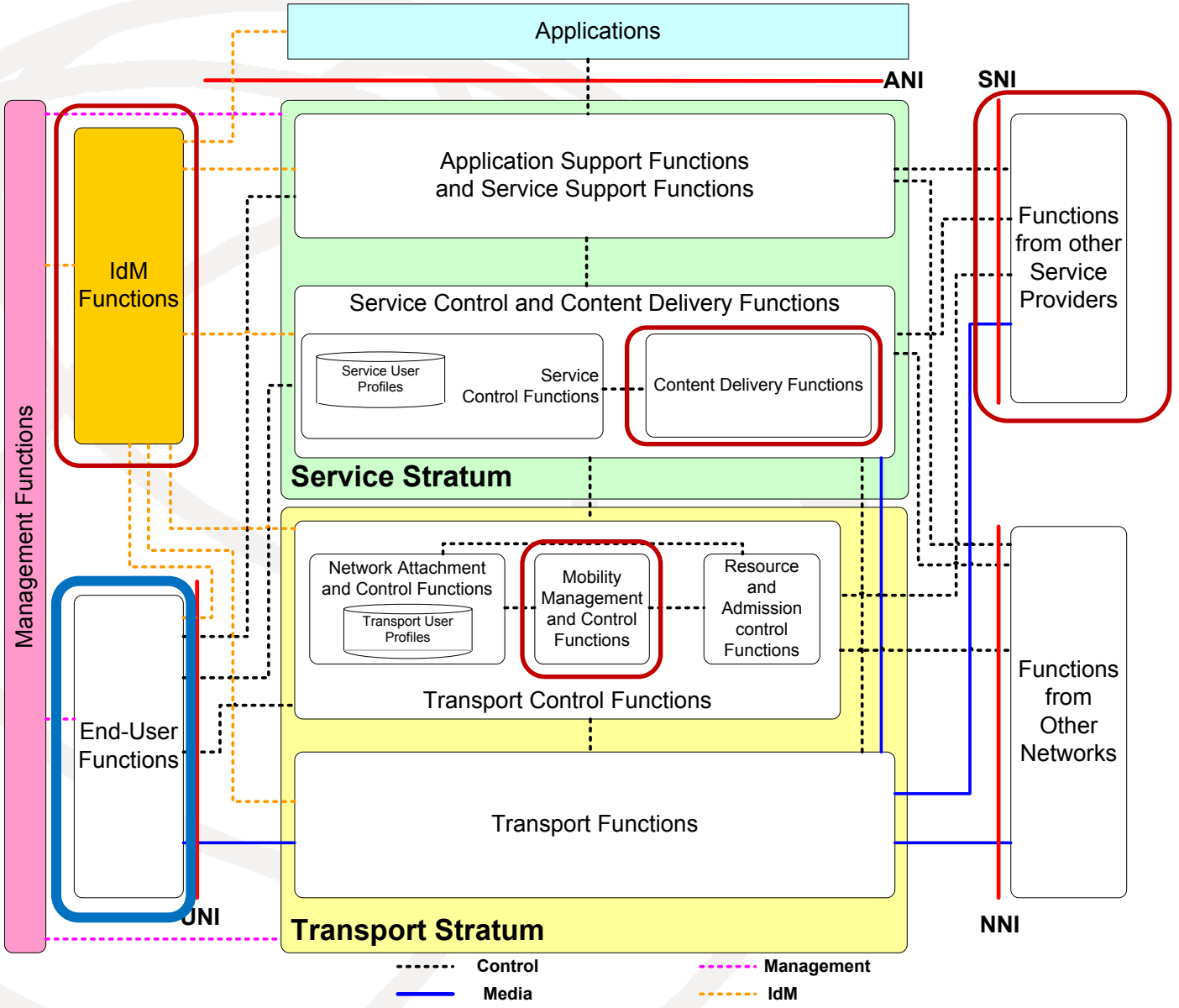
- Separation Transport (Access and Core) from Services
- But keeping 3 Planes for basic function: User, Control and Management



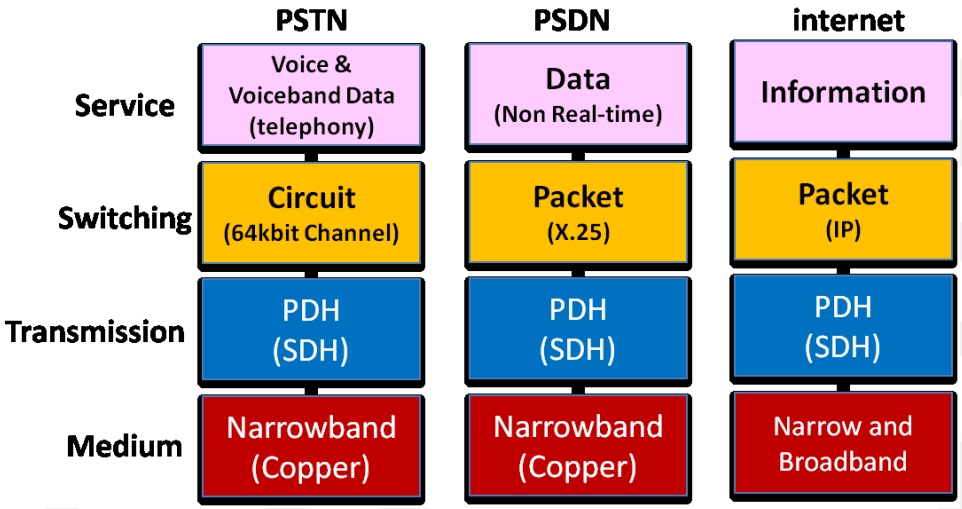
Key Features of NGN Functions

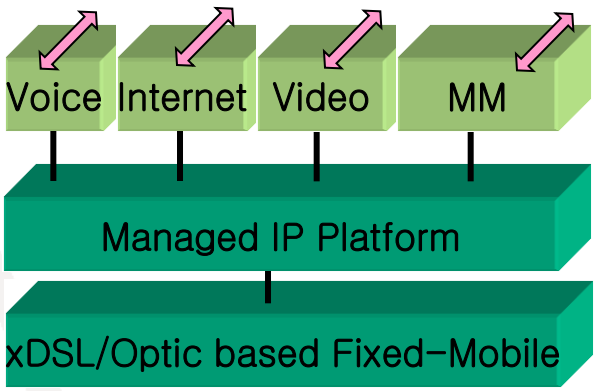


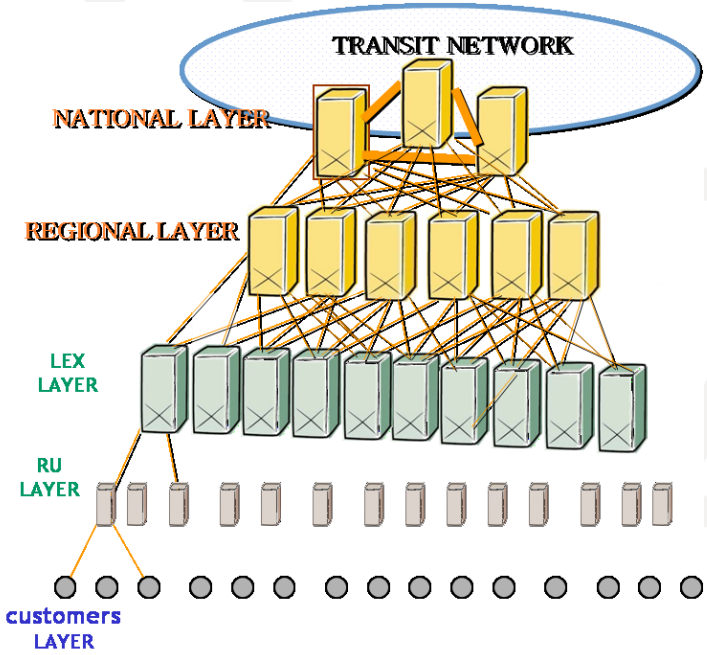
Overall NGN Architecture

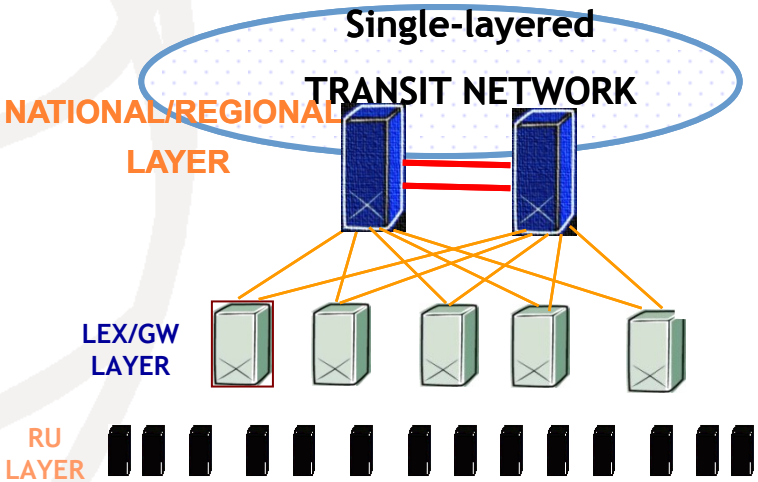


Impacts of NGN Architecture









Objectives of QoS and Security

- **QoS objectives**
  - End-to-end QoS environment for the services offered to end users via QoS coordination across the transport stratum
  - NGN will provide an initial set of requirements, architectures, mechanisms and guidelines to enable end-to-end QoS
  - Focus on Resource and Admission Control, including coordination between access and core, as well as between core and other NGN
- **Security objectives**
  - NGN identified Security Requirements specification based on the application of ITU-T X.805 to NGN
  - Addressing the following security dimensions: Access Control, Authentication, Non-repudiation, Data Confidentiality, Communication Security, Data Integrity, Availability and Privacy.
  - Addressing the incremental security features required for secure interconnection with other NGN or existing networks

Objectives of Mobility Management

Mobility objectives

- **Mobile users requirements**
  - Seamless and transparent mechanisms for roaming between network operators and continual access to tailored services from a variety of environments while using a variety of terminals with varying capabilities
- **No major new interfaces for mobility are proposed**
  - Existing interfaces will be used, as well as existing signalling capabilities for all types of mobility as currently defined
  - Personal mobility will exist where users can register themselves to the services (existing interfaces with terminals and networks)
  - Terminal Mobility will exist within and among networks where terminals can register to the network
- **Nomadism (mobility without maintaining service continuity)**
  - It shall be supported between networks and within a network
  - This does not exclude support for mobility with service continuity

Enabling for Convergences

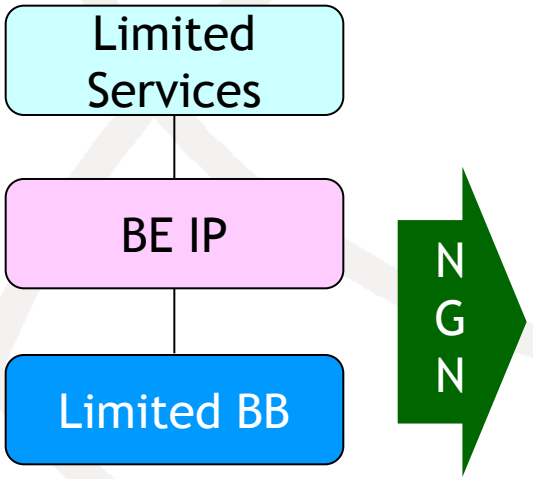
Future should direct to the Convergence

- Vision: Any Time, Any Where, Any Services and Any Devices
- FMC and IPTV should be the instantiation
- Any information/services over any transport infrastructures: VoDSL, TVoMobile, etc.

Convergence classifies into following:

- **Internal Convergences** (within a industry): FMC, IPTV and others
- **External Convergences**: between/among different industries, e.g., Telematics/ITS, USN, e-Health, Networked Robotics and others

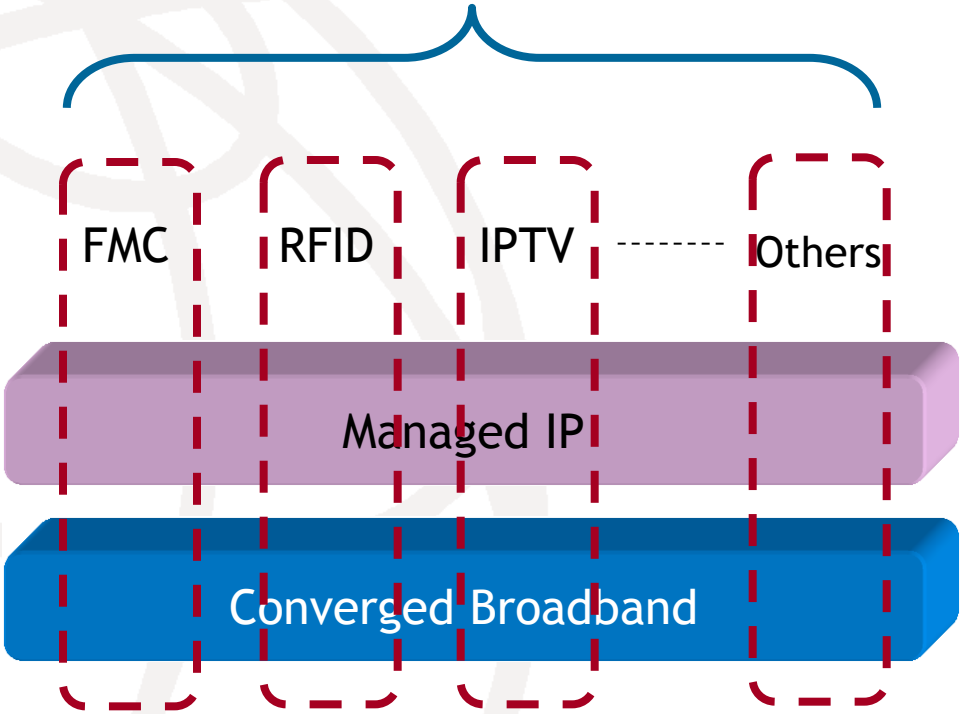
Enabling for Convergences



- Simple linkage btw layers
- Simple business relationships
- Simple players

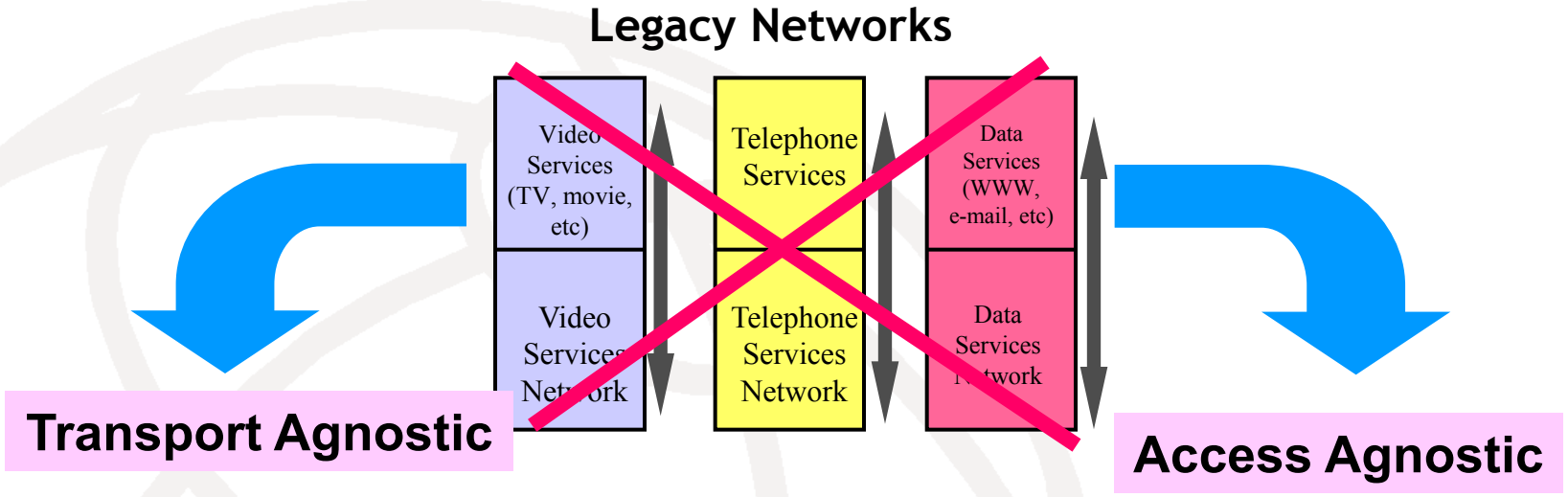
NGN

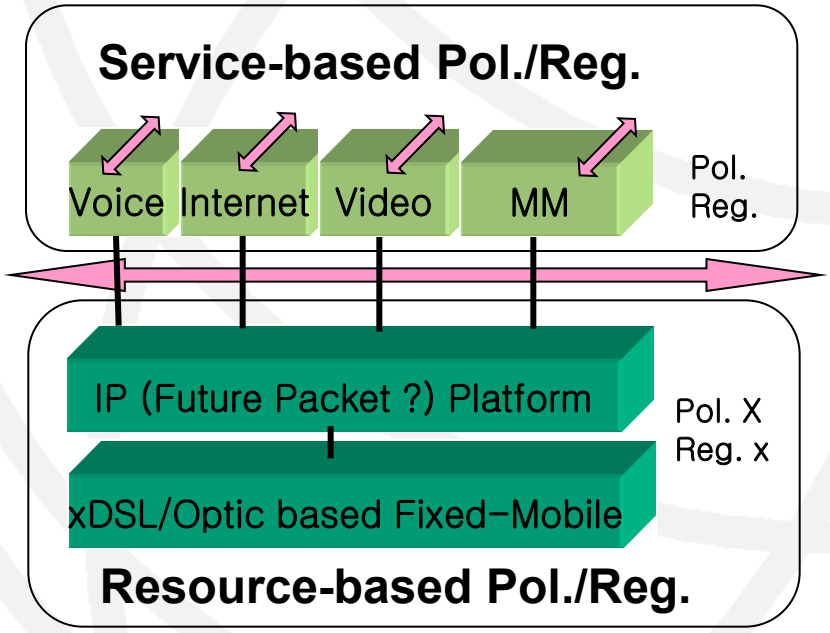
Business/Application oriented projects

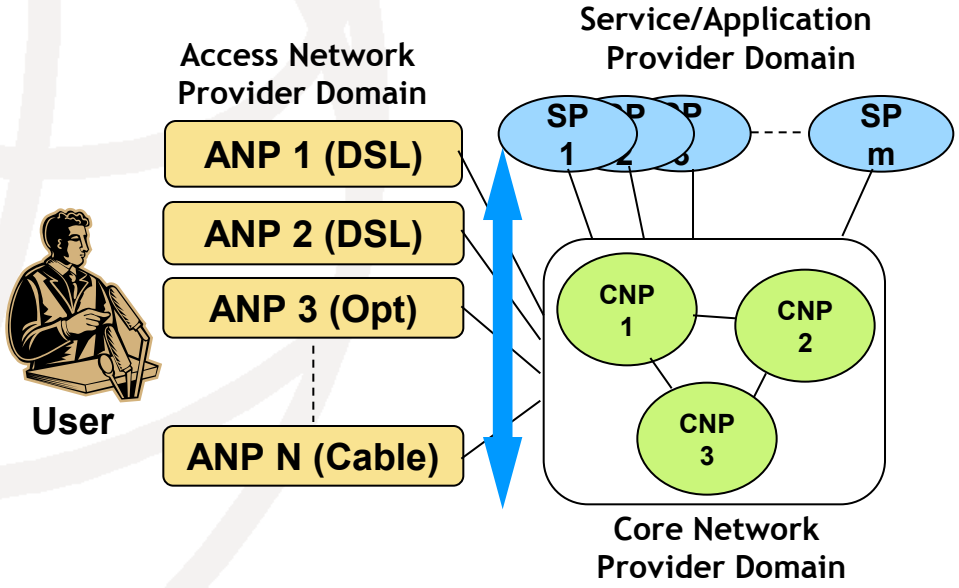


- Simple linkage btw layers with dynamics
- Diverse and Flexible business relationships
- Diverse business models and players

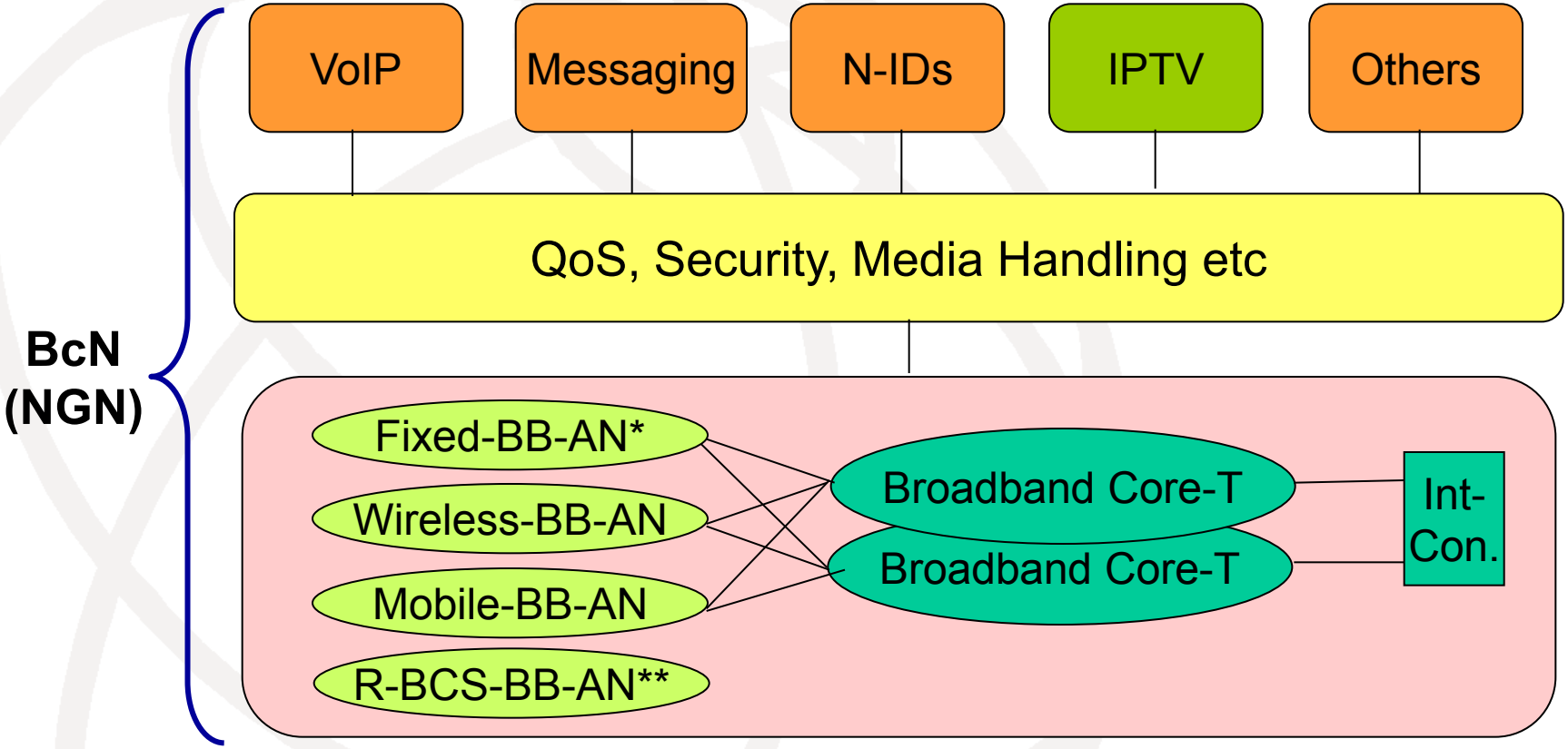
NGN: Changing Regulation Frameworks





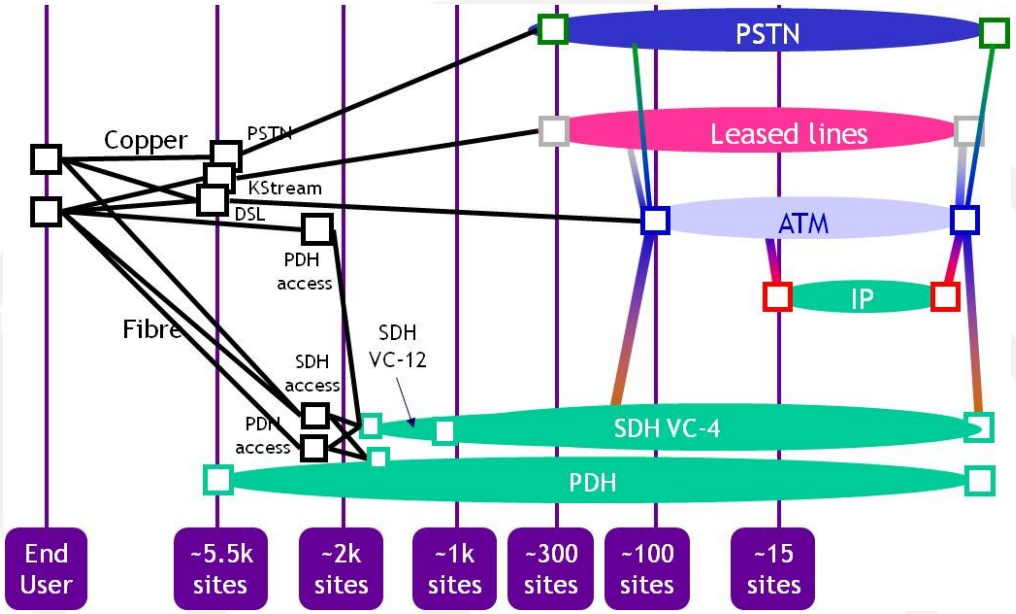


Broadband Convergence Networks

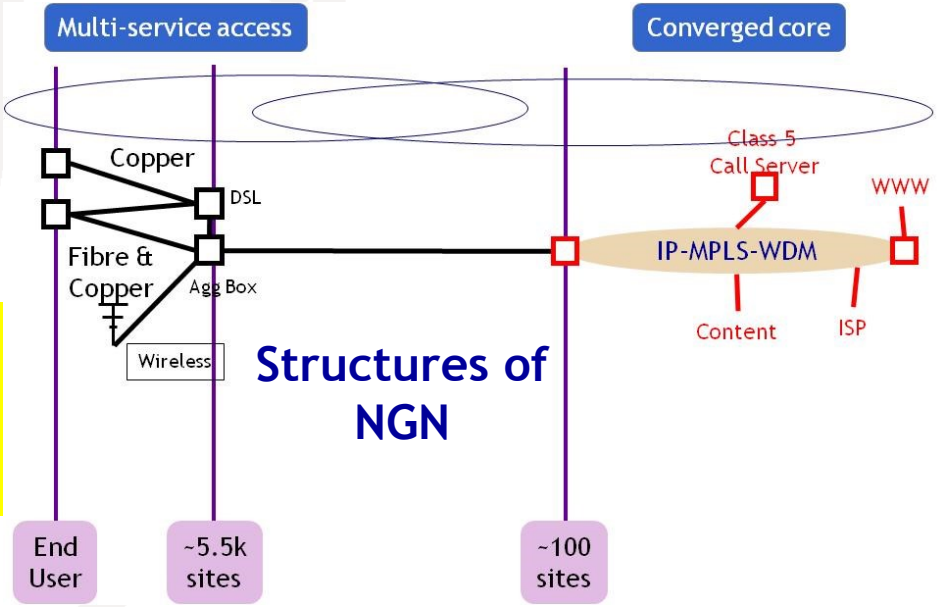


* Include cable based Broadband Access Network technology
** means radio based broadcasting trasport capabilities include satellite means

21CN - simplified UK network



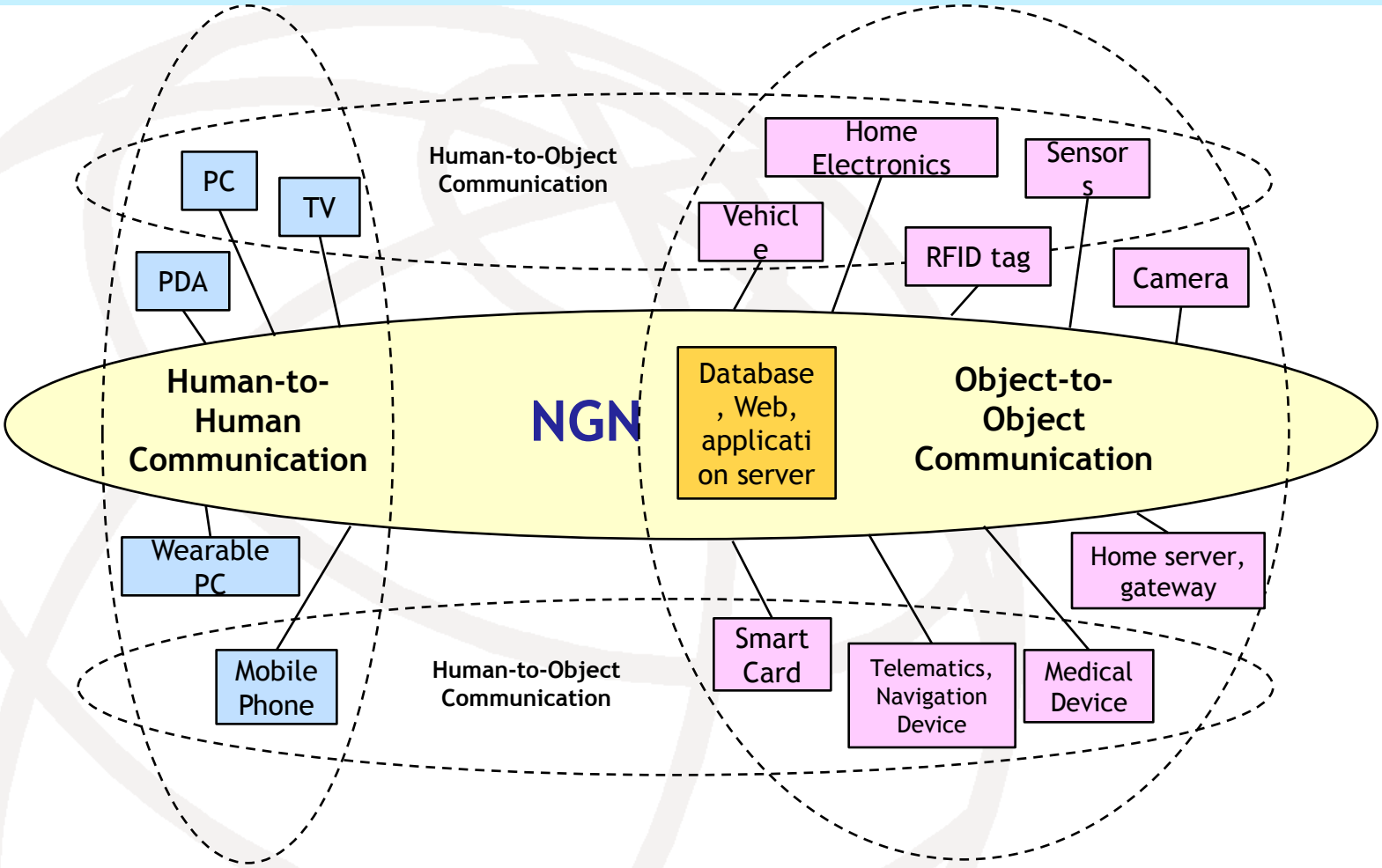
Structures of legacy networks



Structures of NGN

Reduction number of nodes (offices) around 30~40%

Future use of NGN for OtO (inc. IoT/M2M)



Thank you for your attention !!!