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International Telecommunication Union

What is NGN: Basic Architecture

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ITU-T/OGF Workshop on Next Generation Networks and Grids
Geneva, 23-24 October 2006

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Outline

- Set scene for subsequent sessions by:
  - Introducing basic concepts
  - Showing high-level viewpoints
  - List architectural challenges
  - Summarize architectural work to date
  - Show areas for further study

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NGN Definition

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.

From ITU-T Recommendation Y.2001

Y.2011: NGN General Reference Model

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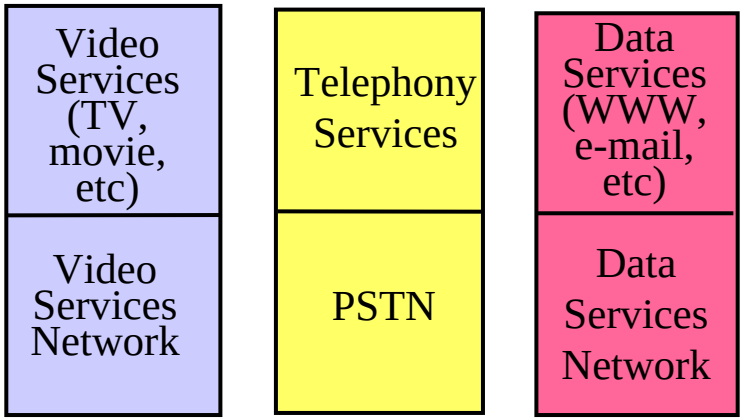
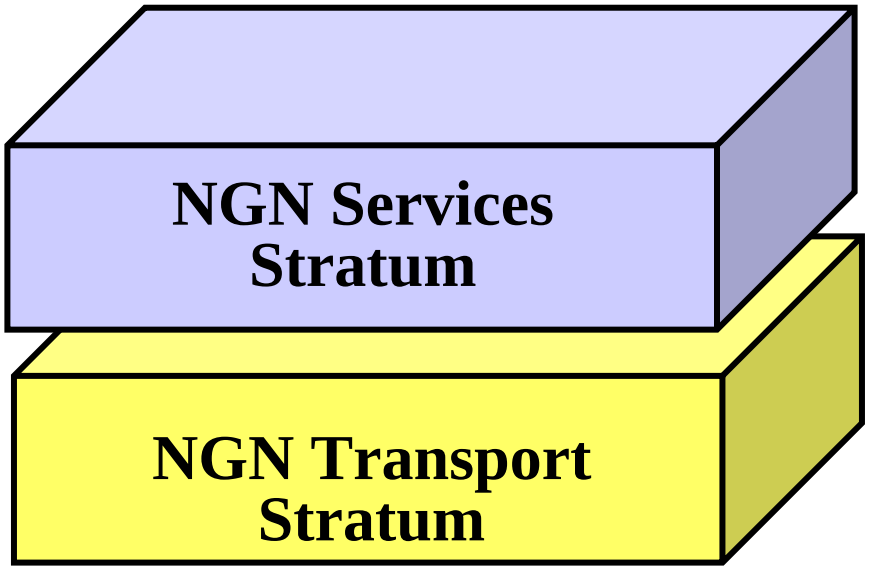
Pre-NGN: Vertically Integrated Networks



NGN: Horizontally Integrated Networks



ITU-T Rec. Y.2011

Far reaching implications

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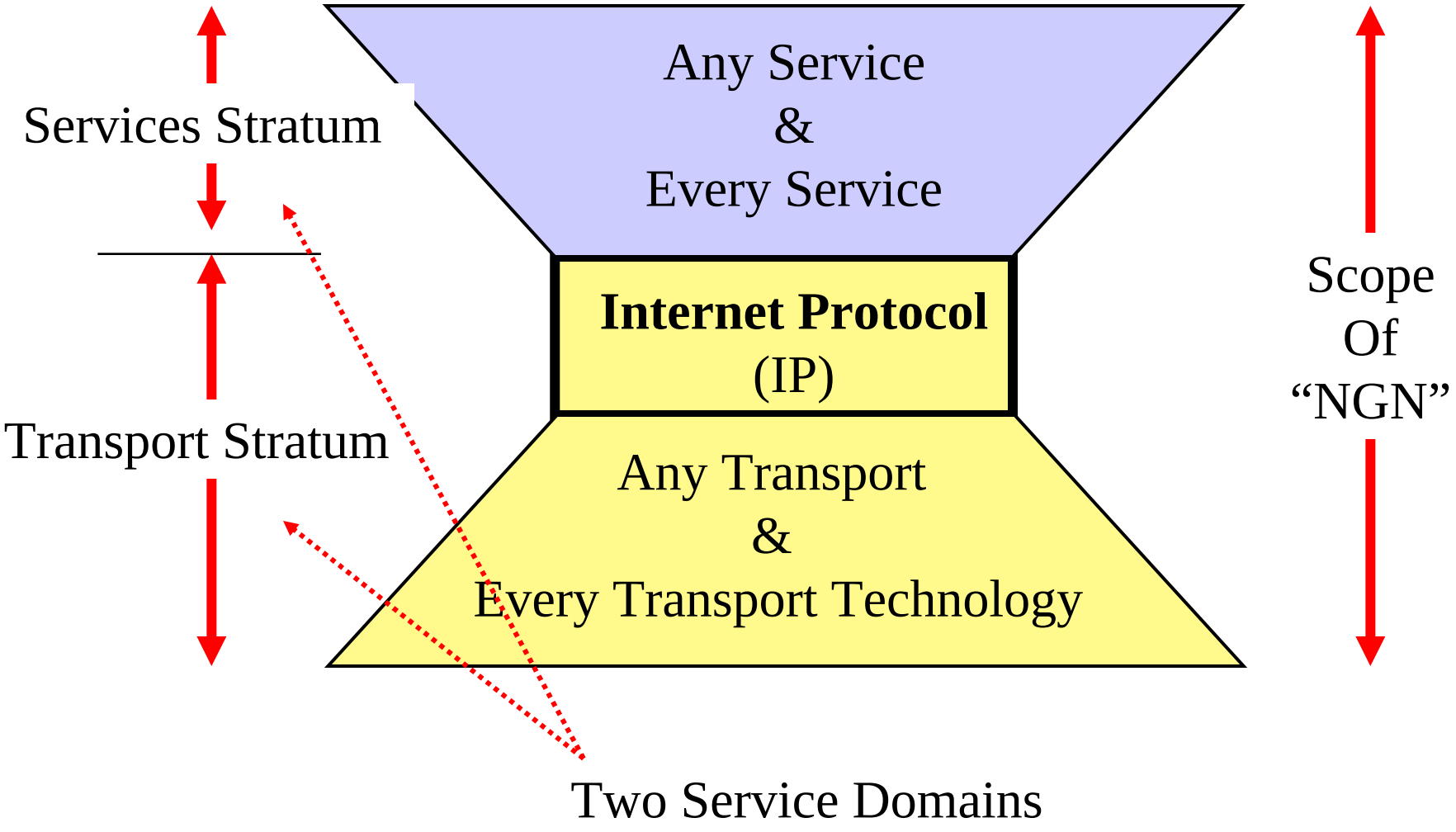
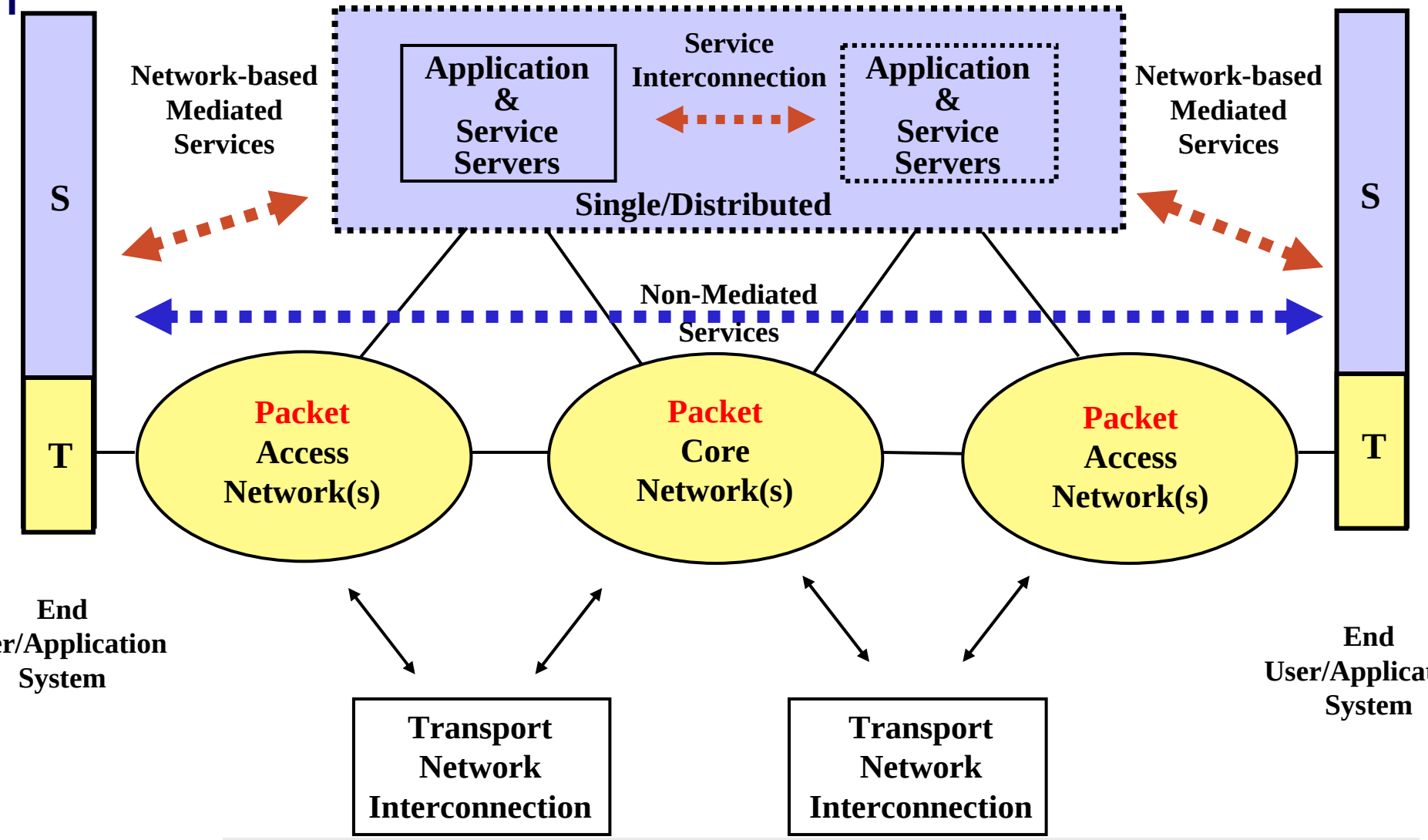
Single Convergence Layer



Service Provision: Mediated and non-mediated services



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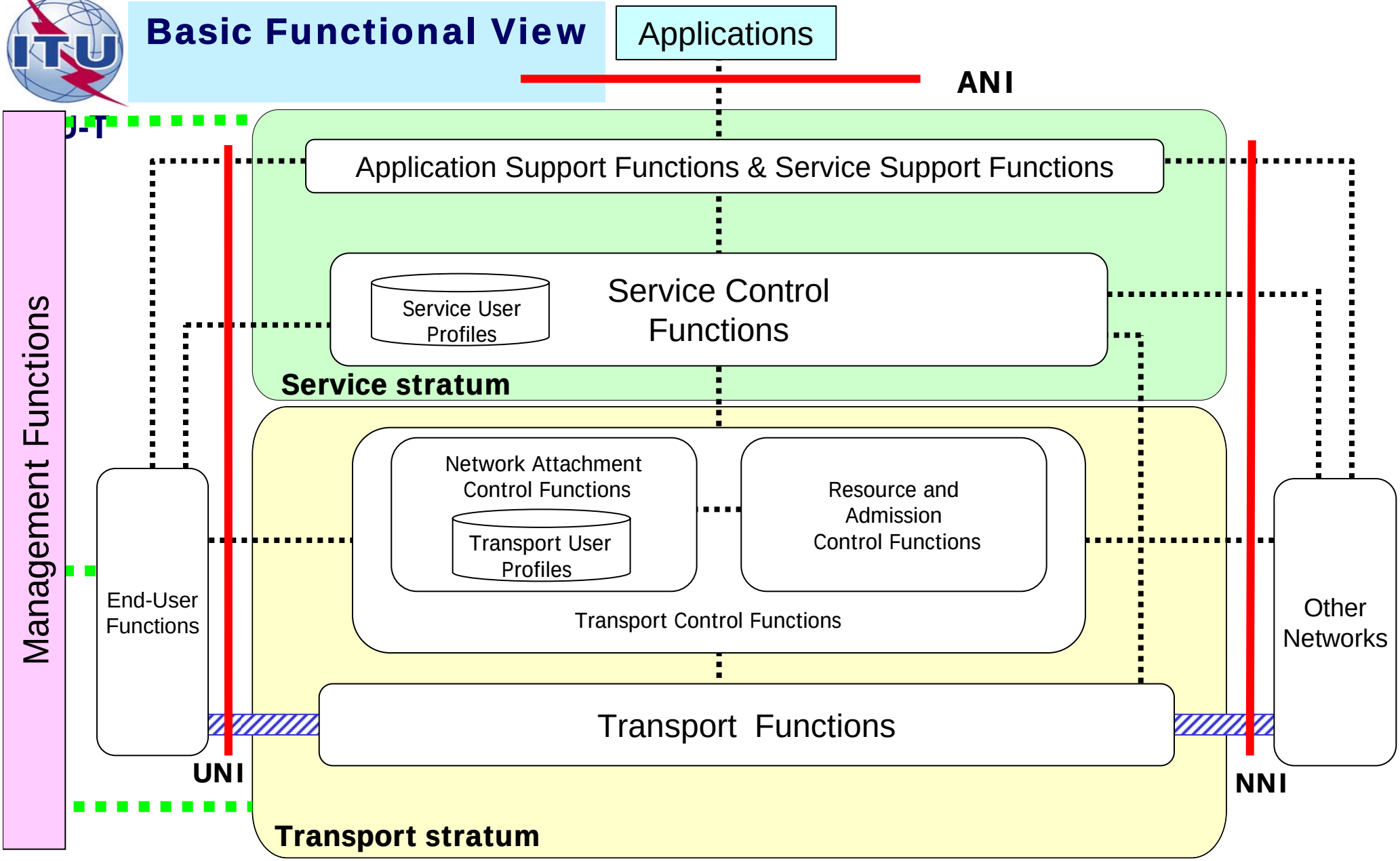
Effects of Separation

- Universal:
  - Any service over a single IP transport network
- Side Effect:
  - Two different levels of control, authentication, admission, charging, etc.
- Challenge:
  - Service to transport coupling & mapping for:
    - QoS selection
    - QoS control
    - transport resource allocation
    - monitoring
    - accounting for usage

Solution: Resource & Admission Control Functions

Basic Functional View



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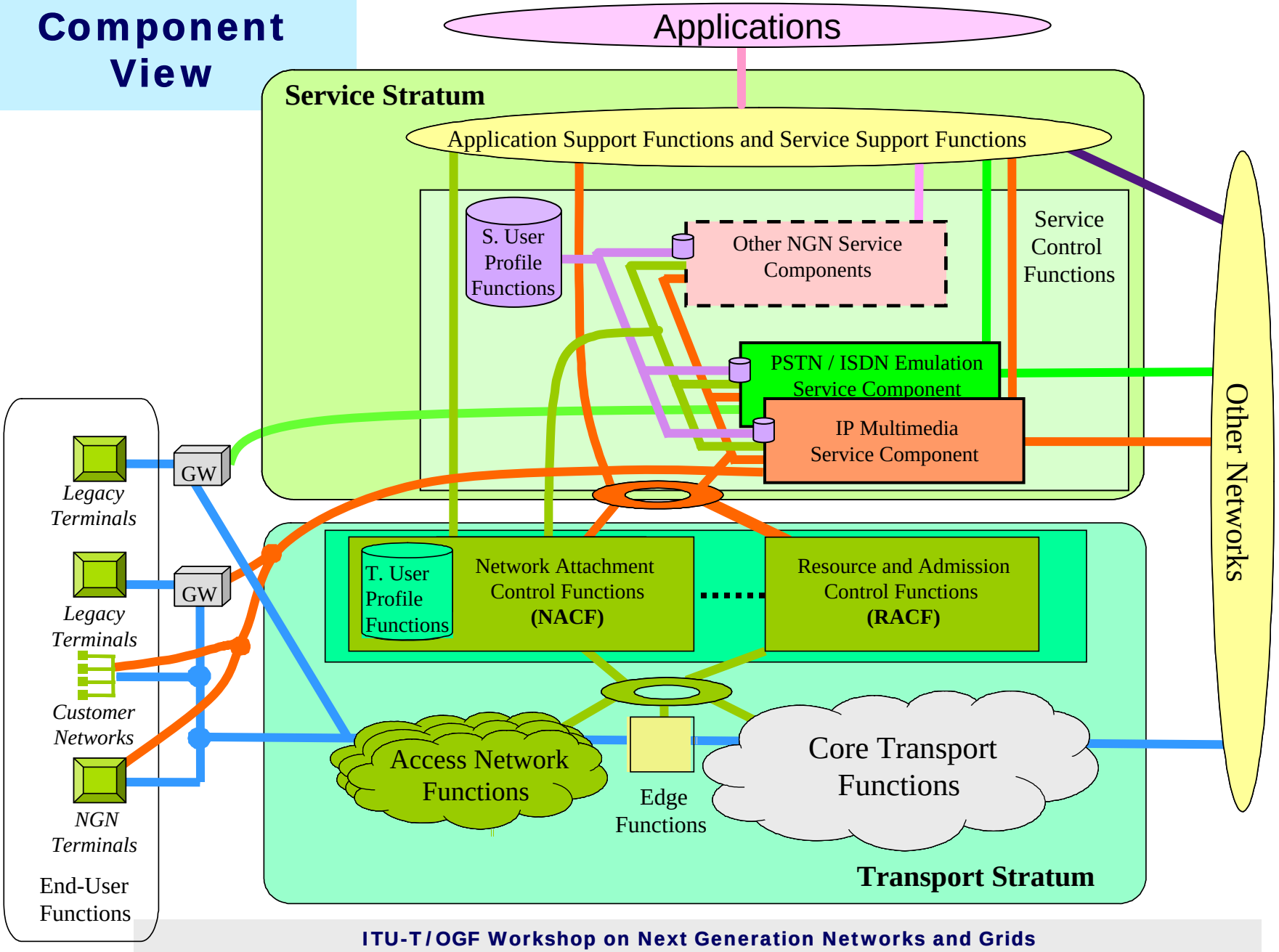
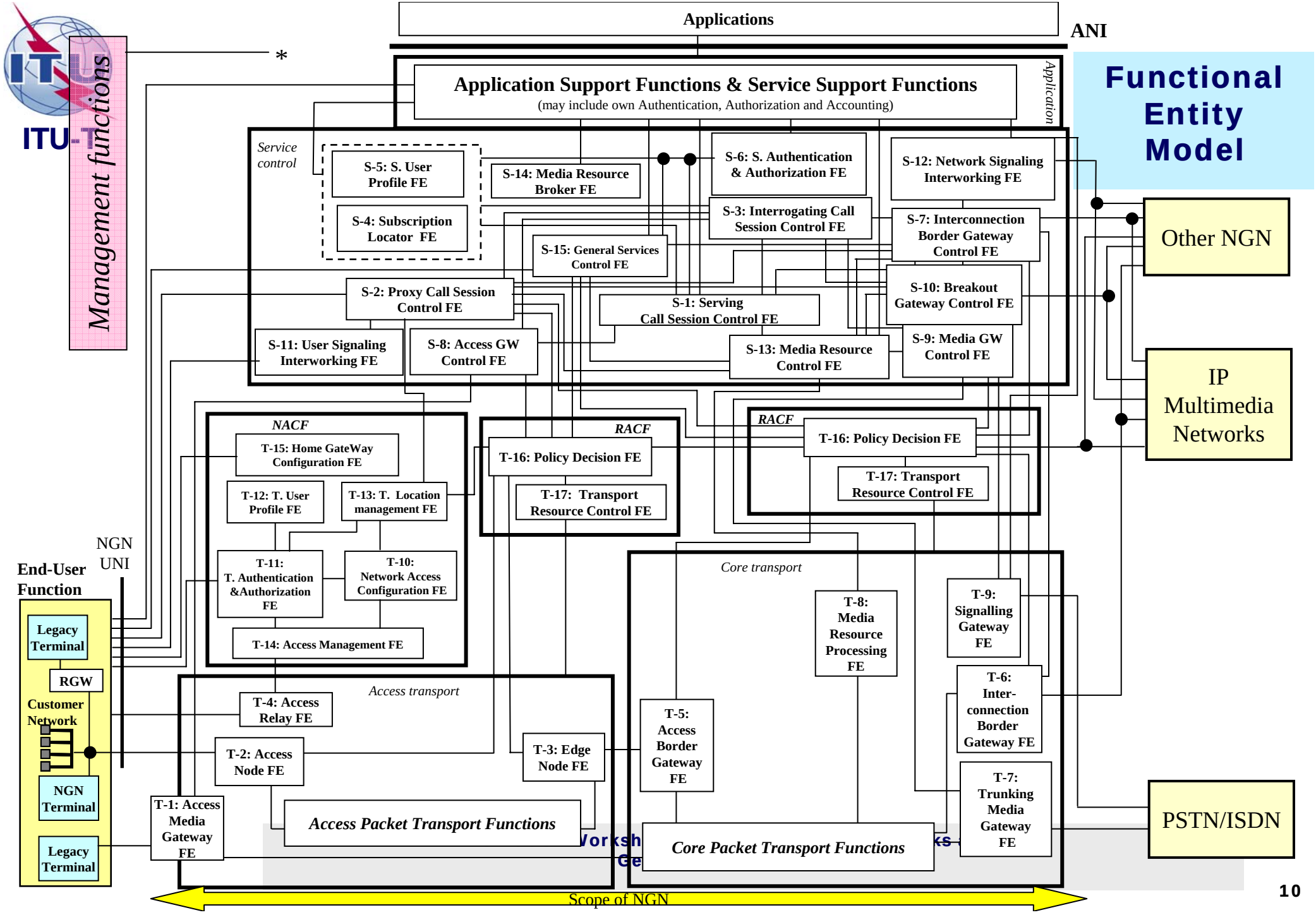
Component View

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Management functions
*
Applications
ANI
Application Support Functions & Service Support Functions
(may include own Authentication, Authorization and Accounting)
Application
Functional Entity Model
Service control
S-5: S. User Profile FE
S-4: Subscription Locator FE
S-14: Media Resource Broker FE
S-6: S. Authentication & Authorization FE
S-12: Network Signaling Interworking FE
S-3: Interrogating Call Session Control FE
S-7: Interconnection Border Gateway Control FE
S-15: General Services Control FE
S-2: Proxy Call Session Control FE
S-1: Serving Call Session Control FE
S-10: Breakout Gateway Control FE
S-11: User Signaling Interworking FE
S-8: Access GW Control FE
S-13: Media Resource Control FE
S-9: Media GW Control FE
Other NGN
IP Multimedia Networks
NACF
T-15: Home GateWay Configuration FE
T-12: T. User Profile FE
T-13: T. Location management FE
T-11: T. Authentication &Authorization FE
T-10: Network Access Configuration FE
T-14: Access Management FE
RACF
T-16: Policy Decision FE
T-17: Transport Resource Control FE
RACF
T-16: Policy Decision FE
T-17: Transport Resource Control FE
NGN UNI
End-User Function
Legacy Terminal
RGW
Customer Network
NGN Terminal
Legacy Terminal
Access transport
T-4: Access Relay FE
T-2: Access Node FE
T-3: Edge Node FE
T-1: Access Media Gateway FE
Access Packet Transport Functions
Core transport
T-8: Media Resource Processing FE
T-9: Signalling Gateway FE
T-5: Access Border Gateway FE
T-6: Inter-connection Border Gateway FE
T-7: Trunking Media Gateway FE
Core Packet Transport Functions
PSTN/ISDN
Scope of NGN

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Architectural Challenges

- Mobility
  - Fixed to mobile convergence (FMC)
- Application-driven QoS:
  - Classes and their designations
  - Explicit bandwidth selection
  - Service to transport mapping & control
  - Flow awareness

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Architectural Evolution

- QoS in Access:
  - Multiple terminals, multiple QoS
  - Role of Home Gateway (shaping, limiting)
  - Home gateway management control
- Distributed network control of/for QoS path:
  - Horizontal means
  - Vertical means
  - Monitoring, dynamic allocations, accounting
- Network Control and Management
  - Protect from attack
  - Separation from payload paths

Fixed to Mobile convergence

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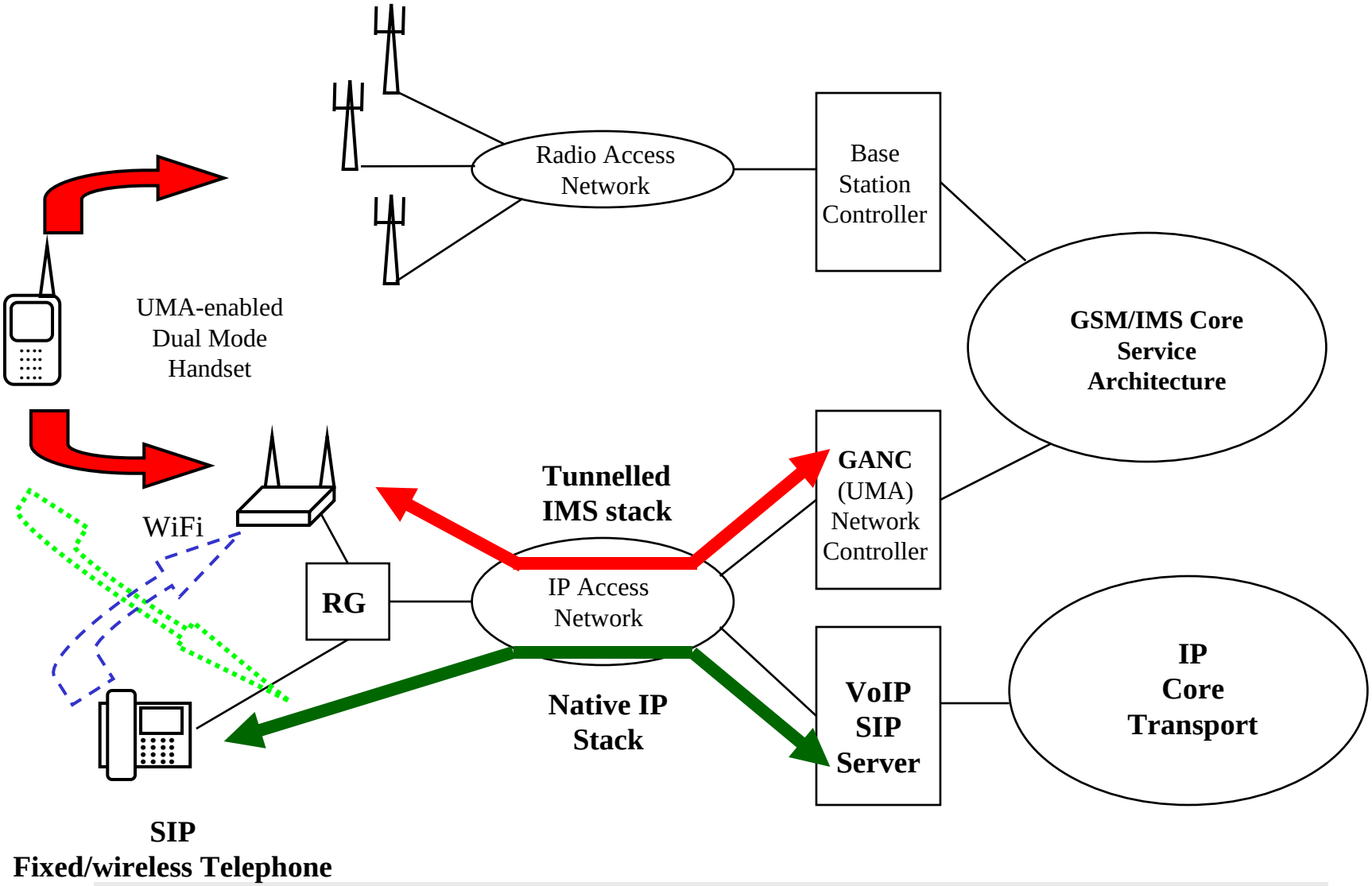
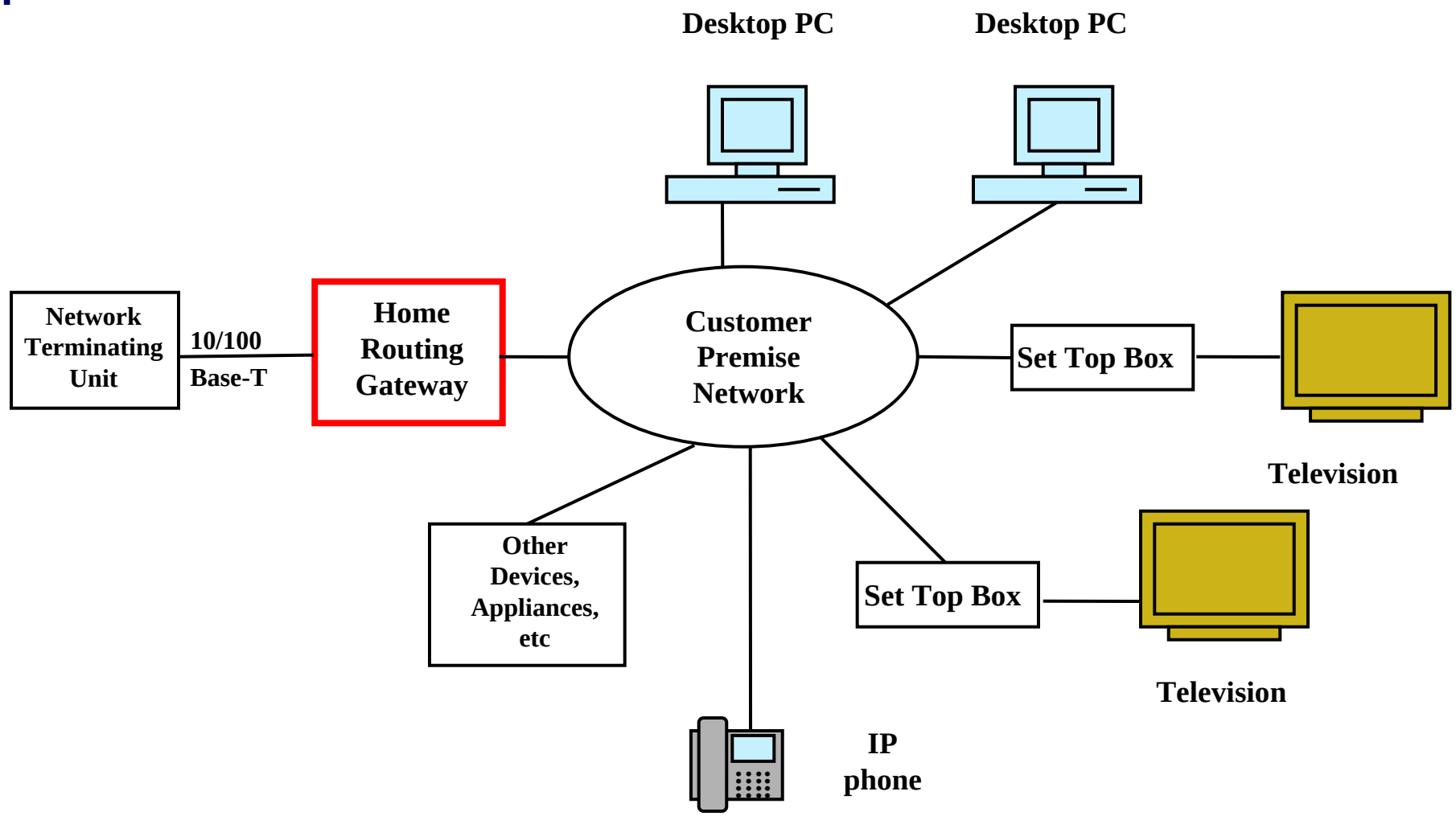


Home Gateway Architecture / Functionality



QoS per device/terminal

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Summary of key architectural work in SG13 (1)

- Y.2001: NGN Overview
  - NGN Definition, Characteristics & Subject Areas
- Y.2011: General Reference Model
  - High-level paradigms
  - Separation of concerns, services from networks
  - Architectural principles
  - OSI model relevance
  - G.805 relevance
- Y.2012 (Y.FRA) Functional Requirements & Architecture
  - Generic service control functions
  - Generic transport control functions

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Summary of key architectural work in SG13 (2)

- Y.2021 (Y.IFN) IMS for NGN
  - IMS functions
  - Positioning with respect to Y.FRA
- Y.2031) Y.PIEA) PSTN/ISDN Emulation Architecture
  - Call Server based emulation
  - IMS based emulation
- Y.CSF: Converged Services Framework
  - Service coordination across heterogenous systems and technologies
  - Overlay architecture across diverse systems

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Areas for further study

- Streaming Services
  - IPTV
- Identity based systems
  - RFID
- Home Networks
  - Home Gateways
  - Gateway management

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The End

Thank you

for your attention

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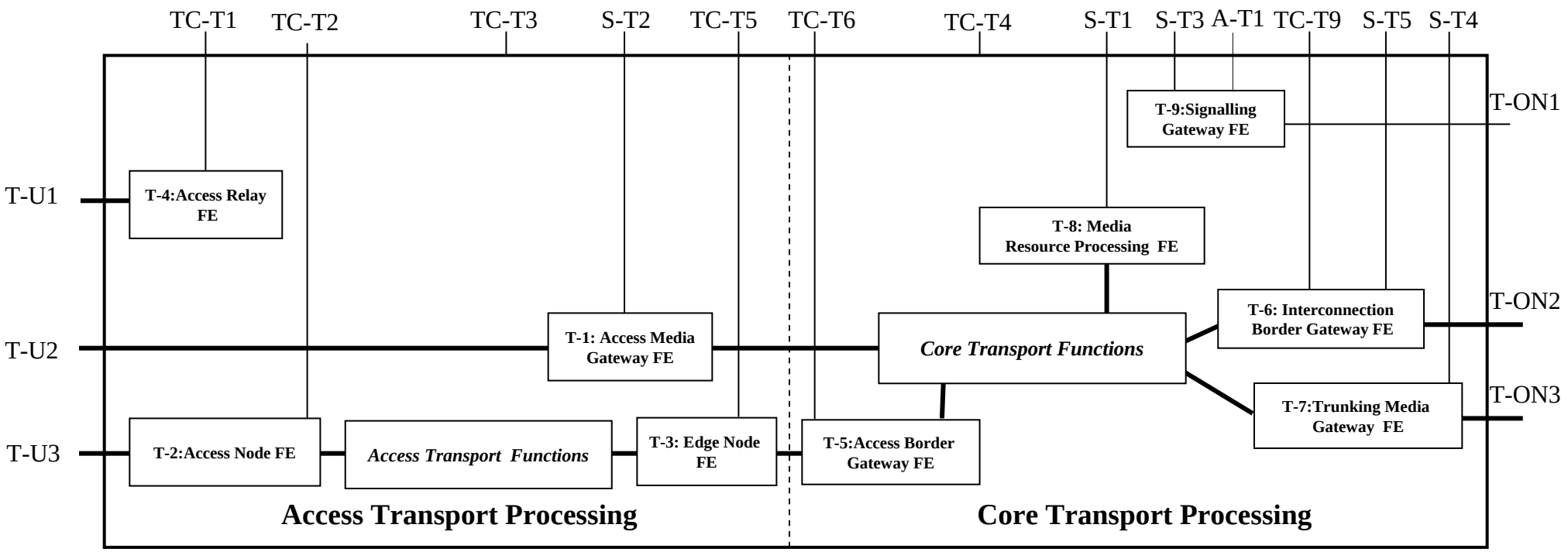
Backup Slide 1



Backup Slide 2

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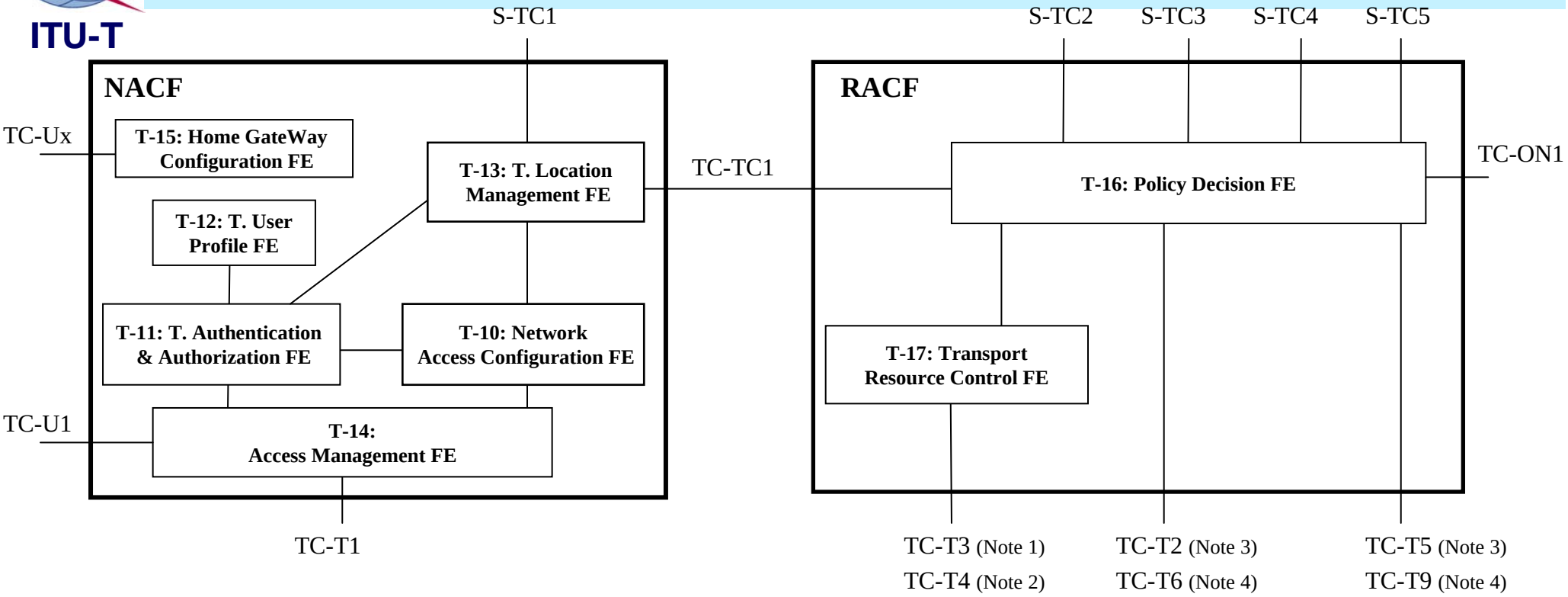
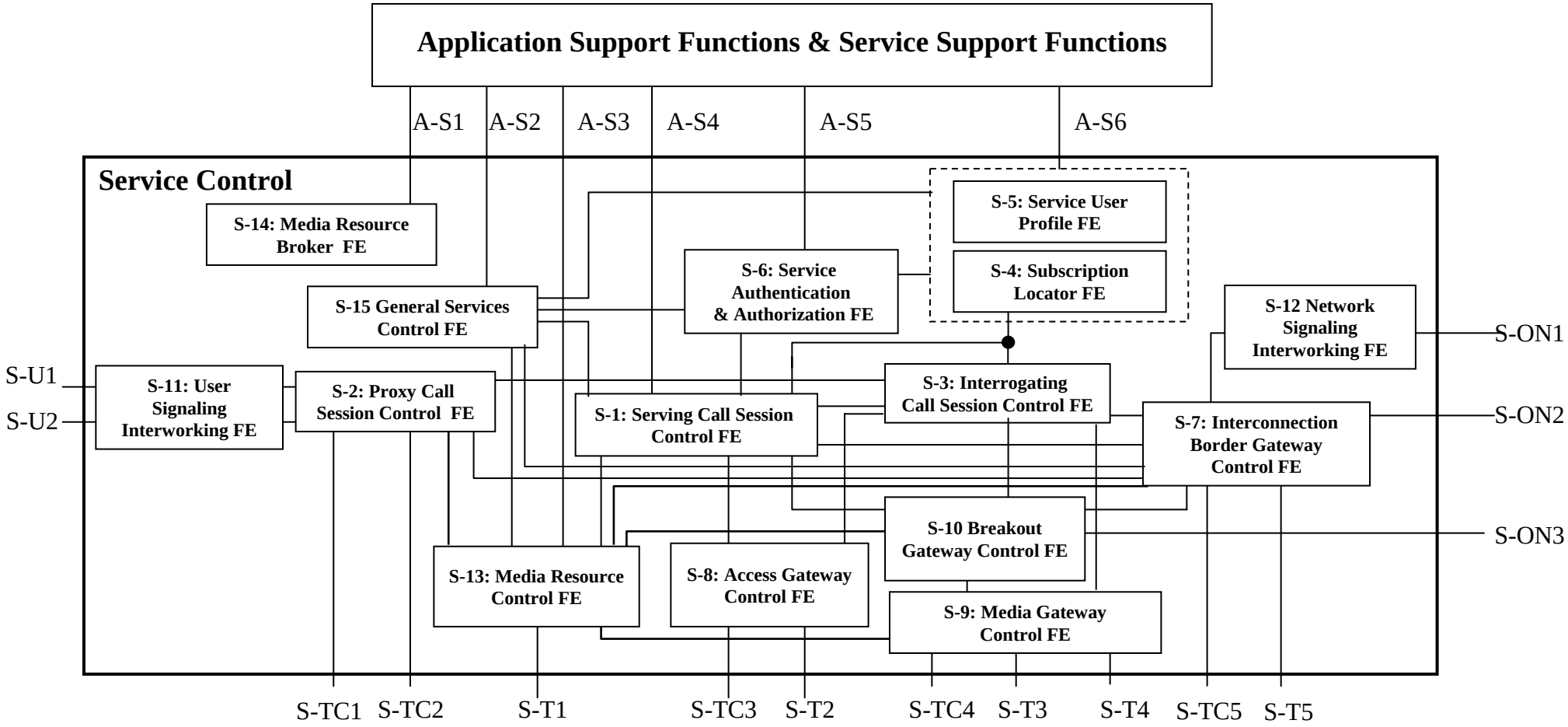
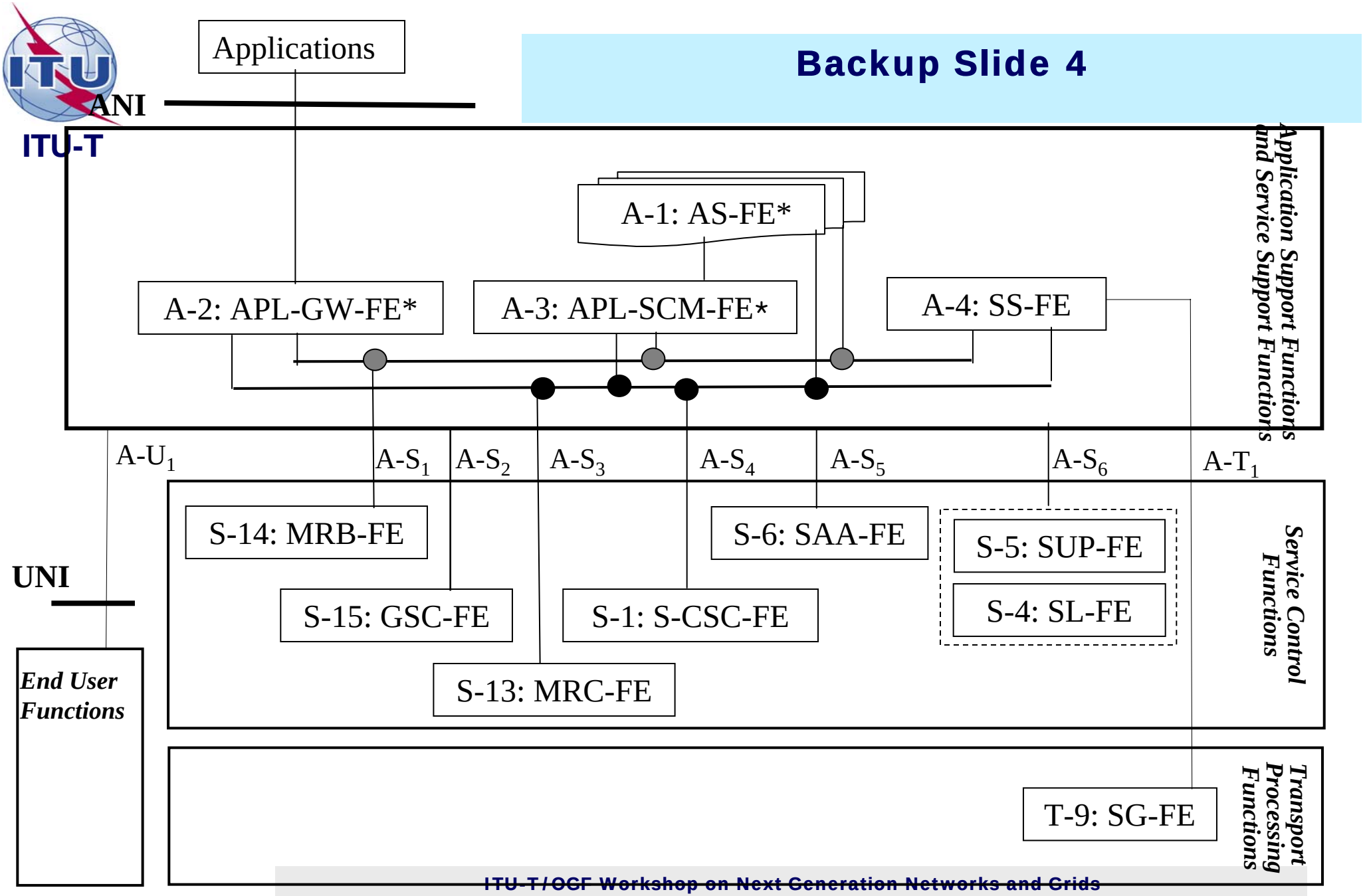


Note 1: applicable when TRC-FE operates in the access network domain
Note 2: applicable when TRC-FE operates in the core network domain
Note 3: applicable when PD-FE operates in the access network domain
Note 4: applicable when PD-FE operates in the core network domain

Backup Slide 3



Backup Slide 4



Note: * may include Authentication, Authorization, and Accounting