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Functional Architecture Model of NGN

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Definition & Features of NGN

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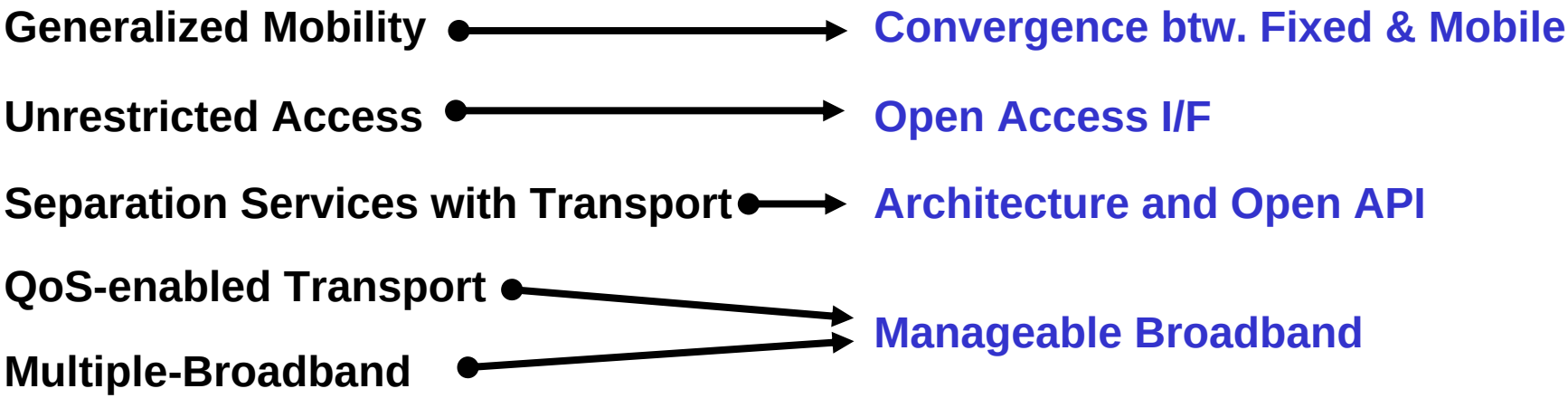
Definition of NGN (Rec. Y.2001)

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.

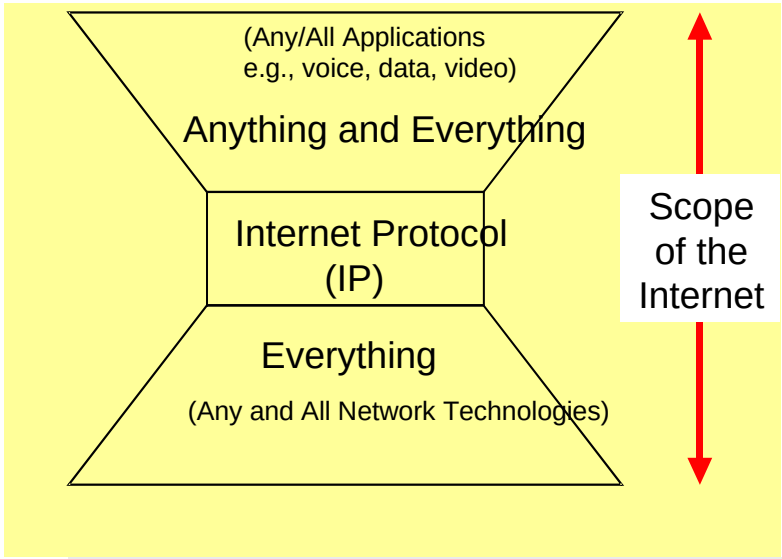
Target Standards Area

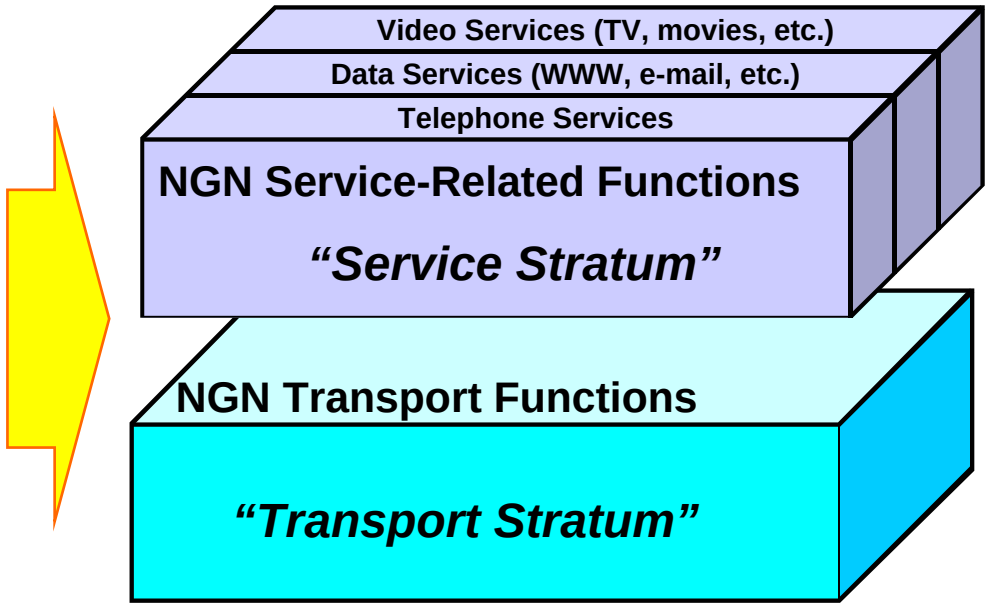


Characteristics of Next Generation Networks (NGN)

Service-related functions and transport functions are separated into two strata

- **Transport functions assume packet-based integrated networks**
  - **The currently widely used IP protocol is the core protocol.**
- **Service-related functions refer to basic and additional telephone connection functions and the provision of functions inherent to services such as WWW and video distribution**
  - **Initial studies focused on session control functions for the implementation of IP telephony, video chat, and video-conferencing using the SIP protocol as the core protocol.**
- **The NGN separation model supports new independently developed technologies and flexible system deployment and permits the formation of various businesses**





Reference: ITU-T Recommendation Y.2011 — *General principles and general reference model for next generation networks*

Y.NGN-FRA Figure 1. NGN architecture overview

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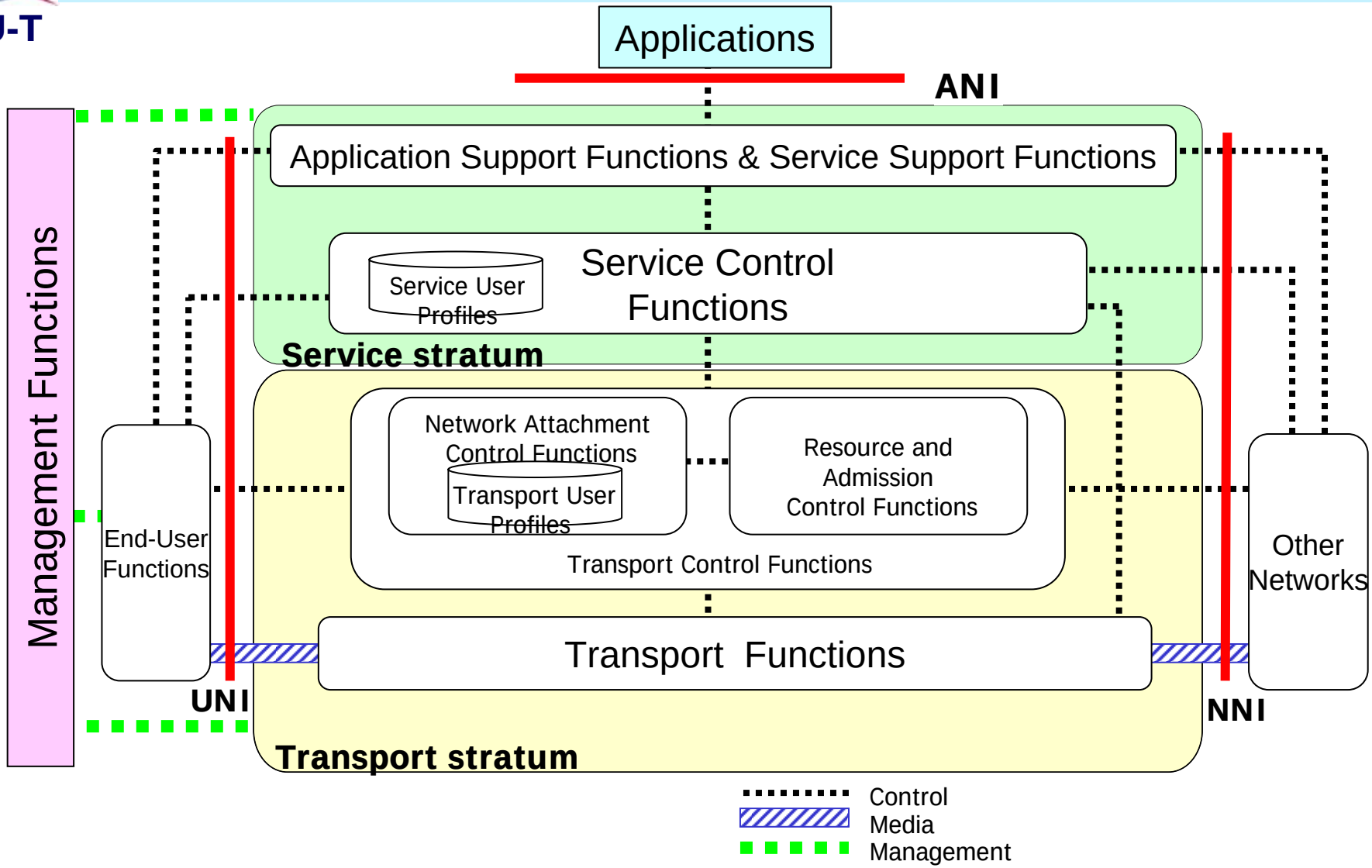

Note: UNI/NNI/ANI are not meant to represent any specific interfaces. (This type of note is written in TR-FRA word file.)

What is IMS?

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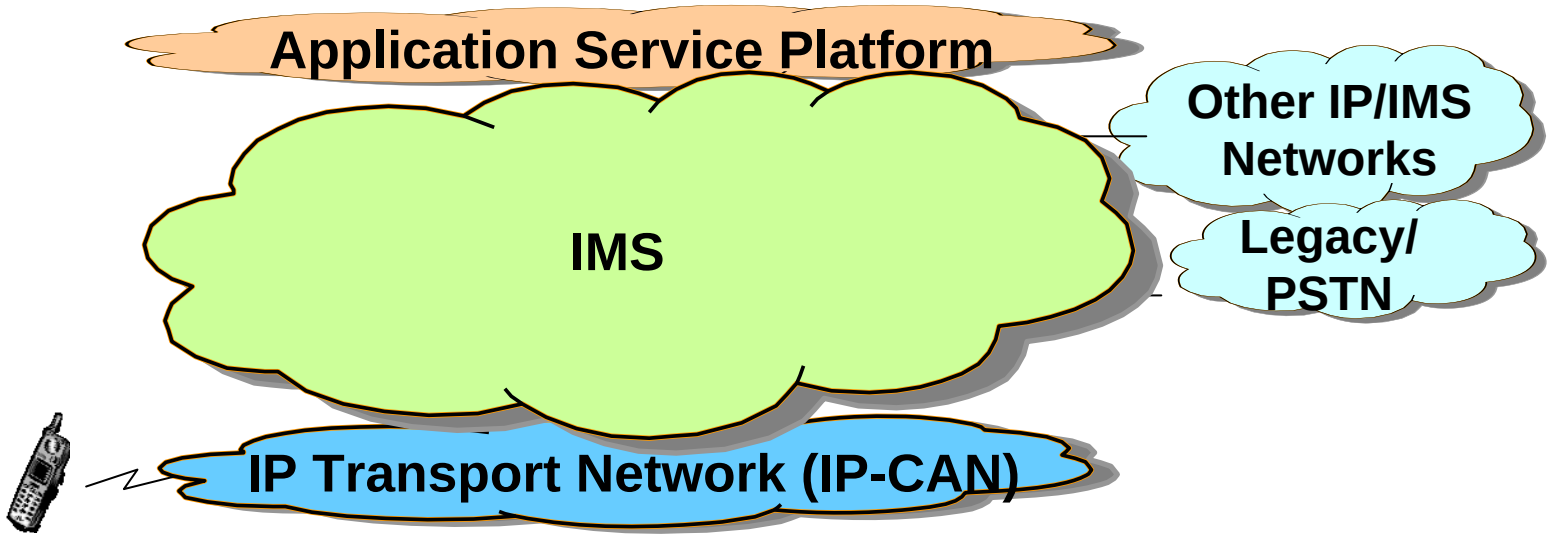
IMS is a subsystem providing call processing and a variety of multimedia services in an IP-based packet-switching domain.

— Provides voice, video, presence, messaging, conferencing, and other services

— Complies with IETF standardized session control (SIP); profiling

— Independent of the access network

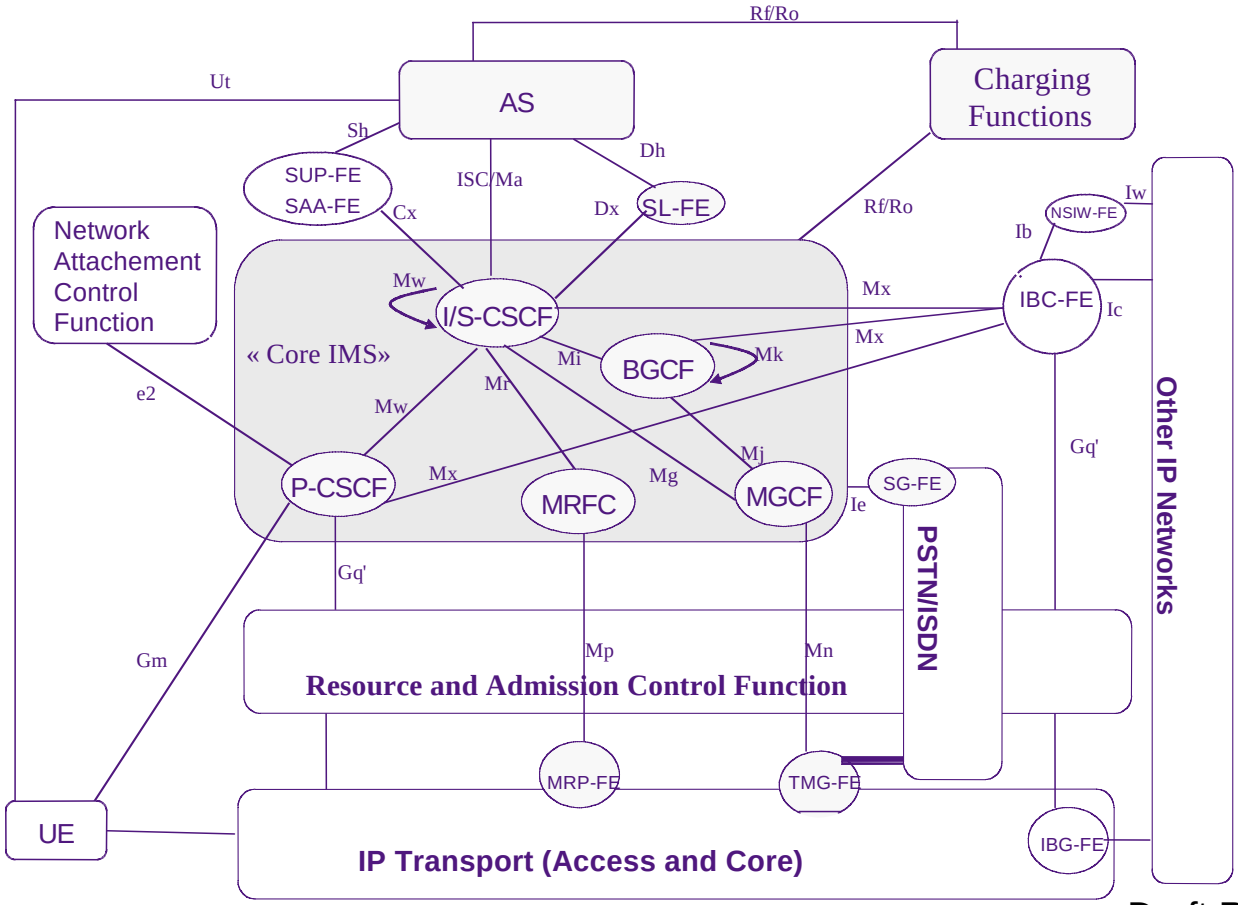
— The application service platform itself is outside the scope of IMS



IP-CAN: IP Connectivity Access Network

NGNs Based on IMS (from Y.IFN)

- Architecture centers on SIP proxy-equivalent Call Session Control Functions (CSCFs).
- Employs a separation model that decouples media processing elements and their controlling elements.
- Links to transmission systems through a Gq interface.

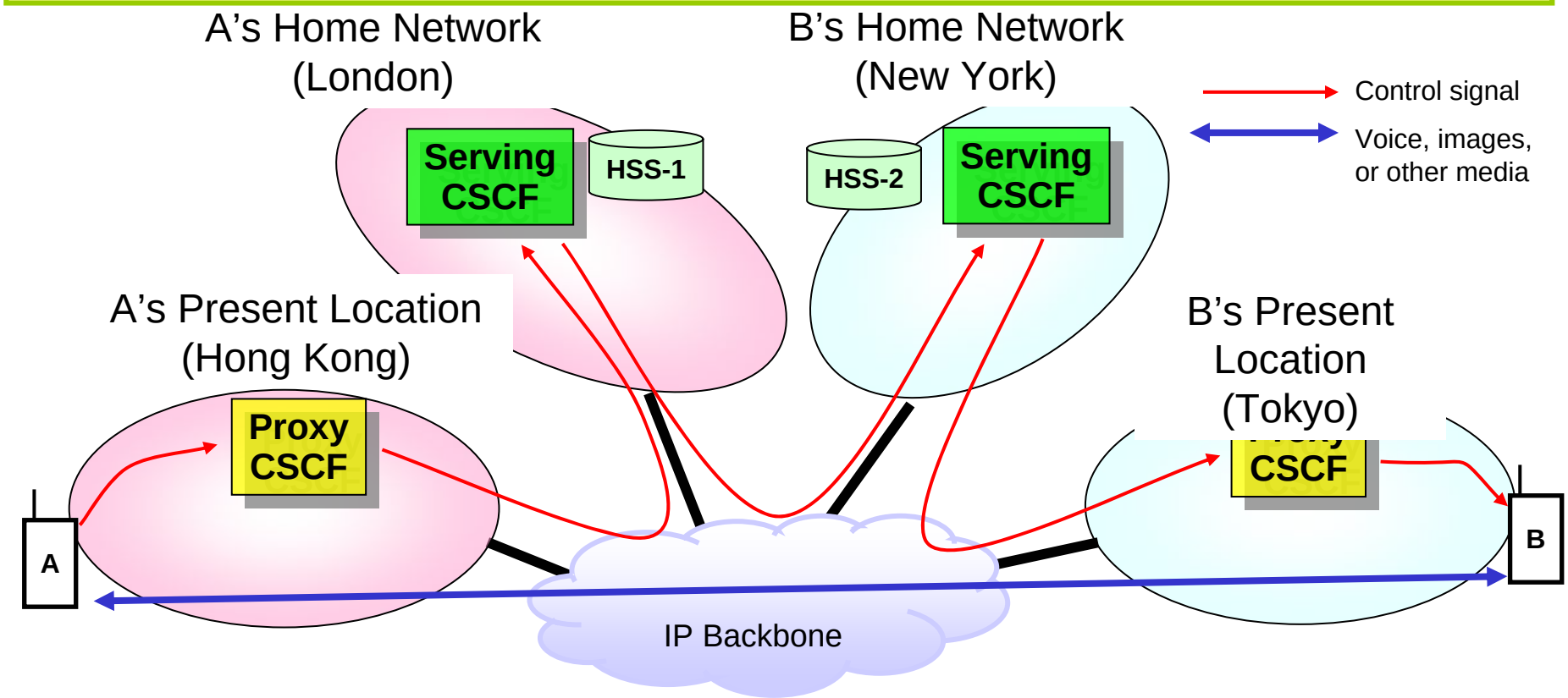


AS:	Application Server
BGCF:	Breakout Gateway Control Function
CSCF:	Serving CSCF
HSS:	Home Subscriber Server
IP-CAN:	IP-Connectivity Access Network
ISC:	IMS Service Control Interface
MGCF:	Media Gateway Control Function
MGW:	Media Gateway
MRFC:	Multimedia Resource Function Controller
MRFP:	Multimedia Resource Function Processo
P-CSCF:	Proxy CSCF
SLF:	Subscription Locator Function

Draft Recommendation Y-IFN: IMS for NGN

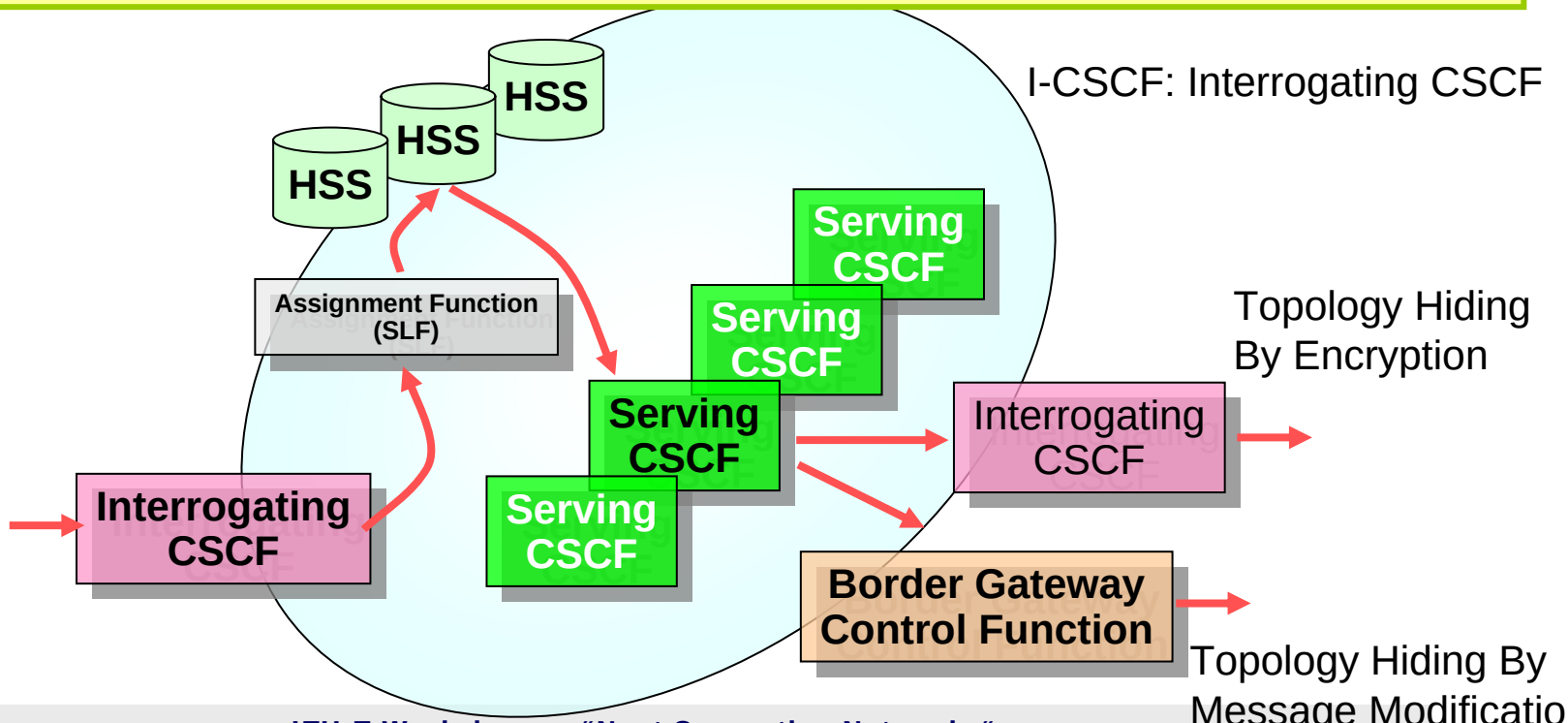
Roaming Implementation with Proxy CSCF

- In IMS nomenclature, the SIP proxy function is called the Call Session Control Function **(CSCF)**.
- IMS defines a mobile-destination (roaming-destination) SIP server (proxy CSCF) in addition to the subscribing SIP server (serving CSCF) to allow authentication and QoS control by the mobile-destination network.
- IMS presumes that the serving CSCF cannot be accessed directly (a walled garden).



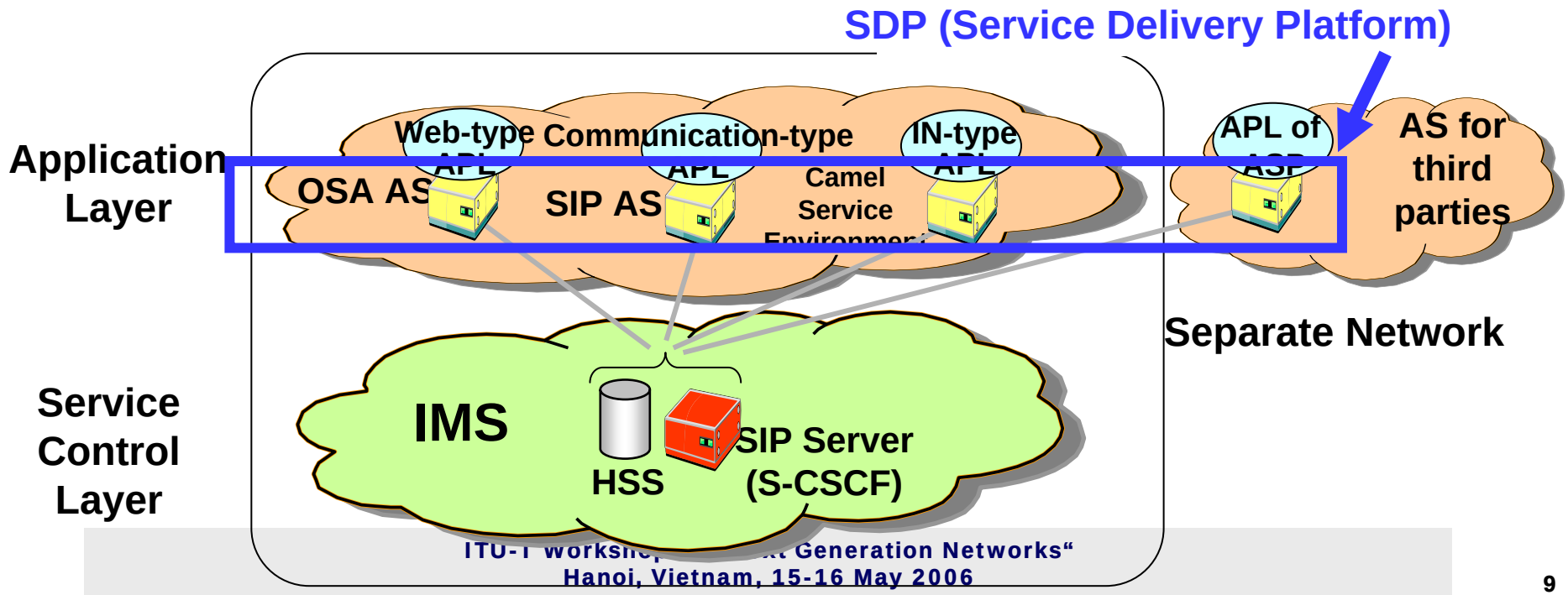
Dynamic Assignment of SIP Proxies with Interrogating CSCF

- In IMS, a CSCF is assigned to a user each time the user is registered (at power up). (This accounts for CSCF expansion, loading distribution, and risk distribution.)
- SIP signals from another network are first sent to the interrogating CSCF and then forwarded to the assigned CSCF.
- The interrogating CSCF has a topology hiding inter-network gateway function that can be deployed on the exit side as well.
- Fixed-network NGN discussions are permitting the deployment of a border gateway control function, which is different type of SIP proxy from an interrogating CSCF.

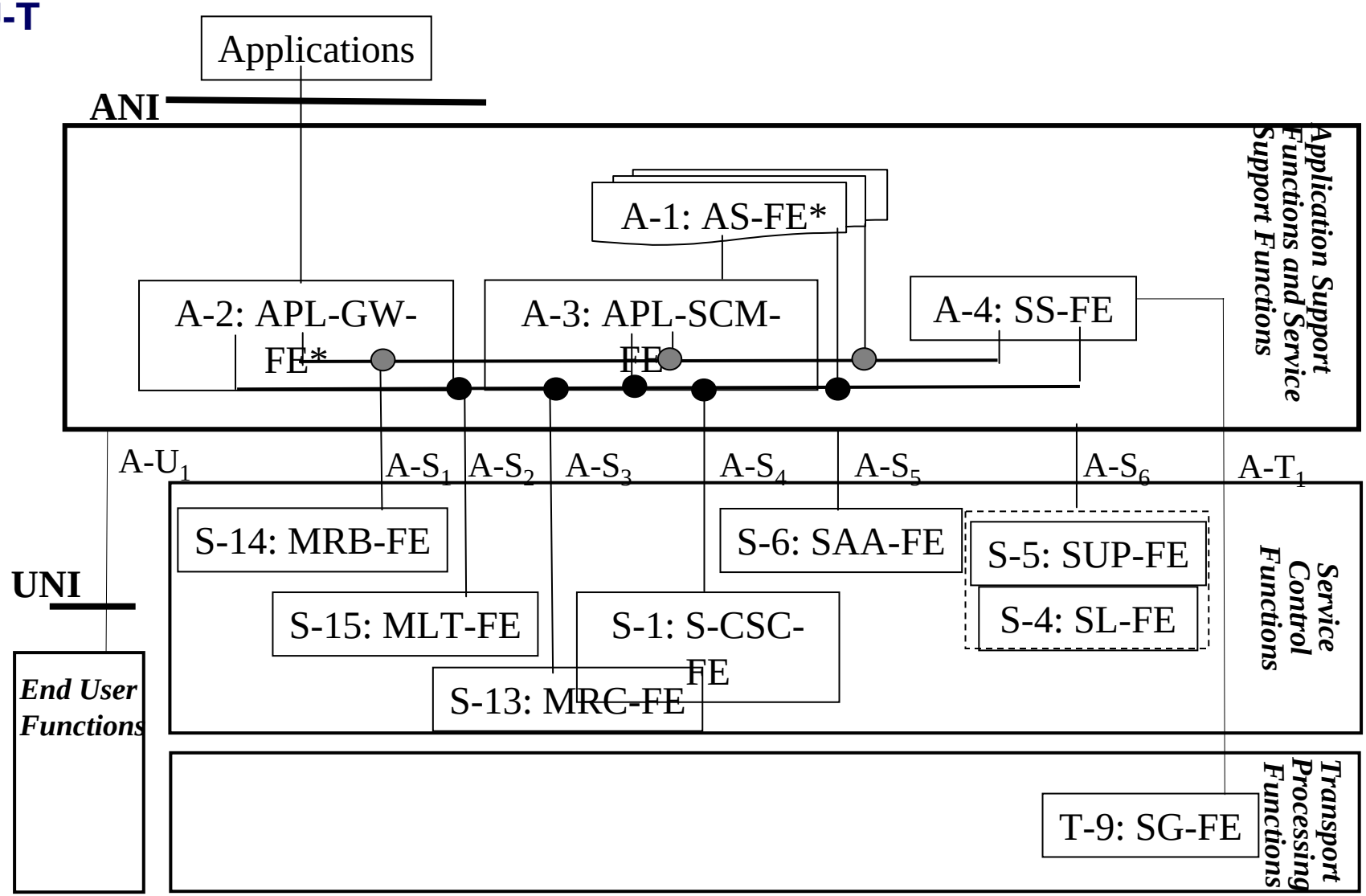


IMS and Applications

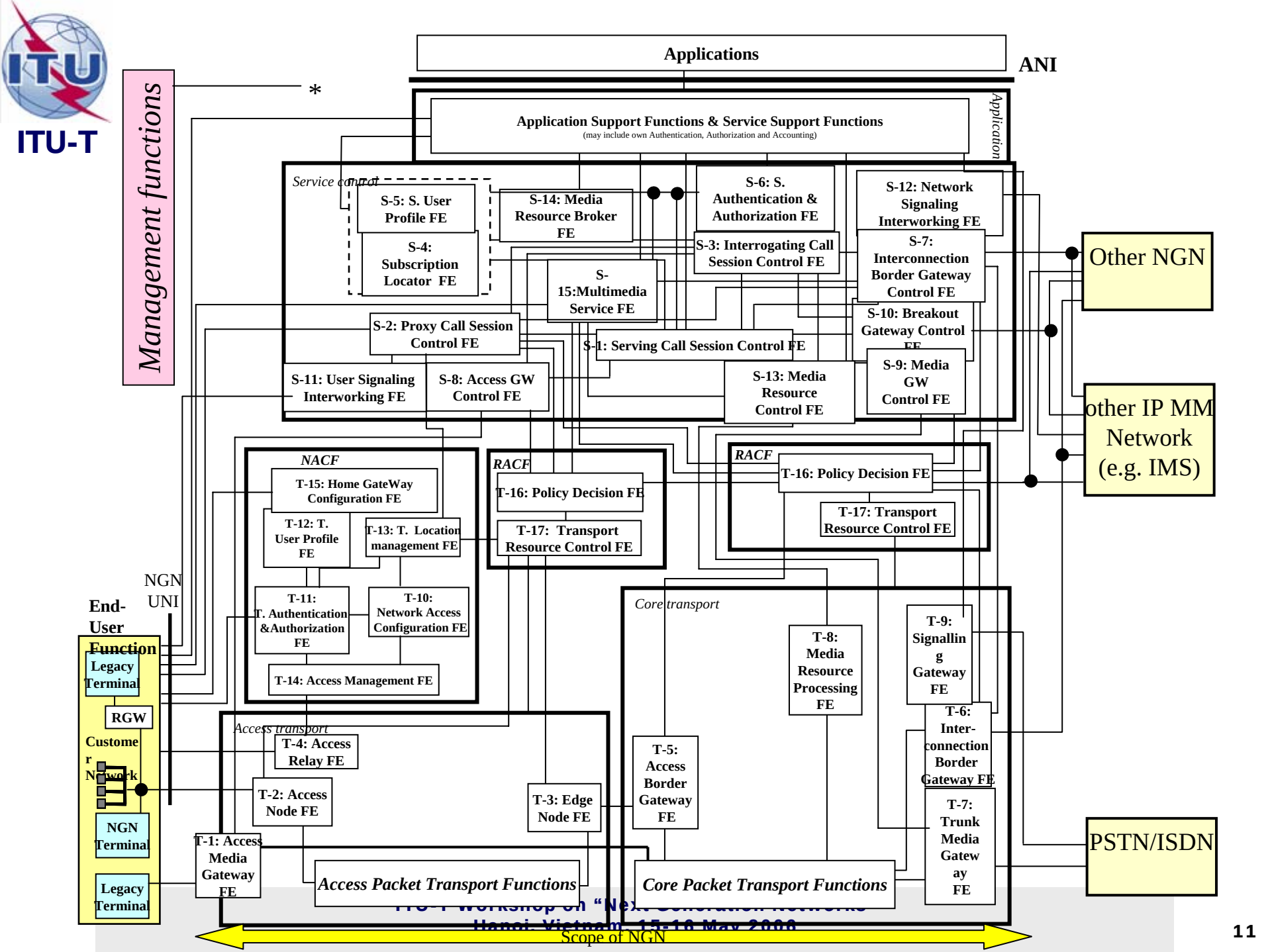
- Implementation of new service functions
  (Examples: call-waiting, conferencing calls, ring-back music, IP centrex, calendar coordination)
- Three types of application servers that connect to SIP servers (S-CSCF):
— OSA (Open Service Architecture Server)
— SIP (SIP Application Server)
— CAMEL (Camel Service Environment)
- Additional studies are looking at the construction of a Service Delivery Platform (SDP) in the application layer



Y.NGN-FRA Figure 7. Application/Service support functions



Note: * may include Authentication, Authorization, and Accounting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Management functions
*
Applications
ANI
Application Support Functions & Service Support Functions
(may include own Authentication, Authorization and Accounting)
Application
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-3: Interrogating Call Session Control FE
S-12: Network Signaling Interworking FE
S-7: Interconnection Border Gateway Control FE
S-15:Multimedia Service FE
S-10: Breakout Gateway Control FE
S-2: Proxy Call Session Control FE
S-1: Serving Call Session 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
other IP MM Network (e.g. IMS)
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
Core transport
T-8: Media Resource Processing FE
T-9: Signalling Gateway FE
T-6: Inter-connection Border Gateway FE
T-7: Trunk Media Gateway FE
PSTN/ISDN
Access transport
T-4: Access Relay FE
T-2: Access Node FE
T-3: Edge Node FE
T-5: Access Border Gateway FE
T-1: Access Media Gateway FE
Access Packet Transport Functions
Core Packet Transport Functions
Scope of NGN

Y.NGN-FRA Figure 8 - Transport and service configuration of the NGN

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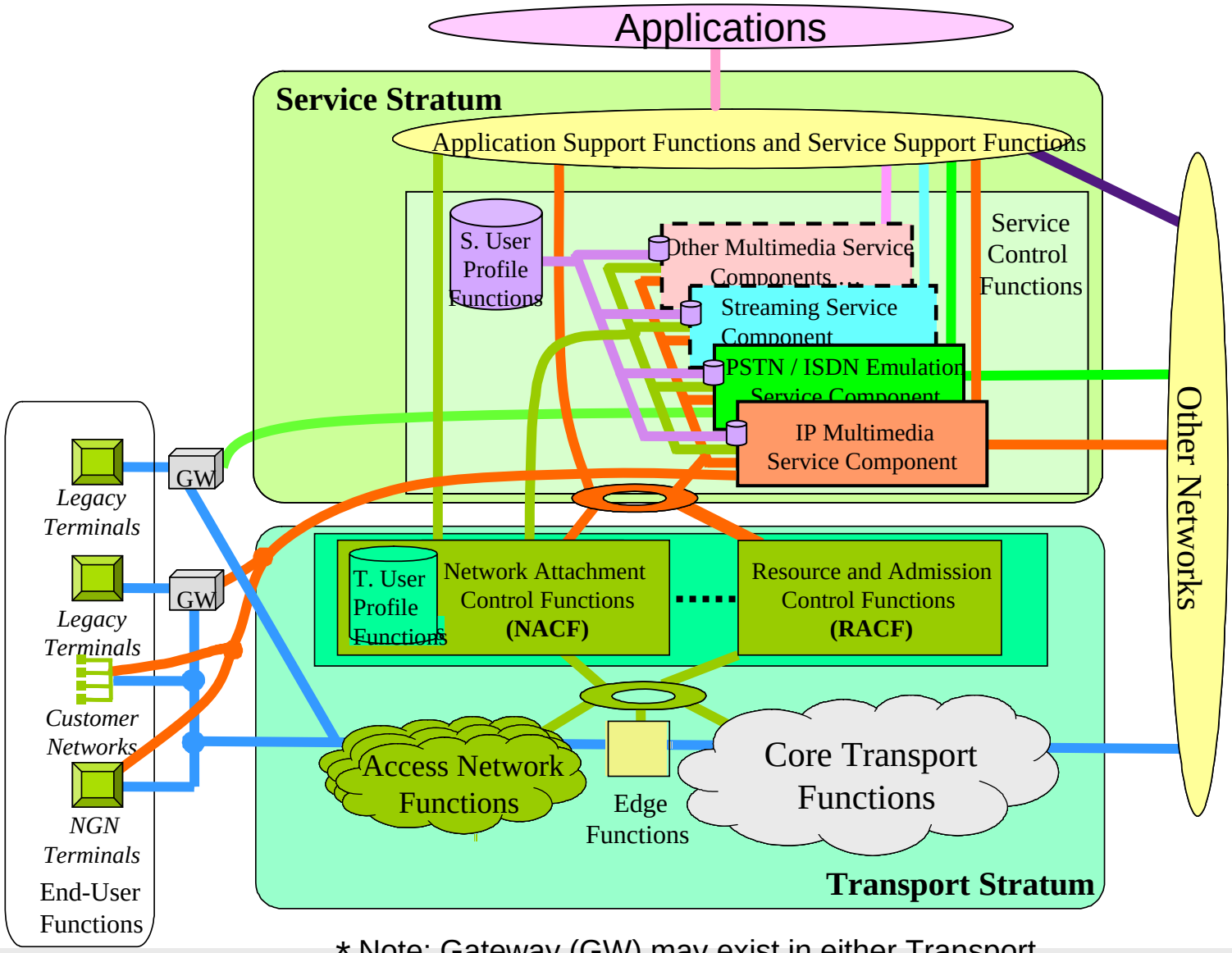

* Note: Gateway (GW) may exist in either Transport Stratum or End-User Functions.

Y.NGN-FRA Appendix I Figure I.5: NGN example of service domains

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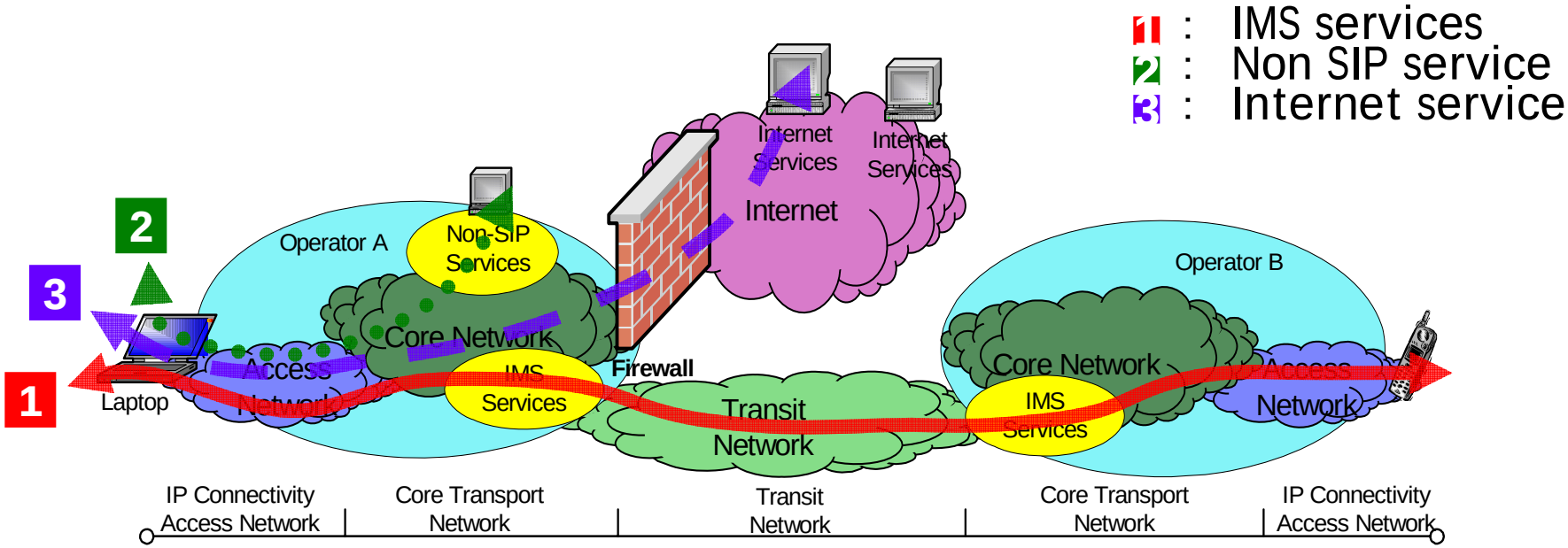

Y.NGN-FRA Figure 2: Charging and Billing Functions

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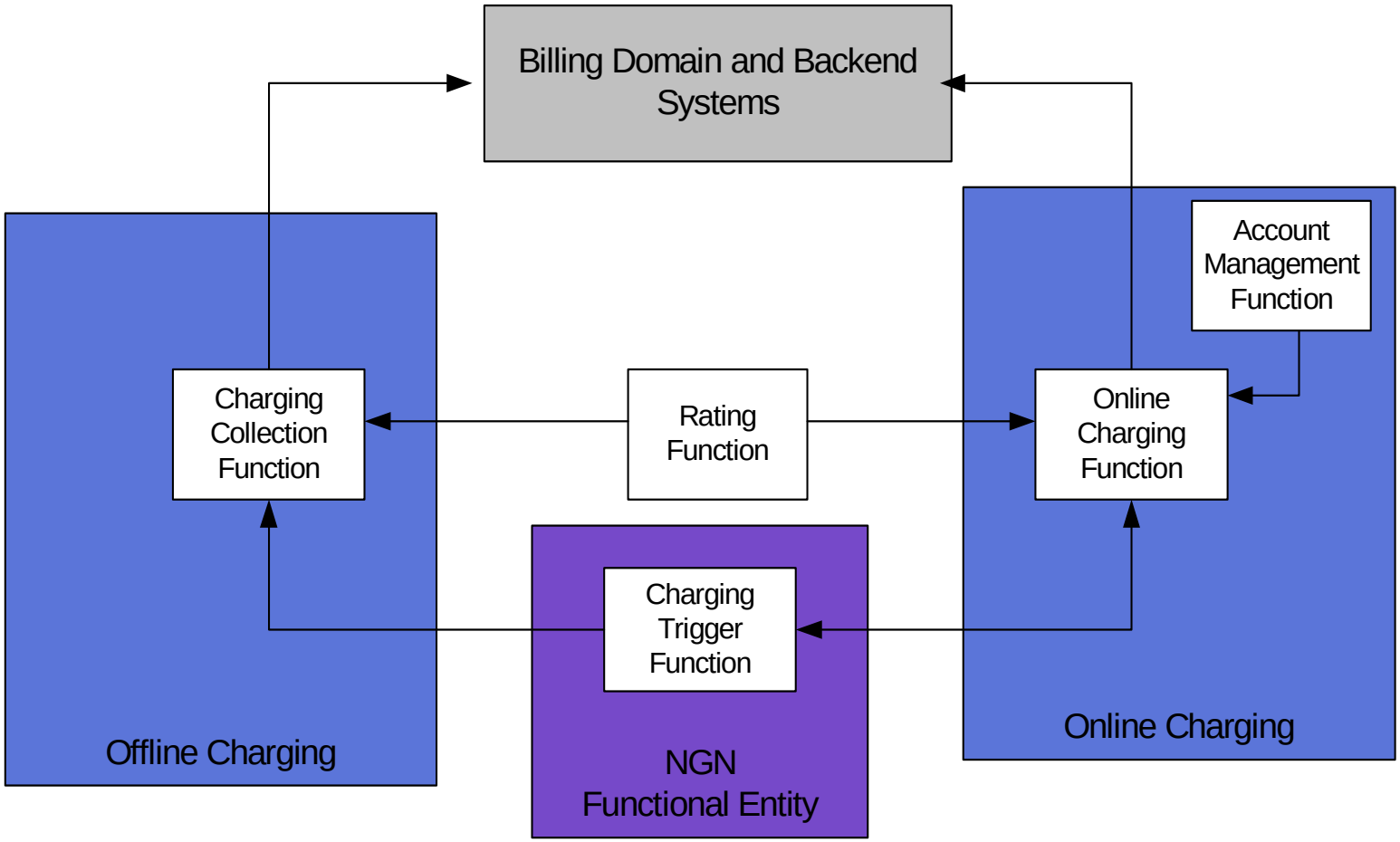

Y.NGN-FRA Appendix II Figure II.1 – Multi-Layered Transport Stratum

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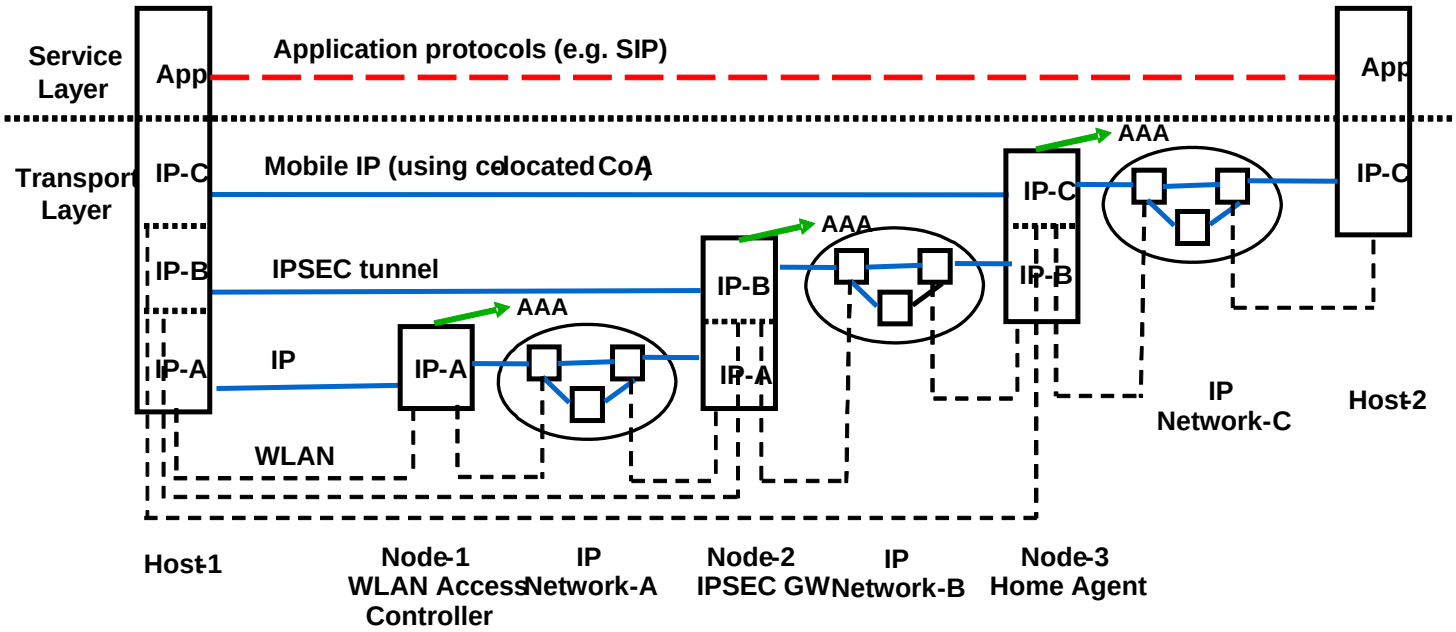

Y.NGN-FRA Appendix III Figure III.1: Locations of S/BC functions

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