



International Telecommunication Union

NGN Focus Group Activities

Chae-Sub, LEE
Chairman of FG NGN



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1. Overview of Focus Group
2. Services and Architectures
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4. General Mobility
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6. Evolution and Realization
7. Future of FG NGN



1. Overview of Focus Group

ToR and Working Groups

- ITU-T Director launched NGN Focus Group at June 2004
- Almost every two month meeting : 6, 7, 9, 11/2004 and 3, 5, 7, 9, 11/2005

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- Functional & Nomadicity Architecture (base on IMS & non-IMS)
 - QoS (include the xDSL Access)
 - Security Capability (inc. Authentication)
 - NGN Control and Signaling Capability
 - Evolution from CGN to NGN

WG	Area	Deliverables
WG 1	SR (Service Requirements)	NGN Scope, Releases 1 / General Requirements, Service and Capability, Mobility Services and Capabilities
WG 2	FAM (Functional Architecture, and Mobility)	Req. and Architecture, Functional Req. for NGN Mobility, Functional Req. for Soft Router
WG 3	QoS	TR-123.qos, TR-msnniqos, TR-NGN.qos, TR-NGN.NHNperf, TR-e2eqos.1, TR-enet, TR-atmipa, TR-racs, TR-ipaqos
WG 4	CSC (Control & Signalling)	TRQ.IP QoS.SIG.CS1
WG 5	SeC (Security Capability)	NGN Security Framework
WG 6	Evol (Evolution)	Evolution of Networks to NGN, PSTN evolution to NGN
WG7	FPBN (Future Packet-based Bearer Network)	Future Packet Network requirements



1. Overview of Focus Group

Statistics of NGN Focus Group

Analysis of Input Documents and Participants

	Input	Contribution	LS	Others	Participants (Korean)
1 st	39	14 (1)	5	20	99 (15)
2 nd	66	40 (3)	5	21	66 (5)
3 rd	141	122 (14)	7	12	121 (12)
4 th	125	113 (12)	5	7	123 (16)
Total	371	293 (30)	22	60	409 (48)

Involvement of Koreans

Chairman 1, WG Technical Leader 2, Editor 2



1. Overview of Focus Group

Statistics of NGN Focus Group

Analysis of IDs by organizations and regions

	ROA	SIO	Others
1 st	2	12	25
2 nd	3	34	29
3 rd	45	87	9
4 th	38	61	26
Total	88	194	89

	Asia	North America	Europe	Others
1 st	2	12	2	23
2 nd	8	22	3	33
3 rd	60	48	11	22
4 th	46	47	11	21
Total	116	129	27	99



1. Overview of Focus Group

NGN Deliverables from FG NGN

WG	Title	Current Draft	Target Date	Release	Status
1	NGN Scope	FGNGN-OD-00070	1Q05	1	S
1	Services & Capabilities	FGNGN-OD-00067	1Q05	1	S
1	NGN Release 1 general requirements	FGNGN-OD-00071	2Q05	1	D
1	NGN general requirements (release-independent requirements)	TBD	3Q05	RI	P
1	NGN general services and capabilities (release independent)	TBD	3Q05	RI	P
2	Requirements & Architecture for NGN	FGNGN-OD-00065	2Q05	1	D
2	Functional Requirements for NGN Mobility	FGNGN-OD-00060	2Q05	1	D
2	Functional Requirement for Soft Router	FGNGN-OD-00043	TBD	2	D
2	Customer Manageable IP Network	FGNGN-OD-00061	TBD	2	D



1. Overview of Focus Group

NGN Deliverables from FG NGN

3	A QoS control architecture for Ethernet-based IP access networks (TR-123.qos)	FGNGN-OD-00010	Mar '05	1	3
3	Multi Service Provider NNI for IP QoS (TR-msnqiqos)	FGNGN-OD-00027	Mar '05	1	3
3	General aspects of QoS and network performance in NGN (TR-NGN.QoS)	FGNGN-OD-00045	May '05	RI	3
3	Network performance of non-homogeneous networks in NGN (TR-NGN.NHNperf.).	FGNGN-OD-00025	May '05	RI	3
3	Requirements and framework for end-to-end QoS in NGN (TR-e2eqos.1)	FGNGN-OD-00076	July '05	1	3
3	A QoS architecture for Ethernet networks (TR-enet)	FGNGN-OD-00077	July '05	1	3
3	Resource and admission control sub-system (TR-racs)	FGNGN-OD-00074	July '05	1	3
3	A QoS Framework for IP-based access networks (TR-ipaqos)	FGNGN-OD-00075	July '05	1	3
3	Performance measurement and management for NGN (TR-pmm)	FGNGN-OD-00073	May '05	1	3
3	A QoS control architecture for ATM-based IP access networks (TR-atmipa)	TBD	July '05	1	P



1. Overview of Focus Group

NGN Deliverables from FG NGN

4	Signalling requirements for IP QoS TRQ.IP QoS.SIG.CS1	FGNGN-OD-00079	Dec.'04	1	A
5	Guidelines for NGN Security	FGNGN-OD-00059	2Q 05	TBD	D
5	NGN Release 1 Requirements	FGNGN-OD-00057	1Q 05	1	S
6	Evolution of Networks to NGN	FGNGN-OD-00049	1Q05	1	D
6	Scenarios for PSTN/ISDN evolution to NGN	FGNGN-OD-00050	1Q05	1	D
6	PSTN/ISDN emulation and simulation scenarios	FGNGN-OD-00051	1Q05	1	D
7	Problem Statement	FGNGN-OD-00028	4Q04	2	D
7	Requirements	FGNGN-OD-00055	2Q05	2	D
7	High Level Architecture	FGNGN-OD-00056	3Q05	2	D
7	Candidate Technologies	TBD	3Q05	2	P



2. Services and Architectures

Definition of NGN

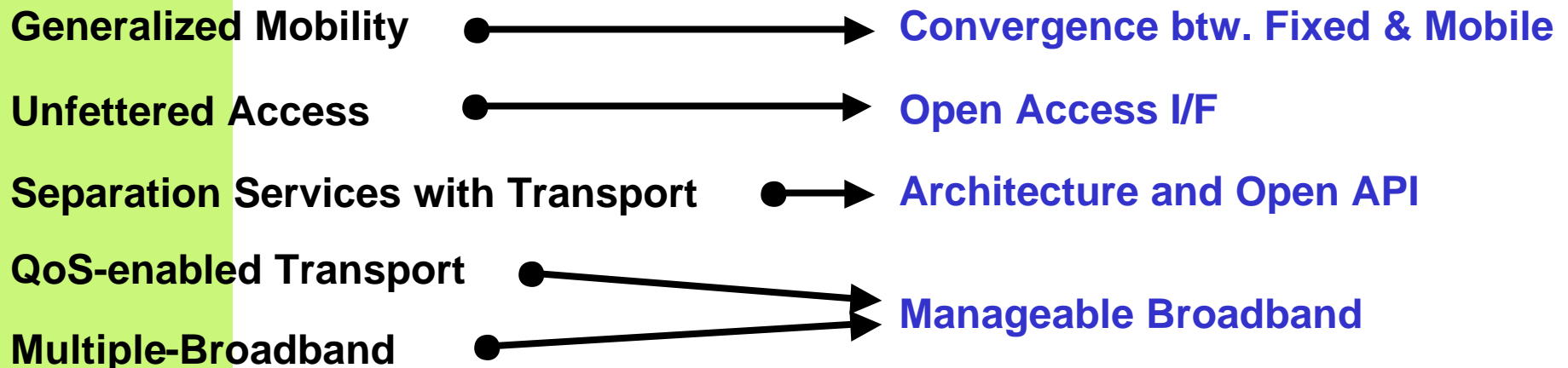
Definition
of NGN
(Rec.
Y.2001)

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





Key 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;**
- **Unrestricted 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.)**



Services and Capabilities

◆ Defined Service Types

- Interactive-based Services (video-phone, white-boarding, PoN, IM etc.);
- Non Interactive-based Services (Content delivery, Sensor Net., etc.);
- Both Interactive and Non Interactive-based Services (VPN, Presence & General Notification services, Hosted and Transit services etc.);
- Network Services : BTS(P-P, P-MP, MP-MP etc), ETS (BTS+QoS guaranty, Advanced Security, Access to VPN etc.)

	Service Layer	Transport Layer
Basic Services	<ul style="list-style-type: none">● Point-Point voice, fax and video services● Multi-point voice, fax and video services	<ul style="list-style-type: none">● Bandwidth and circuit wholesaling
Enhanced Services	<ul style="list-style-type: none">● Content Delivery services● Presence Services● Multi-media conferencing	<ul style="list-style-type: none">● Virtual Private connectivity



Services and Capabilities

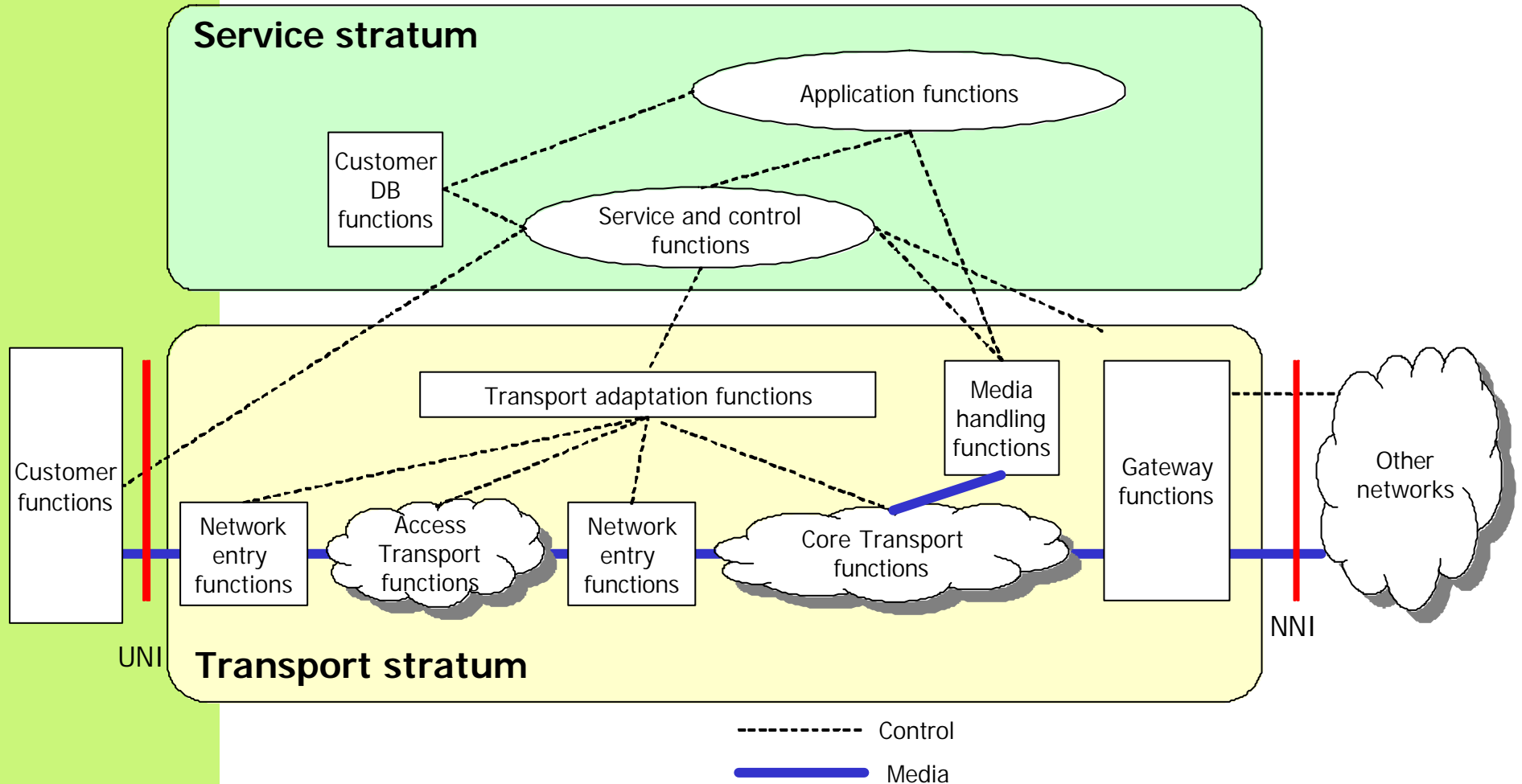
◆ Defining Capabilities

- Addressing, Naming and Directory services;
- OAM requirements (Protection Switching, Re-routing req.);
- Mobility, QoS , Traffic and Resource Management
- Security, Privacy, Identification, authentication & authorization
- Interoperability and Interworking
- Access Network Requirements
- Network migration aspects
- Accounting, charging and billing
- Policy and Profile management
- User device and Content delivery management
- Service Creation and Service reliability
- Regulatory Requirements



2. Services and Architectures

Overall NGN Architecture

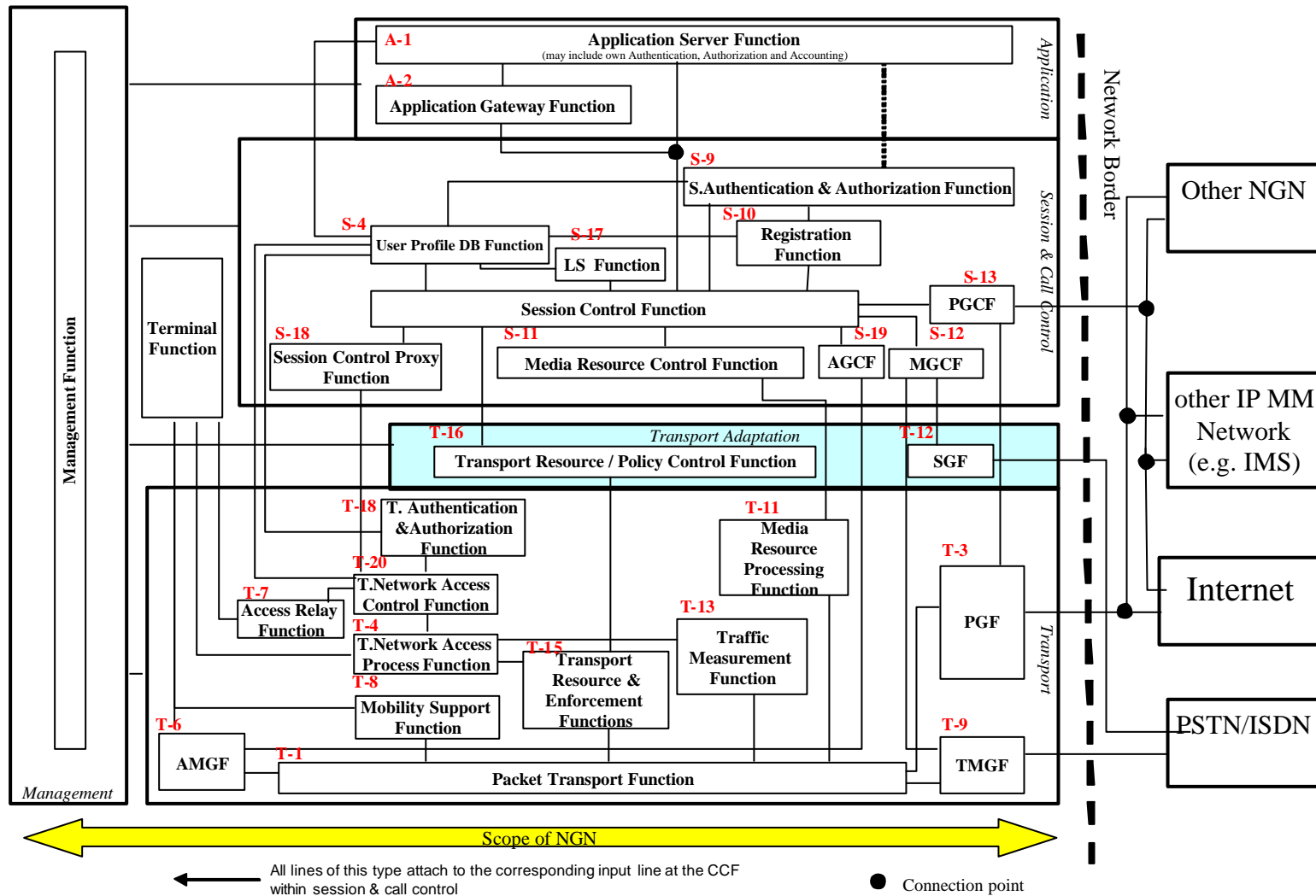


Note: Charging and billing functions and Management functions are applied to both Service and Transport strata



2. Services and Architectures

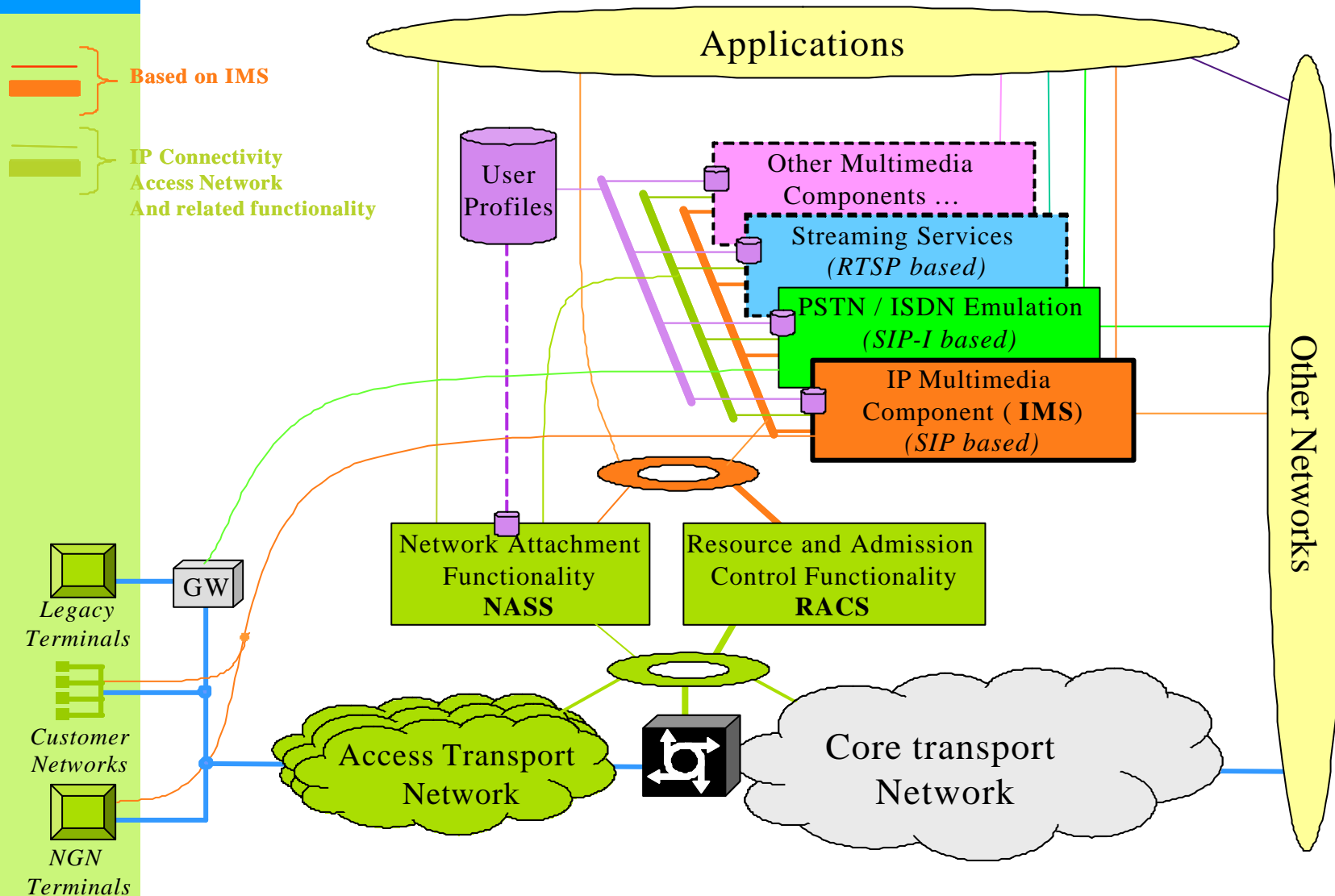
Functional Architecture Model





2. Services and Architectures

Grouping of NGN Functional Entities





2. Services and Architectures

Relationship IMS with NGN Func. Entities



General QoS Requirements of NGN

◆ Two perspectives for NGN QoS

- “Vertical” mechanism : linking the upper and lower layer QoS mechanisms (e.g. diffserv, etc)
- “Horizontal” mechanism : linking the lower layer QoS control between different domains and networks.

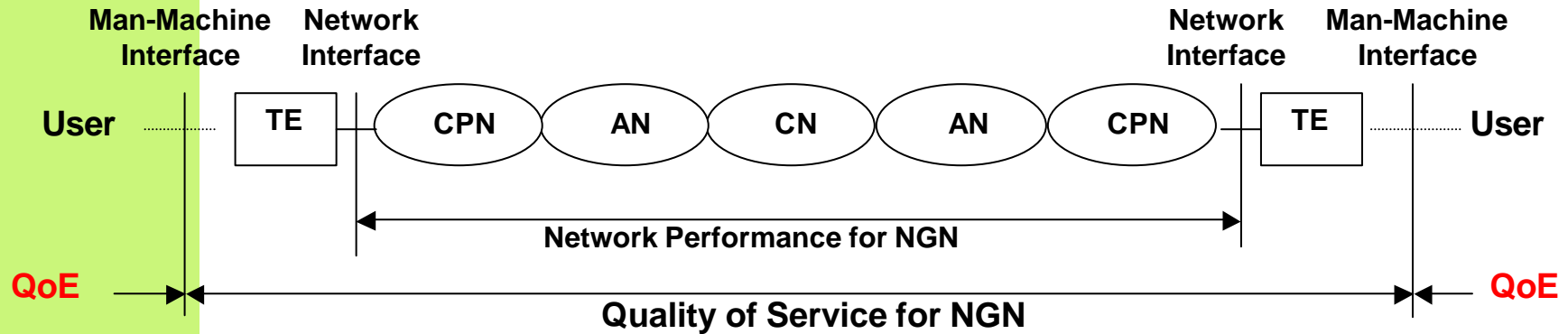
◆ Considerations for NGN QoS

- End-to-end QoS class definition for telephony over packet networks;
- End-to-end multimedia QoS class definition framework and a method of Identifying QoS classes of individual media components;
- Specification of how to use lower layer QoS mechanism to achieve Upper layer QoS within the network;
- Inter-domain lower layer QoS control;
- End user perception of QoS.



3. Quality of Service

Ref. Configuration of QoS, NP and QoE

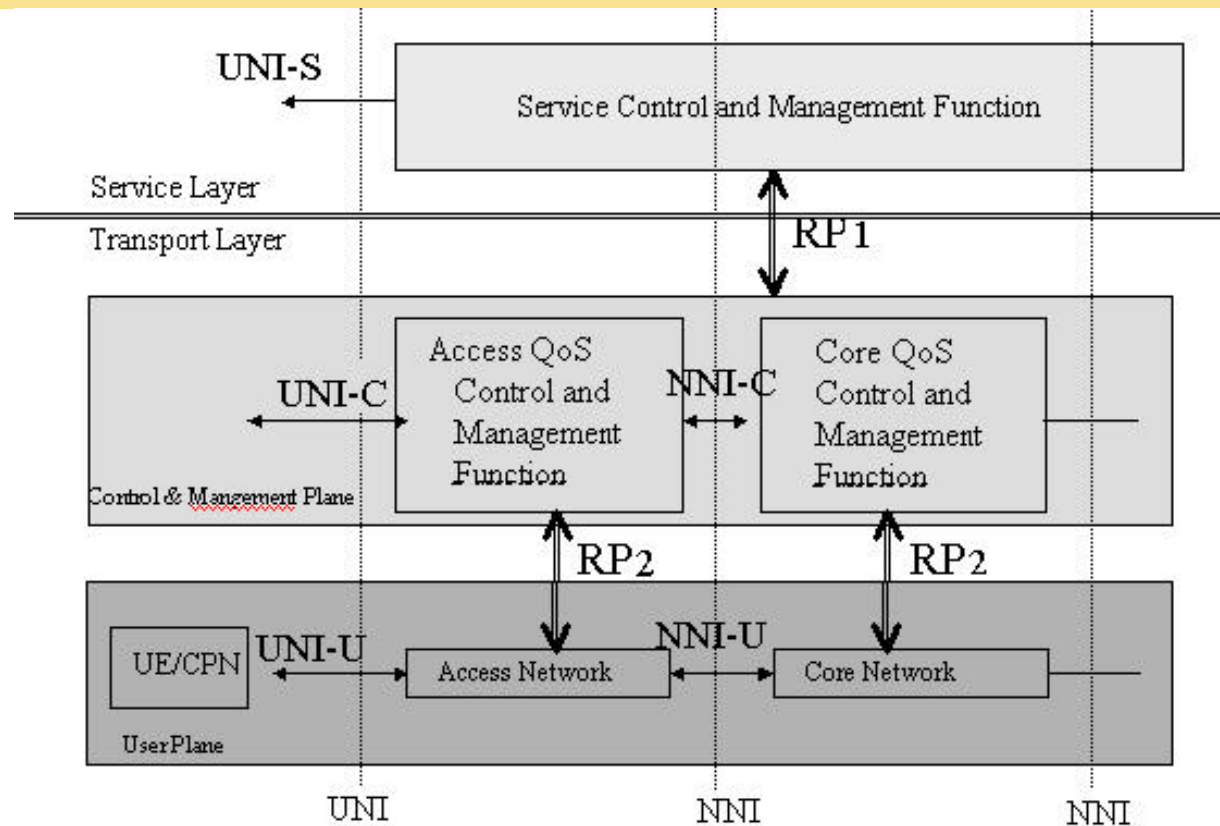


Quality of Experience	Quality of Service	Network Performance
User oriented		Provider oriented
User behaviour attribute	Service attribute	Connection/Flow element attribute
Focus on user-expected effects	Focus on user-observable effects	Focus on planning, development (design), operations and maintenance
User subject	Between (at) service access points	End-to-end or network elements capabilities



3. Quality of Service

End-End QoS Architecture



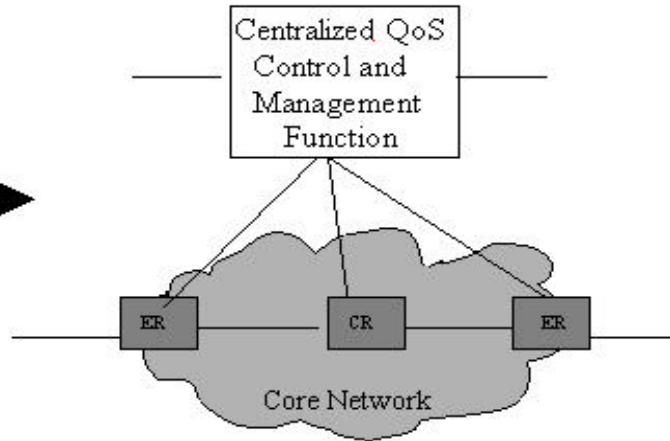
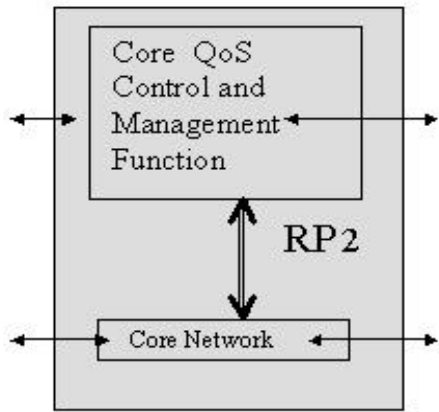
Reference Point	Possible candidate protocols examples
RP1	RSVP, IETF NSIS (still working on), other new protocols
RP2	Like COPS-PR, Diameter, H.248, SNMP...
UNI-C, NNI-C	QoS signaling protocols, like RSVP, IETF NSIS (still working on), and other new protocols
UNI-S, NNI-S	Call/Session control protocols, Like SIP/SDP, H.323/H245.



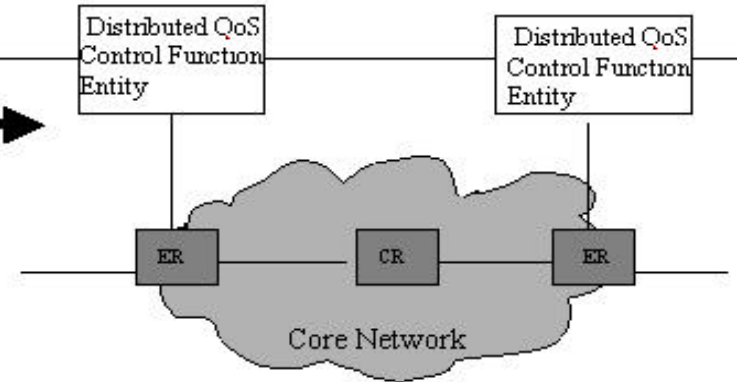
3. Quality of Service

End-End QoS Control Scenarios

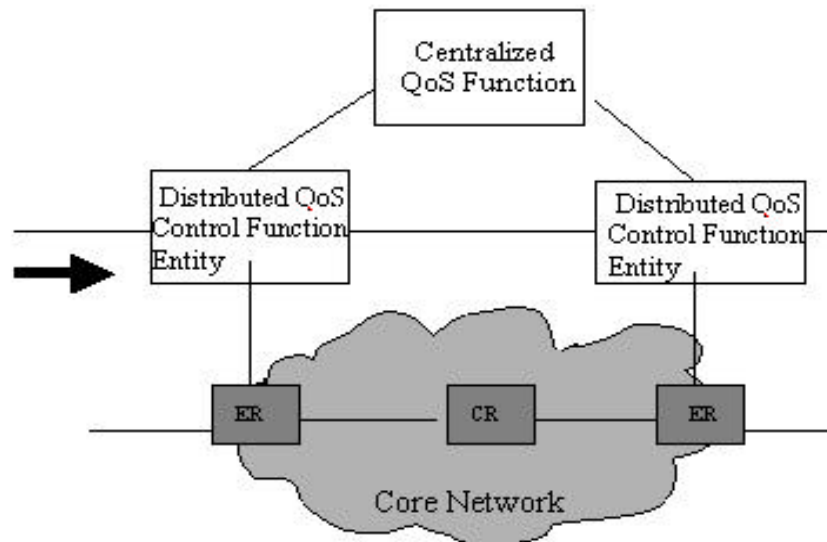
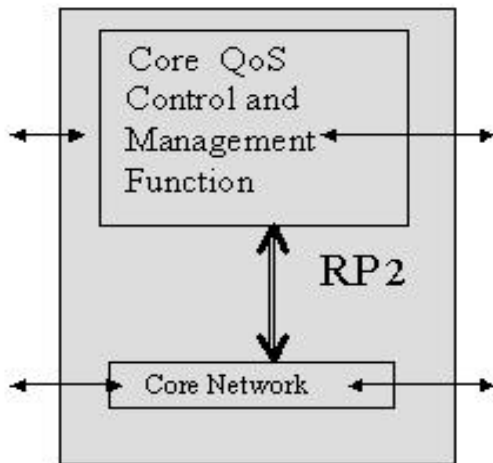
Centralized Scenario



Distributed Scenario



Hybrid Scenario





Requirements and Capabilities

◆ Mobility Requirements in NGN

- ability to change access point and/or terminal;
- ability to get access from any network access point, including all access technologies identified;
- ability to get services in a consistent manner, subject to the constraints experienced in their current situations;
- user availability and reach ability should be known to net. functions, and possibly to services and applications (including by a third party).

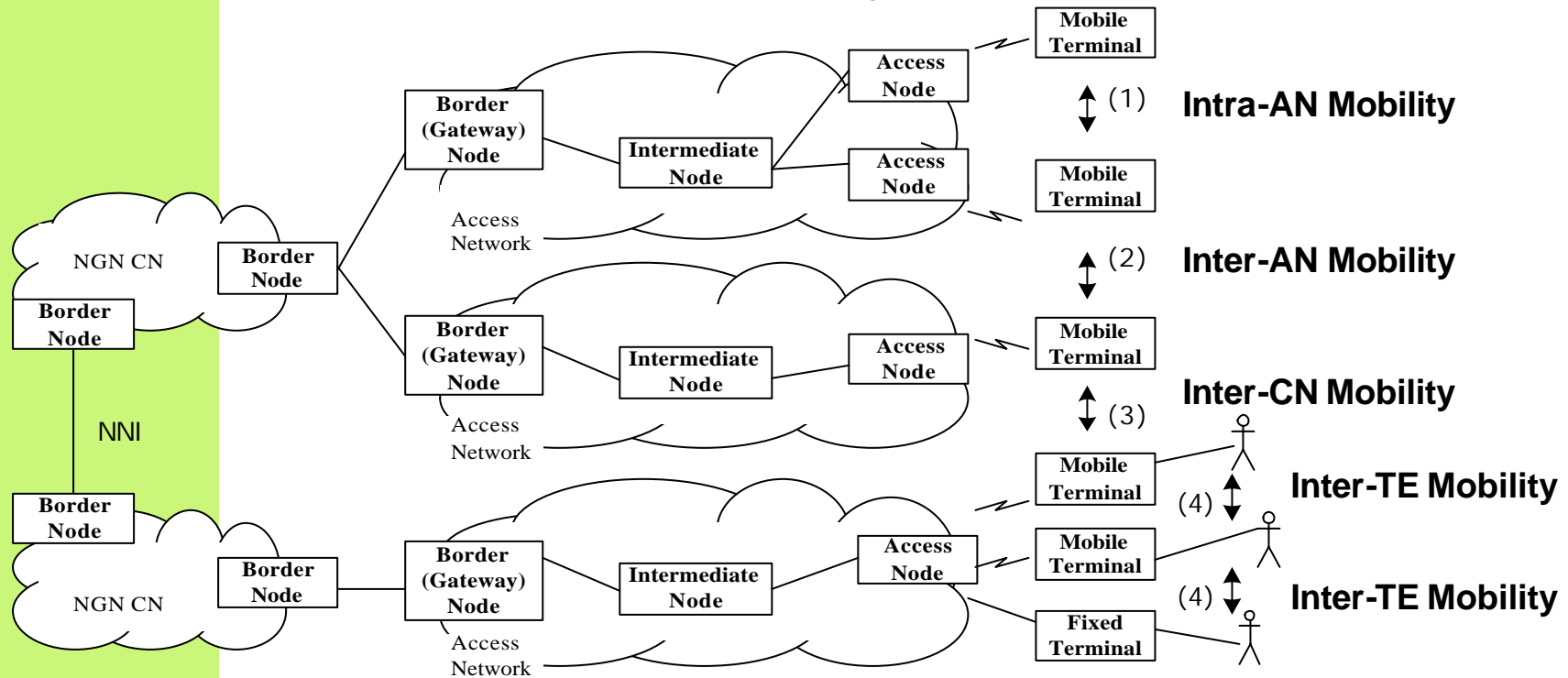
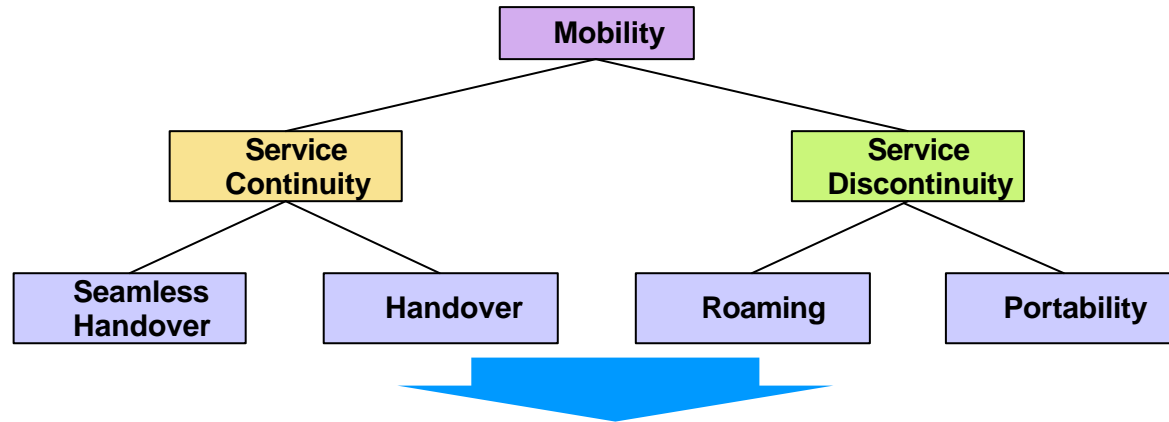
◆ Service Capabilities for NGN Mobility

- support of personal (User and Service) mobility;
- support of terminal mobility;
- support of both personal and terminal mobility



4. General Mobility

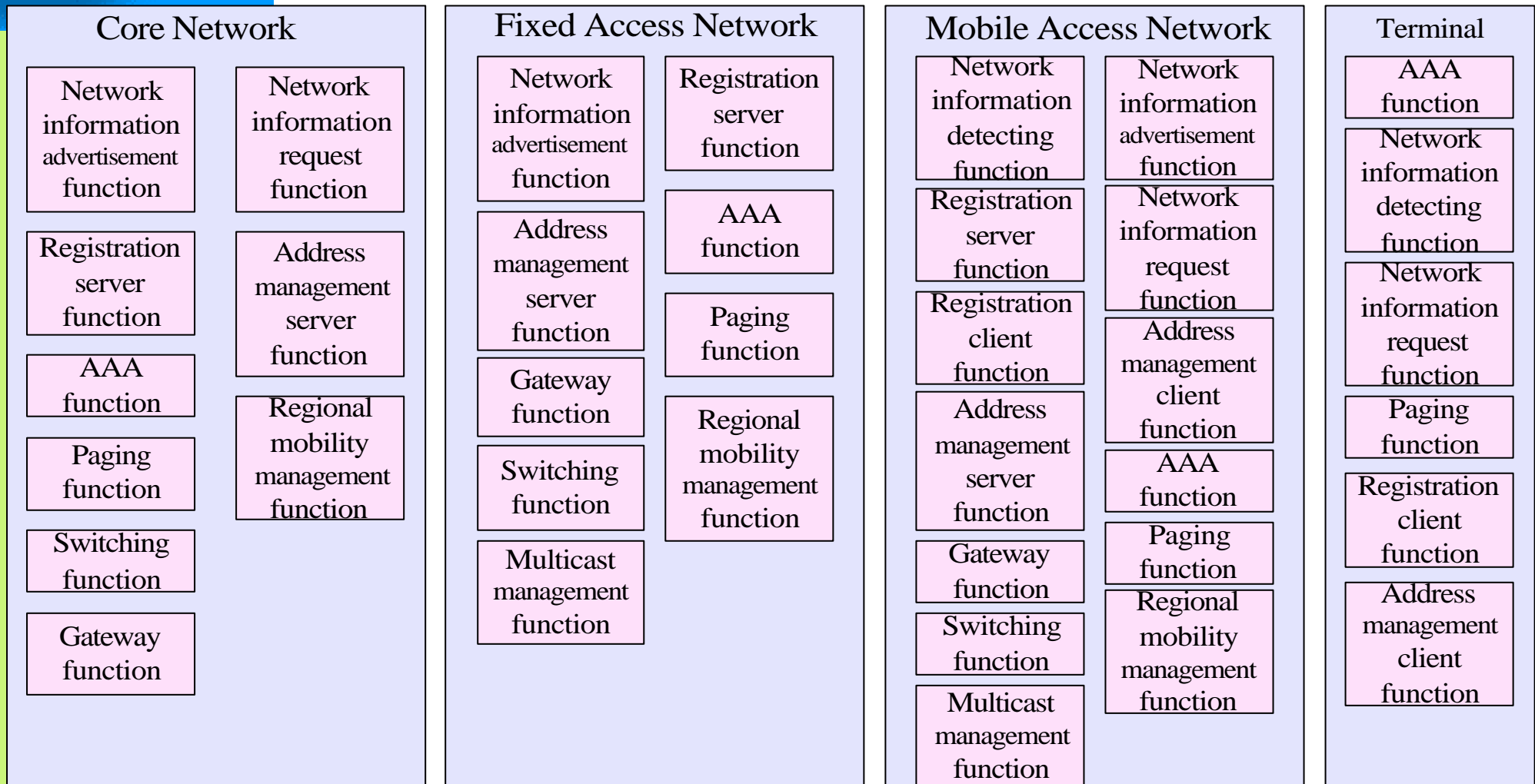
Types of Mobility





4. General Mobility

Configuration of Func. Entities

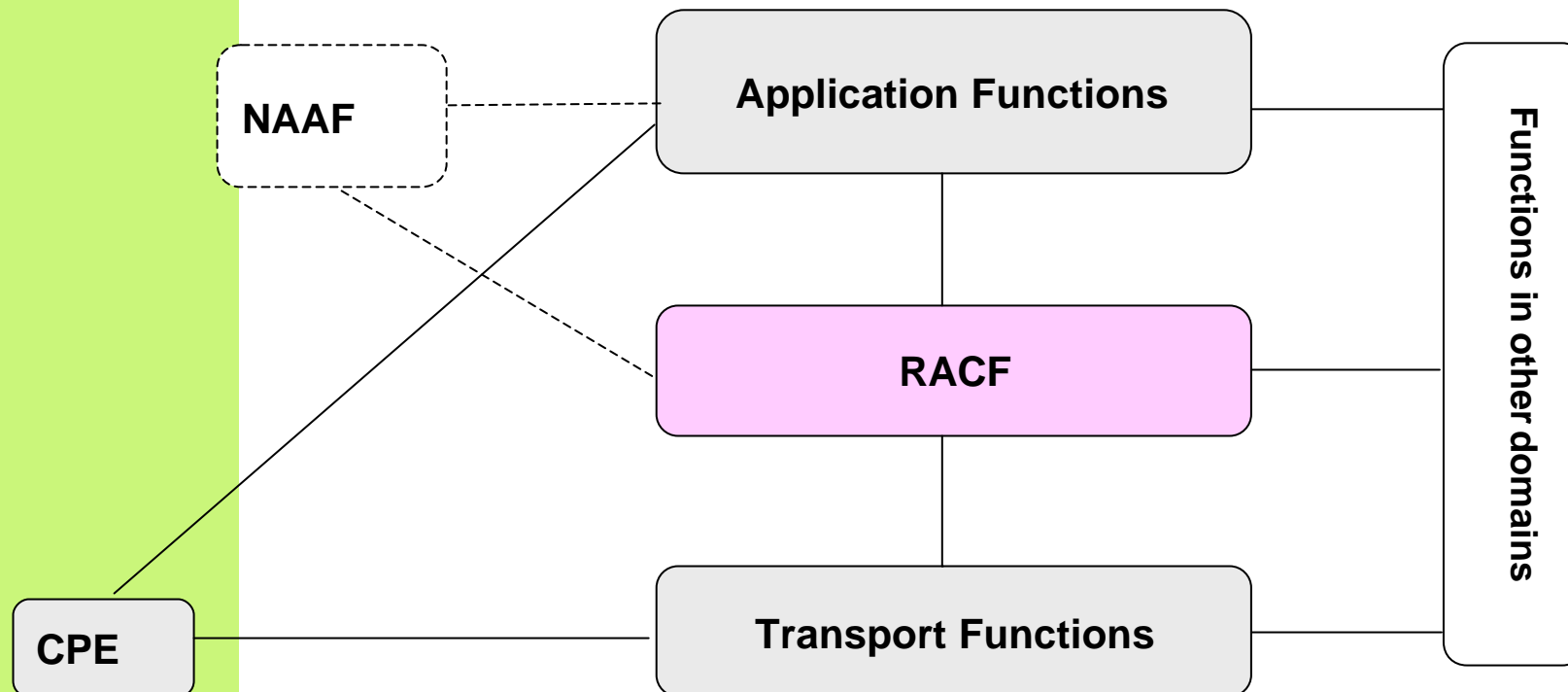




5. Controllability and Manageability

Resource Admission and Control Func.

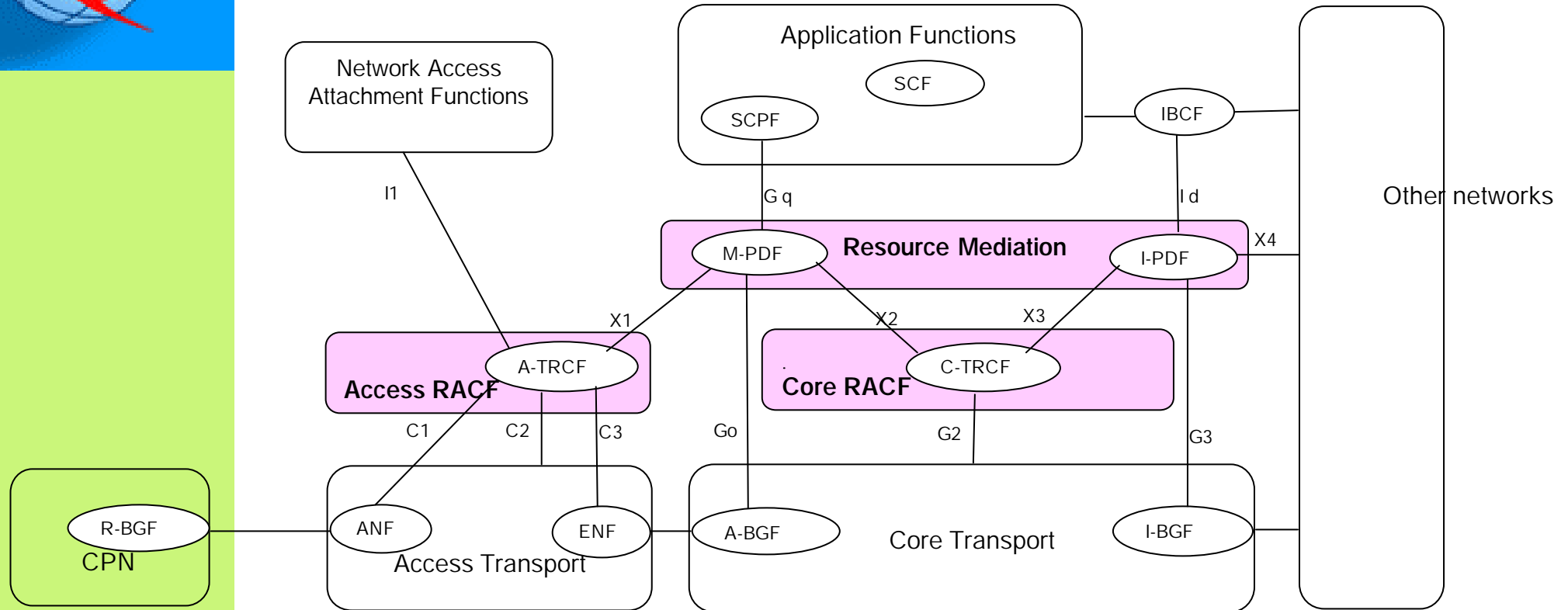
- Provide QoS control (inc. Res. reservation, Admi. control and Gate control), NAPT and/or FW traversal control func. over access and core transport networks.
- Admission control involves checking authorisation based on user profiles, SLAs, operator specific policy rules, and resource availability within access & core transport.
- Act as the arbitrator for resource negotiation and allocation between Application Functions and Transport Functions.





5. Controllability and Manageability

Functional Architecture Model of RACF



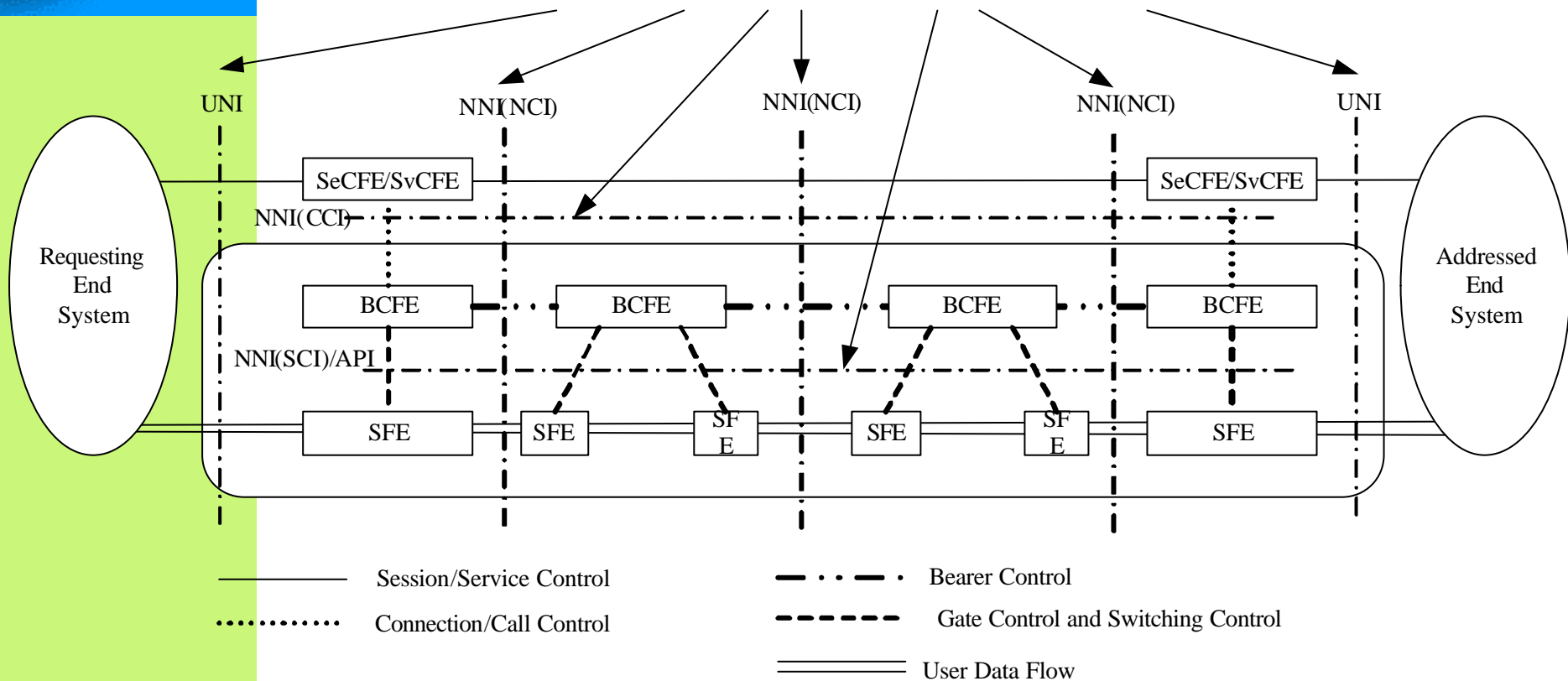
- R-BGF** - Residential Border Gateway Function
- ANF** - Access Node Function,
- SCF** - Session Control Function,
- IBCF** - Interconnection Border Control Function
- M-PDF** - Mediation Policy Decision Function
- I-PDF** - Interconnection Policy Decision Function
- A-TRCF** - Transport Resource Control Function over access network
- C-TRCF** - Transport Resource Control Function over core networks
- A-BGF** - Access Border Gateway Function
- I-BGF** - Interconnection Border Gateway Function
- ENF** - Edge Node Function
- SCPF** - Session Control Proxy Function



5. Controllability and Manageability

IP QoS Signaling Functional Model

The Interfaces can be Either Path-Coupled or Path-Decoupled



BCFE Bearer Control Functional Entity
CC Connection Control
CCI Connection Control Interface

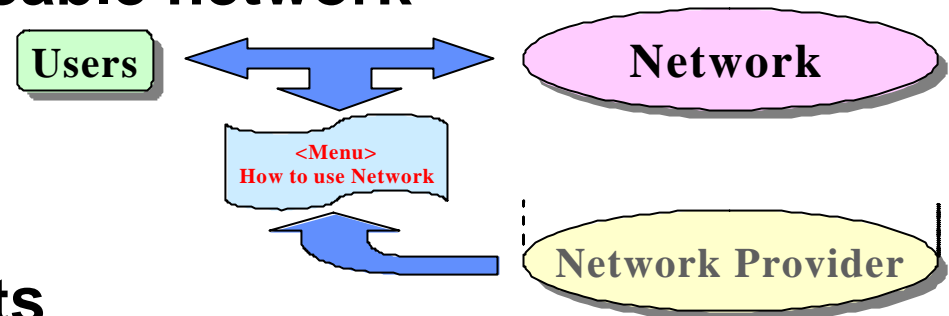
SeCFE Session Control Functional Entity
SFE Switching Functional Entity
SvCFE Service Control Functional Entity



Customer Manageable Requirements

◆ Definition of Customer Manageable network

- End user create their own services and network configurations
- End user choose some control & mngt. funct. over their own network.



◆ End User Service Requirements

- Availability (e.g., 99.999 %)
- Response time
- Service blocking probability including network access blocking
- Service priority and QoS/CoS

◆ Network Provider Requirements

- Network Access Capabilities (Assignment of network addresses etc.)
- Network Performance Parameters (Round Trip Delay, Availability etc.)

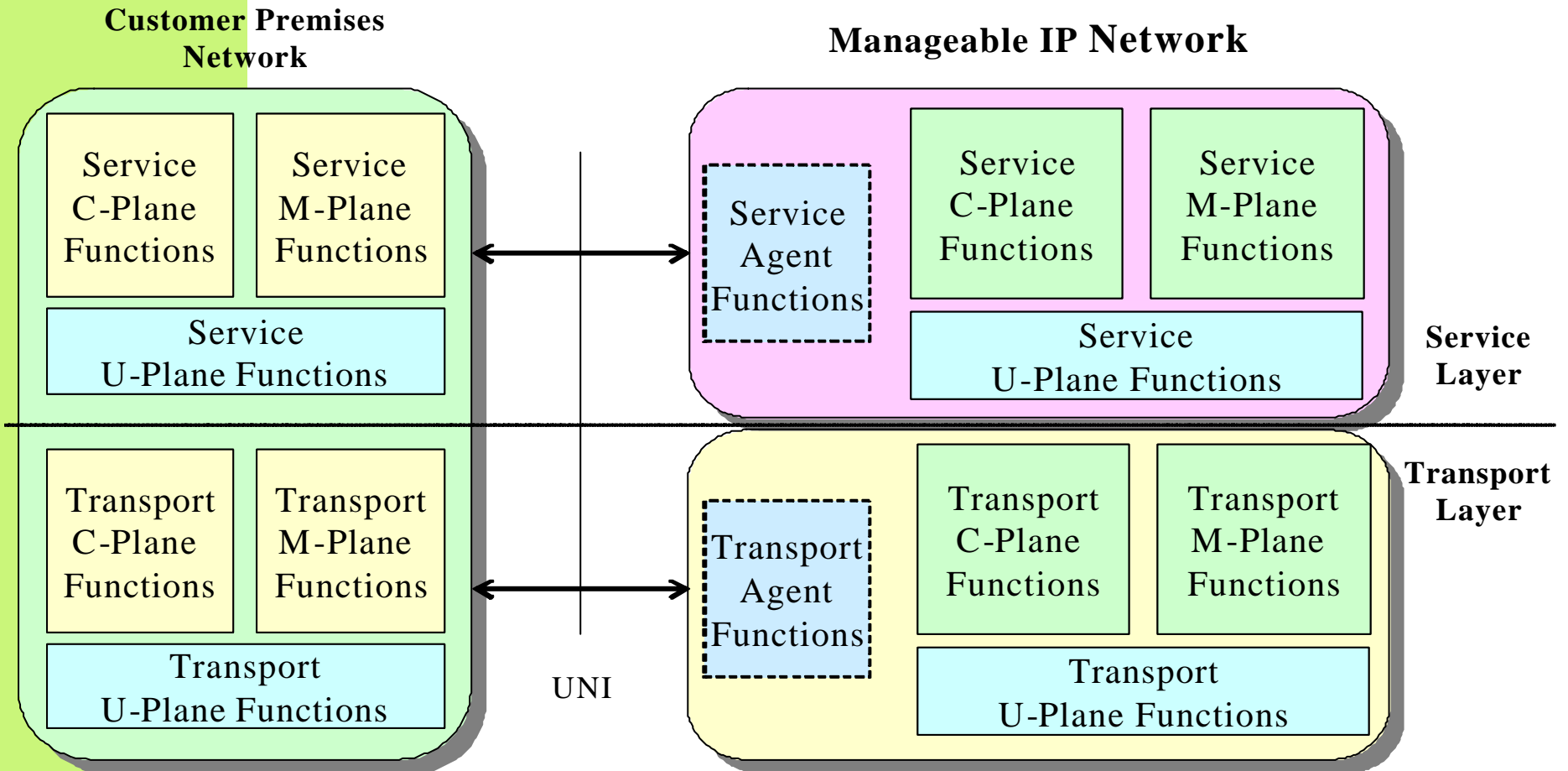
◆ Application Provider Requirements

- Identification of user, service, and terminal type
- Redundancy and Clustering of servers
- Information query and navigation including DB management



5. Controllability and Manageability

Ref. Architecture Model of CMIP





5. Controllability and Manageability

Level of Customer Manageability

Level	Descriptions	Features	Remarks
0	No Management	No monitoring, No Resource Control	<ul style="list-style-type: none"> ● No mechanism to detect network fault and congestion. ● No mechanism to control network resources
1	Overall Network Resource Management	Overall monitoring, No Resource Control	<ul style="list-style-type: none"> ● Notify overall network fault and resource status by network provider ● No resource control by the end user
2	Group level Resource Management	Group level Resource Monitoring & Control	<ul style="list-style-type: none"> ● Notify group level network fault and resource status by network provider ● End user manages the group level resources
3	Individual Resource Management	Individual level Resource Monitoring & Control	<ul style="list-style-type: none"> ● Notify individual network fault and resource status for end-to-end connectivity ● End user manages the end-to-end resources

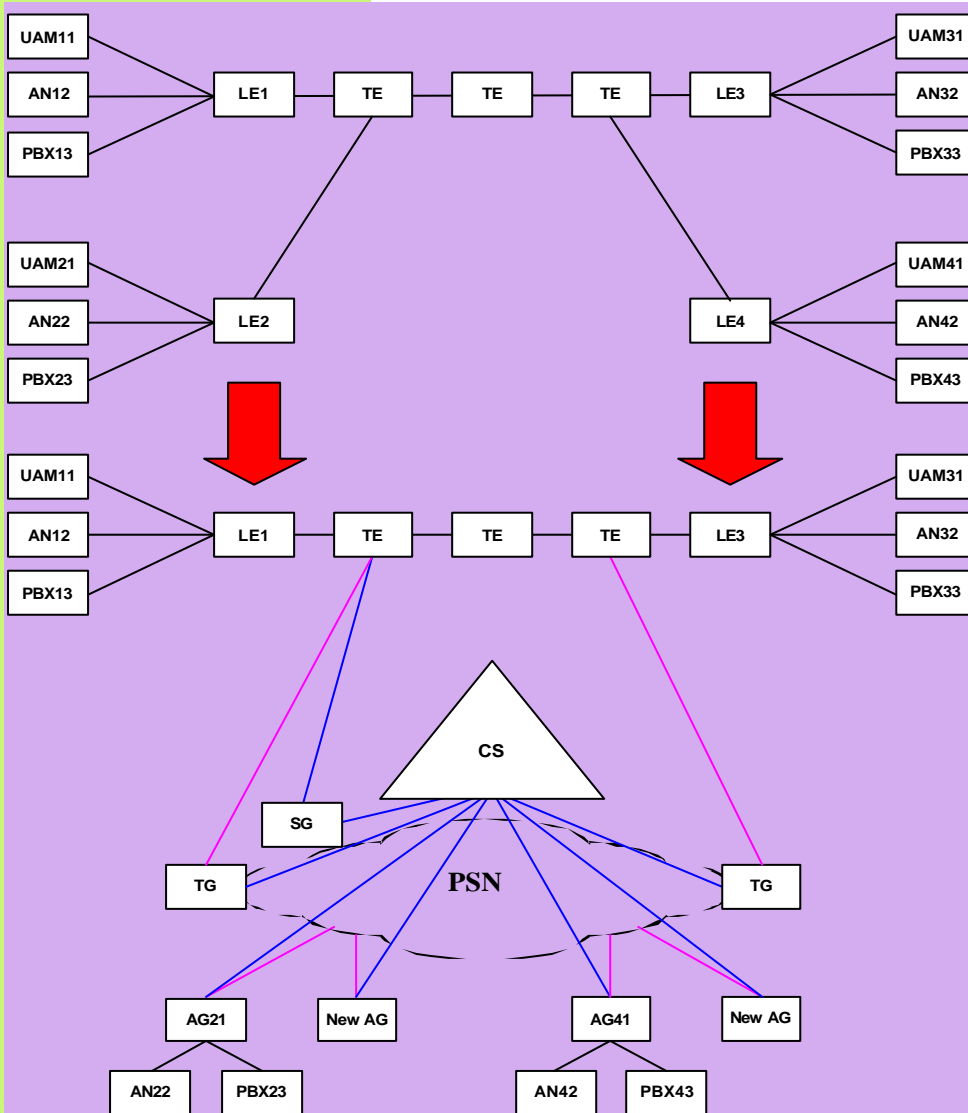


6. Evolution and Realization

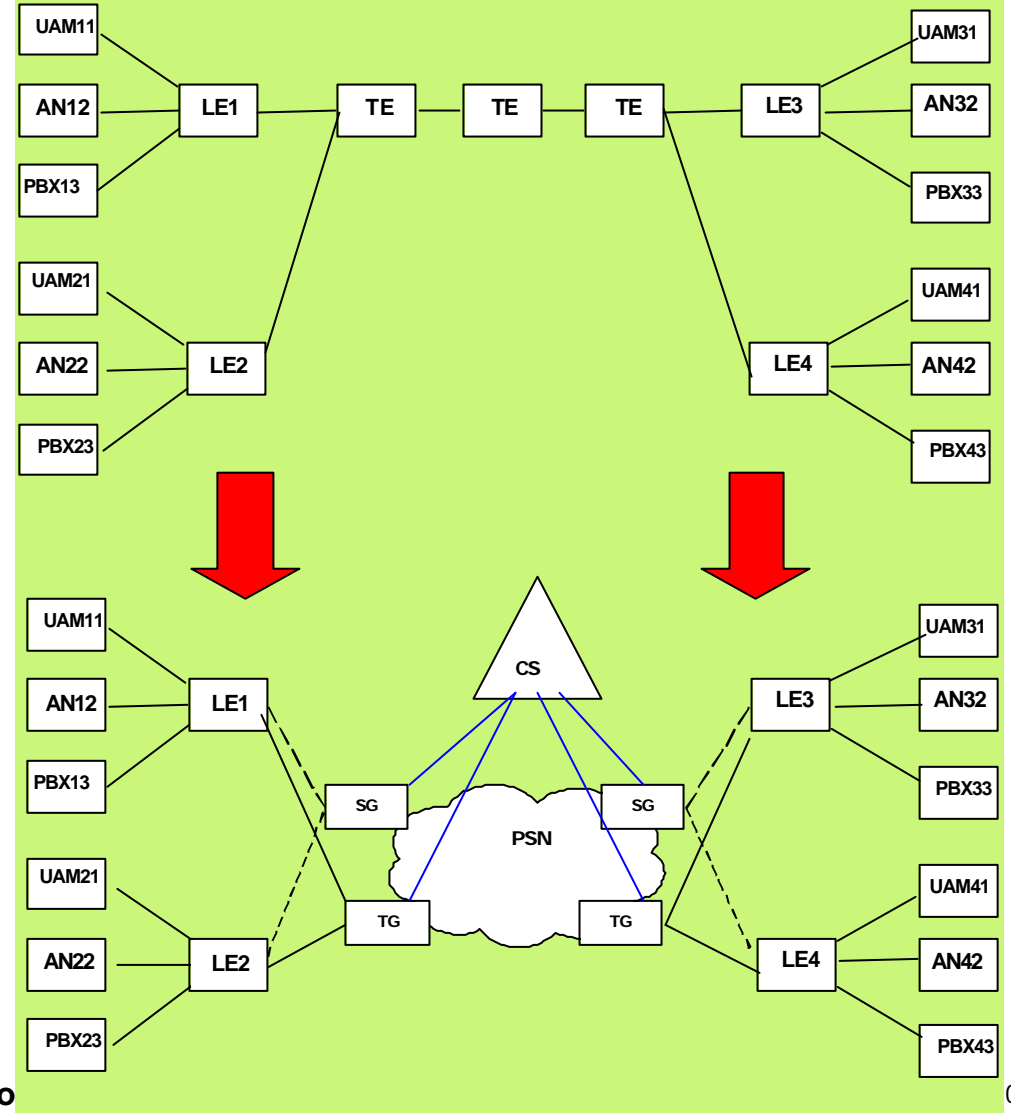
Evolution Aspects of NGN

• 4 Scenarios for PSTN evolution to NGN

3rd Scenario



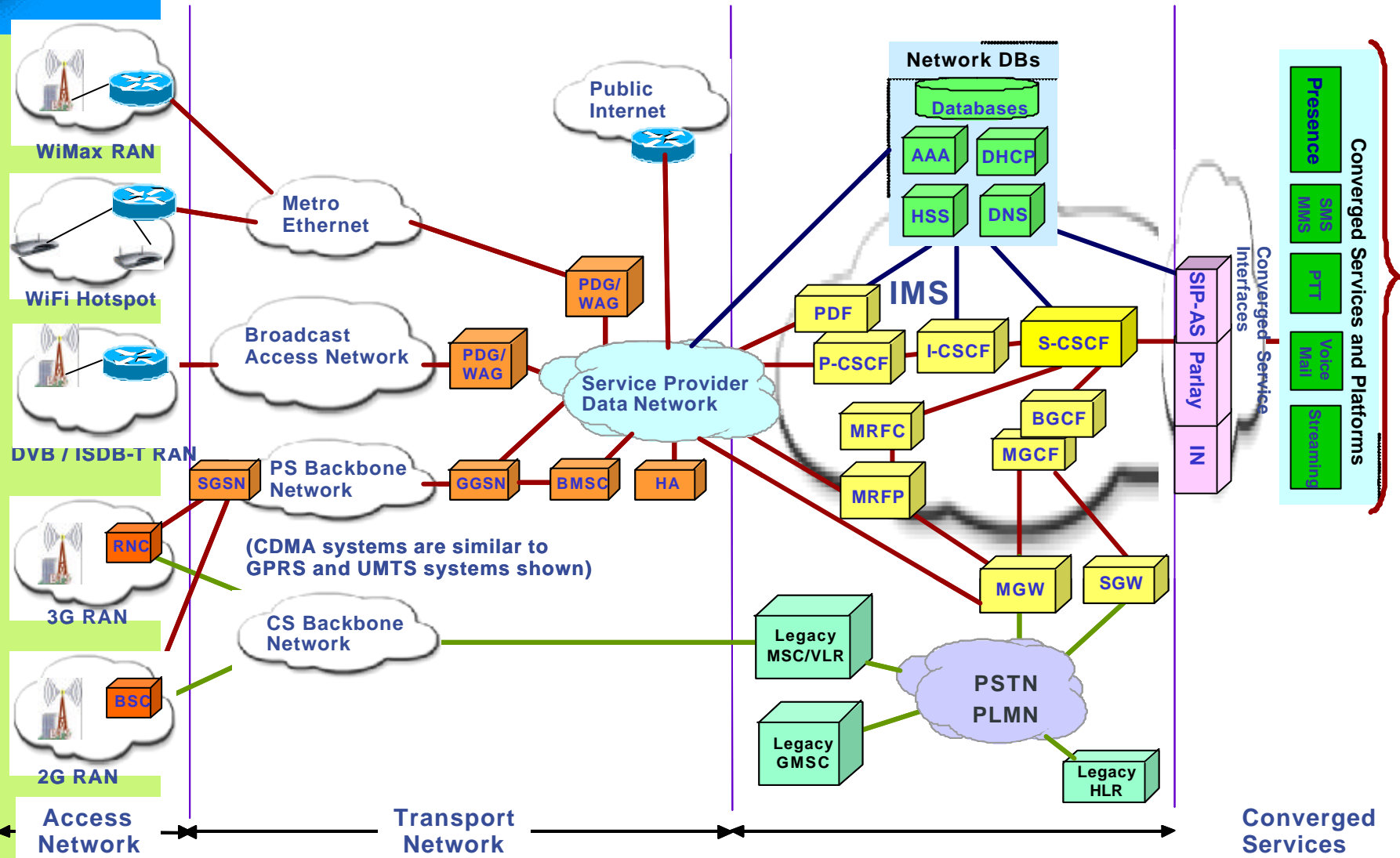
4th Scenario





6. Evolution and Realization

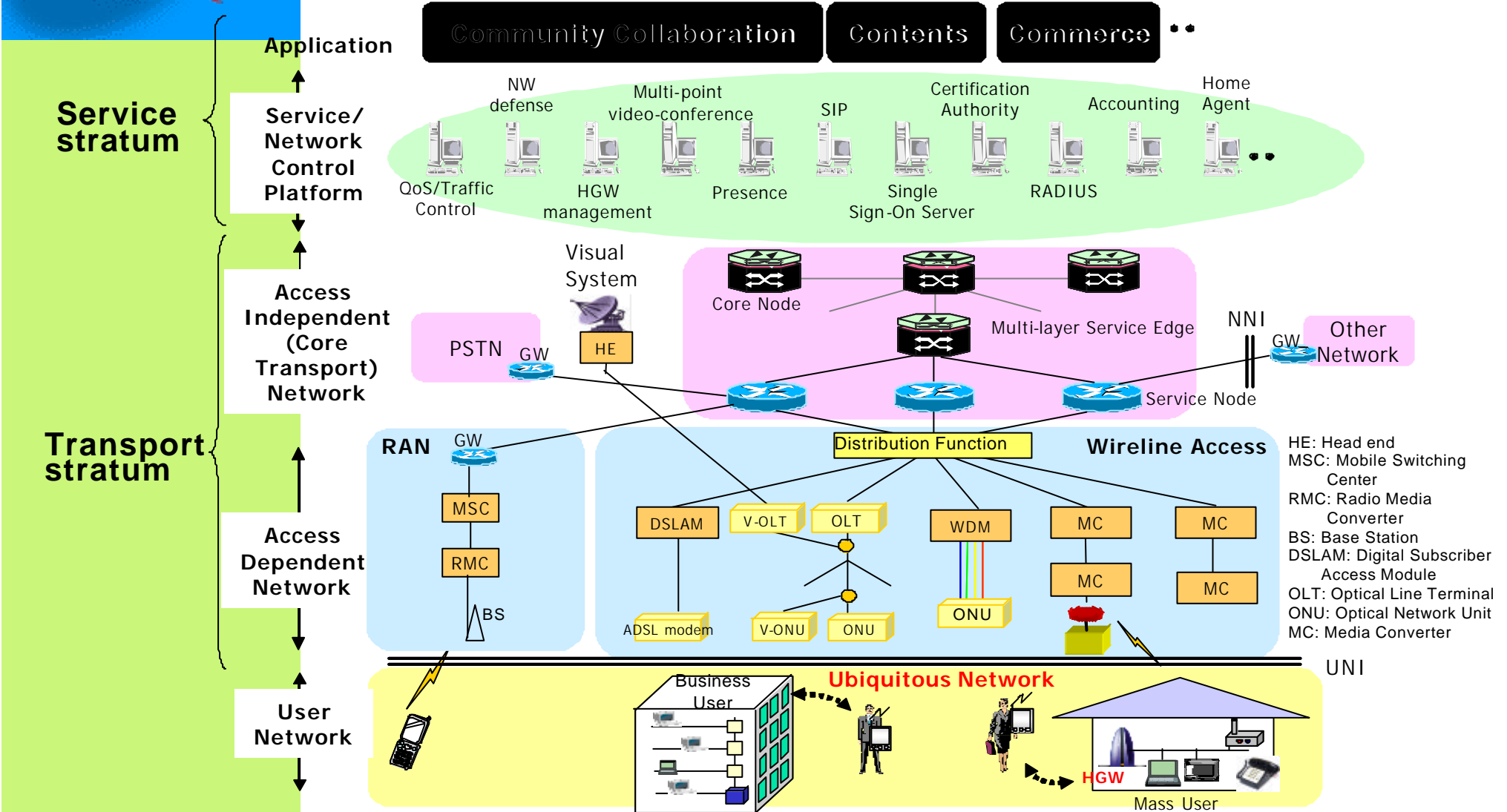
Example of NGN Realization





6. Evolution and Realization

Example of NGN Realization

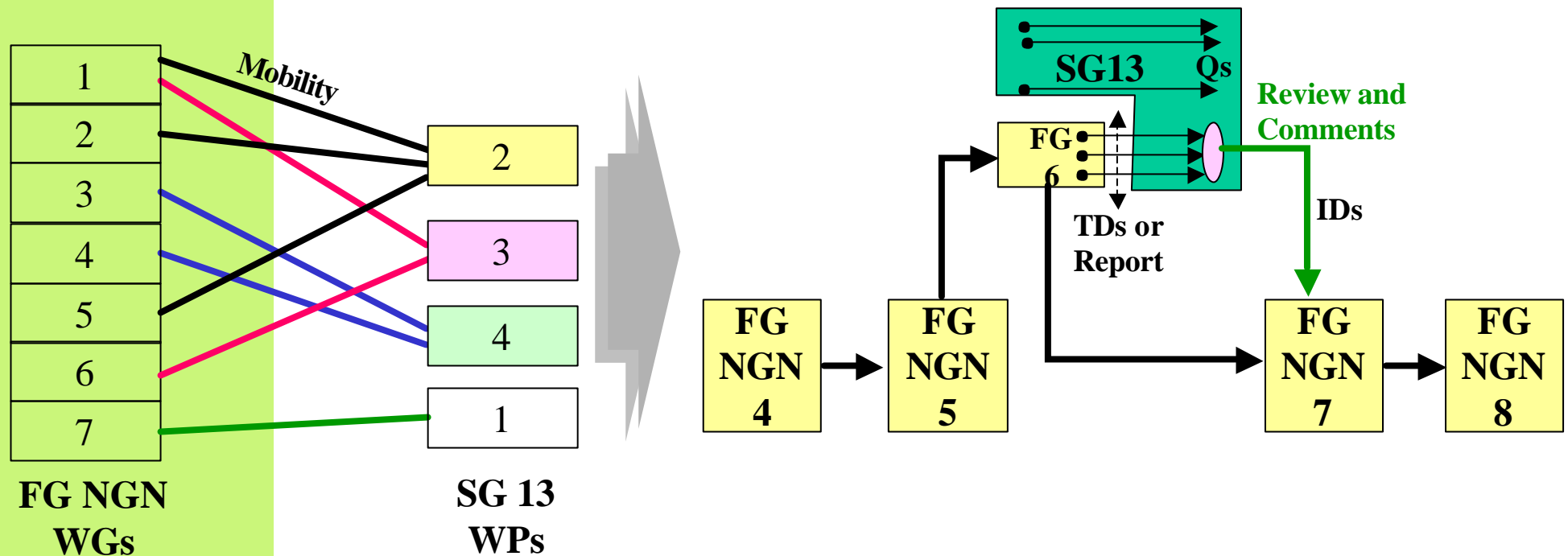




7. Future of FG NGN

Seamless link with SG 13

- **FG NGN formally belong to SG 13 (separation between two is no value)**
- **SG 13 and FG NGN could be focus to progress work**
- **FG NGN could be use time within SG 13 meeting**
- **8 Technical Leaders out of 19 from FG are involved in SG13 as VCs and Rapporteurs**
- **More than 70% of participants from FG are also participate SG 13**
- **Need a mapping between deliverables of FG and Questions of SG**





Plan for 2005

- **5th FG NGN : 14 ~ 22 March, Jeju-island Korea**
NGN Technical Workshop : 12 ~ 13 Korea
- **6th FG NGN : 26 April ~ 30 April, Geneva Swiss**
ITU-T and IETF Joint NGN Workshop 1 ~ 2 May, Geneva, Swiss
- **7th FG NGN : 27 June ~ 1 July, not yet decided**
- **8th FG NGN : 29 August ~ 2 September, Geneva Swiss**
- **9th FG NGN : 30 November ~ 6 December, Geneva Swiss**



Finish Release 1 and Initiate Release 2
Transfer all scope to SGs (SG11, 12, 13, 19) ?



**Thank you
for attention !!!**