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NGN Service Requirements and Capabilities

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Outline

- Key Requirements of NGN Release 1 Environment
- Services and Capabilities
- Items for Release 2 and beyond

Based on ITU-T FGNGN and ETSI TISPAN work



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- **Advanced architecture objectives**
 - Comprehensive set of services over a unifying IP based network
 - Services separable from Transport stratum into Service stratum
 - Transport stratum has to support a multiplicity of access networks and a variety of mobile and fixed terminal types
 - Service not limited to those provided by the “home network”
 - Services shall be able to traverse multiple providers’ networks

- **The positioning of the IP Multimedia Subsystem (IMS)**
 - Unanimously agreed starting point for Release 1: to leverage IMS capabilities defined by 3GPP/3GPP2
 - The capabilities of the IMS need to be extended and accommodate the heterogeneous access transport environment of Release 1



Release 1 environment – Open environment

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- **Open environment objectives for service creation and provisioning**
 - Flexible service framework for implementation of value added services using capabilities
 - Capabilities are accessed via standard application interfaces
 - Third Party application access via Application Network Interface

- **Release 1 should support the following classes of value added service environments:**
 - IN-based service environment (INAP, CAMEL, WIN, ...)
 - IMS-based service environment
 - Open service environment (OSA/Parlay, Parlay X, OMA, ...)



Release 1 environment - Security

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o **Security objectives**

- Address security dimensions
- Address the security features required for secure interconnection

Guidelines for NGN Security R1

- o Overview of security standards
- o NGN threat model (X.800, X.805)
- o Security risks in NGN
- o Security dimensions and threats countered (ITU-T X.805)
- o NGN Security Models
- o Security of the NGN subsystems

Security Requirements for NGN R1

- o General security requirements (based on X.805 concepts)
- o General security objectives
- o Security requirements for Transport Stratum and for Service Stratum



Release 1 environment - Management Interface Capabilities

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- **Management objectives**
 - Monitoring and control of NGN services and components via communication of management information across interfaces
- **Release 1 work items**
 - Definition of realistic R1 objectives and corresponding solutions
 - Focus on identification of management requirements, architecture, and protocol-neutral/protocol-specific interface specifications for managing NGN services and components
- **Output based on collaboration among ITU-T NGN Management Focus Group/SG4 and partner organizations**
 - SG15, TISPAN WG8, ATIS TMOC, TMF, 3GPP SA5, OASIS, IETF O&M
 - Emphasis on reuse of partner specifications
- **NGN Management Specification Roadmap**
 - Gaps and best organization to fill the gaps
 - Stimulating harmonization among partners



Release 1 environment – Quality of Service

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- **QoS objectives**
 - End-to-end QoS environment for the services offered to end users via QoS coordination across the Transport stratum
 - NGN Release 1 provides an initial set of requirements, architectures, mechanisms and guidelines to enable end-to-end QoS

- **Main work items: Procedures for QoS control**
 - IP QoS signalling
 - Resource Reservation, Admission Control and Gateway Control
 - NAPT and Firewall traversal

- **Focus on Resource and Admission Control**
 - Authorization checking based on various policy criterias
 - **FGNGN : coordination between access and core, between core and other NGNs**
 - TISPAN Release 1: QoS control only for access network



Release 1 environment - Mobility

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Mobility objectives

- **Mobile users requirements**
 - Seamless and transparent mechanisms for roaming between operators
 - Access from variety of environments with variety of terminals with varying capabilities
- **Towards Fixed-Mobile Convergence (FMC)**
 - converged services, converged devices, converged networks
(any service, anywhere, anytime)
- **No major new interfaces for mobility proposed for Release 1**
 - Personal mobility will exist where users can register themselves to the services
 - 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 in Rel.1 between networks and within a network
 - This does not exclude support for mobility with service continuity



Evolution requirements to NGN: PSTN/ISDN Emulation and Simulation

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NGN Rel.1 will support (in evolution path to NGN) :

- legacy terminal equipment (e.g. PSTN/ISDN phones)
- PSTN/ISDN-like service 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 capabilities
- Legacy terminals with terminal adaptations may be also used
- Implemented over IP-based control infrastructure



ITU-T **What has been done in FGNGN**

- Principles and requirements for evolution
- Scenarios for PSTN/ISDN evolution to NGN
- PSTN/ISDN Emulation and Simulation scenarios
 - Call Server-based and IMS-based Emulation approaches
 - PSTN/ISDN Simulation based on IMS capabilities

What next in ITU-T

- Examination of legacy services and selection of candidates for PSTN/ISDN Emulation and Simulation
- Identification of additional capabilities
- Control, signalling, management and protocol aspects

TISPAN additional work in Release 1

- Description and requirements of Simulation services
- Ongoing work on E/S protocol specifications



Basic components: Release 1 Requirements for Access Networks (AN)

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- **NGN will support AN of diverse technologies and capabilities**
 - All AN types are required to provide IP connectivity
- **FGNGN Rel.1: non-exhaustive set of candidate technologies**
 - NGN-GSI selection will be based on Rel.1 time constraints against respective technology maturity
- **TISPAN Rel.1: limited set of technologies**
 - Focus on xDSL and 3GPP/3GPP2 Packet Switched domain
 - Others under discussion for Rel.2



Basic components : Release 1 Requirements for Interconnection with peer networks

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- **Interconnection at the Network Node Interface (NNI)**
 - Between multiple NGN domains
 - Between NGN domains and other networks

- **Interoperability will be based on defined interconnect specifications**

- **FGNGN candidate Release 1 NNI interconnections (*)**
 - PSTN/ISDN
 - PLMN (Public Land Mobile Network)
 - Cable networks
 - Internet
 - Broadcast networks
 - Enterprise networks (Private NNI)

(*) Similar considerations to AN case will apply



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Interconnection between NGN domains

- Practicable Interconnection arrangements are essential
- GSMA is considering GRX backbone extension to IMS. NGN ?
- TISPAN is discussing NGN backbone routing options:
 - Internet routing
 - Private IP domain: routing across common backbone
 - IP isolated subnets: step-by-step routing (PSTN-like model)
- Other related issues
 - IP addressing : IP connectivity, private vs public, IPv4 vs IPv6
 - User identification options for routing and DNS/ENUM options
 - QoS and security



Basic components : Release 1 Requirements for User Networks and Equipment

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- Customers may deploy a variety of network configurations inside their networks
- Customers may deploy firewalls and private IP addresses in combination with NAPT
- NGN Rel.1 support for user functions will be limited to control (part of) the gateway functions between user network and AN

- NGN shall support a huge variety of user equipment
- But NGN Rel.1 does not specify or mandate a particular NGN user equipment type or capability
- However, user equipment should enable interface adaptation to varying user requirements (accessibility)



The Service Shift in NGN

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- In today's networks, services are typically “vertically integrated”, requiring specific infrastructure components for their delivery
- Key expectation in NGN : flexible service creation and innovation
 - **Focus will be on standard “service capabilities” as service enabling toolkit**
- The service shift as challenge for NGN Regulation
 - NGN moves the competition from lower layers to service layers
 - This leads to new sources of possible market power, bottlenecks



Release 1 Services & Capabilities

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FGNGN Release 1

Service Types

- Multimedia services
- PSTN/ISDN Simulation services
- PSTN/ISDN Emulation services
- Internet access
- Other services
- Public interest service aspects

Service Capabilities

- Basic capabilities
- Service support capabilities

TISPAN Release 1

IP Multimedia services (supported by IMS)

- Multimedia Telephony, Videotelephony
- Others (IMS messaging, Presence, ...)

PSTN/ISDN Emulation services

Emergency communications from Citizen to Authority



FGNGN Service support capabilities

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Open Service Environment

To support and establish an environment for enhanced, flexible and open service creation and provisioning

- Service coordination
- Application Service Interworking
- Service discovery
- Service registration
- Developer support

Profile management

- User Profile
- Device Profile

Policy Management

Service Enablers

PSTN/ISDN Emulation support

Other capabilities of interest for network/service providers

- Capabilities for Public interest services
- Digital right management
- Fraud detection and management
- Number portability



FGNGN Service enablers

ITU-T To support specific or advanced services and enable access and/or handling of specific information provided by these capabilities

Current list is mostly derived from 3GPP and OMA

- o Group management
- o Personal information support
- o Message handling
- o Broadcast/Multicast support
- o Presence
- o Location management
- o Push-based support
- o Device management
- o Session handling
- o Web-based application support and content processing
- o Data synchronization
- o Commerce and Charging



Which requirements and capabilities for R2?

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- Additional reqts/capabilities based on service scenarios
 - Business models, Interconnection, AN variety, Converged services
- Advances in Customer Networks
 - Delivering QoS to terminal, Home Networking integration with NGN
- More support on Corporate communications requirements
 - NGN services, cooperation with NGN in service provisioning
 - NGN integration (addressing, identification, security, QoS, mobility)
- More services
 - Extensions to R1 (simulation)
 - Multicast, more interactive entertainment (**IPTV** etc.)
 - Identification-based services (sensor/RFID networks), Push-to-Talk
- Full Mobility -> true Fixed-Mobile Convergence
- Advances in QoS
 - Resource monitoring, Traffic Engineering



Which requirements and capabilities for R2?

- ITU-T ○ Advances in Transport
 - To satisfy Service stratum requirements (FPBN)
 - Carrier Ethernet, Broadband Wireless Access
- Solutions for Interconnect issues
 - Addressing, routing, security, QoS
- Service Delivery Platforms
 - Third party access, Web services linkage
 - Multiple business models and service scenarios
 - Positioning versus self-provisioned services over the Internet
- Advanced Management capabilities
 - Subscription, Interconnect, Customer Management, ...
- Others
 - Auto configuration (SoHo, enterprise)
 - User Data (Identification, Single-Sign on)
 - Online Charging capabilities
- Protocols (profiles!) to deliver the NGN promise



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**Thank you for your
attention**



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Background information



ITU-T FGNGN Release based approach

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- o Release based approach : method of prioritizing by identifying a set of services to be addressed in a certain time frame.
- o "FGNGN should progress the work to define the service requirements and capabilities needed to realize the services in addition to defining other associated capabilities as needed to facilitate a NGN in a first Release."
- o "The approach will not prevent other work, such as development of more generic (release independent) capabilities, and collection of services, requirements and issues for later releases."



FGNGN working assumptions

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- o Compliance to NGN Rel.1 of a given network environment does not mean support of all possible combinations of services (as well as capabilities and network configurations)
- o Specific realisations of NGN Rel.1 may extend beyond the identified services and capabilities, as well as SP requirements may drive a particular (sub/super) set of services and capabilities to be supported in a particular network



Service capabilities : componentizing the network functions

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Service Capability: **reusable service building block**

- a (group of) function(s) or operation(s) within a service provider's network, reusable at runtime by other services
- More functions may be interworked for service execution and management
- Some functions can play both roles of Service and Service Capability (e.g. Presence)
- Service Capabilities may be used by
 - services within that SP's network (e.g. via SIP)
 - services outside of that SP's network domain (e.g. via Parlay, Web Services)
 - Third party access, externalisation



The classification of Capabilities adopted in FGNGN

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Basic capabilities

- Underlying capabilities or (directly accessed) capabilities of general usage by services

Service support capabilities

- Capabilities which are generally accessed “directly” by services, and of specific usage by a specific class of services. Mostly located in the NGN Service stratum
- Generally combined with other capabilities/services to provide enhanced functionality. Some may be also used as stand alone services in specific cases (e.g. presence service)



NGN Release 1 Capabilities in FGNGN: what for

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- The capabilities identified in FGNGN have been derived from functionalities already developed in various technical bodies and considered ready for use in Release 1 time frame
- A list of capabilities with no ambition to be exhaustive and to identify the most appropriate level of functional aggregation for NGN Release 1 realisations
- Basically, the list provides guidelines for the NGN architecture work so that the functional building blocks identified in the NGN architecture are able to support these capabilities



Mapping services to Capabilities (examples)

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Services/Service Enablers	Presence	Location mgt	Group mgt	Pers. Inf. Support	Message Handling	Bcast/Mcast Support	Push-Based Support	Session Handling
Real-time Conversational Voice services								X
Messaging services	X		X		X			X
Push to talk over NGN	X		X					X
Point to Point interactive multimedia services			X					X
Collaborative interactive communication services		X	X					X
Content Delivery Services		X					X	
Push-based Services		X					X	
Broadcast/Multicast Svcs						X		
Hosted and transit services for enterprises			X					X
Information Services	X	X		X			X	
Presence, notification Svcs	X	X	X					
3GPP Rel.6/ 3GPP2 Rel. A OSA-based services	X	X	X	X	X	X	X	X
Data Retrieval	X			X			X	
Sensor Network							X	
Over the Net. Device Mgt	X			X			X	



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Main "stage 1 deliverables" on NGN service requirements and capabilities

ETSI TISPAN Release 1

- o Release 1 definition
- o Service and Capabilities requirements (Requirements per class of services)
- o Requirements for multimedia telephony with PSTN/ISDN simulation services
- o NGN Videotelephony service description
- o Others

Focus Group on NGN

- o Release 1 Scope
- o Release 1 Requirements (High-level requirements)

To
NGN-GSI

Other *stage 1 work items* in NGN-GSI(*)

- Service requirements
- Service scenarios
- Service capabilities

(*) A following slide provides details from Q.2/13 activity



TISPAN Release 1 Multimedia Telephony services

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Multimedia Telephony with PSTN/ISDN simulation services

- o Service characteristics
 - PSTN/ISDN-like services, but not limited to the voice media
 - Some correspond to popular PSTN/ISDN supplementary services
 - No mandatory set in a particular network deployment
 - Interoperability with PSTN/PLMN-CS networks shall be supported, but not required for all services offered in the CS network

- o Three service categories
 - Mandatory: shall be offered when there is a service offer
 - OIP, OIR, TIP, TIR, MCID, ACR
 - Recommended: offer transition from PSTN/ISDN to NGN
 - CDIV (CFU, CFB, CFNR, CFNL, CD), CW, HOLD, CB, CCBS, MWI
 - Optional
 - CONF, AOC, ECT, RC
 - Service interaction between pairs of these services has been analysed



Service related work items currently under development inside Q.2/13

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General NGN Requirements

- o NGN Release 1 requirements Y.NGN-R1-reqts

Focused on NGN services and scenarios

- o IMS-based Real Time Conversational Voice services over NGN Y.ngn-rtconv
- o UPT (Universal Personal Telecommunications) service over NGN Y.ngn-upt
- o NGN service requirements for ID-based applications Y.idserv-reqts

Focused on NGN capabilities

- o Requirements and framework allowing accounting, charging and billing capabilities in NGN Y.ngn-account
- o Open Service Environment Capabilities for NGN Applications and User Services Y.ngn-openenv
- o VPN Service Capabilities in NGN mobile environment Y.ngn-vpn NGN Multicast Service Framework Y.ngn-mcastsf
- o NGN Multicast service capabilities with MPLS-based QoS support Y.ngn-mcast
- o MPLS-based Mobility and QoS capabilities for NGN services Y.mpls-mob

Q2 work is in coordination with NGN-GSI Questions (Q1, Q2, Q8/13,etc.), other ITU-T SGs and SDOs (including regional ones - TISPAN, ATIS, *ASTAP*)