The evolution of NGN
to an open service platform

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Outline

- NGN Capabilities
- Towards an open service platform in NGN
- Service platform standardization developments, including ITU-T
NGN Capabilities
Next Generation Services

- From vertical sylos
  - Services require specific infrastructure components for their delivery
- to NGN
  - Horizontal Convergence: services no more vertically integrated
  - Network functions are componentised
  - Standard “capabilities” as service enabling toolkit

- NGN services standardization
  - Services specified in terms of required “capabilities”
  - Service definitions not anymore a requirement
    - Public Interest Services are a special case

Service Shift as consequence of NGN service vs transport stratum separation
Requirements and Capabilities of NGN

High level requirements
- Y.2201 ”High level requirements and capabilities to support NGN Release 1 service objectives” - approved in April 07
  • Only network related capabilities
- Y.2201 Rev.1 (formerly NGN Rel.2) ”Requirements and capabilities for ITU-T NGN” - approved in Sept 09
  • Includes user related and service-specific requirements

Detailed requirements
- A number of specific Recommendations have been developed covering the various capabilities (e.g. Security and IdM, QoS, Mobility and FMC, Accounting & Charging, Interconnection etc.)

Each specific NGN realisation may support an arbitrary set of services, thus requiring the implementation of an arbitrary set of capabilities
NGN Capabilities: Rel.1 (Y.2201) and Rel.2 (Y.2201 Rev.1)

- Transport connectivity and network components
- Communication modes
- Multicast
- Media handling (resource management and codecs)
- Access networks and network attachments
- User networks including enterprise networks
- Interconnection, Interoperability and Interworking
- Numbering, naming, addressing
- Identific., authentic., authoriz.
- Identity management
- Security
- Critical infrastructure protection
- Routing
- Quality of Service

- OAM and Survivability
- Accounting and Charging
- Management
- Mobility handling
- Service enablers
- Context awareness
- Open service environment
- Profile management
- Policy management
- Content management
- IPV6 support
- Non disclosure of info across NNI and ANI
- Inter-provider exchange of user-related information
- Public Interest Services support capabilities
- **Capabilities for service specific requirements**
Towards an open service platform in NGN
Application Network Interface in NGN Reference Functional Architecture

Y.2012 Rev.1 (work in progress)
Reusable “Capabilities” for an (open) service environment

Generic concept of ANI (Application to Network Interface)

- Reusable common set of “Capabilities” for reduced service development costs
  - Applying the development approach from IT industry to Telecoms
- (Open) service environment for flexible and agile service creation, execution and management
  - Service platform (NGN SDP / Telco SDP)
  - Rapid changes for satisfying the changing customer needs
  - Increasing business opportunities via an environment integrating applications and telecom infrastructure
  - Competing with Web companies’ service offerings
Reusable common capabilities:
BT’s 21CN Service Creation Framework

- Creation of a series of reusable, common capabilities
- First 9 components launched in 2004/5
- 17 new products or enhancements based on these components launched in 2005/6
- Increased automation and acceleration of time to market for new services
- Help to contribute to cost reduction

- Some capabilities have been made available to 3rd parties, invited to develop within the BT ecosystem (3rd party-open environment)

Source: BT
A (open) service environment increases the business opportunities

- Personalisation
- On-Demand
- Communities
- Self-Service
- Collaboration

End user created applications

3rd Party applications

NGN Provider services

NGN common building blocks
New business models: « multi-sided model » example scenario

- NGN dynamic features and comprehensive service delivery control capabilities are made available via MDS through ANI by the NGN Provider to 3rd Party Providers and their customers.
- 3rd Party Providers can offer enhanced services to their customers.

A win-win situation for both 3rd Party Provider and NGN Provider.

ITU-T Y.2212 - Managed Delivery Services (MDS)
Telco SDP to compete with Web Companies

- **Telco world** versus **Web world** (with its huge offer of Web applications)

- Telcos may become just ‘bit pipe’ providers (services Over The TOP)

- New services become a strategic differentiator and a way to face with decreasing voice revenues

- But legacy service delivery is inefficient and expensive

**Telco SDP** (*) as framework for a new service deployment model

(*) IMS may be seen as separate or complementary framework
Attributes of an open service environment in NGN

“Open service environment” key attributes (ITU-T Y.2234)

- Capability exposure via standard appl.-network interfaces (APIs)
- Usable capabilities from different network domains (NGN, but also Internet/Web 2.0, Broadcast Networks, Mobile Networks etc.)
- Portable and re-usable capabilities across network domains (e.g. from Web to NGN, but also from NGN to Web)
- Flexible development of applications and capabilities by NGN Providers, as well as Application Providers and End Users
- Support of all types of service provision
- Support of different business models & service delivery approaches

Enabled interworking with other service creation environments

- IN-based service creation environment (INAP, CAMEL, WIN, ...)
- IMS-based service creation environment
- Open service creation environment (OSA/Parlay, OMA, ...)
Other service creation environments - example

Source: 3GPP IMS and OSA/Parlay
**Approaches for an open service environment in NGN**

- **How to open**
  - Adopting a **Service Oriented Architectures (SOA)** framework from the Information Technology world, and enhance it as appropriate. **Telecom SOA**
  - Using **Web Services** as implementation tool set of the Telecom SOA framework (SOAP vs REST approach)
    - Most SOA implementations identify Web Services (WS) as the means for realizing a SOA

- **What to open (exposing via standard interfaces)**
  - NGN capabilities to Applications
    - **Telecom APIs**
      - To a common basic set of Telecom APIs reusable across different service platform implementations
  - NGN capabilities to other NGN capabilities
Service Oriented Architectures (SOA)

- SOA resources are made available via independent services, accessed in standardized way
- SOA systems comprise loosely joined, highly interoperable services
Web Services (WS)

- WS are simple XML-based messages for machine-machine messaging, acting as XML-based APIs
- WS use standard Internet technologies to interact each other dynamically, open standards connect disparate platforms
- WS security model is well understood
- WS are loosely coupled, can be combined to form complex services
- Market success of WS based middleware (e.g. Google, Amazon and many many others) [cloud computing and Web as a platform]
Telecom SOA and enhanced Web Services: new challenges for the development of standards

- Key values of a SOA framework
  - Cross-platform and highly reusable
- But new requirements have to be supported for a Telecom SOA such as those for carrier grade reliability, performance, security

- But Web Services enhancements are required
  - Security, policy management, addressing, service traceability
  - Current WS standards are incomplete (proprietary implementations, low interoperability)
Status of Telco SDPs

Service platforms today

- Platforms using Web Services with interfaces developed between proprietary implementations
- Controlled platforms (Walled Garden approach)
  - Usage of proprietary control mechanisms (e.g. for security, policy mgt)
  - SDK (creation and launch)

No openness, no interoperability

Moves to “open” platforms

Why

- Open = Growth of service market
- Closed = Market restricted to those using your proprietary system

- Providers start opening
  - Initiatives in terms of SDP interworking (Verizon, Qwest)
  - Joint Labs (www.jil.org)
  - Leadership in standardization (e.g. APIs in OMA)
  - IMS platforms: RCS (Rich Communication Suite) trials among 3 French IMS Providers
Standardization developments
Some key items for Telecom SOA and open Telco SDP emerged in standardization discussions

- SDP architecture and key functions, including service creation, execution and delivery
- Common basic Telecom APIs
- Capabilities (unified description, security, liability, unified addressing, manageable register/discover/accessing, tracing)
- Agile service construction (policy-based dynamic service composition, dynamic adaptation to traffic conditions, SLA management, integration with Business Process Mgt etc.)
- Identity Management (unique identity for all user related info)
- Common data models
- Data mining based capabilities
  - user’s characteristics analysis, usage information monitoring etc.
- Brokering/interworking with other domains (Service Quality Mgt and Policy Mgt)
Service platforms related standardization activities

- Numerous (closed) market ecosystems (Telco Providers)
  - although some moves to openness
- A number of SDOs/Forums/Consortia are involved in this area, including
  - ITU-T: SG13 (NGN and Future Networks), SG16 (IPTV)
  - OMA: OMA Service (Provider) Environment, enablers, APIs
    - APIs: Parlay Service Access (22 APIs), Parlay REST, PXPROF (OneAPI profile of Parlay X SOAP WS (SM, MMS, Payment, Terminal location)), NGSI (Next Gen Service Interfaces)
  - GSMA: OneAPI (work now brought into OMA)
  - 3GPP (SCIM, brokering)
  - TeleManagement Forum: Service Delivery Framework
  - OASIS: Telecommunications Services Member Section, others
  - IEEE: NGSON (Next Generation Service Overlay Network)
  - ATIS: Service Oriented Networks (SON)
  - Others, including OMG (service description), Service Broker Forum

- It is required to fill gaps and converge/harmonize existing standards
- ITU-T (SG13) has started collaboration with other organizations
  - OMA, OASIS, TMF, IEEE - plan to strengthen these collaborations
Initial ITU-T work items in NGN service platform area

ITU-T SG13 is increasing its activities in this area

- **Y.2234**: Open service environment capabilities for NGN (Sep08)
- **Y.OSE-arch**: “OSE functional architecture for NGN” (launched in Jan09)
- **Y.NGN-SIDE-Req**: Requirements for NGN SDP (“Service Integration and Delivery Environment”) (launched in May09)
- **Y.NGN-Web**: “Functional requirements and architecture of Web Service Component in NGN” (just launched - Sept09)
- **Y.2212**: Requirements of Managed Delivery Services (Jan08)
- **Y.2232**: NGN convergence service model and scenario using WS (Feb08)
- Deliverables based on past OCAF Focus Group activities (Dec06)
  - **Y.2901/Y.2902**: Carrier grade open environment model/components

Other ITU-T activities in Telecom SOA and WS include

- **M.3060**: Principles for NGN management (March06) (ex- ITU-T SG4)
- SOA/WS related security aspects (ITU-T SG17)
- Middleware aspects for IPTV and USN (ITU-T SG16)
Y.2234 : NGN Open service environment (NGN OSE)

- NGN OSE
  - requires the use of standard interfaces
  - opens the capabilities of the NGN to third parties
  - provides a SOA enabled environment
  - may be implemented via Web Services technologies

- NGN OSE high level requirements
  - to provide standard APIs for application providers and developers, and potentially end users
  - to provide service level interoperability underlying different networks, operating systems and programming languages
  - to support service independence from NGN providers and manufacturers
  - to support NGN OSE capabilities based on NGN providers’ capabilities [OSE capabilities based on application providers’ capabilities not supported in this version of Y.2234]
  - to support location, network and protocol transparency
  - to provide secure access to NGN OSE capabilities satisfying the general NGN security requirements
Capabilities of NGN OSE

- **Registration** of capabilities and services(/applications)
- **Discovery** by users and devices of capabilities and services and other network information and resources of their interest
- **Coordination** of services with capabilities
- **Composition** for flexible composition of services
- **Management** of services and capabilities
- **Development support** for efficient service construction, trialing, deployment, removal
- **Policy enforcement** for resources protection and management, and service personalization
- **Interworking with other service creation environments**
Example of “Composition” (implemented via Web Services)

Application: Locate and Call User

Choreography Description Language (CDL)

Parlay X API Call

Location Capability

Presence Capability

Session Handling Capability

Charging Capability

Web Service Description Language (WSDL)
NGN OSE positioning within the NGN Architecture

Source: Y.2234
<table>
<thead>
<tr>
<th>OSE</th>
<th>Service discovery</th>
<th>Service management</th>
<th>Service registration</th>
<th>Service coordination</th>
<th>Service composition</th>
<th>Service development support</th>
<th>Interworking with service creation environments</th>
<th>Policy enforcement</th>
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<tbody>
<tr>
<td>Mapping of NGN OSE functional components into NGN ASF&amp;SSF functional entities [Y.2234]</td>
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<tr>
<td>AS-FE</td>
<td>supports generic server functions including hosting and executing services [ITU-T Y.2012]</td>
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<td>SS-FE</td>
<td>provides access and interworking to a legacy IN SCP [ITU-T Y.2012]</td>
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[ITU-T Y.2012] ASF&SSF FEs

| New FE currently not identified |
NGN SDP requirements - Y.NGN-SIDE-Req draft (Nov09)

Capabilities

3rd party applications
User generated applications

Applications

In-house applications

NGN-SIDE

application layer

In-house applications

3rd party applications
User generated applications

NGN-SIDE

NGN SDP functional framework
Table of contents

- NGN SDP capabilities
  - Generic capability set
  - Application-specific capability sets
  - Functional positioning (NGN architecture, NGN OSE)

- Requirements of NGN SDP capabilities
  - General requirements
  - Service interface reqts across ANI, NNI and UNI
  - Open service interface reqts within NGN SDP

- Appendixes
  - Application scenarios
  - Survey of API standardisation
  - Capabilities and APIs of relevant market SDPs

A number of items for further consideration (Appendix IV.5)
  - User access to NGN SDP from other domains (Web) and by Internet xSPs
  - Role of a Web service platform for NGN SDP, including Web 2.0 APIs
  - Role of NGN SDP for a Web service platform (e.g. as NGN capability negotiator)
  - others
Other SDOs’ work relevant for NGN service platform: the OMA Service Environment

Source: Open Mobile Alliance
Parlay-X Web Services specifications provide simple, abstracted telecom Web Services based on use of network capabilities:

- Part 1: "Common"
- Part 2: "Third party call"
- Part 3: "Call Notification"
- Part 4: "Short Messaging"
- Part 5: "Multimedia Messaging"
- Part 6: "Payment"
- Part 7: "Account management"
- Part 8: "Terminal Status"
- Part 9: "Terminal location"
- Part 10: "Call handling"
- Part 11: "Audio call"
- Part 12: "Multimedia conference"
- Part 13: "Address list management"
- Part 14: "Presence"
- Part 15: "Message Broadcast"
- Part 16: "Geocoding"
- Part 17: "Application driven QoS"
- Part 18: "Device Capabilities and Config"
- Part 19: "Multimedia streaming control"
- Part 20: "Multimedia multicast session management"
- Part 21: "Content management"
- Part 22: "Policy"
Other SDOs’ work relevant for NGN service platform: the IEEE NGSON framework

Application and Services

Context-aware Routing
Service Addressing, Discovery
Basic Routing
Dynamic policy enforcement
Service interaction facilitation functions
Security/Trust
Self-organization
...,

NGSON
[Context-aware, dynamically adaptive and self-organizing networking capabilities]

Underlying Transport Networks

Service related functions
Transport related functions

Source: IEEE NGSON
Example of NGSON implementation

Key Aspects:
Context awareness, addressing, routing, discovery, registration, composition, self-organization etc.

Source: IEEE NGSON
Other SDOs’ work relevant for NGN service platform: the TMF Service Delivery Framework

Source: TeleManagement Forum
Towards an open service platform in NGN (Telco SDP)

- Service Oriented Architectures (SOA) as framework
- Web Services (WS) as implementation tool set

Integrated applications - telco environment enables new business opportunities and a way to “compete” with Web companies and applications (*will this be enough?*)

- but bring new challenges to standards development

Numerous SDOs, Forums and Consortia involved

- Required standards convergence and harmonization
- Increasing involvement of ITU-T in this area
- NGN OSE, NGN SDP and other developments
- Collaboration started with other SDOs to integrate relevant specifications within ITU-T NGN standardization framework and enable an open service platform in NGN
Thank you for your attention

Questions ?