Towards an open service delivery environment/platform in NGN

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Outline

- NGN capabilities
- NGN Open service environment - ITU-T SG13
- Collaboration with other SDOs and future items
Next Generation Services

- From today’s networks
  - Services are typically “vertically integrated”
  - Services require specific infrastructure components for their delivery

- to NGN: flexible service creation and provisioning
  - Horizontal Convergence: services are no more vertically integrated
  - Network functions are componentised
  - New paradigm: standard “capabilities” as service enabling toolkit

- Key objectives in NGN service standardisation
  - Not just a new voice network
  - “Service level equal or better than in circuit-switched networks”
  - Services specified in terms of required “capabilities”
  - Service definitions not an objective like in legacy world
    - Public Interest Services are a special case

Service Shift as consequence of NGN service vs transport stratum separation
The concept of “Capabilities” as re-usable building blocks for applications/services

Applications

Reusable blocks
Service environment

NGN resources

Generic concept of ANI (Application Network Interface)

- A reusable set of Capabilities
  - Objective to reduce service development costs
- Towards an NGN Open Service Environment for flexible and agile service creation, execution and management
  - Service platform concept
  - “Rapid change” is key for satisfying changing customer needs
  - New business opportunities

Colombo, Sri Lanka, 7-10 April 2009
### Capabilities for NGN Release 1 (Y.2201) and Release 2

<table>
<thead>
<tr>
<th>Transport connectivity</th>
<th>Mobility handling</th>
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<tbody>
<tr>
<td>Communication modes</td>
<td>Service enablers</td>
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<td>Multicast</td>
<td>Open service environment</td>
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<td>Media resource management</td>
<td>Profile management</td>
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<td>Codecs</td>
<td>Policy management</td>
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<td>Access Networks, network attachment</td>
<td>PSTN/ISDN emulation and simulation</td>
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<td>User networks</td>
<td>Public Interest Services support</td>
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<tr>
<td>Interconnection, Interoperability and Interworking</td>
<td>Critical infrastructure protection</td>
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<tr>
<td>Numbering, naming, addressing</td>
<td>Non disclosure of info across NNI</td>
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<tr>
<td>Identific., authentic., authoriz.</td>
<td>Inter-provider exchange of user-related information</td>
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<td>Security</td>
<td>Context awareness</td>
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<tr>
<td>Routing</td>
<td>Identity management</td>
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<tr>
<td>QoS</td>
<td>Content management</td>
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<td>OAM and Survivability</td>
<td>IPTV services support capabilities</td>
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<tr>
<td>Accounting and Charging</td>
<td>Enterprise Networks support capabilities</td>
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<tr>
<td>Management</td>
<td>IPV6 support capabilities</td>
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</table>
Towards an open service environment in NGN (NGN OSE)

- "Open service environment" for flexible and agile service creation, execution and management
  - Leveraging new capabilities enabled by technologies of different worlds (3G, but also Internet/Web 2.0 and IT)
  - Exposure of capabilities via standard application network interfaces
  - Portability and re-usability of capabilities across networks (and from Web to NGN or from NGN to Web)
  - Flexible development of applications and capabilities by NGN Providers as well as by Application Providers

- Types of service creation environments recommended to be supported in NGN (Release 1):
  - IN-based service creation environment (INAP, CAMEL, WIN, ...)
  - IMS-based service creation environment
  - Open service creation environment (OSA/Parlay, OMA, ...)

Framework for value added applications leveraging network capabilities (COMMUNICATIONS-ENABLED APPLICATIONS)
Service creation environments - example

Source: 3GPP IMS and OSA/Parlay

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3rd party scenarios:
Managed Delivery Services (MDS) – Y.2212

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

**Example of MDS Business Model**

A win-win situation for both 3rd Party Provider and NGN Provider.
Opening the NGN service environment through Telco SOA and enhanced Web Services

- **How to open**
  - Adopting a Service Oriented Architectures (SOA) framework from the IT world and enhance it as appropriate -&gt; **Telco SOA**
  - Using **Web Services (WS)** as implementation tool set of the Telco SOA framework
    - other tools (e.g. REST) are not excluded

- **What to open (expose)**
  - Applications &lt;-&gt; Network capabilities (NGN)
    - **Telecom APIs**
  - Network capabilities &lt;-&gt; Network capabilities
Service Oriented Architectures (SOA)

SOA framework was originally developed in the IT world.

SOA resources are made available to other participants in a network via independent services, accessed in a standardized way.

SOA systems comprise loosely joined, highly interoperable services.

SOA is attractive to businesses because:

- Cross-platform
- Highly reusable

Most SOA implementations identify Web Services as the means for realizing a SOA.

New requirements for a Telco SOA!
We see a growing market success of middleware based on Web Services (e.g., eBay/PayPal, Amazon and Google are major users of Web Services)

Web Services 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 have well understood security model

WS are loosely coupled, can be combined to form complex services

WS enhancements are needed to support Telco SOA requirements

- Carrier Grade reliability and performance
- Convergence of competing WS standards (SDO alignment and harmonisation)
Initial work items on SOA and WS topics in ITU-T SG13

• **Y.2234**: Open service environment capabilities for NGN (Sept 2008)
  – Y.OSE-arch (OSE functional architecture for NGN) launched in Jan 09
• **Y.2212**: Requirements of Managed Delivery Services (Jan 08)
• **Y.2232**: NGN convergence service model and scenario using Web Services (Feb 08)
• **Y.2235**: Converged web-browsing service scenarios in NGN (Dec 08)
• Docs based on previous work in OCAF Focus Group (Dec 06)
  – Y.2901/Y.2902 - Carrier grade open environment model/components

Other ongoing ITU-T activities are SOA/WS related, including in
• ITU-T SG4 (NGN management - M.3060)
• ITU-T SG17 (security aspects for SOA/WS)
• ITU-T SG16 (middleware aspects for IPTV)
The open service environment is required to:

- Provide standard APIs for application providers and developers, and potentially end users.
- Provide service level interoperability underlying different networks, operating systems, and programming languages.
- Support service independence from NGN providers and manufacturers.
- Support location, network, and protocol transparency.
- Support OSE capabilities based on NGN providers’ capabilities. [OSE capabilities based on application providers’ capabilities are not supported in this version.]
- Provide secure access to open service environment capabilities satisfying the general NGN security requirements.
- Provide capabilities for coordinating services among themselves and services with applications.
The open service environment is required to (con’t)

- provide the means to manage the registration of capabilities, services and applications
- support service discovery capabilities to allow users and devices to discover applications, services and other network information and resources of their interest
- provide service management capabilities
- provide service composition capabilities to flexibly compose services and capabilities
- offer an efficient development support environment which supports application construction, trialing, deployment, removal
- allow interworking with service creation environments
- support policy enforcement capability for resources protection and management, and service personalization
Service Composition example (implemented via Web Services tool set)

Application::LocateAndCallUser
Choreography Description Language (CDL)

Web Service Description Language (WSDL)

- Location Capability
- Presence Capability
- Session Handling Capability
- Charging Capability

Parlay X API Call
NGN OSE functional positioning
Functional components of the NGN OSE functional group

OSE

Applications

Service Coordination
Service Discovery
Service Registration
Service Management
Service Composition
Service Development Support
Interworking with Service Creation Environments
Policy Enforcement

Other ASF&SSF FEs

ANI
### Mapping of NGN OSE functional components into NGN ASF&SSF Functional Entities [Y.2234]

<table>
<thead>
<tr>
<th>Service Function</th>
<th>APL-GW-FE</th>
<th>APL-SCM-FE</th>
<th>AS-FE</th>
<th>SS-FE</th>
<th>New FE currently not identified</th>
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</thead>
<tbody>
<tr>
<td>Service discovery</td>
<td>optional</td>
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<td>Service management</td>
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<td>Service registration</td>
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<tr>
<td>Service coordination</td>
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<tr>
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<tr>
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<td>Interworking with service creation environments</td>
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</tr>
<tr>
<td>Policy enforcement</td>
<td>optional</td>
<td>optional</td>
<td>not applicable</td>
<td>not applicable</td>
<td>optional</td>
</tr>
</tbody>
</table>
Relationship of ITU-T SG13 with other SDOs: collaboration has started

- NGN OSE capabilities
  - Require the use of standard interfaces
  - Open the NGN capabilities to third parties
  - Provide a SOA enabled environment
  - Web Services as an implementation technology for NGN OSE
- Many developments in other SDOs are or may be relevant for ITU-T objectives
  - OMA (OMA Service (Provider) Environment, enablers)
  - Parlay Group (Parlay-X Web Services/API work now in OMA)
  - TeleManagement Forum (Service Delivery Framework)
  - OASIS (Telecom Member Section activity, SOA Ref. Model, other)
  - other SDOs (W3C, IEEE NGSON, OGF, OMG etc.)
- Collaboration started with other SDOs
  - Initial joint meetings, liaisons, analysis of other SDOs’ documents
  - Collaboration needs to continue and increase in intensity
Analysing the work of other SDOs for NGN OSE – the OMA Service Environment example

Source: Open Mobile Alliance
Parlay-X Web Services specifications provide simple, abstracted Web Services based on use of network functionality, features and enablers:

- 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"
TMF SDF: positioning and relationship with OSS/BSS

Source: TeleManagement Forum
Colombo, Sri Lanka, 7-10 April 2009
Future SOA/WS topics within ITU-T SG13: an informal and non-exhaustive list (*)

- Requirements of service interfaces between Applications and NGN capabilities (Telecom APIs for carriers and enterprises)
  - Key APIs
  - Building on relevant business cases (IPTV, USN, etc.)
- SOA framework for NGN (carrier-grade, service traceability etc.)
- Standard requirements and SOA/WS enabled capabilities of service delivery platforms for NGN
- SOA/WS enabled NGN (2.0) functional architecture and related service components (IMS, others)
- Middleware aspects
  - Application-specific middleware requirements versus NGN OSE
- Application scenarios
  - SOA based service composition and NGN OSE
  - 3rd party provider applications
  - Composition of NGN capabilities and Web 2.0/Internet capabilities
  - Composition of NGN services and legacy services

(*) SG13 is currently developing its work plan in the various technical areas
Towards an open service environment in NGN
- Service Oriented Architectures (SOA) as framework
- Web Services (WS) as implementation tool set
SOA and WS will enable new business revenues within the integrated IT+C environment
- but bring new challenges to standards development (not fully discussed here)
ITU-T has started work in this direction
- NGN OSE and other developments
Various other SDOs, Forums, and Consortia are involved in this space
- standards convergence and harmonization are essential
- ITU-T collaboration with other SDOs has started to integrate relevant specifications with the NGN standardization framework
Thank you for your attention

Questions ?
Backup slides
OSE functional requirements (1/4)

- Service Coordination is required to
  - Provide coordination of applications and services with capabilities
  - Provide the tracking of NGN capabilities or service components from various application providers, and the relationship between these capabilities or service components
  - Support the information on state change of capabilities or service components for applications and services

- Service Discovery is required to
  - Provide service discovery for physically distributed NGN services
  - Support a variety of discovering criteria
  - Use user and device profile information for discovering proper service
  - Allow users to discover user-interest services, device-interest services and network information
OSE functional requirements (2/4)

- Service Registration is required to
  - **Provide service registration**, including configuration, activation, publication and service deregistration
  - **Provide a variety of service registration features** (e.g. manual, autonomous) for NGN services
  - **Support a variety of registration parameters**, including mandatory and optional parameters

- Service Management requirements include
  - **Provide monitoring function** of registered services for availability, predicted response time
  - **Provide managing function of QoS information about registered NGN services**
  - **Provide version management function** to NGN services for interoperability
  - **Provide notification service functions** for updated services
  - **Provide failure detection and recovering functions** for unexpected failures
OSE functional requirements (3/4)

- Service Composition is required to
  - Provide composition language that describes interaction flow among NGN services
  - Support the composition of NGN services statically or dynamically

- Service Development Support is required to
  - Support services re-use and allow for services interchangeability
  - Support mixing-and-matching of services by management of interfaces and consistent semantics of shared data/schema across these services
  - Support the full life cycle of components, including installation, configuration, administration, publishing, versioning, maintenance and removal
  - Support delivery-agnostic application design to allow applications to be implemented without requiring re-design for each development scenario
  - Support tracking of dependencies among services
OSE functional requirements (4/4)

- Interworking with Service Creation Environments is required to
  - Support open service creation environment
  - Support IP multimedia subsystem (IMS)-based service creation environment
  - Support Intelligent network (IN)-based service creation environment

- Policy Enforcement is required to
  - Provide a description language to express various kinds of policy rules
  - Provide a policy execution framework to interpret and execute the policies
  - Protect services from unauthorized users’ requests and manage requests based on the policy rules
Y.2234 Appendix: relevant developments in other SDOs [1/5]

<table>
<thead>
<tr>
<th>NGN capabilities</th>
<th>OSA/Parlay</th>
<th>OMA</th>
<th>OASIS</th>
<th>W3C</th>
<th>OMG</th>
<th>TMF</th>
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</thead>
<tbody>
<tr>
<td>Service Discovery</td>
<td>Discovery of framework and network service capability features</td>
<td>OWSER (UDDI), OMA’s DPE, OMA’s GPM</td>
<td>Universal Description, Discovery and Integration (UDDI), ebXML Registry Information Model (RIM), ebXML Registry Services and Protocols (RS)</td>
<td>Web Services Description Language (WSDL)</td>
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Colombo, Sri Lanka, 7-10 April 2009
Y.2234 Appendix: relevant developments in other SDOs [2/5]

<table>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Management Of Web Services (WSDM-MOWS)</td>
<td>WS-Notification</td>
<td>Description: looking at runtime system, monitoring and measuring its and evaluating these measurements against what the expectations</td>
<td>a framework that supports and integrates all functions required for the lifecycle of a service delivered to Customer, across all stakeholders in a Service Provider environment.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>WS-Brokered Notification</td>
<td>WS-Eventing</td>
<td>RAS: to publish the services</td>
<td>SDF unifies under a logical view service design, creation/composition, deployment, activation, provisioning, sale and campaign management, execution, operations, charging, billing and revenue management, retirement, monitoring and trouble resolution etc.</td>
</tr>
<tr>
<td>Service Composition</td>
<td>PEEM((Policy Evaluation, Enforcement and Management)</td>
<td>Business Process Execution Language for Web Services</td>
<td>Web Services Choreography Description Language</td>
<td>UPMS, BPMN, BPDM</td>
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<tr>
<td>Service Development Support</td>
<td>XDM, OSPE (OMA Service Provider Environment)</td>
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<td>Service Modeling Language</td>
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<td>- TMF053 series: NGOSS Technology Neutral Architecture (TNA)</td>
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<td>GB921 series: eTOM, business process framework</td>
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<td>MTNM/MTOSI, OSS/J (TIP)</td>
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<td>Universal Description, Discovery and Integration (UDDI)</td>
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<td>Existing Standards</td>
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## Y.2234 Appendix: relevant developments in other SDOs [4/5]

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## Y.2234 Appendix: relevant developments in other SDOs [5/5]

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<th>TMF</th>
</tr>
</thead>
</table>
| Security         | Authentication, Authorization | SEC_CF (Security Common Function) | WS-Security  
WS-Security: SOAP Message Security  
WS-Security: Username Token Profile  
WS-Security: SAML Token Profile  
WS-Security: X.509 Certificate Token Profile  
WS-Federation | | | | | | |