Towards a SOA/Web Services enabled NGN Open Service Environment

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Outline

• NGN Open Service Environment (ITU-T perspective)
• SOA and Web Services for ICT
• Towards a SOA/WS enabled NGN Open Service Environment (initial steps)
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 of standard “CAPABILITIES” as service enabling toolkit

• A new challenge for regulation
  • NGN moves the competition from lower layers to service layers
  • Leading to new sources of possible market power, bottlenecks
  • “Control Points” identification: major area of NGN regulators’ work

The Service Shift as consequence of the NGN model
“Capabilities” as re-usable building blocks for applications over NGN

- ITU-T Y.2201: NGN Rel.1 Requirements & Capabilities (approved 04/07)
  - High level requirements and capabilities to support NGN Release 1 service objectives
  - NGN Release 1 addresses only “network capabilities”
  - The identified capabilities as guidelines for the NGN architecture work
    - NGN Architecture Functional Entities (FEs) specified to support these capabilities and associated requirements
  - Each specific NGN realisation may use an arbitrary set of services and capabilities
The list of capabilities identified in Y.2201

- Transport connectivity
- Communication modes
- Media resource management
- Codecs support
- Access Network and network attachment
- User networks
- Interconnection, Interoperability and Interworking
- Routing
- Quality of Service
- Accounting and Charging
- Numbering, naming and addressing
- Identification, authentication and authorization
- Security

- Mobility management
- OAM
- Survivability
- Management

- Open Service Environment
  - Profile management
  - Policy management

- Service enablers
  - PSTN/ISDN emulation and simulation
  - Public interest aspects
  - Critical infrastructure protection
  - Non disclosure of information across NNI interfaces
  - Inter-provider exchange of user-related information
Service enablers (as named in Y.2201)

Capabilities providing features for specific or advanced services, and/or enabling access to/handling of specific information provided by these capabilities

3GPP(IMS) and OMA as main sources for Rel.1 Service enablers

- Group management
- Multicast support
- Personal information management
- Message handling
- Presence
- Location management
- Push
- Device management
- Session handling
- Web-based application support
- Data synchronization

Drivers for advanced application scenarios
Towards an Open Service Environment in NGN (NGN OSE)

- “NGN Open Service Environment” for flexible and agile service creation, execution and management
  - Leveraging new capabilities enabled by technologies of 3G, Internet and IT
  - Exposing capabilities via standard application network interfaces
  - Portability and re-usability of capabilities across networks
  - Flexible development of applications and capabilities by Service and Network Providers, as well as Third Party Providers

- NGN Release 1 should support the following classes of service creation environments (Y.2201):
  - IN-based service creation environment (INAP, CAMEL, WIN, …)
  - IMS-based service creation environment
  - OPEN service creation environment

A service framework for implementation of value added services taking advantage of network capabilities
Example of service creation environment

Source: 3GPP IMS and OSA/Parlay
MDS: services provided through ANI (Application Network Interface) by an NGN Provider to 3rd Party Providers with NGN dynamic features and comprehensive service delivery control capabilities available to 3rd Party Providers and their customers.

3rd Party Providers are then enabled to enhance their offer via MDS support of NGN Provider capabilities.

A win-win situation for both 3rd Party Provider and NGN Provider
Capabilities for NGN Open Service Environment
Ongoing work - Y.ngn-openenv

- General requirements for NGN Open Service Environment
  - Independence from network providers and network manufacturers
  - Location, Network and Protocol transparency
  - Secure access to capabilities

- Service registration
  - Features of registration to allow registry access by other capabilities/applications

- Service discovery
  - Scalable, secure, flexible discovery of User-interest and Device-interest services

- Service composition (orchestration, choreography)
  - Description logic for application static/dynamic composition (business process execution)

- Service coordination
  - Coordination of applications with capabilities, tracking of capabilities, availability of information about capability state changes

- Service management
  - Management features (e.g. failure detection/recovery, capability replacement)

- Service development support
  - Delivery-agnostic design, trial, deployment and removal of applications
  - Component reusability, mixing-and-matching, life cycle support, dependency tracking, ...

- Interworking with service creation environments
Example of service composition - implementation via Web Services techniques

Service composition provided via CDL

Application::LocateAndCallUser

Choreography Description Language (CDL)

Web Service Description Language (WSDL)

Location Capability

Presence Capability

Session Handling Capability

Charging Capability

Parlay X API Call
Web Services (WS)

- Web Services are simple XML-based messages for machine-machine messaging
  - Web Services don’t necessarily involve web browsers
  - Web Services act as XML-based APIs
  - Use SOAP as a transport Protocol

- Web Services use standard Internet technologies to interact dynamically with one another
  - Well understood security model
  - Loosely coupled
  - Can be combined to form complex services
  - Open standards connect disparate platforms

- Middleware based on Web Services has enjoyed tremendous success in the past five years
  - Examples: eBay/PayPal, Amazon and Google - major users of Web Services

Web Services rapidly becoming an essential part of many IT services, in both B2B and B2C market categories
**Service Oriented Architectures (SOA)**

- SOA framework developed in the IT world
- In 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 application services
- Attractive to businesses because:
  - Cross-platform
  - Highly reusable

Most SOA implementations identify Web Services as the tool set for realizing a SOA
SOA and WS fundamental bricks
OASIS and W3C as main SDO contributors in these topics

Source: WS-I (Web Services Interoperability Forum)
Open the NGN with SOA and Web Services

- **How to open**
  - **A Service Oriented Architecture framework for NGN**
    - Framework for composition of interoperable, independent and reusable building blocks from both IT and Telecom domains
    - Enables integration of rich content, data applications and business processes of the IT domain with intelligent, real-time network capabilities of the Telecom domain (ICT integration)
  - **Web Services (WS) as main implementation approach of this SOA framework for NGN**
    - Doesn’t exclude possibility to implement other approaches

- **What to open (expose)**
  - Telecom network capabilities (which) to Applications
  - Also, network capabilities to other network capabilities
  - (and open interfaces at the Application level)

- **Industry support**
  - Service Delivery Platforms, Ecosystems, Middleware

- **Emerging business requirements from Service Providers, new business opportunities**
Requirements on standards

1. Expose network capabilities to applications through a unified interoperable set of interfaces to make it easy for IT to tap the Telecom capabilities – driving demand for network assets which can provide intelligent service interfaces.

2. Ensure emerging Web Services standards can support Carrier Grade reliability and performance as required for a SOA framework for NGN.

3. Ensure that competing standards converge.

Premise: the emerging IT Applications ↔ Telecom Network interface is based on the Web Services stack.
Towards Carrier Grade Web Services standards

• Some pivotal areas in Carrier Grade Web Services standardisation:
  • Business Process
  • Service composition (tools, performance, etc.)
  • Parlay X APIs
  • WS Management
  • WS Convergence
  • Identity Management (Identity Layer)
  • Federation and Security (access control, policy)
• Standards Organizations need to adapt to this reality
Parlay X API specifications

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 Management
Part 19: Multi-Media Streaming Control
Part 20: Multi-Media Multicast Control
The SDO arena for SOA and Web Services: an evolving (and not exhausting) picture

------ links in progress or in perspective
A draft list of initial SOA/WS related work items within the NGN standardisation framework

- SOA framework for NGN
- Capabilities and Architectures for NGN OSE
- Priority Use Cases (Applications) in NGN OSE
- Telecom Web Services and enhanced Parlay X specifications
- WS converged services (also with non WS services)
- WS enabled NGN/IMS components and capabilities
- Interface specifications for NGN capabilities and applications over NGN
Various ongoing work items within ITU-T NGN GSI
- NGN Open Service Environment capabilities and service architecture
- WS deployment scenarios and other WS aspects (security)
- OCAF model and components

Other relevant activities in ITU-T
- Identity Management
- WS enabled NGN Management

Ongoing work in ETSI TISPAN NGN and 3GPP Common IMS
- Open Service Access (OSA)/Parlay requirements
  - ETSI TISPAN guide and corresponding new 3GPP SA1 new work item on OSA/Parlay requirements for Common IMS
- OSA/Parlay protocol specifications in JWG (Parlay-ETSI-3GPP CT5)
- TISPAN Technical Report on use cases, existing technical approaches and industry efforts for exposure of NGN capabilities
Towards a SOA/WS enabled NGN OSE: contributions from and required coordination with other SDOs

• A number of Fora, Consortia and SDOs (not focused on NGN) may contribute relevant SOA/WS pieces to the NGN picture
  • OASIS, W3C, Parlay, OMA, DMTF and TMF, OMG, IPSphere (draft list)
  • Published specifications as well as ongoing developments
  REUSE as much as possible BUT
  • Enhancements are required for adaptation to Next Gen Telecom
  • Alignment and Harmonization among specifications are essential

• Within the NGN standardisation framework, it is required to develop adequate relationship with the most relevant standards organisations in SOA and WS areas
NGN OSE capabilities and related work in other SDOs [1]

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<th>NGN OSE capabilities</th>
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<td><strong>Service Coordination</strong></td>
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<td>Discovery of framework and network service capability Features</td>
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<td>Policy enforcer</td>
<td>WS-Coordination 1.1</td>
<td>Web Services Policy 1.5 – Framework</td>
<td>Current effort: - UPMS (SOA extension of UML) - BPDM Existing Standards: - UML - EDOC: component architecture - Enterprise Distributed Object Computing</td>
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**Ongoing work – Y.ngn-openenv**

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**Ongoing work – Y.ngn-openenv**

ITU-T/OMA collaboration on NGN OSE: Q2/13-OMA ARC April 07 workshop and ongoing exchanges

OMA Service Environment

Source: OMA

ITU-T NGN GSI (Q2/13) plans to extend collaboration to other SDOs
Conclusion

• Towards an NGN Open Service Environment (NGN OSE)

• SOA and Web Services enable new business revenues for the ICT ecosystem, but bring new challenges to standards development – the intersection of IT and C in ICT

• Many SDOs, Forums, and Consortia involved in this space → alignment and harmonization are essential

• Initial steps towards a SOA/WS enabled NGN Open Service Environment
  • ITU-T is integral part of this effort, with Q2/13 leading NGN OSE developments and coordination with other standards organisations