>THIS IS **THE WAY**

Requirements and capabilities for NGN services

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Outline

- NGN Services
- Service Capabilities
- Some capabilities and related requirements
- Use Cases and service enablers (examples)

NGN services

Current service list from ITU-T FGNGN WG1 Services and capabilities document

- Interactive-based services
  - Real-time Conversational Voice services
  - Point to Point interactive multimedia services, including interactive real-time voice, video and other media (video telephony, white boarding, etc.)
  - Collaborative interactive communication services (multimedia conferencing with file sharing and application sharing, e-learning, gaming)
  - Push to talk over NGN (PoN)
  - Instant messaging (IM) and Messaging services (SMS, MMS, etc.)
  - Group Messaging
  - Existing PSTN/ISDN services (PSTN/ISDN emulation and simulation)
  - Data communication services (data file transfer, fax, electronic mailbox, …)
  - Data retrieval applications (tele-software)
  - Online applications (online sales for consumers, e-commerce, online procurement for commercials, …)
  - Speech-enabled services

NGN services

Current service list from ITU-T FGNGN WG1 (2)

- Non Interactive-based services
  - Content delivery services (Radio and Video streaming, Music and Video on Demand, (Digital) TV Channel Distribution, financial information distribution, professional and medical image distribution, electronic publishing)
  - Sensor Network services
  - Push services
  - Remote control/tele-action services, such as home applications control, telemetry, alarms etc.
  - Broadcast/Multicast Services
  - Over-the-Network Device Management

- Both Interactive-based and Non Interactive-based Services
  - Virtual Private Network (VPN) services
  - Hosted and transit services for enterprises (IP Centrex, etc.)
  - Information services (cinema ticket information, motorway traffic status, advanced push services, etc.)
  - Presence and general notification services (display of peers that a user can contact, their current status, and any service-related notifications)
  - 3GPP Release 6/3GPP2 Release A OSA-based services

NGN services

Current service list from ITU-T FGNGN WG1 (3)

- Network Services
  - Basic Transport Service (BTS): providing basic point-point, or point to-multipoint, or multipoint-to-multipoint connectivity. Aspects of basic transport include: best effort service, limited security, etc.
  - Enhanced Transport Service (ETS) : providing connectivity services as in BTS plus differentiating services such as QoS guarantee, advanced level of security, and access to virtual private networking.

- Regulated Services
  - Emergency Telecommunication Services (citizen to authority, authority to authority, authority to citizen)
  - Lawful Intercept Services
  - Broadcast Emergency Alerting Services

NGN services

Services selected in ETSI TISPAN Release 1

- IP multimedia services ("services supported by TISPAN IMS")
  - IP multimedia applications
  - PSTN/ISDN simulation services (3 classes)
  - Instant messaging service
  - Presence service
  - Location service
  - Video Telephony service

- PSTN/ISDN Emulation services

- Regulated services for both IP multimedia and PSTN/ISDN emulation
  - Lawful Intercept, Emergency call, Malicious Communication Identity, Anonymous Communication Rejection

NGN service standardisation (1)

Services in an NGN environment

- Applications can be classified under multiple dimensions
  - But some criteria probably make more sense than others

- Services are typically vertically integrated in today's networks, requiring specific infrastructure components for their delivery

- Services will not be vertically integrated with converged NGN infrastructure

- Essential to distinguish between core network-level service capabilities needed to operate the services and environment or end user application-specific features
  - Core network-level capabilities -> Functional Architecture blocks ?
  - Application-specific capabilities -> Functions provided via Application Servers/APIs ?
  - Environment-specific capabilities (e.g. business vs medical service cases) -> Scenario-specific functional blocks ?

NGN service standardisation (2)

Do we really want to standardize the NGN services ?

- Key expectation in NGN : flexible service creation, and innovation

- Certainly, we should re-use existing service definitions when possible
  - e.g. PSTN/ISDN emulation

- For new service creation, focus should be on standard "service capabilities" as toolkit of service enablers
  - Flexible service design, creation and development
  - Promotion of innovative and evolving services
  - Third-party development and support

- The challenge of NGN for Regulation
  - NGN shifts competition from lower layers to services and application layers
  - This leads to new sources of possible market power, bottlenecks
  - "Control Points" identification will be major area of regulators' work in future
  - Potential control points (EU 2003 study): network capabilities, elementary services, service access and content, user information

Service Capabilities : componentizing the network functions
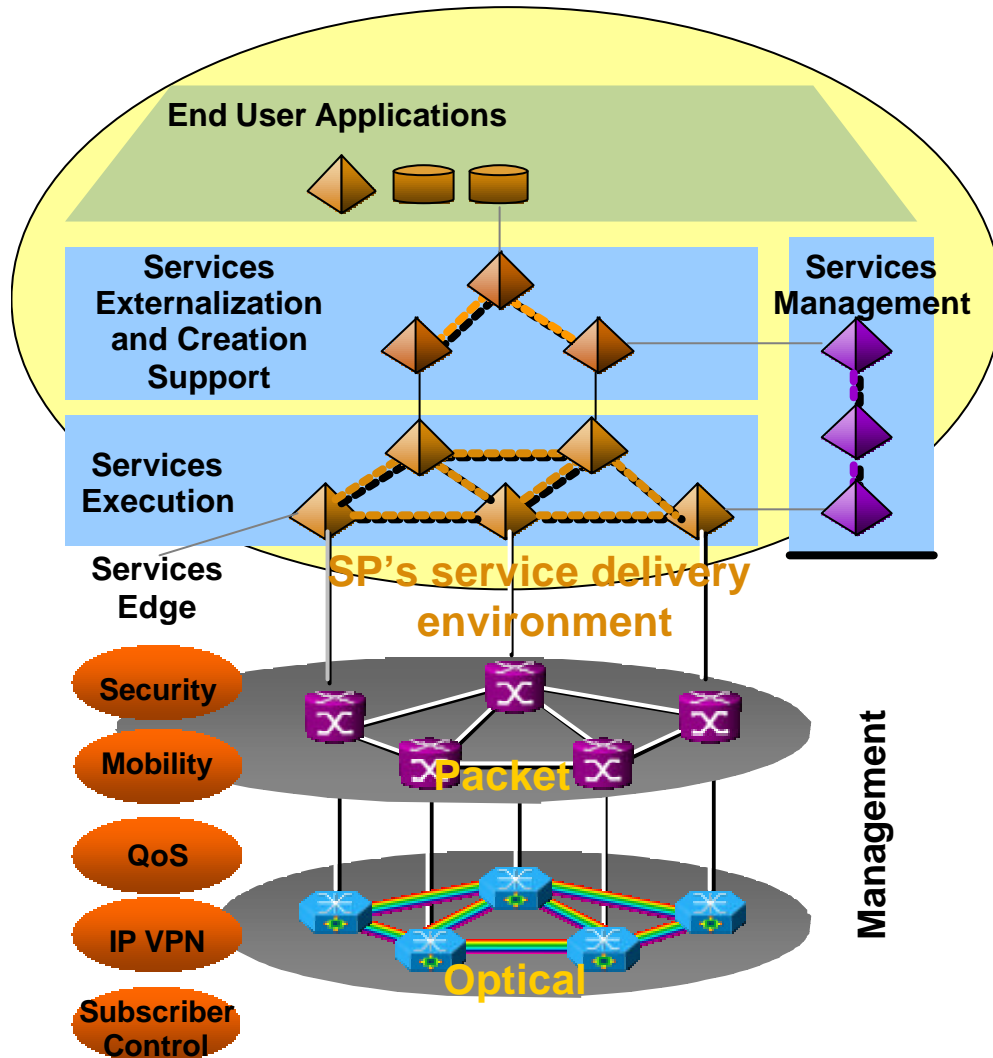
Reusable building blocks for services

- Service Capability (SC): a function or operation within a service provider's network, reusable at runtime by various services

- SCs typically involve aggregation across one or more network enablers

- More functions may be interworked for service execution and management

- Some can play both Service and Service Capability roles (e.g. Presence)

- SCs may be derived from both Telecom and IT worlds (e.g. AAA)

- SCs may be used by
  - services within a SP's network (e.g. via SIP)
  - services outside of a SP's network domain (e.g. via OSA, Parlay, Web Services)

Service Capabilities standardisation

- **SC concept adopted in standardisation**
  - 3GPP OSA, Parlay, Web Services, OMA
  - ITU-T (SG13 OCAF Focus Group, previous works (e.g. BICC cap. Sets))
  - Regional NGN bodies (ETSI TISPAN, ATIS)

- **SC concept has found its way in the market**
  - Application and service platforms based on 3GPP IMS capabilities, Web Services etc.

- **Some issues**
  - Some harmonisation required across bodies
    - levels of functional/operational aggregation
    - definitions (e.g. presence in 3GPP and OMA)
  - A number of items still requiring further work
    - Identification and definition of functions for
      - discovery, access, usage, control, charging, externalisation ..
    - Identification and definition of associated standards for
      - protocols, interfaces, APIs

- **Which path for ITU-T NGN work ?**
  - Align where possible on consolidated/agreed pre-existing developments
  - Identified services -> core capabilities -> Architecture functional blocks ?

Schematic Open NGN service architecture (NGN Core Network focus)

End User Applications

Services Externalization and Creation Support

Services Management

Services Execution

Services Edge

SP's service delivery environment

Security

Mobility

Packet

QoS

IP VPN

Optical

Subscriber Control

Management

- **Services Execution:** IMS/other service domain, SP's Service Capabilities

- **Services Externalisation and Creation Support:** API Gateway to interface with External App./Capability Servers, API libraries and toolkits

- **Services Management:** Management of Services instances, support for Service providers/OSS partners/Service creators

- **Services Edge:** logical point of separation between access network and services domain

Service Capabilities : draft list from FG NGN WG1 docs

- Presence
- Location
- Messaging
- Push
- Mobility Management
  - Terminal, user, service
- Session management
- Policy management
- Profile management
- Service Subscription management
- Identification, authentication, authorization
- Numbering, Naming, Addressing and Directory services
- Security and Privacy
- Regulatory requirements management
  - Emergency Communications, Lawful Intercept etc.
- Accounting, Charging and Billing

- Service Creation support
  - Service independence
  - Application Service Interworking
  - Service Coordination and Interaction
  - Service discovery
  - Open APIs to external services/capabilities
  - Context-awareness etc.
- Group management (CUG/VPN)
- Content delivery management
  - Unicast/Multicast/Broadcast connectivity etc.
- Management
  - Service and Transport Network, Customer capabilities
- OAM, network/service survivability and resiliency
- QoS, SLA, Traffic and Resource Management
- User devices management
- Interoperability and Interworking capabilities
- Access Network capabilities
- Migration capabilities

Other capabilities from ATIS NGN framework

Service enablers

- Media Resource Functions (media servers)
- Unified interface and service ubiquity
  - Users' profiles allowing uniform network interfaces (regardless of location) and service availability also on host networks
- Communication context
  - Context of a service communication including a profile, an agent and a virtual environment
- Personal Information manag. and access
  - Enhanced capabilities for contact information storage and access
- Content and Service Discovery
  - Discovery of applications, services and other network information; user-interest content discovery
- Digital Right Management
  - Can be associated with Application-based DRM mechanisms

Underlying capabilities (not directly accessible by applications)

- Identity management
- Security
  - access control
  - authentication
  - non-repudiation
  - data confidentiality
  - communication security
  - data integrity
  - availability and privacy
- Ad Hoc and Zero Configuration Networking
  - Capability to support communication regardless of network context
- SLAs
- Service Quality measurements
  - Service quality metrics and performance metrics for NGN functions
- Service Quality prediction
- Trust

Other capabilities from TISPAN WG1 documents

- Access network capabilities
  - User and terminal identification/authentication/authorization mechanisms at network access level
  - User profile-based requirements (resource allocation, privacy, charging etc.)
- Detection and control of processing overload
  - Configurable mechanisms for throughput maximisation at overloaded resources
- Single sign-on

Convergence on NGN Release 1 services and capabilities

- Need at first to clarify the global NGN Release process
  - What covered in each release (this includes services), which time schedule
  - Stage 1, 2 and 3
  - Level of feature support (QoS, mobility, security, management, etc.)
  - Packaging of deliverables for each release
  - **Service Providers' input essential (service priorities, business cases) !!**

- Release 1 Services work
  - Identify relevant Business models and Use Cases for Services
  - Generate Service Requirements and Service Capabilities
  - Map Service Capabilities into Functional Requirements (architecture)

- Release 1 Architecture and Protocols work
 - Feasibility checking of above service requirements and capabilities

Convergence is required on :
  - **NGN Release process**
  - **«Pragmatic» list of services, associated feature support for rel.1**
  - **Identification and agreed role of a core set of service capabilities**
  - **Consequent prioritization of work in architecture and protocols**
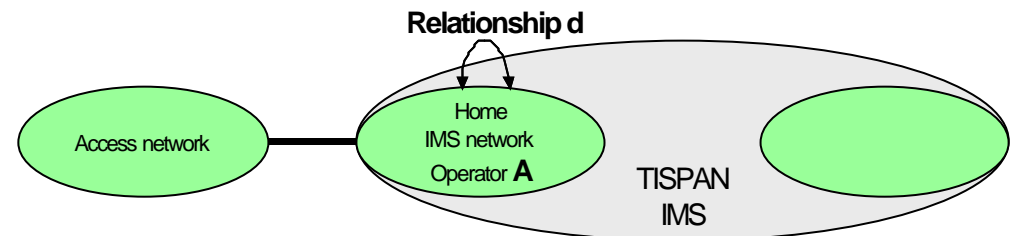
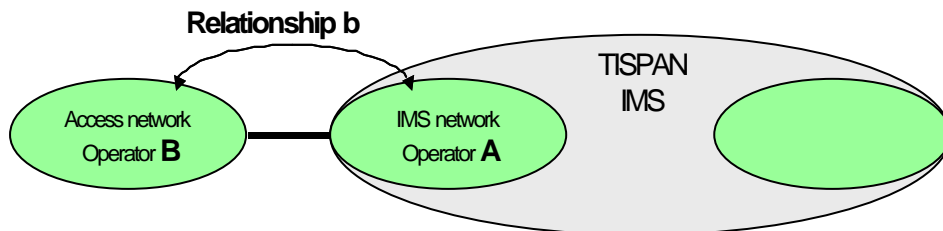# Business models – Example from TISPAN IMS-based services
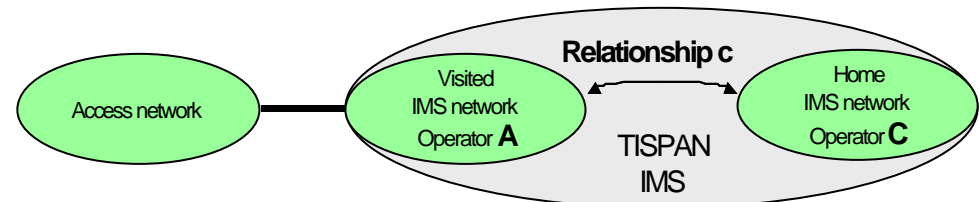
- **IMS/Access network relationship**
  - Same operator
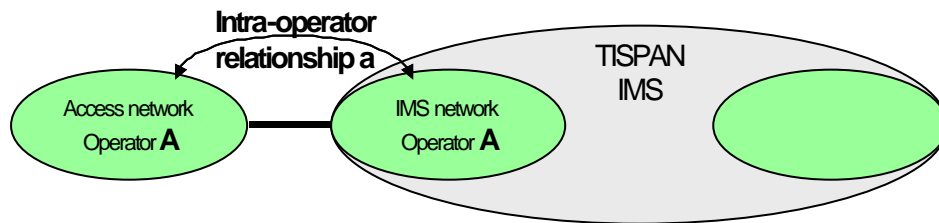
- **IMS level relationships**
  - Visited and Home IMS Networks belong to same operator

Intra-operator relationship a

Access network Operator **A** — IMS network Operator **A**

TISPAN IMS

Relationship d

Access network — Home IMS network Operator **A**

TISPAN IMS

- Different operators having an interconnection agreement

- Visited and Home IMS Networks belong to different operators

Relationship b

Access network Operator **B** — IMS network Operator **A**

TISPAN IMS

Access network — Visited IMS network Operator **A** — **Relationship c** — Home IMS network Operator **C**

TISPAN IMS

Generators of service requirements

- A) The most visible actors at the standardisation level
  - Service providers, Application providers, Content Providers
  - Service platform and software Vendors
  - Network Equipment, Terminal and Component Vendors

- B) The User Community
  - Enterprises
  - Consumers
  - Public administrations and institutions
  - Research and Academic Community

- C) Regulators

- Need attention since the beginning on requirements from B and C
  - Some examples from B: Enterprise communication scenarios, security and privacy features, users with disabilities, scenarios of emergency services, Lawful Interception, e-education, e-health, e-transport, grid computing
  - Examples from C: control points and APIs

Requirements and open issues for some key services/capabilities (1)

Charging (Accounting, Billing)

- Charging policies in the legacy world
  - Based on agreed precise service definitions
  - Well defined Regulatory and Policy context

- Charging in the new NGN world is still an open issue
  - Precise Service definitions will not generally exist
  - Multiple business models and arrangements to be supported
  - Multiple charging policies to be supported
    - Service Based Local Policy, Flow Based Charging, Content-level Charging
    - Online (e.g. pre-paid) and Offline charging (post-processing)
  - Will existing charging technical models be sufficient ?
  - Relationship with Policy and Regulatory issues to be developed

- ITU-T work just started
  - FGNGN Functional Architecture includes charging and billing functional entities
  - SG13 Y.ngn-account Draft Rec. (technical requirements and mechanisms)
    - SG3 involvement, Management aspects to be considered

More discussion in a following talk dedicated to these topics

Requirements and open issues of some key services/capabilities (2)

Mobility

- Mobile entities : Terminal, User, Service ? (Network)

- Service experience
  - service/session continuity, QoS/QoExperience, unified user interface and service ubiquity
  - Ideal scenario for mobile user: minimal/no user interaction, terminal type independence

- Network view: mobility functions activated at different architecture levels
  - intra-AN level (radio,local area, wide area); inter-AN level; service level (e.g. IMS)

- User identification, authorization and authentication aspects

The good point: consensus on key requirements for Release 1 (TISPAN, FGNGN)

Some issues:

- Need to agree on appropriate and commonly understood Terminology
  - No unified and agreed terminology at this stage (FGNGN, SG13, SG19 discussions)
  - A valid proposed starting point : relevant (User, Service) Mobility Scenarios
  - Consider the multiplicity of network configurations and Access Networks when moving
  - Define and focus on key parameters related to the mobility scenarios

- Identify the required capabilities for the agreed scenarios
  - Prioritize functionalities for Release 1 (Full/Limited Nomadicity vs Full mobility)

Requirements and open issues of some key services/capabilities (3)

Internet services

Internet access, peer-to-peer applications, other Internet services

- Internet should still be accessible through existing mechanisms

- Internet services shall continue to be provided transparently by means outside the NGN core, e.g. functionality in the access network

- Transparent provisioning of Internet services through the NGN core
  - Which issues to be solved ?
  - Is this a requirement for Release 1 or beyond ?

Requirements and open issues of some key services/capabilities (4)

Service Delivery Environment

- Support of APIs for interfacing Service capabilities with Applications
  - Standardised and secure APIs
  - APIs independent from vendor solutions, location, access technology and service capabilities supported in the network

- Support of Third Party services and capabilities

- Openness
  - To end-user for self-management purposes (e.g. Web portals)

- Interoperability
  - with multiple access networks, OSS, devices and CPEs

- High Scalability and Reliability

Requirements and open issues of some key services/capabilities (6)

NGN service scenarios and seamless operations

- Service seamless operations across multi-provider NGN infrastructure
  - Open issues exist for end-to-end support of features like Security, QoS, OAM, resiliency etc.

- Service seamless operations across fixed and mobile users
  - e.g. Fixed Access IMS, Access Network independence (Wireline, Wireless)

- Service interworking with other (peer) networks
  - other NGN networks, legacy PSTN/ISDN, PLMN, PacketCable, Broadcast Networks, Public Internet, IP-based Enterprise networks

- Service seamless operation across NAT and Firewalls
  - In home networks, in access networks

- And others

Use Case for Interactive Voice Services - from ATIS NGN framework document

Service enablers

- *QoS*
- *Presence*
- *Policy*
- *Media Resource Functions*
- *Unified interface and Service Ubiquity*
- *Multicast*
- *Communication context*
- *Nomadicity*
- *Location*
- *Personal Information Management*
- *ENUM*
- *Service and content discovery*
- *Session Management*

Use Case for content-based services (e.g. Internet TV) - from ATIS NGN framework document

Service enablers

- *QoS*

- *Multicast*

- *Authentication / Authorization/ Identity*

- *Communication context*

- *Nomadicity*

- *Emergency Services*

- *Content and service discovery*

- *Digital Rights Management*

- *Session Management*

Use case for content sharing (e.g. access to hosted private content repository) - from ATIS NGN framework document

Service enablers

- *QoS*

- *Policy*

- *Media Resource Functions*

- *Unified interface and Service ubiquity*

- *Multicast*

- *Nomadicity*

- *Location*

- *Personal Information Management*

- *Service and content discovery*

- *Digital right management*

Use Case for Interactive Gaming - from ATIS NGN framework document

Service enablers

- *QoS*

- *Presence*

- *Policy*

- *Unified interface and Service ubiquity*

- *Multicast*

- *Communication context*

- *Nomadicity*

- *Location*

- *Personal Information Management*

- *Service and content discovery*

- *Digital right management*

- *Session management*
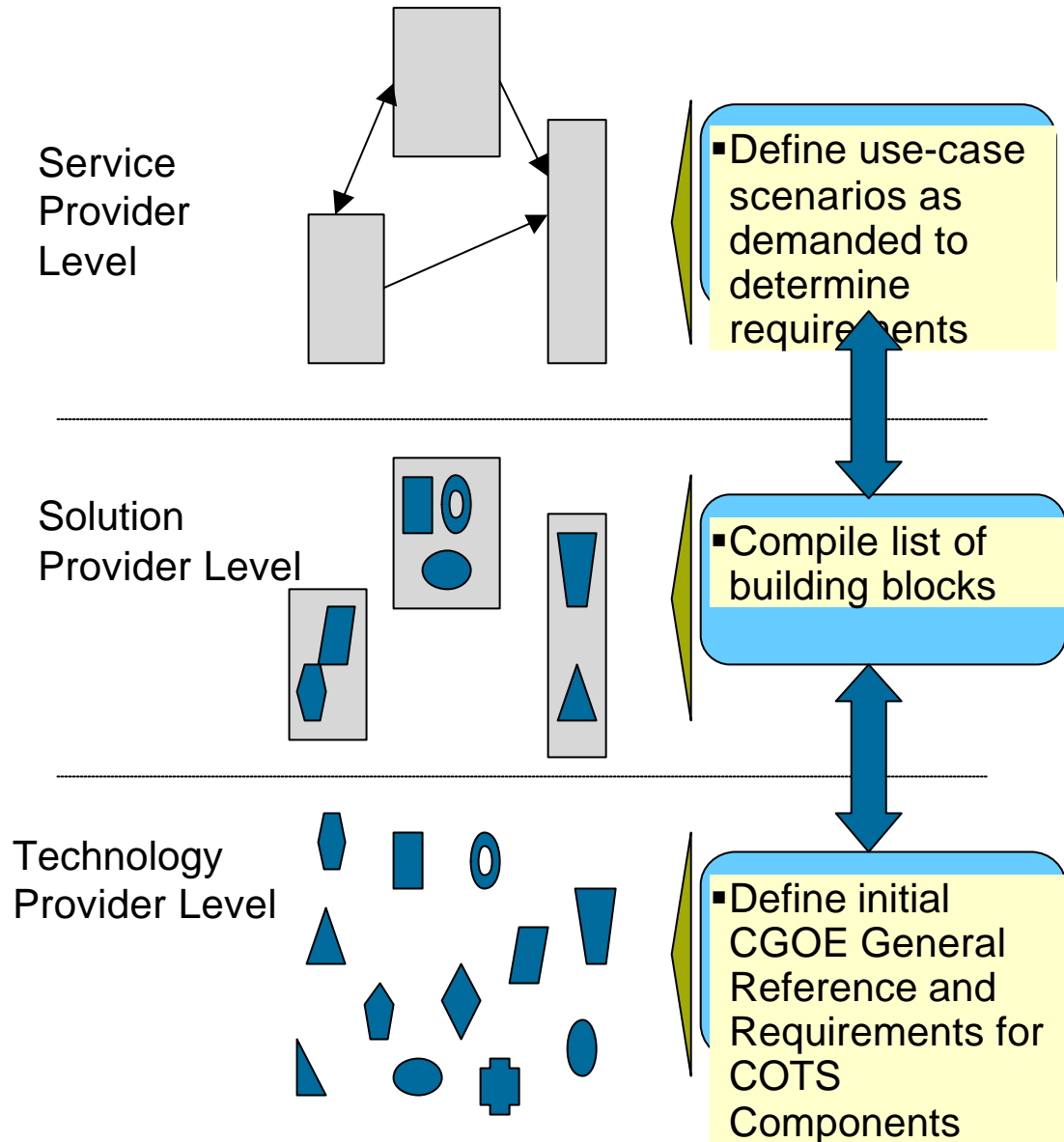
Parlay X Web Services in 3GPP OSA R6

A set of abstracted non application-specific capabilities

- *Third Party Call*

- *Network-Initiated Third Party Call*

- *SMS*

- *Multimedia Message*

- *Payment*

- *Account Management*

- *User Status*

- *Terminal Location*

- *In Parlay terms, an «application» invokes a «Parlay X Web service» provided by a «Parlay X Gateway»*

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OMA List of Enablers	
OMA Billing Framework	
OMA Browsing	
OMA Client Provisioning	
OMA Data Synchronization	
OMA Device Management	
OMA Digital Rights Management	
OMA DNS	
OMA Download	
OMA Email Notification	
OMA External Functionality Interface	
OMA Games Services	
OMA Instant Messaging and Presence Service	
OMA Mobile Location Protocol	
OMA Multimedia Messaging Service	
OMA Online Certificate Status Protocol Mobile Profile	
OMA SyncML Common Specification	
OMA User Agent Profile	
OMA vObject Minimum Interoperability Profile	
OMA Web Services	
OMA Wireless Public Key Infrastructure	

OCAF Solutions WG

Service Provider Level

- Define use-case scenarios as demanded to determine requirements

Solution Provider Level

- Compile list of building blocks

Technology Provider Level

- Define initial CGOE General Reference and Requirements for COTS Components

Use-case scenarios	List of building blocks
▪ Presence ▪ Push-to-talk ▪ IP Centrex ▪ Service delivery platform for multipoint interactive communication and cooperation services	▪ Softswitch ▪ Databases ▪ Application Servers ▪ Group/list Manager Server ▪ Call Session Control Function ▪ Multimedia Resource Function

Thank you for your attention