

WORKSHOP ON NEXT GENERATION NETWORKS AND APPLICATIONS

(Athens, Greece, 8 May 2009)

Towards an open service environment in NGN

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Outline

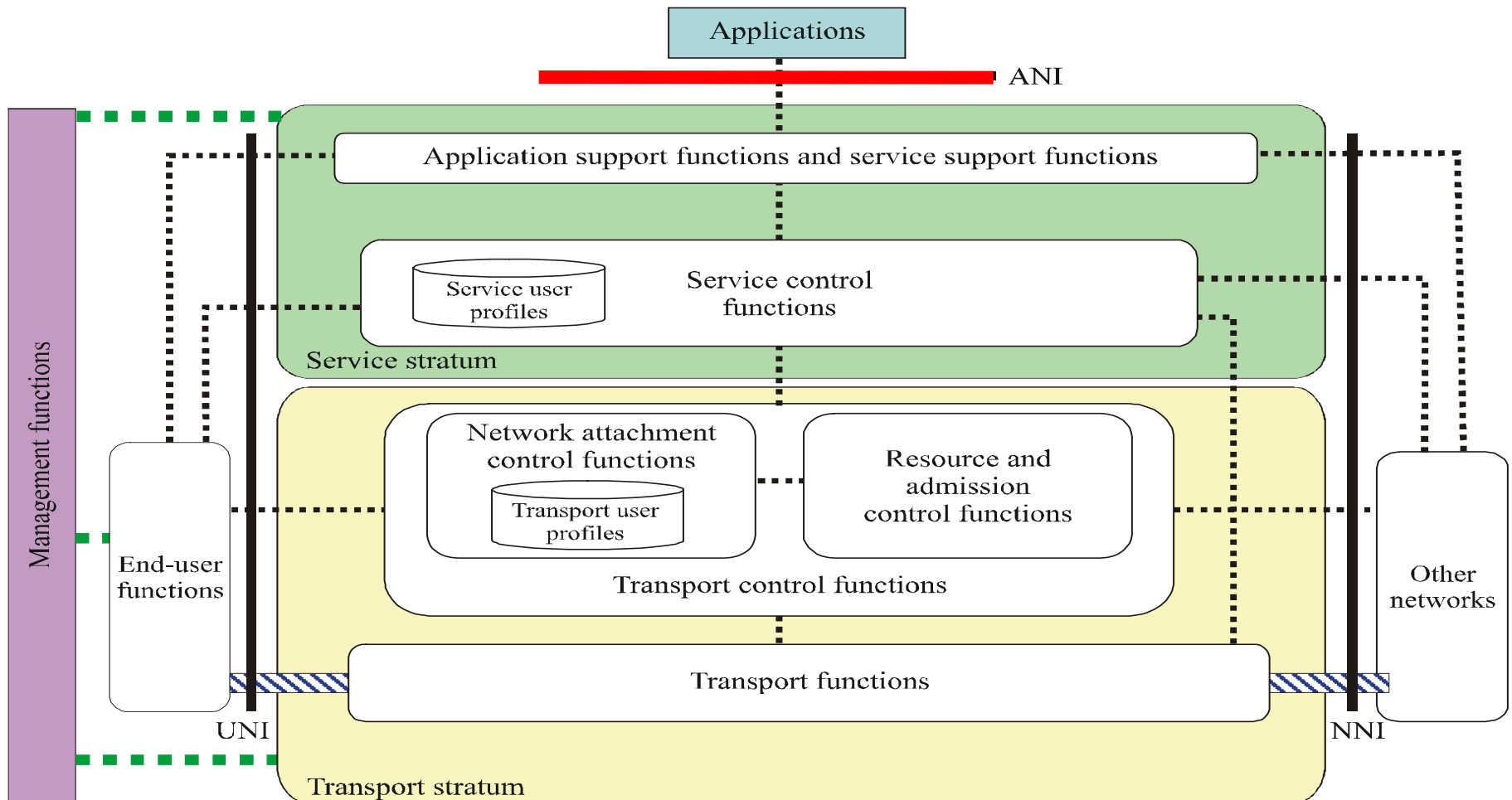
- o NGN capabilities
- o NGN Open service environment - ITU-T SG13
- o Collaboration with other SDOs and future items

Next Generation Services

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

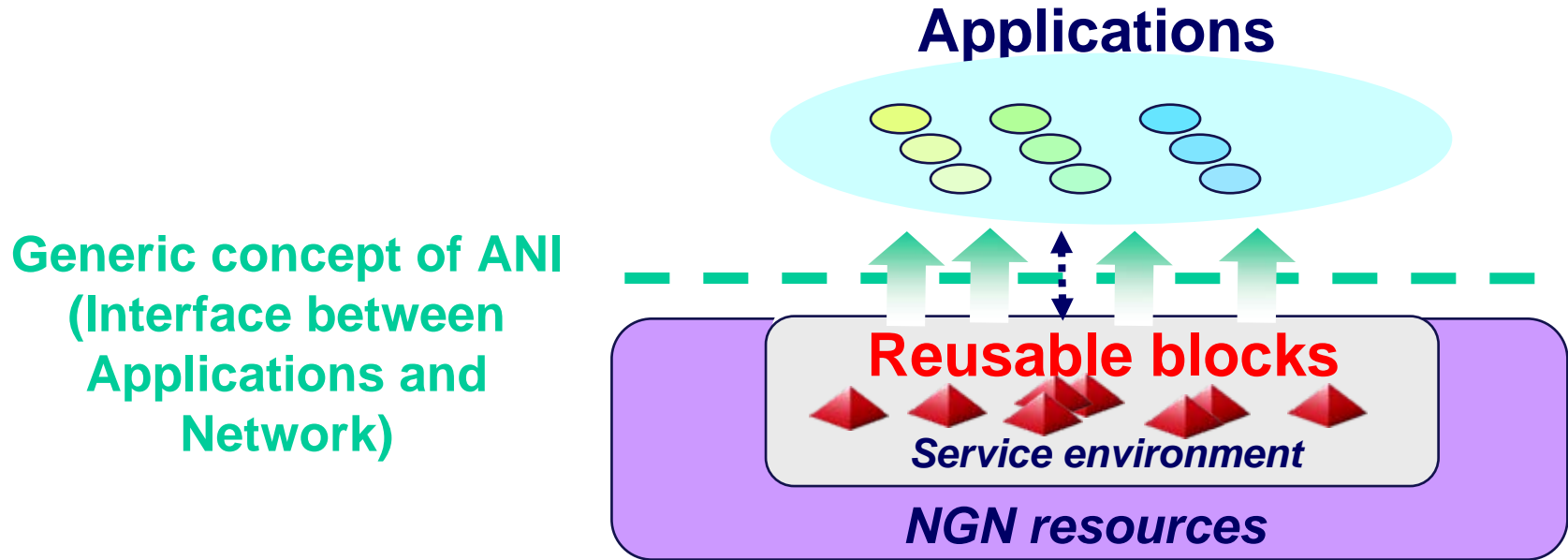
Service Shift as consequence of NGN service vs transport stratum separation

Application Network Interface in NGN Release 1 Reference Architecture (Y.2012)



Y.2012(09-2006)_F01

The concept of “Capabilities” as re-usable building blocks for applications/services



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

Capabilities for NGN Release 1 (Y.2201) *and Release 2*

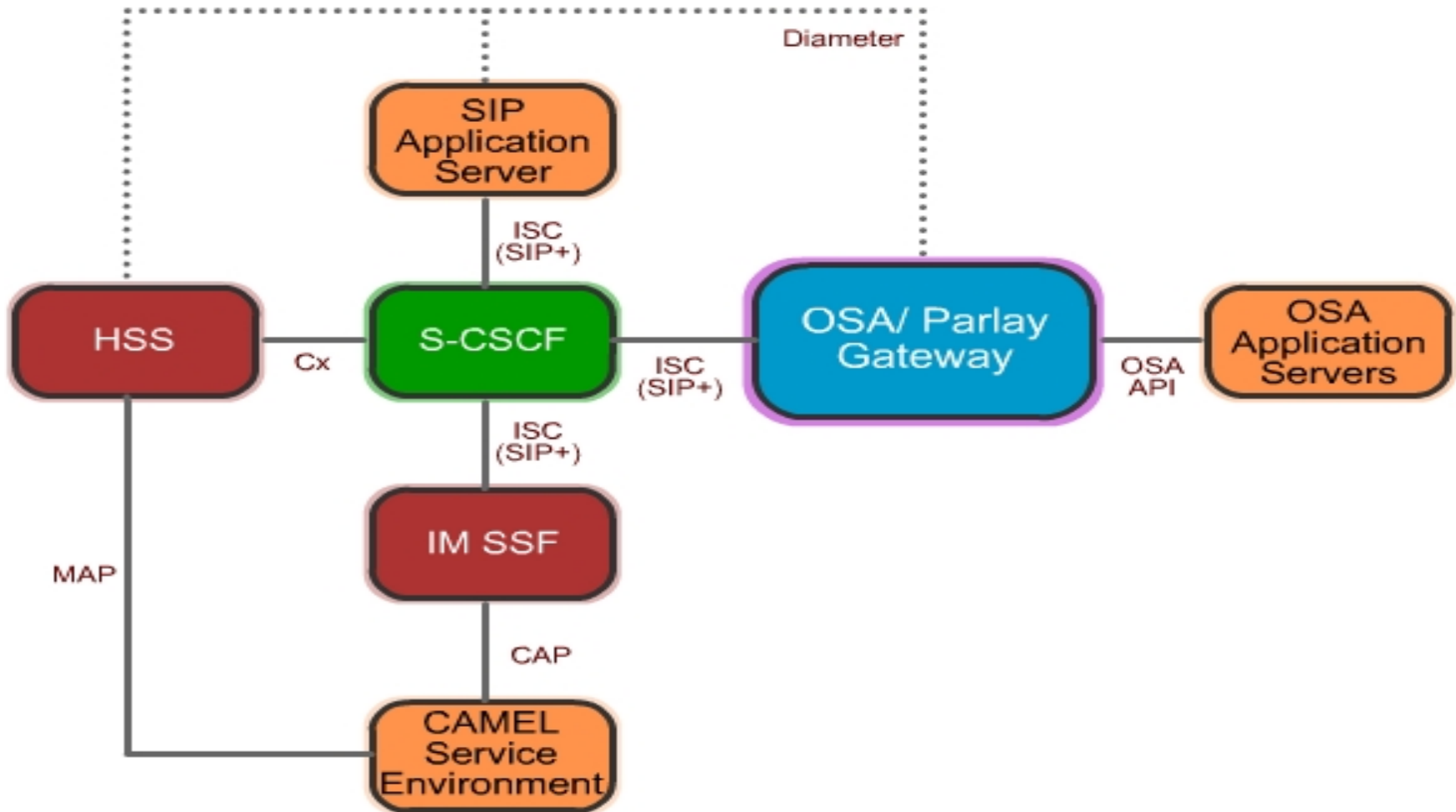
- o Transport connectivity
- o Communication modes
- o Multicast
- o Media resource management
- o Codecs
- o Access Networks, network attachment
- o User networks
- o Interconnection, Interoperability and Interworking
- o Numbering, naming, addressing
- o Identific., authentic., authoriz.
- o Security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

Towards an open service environment in NGN (NGN OSE)

- o “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
- o 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)

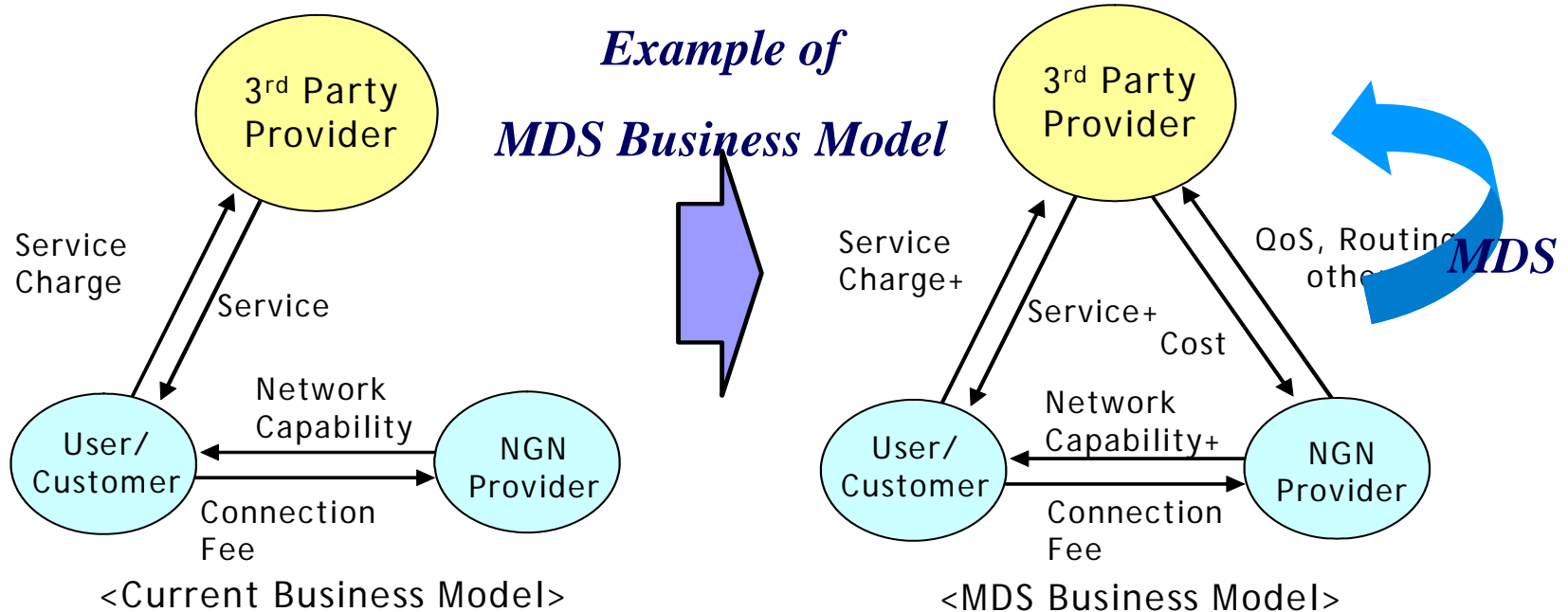
Service creation environments - example



Source: 3GPP IMS and OSA/Parlay

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




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

Opening the NGN service environment through Telecom SOA and enhanced Web Services

o How to open

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

o What to open (expose)

- Applications <-> Network capabilities (NGN)
 **Telecom APIs**
- Network capabilities <-> Network capabilities

Target is an Open NGN Service (Delivery) Platform

An Open NGN Service Platform



End user created applications

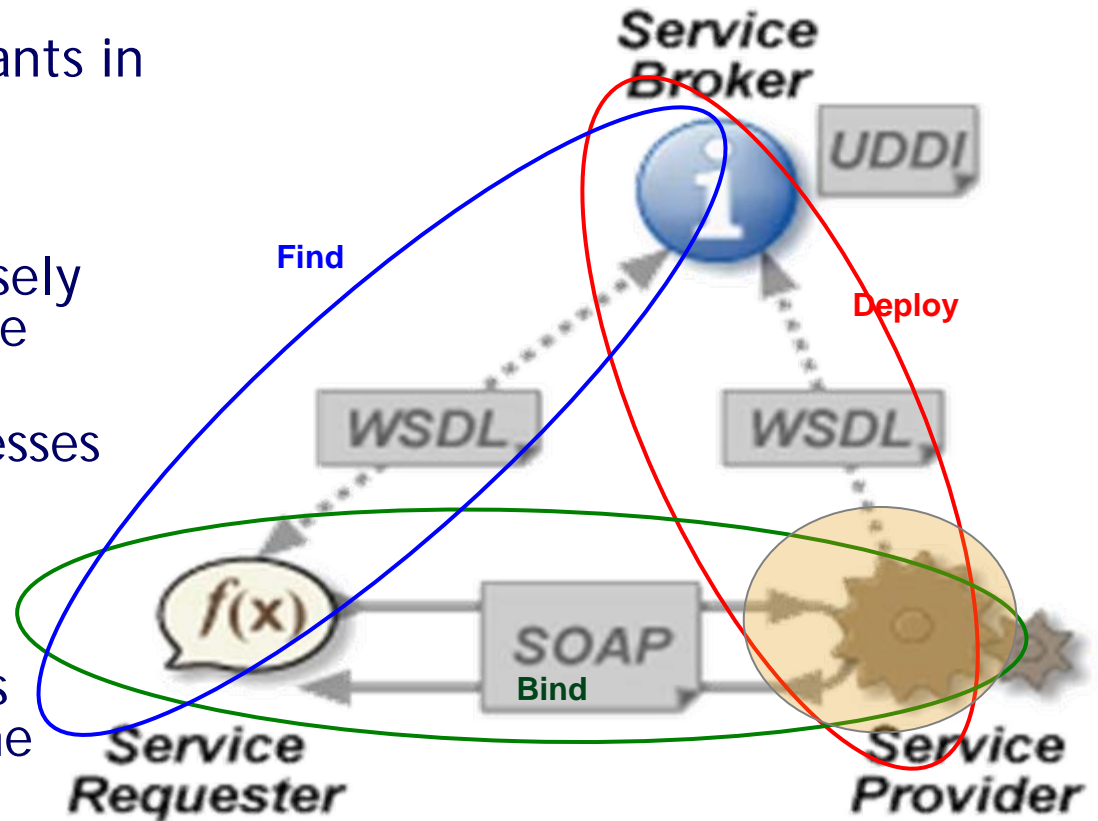
3rd Party applications

NGN Provider services

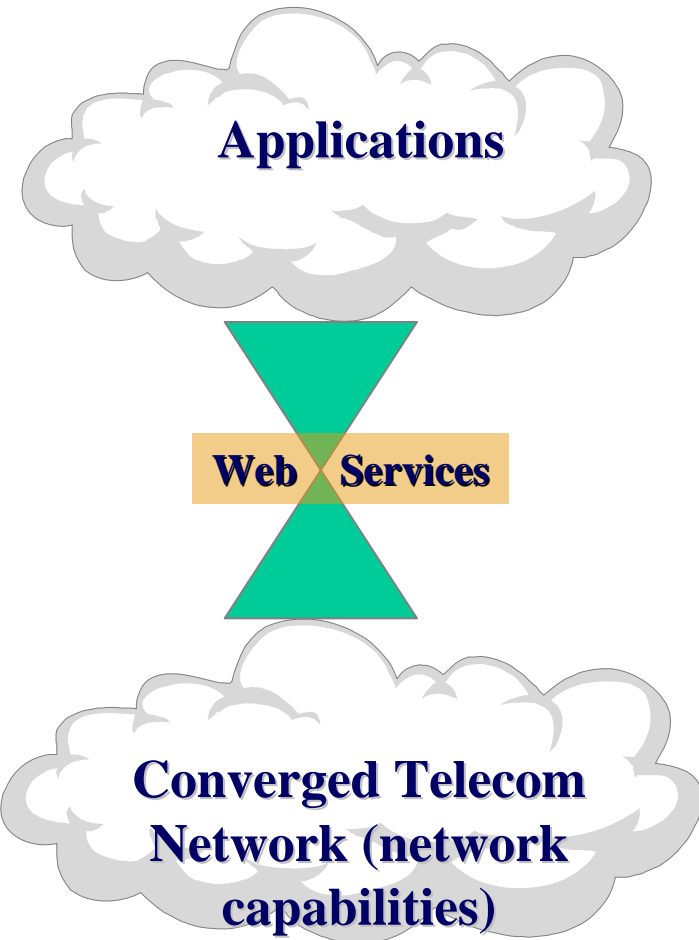
NGN common building blocks

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
- **But new requirements for a Telecom SOA !**



Enhanced Web Services for a Telco SOA



- We see a growing market success of middleware based on Web Services (e.g. eBay, 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)

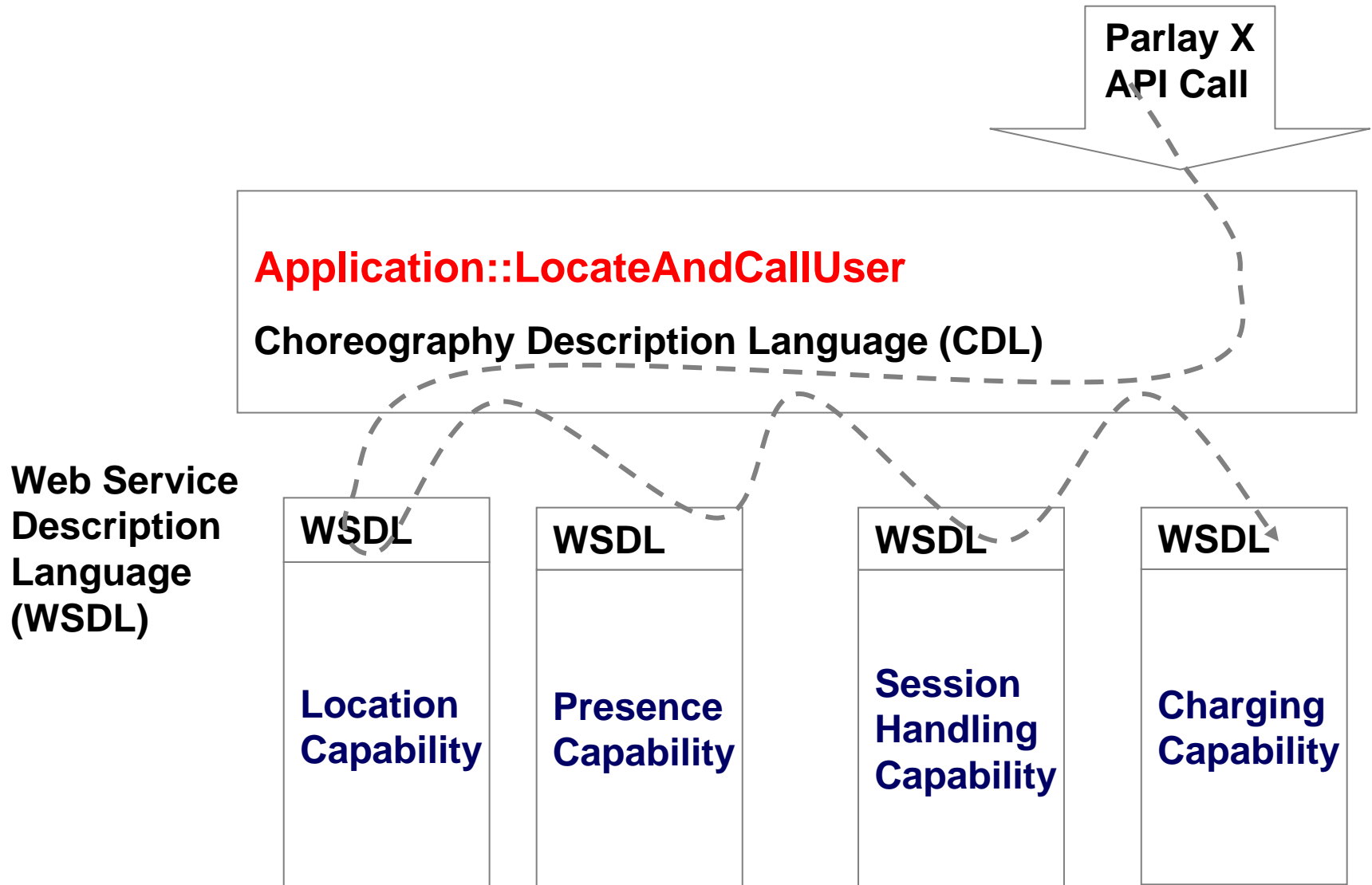
Service requirements for NGN OSE (1/2)

- o 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

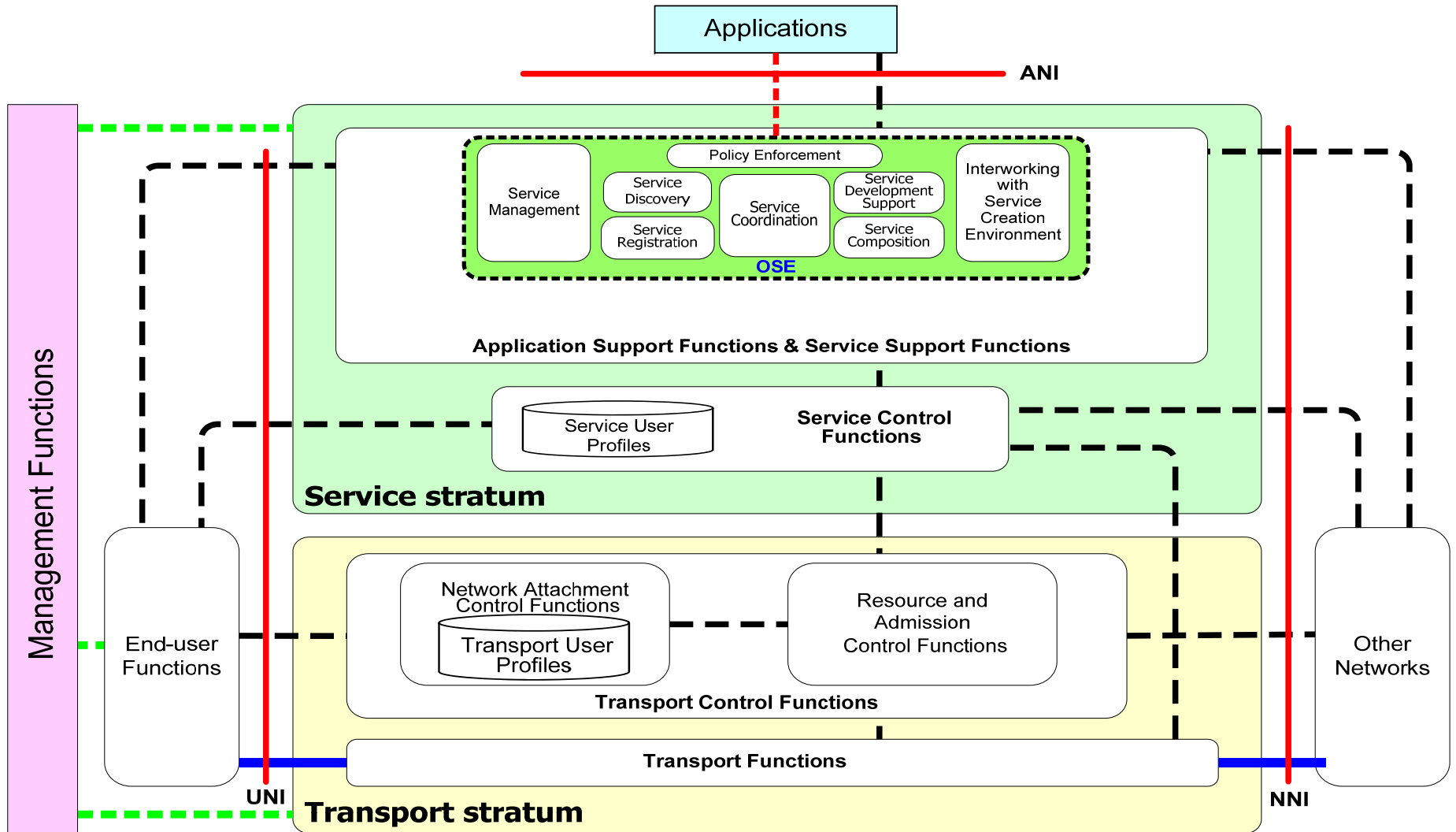
Service requirements for NGN OSE (2/2)

- o 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)

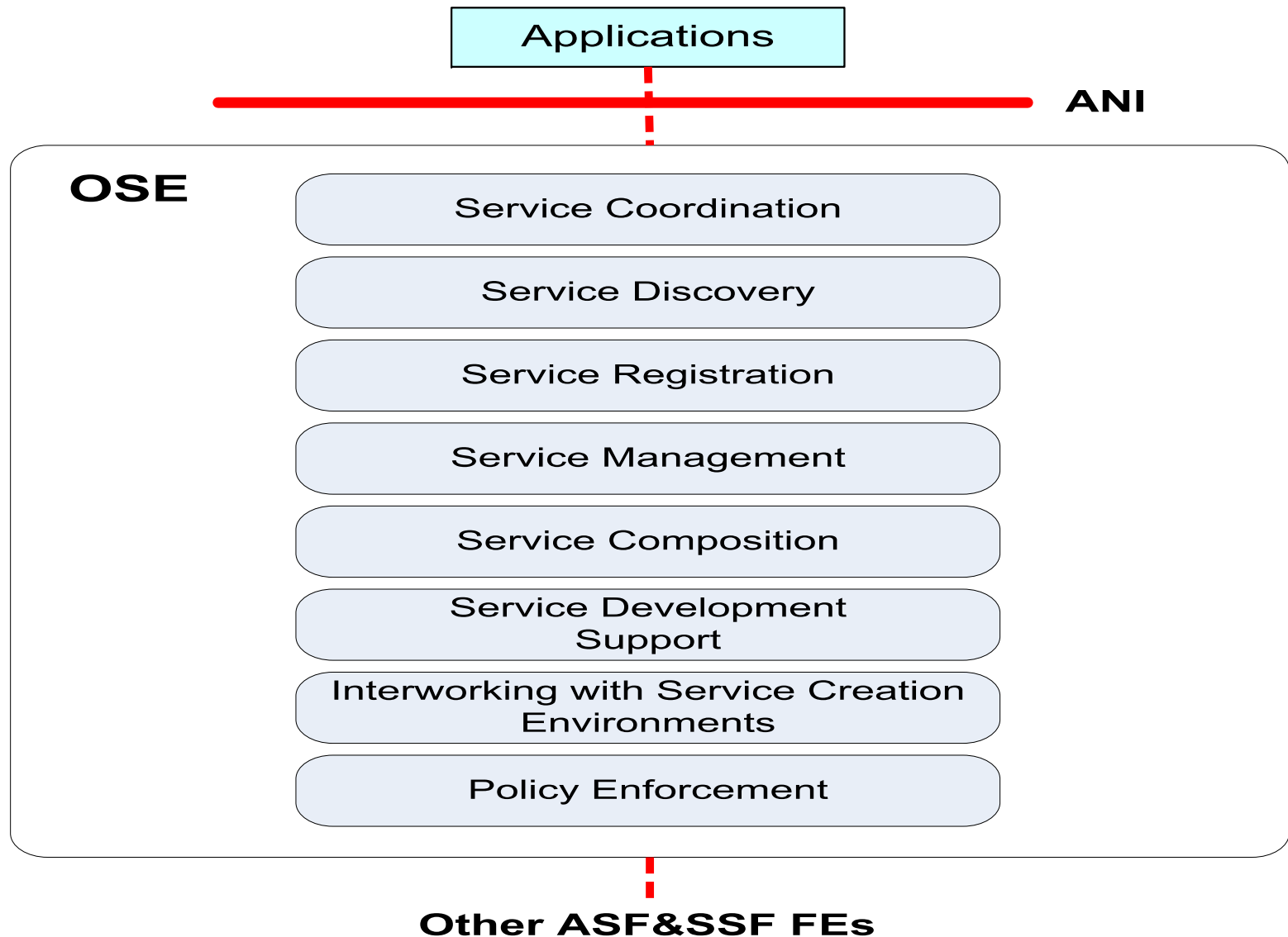


NGN OSE functional positioning



- Control except OSE
- Media
- - - Management
- · - · Control for OSE

Functional components of the NGN OSE functional group



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

[ITU-T Y.2012] ASF&SSF FEs

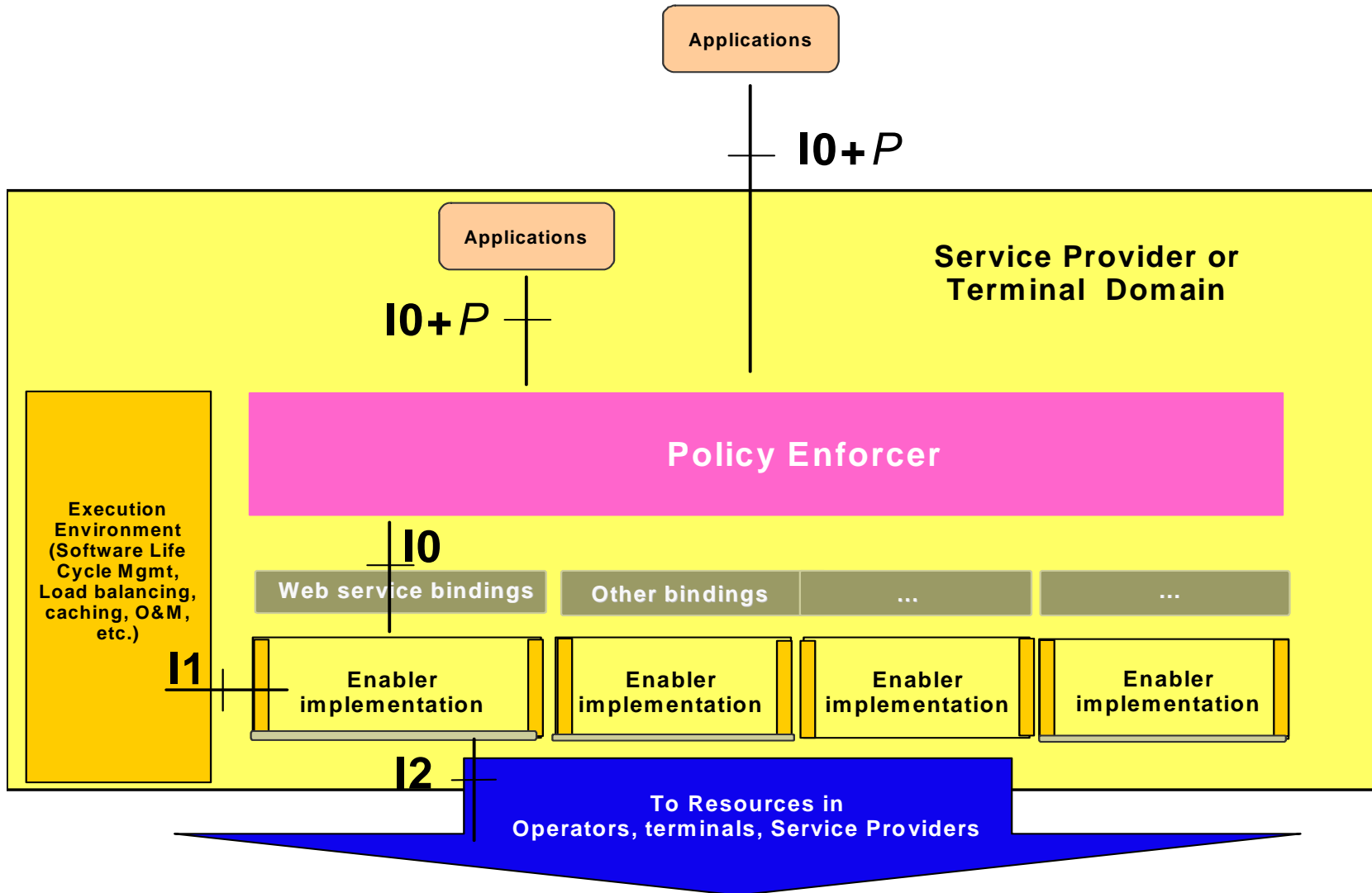
APL-GW-FE	APL-SCM-FE	AS-FE	SS-FE	New FE currently not identified
<p>serves as an interworking entity between the applications, and services and capabilities of the NGN (adapted from [ITU-T Y.2012])</p>	<p>manages interactions between multiple application services (or servers) [ITU-T Y.2012]</p>	<p>supports generic application server functions including hosting and executing services [ITU-T Y.2012]</p>	<p>provides access and interworking to a legacy IN SCP [ITU-T Y.2012]</p>	

O S E	Service discovery	optional	not applicable	not applicable	not applicable	optional
	Service management	optional	not applicable	not applicable	not applicable	optional
	Service registration	optional	not applicable	not applicable	not applicable	optional
	Service coordination	not applicable	optional	not applicable	not applicable	optional
	Service composition	not applicable	optional	not applicable	not applicable	optional
	Service development support	optional	not applicable	not applicable	not applicable	optional
	Interworking with service creation environments	optional	not applicable	optional	optional	optional
	Policy enforcement	optional	optional	not applicable	not applicable	optional

Relationship of ITU-T SG13 with other SDOs: collaboration has started

- o 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
- o 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.)
- o 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



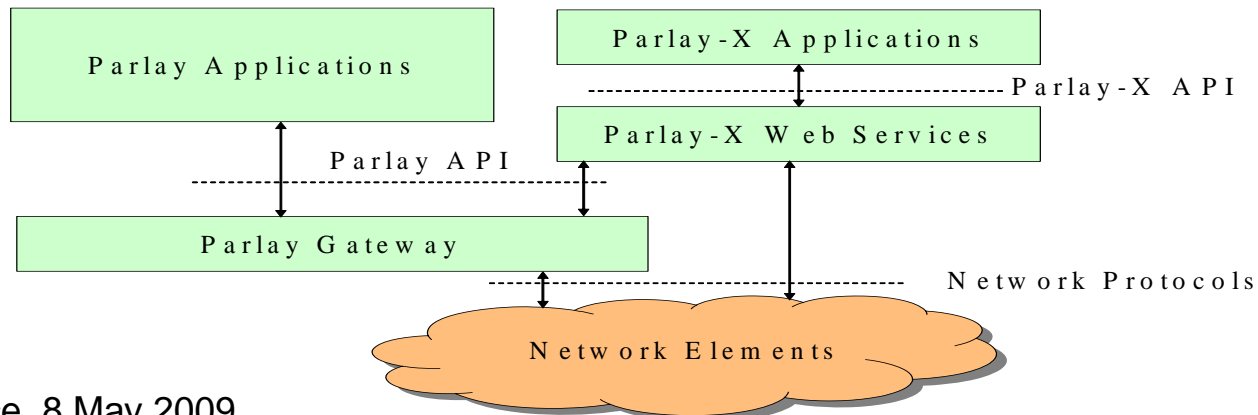
Source: Open Mobile Alliance

Parlay-X Web Services/API specifications

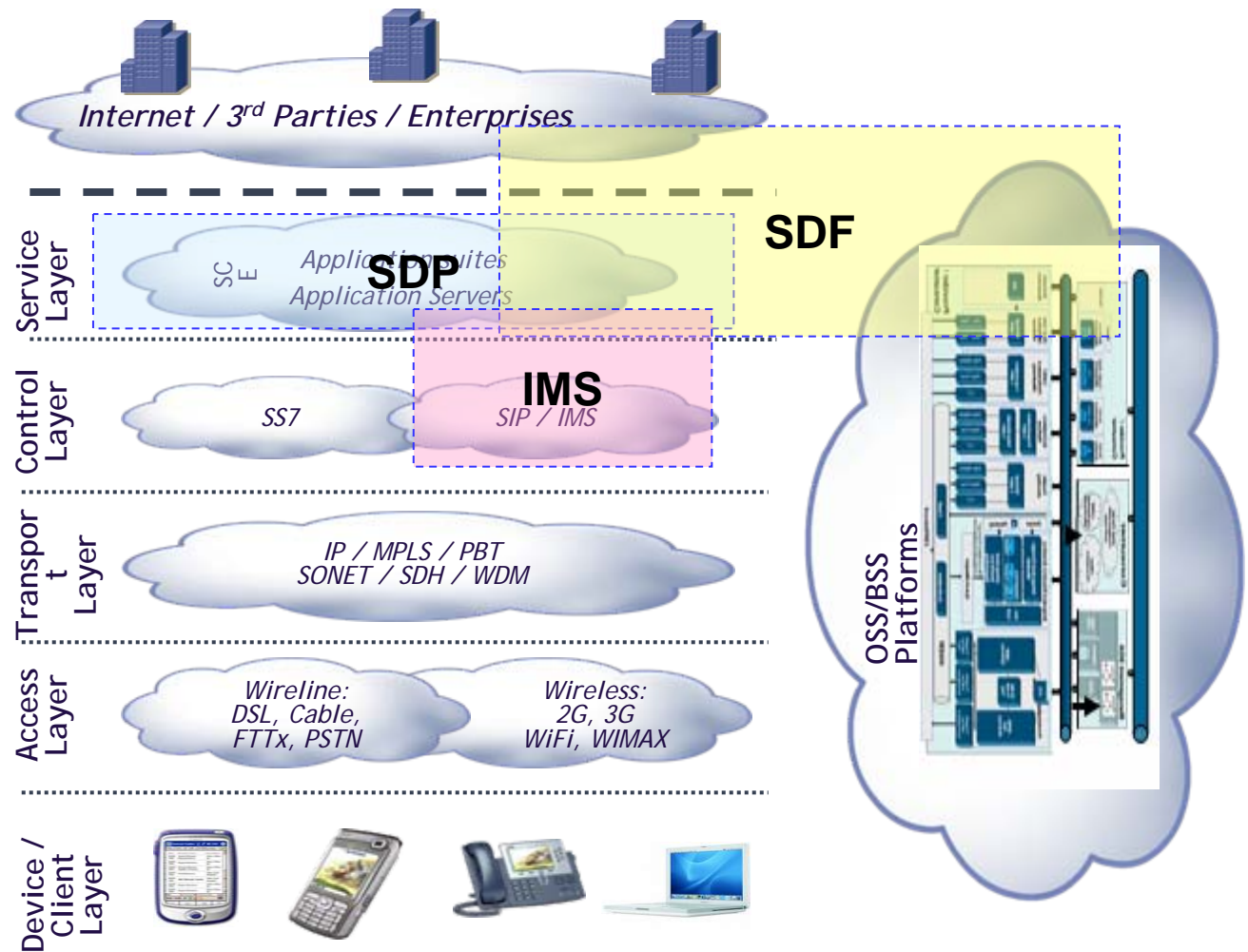
Parlay-X Web Services specifications provide simple, abstracted telecom Web Services based on use of network functionality, features and enablers

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

Parlay-X Architecture



TMF SDF: positioning and relationship with OSS/BSS



Source: TeleManagement Forum

Athens, Greece, 8 May 2009

Future SOA/WS topics within ITU-T SG13: an informal and non-exhaustive list (*)

- o 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.)
- o SOA framework for NGN (carrier-grade, service traceability etc.)
- o Standard requirements and SOA/WS enabled capabilities of service delivery platforms for NGN
- o SOA/WS enabled NGN (2.0) functional architecture and related service components (IMS, others)
- o Middleware aspects
 - Application-specific middleware requirements versus NGN OSE
- o 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 this area

Conclusion

- 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]

NGN capabilities	OSA/Parlay	OMA	OASIS	W3C	OMG	TMF
Service Coordination		PEEM (Policy Evaluation, Enforcement and Management), OSPE (OMA Service Provider Environment)	WS-Coordination WS-Business Activity WS-Atomic Transaction	Web Services Policy – Framework Web Services Policy – Attachment Web Services Policy Namespace Web Services Policy XML Schema	Current effort: - UPMS (SOA extension of UML) - BPDM Existing Standards: - UML - EDOC: component architecture - Distributed Object Computing	TMF053 series: NGOSS Technology Neutral Architecture (TNA) GB921 series: eTOM, business process framework GB922 series: SID, shared information architecture NGOSS Contract Metamodel (Work In Progress)
Service Discovery	Discovery of framework and network service capability features	OWSER (UDDI), OMA's DPE, OMA's GPM	Universal Description, Discovery and Integration (UDDI) ebXML Registry Information Model (RIM) ebXML Registry Services and Protocols (RS)	Web Services Description Language (WSDL)	Current effort: - UPMS (SOA extension of UML) - BPDM Existing Standards: - RAS : Reusable Asset Specifications - RAS Description: Metamodel for describing and managing reusable assets	

Y.2234 Appendix: relevant developments in other SDOs [2/5]

NGN capabilities	OSA/Parlay	OMA	OASIS	W3C	OMG	TMF
Service Management	Registering of network service capability features, Integrity Management	OSPE (OMA Service Provider Environment)	Management Using Web Services (WSDM-MUWS) Management Of Web Services (WSDM-MOWS) WS-Notification WS-Brokered Notification	Service Modeling Language WS-Eventing	BPRI: Business Process Run time Interface Description: looking at runtime system, monitoring and measuring its and evaluating these measurements against what the expectations RAS: to publish the services	Service Delivery Framework (Work In Progress) 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. 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.
Service Composition		PEEM((Policy Evaluation, Enforcement and Management)	Business Process Execution Language for Web Services	Web Services Choreography Description Language	UPMS, BPMN, BPDM	

Y.2234 Appendix: relevant developments in other SDOs [3/5]

NGN capabilities	OSA/Parlay	OMA	OASIS	W3C	OMG	TMF
Service Development Support		XDM, OSPE (OMA Service Provider Environment)		Service Modeling Language	Existing Standards - UPMS, - BPMN, - BPDM - EDOC	TMF053 series: NGOSS Technology Neutral Architecture (TNA) GB921 series: eTOM, business process framework GB922 series: SID, shared information architecture GB942 Contract Guidelines and Principles NGOSS Contract Metamodel MTNM/MTOSI, OSS/J (TIP)
Service Registration		OSPE (OMA Service Provider Environment)	ebXML Registry Information Model (RIM) ebXML Registry Services and Protocols (RS) Universal Description, Discovery and Integration (UDDI)		Existing Standards - RAS - MOF	

Y.2234 Appendix: relevant developments in other SDOs [4/5]

NGN capabilities	OSA/Parlay	OMA	OASIS	W3C	OMG	TMF
Interworking with Service Creation Environments						
Policy Enforcement	Policy Management SCF	PEEM((Policy Evaluation, Enforcement and Management))	Service Component Architecture (SCA) Policy Framework Privacy policy profile of XACML	Web Services Policy - Framework Web Services Policy - Attachment Web Services Policy Namespace Web Services Policy XML Schema Web Services Policy - Primer Web Services Policy - Guidelines for Policy Assertion Authors		SID Policy Framework

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

NGN capabilities	OSA/Parlay	OMA	OASIS	W3C	OMG	TMF
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			