SDF - Industry Groups Positioning Document

(IGPD)

TR141

Version 2.0

tmforum

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Executive Summary

One of the major goals of the SDF work program is to correctly position TM Forum development of SDF in relation to developments in other Industry Groups - the object being not to re-invent, but rather to build upon related work where this is possible. Another need is, where possible, to influence the emerging work in other Industry Groups to be aligned with TM Forum's SDF development.

Overall, this should then lead to ultimate cost-savings in time-to-market and less industry confusion as "harmonized" specifications are increasing produced for SDF related standards across various Industry Group stakeholders.

In order to achieve the above objectives, a process has been put in place within the TM Forum SDF program to properly engage with a number of other Industry Groups. This process is expected to complement the wider Industry Group Liaison procedure which is operated within TM Forum.

As a result of a selection process operated within the SDF team, ten Industry Groups were identified as being engaged in technical developments which in some way were considered to have influence and possible input to TM Forum's SDF work. The possibility of SDF work feedback and influence into these associated Industry Groups and possible impact on these related work programs was also considered.

Various methods were used to engage with these selected Industry Groups and correctly identify placement of the associated work activities – these included structured face-to-face workshops, follow-on conference calls and individual communications, documentation exchanges etc.

This document (TR141) contains the summary of the information gathered and agreed between the parties concerned. Various items for possible collaborative work are identified in the individual sections which address the contributions from each Industry Group. In addition there are some overall collaborative views expressed in a "Conclusions" section at the end of the document. The overall observation is that each of the Industry Groups involved to date, to a grater or lesser extent, is working in areas that could impact the TM Forum SDF development.

The information contained in this document is now also being used as the basis for establishing agreed co-operative working relationships with the Industry Groups concerned. This is being achieved though the production of separately constructed Work Registers – which are a usual part of the TM Forum Industry Groups Liaisons process. Each Work Register produced has associated work proposal content extracted from this document.

1. Introduction

Document Structure

This document reviews work being carried out by a number of other Industry Groups who are involved in work activities associated with TM Forum's SDF development. Each of the Industry Groups that have been involved in co-operative discussions are covered below in a separate section. In each section, first an overview is provided of the relevant work in the associated Industry Group, then the relationships to work items in TM Forum's SDF development are identified.

The document continues with a high-level positioning of NGN,SDPs,IMS and SDF to assist future developments involving Industry Groups working in these various areas.

Finally, some Conclusions are drawn on the overall applicability of the Industry Group work areas to TM Forum's SDF development – which is then leading-on to more detailed collaborative work items being put in place.

1.0.1. Introduction

One of the major goals of the SDF work program is to correctly position TM Forum development of SDF in relation to developments in other Industry Groups - the object being not to re-invent, but rather to build upon related work where this is possible. Another need is, where possible, is to influence the emerging work in other Industry Groups to be aligned with TM Forum's SDF development.

Overall, this should then lead to ultimate cost-savings in time-to-market and less industry confusion as "harmonized" specifications are increasing produced for SDF related standards across various Industry Group stakeholders.
In order to achieve the above objectives, a process has been put in place within the SDF project to properly engage with a number of other Industry Groups. This process is expected to complement the wider Industry Group Liaison procedure which is operated within TM Forum. An outline of the approach is provided in the following steps below.

Step1 - The Industry Groups known to TM Forum were evaluated in relation to work being carried out which could be considered within the scope of SDF development. This was not a trivial exercise as the potential scope of SDF is quite broad and there are many Industry Groups who may be considered to be working in areas related to SDF. The resultant list also had to be of manageable size. Nevertheless, this step of the process was carried out successfully and there was broad agreement that the ten Industry Groups identified were of most importance. (A few other Industry Groups have also since been identified - as identified in a section below. However, it is still considered that those reviewed below are still of most importance, and others may be added as time progresses)

Step 2 - Face-to-face workshops were arranged to discuss work relationships between the selected Industry Groups and the associated SDF developments. These were assisted by asking for pre-prepared presentations and also by supplying relevant SDF working documentation. There were also follow-on conference calls, individual discussions with specific Industry Group representatives etc.

Step 3 - A first version (Version 1.0) of this document (TR141) was produced as a summary of the information obtained through the methods outlined above.

Step 4 - Version 1.0 was reviewed, updated and agreed through the involvement of the TM Forum SDF team

Step 5 – The various Industry Group sections were then extracted reviewed, updated and agreed through discussions with each of the associated Industry Groups. This was done individually with each Industry Group to ensure that non-agreed information was not distributed to a wider audience.

Step 6 - Version 2.0 of this document was then produced – this contain the overall agreed view of related work in TM Forum's SDF development and in the associated Industry Group work areas.

Step 7 – When Version 2.0 receives its final overall TM Forum review, it will then be supplied to all parties involved.

Step 8 – In parallel with the above, decisions have been made as to which work items should be taken forward in terms of collaborative work items with the associated Industry groups involved. As mentioned earlier, this has been done within the existing TM Forum Liaison Procedure. Hence Work Registers are being agreed with the selected Industry Groups, with the associated section items within this document being used to supply the related detail. Where necessary, Liaison Agreements (business relationships) may also need to be put in place.

The final result of TR141 development and associated Work Register agreements is properly constructed co-operative work items between the TM Forum SDF development and associated work items in the selected Industry Groups..

The **Industry Groups** involved in discussions to date are listed below - details are contained in the sections that follow.

- OMA
- OASIS
- ITU-T SG4/NGNMFG
- ETSI/TISPAN (WG8)
- Parlay
- ATIS/TMOC
- CableLabs
- IEEE/NGSON
- IPsphere

Industry Consortia:
SDP Alliance

1.0.2. Issues and Appendices

Appendix A   **Terminology, Acronyms and Abbreviations**

Appendix B   **References**

Administrative Appendix provides document revision history, acknowledgements for work completed and information about the TM Forum.

Terminology used within this document

This section identifies the important terms, abbreviations and acronyms introduced by the project and are necessary for the understanding of this document. More detailed definitions and definitions for other terms are shown in Appendix A.

This document makes use of the following terms:

SDF – Service Delivery Framework

SDP – Service Delivery Platform

NGS – Next Generation Services

These and other terms related to SDF development are defined in **TR139**
(As part of the SDF Reference Model description)

Only terms particularly applicable to Industry Groups work related to SDF development are defined in this document

2. Analysis of Industry Groups (who produce specifications)

Each section below examines the SDF related work being carried out by the associated Industry Group and identifies how this relates to TM Forum's SDF development. The information for this analysis has been obtained through the various means identified above in the "Introduction" section

2.1 OMA - Overview

OMA's view of future service needs is that Service Providers want to improve their time-to-market and reduce costs to develop and deploy new services and enablers. Particular needs identified by OMA are listed below:

- Reduce service deployment and lifecycle costs
- Improve service/component time-to-market
- Allow component inter-changeability (one vendor to another)
- Allow the multi-vendor mixing-and-matching of components
- Provide run-time end-to-end Service Level Tracing within and across domains/environments
- Reduce mobile SP costs for services/components in areas such as:
    - integration and deployment
    - lifecycle management

OMA views services as using components that can be "composed", in a manner consistent with SOA principles.
They focus solely on "OMA Enablers", which it separates from other assets (as part of OMA Service Environment (OSE)).
Applications, or end-to-end Services, are out-of-scope for OMA specifications. Also, OMA has a logical architecture - OMA Service Environment (OSE) in which it combines "management entities" (e.g. OSS/BSS) with other infrastructure entities existing in the Service Provider Environment. These are grouped into what OSE calls "Execution Environment" (EE). OMA Enablers expose their ability to be managed through the I1 interface of the OSE.
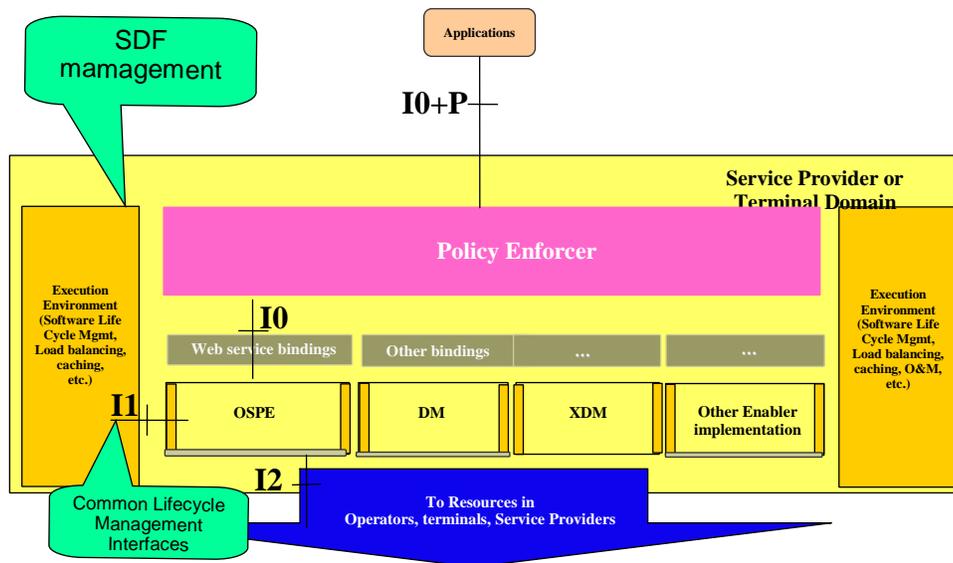
Figure 1 – TM Forum SDF mapped on OMA Service Environment (OSE)

An OMA enabler (and its components, if it has multiple components) is defined in terms of 3 types of interface. This then allows interactions with other Service Components:

    1) a functional interface (category I0)
    2) a resource facing interface (I2)
    3) a lifecycle management interface (I1)

In addition an I0+ interface category provides a functional interface that considers parameters to be exposed for associated policy rules.

    I0 are interfaces that OMA Working Groups define in their enabler specifications.
    I2 are interfaces that are not specified in OMA.
    I1 is the category of interfaces between enablers and the Execution Environment (e.g. software life cycle management process and monitoring etc).

The I1 interfaces may be specified by OMA, or may represent a reference to an interface defined elsewhere.
I1 definition (taken from the OSE Architecture Document): "I1 may be perceived as "a common lifecycle interface presented by all OMA enablers".

The OMA Service Provider Environment (OSPE)
OSPE can be used to implement Life Cycle Management (LCM) and Service Level Tracing (SLT) functions for OMA enablers and services within the OSE (it provides OAM&P with limitations). OSPE is therefore itself an OMA enabler that is able to provide Lifecycle Management including Service Level Tracing capabilities for other OMA enablers. These Management capabilities are exposed through the OSPE I0 interfaces.

Because services are executed by composing / orchestrating one or several enablers, OSPE has to be able to interact (or be bundled) with OMA enablers to make the activities of LCM and SLT take effect.

OSPE has identified Lifecycle Phases (defined in OSPE activity). The OMA focus has been mainly on deployment and execution phases.

OMA Management

OMA has approached the notion of "Management" from several angles:

- The OMA Service Environment (OSE) - a logical architecture that includes a category of interfaces (labeled I1) that support interactions between OMA enablers and the SP "execution environment" (including OSS/BSS to the extent they have to interface to OMA enablers to manage them).
- Requirements, architecture and technical specifications for identified interfaces to support OMA enablers life-cycle management (LCM) and Service Level Tracing (SLT), collectively referred to as OSPE (OMA Service Provider Environment). These have the goal of interacting with other enablers for OAM&P purposes. It may be viewed as an enabler that interacts with other enablers through their I1 set of interfaces.
- Comprehensive/focused Device Management (DM) provides a collection of enablers, including a DM Protocol (based on SyncML) and a set of DM Management Objects (MOs).
- Individual OMA enablers may also expose various management interfaces (e.g. for creating, retrieving, modifying or deleting specific data related to the enabler). Many of them are re-using XML Document Management (XDM is based on XCAP – RFC 4825)

2.1.1 Relation to TM Forum / SDF Work

The OSE and OSPE work in OMA may collectively be considered as a blueprint to an open Service Delivery Platform (SDP – defined in TR139), at least for services composed from service components deployed independently of the network technology.

OMA defines service component interfaces in the OSE in a similar fashion to those within the SDF development:

I0 – relates to the TM Forum SDF "Functional" interface
I1 – relates to the TM Forum SDF "Lifecycle Management" interface
I2 – relates to the TM Forum SDF "Resource Abstraction" interface

It would be of value to compare any of the associated requirements for these OMA interfaces with related requirements being specified within the SDF development.

OMA have the prime objective of defining I0 (Functional) interfaces. This complements very well the TM Forum SDF work which sees this area as being out of scope. Likewise the TM Forum SDF development is primarily aimed at the definition of Service Lifecycle Management – which is related to the OMA I1 interface. OMA may consider looking to other fora to provide specification for this interface – which fits well into the TM Forum SDF work direction.

OMA exposes a number of network based capabilities through OMA enablers - this being exposed through I0 interfaces and realized using I2 interfaces. This may provide a ready means for TM Forum SDF to provide value-add services over these network-based capabilities.

The OSPE provides specifications for many Management-related activities – e.g. Service Lifecycle (SLC), Service Level Tracing (SLT) and Service Model Management. This, coupled with the various other items of Requirements specification could provide multiple inputs into the TM Forum SDF Requirements for Management.

The OMA specifies a Device Management capability (DM). This should be related to the End User Device Management capability being defined within TM Forum and both of these should collectively be considered in relation to the scope of TM Forum SDF Management.

In summary, closer co-operation between TM Forum SDF and OMA OSE architecture and OSPE specifications could provide a combined open framework for next generation services management (SDF) and specifications for implementation of lifecycle management of the resources in such an SDF. The crucial area of integration between these two work areas would be around the OMA I1 (Lifecycle Management) interfaces and associated specifications and appropriate extensions of the OSPE. An initial comparison of Requirement specifications (e.g. for Lifecycle Management) would also seem to be extremely valuable.
Future collaborative development of OSPE between OMA and TM Forum should be considered.

2.2 OASIS - Overview

OASIS define many software system standards that should be considered in the development of the SDF Reference Model / meta-model.
In particular these include specifications for SOA operation, service component assembly and specifications for web service operation.
Items most relevant to SDF include:

SOA
OASIS SOA Reference Model TC
Developing a core reference model to guide and foster the creation of specific, service-oriented architectures
OASIS Service Component Architecture / Bindings (SCA-Bindings) TC
Standardizing bindings for SCA services and references to communication protocols, technologies and frameworks
OASIS Service Component Architecture / BPEL (SCA-BPEL) TC
Specifying how SCA component implementations for SOA can be written using BPEL
OASIS Service Component Architecture / Policy (SCA-Policy) TC
Defining an SCA policy framework to simplify SOA application development

Web Services
OASIS Framework for Web Services Implementation (FWSI) TC
Defining methods and functional components for broad, multi-platform, vendor-neutral cross-industry implementation of Web services
OASIS Web Services Quality Model TC
Defining common criteria to evaluate quality levels for interoperability, security, and manageability of services
OASIS UDDI Specification TC
Defining a standard method for enterprises to dynamically discover and invoke Web services

OASIS Web Services Transaction (WS-TX) TC
Defining protocols for coordinating the outcome of distributed application actions

WSDM – Web Services Distributed Management – composed of:
– *Management Using Web Services (MUWS, v1.1, parts 1 and 2)*
– *Management Of Web Services (MOWS, v1.1)*
Details at:
http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=wsdm#technical

In addition to the above, OASIS have recently formed a new work area aimed at ensuing SOA and Web Service specifications are made fit-for-purpose for the Telecoms Industry. This "Telecom MS" (Member Section) could act as an ideal point of contact between TM Forum and OASIS on SDF related developments.

2.2.1 Relation to TM Forum / SDF Work

The overall context for TM Forum's SDF development is set by the SDF Reference Model (and perhaps a more formally associated meta-model) – which is described in the TR139 documentation (see References). This Reference Model will eventually provide a precise framework within which SDF operation will be defined. Much of this approach will be based upon precise application of SOA principles. In addition it is a major objective of SDF to be able to blend together services from the traditionally separate industry sectors of Telecom and Web Service capabilities.

OASIS provides very precise specifications for both the SOA and web services areas. In addition specifications are available on Web Service Distributed Management (WSDM) both for the Management Of Web Services (MOWS) and Management Using Web Services (MUWS). Both of these specifications may be of importance – both in terms of providing Management capability using web services (MUWS), and also by providing a standardized way of instrumenting web services (MOWS) so that they too can be represented as managed resources as part of a comprehensive and unified Managed environment.

These specifications from OASIS should be fully reviewed for their possibly applicability to SDF definition and also as a source of possible terminology agreement.
The newly formed Telecom MS work area within OASIS should be considered as a point of working contact between TM Forum's SDF development and the aim of the Telecom MS – to develop SOA and Web Service specifications which are fit-for-purpose in Telecoms application. Initial discussions should perhaps include: agreed terminology, review / comment on SDF Reference Model (contained in TR139), common views on any overall meta-models, common approaches to design patterns etc.

2.3 ITU-T SG4/ NGNMFG - Overview

The Next Generation Network Management Focus Group (NGNMFG) was established under ITU-T / SG4 to developing a "Roadmap" of specifications for the support of NGN Management. There are a number of Industry Groups working with ITU-T on the collection of specifications, these include:

ITU-T SGs 2, 4, 13 and 15, ETSI TISPAN WG8, ATIS TMOC, TTC, 3GPP SA5, 3GPP2 TSG-S (WG5), TM Forum (including IPDR), IEEE, IETF O&M Area, OASIS (WSDM), MEF and DMTF

A major concern at present is to define a suitable overall framework in which to show the full set of relationships between these specifications. This is being accompanied by associated identification of "gaps" is the set of specifications.

Another major consideration in constructing the Roadmap is to understand how various specifications, from the number of Industry Groups, may be "harmonized" in areas on common concern. Particular areas of harmonization work include:

- NGN Management Architecture
- Accounting Management
- Model Harmonization

2.3.1 Relation to TM Forum / SDF Work

A yet to be fully explored item in the SDF development is the relationship between SDF and NGN. This extends into the relationship between NGN Management and SDF Management. These relationships will be very important to define as many of the next generation services provided via SDF will have at least part of their service compositions provided over NGN. Initially this may involve well defined interfaces between SDF and IMS (from 3GPP) but will need to extend into other NGN-related interfaces in the longer term.

Hence, the full detail of the work relationships between SDF and the NGNMFG will need to be based upon agreement on the associated positioning and interface definitions. This issue of wider SDF / NGN relationship is further developed in a separate section towards the end of this document.

2.4 ETSI / TISPAN (WG8) - Overview

ETSI TISPAN is developing an architecture and associated specifications for NGN Management. In particular the following are being developed:

- NGN Network Resource Management -Requirements, Information Model and Solution Set approved
- NGN Subscription Management - Requirements, Information Model and Functional Architecture (work on further evolution expected)
- New work - on IPTV Management**.**

Of specific interest is the NGN Management Architecture (TS 188001) developed by ETSI which is based upon the application of SOA principles.
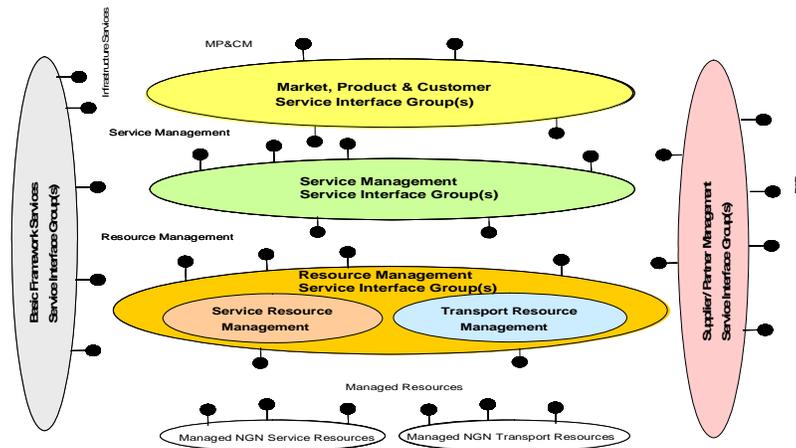
Figure 2 – ETSI/TISPAN OSS Architecture

2.4.1 Relation to TM Forum / SDF Work

The ETSI SOA-based Management architecture should be considered as a particular influence on the development of SDF Reference Model / meta-model. In particular the way in which managed resources "export" their interfaces to be managed, and the way in which the management functions "import" these interfaces and "bind" to them at run time should be viewed as a possible model for SDF management component interaction..

Likewise for SDF (and other related work areas) Subscription Management will be an important concern. Hence TS 188 002 series on Subscription Management Requirements should also be reviewed for possible input. It is important that both ETSI/TISPAN and TM Forum's SDF work have a common view on the application of Subscription Management, as this will then allow the correct distribution of functionality to be placed between the wider BSS/OSS environment and that of the SDF.

Finally, the ETSI / TISPAN work should be reviewed for the perspective of providing terminology definitions that may be used in SDF definitions. (This would also prevent industry confusion that may otherwise occur through possible SDF redefinition of terms).

2.5 Parlay - Overview

Parlay defines a number of APIs for various forms of telecom enablers (Service Capability Servers), that may be used in the creation and delivery of communication applications and services. These APIs are consistent and aligned with the 3GPP requirements for Open Service Access (OSA). The APIs consist of a number of service or network capability enablers, and a management enabler. The OSA/Parlay Framework provides secure managed integration between the SCS enablers and the applications or services utilizing them.
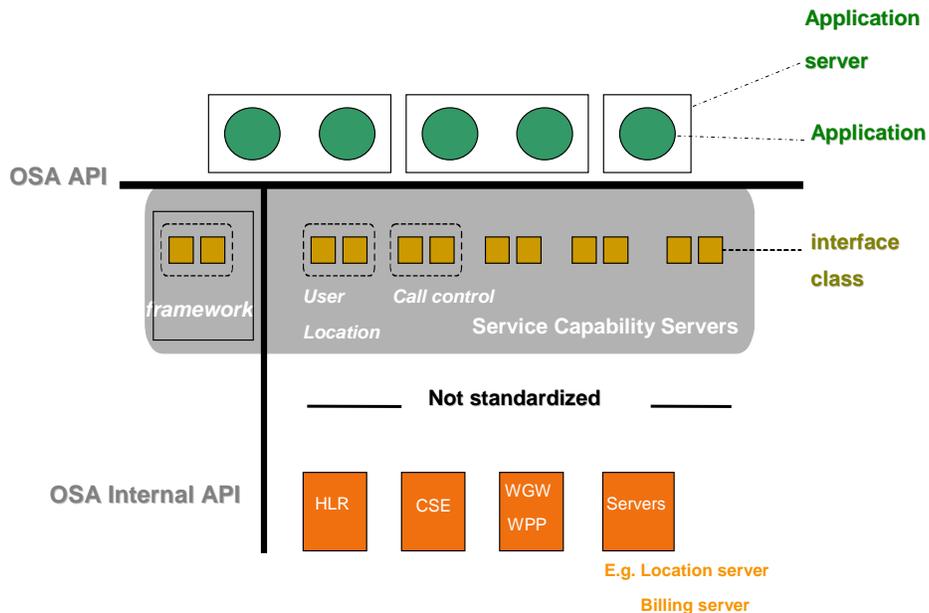
Figure 3 – Parlay Open Service Access (OSA)

The API set includes:

- Framework
- Call Control
- Generic
- Multi-Party
- Conference
- Multi-media
- User Interaction
- Policy Management
- Charging
- Account Management
- Terminal Capabilities
- Data Session Control
- Connectivity Management
- Messaging
- Mobility
- Presence & Availability

Parlay X

Parlay X provides a wide range of abstracted value-added Web Service specifications. These specifications provide service oriented Web Services that address the service creation and delivery requirements for use in conjunction with underlying service enablers, either in conjunction with the Parlay APIs or directly with the underlying enabler platforms.

Parlay Community

"Community" provides a collection of APIs and web service interfaces for the telecom industry

The Parlay approach is based upon SOA principles. There is alignment with OMA, 3GPP and W3C. Parlay specifications are available as ETSI publications.

2.5.1 Relation to TM Forum / SDF Work

Parlay provides interfaces to a number of telecom based services. As such they may well be very useful building blocks in the delivery of SDF-based next generation blended services. In this future service scenario, the blending of these individual services and combination with service components outside of this present range (eg content-based) will be a prime concern. Access to these Parlay-based services may be provided directly – via the SDF "Resource Abstraction" interface, or via SDPs – such as the OMA's OSE Enablers I2 interface to the associated Parlay API or Parlay X web service.

2.6 ATIS / TMOC - Overview

TMOC have developed a framework for OSS/BSS support for IPTV services, they see this capability as being part of a wider SDP/SDF activity. In addition they have been developing a framework for supporting Accounting of future NGS (including IPTV)

Management of IPTV

TMOC's Goal for an OSS Solution for IPTV:

- Enable the widest range of IPTV business models by a <u>flexible</u> service <u>integration framework</u>
- Supporting issues such as:
– Process automation
– Personalization and customer self-service
– Mass customization of services
– Flexible value network chains
– Easy accommodation of a (wide) range of resource types from a (wide) range of suppliers

IPTV Business Processes were defined based upon the application and extension of TM Forum's eTOM.

IPTV OSS Requirements are defined under a number of categories:

1. General Requirements
2. Configuration, Provisioning & IPTV Service Support
3. Performance & Quality Management
4. Collection, Rating, Billing & Settlements Management
5. Problem Management
6. Customer Relationship Management
7. Supplier/Partner Relationship Management

TMOC have developed a Reference Architecture for IPTV OSS/BSS.
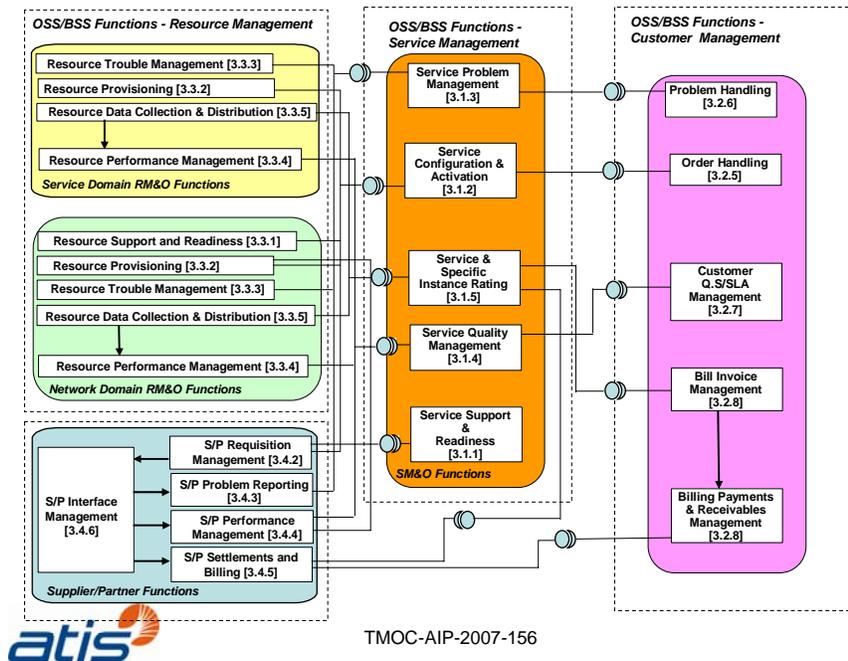
Figure 4 – ATIS/TMOC IPTV Management Processes

Summary of progress:

- Joint work: TMOC/OBF - TMOC Issue 92
- Collaboration with IIF (IPTV Interoperability Forum)
- Completed on 3rd Quarter 2007 – ATIS-0300092
  Description:
    - Define high level FRA for IPTV OSS/BSS.
    - Uses eTOM (TMF/ITU-T) as basis.
- Is evolving as ITU-T rec. within ITU-T SG-4
- Ordering API (TMOC Issue 93) – initially focus on API for ordering of IPTV advertisement

Accounting

The TMOC Accounting Management Task Force (TF) was established in October 2004 with the objective of developing an ANS and contribute to global standardization such as ITU-T Recommendation(s) in the area of Accounting Management and Data Collection architecture and protocols - for packet based networks & services

So far the major contributors to this TF have been: Amdocs, Cisco, IPDR.org, Qwest, and Telcordia, with some other TMOC Member inputs from Alcatel-Lucent and AT&T.

Common Requirements for Accounting Management & Data Collection:
- Service Agnostic
- Some examples of core requirements:
    - utilize the Network link Efficiently,
        - introduce minimum impact on service element and network elements, and

- provide Carrier-grade (99.999% up time) reliability and high availability,
  - these are a must for critical accounting, billing and charging applications.
  - needed to Comply with legal and regulatory requirements.
  - enable efficient implementation (both in sense of time and cost)
- introduce minimal end-to-end latency,
  - to allows real-time reaction to certain activities such as: fraud, or network abuse of network or service abuse), and
  - support real-time applications such as hot-billing or real-time CSR.

SDP/SDF oriented requirements:
- flexible enough to supports <u>concurrent</u> exchange of different types of data records
  - with minimal constraints on the data models, so it can support:
    - a variety of applications and
    - a wide range of billing models (post-paid, pre-paid, pay-per-click, and/or pay-per-view).
  - extensible so it will be easy to introduce new services and new attributes
- easy to manage:
  - E.g., It should support plug-and-play for large multi-vendor deployments
  - Ideally it should be built as a standard mechanism to support a global, heterogeneous environment
  - allow an easy upgrade and keep backward and forward compatibility
- It should scale, to handle, in real time, high volume (millions) of usage data records, from many data exporters distributed across large scale network & systems.
- published as an open standard to ensure its wide acceptance across the entire industry.

2.6.1 Relation to TM Forum / SDF Work

As indicated by TMOC, they see IPTV as being one of a number of Next Generation Services to be supported in an SDP / SDF environment – rather than a stand-alone service. As such the Management issues for IPTV should be considered as a major input into SDF Requirements. Detailed examination should take place of the application and necessary extension to the TM Forum's Business Process Framework (eTOM) that was needed to define business process aspects in the Management capability for IPTV. This should then be accompanied by associated Shared Information and Data (SID) framework relationships / extensions.

A suitable Accounting framework will be an essential part of the SDF definition. Since the framework being developed by TMOC is aimed to be a common standard in ATIS and ITU-T and also incorporates much of TM Forum's IPDR capability, it should be fully considered as the basis for an Accounting Framework within SDF.

2.7 CableLabs - Overview

CableLabs in support of its members develop specifications, tools and certification of devices for the following projects:

- DOCSIS®

- Specification and Certification of interfaces for high-speed data service over cable television system networks
- CableHome®
    - Specifications and certification of Residential Gateway interface within the home
- PacketCable™
    - Specification and Certification of interfaces for delivering advanced, real-time multimedia services.
- OpenCable™
    - Specification and Certification of interfaces for two-way Interactive content
- Go2BroadBandSM
    - Provide an Internet-based electronic commerce tool to assist Cable Service selling
- Metadata
    - Specification of descriptive data formats for content assets (e.g., movies) for VOD and SVOD.
- Digital Advertisement
    - Interoperability and Certification of SCTE DPI

These specifications allow a number of services to be delivered over cable:
- Broadband Internet
- VoIP
- Tiered Services
- Video Conferencing
- Business Services
- Entertainment Video
- Home Networking

CableLabs define a number of FCAPS Management interfaces which accompany their associated specifications – these are summarized in the table below:

|	Fault	Configuration	Accounting	Performance	Security
DOCSIS	SNMP syslog	DHCP TFTP SNMP	IPDR/SP	SNMP IPDR/SP (1)	DOCSIS BPI SNMPv3
CableHome	SNMP syslog	DHCP,DNS TFTP, HTTP-TLS SNMP	---	SNMP	SNMPv3 Kerberos HTTP-TLS
OpenCable	SNMP IPDR/SP	DHCP TFTP	IPDR/SP	SNMP IPDR/SP	Conditional Access
PacketCable (1.0 & 1.5)	SNMP syslog	DHCP, DNS TFTP, HTTP SNMP	Radius	SNMP syslog	SNMPv3 Kerberos
PacketCable (2.0)	SNMP	SIP Config. Framework, HTTP-based XCAP	Radius Diameter	SNMP	IMS AKA & IPsec, SIP Digest & TLS

Figure 5 – CableLabs FCAPS Management v Areas of Specification

The Architecture for Service Management is shown below.
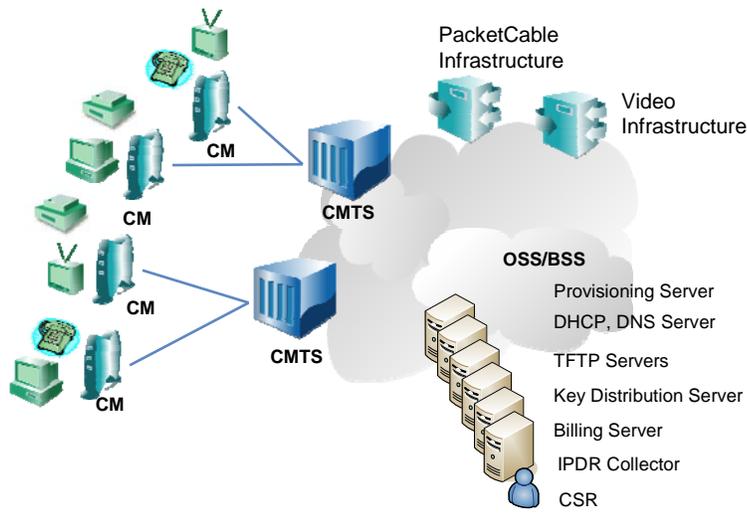
Figure 6 - CableLabs Service Management Architecture

Application of IPDR

CableLabs have incorporated the IPDR.org - PDR Streaming Protocol (now part of TM Forum working groups) to facilitate the management of Devices and Services as shown in Figure-6

Areas of application:

DOCSIS
- Billing for HSD
    - SAMIS
- Performance Metrics
    - Spectrum Management Measurements
    - Diagnostic Log
- Configuration
    - CM Registration Status
    - HFC Topology

OpenCable
    - Receiver Metrics Gathering
    - Efficient mapping of data to back-office object models

- Set-top Box Metrics
    - A set of well-defined data reported by a receiver
    - Used for measuring certain aspects of cable service delivery
    - Applications may define specific Metrics as IPDR Service Definitions
- Benefits

- Tracks usage, performance, and reliability of services and applications
- Knowledge-base for planning new services, deployment and operations

In addition IPDR/SP reduces drastically network resources usage for exporters and collectors:
- Compact data representation (encoding)
- Redundant information suppression
- Flexible and scalable data models

2.7.1 Relation to TM Forum / SDF Work

SDF will act as the point of convergence for many traditional forms of service providing capability, this will include the convergence of services previously provided separately over landline, mobile and cable networks. For this reason the associated possible incorporation of CableLabs specifications into SDF needs to be considered. In particular full consideration should be given to the various Management interfaces and relevant Service and Device management capabilities outlined above.

CableLabs also make extensive use of IPDR specifications for both service mark-up / identification and related charging and also associated protocols for efficient information transfer. The full possible application of these IPDR specifications within the wider SDF environment needs to be considered.

2.8 IEEE / NGSON - Overview

The IEEE- Next Generation Service Overlay Network (NGSON) describes a framework of IP-based overlay network capabilities. It specifies context-aware, dynamically adaptive, and self-organizing capabilities, including advanced routing and forwarding schemes, that are independent of underlying transport networks.
The standard aims to provide benefit to network operators, service/content providers, and end-users to supply and consume collaborative services by the deployment of context-aware, dynamically adaptive, and self-organizing networking capabilities.
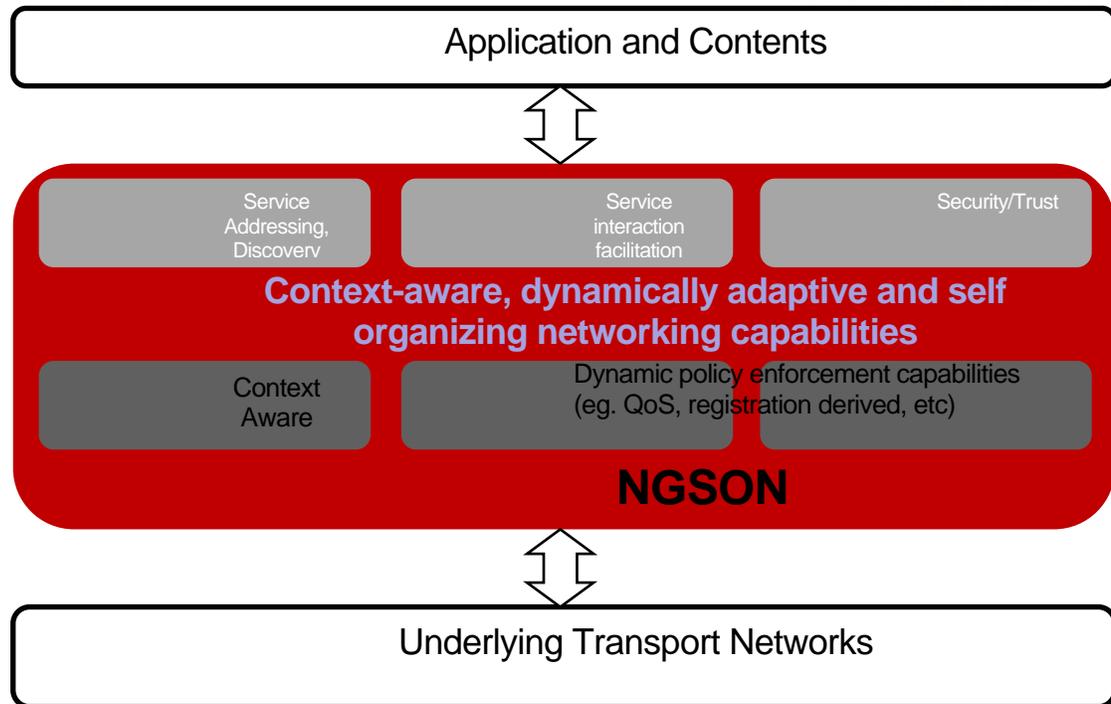
Figure 7 – IEEE/NGSON Conceptual Framework

2.8.1 Relation to TM Forum / SDF Work

At present NGSON is still in its very early stages of development. However, interactions with the IEEE on this work area have been useful in helping to position NGSON in relation to SDF. At the present time SDF could be seen as a Service Lifecycle Management capability to allow service deployment over NGSON.
Further details will need to be exchanged as both SDF and NGSON mature – to ensure they are mutually supportive.

2.9 IPsphere - Overview

IPsphere define an environment in which future services will involve "multi-stakeholder" relationships:
- Horizontal pan-operator connections
- Vertical content/processing relationships

To create this environment a number of issues are considered: settlement for resource usage; assurance of service behavior; regulatory compliance in a multinational service environment; requirements that allow carriers to preserve autonomy etc. Collectively these are supported by the SSS ("Service Structuring Stratum").

The approach also aims to control operations costs and be consistent with software structure and practices used for intra-provider services

Design Goals

There are a number of overall design goals:

- Services can be composed:
    - Solely from a provider's own resource capabilities
    - Cooperatively with own and external partners resources
- Internal or external resource owners
    - Need only publish the service-business relationships from which items can be selected (internally or externally)
- Business relationships
    - Reflected by service publication giving different views according to resource owner commercial policies

Business Layer

IPsphere Business Layer
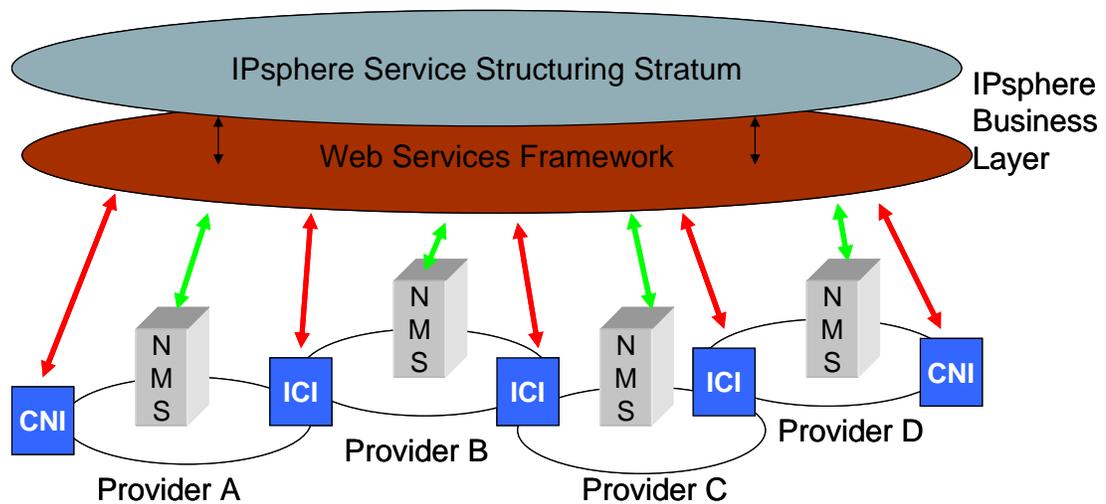
Figure 8 - IPsphere Service Structuring Stratum

A "Business Layer" provides the following capabilities:

- Each individual provider registers "Services"
- Providers "discover" the services of others
- Providers negotiate real-time contracts for composites of those services
- Individual providers provision their own networks according to service contracts
- Services are offered to the customer based on features and pricing, but with the offer is a collateral description of how to optimally fulfill these terms through internal and external resource commitments.
- Resource owners can build "widgets" that can be composed into services by their own retail arm or by others, and can focus on fulfilling and managing their resource commitments.

Service Abstraction and Templates

- Services are defined at an appropriate level of Business Abstraction
- Service "Templates" are created by "Administrative Owners" who have retail customers, and Element Templates by providers with "wholesale" contributions

Use Cases

A number of Business Use Cases have been defined:

- Inter-provider VPN
- IPTV
- FMC
- Content Distribution
- Telepresence Reunion (Rich Media Services)
- Interconnect

Demonstration

A lab-based demonstration of some of IPsphere's specifications has been produced. Possible multi-site demonstration has also discussed (in possible co-operation with Multi Service Forum – MSF)

2.9.1 Relation to TM Forum / SDF Work

IPsphere are producing specifications for pan-provider business solutions which are very much in line with TM Forum's view of SDF-based services and the application of SOA (Service Oriented Architecture) principles in general. Service Abstractions are defined at an appropriate business level and "Templates" are used to describe both Business services and also Elements of this service. A particular Service Provider can then offer a customer a service based upon a combination of their own and co-operating Service Provider business elements – by exchanging information at the (SSS) Business level.

This looks to be extremely valuable complementary work to TM Forum's SDF program and Content Encounter (Digital Content Marketplace) catalyst project developments.
The Use Cases defined will be of particular value – particularly in the areas of IPTV and Content Distribution. In addition the Templates defined to support both Service to customers and Service Element production could also be of considerable value.

3. Analysis of Consortia

3.1 SDP Alliance - Overview

The SDP Alliance is a collaboration of five telecoms software product companies, all established leading vendors of category-defining products: Aepona, ChangingWorlds, Cibenix, Mobile Data Systems and Openet.
The SDP Alliance aim to construct a cost effective, customized end-to-end SDP - based on best-of-breed products that are pre-integrated with internal and external enablers.
The SDP Alliance was established in Q4-2006 to devise an end-to-end solution that offers:

- Highly reliable and scalable 'out-of-the-box' solution
- Flexible architecture
- Rapid return on investment

The SDP Alliance is very much technology solution based and not specification development based. The SDP Alliance provides a showcase and Reference Implementation for SDP development. There is also Interoperability testing across defined interfaces.

3.1.1 Relation to TM Forum / SDF Work

Since the work of the SDP Alliance is more focused on technology / Reference Implementation it is not directly related to the Management Requirements and subsequent specification work within TM Forum at the present time.

Having said this, it may well be worth looking at the Reference Implementation work in the SDP Alliance to see if any associated Management Requirements can be extracted from this. In addition it would be useful to identify the Interfaces identified by the SDP Alliance for Interoperability testing to see if any of these may have impact on the Management aspects – and hence to the associated Requirements gathering.

Finally, it may also be valuable to consider some joint work with the SDP Alliance, particular in relation to TM Forum Catalyst developments associated with the SDP. There may then be the possibility of seeing some of the TM Forum's results influencing the SDP Alliance Reference Implementation.

4. SDF / NGN – Positioning

The Next Generation Network (NGN) will provide an environment for the convergence of many forms of service which have traditionally been provided from a number of industry sectors. These sectors include suppliers of telecommunications related services which have been provided over wireline, mobile and also increasingly over cable technologies; but in addition future Next Generation Services (NGS) will also include items such as information content which may be provided by other sectors such as the media and entertainment industries. As such many of these NGS services will become "Blended Services"

The figure of NGN below has been provided by the ITU-T and forms a foundation against which specification for NGN infrastructure and NGN management capabilities are being defined by a number of ITU-T Study Groups.

The main feature of this ITU-T model are:

- Separation of the "Service Stratum" from the "Transport Stratum" – which means that service supply is no longer tied to particular implementations of network technologies

- A common IP-based Transport Network which spans Access, Edge and Core

- Common Transport control functions that provide for Network Device attachment, Media Handling (eg for various forms of announcement), Gateways to networks outside of direct NGN-based operation etc

- Service Stratum which has common Service Control Functions which will then support various forms of Customer Applications
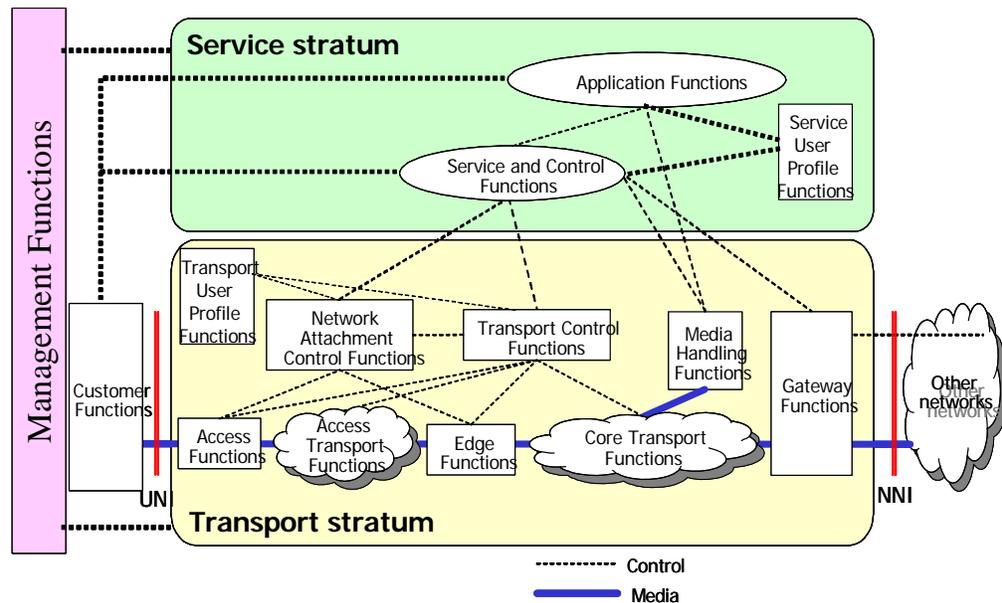
Figure 9 - ITU-T NGN Model

NGN and Industry Group developments

Complementing the work of ITU-T are activities in a number of other Industry Groups, each of which are also developing specifications which can contribute to more rapid deployment of NGN and NGS. Such Industry Groups include:

- 3GPP – who have developed IMS (IP Multimedia Sub-system) which provides a path for IP-based convergence between mobile and Internet services

- ETSI / TISPAN – who build upon the Infrastructure work of 3GPP / IMS to add wireline support though a sub-systems approach - providing for example the NASS (Network Attachment Sub System) and RACS (Resource and Admission Control Sub System) as well as PSTN and ISDN Simulation and Emulation.

ETSI are also defining a SOA (Service Oriented Architecture) based Management Architecture.

 Another important facet of NGN is that it will increasingly be developed from the application of my general IT technologies. For this reason other Industry Groups such as W3C, OASIS, OMG etc are also of importance.

There are many other Industry Groups who are also working in NGN-related areas.

In many cases TM Forum's products / specifications (eTOM, SID, TAM, TNA, MTNM, MTOSI etc) have been used to influence, and have often been incorporated into these other Industry Group developments.

Why SDF?
In all of this it is important to recognize the main business drivers behind NGN and NGS. Whilst the convergence of Transport technologies towards a common IP-based approach will bring many cost saving advantages, the bigger value of NGN will probably be delivered through the very rapid and flexible delivery of NGN Services.
As mentioned above, increasing these will be blended services and will come from multiple industry sources; and the service provider who can bring all these otherwise separate service offering together rapidly, at the right price, and to meet increasing personalized customer needs will be the main beneficiary of the future NGN.

Increasingly, individual product vendors are beginning to supply Service Delivery Platforms (SDPs) which provide elements of this rapid service delivery environment. However, these are very self-contained, often providing only a very limited range of services and also often including their own closely linked Management capability (if any Management capability is provided). Such approaches will provide useful point product solutions, but will not fully enable the wider value of NGS – where service providers can rapidly and cost-effectively build services from multiple source supplies and across multiple forms of SDP. This eventual environment will also support flexible value chains, which in turn will support a considerably more open market for future service component supply.

It is for the above reasons that TM Forum is developing an SDF (Service Delivery Framework). This will enable this much wider mix and blending together of service components, and thus provide a common target environment which present SDPs can use for a common migration strategy.

There are a number of industry enables which now make the development of an SDF a real possibility; these include the increasingly wider uptake of SOA-based service supply and increasing use of common off-the-shelf IT technologies to provide business solutions (eg application of Web Services)
However, a critical aspect of the SDF is to understand both the run-time needs of the service providing platform, and also the <u>Management</u> capabilities which must be provided to allow the SDF to operate.

Much of what TM Forum has produced previously in its product / specification framework developments (eTOM, SID, TAM etc) will be reusable for managing the SDF environment. However, because of the different nature in which NGN services will be defined, configured, instantiated, consumed and charged-for etc.- there will be the need to upgrade these products / specifications to meet the more challenging needs of NGN.

Relationship between SDF and NGN
In many instances it is assumed that SDF will provide services which will operate over the NGN. New Generation Services and Products will be formed from combinations / aggregations / blending together of many forms of service component (as outlined previously above). These resultant services and products will then increasingly provide their service capability over the NGN. It will therefore be important to understand the precise interfaces between NGN and SDF – both for service supply and also support of the combined Management aspects.
SDF is aimed to provide a common Management environment within which Service Delivery Platform (SDP) can co-operate. These SDPs in-turn will build upon services provided by IMS or Parlay and Parlay X interfaces etc.
The exact detail of NGN, SDPs, IMS and SDF positioning and the associated interface requirements still needs to be fully defined, but an initial possible positioning is shown below.

Exact detail on this arrangement will also help with the positioning of many of the Industry Group contributions – which have been outlined previously above.
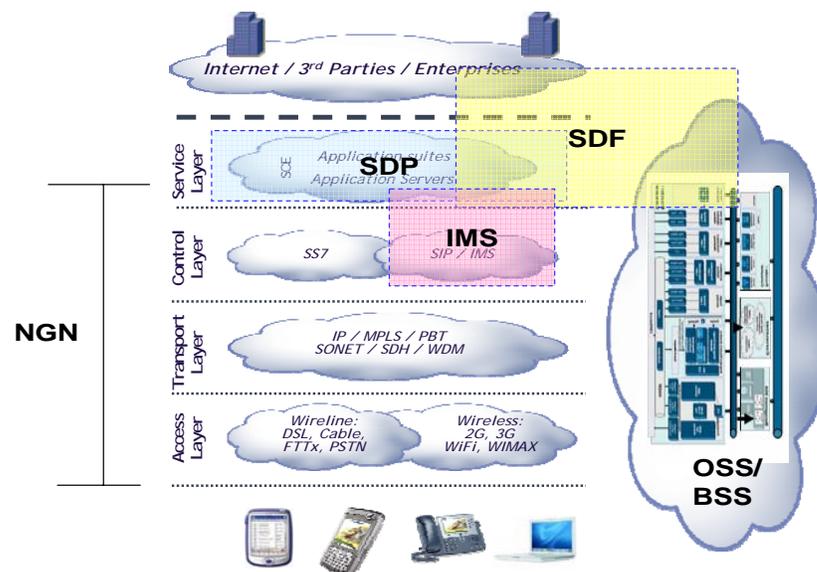

Figure 10 – NGN/SDP/IMS/SDF/BSS&OSS High-Level Positioning

5. Other Industry Groups

 The Industry Groups outlined above are those that TM Forum has had dialogue with as part of the SDF development and the time of producing this document. Although it is felt that most of the Industry Groups who have possibly significant contributions into SDF development have been engaged, it is possible that a few others should also be considered. A few examples of possible additions and the associated reasons for their inclusion is given below.

- 3GPP – IMS / architecture and interfaces
- OMG – Business Process Modeling, MDA factory-based agile software development, UML (eg version 2.0), Development tool support
- W3C – WSDL, web and muliti-media content metadata etc
- DMTF – Entreprise / Application / Software Management
- Industry Group dealing with Content Management ?
- ISO/IEC JTC 1/SC 32/WG 1 - B2B scenario specification
- ITU-T SG13 – NGN Infrastructure
- European Commission funded project - SPICE (http://www.ist-spice.org/documents/SPICE_WP1_unified_architecture_Phase%202.pdf)

6. Conclusions

As outlined previously, this document is aimed at identifying Industry Groups who could make contributions into TM Forum's SDF development. It is thought that the potential major contributors have been identified, however others may also be relevant and few examples of other Industry Groups who should perhaps also be considered have been included in this document. (And perhaps added into an update of this document in a later phase of development of the SDF program?)

For each Industry Group considered in this report, a brief overview has been provided of the work items which it is felt are most relevant to SDF and also suggestions are provided as to how these work items may impact SDF development within TM Forum.

This analysis in this report is not meant to be the final step, but rather gives indications of work that needs further consideration and follow-on discussions with each Industry Group – as identified in each of the associated sections above.
However, a few general conclusions can also be drawn from the analysis completed so far as it is obvious that there are work activities in a number of other Industry Groups which are very relevant to the SDF development underway within TM Forum. These relationships may perhaps be classified under a number of broad headings, as outlined below, with the associated Industry Groups contained within these headings.

SDP/SDF related
IPsphere, OMA, SDP Alliance, IEEE/NGSON

NGN related
ITU-T / NGNMFG, ETSI/TISPAN

NGS related
Parlay, ATIS/TMOC, CableLabs

IT related
OASIS

The above is a gross simplification of the work being carried out in these various Industry Groups – but hopefully does give some overall indication of positioning. Other classifications are also possible – but the above seems to provide at least some means to progress contributions into SDF development.

Of the above, the **SDP/SDF related** activities seem most directly applicable. In particular the OSA/OPSE developments within OMA; and the Service and Element Templates and associated Use Case production in IPsphere seem to be directly applicable to SDF, both as possible direct contributions to SDF specification and also as sources of related Recommendations.

In addition the **IT related** specifications being produced by OASIS (and possibly also by W3C – when further examined) would seem to have direct relevance to the SOA-based approach being developed as part of SDF. Hence the possible usage of the SOA Reference Model and Service Component Architecture (SCA) as a basis for the SDF Reference Model should be considered. In addition other IT specifications from OASIS should also be reviewed in more detail – eg for good practice in Web Service implementation (as indicated in the specifications listed in the related section above). OASIS specifications should also be reviewed from the perspective of Terminology usage. This is important

as SDF is acting as a catalyst for the convergence of many industry sectors (eg Telecom, IT, Media etc). Unfortunately, each of these sectors has their own items of terminology for very similar, or in some cases exactly the same concepts (examples include "Service", "Service Provider", Service Component" etc.) This then leads to the very real problem of confusion when discussing items that bridge across these sectors. It is important that SDF does not add to this confusion by defining its own set of terminology. OASIS does provide the possibility of some form of agreed terminology around the definition of Component-related items and hence should perhaps be built-upon rather than re-invented.

The newly formed Telecom MS within OASIS also provides an ideal point of contact between TM Forum and OASIS on many of the possible work item outlined above. This would also aid the Telecom MS mission – to ensure that OASIS specifications are made fit-for purpose within the Telecoms industry.

As mentioned earlier in this report, it is assumed that many New Generation (SDF) Services will actually operate over NGN. This may be just the core IMS capability, or extended capability provided by, for example ETSI/TISPAN in its NASS and RACS sub-system developments. Whichever way, it will be important to fully define the relationship between SDF and NGN and the associated interfaces over which they will need to interact. A brief introduction to this issue has been provided in this document but further detail needs to be defined and the Industry Groups identified in this report who are concerned with **NGN related** developments should be worked with to help define these working relationships and associated interfaces.

Finally, those Industry Groups working on **NGS related** developments should be viewed as early examples of the forms of service that will need to be composed and managed by the SDF. In particular ATIS/TMOC have very comprehensive document on BSS/OSS Management needs for IPTV – which they themselves see as being one of a number of services that a future SDF will need to support. These IPTV Management Requirements should be incorporated into the wider SDF Management needs. A similar approach should be adopted with the possible application of TMOC's work on Accounting Management.

As mentioned earlier, this document should not be viewed as the final step in working with other Industry Groups on SDF developments. But it does provide a good overall view of possible working relationships.

The outlines above are now being more fully explored with the Groups identified – and where appropriate collaborate work items are being put in place (via agreed TM Forum Industry Group Liaison - Work Register items etc).

7. Appendix A: Terms and Abbreviations Used within this Document

Terminology

Term	Definition	TMF or Outside Source
NGN	Next Generation Network	Outside Source

Abbreviations and Acronyms

Abbreviation/ Acronym	Abbreviation/ Acronym Spelled Out	Definition	TMF or External Source
OMA	Open Mobile Alliance		External
ETSI/TISPAN	European Telecommunications Standards Institute - Telecoms & Internet converged Services & Protocols for Advanced Networks		External
OASIS	Organization for the Advancement of Structured Information Standards		External
IEEE/NGSON	Institute of Electrical and Electronics Engineers – Next Generation Service Overlay Network		External
ITU-T/NGNMFG	International Telecommunications Union – Next Generation Network Management Focus Group		External
ATIS/TMOC	Alliance for Telecommunications Industry Solutions - Telecom Management and Operations Committee		External

8. References

References

Reference	Description	Source	Brief Use Summary
Project Charter	SDF Project Charter – Phase II	TM Forum / SDF Team	This document covers one of the defined work items in Phase II of the SDF project charter
TR139	Service Delivery Framework Overview	TM Forum / SDF Team	Provides and overview of the SDF – including the emerging SDF Reference Model. This document also provide the source of term definitions for SDF-related work Version 1.0 was delivered in November 2007 (as part of SDF Phase I development) Version 2.0 is planned for final delivery in June 2008 (as part of SDF Phase II development)
IPsphere Slide sets	TMF TAW – SDF Industry Group Workshops #1 (Boston 2007) and Workshop 2 (Portugal 2008)	IPsphere	Information extracted from slide packs, associated presentations and follow-on discussions
OMA Slide packs	TMF TAW – SDF Industry Group Workshops #1 (Boston 2007) and Workshop 2 (Portugal 2008)	OMA	Information extracted from slide packs, associated presentations and follow-on discussions
Aepona - Parlay	TMF TAW – SDF Industry Workshop 2 (Portugal 2008)	Aepona	Information extracted from slide packs, associated presentations and follow-on discussions
Aepona – SDP Alliance	TMF TAW – SDF Industry Workshop 2 (Portugal 2008)	Aepona	Information extracted from slide packs, associated presentations and follow-on discussions
ETSI/TISPAN (WG8)	TMF TAW – SDF Industry Group Workshops #1 (Boston 2007) and Workshop 2 (Portugal 2008)	ETSI/TISPAN (WG8)	Information extracted from slide packs, associated presentations and follow-on discussions
OASIS	TMF TAW – SDF Industry Group Workshops #1 (Boston 2007)	OASIS	Information extracted from slide packs, associated presentations and follow-on discussions
IEEE/NGSON	TMF TAW – SDF Industry Group Workshops #1 (Boston 2007) and Workshop 2 (Portugal 2008)	IEEE/NGSON	Information extracted from slide packs, associated presentations and follow-on discussions
ITU-T/NGNMFG (SG4)	TMF TAW – SDF Industry Group Workshop 2 (Portugal	ITU-T/NGNMFG (SG4)	Information extracted from slide packs, associated presentations and follow-on

	2008)		discussions
ATIS/TMOC	TMF TAW – SDF Industry Group Workshops #1 (Boston 2007) and Workshop 2 (Portugal 2008)	ATIS/TMOC	Information extracted from slide packs, associated presentations and follow-on discussions
CableLabs	TMF TAW – SDF Industry Group Workshops #1 (Boston 2007)	CableLabs	Information extracted from slide packs, associated presentations and follow-on discussions

IPR Releases and Patent Disclosures

This document may involve a claim of patent rights by one or more of the contributors to this document, pursuant to the Agreement on Intellectual Rights between the TM Forum and its members. Interested parties should contact the TM Forum office to obtain notice of current patent rights claims subject to this document.

9. Administrative Appendix

Document History

Version History

Version Number	Date Modified	Modified by:	Description of changes
Version 1.0	30th March 2008	Tony Richardson	First version of Document
Version 1.1	4th April 2008	Tony Richardson	Update based on initial SDF team comments
Version 1.2	16th April 2008	Tony Richardson	All SDF team comments incorporated – following completion of review period
Version 1.3	21st April 2008	Tony Richardson	Changes made associated with additional supply of OMA material
Version 1.4	25th April 2008	Tony Richardson	Changes made associated additional supply of OASIS material
Version 2.0	3rd June 2008	Tony Richardson	Changes made following reviews / updates by Industry Groups involved in development of the document.

Release History

Release Number	Date Modified	Modified by:	Description of changes
Release 1.0		Tony Richardson	First Release of Document

Company Contact Details

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- o Thanks to SDF team members for their review of earlier versions of this document and associated further contributions

About TM Forum

TM Forum is an international consortium of communications service providers and their suppliers. Its mission is to help service providers and network operators automate their business processes in a cost- and time-effective way. Specifically, the work of the TM Forum includes:

- o Establishing operational guidance on the shape of business processes.

- o Agreeing on information that needs to flow from one process activity to another.

- o Identifying a realistic systems environment to support the interconnection of operational support systems.

- o Enabling the development of a market and real products for integrating and automating telecom operations processes.

The members of TM Forum include service providers, network operators and suppliers of equipment and software to the communications industry. With that combination of buyers and suppliers of operational support systems, TM Forum is able to achieve results in a pragmatic way that leads to product offerings (from member companies) as well as paper specifications.