ETSI TS 188 002-3 V2.0.0 (2008-03)

Technical Specification

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Network and Service Management; Subscription Management; Part 3: Functional Architecture

Reference

DTS/TISPAN-08015-3-NGN-R2

Keywords

administration, management, service, subscriber

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00   Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

Individual copies of the present document can be downloaded from:
http://www.etsi.org

The present document may be made available in more than one electronic version or in print. In any case of existing or
perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF).
In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive
within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.
Information on the current status of this and other ETSI documents is available at
http://portal.etsi.org/tb/status/status.asp

If you find errors in the present document, please send your comment to one of the following services:
http://portal.etsi.org/chaircor/ETSI_support.asp

Copyright Notification

Contents

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://webapp.etsi.org/IPR/home.asp).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

The present document is part 3 of a multi-part deliverable covering the Network and Service Management; Subscription Management, as identified below:

Part 1:   "Requirements";

Part 2:   "Information Model";

Part 3:   "Functional Architecture".

Introduction

The focus of the present document is the definition of the Subscription Management (SuM) Functional Architecture that has the objective to offer service providers and operators means for a simple, flexible and efficient subscription data repartition in the TISPAN NGN network entities.

1   Scope

The purpose of the SuM Functional Architecture is the design of the NGN OSS Service Interfaces (NOSIs) needed for the management of a specific Subscriber, User, Service Profile and User Services within TISPAN NGN. The SuM Functional Architecture shall deliver the necessary NOSIs for the Resource Provisioning and Service Activation processes.

The NOSIs related to Service Configuration & Activation shall be network technology agnostic without any knowledge of the NGN functional entities that are involved. The NOSIs related to Resource Provisioning are responsible of NGN functional entities (including CPE and AS) management and shall hide the complexity of the different NGN functional entities to the NOSIs related to Service Configuration & Activation.

The specification of the NOSIs comprises the list of operations they are offering and the associated subscription and user data that are specified in the SuM Information model. The set of NGN FEs expose one or more NOSIs for the management of Subscription Management data.

The present document is part of specifications related to subscription management that comprises:

- TS 188 002-1 [2]: SuM Requirements.

- TS 188 002-2 [3]: SuM Information Model.

- TS 188 002-3 (the present document): SuM Functional Architecture.

The present document is developed according to the specifications of TISPAN R1, including the NGN OSS Architecture specifications described in TS 188 001 [1]. The SuM Functional Architecture meets the requirements of TS 188 002-1 [2].

2   References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:

    - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;

    - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

[1]   ETSI TS 188 001: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); NGN management; OSS Architecture Release 1".

[2]   ETSI TS 188 002-1: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Subscription Management; Part 1: Requirements".

[3]   ETSI TS 188 002-2: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Subscription Management; Part 2: Information Model".

[4]   ETSI TS 122 240: "Universal Mobile Telecommunications System (UMTS); Service requirements for 3GPP Generic User Profile (GUP); Stage 1 (3GPP TS 22.240 Release 6)".

[5]   ETSI TS 123 240: "Universal Mobile Telecommunications System (UMTS); 3GPP Generic User Profile (GUP) requirements; Architecture (Stage 2) (3GPP TS 23.240 Release 6)".

[6]   ETSI TR 123 941: "Universal Mobile Telecommunications System (UMTS); 3GPP Generic User Profile (GUP); Stage 2; Data Description Method (DDM) (3GPP TR 23.941 Release 6)".

[7]   ETSI TS 129 240: "Universal Mobile Telecommunications System (UMTS); 3GPP Generic User Profile (GUP); Stage 3; Network (3GPP TS 29.240 Release 6)".

[8]   ETSI TS 132 171: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): Requirements (3GPP TS 32.171)".

[9]   3GPP TS 32.172: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management; Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS) (Release 8)".

[10]   ETSI TS 132 175: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): eXtensible Markup Language (XML) definition (3GPP TS 32.175)".

2.2 Informative references

[11]   ETSI TS 132 101: "Universal Mobile Telecommunications System (UMTS); Telecommunication management; Principles and high level requirements (3GPP TS 32.101)".

[12]   ETSI TS 132 150: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Integration Reference Point (IRP) Concept and definitions (3GPP TS 32.150)".

[13]   ETSI TS 132 311: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Generic Integration Reference Point (IRP) management; Requirements (3GPP TS 32.311)".

[14]   ETSI TS 132 312: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Generic Integration Reference Point (IRP) management; Information Service (IS) (3GPP TS 32.312)".

[15]   ETSI TS 132 317: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Generic Integration Reference Point (IRP) management; SOAP Solution Set (SS) (3GPP TS 32.317)".

[16]   ETSI TS 132 301: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Requirements (3GPP TS 32.301)".

[17]   ETSI TS 132 302: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Information Service (IS) (3GPP TS 32.302)".

[18]   ETSI TS 132 307: "Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Simple Object Access Protocol (SOAP) Solution Set (SS) (3GPP TS 32.307)".

[19]   ETSI TS 132 661: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Kernel CM; Requirements (3GPP TS 32.661)".

[20]   ETSI TS 132 662: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Kernel CM; Information service (IS) (3GPP TS 32.662)".

[21]   ETSI TS 132 665: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Kernel CM Integration Reference Point (IRP): eXtensible Markup Language (XML) definitions (3GPP TS 32.665)".

[22]   ETSI TS 132 667: "Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Kernel CM Integration Reference Point (IRP): Simple Object Access Protocol (SOAP) Solution Set (SS) (3GPP TS 32.667)".

[23]   ETSI TS 132 601: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP); Requirements (3GPP TS 32.601)".

[24]   ETSI TS 132 602: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP): Information Service (IS) (3GPP TS 32.602)".

[25]   ETSI TS 132 607: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP): SOAP Solution Set (SS) (3GPP TS 32.607)".

[26]   ETSI TS 132 621: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP); Requirements (3GPP TS 32.621)".

[27]   ETSI TS 132 622: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Network Resource Model (NRM) (3GPP TS 32.622)".

[28]   ETSI TS 132 625: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Bulk CM eXtensible Markup Language (XML) file format definition (3GPP TS 32.625)".

[29]   W3C Recommendation: "XML Path Language (XPath)" Version 1.0, 16 November 1999.

3   Abbreviations

For the purposes of the present document, the following abbreviations apply:

AS	Application Server
CLF	Connectivity session Location and repository Function
GUP	Generic User Profile
IOC	Information Object Class
IRP	Integration Reference Point
IS	Information Service
NASS	Network Attachment SubSystem
NGN FE	NGN Functional Entity
NOSI	NGN OSS Service Interface
OSS	Operation Support Systems
PDBF	Profile Data Base Function
RAF	Repository Access Function
RP	Resource Provisioning
SCA	Service Configuration & Activation
SOAP	Simple Object Access Protocol
SS	Solution Set
SuM	Subscription Management
TOM	Telecommunication Operation Map
UPSF	User Profile Server Function
WSDL	Web Services Description Language
XML	eXtensible Markup Language

4   SuM Functional Architecture

4.1   Overview

Subscription Management is paramount for the NGN service delivery within TISPAN NGN. It aims to define an end-to-end information model and a functional architecture that allows service providers to provision their NGN functional entities with all the mandatory/optional information specific to a subscriber and its users. Subscription Management can be summarized as the framework that offer service providers means for efficient management of all the data related to a specific subscription. The purposes of specifying a SuM Information Model is to capture all the information needed for the management of a specific subscription. The purpose of the SuM Functional Architecture is the design of the NGN OSS Service Interfaces (NOSIs) needed for the management of subscribers and their users, with respect to the requirements defined in [2], and to the NGN OSS Architecture [1].

Subscription Management aligns with subset of the eTOM fulfilment process, in particular the Customer Relationship Management process, the Service Management & Operations process, and the Resource management and operation process. As depicted in figure 1, the current target of the SuM FA is the specification of:

- The NOSIs for the realization of the Service Configuration & Activation (SCA NOSIs).

- The NOSIs for the realization of the Resource Provisioning (RP NOSIs).

- The NOSIs exposed for the management of data stored within NGN FEs (NGN FE NOSIs).
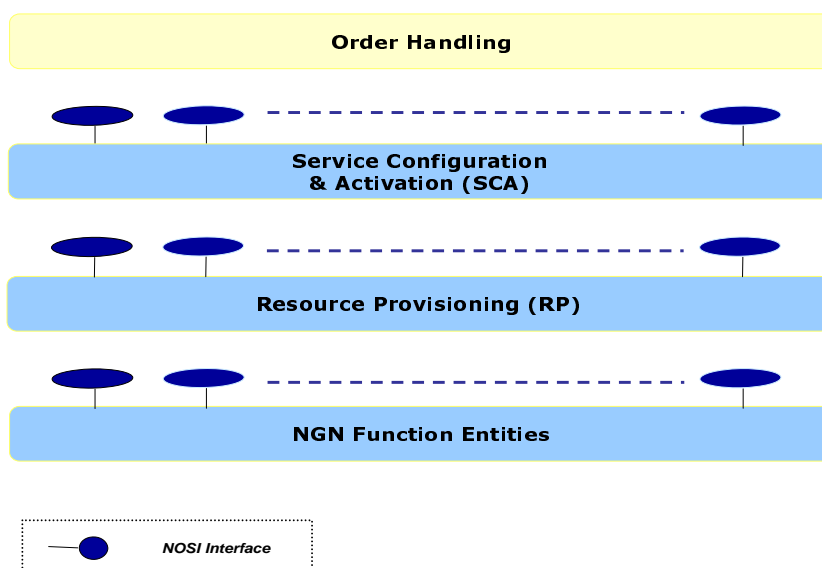
Figure 1: Subscription Management NOSI

Following concepts are introduced:

- **SCA Service (SCA):** Service which exposes at least one SCA NOSI.

- **RP Service (RP):** Service which exposes at least one RP NOSI.

- **NGN FE Service (NGN FE MA):** Service which exposes at least one NGN FE NOSI.

The following figure depicts the Subscription Management Functional Architecture based on the precedent concepts and TISPAN NGN OSS Architecture.
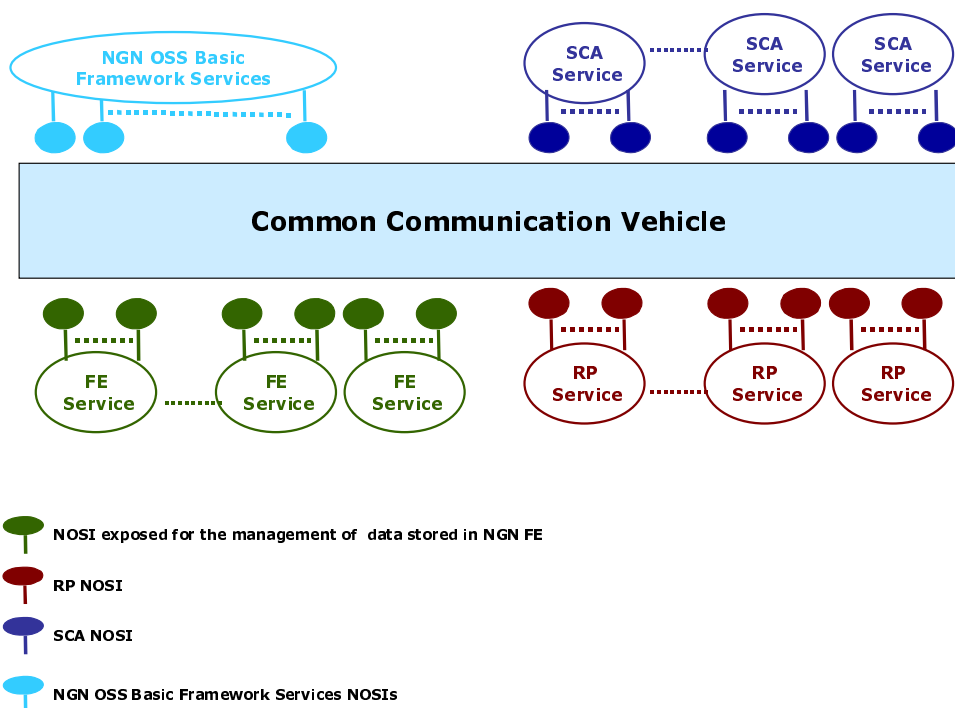
Figure 2: Subscription Management NOSIs

The NGN OSS basic framework services NOSIs are the NOSIs in charge of aspects such as distribution, transparency, registration, etc., as described in NGN OSS Architecture. The NGN OSS basic framework services NOSIs are out of the scope of the Subscription Management standards.

4.2   Service Configuration and Activation

For the specification of the SCA NOSIs, it is necessary to list all the required capabilities that need to be supported or offered by the NOSIs with respect to SuM requirements, eTOM and to the use cases defined in [2]. There is no assumption on the relations between the required capabilities and the NOSIs that support them.

The SCA NOSIs shall expose the following capabilities:

- **Manage Subscription by the service provider:** consist in all the CRUD operations needed for the management of a specific subscription.

- **Manage Subscription by the subscriber:** consist in all the CRUD operation allowed by the service provider for its subscribers (example: subscribe to new services, etc.).

- **Manage Users:** consist in all the CRUD capabilities needed for the management of a user of a specific subscriber. (example: create new user, assign services to a user, etc.).

- **Manage User Services:** consist in all the capabilities needed for the customization of services by users (example: configure a phone number for the call forwarding service, etc.).

In addition to the above capabilities, the SCA NOSI shall expose the subscribe/notify capabilities that allows notifications when subscription information change (example: when a phone number for the call forwarding service is configured by a user, the service provider may be informed for legal interception purposes).

The precedent capabilities of the SCA NOSIs represent the fact that theses NOSIs are responsible of the management of Subscriber, Subscription and Users.

4.3   Resource Provisioning

This clause consists in a description of all the capabilities required for SuM within the Resource Provisioning process group with respect to the Subscription Management Requirements and to eTOM.

For the specification of the RP NOSIs, it is necessary to list all the required capabilities that need to be supported or offered by the NOSIs with respect to eTOM and to the use cases defined in [2].

The RP NOSIs shall expose the following capabilities:

- **Manage NGN Subscription Management Data:** consist in all the CRUD capabilities related to the management of Subscription Management information (services, network access, credentials, etc.) for subscription, users, and user services.

The precedent capabilities represent the fact that the RP NOSIs allow the management of the information part of the Subscriber, Subscription and Users which are the Services, Credentials, Network Access, etc.

4.4   NGN Functional entities

This clause consists in a description of all the capabilities required for SuM within the NGN Functional entities with respect to the Subscription Management Requirements and to eTOM.

The TISPAN NGN Functional entities concerned by the present SuM NGN FEs NOSI specification are:

- The UPSF.

- The PDBF, NACF and the CLF in the NASS subsystem.

- User data repositories of Application servers offering NGN services.

   NOTE: The CPE case is for further study.

The Operations offered by NGN FE NOSIs allows to create, read, update and delete subscription data stored on any instance of the concerned NGN FEs.

These operations are not different from a NGN FE to another, so the specifications of these operations are common to all the NGN FEs. They comprise:

- "Create" operation: it applies to a data that is created on the concerned NGN FE. It indicates the links or references that this data can have with other data.

- "Read" operation: it allows to retrieve a data stored on a given NGN FE, by using the relevant identifier of this data.

- "Update" operation: it allows to update a data, its attributes or its links to other data.

- "Delete" operation: it allows to delete a data and its dependent data ("children").

These operations are completed with the following ones:

- "Notify" operations: it allows the NGN FE to notify modifications occurring on data to the Resource Management.

- "Subscribe/ unsubscribe to notify": it allows the Resource Management to be (/ or not) notified of modifications occurring on data stored on the NGN FE.

5 SuM NOSI

In this clause, a description of the process used for the identification and specification of the SUM NOSI is given. In addition, a description of the relationship between the SuM NOSI and the SuM Information model is also given.

A NGN OSS Service Interface (NGN OSS SI) is defined in the NGN OSS Architecture [1], clauses 3 and 6.3. It is a well defined grouping of related NGN OSS Operations and constant data which are necessary to deliver coherent business or system functionality. The NGN OSS Service Interface is:

- An aggregation of functionality required for managing some coherent aspect of the NGN network or services. This functionality is provided through a set of related behaviour/functionality and is made publicly available for use by consumers of this service interface. An example is an Alarm Reporting service interface that offers the functionality supporting the NGN OSS Operations "getAlarmList" and "acknowledgeAlarms".

- Comprised of a set of NGN OSS Operations which must be all present.

According to the above definition from [1], a NOSI is a set of operations and constant data, which correspond to an aggregation of functionality required for managing aspects of NGN network or services.

With respect to this definition, we will first describe the methodology used for the identification of the NOSIs needed for Subscription Management, and the NOSI themselves with their operations. We will then detail the relationship between the NOSIs and the Subscription Management Information Model which represent the data part of the NOSI.

5.1 SuM NOSI Identification

In this clause, a description of the process used for the identification and specification of the SUM NOSI is given.

In clause 4, we have identified three sets of NOSI for Subscription Management: SCA, RP and NGN FE NOSIs and the capabilities they should expose.

The SCA NOSI should expose capabilities for the management of subscriber, subscription and users. The RP NOSI should expose capabilities for the management of the information part of the Subscriber, subscription and users which are the Services, Credentials, Network Access, etc.

The NGN FE NOSIs shall expose the capabilities for the basic CRUD operations on the subscription management information contained in the NGN FE(s).

The following NOSI have been identified.

SCA NOSI	Operations
Manage Subscription by Service Provider (SCA-MSSP)	- Create/ Read/Update/ Delete Subscription - Subscribe/Notify operations may be defined
Manage Subscription by Subscriber (SCA-MSS)	- Read/Update Subscription - Subscribe/Notify operations may be defined
Manage User(SCA-MU)	- Create/Read/Update/Delete User - Subscribe/Notify operations may be defined
Manage User Services(SCA-MUS)	- Create/Read/Update/Delete User Services - Subscribe/Notify operations may be defined

RP NOSI	
Subscription Services (RP-SS)	- Configure/Update/Read/Remove subscription and user information - Subscribe/Notify operations may be defined
User Preferences (RP-UP)	- Configure/Update/Read/Remove Preferences for user - Subscribe/Notify operations may be defined
Subscription Network Access (RP- SNA)	- Configure/Update/Read/Remove Network Access for user/subscription - Subscribe/Notify operations may be defined

NGN FE	Operations
Manage Data (NGN FE-MD)	- Create/ Read/Update/ Delete Data - Subscribe/Notify operations may be defined

5.2 SuM NOSI and SUM Information Model

In this clause, a description of the relationship between the SuM NOSI and the SuM Information model is also given. A NOSI is a well defined grouping of related NGN OSS Operations and constant data. In clause 5.1 we have identified a set of NOSIs with their related operations. The constant data that are part of a NOSI is part of the Subscription Management Information Model.

A NOSI as defined in NGN OSS Architecture is equivalent to the SOA service interface concept. In the OASIS SOA reference model which is used as the reference in TISPAN, service interface is defined as the means for interacting with a service (an SOA service is accessed by means of a service interface, where the interface comprises the specifics of how to access the underlying capabilities). A service is opaque in that its implementation is typically hidden from the **service consumer** except for the information and behaviour models exposed through the service interface and the information required by service consumers to determine whether a given service is appropriate for their needs.

An SOA service interface includes the specific protocols, commands, and information exchange by which actions are initiated that result in the real world effects as specified through the service functionality portion of the service description. The specifics of the interface SHOULD be syntactically represented in a standard referenceable format.

These prescribe what information needs to be provided to the service in order to access its capabilities and interpret responses. This is often referred to as the service's information model.

The information model of a service is a characterization of the information that may be exchanged with the service. Only information and data that are potentially exchanged with a service are generally included within that service's information model. The scope of the information model includes the format of information that is exchanged, the structural relationship within the exchanged information and also the definition of terms used.

According to the OASIS service interface and its information model definitions, we define the relation between the SuM NOSI and the SuM information Model as follows: "The Information model of a SuM NOSI should be a part of the whole SuM Information Model".

For example, if the SuM Information Model define 3 objects (object A, object B, object C), their attributes and relations between the 3 objects, a specific SuM NOSI may use only 2 objects (Object A and Object C) with all their attributes an relations between the 2 objects as defined in the SuM Information Model.

In summary, for each SuM NOSI, its associated part of the SuM Information Model should be indicated. For example, the NOSIs exposed by the SCA may access only to information that represents subscription, user, service profiles and services which are independent from the network resources.

The association between the NOSIs and the information model or information part of the information model which is accessed by a specific NOSI is defined in clauses 6, 7 and 8.

5.3 SuM NOSI description

The following table is used to describe the SuM NOSIs in clauses 6, 7 and 8.

Operation	contains the name of a NOSI operation
Description	describes the purpose of a NOSI operation
Pre-conditions	defines the conditions to be fulfilled before requesting a NOSI operation
Post-conditions	defines the new conditions after the execution of a NOSI operation
SuM Info Model related Inputs	as according to clause 5.2, data inputs defined for a NOSI operation are part of the SuM info model, and are identified through the relevant Information Object Classes (IOC) of the SuM info model to which they refer or belong
SuM Info Model related Outputs	as according to clause 5.2, data outputs defined for a NOSI operation are part of the SuM info model, and are identified through the relevant Information Object Classes (IOC) of the SuM info model to which they refer or belong

NOTE 1: The outputs parameters are those delivered when the request is successful. Exception cases are not covered in this release.

NOTE 2: Subscribe to notify / notify operations are not described in this release.

6 SuM Service Activation and Configuration NOSIs

This clause contains the description of the SuM Service Configuration & Configuration NOSIs identified in clause 5.1.

NOTE: Since both the TISPAN SCA-NOSI and MTOSI Interfaces from TMF mTOP in the Service Activation domain specify interfaces between the eTOM's Order Handling process in the CRM layer and the SCA process in the Service Management layer, a possible further harmonization and alignment between these standards in the offered functionalities as well as the interfaces and the associated information model will be investigated.

A mutual further study as to the potential benefits of using MTOSI Service Activation Interface as SCA NOSIs has been offered and possible advantages from alignment with MTOSI Service Activation Interfaces will be explored with mTOP's MTOSI SAI team.

6.1 Manage Subscription by Service Provider (SCA-MSSP)

The SCA-MSSP NOSI is dealing with the following part of the SuM Info model:

- SuMSubscriberProfile IOC.
- SuMService IOCs.
- SuMSubscribedServiceGroup IOC.
- SuMSubscribedService IOCs.

NOTE 1: The subclasses of the SuMSubscribedService and SuMService IOCs are involved in the SCA process. These classes contain also attributes belonging to the Resource Provisioning process, and the implications of this are for further study.

NOTE 2: An instance of the SumSubscribedServicesGroup IOC may identify a subscription with multiple subscribed services.

Operation	SCA-MSSP Create Subscription
Description	Create a subscription with associated subscribed services
Pre-conditions	Subscriber exists
Post-conditions	The subscription with its set of subscribed services has been created
SuM Info Model related Inputs	SuMSubscriberProfile IOC, SuMService IOCs
SuM Info Model related Outputs	SuMSubscribedServiceGroup IOC, SuMSubscribedService IOCs

Operation	SCA-MSSP Delete Subscription
Description	Delete a subscription with associated subscribed services NOTE: This operation should also suppress / modify all User Service profiles concerned by subscribed services that are suppressed.
Pre-conditions	Subscriber and subscribed services exists
Post-conditions	The subscription with its set of subscribed services has been deleted
SuM Info Model related Inputs	SuMSubscribedServiceGroup IOC
SuM Info Model related Outputs	None identified

Operation	SCA-MSSP Update Subscription
Description	Update a subscription and/or associated subscribed services. It can comprise addition, deletion and modification of a service
Pre-conditions	Subscriber and subscription exists
Post-conditions	The subscription with its set of subscribed services has been modified
SuM Info Model related Inputs	SuMSubscribedServiceGroup IOC, SuMSubscribed Service IOCs
SuM Info Model related Outputs	None identified

Operation	SCA-MSSP Read Subscription
Description	Read a subscription and associated subscribed services
Pre-conditions	Subscriber and subscription exists
Post-conditions	No modification
SuM Info Model related Inputs	SuMSubscribedServiceGroup IOC, SuMSubscribed Service IOCs NOTE: According to the input, the read operation may concern the whole set of subscribed services or only a part.
SuM Info Model related Outputs	SuMSubscribedServiceGroup IOC, SuMSubscribed Service IOCs

6.2 Manage Subscription by Subscriber (SCA-MSS)

The SCA-MSS NOSI is dealing with the following part of the SuM Info model:

- SuMSubscriberProfile IOC.

- SuMService IOC.

- SuMSubscribedServiceGroup IOC.

- SuMSubscribedService IOCs.

NOTE 1: The subclasses of the SuMSubscribedService and SuMService IOCs are involved in the SCA process. These classes contain also attributes belonging to the Resource Provisioning process, and the implications of this are for further study.

NOTE 2: The SCA-MSS operations are similar to the SCA-MSSP ones but the behaviour would be different according to what the subscriber is allowed to do.

Operation	SCA-MSS Create Subscription
Description	Create a subscription with associated subscribed services
Pre-conditions	Subscriber exists
Post-conditions	The subscription with its set of Subscribed services has been created
SuM Info Model related Inputs	SuMSubscriberProfile IOC, SuMService IOCs
SuM Info Model related Outputs	SuMSubscribedServiceGroup IOC, SuMSubscribedService IOCs

Operation	SCA-MSS Delete Subscription
Description	Delete a subscription with associated subscribed services
Pre-conditions	Subscriber and subscribed services exists
Post-conditions	The subscription with its set of Subscribed services has been deleted
SuM Info Model related Inputs	SuMSubscriberProfile IOC, SuMSubscribedServiceGroup IOC
SuM Info Model related Outputs	None identified

Operation	SCA-MSS Update Subscription
Description	Update a subscription and/or associated subscribed services. It can comprise addition, deletion and modification of a service
Pre-conditions	Subscriber and subscription exists
Post-conditions	The subscription with its set of Subscribed services has been modified
SuM Info Model related Inputs	SuMSubscriberProfile IOC, SuMService IOCs, SuMSubscribedServiceGroup IOC, SuMSubscribedService IOCs
SuM Info Model related Outputs	None identified

Operation	SCA-MSS Read Subscription
Description	Read a subscription and associated subscribed services
Pre-conditions	Subscriber and subscription exists
Post-conditions	No modification
SuM Info Model related Inputs	SuMSubscriberProfile IOC, SuMSubscribedServiceGroup IOC, SuMSubscribedService IOC
SuM Info Model related Outputs	SuMSubscribedServiceGroup IOC, SuMSubscribed Service IOCs

6.3 Manage User(SCA-MU)

The SCA-MU NOSI is dealing with the following part of the SuM Info model:

- SuMSubscriberProfile IOC.

- SuMUser IOC.

Operation	SCA-MU Create User
Description	Create User with user general characteristics NOTE: This operation does not assign any service to the user. In practice, a user is at least associated to one service that will be achieved through the SCA MUS NOSI.
Pre-conditions	Subscriber exists
Post-conditions	The user has been created
SuM Info Model related Inputs	SuMSubscriber IOC, SuMUser IOC
SuM Info Model related Outputs	SuMUser IOC

Operation	SCA-MU Delete User
Description	Delete a user NOTE: This operation should also suppress all SuM Service profiles attached to the user.
Pre-conditions	Subscriber exists
Post-conditions	The user and its associated User Service profiles have been deleted
SuM Info Model related Inputs	SuMUser IOC
SuM Info Model related Outputs	None identified

Operation	SCA-MU Update User
Description	Update the profile of a user
Pre-conditions	Subscriber and User exist
Post-conditions	User updated
SuM Info Model related Inputs	SuMUser IOC
SuM Info Model related Outputs	None identified

Operation	SCA-MU Read User
Description	Read the profile of a user
Pre-conditions	Subscriber and User exist
Post-conditions	No modification
SuM Info Model related Inputs	SuMUser IOC
SuM Info Model related Outputs	SuMUser IOC

6.4   Manage User Services(SCA-MUS)

The SCA-MU NOSI is dealing with the following part of the SuM Info model:

- SuMUser IOC.

- SuMSubscribedService IOCs.

- SuMServiceProfile IOCs (IMSServiceProfile IOC, ApplicationServiceProfile IOC, NgnNetworkAccessProfile IOC).

NOTE 1: The subclasses of the SuMSubscribedService and SuMServiceProfile IOCs are involved in the SCA process. These classes contain also attributes belonging to the Resource Provisioning process, and the implications of this are for further study.

Operation	SCA-MUS Create User Services
Description	Assign subscribed services to the user
Pre-conditions	Subscriber, subscription with subscribed services, user exist
Post-conditions	The user with its service profiles for subscribed services has been provisioned The execution of this operation will create related instances of SuMServiceProfile IOC subclasses according to the SuMSubscribedService instances
SuM Info Model related Inputs	SuMUser IOC, SuMSubscribedService IOCs, NgnSuMCredentials IOC
SuM Info Model related Outputs	None identified

NOTE 2: The handling of credentials through this NOSI is for further study.

Operation	SCA-MUS Delete User Services
Description	Delete services assigned to a user
Pre-conditions	Subscriber, user and User Service profiles exist
Post-conditions	The concerned user services have been deleted The execution of this operation will delete related instances of SuMServiceProfile IOCs
SuM Info Model related Inputs	SuMUserIOC, SuMServiceProfile IOCs
SuM Info Model related Outputs	None identified

Operation	SCA-MUS Update User Services
Description	Update user services
Pre-conditions	Subscriber, user and User Service profiles exist
Post-conditions	The services assigned to the user have been modified The execution of this operation will update related instances of SuMServiceProfile IOCs in the respect of subscribed services
SuM Info Model related Inputs	SuMUser IOC, SuMSubscribedService IOCs, SuMServiceProfile IOCs
SuM Info Model related Outputs	None identified

Operation	SCA-MUS Read UserServices
Description	Read user services
Pre-conditions	Subscriber, user and User Service profiles exist
Post-conditions	No modification
SuM Info Model related Inputs	SuMUser IOC, SuMServiceProfile IOCs
SuM Info Model related Outputs	SuMServiceProfile IOCs

7   SuM Resource Provisioning NOSI

This clause contains the description of the SuM Resource Provisioning NOSIs identified in clause 5.1.

7.1   Subscription Services (RP-SS)

The RP-SS NOSI is dealing with the following part of the SuM Info model:

- SuMUser IOC.

- SuMServiceProfile IOCs (IMSServiceProfile, ApplicationServiceProfile), User ServiceInstance IOCs, NgnSuMCredentials IOC, IMSPublicIdentification IOCs.

NOTE: The IOCs here listed are all associated to the user and to the services of a subscription that are assigned to the user. It is not here considered there may be other data associated to the subscription, but not to the user.

Operation	RP-SS Configure Subscription Services
Description	Configure subscription and user information related to IMS, and Applications, (it does not concern NGN network Access)
Pre-conditions	Subscriber, subscription with subscribed services, user exist
Post-conditions	The user with its service profiles has been configured
SuM Info Model related Inputs	SuMUserIOC, SumServiceProfile IOCs (IMSServiceprofile IOC, ApplicationServiceProfile IOC), UserServiceInstance IOC, NgnSuMCredentials IOC, IMSPublicIdentification IOCs
SuM Info Model related Outputs	None identified

Operation	RP-SS Remove Subscription Services
Description	Remove subscription and user information related to IMS service and Application services
Pre-conditions	Subscriber, user and User Service profiles exist
Post-conditions	The user services profiles have been deleted
SuM Info Model related Inputs	SuMUser IOC, SumServiceProfile IOCs (IMSServiceProfile IOC, ApplicationServiceProfile IOC), UserServiceInstance IOCs, NgnSuMCredentials IOC, IMSPublicIdentification IOC
SuM Info Model related Outputs	None identified

Operation	RP-SS Update Subscription Services
Description	Update subscription and user information related to IMS services and Application services
Pre-conditions	Subscriber, user and user service profiles exist
Post-conditions	The user services profiles have been updated
SuM Info Model related Inputs	SuMUser IOC, SumServiceProfile IOCs (IMSServiceprofile IOC, ApplicationServiceProfile IOC), NgnSuMCredentials IOCs, IMSPublicIdentification IOCs
SuM Info Model related Outputs	None identified

Operation	RP-SS Read Subscription Services
Description	Read subscription and user information related to IMS services and Application services
Pre-conditions	Subscriber, user and user service profiles exist
Post-conditions	No modification
SuM Info Model related Inputs	SuMUserIOC, SumServiceProfile IOCs (IMSServiceProfile IOC, ApplicationServiceProfile IOC), UserServiceInstance IOCs, NgnSuMCredentials IOCs, IMSPublicIdentification IOC
SuM Info Model related Outputs	SumServiceProfile IOC (IMS ServiceProfile IOC, ApplicationServiceProfile IOC), User ServiceInstance IOC, NgnSuMCredentials IOC, IMSPublicIdentification IOC

7.2   User Preferences (RP-UP)

The RP-UP NOSI is dealing with the following part of the SuM Info model:

- UserServiceInstance IOCs, IMSServiceProfile IOC, ApplicationServiceProfiles IOC.

Operation	RP-UP Configure preferences for user
Description	Configure user preferences in IMS services and Application services
Pre-conditions	Subscriber, subscription with subscribed services, user, user service profiles exist
Post-conditions	The preferences for the user have been configured
SuM Info Model related Inputs	SuMUser IOC, UserServiceInstance IOCs and possibly SumServiceProfile IOC (IMSServiceProfile IOC, ApplicationServiceProfile IOC)
SuM Info Model related Outputs	None identified

Operation	RP-UP Remove preferences for user
Description	Remove user preferences in IMS services and Application services
Pre-conditions	Subscriber, subscription with subscribed services, user, user service profiles exist
Post-conditions	The preferences for the user have been removed
SuM Info Model related Inputs	SuMuser IOC, UserServiceInstance IOCs and possibly SumServiceProfileIOC (IMSServiceProfileIOC, ApplicationServiceProfile IOC)
SuM Info Model related Outputs	None identified

Operation	RP-UP Update preferences for user
Description	Update user preferences in IMS services and Application services
Pre-conditions	Subscriber, subscription with subscribed services, user, user service profiles exist
Post-conditions	The user preferences have been updated
SuM Info Model related Inputs	SuMuserIOC, UserServiceInstance IOCs and possibly SumServiceProfile IOC (IMSServiceProfile IOC, ApplicationServiceProfile IOC)
SuM Info Model related Outputs	None identified

Operation	RP-UP Read preferences for user
Description	Read user preferences in IMS services and Application services
Pre-conditions	Subscriber, subscription with subscribed services, user, user service profiles exist
Post-conditions	No modification
SuM Info Model related Inputs	SuMUser IOC, UserServiceInstance IOC and possibly SumServiceProfile IOC (IMSServiceProfile IOC, ApplicationServiceProfile IOC)
SuM Info Model related Outputs	UserServiceInstance IOCs and possibly SumServiceProfile IOC (IMSServiceProfile IOC, ApplicationServiceProfile IOC)

7.3   Subscription Network Access (RP- SNA)

The RP-SNA NOSI is dealing with the following part of the SuM Info model:

- NgnSubscribedNetworkAccess IOC, NgnPhysical Access IOC, NgnLocation IOC, NgnLogicalAccess.

- NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfile IOC.

Operation	RP-SNA Configure Network Access for user/subscription
Description	Configure subscription and user information of a TISPAN Network Access (NASS)
Pre-conditions	Subscriber, subscription with a Network Access subscribed service exists
Post-conditions	The subscription and user information of a TISPAN Network Access (NASS) has been configured
SuM Info Model related Inputs	NgnSubscribedNetworkAccess IOC, NgnPhysical Access IOC, NgnLogicalAccess SuMUser IOC (NASSUser), NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfile IOC
SuM Info Model related Outputs	None identified

Operation	RP- SNA Remove Network Access for user/subscription
Description	Remove subscription and user information of a TISPAN Network Access (NASS)
Pre-conditions	The concerned TISPAN Network Access (NASS) and its configuration exists
Post-conditions	The subscription and user information of a TISPAN Network Access (NASS) has been removed
SuM Info Model related Inputs	NgnSubscribedNetworkAccess IOC, NgnPhysical Access IOC, NgnLogicalAccess SuMUser IOC (NASSUser), NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfile IOC
SuM Info Model related Outputs	None identified

Operation	RP- SNA Update Network Access for user/subscription
Description	Update subscription and user information of a TISPAN Network Access (NASS)
Pre-conditions	The concerned TISPAN Network Access (NASS) and its configuration exists
Post-conditions	The subscription and user information of a TISPAN Network Access (NASS) has been updated
SuM Info Model related Inputs	NgnSubscribedNetworkAccess IOC, NgnPhysical Access IOC, NgnLogicalAccess SuMUser IOC (NASSUser), NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfile IOC
SuM Info Model related Outputs	None identified

Operation	RP- SNA Read Network Access for user/subscription
Description	Read subscription information and user of a TISPAN Network Access (NASS)
Pre-conditions	The concerned TISPAN Network Access (NASS) and its configuration exists
Post-conditions	No modification
SuM Info Model related Inputs	NgnSubscribedNetworkAccess IOC, NgnPhysical Access IOC, NgnLogicalAccess IOC SuMUser IOC (NASSUser), NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfile IOC
SuM Info Model related Outputs	NgnSubscribedNetworkAccess IOC, NgnPhysical Access IOC, NgnLogicalAccess NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfile IOC

8   SuM NGN Functional entities NOSIs

This clause contains the description of the SuM NGN Functional entities NOSIs identified in clause 5.1.

The NGN FE-MD NOSIs are dealing with the following part of the SuM Info model:

- For UPSF: IMSUserProfile IOCs, NgnSuMCredentials IOCs, IMSPublicIdentification IOCs, IFC IOCs, IRSET IOCs and relevant Ids.

- ApplicationServiceProfile IOCs, UserServiceInstance IOC (when stored on the UPSF).

- For AS: ApplicationServiceProfile IOCs, UserServiceInstance IOC (when stored on AS).

- For PDBF: NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfileIOC.

- For CLF: NgnPhysicalAccess IOC, NgnLocationIOC, NGNLogicalAccess IOC.

NOTE: The NGN FE NOSIs support the same type of operations with the different NGN FEs (UPSF, PDBF, CLF, AS), but the transferred data are different from a NGN FE to another.

Operation	NGN FE-MD Create Data
Description	Create Data in a NGN FE (UPSF, AS, PDBF, CLF)
Pre-conditions	The concerned data do not exist in the concerned NGN FE
Post-conditions	The concerned data have been created in the concerned NGN FE
SuM Info Model related Inputs	For UPSF: IMSServiceProfile IOCs, NgnSuMCredentials IOCs, IMSPublicIdentification IOCs, IFC IOCs, IRSET IOCs ApplicationServiceProfiles IOC, UserServiceInstance IOC (when stored on the UPSF) For AS: ApplicationServiceProfile IOCs, UserServiceInstance IOC (when stored on AS) For PDBF: NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfileIOC For CLF: NgnPhysicalAccess IOC, NGNLogicalAccess IOC
SuM Info Model related Outputs	None identified

Operation	NGN FE-MD Delete Data
Description	Delete Data in a NGN FE (UPSF, AS, PDBF, CLF)
Pre-conditions	The concerned data exists in the concerned NGN FE
Post-conditions	The concerned data have been deleted in the concerned NGN FE
SuM Info Model related Inputs	For UPSF: IMSServiceProfile IOCs, NgnSuMCredentials IOCs, IMSPublicIdentification IOCs, IFC IOCs, IRSET IOCs, ApplicationServiceProfile IOCs, UserServiceInstance IOC (when stored on the UPSF) For AS: ApplicationServiceProfile IOCs, UserServiceInstance IOC (when stored on AS) For PDBF: NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfileIOC For CLF: NgnPhysicalAccess IOC, NgnLocationIOC, NGNLogicalAccess IOC
SuM Info Model related Outputs	None identified

Operation	NGN FE-MD Update Data
Description	Update Data in a NGN FE (UPSF, AS, PDBF, CLF)
Pre-conditions	The concerned data exists in the concerned NGN FE
Post-conditions	The concerned data have been updated in the concerned NGN FE
SuM Info Model related Inputs	For UPSF: IMSServiceProfile IOCs, NgnSuMCredentials IOCs, IMSPublicIdentification IOCs, IFC IOCs, IRSET IOCs, and relevant Ids ApplicationServiceProfile IOCs, UserServiceInstance IOC (when stored on the UPSF) For AS: ApplicationServiceProfile IOCs, UserService-Instance IOC (when stored on AS) For PDBF: NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfileIOC For CLF: NgnPhysicalAccess IOC, NgnLocationIOC, NGNLogicalAccess IOC
SuM Info Model related Outputs	None identified

Operation	NGN FE-MD Read Data
Description	Read Data in a NGN FE (UPSF, AS, PDBF, CLF)
Pre-conditions	The concerned data exists in the concerned NGN FE
Post-conditions	No modification
SuM Info Model related Inputs	For UPSF: IMSServiceProfile IOCs, NgnSuMCredentials IOCs, IMSPublicIdentification IOCs, IFC IOCs, IRSET IOCs ApplicationServiceProfile IOCs, UserServiceInstance IOC (when stored on the UPSF) For AS: ApplicationServiceProfile IOCs, UserServiceInstance IOC (when stored on AS) For PDBF: NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfileIOC For CLF: NgnPhysicalAccess IOC, NGNLogicalAccess IOC
SuM Info Model related Outputs	For UPSF: IMSServiceProfile IOCs, NgnSuMCredentials IOCs, IMSPublicIdentification IOCs, IFC IOCs, IRSET IOCs ApplicationServiceProfile IOCs, UserServiceInstance IOC (when stored on the UPSF) For AS: ApplicationServiceProfile IOCs, UserServiceInstance IOC (when stored on AS) For PDBF: NgnNetworkAccessProfile IOC, NgnNetworkAccessSubProfileIOC For CLF: NgnPhysicalAccess IOC, NGNLogicalAccess IOC

Annex A (informative):
Relation with 3GPP Generic User Profile (GUP)

A.1   3GPP GUP Overview

The objective of 3GPP Generic User Profile (GUP) [4], [5], [6], [7] is to provide means to enable harmonized usage of the user-related information originating from different entities, and allow extensibility to cater for future developments.

The 3GPP Generic User Profile:

- Is a Collection of User-related data.

- Can be stored in the home network environment and/or Value Added Service Provider equipment.

- Can be accessed by different stakeholders and managed either by one (centralized) or by different stakeholders (de-centralized) such as the user, subscriber, value added service provider and network operator by a standardized access mechanism.

- Allows intra-network usage (i.e. data exchange between applications within a mobile operator's network) and inter-network usage (between mobile operator's network and value added service providers).

- May be also be used by different applications in a standardized way.

The 3GPP Generic User Profile consists in the following technical aspects:

- Architecture + Information Model.

- Data Description.

- Interface with mechanisms to handle the data.

A.1.1   Architecture

The GUP Architecture as depicted in the figure consists of:

- **GUP Server:** functional entity providing a single point of access to the Generic User Profile data of a particular subscriber. The GUP Server may be located in the home operator network of the targeted subscriber. The GUP Server includes the following functionalities:

    - Single point of access for reading and managing generic user profile data of a particular subscriber.

    - Location of Profile Components.

    - Authentication of profile requests.

    - Authorization of profile requests.

    - Synchronization of Profile Components.

- **Repository Access Function (RAF):** realizes the harmonized access interface. It hides the implementation details of the data repositories from the GUP infrastructure.

- **GUP Data Repositories:** Each GUP Data Repository stores the primary master copy of one or several profile components. The RAF provides for the standardized access to the GUP Data Repository.

- **Rg and Rp reference points:** The Rg reference points may allow applications to create, read, modify and delete any user profile data using the harmonized access interface. The Rp reference point may allow the GUP Server or applications, excluding external applications (e.g. located in a third party application or in the UE), to create, read, modify and delete user profile data using the harmonized access interface. Rp is an intra-operator reference point.

- **Applications:** The applications that may apply GUP reference points Rg and Rp may be targeted for different purposes e.g. for value added services or subscription management. Both operator's own applications and third party applications are covered.
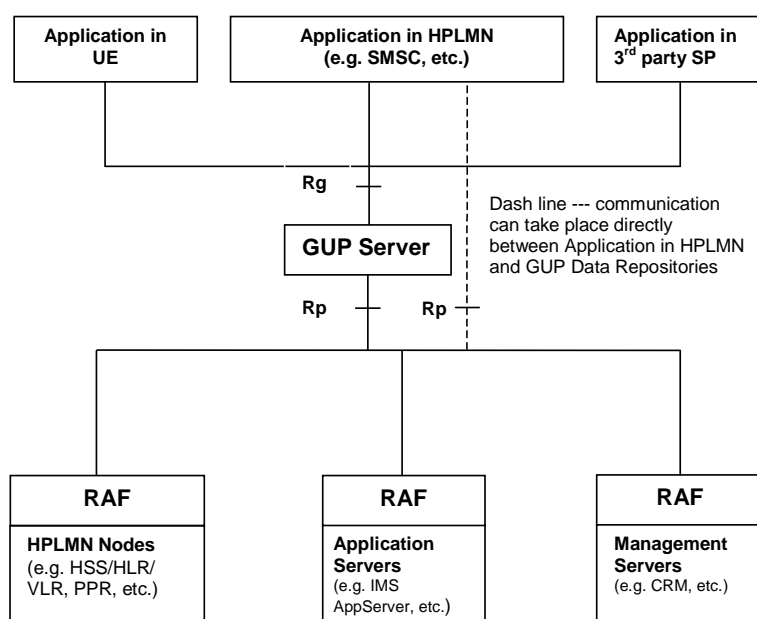

**Figure A.1: An example of mapping the GUP reference architecture
to current infrastructure environment**

A.1.2   Information Model

A Generic User Profile consists of a number of independent GUP Components. However, a GUP Component may contain (i.e. reference) other GUP components e.g. to enable reuse of data. The GUP Component has a unique identity within the Generic User Profile. In addition to the component type the component identity contains either a subscriber identity or more generic identification depending on which kind of component is in question. A GUP Component can be retrieved through one RAF, and it may consist of a number of GUP Components, Data Element Groups and/or Data Elements. The UML Class Diagram below illustrates the basic concepts of the GUP Information Model.
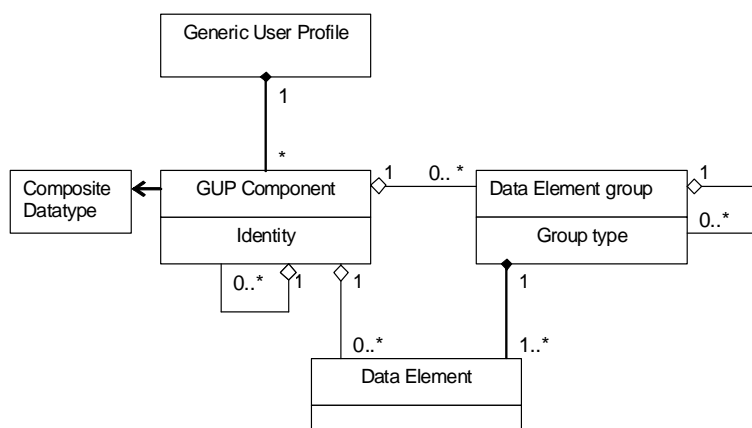
Figure A.2: Example of the structure of GUP information

A.1.3   Interfaces

Communication between GUP entities is performed via the exchange of messages expressed as XML documents. XML documents should include the XML declaration with the version and encoding attributes. The XML documents may be well-formed and valid. The W3C XML Schema is used in GUP to define the structure of valid XML documents. The implementation of the Rp and Rg interfaces follows the Liberty Alliance Data Service Template specification [Liberty Alliance].

The GUP interfaces and procedures are SOAP protocol based. Each interface is defined in terms of the messages sent and received. The payload of each message is XML, defined using an XML schema language. The framework, procedures, SOAP binding and security solutions of GUP are based on the Liberty Alliance Project work.

The definition of the interfaces can be divided into the following sections:

- Definition of the operations (WSDL/XML).

- Common functions like security, authentication and authorization (WSDL/XML).

- Repository Access Function specific data contents for the operations (XML Schema).

A.1.4   Data Description Method

The Data Description Method can be viewed as a set of templates for constructing the data description. The templates (sets of rules) enable the standardization of the data description such that it and the described data can be shared (used) by many applications. The data descriptions are abstract in the sense that the data are described independently of data formats specific to data storage, transport protocols or application technologies. Abstraction of data descriptions simplifies the mapping between different data formats, and facilitates future extensions.

The common use of the Data Description Method will avoid incompatibilities and inconsistencies between different Profile Components.

A.2   3GPP GUP and TISPAN SuM Functional Architecture

This clause analyses the possible reuse of 3GPP GUP Standards for TISPAN SuM Functional Architecture when considering:

- The commonalities regarding requirements for GUP or TISPAN SuM Functional Architecture (Stage 1).

- The commonalities regarding the architecture for GUP or for SuM (Stage 2).

- The commonalities regarding the solutions sets (Stage 3).

A.2.1   Commonalities regarding requirements

Without going into a detailed analysis of GUP requirements as defined in TS 122 240 [4], this clause indicates many points where GUP objectives and requirements map to those of TISPAN SUM.

TS 122 240 [4], clause 4.1, in its introduction mentions:

- The objective of specifying the 3GPP Generic User Profile is to provide a means to enable harmonized usage of the user-related information originating from different entities. …..

- The 3GPP Generic User Profile is the collection of User-related data which affects the way in which an individual user experiences services where a community of entities share this data. The 3GPP Generic User Profile can be stored in the home network environment and/or Value Added Service Provider equipment.

- The 3GPP Generic User Profile will be accessed by different stakeholders and managed either by one (centralized) or by different stakeholders (de-centralized) such as the user, subscriber, value added service provider and network operator by a standardized access mechanism. (….)

- The 3GPP Generic User Profile may be also be used by different applications in a standardized way.

- The 3GPP Generic User Profile will help to create and manage the user data in each entity and on the other hand to make it easier to find all user related data as a whole in the home network environment.

These GUP objectives maps with TISPAN SUM ones as they focus on user related data that are distributed on different entities. They are accessed by different stakeholders (user, subscriber, service provider) that have also been identified as such in the SuM requirements. It also addresses the user data related to applications that constitute an important part of SuM. Its design allows the creation and the management of user data distributed over different entities.

General way to access user data

It should be noted that GUP can be used in other areas than Subscription Management, as it allows access to user data stored in an entity by other entities (e.g. when different applications cooperate, they may access to user data stored or managed by another one, also when a third party application need to access user data stored in the operator network, with relevant access rights). GUP is a general way to access and manage user data. In a GUP environment, Subscription Management is one process among others that have to access user data. It seems important to avoid to develop two interfaces to access user data, one dedicated to Subscription Management, one used for other applications.

Support of Applications in particular with non standardized services

TS 122 240 [4], clause 4.1.2, explicitly mentions that:

- Subscription Management benefits from a standardized way to access subscription data of a user.

- (….) new services in 3GPP are not standardized. Therefore content and format of subscription data as well as the places (repositories) where subscription data are stored may be different for different new services. GUP specifies the description of - and access of data in a standardized way.

It should be noted that GUP addresses non standardized services, by defining a minimum set of rules allowing to describe and access data in a standardized way. It allows to introduce new applications with their specific user data in a flexible way without impacting other entities. It corresponds to a SuM objective to support provisioning of NGN Services including those, non standardized, offered by Application Servers.

Synchronization of data

TS 122 240 [4], clauses 4.4 and 6.5, identifies the need to keep synchronized GUP data components stored in different repositories, that SuM functional Architecture has also to address.

Stakeholder requirements

TS 122 240 [4], clause 5, describes requirements regarding stakeholders quite close to the TISPAN SuM ones:

- The subscriber may hold subscriptions for one user (..;) or several users (…)

- The subscriber may be able to customize her subscribed services and interrogate customization settings, subject to limitations by the Home operator and/or value added service provider.(…)

- The user may be able to customize the services, that have been subscribed to her by the subscriber and interrogate customization settings, subject to limitations by the Home operator and/or value added service provider and/or subscriber.

General Service Requirements

TS 122 240 [4], clause 6.3, mentions:

It may be possible for an application to retrieve the whole user profile or selected parts of it in one transaction.

A.2.2   Commonalities regarding Architecture (Stage 2)

Reference points Rp and Rg

The reference Architecture of TS 123 240 [5] describes two reference points Rp and Rg that fit with the reference points (NOSIs) identified in the SUM Functional Architecture:

- 3GPP GUP Rp corresponds to the NGN FE NOSI. Both are used to access and manage the user data stored on NGN FE.

- 3GPP GUP Rg corresponds to the RP NOSIs, that hide the network topology, offer a single point of access and allow synchronization of profile components.

Repository Access Function (RAF)

The RAF function realizes the harmonized Rp access interface. It hides the implementation details of the data repositories from the GUP infrastructure real. It correspond to the fact that in SuM Functional Architecture, NGN FEs should expose NOSIs with the same characteristics to access the data, regarding the operations and the way to structure the data, the difference being in the data themselves that are specific to each type of NGN FE.

Structure of data

The SuM Functional Architecture should support a large variety of user profiles, dependent of the NGN services offered, in particular from applications servers. There is the need to structure the user data by grouping them in independent components. The word "independent" is important, as when adding a new application with its own user profiles, it should not impact the user data of other applications and avoid incompatibilities.

TS 123 240 [5], clause 5 defines an info model, and TR 123 941 [6], a Data Description Method that describes a way to structure the data in GUP components to answer the same type of requirement as for SuM. The GUP component concept allow the independence of applications and their user profiles and offer the way to process these components individually.

Operations

The operations that TS 123 240 [5] describes for Rp and Rg interfaces (Create, Delete, Modify, Query, Subscribe, Notify) corresponds to the operations defined respectively for NGN FE NOSIS and RP NOSIs. Able to contain several data components, they allow data synchronization within one data repository or several.

A.2.3 Commonalities regarding Solution Sets (Stage 3)

The TISPAN SuM functional architecture does not address stage 3 specifications, it is nevertheless worthwhile to note a certain number of Stage 3 GUP characteristics that are of interest for SuM.

3GPP GUP stage 3 relies on:

- Web services described by wsdl files.

- Data structure described through XML data scheme (xsd) files.

- Liberty Alliance standards in particular for the definition of operations.

- use of different name spaces guaranteeing independence of the user profiles.

- use of a subset of Xpath language to retrieve the components.

The use of Web Services is conform to the TISPAN OSS Architecture for NGN Management [1].

Annex B (informative):
Relation with 3GPP Integration Reference Points (IRPs)

B.1   3GPP IRP Introduction and overview

References: TS 132 101 [11] and 132 150 [12].

IRP (Integration Reference Point): an architectural concept that is described by a set of specifications for definition of a certain aspect of a management interface, comprising a **Requirements** specification, an **IRP Information Service** specification, and one or more **IRP Solution Set** specifications.

For the purpose of management interface development 3GPP has developed an interface concept known as Integration Reference Point (IRP) to promote the wider adoption of standardized management interfaces in telecommunication networks. The IRP concept and associated methodology employs protocol and technology neutral modelling methods as well as protocol specific solution sets to achieve its goals.

B.1.1   General

The three cornerstones of the IRP concept are:

- **Top-down, process-driven modelling approach:** The purpose of each IRP is automation of one specific task, related to TMF TOM. This allows taking a "one step at a time" approach with a focus on the most important tasks.

- **Technology-independent modelling:** To create from the requirements an interface technology independent model. This is specified in the IRP Information Service.

- **Standards-based technology-dependent modelling:** To create one or more interface technology dependent models from the technology independent model. This is specified in the IRP Solution Set(s).
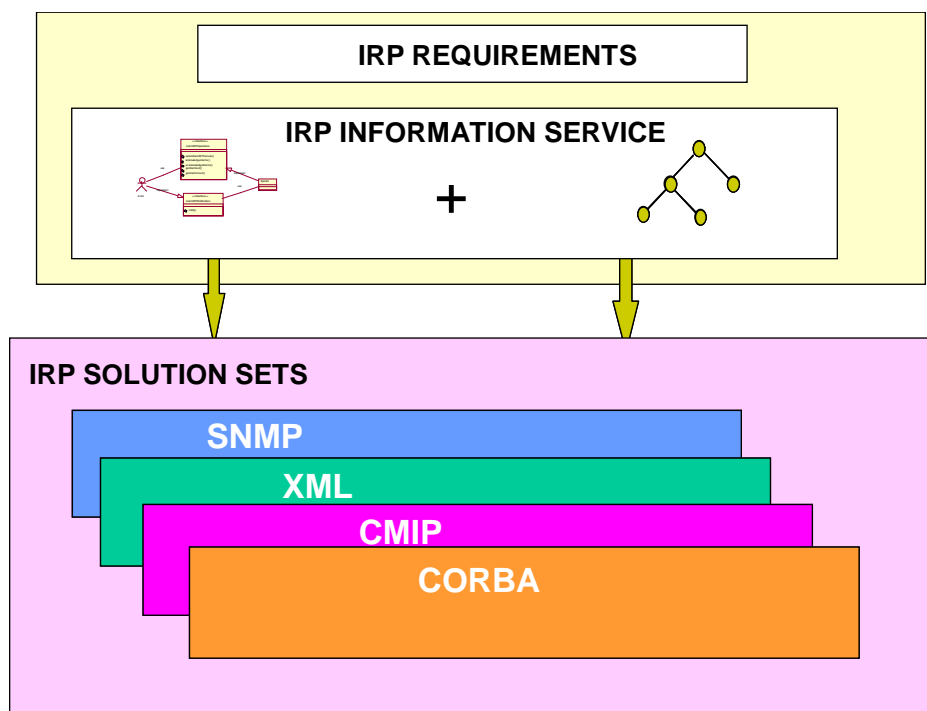

Figure B.1: IRP components (with example Solution Sets; for definition of valid 3GPP Solution Sets, see annex C in TS 188 001 [1])

B.1.2   IRP Specifications Approach

As highlighted in the previous clause, IRP specifications are specified using a 3-level approach: Requirements, IS-level and SS-level.

Furthermore, there are three categories of IRP specifications (see formal and more detailed definitions in clause 3.1):

- Interface IRPs.

- NRM IRPs.

- Data Definition IRPs.

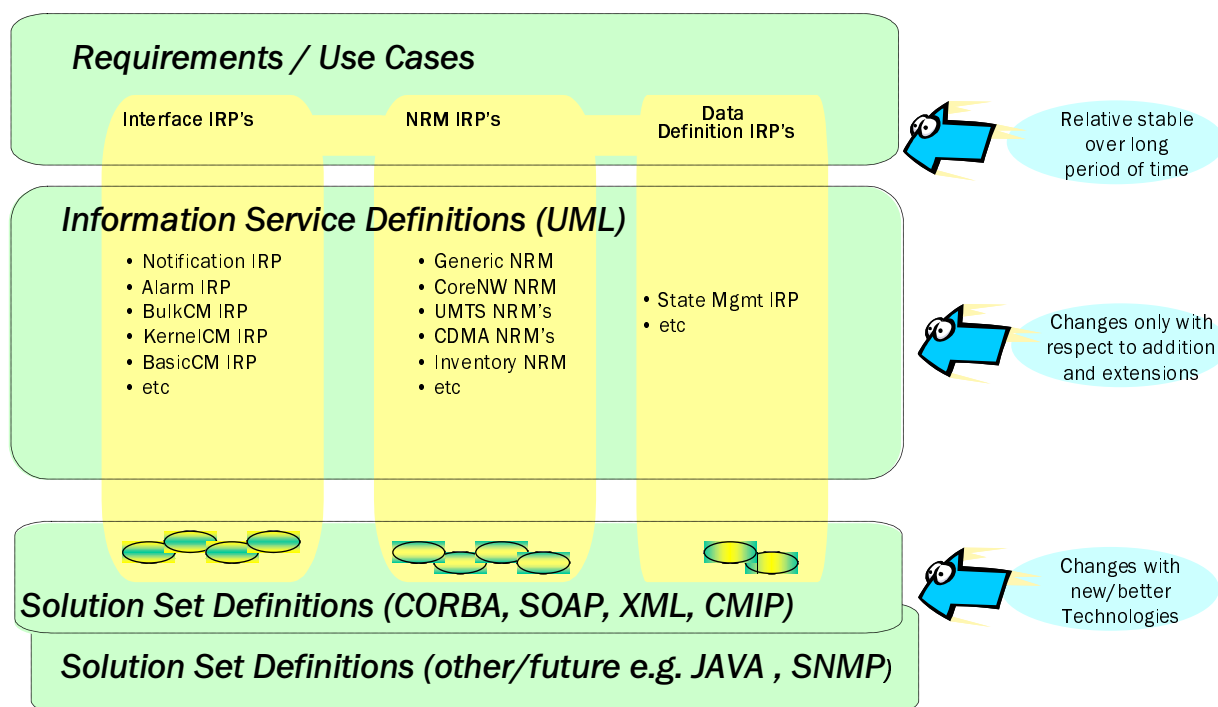Each category is partitioned into Requirements, IS-level and SS-level specifications.

Requirements / Use Cases

Interface IRP's   NRM IRP's   Data Definition IRP's

Relative stable over long period of time

Information Service Definitions (UML)

- Notification IRP
- Alarm IRP
- BulkCM IRP
- KernelCM IRP
- BasicCM IRP
- etc

- Generic NRM
- CoreNW NRM
- UMTS NRM's
- CDMA NRM's
- Inventory NRM
- etc

- State Mgmt IRP
- etc

Changes only with respect to addition and extensions

Solution Set Definitions (CORBA, SOAP, XML, CMIP)

Solution Set Definitions (other/future e.g. JAVA , SNMP)

Changes with new/better Technologies

Figure B.2: The IRP 3-Level Specifications Approach combined with the three IRP categories

Level 1:

The "Requirements-level" intends to provide conceptual and use cases definitions for a specific management interface aspect as well as defining subsequent requirements for this IRP.

Level 2:

The "IS-level" provides the technology independent specification of an IRP.

Level 3:

The "SS-level" finally provides the mapping of IS definitions into one or more technology-specific Solution Sets. This concept provides support for multiple interface technologies as applicable on a vendor and/or network type basis and also enables accommodation of future interface technologies - without the need to redefine requirements and IS-level definitions.

B.2   Architecture

The 3GPP IRPs were originally developed to support the management interfaces Itf-N and Itf-P2P in the following reference architecture:
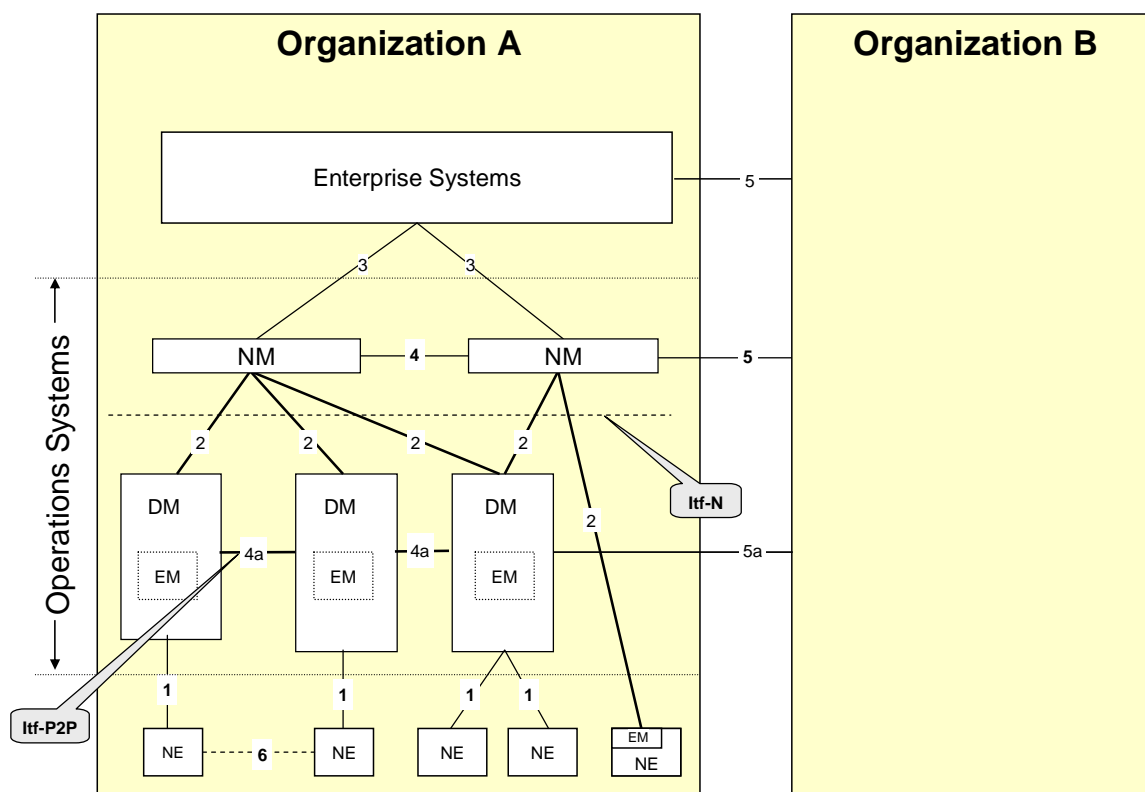

Figure B.3: 3GPP management reference model

However, due to a more generalized definition of the IRP, as seen in the first paragraph of clause B.1, the IRP concept and interface specifications are today applicable to any management interface or reference point, e.g. management interfaces/NOSIs defined by TISPAN, both the SCA layer, the RP layer as well as the NGN FE layer. As can be seen in figure B.1, those layers also have many similarities with the various scenarios for 3GPP management interface 2.

B.3   IRP SOAP Solution Sets

The 3GPP IRP specifications of the table below are supported by SOAP Solution Sets which were created in particular for SuM in 3GPP. These IRPs are described here as candidates for reuse by TISPAN within SuM NOSIs, not excluding the possible relevance of other 3GPP IRPs.

The Requirements, Information Service (IS) and SOAP Solution Sets of the Interface IRPs for 3GPP SuM are the listed below.

The Requirements, Information Service (IS) and XML file format/schema definitions of the NRM IRPs for 3GPP SuM are also listed below.

3GPP identifies system contexts of the Interface IRP in terms of its implementation, called IRPAgent, and the user of the IRPAgent, called IRPManager. These terms are used in the subsequent clauses.

IRP short name	Part	Number, Title
Generic IRP	Requirements	TS 132 311: Generic Integration Reference Point (IRP) management: Requirements [13]
	IS	TS 132 312: Generic Integration Reference Point (IRP) management: Information Service (IS) [14]
	SOAP	TS 132 317: Generic Integration Reference Point (IRP) management; SOAP solution set [15]
Notification IRP	Requirements	TS 132 301: Configuration Management (CM); Notification Integration Reference Point (IRP): Requirements [16]
	IS	TS 132 302: Configuration Management (CM); Notification Integration Reference Point (IRP): Information Service (IS) [17]
	SOAP	TS 132 307: Configuration Management (CM); Notification Integration Reference Point (IRP): SOAP solution set [18]
Kernel CM IRP	Requirements	TS 132 661: Configuration Management (CM); Kernel CM Requirements [19]
	IS	TS 132 662: Configuration Management (CM); Kernel CM Information Service (IS) [20]
	XML	TS 132 665: Configuration Management (CM); Kernel CM Integration Reference Point (IRP): eXtensible Markup Language (XML) definitions [21]
	SOAP	TS 132 667: Configuration Management (CM); Kernel CM Integration Reference Point (IRP): SOAP solution set [22]
Basic CM IRP	Requirements	TS 132 601: Configuration Management (CM); Basic CM Integration Reference Point (IRP): Requirements [23]
	IS	TS 132 602: Configuration Management (CM); Basic CM Integration Reference Point (IRP): Information Service (IS) [24]
	SOAP	TS 132 607: Configuration Management (CM); Basic CM Integration Reference Point (IRP): SOAP solution set [25]
Generic NRM IRP	Requirements	TS 132 621: Configuration Management (CM); Generic network resources Integration Reference Point (IRP); Requirements [26]
	IS	TS 132 622: Configuration Management (CM); Generic network resources Integration Reference Point (IRP); Network Resource Model (NRM) [27]
	XML	TS 132 625: Configuration Management (CM); Generic network resources Integration Reference Point (IRP); Bulk CM eXtensible Markup Language (XML) file format definition [28]
SuM NRM IRP	Requirements	TS 132 171: Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): Requirements [8]
	IS	3GPP TS 32.172: Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS) [9]
	XML	TS 132 175: Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): eXtensible Markup Language (XML) definition [10]

B.4 Overview of IRPs related to SOAP SSs

B.4.1 Generic IRP

The Generic IRP (ETSI TS 132 31x) defines some generic data and operations used by all Interface IRPs. Therefore, this IRP is necessary to reuse when reusing Interface IRPs.

B.4.2 Notification IRP

The Notification IRP (ETSI TS 132 30x) provides basic definitions and operations to send notifications. The basic idea is that an IRPManager subscribes to notifications of events sent by an IRPAgent, where the trigger condition for sending the notification is specified during establishment of the subscription.

The operations to manage establishment and modification of a subscription to notifications includes:

- `subscribe`, `unsubscribe`: To subscribe and unsubscribe to notifications.

- other operations to manage the subscription, such as changing the trigger condition, inquiring status, and suspend/resume.

B.4.3   Kernel CM IRP

The Kernel CM (Configuration Management) IRP (ETSI TS 132 66x) defines operations and notifications for Configuration Management.

The following operation is specified:

- getNRMIRPVersion: Used by an IRPManager to obtain the version(s) of the NRM IRP supported by the IRPAgent.

The notifications are the following:

- notifyObjectCreation, notifyObjectDeletion: To notify creation and deletion of objects.

- notifyAttributeValueChange: To notify change of attribute value(s).

- notifyCMSynchronizationRecommended: To notify a recommendation of synchronizing of data.

- notifyStateChange: To notify a state or status change of an object.

B.4.4   Basic CM IRP

The Basic CM IRP (ETSI TS 132 60x) defines operations on Managed Object instances of a MIB (i.e. object instances of IOCs) defined by an NRM IRP. The information of the Managed Object instances and the attributes are transferred as part of the operations.

The operations are the following:

- getMoAttributes: To read attribute values of Managed Object instances. Scope/filter criteria may be specified, and this allows for a large variety of possibilities in selecting objects and attributes subject to read.

- getContainment: To retrieve (name-)containment relations in the MIB.

- cancelOperation: To cancel an ongoing Basic CM operation.

- createMO: To create a Managed Object instance. In this operation it is also possible to specify attribute values.

- deleteMO: To delete one or more Managed Object instances.

- setMOAttributes: To set attributes of Managed Object instances. Attributes of one or several Managed Objects may be modified - based on the containment hierarchy and scope/filter criteria.

B.4.5   Generic NRM IRP

The Generic NRM IRP (ETSI TS 132 62x) specifies Information Object Classes (IOCs), attributes, relationships, etc., used by both Interface IRPs and other NRM IRPs.

B.4.6   SuM NRM IRP

The SuM NRM IRP IS (3GPP TS 32.172 [9]) is used as basis for the TISPAN SuM Information Model (TS 188 002-2 [3]). The XML file format definition is extendable to cover also the TISPAN specific parts of the model.

B.5 3GPP IRPs and TISPAN SuM Functional Architecture

This clause analyses the possible reuse of 3GPP IRPs for TISPAN SuM Functional Architecture when considering:

- the commonalities regarding **requirements** for IRPs and TISPAN SuM Functional Architecture (Stage 1);

- the commonalities regarding the **architecture and information models** for IRPs and for SuM (Stage 2);

- the commonalities regarding the **solution sets** (Stage 3).

B.5.1 Commonalities regarding requirements (Stage 1)

B.5.1.1 General

- The 3GPPs IRPs were developed to support (any) management interfaces, with CMISE/CRUD-like operations accessing/manipulating data defined in object-oriented information models.

- Interface IRPs and NRM IRPs can be accessed by any entity acting as an IRPManager, which also includes a TISPAN NOSI consumer (in case the NOSI is defined to access an IRP interface).

B.5.1.2 IRP support of SuM FA requirements in TS 188 002-1

The following table gives a high-level overview of the SuM requirements on Functional Architecture in TS 188 002-1 [2], clause 6.3, and whether a reuse of the 3GPP SuM NRM IRP (ETSI TS 132 17x) and corresponding SOAP SSs for Interface IRPs support each requirement or not.

Requirement	IRP support	Comment
R1) The SuM functional architecture may hide the complexity of the different functional entities to be configured including the CPE and the AS.	Yes	The SuM NRM IRP and extensions in the TISPAN SuM IM only model the IOCs and attributes etc., necessary for management.
R2) The SuM functional architecture may allow management of necessary/optional data, operations and notifications related to Subscription Management.	Yes	Supported by 3GPP SuM NRM IRP (ETSI TS 132 17x) with TISPAN extensions, and corresponding SOAP SSs for Interface IRPs.
R3) The SuM functional architecture may be easily extensible for the support of new operations, data, and notifications.	Yes	Supported by TISPAN extensions to the reused 3GPP IRPs.
R4) The SuM functional architecture may define the NGN OSS Service Interfaces for the realization of the following processes: - SM&O Service Configuration and Activation process. - RM&O Resource Provisioning process.	Yes	Supported if the TISPAN NOSIs access relevant objects and data in the TISPAN SuM IM based on the 3GPP SuM NRM and related SOAP SSs.
R5) The NOSIs related to Service Configuration & Activation may be network technology agnostic without any knowledge of the NGN functional entities that are involved.	Yes	The TISPAN SuM IM and 3GPP SuM NRM are network technology agnostic.
R6) The NOSIs related to Resource Provisioning are responsible of NGN functional entities (including CPE and AS) management and may hide the complexity of the different NGN functional entities to the NOSIs related to Service Configuration and Activation.	Yes	See comment to R1 above.
R7) The NOSIs related to Service Configuration and Activation may manage the configuration of new subscription, and support of the reconfiguration of installed subscription (either due to customer demand or problem resolution).	Yes	Supported by normal management operations (Create/Delete instance, Set attributes etc.) to/by the NOSIs accessing TISPAN SuM IM (based on 3GPP SuM NRM) or a more high-level operation. Such operations may be ordered directly by the NOSI consumer or generated by the NGN OSS Service itself as a result of a more high-level operation request.
R8) the SuM Functional Architecture may comply with the eTOM Operation regarding Fulfilment as described in clause 4.2 with the following processes.	To be verified	This is most likely also supported by 3GPP IRP reuse, or at least not hindered by IRP reuse. There is ongoing work in 3GPP SA5 to update the high-level requirements in TS 132 101 [11] and corresponding IRP specifications as necessary to be in line with eTOM.
R9) The SuM functional architecture should consider reuse as much as possible of 3GPP existing standards.	Yes	

B.5.2   Commonalities regarding the architecture and information models (Stage 2)

B.5.2.1   General

- Interface IRPs are separated from, and independent of, the information model managed over the interface and thus can be used to manage any object-oriented information model.

- The Generic NRM (TS 132 622 [27]) and SuM NRM (3GPP TS 32.172 [9]) are already being reused for the core part of the TISPAN SuM IM.

B.5.2.2 Reference points

As mentioned in clause B.2, due to the general definition of the IRP, the IRP concept and interface specifications are today applicable to any management interface or reference point, e.g. management interfaces defined by TISPAN (note: the TISPAN OSS architecture does NOT define any reference points). Thus, this supports the "loose coupling" between entities which is required for service management interfaces.

The following diagram depicts various alternative scenarios with IRPManagers and an NGN OSS Service accessing various NOSIs, the latter acting as IRPAgents.
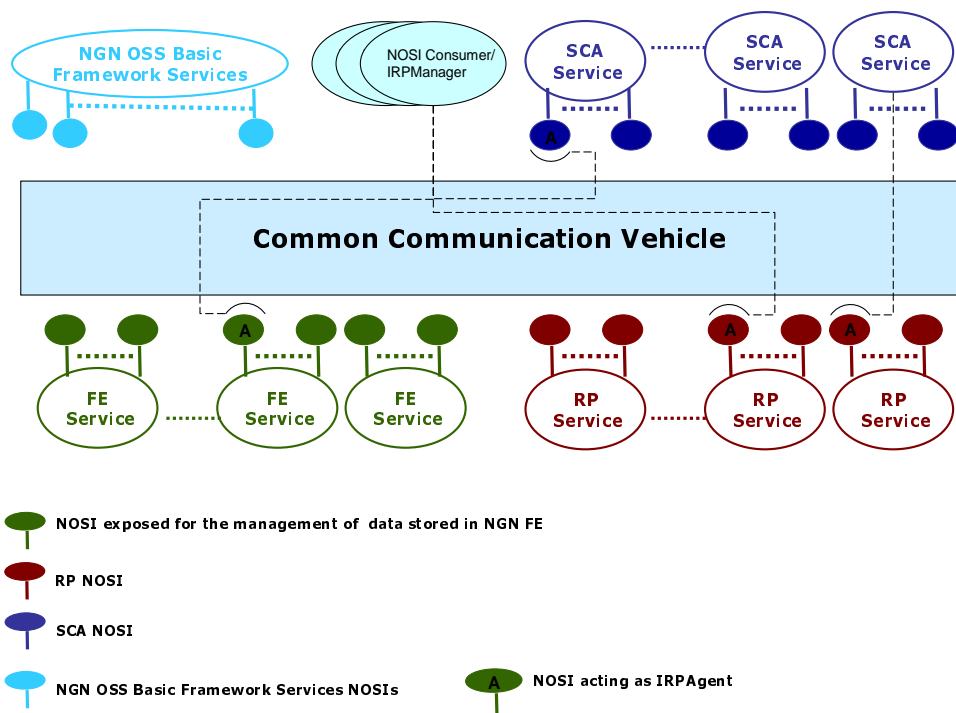

Figure B.4: NOSI scenarios with IRPManagers/Agents

B.5.2.3 Structure of data

The IRP concept, and in particular the separation of Interface IRPs from NRM IRPs, allows any structure of data (and the relationships between data) to be managed. The implementation of the IOCs in the various NRM IRPs may be distributed arbitrarily throughout the network.

B.5.2.4 Operations

The operations that are defined by the various 3GPP Interface IRP specifications listed in B.3 above (Create, Delete, GetMoAttributes, SetMoAttributes, Subscribe, NotifyXyz) correspond to the operations defined respectively for **all** NOSIs (SCA, RP, NGN FE NOSIs).

B.5.3   Commonalities regarding Solution Sets (Stage 3)

The TISPAN SuM functional architecture does not address stage 3 specifications, it is nevertheless worthwhile to note a certain number of 3GPP IRP SS characteristics that are of interest for SuM.

3GPP IRP SOAP Solution Sets for SuM comprise:

- The SS provides a clear mapping of the Stage 2 (ISs for Interface IRP and NRM IRP) to Stage 3 (SS) specifications, which is in line with the TISPAN WG8 specification guidelines. And since there are many commonalities on the Stage 2 level, this also provides for many commonalities on the Stage 3 level.

- Web services described by wsdl files (the use of Web Services is compliant to the TISPAN OSS Architecture for NGN Management [1]).

- Data structures described through XML data scheme (xsd) files of NRM IRPs.

- 3GPP uses name spaces for object instances as well as XSD schema that are perfectly reusable by TISPAN, thus guaranteeing globally unique identification of all IOC instances and XSD schema.

- The SOAP Solution Sets support the XPath filter language (see W3C XPath 1.0 specification [29]). IRPAgents may throw a FilterComplexityLimit fault when a given filter is too complex.

Annex C (informative):
Bibliography

ETSI TS 132 140: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Subscription Management (SuM) requirements (3GPP TS 32.140)".

ETSI TS 132 141: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Subscription Management (SuM) architecture (3GPP TS 32.141)".

History

Document history		
V2.0.0	March 2008	Publication