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Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Network and Service Management; Subscription Management; Part 2: Information Model

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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 2 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 on the definition of SuM Information Model.

# 1	Scope

The purpose of the present document is the definition of the SuM Information model which is paramount for the NGN service delivery within TISPAN NGN.

The present document contains the specification of an information model covering all the mandatory/optional information related to subscription management that shall be provisioned on the NGN Network.

The information model described in the present document is developed according to the specifications of TISPAN R1.

The purposes of the document are:

- To capture the Subscription Management Information Model needs as expressed in [1].

- To satisfy the needs of the NGN OSS Service Interfaces (NOSI) defined in the Subscription Management Functional Architecture and to support their implementation in Solution Set interfaces.

# 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;

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

[2]	ETSI ES 282 001: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture Release 1".

[3]	ETSI ES 282 007: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Subsystem (IMS) Functional Architecture".

[4]   ETSI ES 282 004: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture; Network Attachment Sub-System (NASS)".

[5]   ETSI ES 283 034: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); Network Attachment Sub-System (NASS); e4 interface based on the diameter protocol".

[6]   ETSI TS 123 008: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Organization of subscriber data (3GPP TS 23.008 Release 7)".

[7]   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)".

[8]   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 Release 7)".

[9]   ETSI TS 132 300: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Name convention for Managed Objects (3GPP TS 32.300 Release 7)".

2.2   Informative references

[10]   ETSI TS 123 218: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia (IM) session handling; IM call model; Stage 2 (3GPP TS 23.218 Release 7)".

[11]   ETSI TS 129 228: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents (3GPP TS 29.228 Release 7)".

[12]   ETSI TS 129 328: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia Subsystem (IMS) Sh interface; Signalling flows and message contents (3GPP TS 29.328 Release 7)".

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

3   Definitions and abbreviations

3.1   Definitions

For the purposes of the present document, the terms and definitions given in TS 188 002-1 [1] and the following apply:

IMS Service Profile: collection of service and user related data as defined in TS 129 228

NASS User ID: identity of the attached user at the network access

NOTE   Correspond to the Subscriber ID used in NASS specification [4].

Sub-Profile: set of user network profile information

NOTE   Each user network profile may be divided into sub-profiles.

Subscribed Network Access: collection of data related to a network access subscribed by the subscriber

Subscribed NGN Service: collection of data related to a NGN service subscribed by the subscriber

Subscriber: entity (associated with one or more users) that is engaged in a Subscription with a service provider

NOTE The subscriber is allowed to subscribe and unsubscribe services, to register a user or a list of users authorized to use these services, and also to set the limits relative to the use that associated users make of these services.

Subscription: commercial relationship between the subscriber and the service provider

User: entity that consumes the services subscribed by the subscriber

User NGN Network Access Profile: user profile in a specific network access

User NGN Service Profile: collection of service and user related data

3.2 Abbreviations

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

AMF	Access Management Function
AS	Application Server
CLF	Connectivity session Location and repository Function
CNGCF	CNG Configuration Function
CNG	Customer Network Gateway
GPRS	General Packet Radio Service
IMS	IP Multimedia Subsystem
IOC	Information Object Class
NACF	Network Access Configuration Function
NASS	Network Attachment SubSystem
NGN	Next Generation Network
P-CSCF	Proxy Call Session Control Function
PDBF	Profile Data Base Function
S-CSCF	Serving Call Session Control Function
SuM	Subscription Management
TBD	To Be Defined in next release
UAAF	User Access Authorization Function
UE	User Equipment
UPSF	User Profile Server Function

4 High Level Model

4.1 Overview

In this clause, a general contextualization of Subscription Management within TISPAN is given. This clause is organized with an initial textual description, followed by a general diagram which aims to depict the "SuM High Level Model".

The goal of SuM within the current TISPAN release is to provision the NGN functional entities with all information related to a specific subscriber in order to allow its users to use their services.

The objective of the high level model is the identification of candidate entity groupings that need to be modelled, possible relations between those groupings and the associated candidate attributes.

The High Level Model does not specify any information model, but is used as the basis for the design of the SuM Information Model.

A Subscriber is an entity that is engaged in a subscription with a Service Provider. One or more Users can be associated to a subscriber, who is allowed to subscribe and unsubscribe services, to register a user or a list of users authorized to use these services, and also to set the limits relative to the use that associated users make of these services.

An NGN Subscriber subscribes to NGN Services (e.g. VoIP, VoD, etc) and directly or indirectly to a set of Network Accesses (xDSL, etc.) This subscription covers two different aspects:

- Subscription to the NGN Services.

- Subscription to Network Accesses.

A relationship between NGN services and network accesses is established, in that it is possible to "enjoy" specific NGN services over specific network accesses.

The NGN Subscriber is engaged in a Subscription with a Service Provider. The NGN Subscriber may also be engaged in a subscription with a Network Access Provider.

The entity which uses the NGN subscribed services/accesses is the User. The subscriber is responsible of the assignment of services/accesses and rights to its users.

Each user may be associated to multiple subscribers, and one subscriber may be associated to multiple users.

All the parameters related to the services and/or network accesses subscribed by the subscriber are included in a profile related to the subscriber. All the parameters related to the services and network accesses assigned to the user are stored in a profile related to the user. There is a relation between services assigned to the user and which network accesses on which these services can be used by the user.

In order to use the NGN services, the user must proceed as follows:

1) **Authenticate at Transport Layer:** This transport layer may be the one provided by the Service Provider or may be another network access (in case of nomadism or roaming). In order to use the transport layer, the user must provide credentials in order to allow the authentication and authorization procedures with the NASS (network attachment subsystem). Network attachment through NASS is based on implicit or explicit user identity and authentication credentials stored in the NASS (see ES 282 004 [4]). On one network access, the user may use same credentials independently of the services he wants to launch.

2) **Authenticate at Service Layer:** allow the service provider to identify and authenticate the user at a service level. Within this phase, the user is authenticated by the service provider thanks to authentication procedures and to the credentials provided by the user.

3) **Authenticate at Application Layer (Optional)**: this optional step enables the application provider to identify and authenticate the user for enabling his access to specific applications. Within this phase, the user is authenticated by the applications provider thanks to authentication procedures and to the credentials provided by the user.

4) **Usage of the Service/Application:** Once the user is authenticated and authorized at service/application level, he can use all the services/applications assigned to him by its subscriber.

The relationship between the users, its access credentials and service/application credentials is the following:

1) For each network access and for each user, credentials are associated.

2) For each user, multiple service/applications credentials are associated.

According to this description, a general contextualization of the TISPAN Subscription Management can be derived in a "high level model", depicted by the following diagram.

For readability purposes, the following legend is proposed.
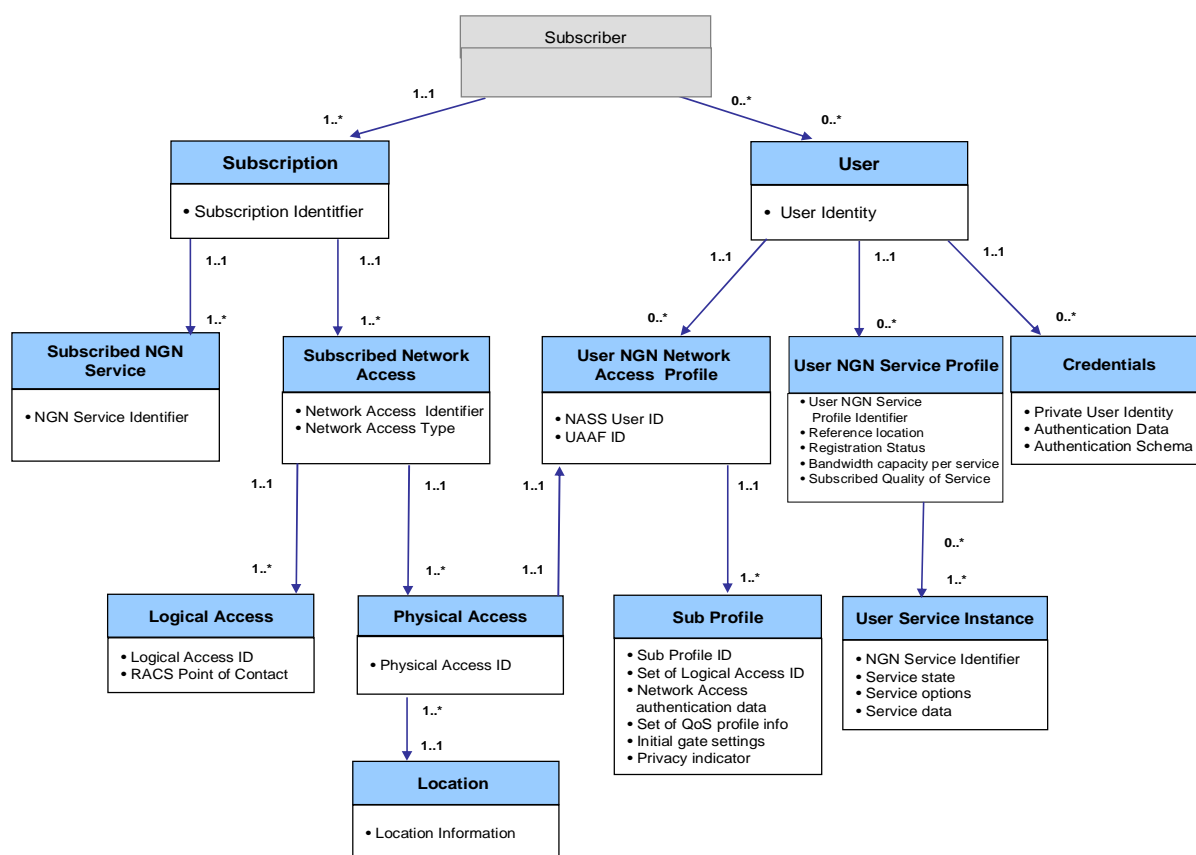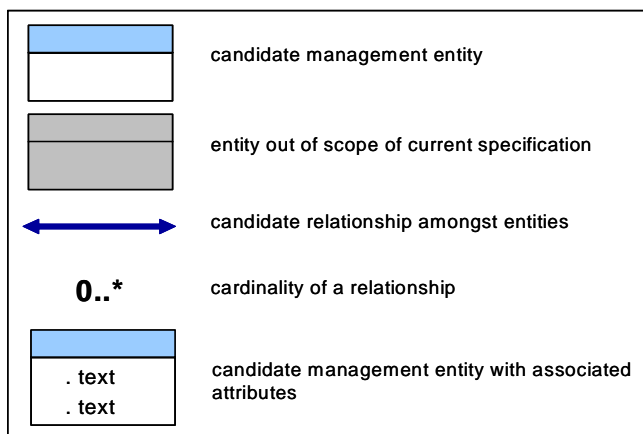
Figure1: TISPAN SuM High Level Model

As depicted in the precedent figure, a user may have one or several User NGN Service Profiles, which are a collection of a service and user related data. A User NGN Service Profile can be either an IMS Service profile or of any other type of Service Profile. Other type of Service Profile can cover Services offered by Applications Servers and Services offered by other TISPAN NGN Subsystems such as IPTV Subsystem.

The candidate management entity "User NGN Service Profile" contains the attributes that are common for any type of Service Profiles. For any type of service profile including IMS Service Profile, the associated candidate management entity inherits from the User NGN Service Profile candidate management entity as shown in figure 2. For the IMS Service Profile candidate management entity, the associated attributes are depicted in the figure 2.

User NGN Service Profile

• NGN Service Profile Identifier
• Reference location
• Bandwidth capacity per service
• Subscribed Quality of Service

IMS Service Profile

• Public User Identities
• Registration Status
• Initial Filter Criteria
• Application Server Information
• Service Indication
• Barring Indication
• List of Authorized visited Network Identifier
• Services related to unregistered state
• Implicitly registered public user identity sets
• Shared IFC Set Identifier
• Default Public User Identity Indicator
• Subscribed Media Profile Identifier
• Network handling

Other type of Service Profile

• Attribute 1
• Attribute 2
• ……………
• ……………..

Figure 2: User NGN Service Profile Inheritance

4.2   Subscriber

The subscriber concept used in the present document is the same as the one defined in [2]. This concept which is defined for both fixed and mobile network accesses is not handled (stored or modified) in the TISPAN NGN network nodes. The subscriber is not in the scope of the present document, and is mentioned for clearness and consistency purposes of the model.

4.3   User

A user is described by its characteristics/attributes, possibly including various identifiers. A user must be immutable and, therefore, independent of any information that may change during the lifecycle of the user. In particular, it must not depend on any service, any device, network access, credential, etc. A user may be associated with zero or more devices, network accesses, credentials, contracts, etc. In addition, the change of/in devices, network accesses, credentials, contracts, etc. must not lead to a change of identities. A user is defined to be long lasting. Life cycle of a user identity is independent of several aspects:

- A user is not strictly bound to a particular contract subscription.

- A user is independent from any device.

- A user is independent from any network access.

A user is identified by a unique user identity described in the table below.

Attribute	Definition
User Identity	The User identity is the unique identifier of a user. The user identity is used only to refer to the user. It shall not be used for other purposes (it shall not identify access resources, accounts, credentials…). The user identity shall not be seen by the user.

4.4　Subscription

The subscription describes the commercial relationship between the subscriber and the service provider. It identifies a subscriber to one or more services.

The subscription is identified by a unique subscription identifier. The Subscription identifier is assigned by the information system and has no semantics with regard to the service execution.

The subscription identifier remains unchanged all along the service subscription.

Attribute	Definition
Subscription Identifier	The Subscription identifier is assigned by the information system and has no semantics with regard to the service execution. The subscription identifier remains unchanged all along the service subscription.

4.5　Subscribed NGN Service

The subscribed NGN Service describes a NGN service subscribed by the subscriber.

The subscribed NGN Service is identified by a unique NGN Service Identifier which is assigned by the service provider.

Attribute	Definition
NGN Service Identifier	The NGN Service Identifier is assigned by the service provider and has no semantics with regard to the service execution.

4.6　Subscribed Network Access

The subscribed Network Access describes a network access subscribed by the subscriber (e.g. xDSL, WLAN..).

The subscribed network access attributes are the following:

Attribute	Definition
Network Access Identifier	The Network Access Identifier is assigned by the service provider.
Network Access Type	Assigned by the Service provider and identifies the type of the network access (xDSL, GPRS, etc.).

4.7　Physical Access

The physical access describes a physical access over which a user equipment can attach to the network access.

The physical access is identified by a physical access ID which is assigned by the service provider.

Attribute	Definition
Default nass user id	This identity corresponds to the default NASS User ID is used to query the UAAF in case no NASS User ID is received from the UAAF.
Physical Access ID	Assigned by the service provider and identify the physical access to which the user equipment is connected.

4.8   Logical Access

The logical access describes the logical access used by the attached user.

Attribute	Definition
Logical Access ID	The identity of the logical access used by the attached user equipment. In the xDSL case, the Logical Access ID may explicitly contain the identity of the port, VP and/or VC carrying the traffic.
RACS point of Contact	The address of the RACS element where the Network Access Profile should be pushed.

4.9   Location

The location is information related to the location of the default NASS User and may take various forms (e.g. network location, geographical coordinates, post mail address, etc.).

Attribute	Definition
Location Information	Information about the location of a user.

4.10   Credential

A credential is a physical or data element that is used by user to establish a claimed identity. Typical credentials include user names/passwords, SIM cards or smart cards, network access numbers, biometrics, etc. The credential attributes are described in the following table.

Attribute	Definition
Private User Identity	Assigned by the service provider and used, for example, for registration, authorization and administration purposes. This identity shall take the form of a Network Access Identifier (NAI).
Authentication Schema	Used during the registration phase and identify the used authentication method (AKA, HTTP DIGEST, NASS-BUNDLED, or other).
Authentication Data	Used during registration and consist in: - A quintuplet vector when AKA authentication is used. - A secret when HTTP DIGEST authentication is used. - A Location ID when NASS-BUNDLED authentication is used.

4.11   User NGN Network Access Profile

The User NGN Network Access Profile is a collection of parameters describing a specific profile of a user for network access. A User NGN Network Access Profile is possibly linked to multiple sub profiles.

Attribute	Definition
NASS User ID	Represent the identity of the user attached on the network access.
UAAF ID	Represent the identity or address of the UAAF or the proxy UAAF that need to be queried in case no NASS User ID is received from the UAAF.

4.12   Sub Profile

The Sub Profile contains user authentication data (list of supported authentication methods, key materials etc.) and information related to the required network access configuration. A sub profile is associated to only NASS User ID.

The Sub Profile attributes are described in the following table.

Attribute	Definition
Sub Profile ID	Identifier of the Sub Profile.
Set of Logical Access ID	List of the logical access ID associated to the sub profile.
Network Access Authentication Data	Network access credentials associated to a NASS User.
Set of QoS Profile Info	A list of QoS profile information. Each QoS profile information consist on the following attributes: - Transport Service Class. - Media Type. - UL Subscribed Bandwidth. - DL Subscribed Bandwidth. - Maximum Priority. - Requestor Name.
Initial Gate Settings	Consist on the following attributes: - List of Allowed destinations. - UL Subscribed Bandwidth. - DL Subscribed Bandwidth.
Privacy Indicator	Indicates whether location information can be exported to services and applications. It provides an indication whether applications can access location information, depending on their security level.

4.13   User Service Instance

A user service instance is a commercial service provided (offer) to a customer by a service provider. It is personalized if it is configured by the user. A service from the products and service catalogue is associated with one or more user services instances..

The service is identified by the attributes detailed in the following table.

Attribute	Definition
NGN Service Identifier	The NGN Service Identifier uniquely identifies a service that needs session control on the S-CSCF. For each service executed on a third party AS, there must also be a unique NGN Service Identifier (typical implementation will be to indicate that a user identity has subscribed to the Presence service).
Service State	The Service State must indicate whether the service is active.
Service Options	The Service Options are used to indicate specific service options relative to a service.
Service Data	The Service Data represents the specific data associated with a service.

4.14   User NGN Service Profile

A User NGN Service Profile is a collection of service and user related data. A User NGN Service Profile is possibly linked to a list of NGN Services depending on the service subscription. This list may change in the following cases:

- The associated subscription account has requested new services or resigned services.

- The service operator has decided to add new services (e.g. for marketing reasons).

- The service operator has decided to restrict some services for any reason.

A User NGN Service Profile can contain either an IMS Service Profile or another type of Service Profile.

The User NGN Service Profile is identified by the attributes detailed in the following table.

Attribute	Definition
User NGN Service profile identifier	The NGN service profile Identifier is used to identify a service profile independently from a public user identity or other attribute.
Reference location	The reference location is a set of parameters describing the nominal network access for which the user subscribes to his service.
Bandwidth Capacity per service	xDSL access: the bandwidth capacity per service characterizes the maximum bandwidth associated with a service subscription or service instance. It is a fraction (or all) of the Subscribed network access bandwidth. Ex: 512 K, 1 024 K.
Subscribed quality of service	xDSL access: the subscribed quality of service characterizes the quality of service subscribed for a xDSL access.

4.15   IMS Service Profile

An IMS Service Profile is a collection of service and user related data as defined in TS 129 228 [11].

The IMS Service Profile is identified by the attributes detailed in the following table.

Attribute	Definition
Public user identities	The Public User Identities are used by any user for requesting communications to other users. For example, this might be included on a business card. It represents one or more Reachability addresses (i.e. tel URI or SIP URI) that can be used by a person in order to reach the user-identity.
Initial filter criteria	Initial filter criteria provide a simple service logic comprising of user/operator preferences that are of static nature. Initial filter criteria contain information allowing the S-CSCF to determine the need to forward SIP requests to an Application Server.
Application server information	The Application server information contains individualized information concerning one particular application server entry. It is defined in TS 123 218 [*10*].
Service Indication	The service indication identifies exactly one set of service related transparent data which is stored in an HSS in an operator network. It is defined in TS 129 328 [*12*].
Barring indication	The Barring Indication parameter specified in TS 123 008 [*6*] indicates that the identity is barred from any IMS communication. A Public User Identity that is barred is allowed to register with the IMS. The Barring Indication applies for both fixed and mobile network. In the case of fixed network, it indicates whether a private user identity is authorized to register in Nomadism cases.
List of authorized visited network identifiers	The list of authorized visited network identifiers specified in TS 123 008 [*6*] indicates which visited network identifiers are allowed for nomadism/roaming.
Services related to Unregistered State	The Services related to Unregistered State specified in TS 123 008 [*6*] is a parameter indicates whether the identity has services related to unregistered state or not. For a Public Service Identity the parameter shall always be set to value indicating that the identity has services related to unregistered state.
Implicitly registered public user identity sets	The Implicitly Registered Public User Identity Set specified in TS 123 008 [*6*] contains one or several instances of Public User Identity of an IMS subscriber. Several Implicitly Registered Public User Identity Sets can be configured for a given user. Each Public User Identity shall be included in no more than one Implicitly Registered Public User Identity Set.
Default public user identity indicator	The Default Public User Identity indicator marks the Public User Identity to be used as default Public User Identity in each Implicitly Registered Public User Identity Set, and is defined in TS 129 228 [*11*]. There shall be one Default Public User Identity per Implicitly Registered Public User Identity Set.
Registration status	Indicates whether the user is registered, non registered, or unregistered.
Subscribed media profile identifier	The Subscribe Media Profile identifier is read by the S-CSCF to indicate a list of authorized Codecs.
Network handling	The network handling attribute contains the data related to the handling of SIP messages: - S-CSCF name: identifies the S-CSCF assigned to the user (SIP URL). - Diameter Client address of S-CSCF: Identifies the S-CSCF assigned to the user (Diameter identity). - Diameter Server address of HSS: Identifies the HSS assigned to the user (Diameter identity). - Server capabilities: contains information to assist the I-CSCF in the selection of a S-CSCF for an IMS subscriber. The server capabilities are defined in TS 129 228 [*11*].
Shared iFC Set Identifier	Shared iFC Set Identifier identifies sets of Initial Filter Criteria that may be shared by more than one IMS subscriber or PSI user. The translation from a Shared iFC Set Identifier to the set of initial Filter Criteria is performed in the S-CSCF based on operator configuration.

5   Information Object Classes

5.1   Imported information entities and local labels

This clause identifies a list of information entities (e.g. information object class, information relationship, information attribute) that have been defined in other specifications and that are imported in the present document.

Label Reference	Local Label
3GPP TS 32.172 [7], Information Object Class, SuMSubscriberProfile	SuMSubscriberProfile
3GPP TS 32.172 [7], Information Object Class, SuMService	SuMService
3GPP TS 32.172 [7], Information Object Class, SuMSubscribedService	SuMSubscribedService
3GPP TS 32.172 [7], Information Object Class, SuMServiceProfile	SuMServiceProfile
3GPP TS 32.172 [7], Information Object Class, SuMCredentials	SuMCredentials
3GPP TS 32.172 [7], Information Object Class, IMSServiceProfile	IMSServiceProfile

NOTE: The TISPAN SuM information model extends the 3GPP SuM NRM IS [7]. The imported IOCs are limited to the IOCs that the TISPAN specific definitions extend in terms of inheritance or name-containment. Other 3GPP TS 32.172 Information Object Classes are used in the present document and are not contained within the table since no extensions are done on them within the present document.

5.2   Class diagram

The TISPAN Subscription Management Information Model is based on the 3GPP SUM NRM IS [7] as described in annex A.

5.2.1   Attributes and relationships

This clause depicts the set of IOCs that encapsulate information relevant for the present document. This clause provides the overview of all information object classes in UML. Subsequent clauses provide more detailed specification of various aspects of these Information Object Classes (IOCs).

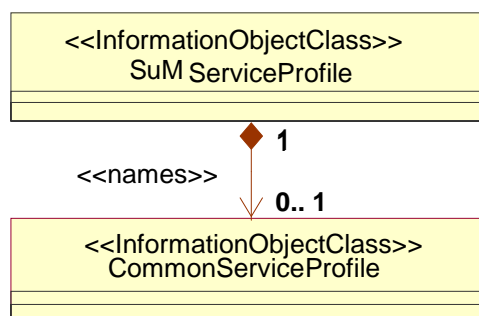**Figure 3a: SuMService Profile Containment/Naming and Association Diagram 1**
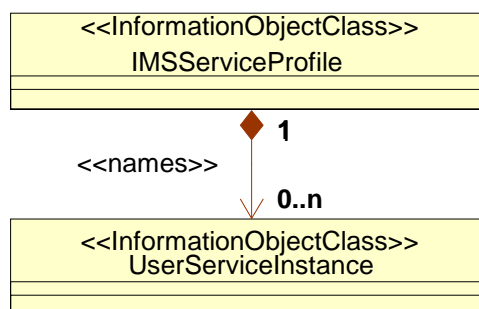
Figure 3b: IMSService Profile Containment/Naming and Association Diagram 2
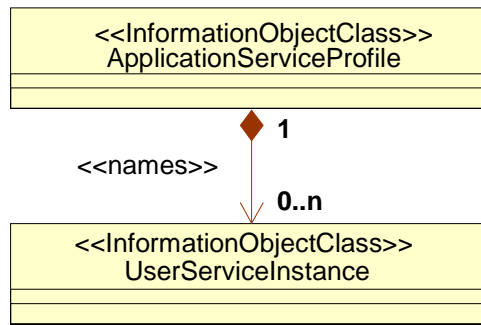
Figure 3c: ApplicationServiceProfile Containment/Naming and Association Diagram 3
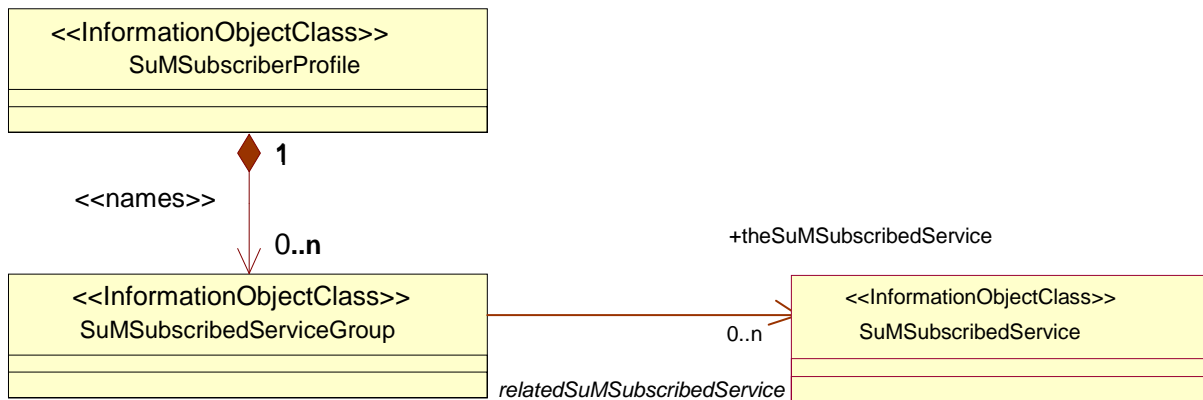
Figure 3d: SUMSubscriberProfile Containment/Naming and Association Diagram 4

Figure 3e: NgnIMSServiceProfile Containment/Naming and Association Diagram 5
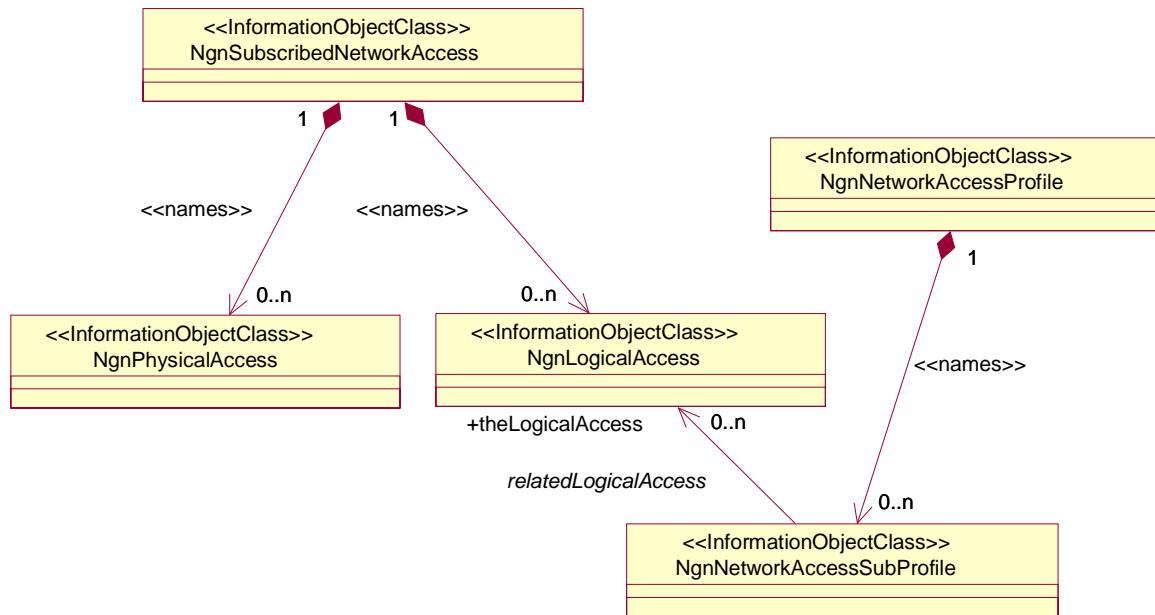
Figure 3f: TISPAN SUM IM Containment/Naming and Association Diagram 6

5.2.2   Inheritance

Figures 4a, 4b, 4c and 4d represent the inheritance hierarchy of all information object classes defined in the present document. These figures do not need to contain the complete inheritance hierarchy but shall at least contain the parent information object classes of all information object classes defined in the present document. By default, an information object class inherits from the information object class "top". This shall be a UML compliant class diagram.
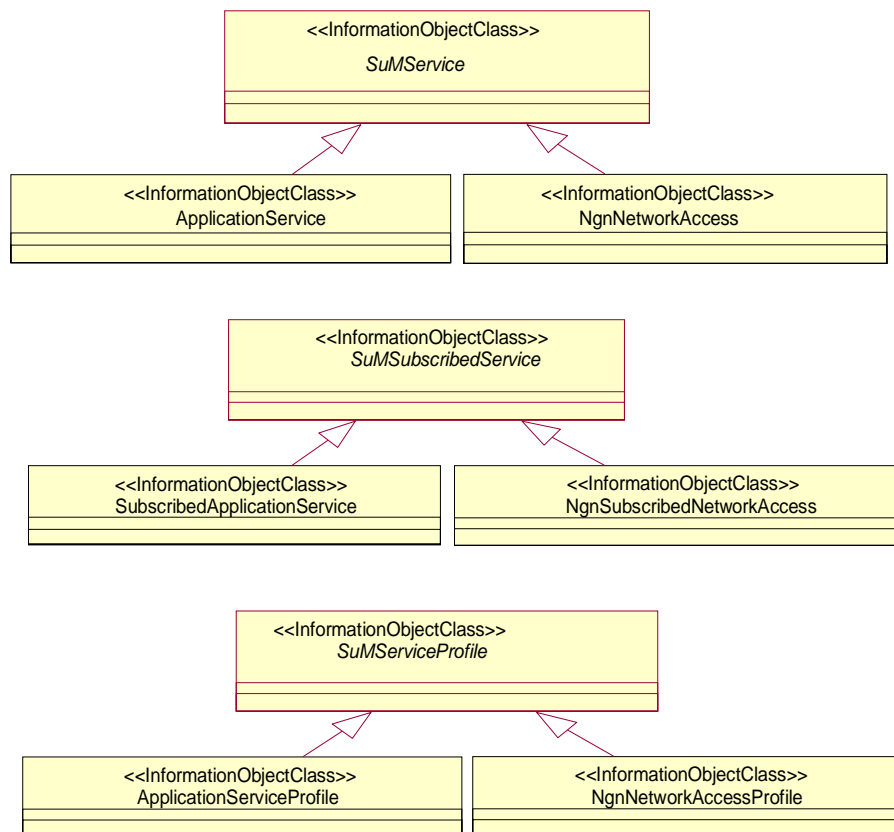
Figure 4a: TISPAN SUM IM Inheritance Hierarchy 1
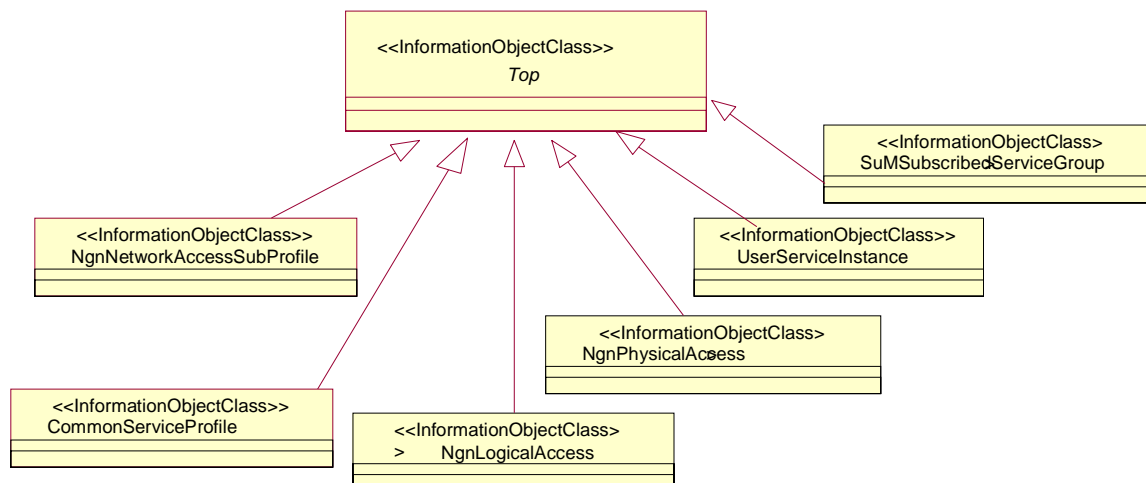
Figure 4b: TISPAN SUM IM Inheritance Hierarchy 2
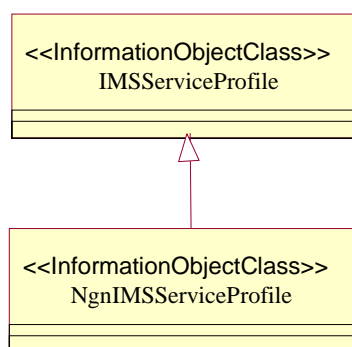
Figure 4c: TISPAN SUM IM Inheritance Hierarchy 3
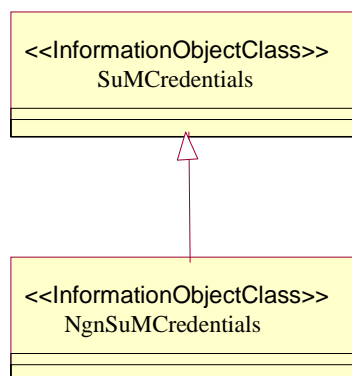
Figure 4d: TISPAN SUM IM Inheritance Hierarchy 4

5.3   Information object class definitions

The definition of all the 3GPP Information object classes used in the present document is defined in [7].

NOTE: The following issues are subject for further study:

- Lack of a Description or Indication of Supplementary Services associated to an IMS or NGN Service for specific subscriber and subscription. For example: Call Forwarding Service, CRBT, etc.

- Lack of Description or Indication of Authorized Network Access on which specific services subscribed by a subscriber can be used.

5.3.1 ApplicationService

5.3.1.1 Definition

This IOC is an abstract class provided for subclassing only.

In this management context:

a) This class represents a service provided by an application server.

b) This class contains the valid parameters that define the Application server service from subscription point of view.

5.3.1.2 Attributes

None.

5.3.2 ApplicationServiceProfile

5.3.2.1 Definition

This is an abstract IOC provided for sub-classing only.

This class represents all the parameters related to specific service provided in an application server.

5.3.2.2 Attributes

None

5.3.3 CommonServiceProfile

5.3.3.1 Definition

This class represents a collection of common service and user related data.

5.3.3.2 Attributes

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
commonServiceProfileId	TBD	TBD	TBD
referenceLocation	TBD	TBD	TBD
bandwidthPerService	TBD	TBD	TBD
subscribedQoS	TBD	TBD	TBD

5.3.4 NgnNetworkAccess

5.3.4.1 Definition

In this management context:

a) This class represents a NGN network access provided by a service provider.

b) This class contains the valid parameters that define the NGN network access from subscription point of view.

5.3.4.2 Attributes

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
ngnNetworkAccessId	TBD	TBD	TBD

5.3.5 NgnSubscribedNetworkAccess

5.3.5.1 Definition

In this management context, this class represents subscription to a NGN network access.

5.3.5.2 Attributes

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
ngnSubscribedNetworkAccessId	TBD	TBD	TBD
ngnNetworkAccessType	TBD	TBD	TBD

5.3.6 NgnIMSServiceProfile

5.3.6.1 Definition

In this management context:

a) This class represents an IMS Service Profile.

b) This class inherits from IMSServiceProfile IOC defined in [7].

5.3.6.2 Attributes

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
listofSharedIFCSetIdentifiers	TBD	TBD	TBD
theApplicationServiceProfile	TBD	TBD	TBD

NOTE 1: The Current Initial Filter Criteria attribute defined in 3GPP IMSServiceProfile IOC does not fulfil the IMS Service Profile requirements since an IMS Service Profile may contain multiple Initial Filter Criteria.

NOTE 2: The Implicit Registration Public Identity Set attribute is not represented in the present document, because currently it is present in neither 3GPP IMSPublicIdentification IOC nor 3GPP IMSServiceProfile IOC.

NOTE 3: The Attribute "Services related to unregistered state" which is associated to each IMS Public User Identity is currently present in neither 3GPP IMSPublicIdentification IOC nor 3GPP IMSServiceProfile IOC.

NOTE 4: The attributes contained in the IMSServiceProfile IOC and that are related to GAA (3GPP Generic Authentication Architecture) are not IMS Specific.

5.3.7 NgnNetworkAccessProfile

5.3.7.1 Definition

This class represents a collection of network access and user related data. A NgnNetworkAccessProfile is possibly linked to a list of NgnNetworkAccessSubProfile depending on the subscribed NGN Network Access.

5.3.7.2 Attributes

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
ngnNetworkAccessProfileId			
nassUserId	TBD	TBD	TBD
uaafId	TBD	TBD	TBD

5.3.8   NgnNetworkAccessSubProfile

5.3.8.1   Definition

The IOC contains the parameters related to a ngn network access sub profile which contains user authentication data (list of supported authentication methods, key materials etc.) and information related to the required network access configuration.

5.3.8.2   Attributes

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
ngnNetworkAccessSubProfileId	TBD	TBD	TBD
theLogicalAccess	TBD	TBD	TBD
networkAccessAuthenticationData	TBD	TBD	TBD
setofQoSProfileInfo	TBD	TBD	TBD
initialGateSettings	TBD	TBD	TBD
privacyIndicator	TBD	TBD	TBD

5.3.9   NgnPhysicalAccess

5.3.9.1   Definition

This class contains parameters identifying one Physical Access associated to a subscribed Ngn Network Access.

5.3.9.2   Attributes

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
ngnPhysicalAccessId	TBD	TBD	TBD
physicalAccessId	TBD	TBD	TBD
defaultNassUserId	TBD	TBD	TBD
ngnLocationInformation	TBD	TBD	TBD

5.3.10   NgnLogicalAccess

5.3.10.1   Definition

This class contains parameters identifying one Logical Access associated to a subscribed Ngn Network Access.

5.3.10.2   Attributes

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
ngnLogicalAccessId	TBD	TBD	TBD
logicalAccessId	TBD	TBD	TBD
racsPointofContact	TBD	TBD	TBD

5.3.11   NgnSuMCredentials

5.3.11.1   Definition

In this management context:

   a)   This class represents a User's credentials.

   b)   This class contains the valid parameters that define the credentials from subscription point of view.

   c)   This class inherits from the SuMCredentials IOC defined in [7].

5.3.11.2   Attributes

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
authenticationData	TBD	TBD	TBD
authenticationSchema	TBD	TBD	TBD

5.3.12   SubscribedApplicationService

5.3.12.1   Definition

This IOC is an abstract class provided for subclassing only.

In this management context, this class represents subscription to a service provided by an application server or other TISPAN NGN Subsystem such IPTV subsystem.

5.3.12.2   Attributes

None.

5.3.13   SuMSubscribedServiceGroup

5.3.13.1   Definition

In this management context:

a)   This class represents a set of subscribed services by a subscriber.

b)   A subscriber can have multiple sets of subscribed service groups.

5.3.13.2   Attributes

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
suMSubscribedServiceGroupId	TBD	TBD	TBD
theSuMSubscribedService	TBD	TBD	TBD

5.3.14   UserServiceInstance

5.3.14.1   Definition

This class represents all the parameters related to specific service and that can be configured or personalized by the user. One or multiple UserServiceInstance may be contained by one IMSServiceProfile IOC or by one ApplicationServiceProfile IOC.

5.3.14.2   Attributes

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
userServiceInstanceId	TBD	TBD	TBD
serviceState	TBD	TBD	TBD
serviceOptions	TBD	TBD	TBD
serviceData	TBD	TBD	TBD

5.4 Information relationship definitions

Each information relationship is defined using the following structure.

5.4.1 relatedLogicalAccess

5.4.1.1 Definition

This represents the relationship between NgnNetworkAccessSubProfile and NgnLogicalAccess.

5.4.1.2 Roles

Name	Definition
theLogicalAccess	Represents the logical access IOCs applicable for the user in this network access sub-profile.

5.4.2 relatedApplicationServiceProfile

5.4.2.1 Definition

This represents the relationship between NgnIMSServiceProfile IOC and ApplicationServiceProfile IOC.

5.4.2.2 Roles

Name	Definition
theApplicationServiceProfile	Represents the Application Service Profile IOCs associated that may be associated to an IMS Service Profile.

5.4.3 relatedSuMSubscribedService

5.4.3.1 Definition

This represents the relationship between SubscribedServiceGroup IOC and SuMSubscribedService IOC.

5.4.3.2 Roles

Name	Definition
theSuMSubscribedService	Represents the SuMSubscribedService IOCs associated to a SuMSubscribedServiceGroup.

5.5 Information attribute definitions

5.5.1 Definition and legal values

The following table defines the attributes that are present in several IOCs of the present document.

The attributes related to 3GPP IOCs are defined in [7].

Attribute Name	Definition	Legal Values (see note)
ngnNetworkAccessId	Identifier of a network access assigned by the service provider.	
ngnNetworkAccessType	Identifies the type of the network access (xDSL, GPRS, etc.).	
referenceLocation	A set of parameters describing the nominal network access for which the user subscribes to his service.	
bandwidthPerservice	characterizes the maximum bandwidth associated with a service profile. It is a fraction (or all) of the Subscribed network access bandwidth.	
subscribedQoS	Identify the quality of service subscribed for specific access.	
userServiceInstanceId	Identifier of the UserServiceInstance IOC.	
serviceState	Identifies if the service is active or not.	
serviceOptions	Identifies options relative to a specific service.	
serviceData	The Service Data represents the specific data associated with a service.	
nassUserId	Represent the identity of the user attached on the network access.	
uaafId	Identify the UAAF or the proxy UAAF that need to be queried in case no NASS User ID is received from the UAAF.	
ngnNetworkAccessSubProfileId	Identifier of the NgnNetworkAccessSubProfile IOC.	
networkAccessAuthenticationData	Authentication data for network access.	
setofQoSProfileInfo	A list of QoS profile information.	
initialGateSettings	Consist in the list of allowed destinations with their associated uplink and downlink bandwidth.	
privacyIndicator	Indicates whether location information can be exported to services and applications.	
ngnPhysicalAccessId	Identifier of the NgnPhysicalAccess IOC.	
physicalAccessId	Identify the physical access to which the user equipment is connected.	
defaultNassUserId	NASS User ID is used to query the UAAF in case no NASS User ID is received from the UAAF.	
ngnLocationInformation	Information related to the location of the default NASS User and may take various forms (e.g. network location, geographical coordinates, post mail address, etc.).	
ngnLogicalAccessId	Identifier of the NgnLogicalAccess IOC.	
logicalAccessId	Identify the logical access used by the attached user equipment (for example, in xDSL case, the Logical Access ID may explicitly contain the identity of the port, VP and/or VC carrying the traffic.	
racsPointOfContact	Identifier of the RACS element where the Network Access Profile should be pushed.	
authenticationData	Used during registration and consist in A quintuplet vector when AKA authentication is used. A secret when HTTP DIGEST authentication is used. A Location Information when NASS-BUNDLED authentication is used.	
authenticationSchema	Identify the used authentication method used during the user registration phase (for example: AKA, HTTP DIGEST, NASS-BUNDLED, or other).	
ListofSharedIFCSetIdentifiers	List of identifiers of SharedIFCSets.	
ListofUserServiceInstanceID	List of UserServiceInstance IOCs.	
NOTE: Legal Values will be defined the next release.		

NOTE 1: The 3GPP IOCs identifiers are based on the name convention described in TS 132 300 [9].

NOTE 2: The TISPAN IOCs identifiers have not yet been defined. This issue is to be discussed with 3GPP SA5.

Annex A (normative):
Portion of 3GPP SuM NRM IS utilized in TISPAN SuM IM

The following diagrams represent an extract from the 3GPP SUM NRM IS which is relevant for the TISPAN SUM Information Model.
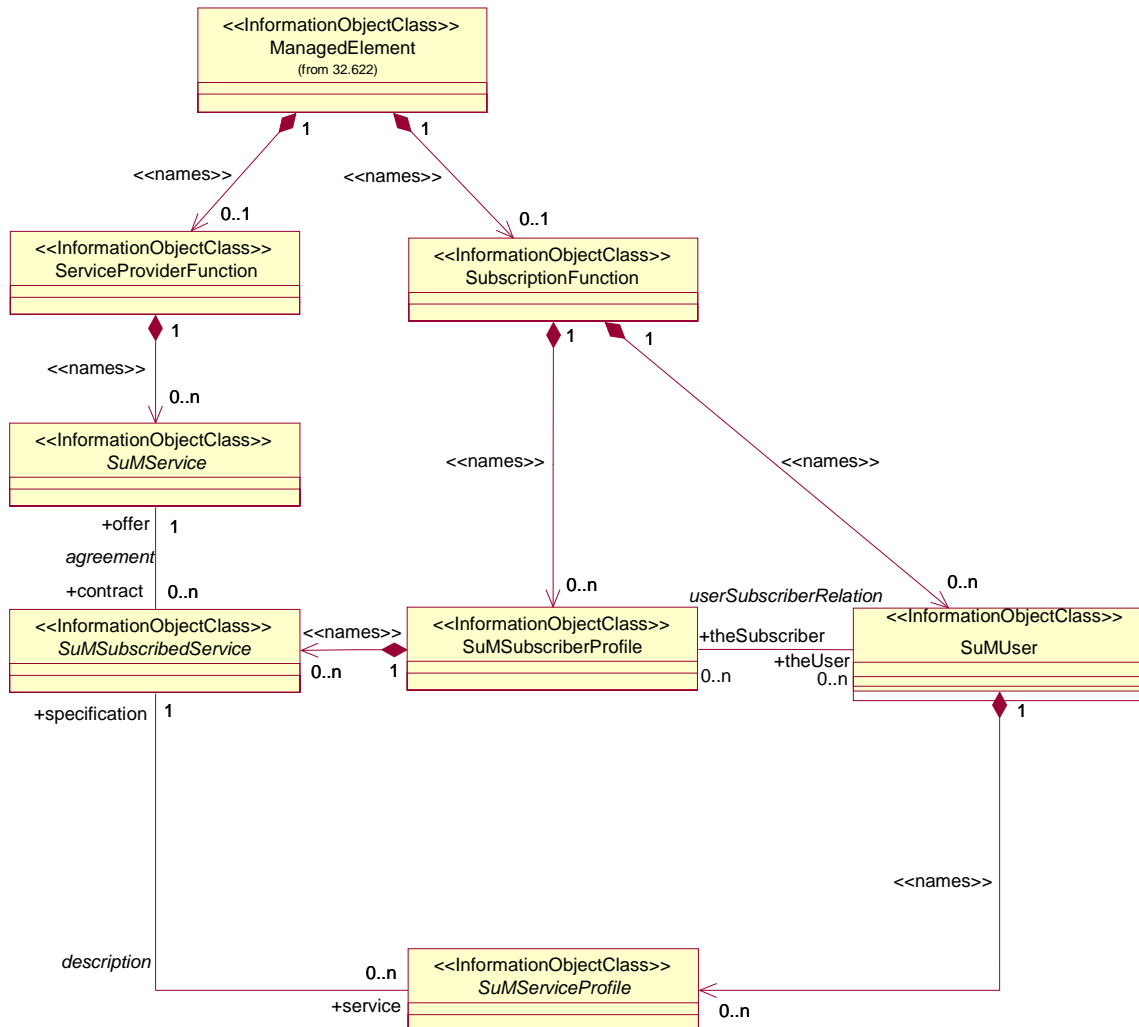

Figure A.1: 3GPP SuM NRM Containment/Naming and Association diagram1

NOTE 1:   The current model in [7] has the SuM IOCs contained by the ManagedElement IOC. This usage of the ManagedElement IOC presents issues in the context of TISPAN SuM related to the fact that this entity has in the definition the following text: "This IOC represents telecommunication equipment or TMN entities within the telecommunications network that performs Managed Element (ME) functions, i.e. provides support and/or service to the subscriber" [8]. The question is if ManagedElement has a too strong correspondence with traditional Network Equipment and its management by Network or Element Management systems to be used for the TISPAN SuM (NOSI) interfaces - for example where applications are being executed in virtualised computing and storage domains. TISPAN SuM needs to address the containment of these SuM information classes in Operations Support Systems including Service Management Systems, Value Added Service Provider and Application Servers. One proposed solution of this issue is described in annex B.

NOTE 2:   The following issue is for further study within subsequent TISPAN releases. Should the TISPAN SuM model be constrained to use the strong composition relationship with its implied cascade delete semantics, or should it use an alternative such as the more relaxed aggregation relationship?
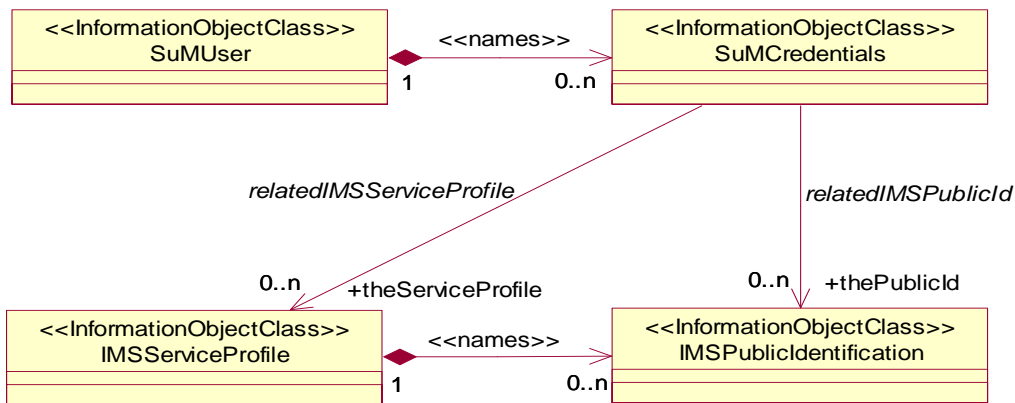
Figure A.2: 3GPP SuM NRM Containment/Naming and Association diagram 2

Annex B (informative):
Description of ManagedElement IOC Issue

The TISPAN SuM Information Model needs to be used in domains such as Service Management, Application Servers and by Value Added Service Providers.

The use in TISPAN SUM of ManagedElement as the root under which all SuM Information Classes is an issue since:

- It carries physical semantics which may seem inappropriate for Service Management where integration with the TMF SID Model is important. Specifically the attributes of ManagedElement, such as VendorName and LocationName, further reinforce this physical viewpoint e.g. locationName - The physical location of this entity (e.g. an address).

- The containment tree in Application Server need to support industry virtualised computing and Storage models.

- A potential realization of a TISPAN SuM IM could be by the use of 3GPP GUP for which containment in a GUP Server function is needed.

One possible way of addressing this issue is described below. There may be other alternative solutions as well. This proposal is to replace ManagedElement by an Abstract Class "Management Entity" from which ManagedElement inherits as shown below.
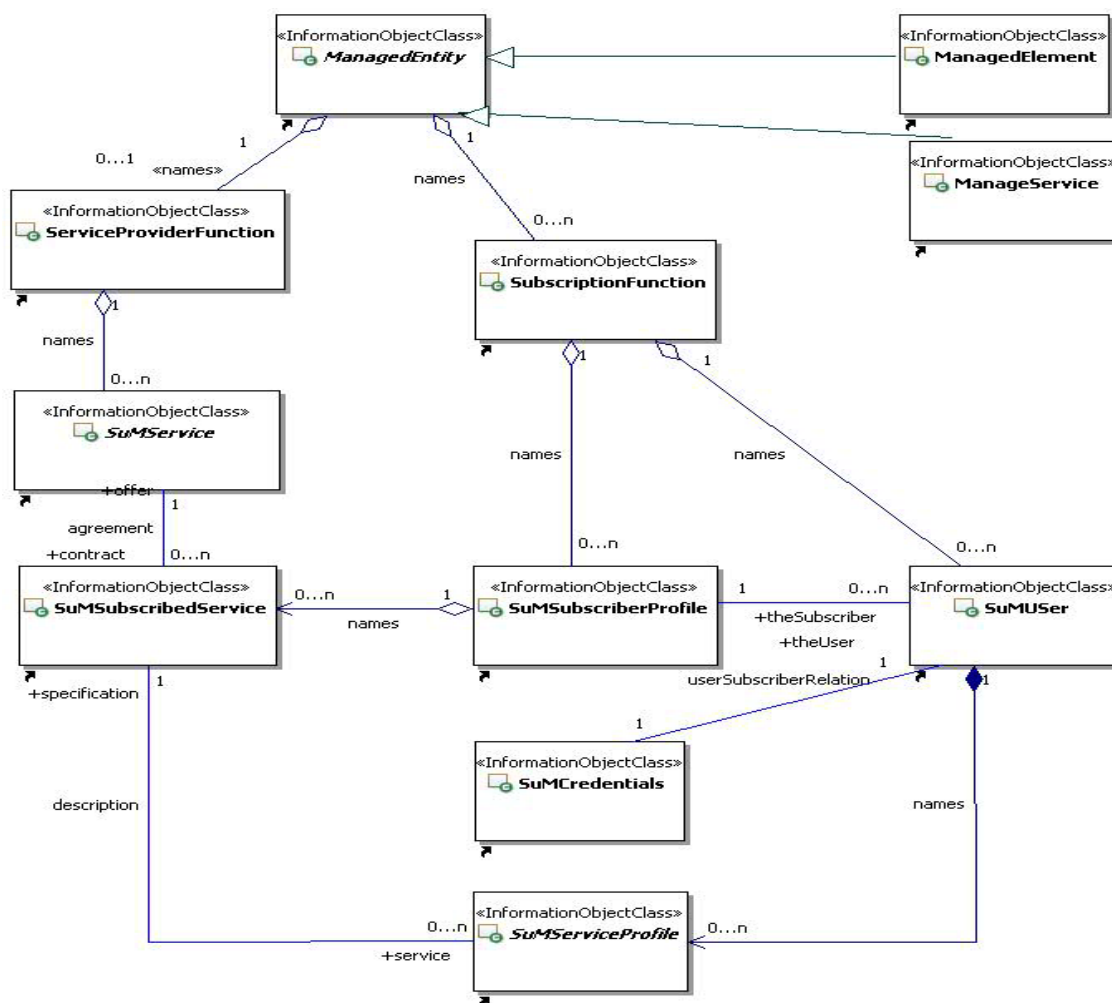

Figure B.1: Revised harmonized TISPAN SUM IM/3GPP SUM NRM IS containment model

The meaning of abstract is that it can not be directly instantiated. It requires sub-classing as one or more concrete classes by either the existing ManagedElement in the 3GPP domains, or by any other suitable containment classes such as ManagedServiceEntity as illustrated above.

The advantages of the approach shown above are:

- The use of an abstract container class allows extensibility of the containment hierarchy to meet the actual requirements of specific TISPAN NOSI Groups.

- TeleManagement Forum (TMF) SID classes and linkage to the TMF eTOM could be more readily incorporated which is expected to be significant for implementation of SuM in Service Management Systems and the liaisons that are being progressed with the TMF.

Annex C (informative):
SuM Information Reference Table

The following table depicts all the information used within the present document, and its corresponding definition and location in 3GPP and TISPAN specifications.

Information	Reference (TISPAN and/or 3GPP)	NGN Functional entity Location
Authentication Data	TS 123 008 [6] and ES 282 007 [3]	
Private User Identity	TS 123 008 [6], clause 3.1.1	UPSF
Authentication Schema	TS 123 008 [6] and ES 282 007 [3]	
Physical Access ID	ES 282 004 [4], clause 5.2.3.1	NACF, PDBF, CLF
Logical Access ID	ES 282 004 [4], clause 5.2.3.1	NACF, PDBF, CLF
RACS Point of Contact	ES 282 004 [4]	
Location Information		
Network Access Type	ES 282 004 [4], clause 5.2.3.1	CLF
NASS User ID	ES 282 004 [4]	
UAAF ID	ES 282 004 [4]	
Sub Profile ID	ES 282 004 [4]	PDBF
Initial Gate Settings	ES 283 034 [5]	PDBF
QoS Profile Info	ES 283 034 [5]	PDBF
Privacy Indicator	ES 283 034 [5]	PDBF
Network Access Authentication Data	ES 282 004 [4], clause 4.4	NACF, PDBF
NGN Service Identifier		AS, UPSF optional
Service State		AS, UPSF optional
Service Options	Part of ServiceInfo defined in TS 129 228 [11] and TS 129 240 [13]	AS, UPSF optional
Service Data	Part of ServiceInfo defined in TS 129 228 [11] and TS 129 240 [13]	AS, UPSF optional
NGN Service Profile Identifier	Identifier of the NGN Service Profile	AS
Public User Identity	TS 123 008 [6], clause 3.1.2	UPSF, AS
Initial Filter Criteria	TS 123 008 [6], clause 3.5.2	UPSF
Application Server Information	TS 123 008 [6], clause 3.5.3	UPSF
Service Indication	TS 123 008 [6], clause 3.5.4	UPSF, one or more AS
Barring Indication	TS 123 008 [6], clause 3.1.3	UPSF
List of authorized visited network identifiers	TS 123 008 [6], clause 3.1.4	UPSF, PDBF, NACF
Services related to unregistered state	TS 123 008 [6], clause 3.1.5	UPSF
Implicitly registered public user identity sets	TS 123 008 [6], clause 3.1.6	UPSF
Default public user identity indicator	TS 123 008 [6], clause 3.1.7	UPSF
Reference location		CLF, UPSF
Registration status	TS 123 008 [6], clause 3.2.1	UPSF
Subscribed media profile identifier	TS 123 008 [6], clause 3.6.1	UPSF
Network Handling	TS 123 008 [6], clauses 3.2.2, 3.2.3, 3.2.4 and 3.4.1	S-CSCF Name: UPSF; AS Name: UPSF; Diameter client: UPSF; Diameter Server: S-CSCF; Server Capabilities: UPSF
Bandwidth capacity per service		
Subscribed quality of service		
Shared IFC Set Identitfier	TS 123 008 [6], clause 3.5.5	UPSF

Annex D (informative):
Mapping High Level Model to Information Model

The following table gives a mapping of the candidate management entities identified in the High Level Model (clause 4) and associated IOCs in the SUM IM.

High Level Candidate Management Entity	Corresponding IOC in the SUM IM
Subscriber	SuMSubscriberProfile
Subscription	SuMSubscribedServiceGroup
User	SuMUser
Subscribed NGN Services	For IMS Service: IMSSubscribedService IOC For Application Server Service: SubscribedApplicationService IOC For other services: Inherit from SuMSubscribedService IOC
Subscribed Network Access	NGNSubscribedNetworkAccess IOC
Logical Access	NgnLogicalAccess IOC
Physical Access	NgnPhysicalAccess
Location	Attribute in the NgnPhysicalAccess IOC
User NGN Network Access Profile	NgnNetworkAccessProfile
Sub Profile	NgnNetworkAccessSubProfile
User NGN Service Profile	For IMS Service Profile: IMSServiceProfile IOC For AS Service Profile: ApplicationServiceProfile IOC For other service profile, Inherit from SuMServiceProfile IOC
User Service Instance	UserServiceInstance IOC
Credentials	SuMCredentials IOC
IMS Service Profile	IMSServiceProfile IOC

Annex E (informative):
NASS Information

This annex describes the data that need to be provisionned within the Network Attachment Subsystem (NASS) in order to allow registration of users at access level.

E.1   NASS Overview

The Network Attachment Subsystem (NASS) provides registration at access level and initialization of User Equipment (UE) for accessing to the TISPAN NGN services. The NASS provides network level identification and authentication, manages the IP address space of the Access Network and authenticates access sessions. The NASS also announces the contact point of the TISPAN NGN Service/Applications Subsystems to the UE.

Network attachment through NASS is based on implicit or explicit user identity and authentication credentials stored in the NASS.

The Network Attachment Subsystem provides the following functionalities:

- Dynamic provision of IP address and other user equipment configuration parameters (e.g. using DHCP).

- User authentication, prior or during the IP address allocation procedure.

- Authorization of network access, based on user profile.

- Access network configuration, based on user profile.

- Location management.

As depicted in the following figure, the Network Attachment Subsystem (NASS) comprises the following functional entities:

- Network Access Configuration Function (NACF).

- Access Management Function (AMF).

- Connectivity Session Location and Repository Function (CLF).

- User Access Authorization Function (UAAF).

- Profile Data Base Function (PDBF).
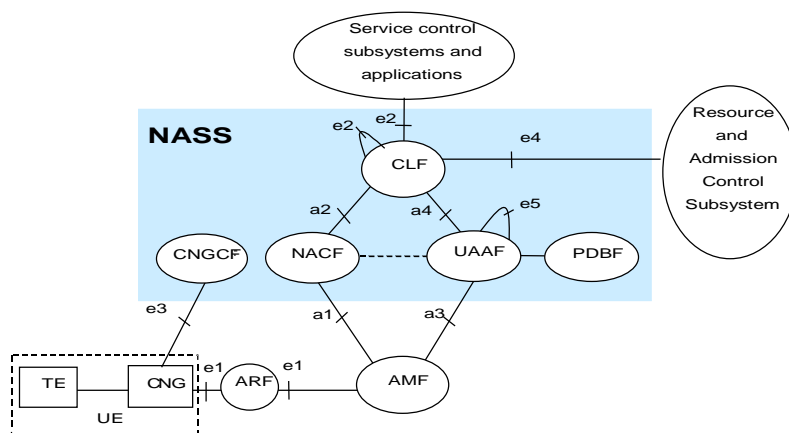
- CNG Configuration Function (CNGCF).

**Figure E.1: NASS Functional Architecture**

E.2   NACF Data

The NACF is responsible for the IP address allocation to the UE. It may also distribute other network configuration parameters such as address of DNS server(s), address of signalling proxies for specific protocols (e.g. address of the P-CSCF when accessing to the IMS). The data contained within the NACF are outscope of TISPAN Subscription Management, since they are not user or subscription specific but network configuration specific.

E.3   CNCGF Data

The CNCGF is used during initialization and update of the CNG. The CNCGF Provides to the CNG with additional configuration information (e.g. configuration of a firewall internally in the CNG, QoS marking of IP packets, etc). This data differs from the network configuration data provided by the NACF. The data contained within the CNCGF are out scope of the current release of TISPAN Subscription Management as stated in TS 188 002-1 [1].

E.4   UAAF/PDBF Data

The User Access Authorization Function (UAAF) performs user authentication, as well as authorization checking, based on user profiles, for network access. For each user, the UAAF retrieves authentication data and access authorization information from the user network profile information contained in the PDBF. The Profile Database Function (PDBF) is the functional entity that contains user authentication data (e.g. user identity, list of supported authentication methods, authentication keys…) and information related to the required network access configuration: these data are called "user network profile". This profile may be sub-divided into sub-profiles as shown in figure E.2. Each sub profile is associated to one or more Logical Access ID. Support of the Logical Access ID is optional.
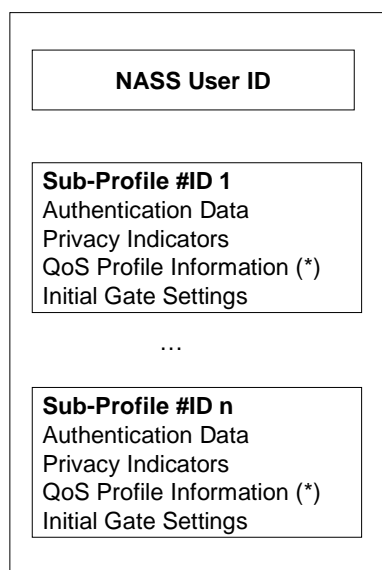
Figure E.2: PDBF Data

E.5   CLF Data

The Connectivity Session Location and Repository Function (CLF) registers the association between the IP address allocated to the UE and related network location information provided by the NACF, i.e.: Logical Access ID, Physical Access ID, Address Realm, etc. The CLF registers the association between network location information received from the NACF and geographical location information. The CLF may also store the identity of the user/UE to which the IP address has been allocated (information received from the UAAF), as well as the user network QoS profile and user preferences regarding the privacy of location information. In case the CLF does not store the identity/profile of the user/UE, the CLF shall be able to retrieve this information from the UAAF. The CLF holds a number of records representing active sessions. These records contain information received from the NACF and the UAAF, and additional statically configured data.

As defined in ES 282 004 [4] (clause 5.2.3.1), the CLF shall be able to carry out the following operations:

- Derive the NASS User ID and location information from the physical access ID.

- Derive the RACS point of contact and Access Network type from the logical access ID.

To allow the CLF to perform the above operations, the CLF shall be provisionned with the information described in the following figure.
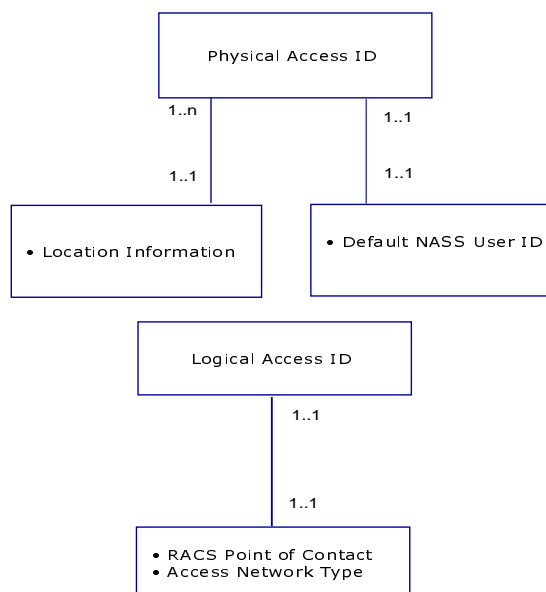

Figure E.3

In addition to the precedent operation, the CLF shall be able to retrieve (request) the user network profile from the UAAF (see ES 282 004 [4], clause 5.3.4.2). To allow the CLF to perform these requests, the CLF shall be provisioned with the information described in the following figure.
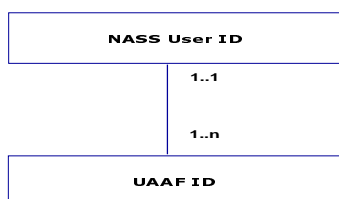

Figure E.4

E.6   AMF Data

The Access Management Function (AMF) translates network access requests issued by the UE. It forwards the requests for allocation of an IP address and possibly additional network configuration parameters to/from the NACF; AMF forwards requests to the User Access Authorization Function (UAAF) to authenticate the user, authorize or deny the network access, and retrieve user-specific access configuration parameters.

The data contained within the AMF is out scope of the TISPA Subscription Management.

Annex F (informative):
SuM Scenarios

This annex provides some examples of scenarios supported by SuM.

F.1   Scenario 1

A company, or its nominated representative, as subscriber, with several subscriptions (e.g. one for sales dept, one for manufacturing, one for senior management). Each subscription having a set of services and/or network access each with a number of users. The Subscriber can allocate a person, or system, to be a User of one or more Subscriptions. Each user being able to customize services.

> EXAMPLES:
>
> - A senior manager, with the same User identifier, can access also the services of the 3 subscriptions.
>
> - A member of the manufacturing department, who is only allocated to one subscription, can only access the services of that subscription.

Note that the Subscription is only way for gathering services into a package
(for example: Subscription A = VoIP + VOD, Subscription B = VoIP + IPTV + VOD + Mobile, etc).

Annex G (informative):
Bibliography

ETSI TR 121 905: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Vocabulary for 3GPP Specifications (3GPP TR 21.905 (Release 7)".

ETSI TS 123 228: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia Subsystem (IMS); Stage 2 (3GPP TS 23.228 Release 8)".

History

Document history		
V2.0.0	March 2008	Publication