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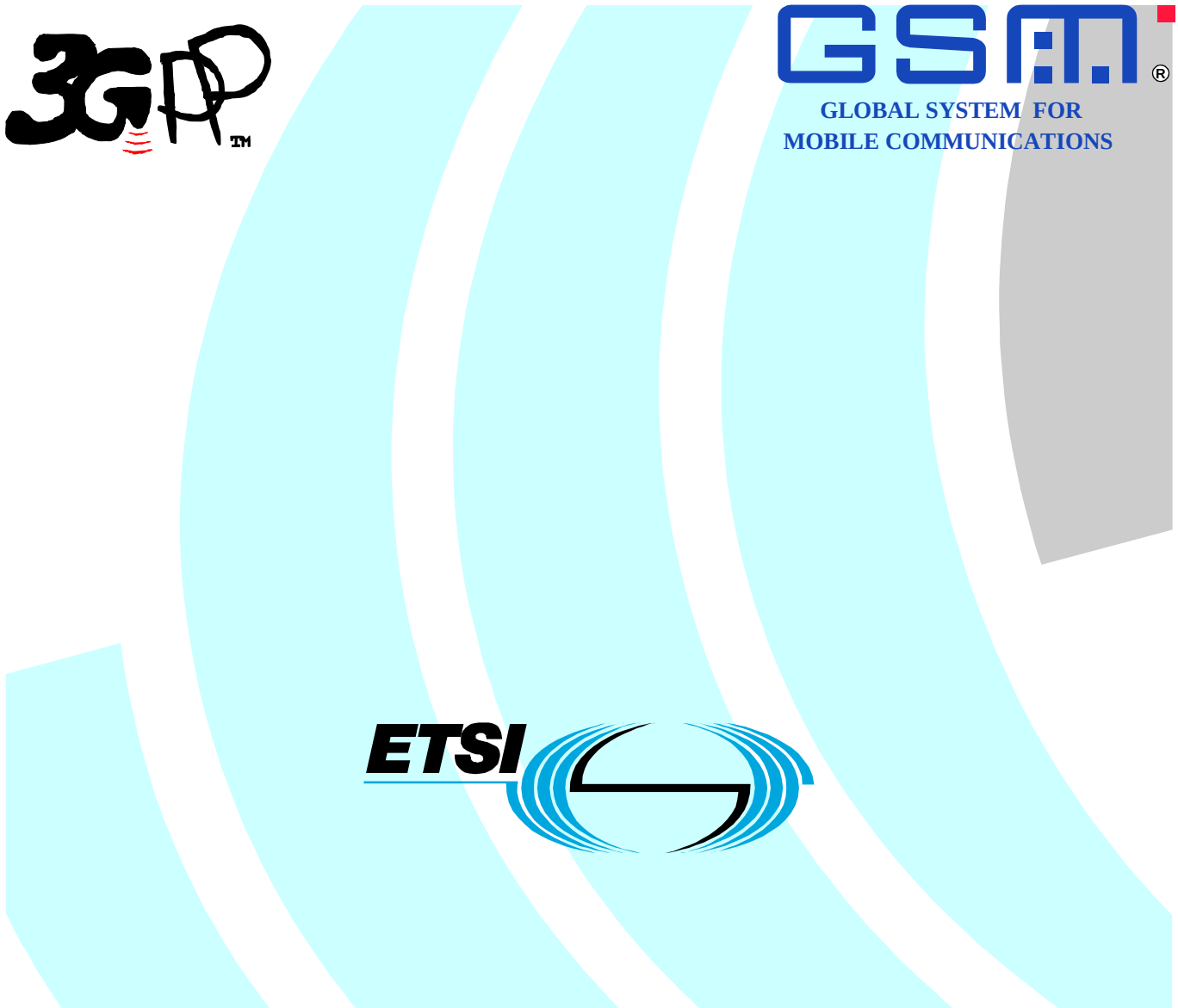
Technical Specification

Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
Telecommunication management;
Subscription Management (SuM) requirements
(3GPP TS 32.140 version 6.3.0 Release 6)



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Foreword

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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Introduction

The present document is part a TS-family covering the 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management, as identified below:

TS 32.140: "Subscription Management (SuM) requirements".

TS 32.141: "Subscription Management (SuM) architecture".

TS 32.171: "Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): Requirements".

TS 32.172: "Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS)".

TS 32.175: "Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): eXtensible Markup Language (XML) definition".

Subscription Management (SuM) is a feature which will develop over a number of 3GPP releases. It is intended to permit Service Providers, Value Added Service Providers and Mobile Operators to provision services for a specific subscriber. The feature is necessary to allow Service Providers and Operators to provision, control, monitor and bill the configuration of services that they offer to their subscribers. SuM focuses on the OAM processes to manage subscription information. These correspond to the 'Fulfilment' Process areas of the TeleManagement Forum Telecom Operations Map [3].

Within the current version of the present document this is limited to a single operator's network.

SuM is an area of service operation management that sets a complex challenge for Service Providers and Operators in their support of new or existing subscribers during their every day network operation.

In 2G solutions the main repository of the subscription information is in the Home Locations Register (HLR). However the management and administration interfaces for controlling this information is proprietary to each vendor. The use of proprietary interfaces is inconvenient for those Operators using multiple vendors' equipment since their provisioning systems have to accommodate multiple proprietary interfaces, which perform essentially identical functions. Moreover, it makes it more difficult to generate customer self care applications that allow subscribers to provision, and amend subscription data.

The 3G environment requires more complex service delivery mechanisms than in 2G and SuM is no longer simply an internal matter for a single operator but a capability that is achieved by linking together features across multiple Service Providers and Operators Operations Support Systems (OSS). Historically, the services provided by Operators have been defined within standards groups such as ETSI or 3GPP. With the advent of Open Services Access (OSA) being adopted by 3GPP the User Service Definitions will be replaced by Service Capabilities traded amongst Service Providers and Network Operators. This will allow Operators and Service Providers to define customized service environments that roam with users as they move amongst networks - this is the Virtual Home Environment (VHE) 3GPP TR 22.121 [9]. This customized service environment means that subscription information is held in a number of locations including the Home Network, the Visited Network, the User Equipment, Application VASP Equipment (e.g. servers accessed by the subscriber for content and information based services) and the Operations Systems of the Service Providers, and Operators supporting the subscriber's service subscription.

Service delivery and support across multiple vendors' solutions and organizations is a feature of other industries, and the solutions adopted are secure supply chain solutions based upon mainstream e-commerce principles, methods and technologies.

There is a relationship between this feature and the PS Domain, CS Domain, IP Multimedia Subsystem (IMS), Authentication Center (AuC), Open Services Access (OSA) and Generic User Profile (GUP) documented in other 3GPP specifications.

Integration Reference Points (IRPs) are specified in separate TSs.

1 Scope

The present document defines the service requirements and high-level architecture for SuM.

SuM is expected evolve in stages over several releases of 3GPP specifications.

The present document provides additional supporting material, which whilst not within the scope of this release, provides an insight towards the future evolution. This is in order that initial work may be done with an appreciation of the wider context expected in future releases of 3GPP specifications.

SuM for 3GPP is primarily concerned with the ability to define subscription profiles and associate the profile with subscribers, users and services that are authorized by agreements. The subscription profile may be used in the process of configuring various network resources (access and core) to make the service a reality for the user.

The management capabilities extend to the creation, modification, synchronization, and re application of subscription profiles.

The present document is oriented towards a standardized interface into the Home Subscriber Server (HSS) in order that services can be provisioned and maintained.

The present document includes information applicable to Network Operators, content providers, and terminal and network manufacturers.

The present document contains the core requirements for SuM, which are sufficient to provide management services.

The method by which applications subscribe to OSA is not within the scope of the present document.

2 References

The following documents contain provisions, which through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.002: "Network architecture".

[3] GB910 Telecom Operations Map v 2.1 (TeleManagement Forum).

[4] MWIF MTR-002 (Annex A): "Architecture requirements".

[5] ebXML Transport Routing and Packaging Overview and Requirements 26th May 2000 v0-96.

[6] 3GPP TS 32.101: "Telecommunication management; Principles and high level requirements".

[7] 3GPP TS 23.008: "Organisation of subscriber data".

[8] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[9] 3GPP TR 22.121: "Service aspects; The Virtual Home Environment; Stage 1".

[10] 3GPP TS 29.198-03: "Open Service Access (OSA) Application Programming Interface (API); Part 3: Framework".

[11] 3GPP TS 22.240: "Service requirements for 3GPP Generic User Profile (GUP); Stage 1".

[12] 3GPP TS 23.240: "3GPP generic user profile requirements; Stage 2; Architecture

[13] 3GPP TS 23.241: "3GPP Generic User Profile (GUP) requirements; Stage 2; Data description framework".

[14] 3GPP TS 24.241: "3GPP Generic User Profile (GUP) requirements; Stage 3; Access; Common objects".

[15] 3GPP TS 22.041: "Operator Determined Call Barring".

[16] 3GPP TS 23.015: "Technical realisation of Operator Determined Barring (ODB)".

[17] 3GPP TS 32.102: "Telecommunication management; Architecture".

[18] 3GPP TS 32.803: "Telecommunication management; Process guide; Use cases in Unified Modelling Language (UML)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply:

actor: entity, party, person or organization playing one or more roles.

Integration Reference Point (IRP): See 3GPP TS 32.102 [17].

Network Operator (NO): See 3GPP TR 21.905 [1].

organization: 'legal entity' that may perform one or more 'business roles' when interacting with other organizations.

PLMN operator: See 3GPP TR 21.905 [1].

reseller Service Provider (SP): actor that resells services provided and defined technically by another service provider. The reseller may re-brand the service or offer a modified tariff package to its customers.

retailer: organization that sells 3GPP User Equipment (UE) and services to retail customers.

role: defined by a set of properties or attributes that describe the capabilities of an entity that can be performed on behalf of other role(s). An activity performed by an actor. Each actor can play many roles.

service: See 3GPP TR 21.905 [1].

service integrator: organization that takes a set of services from other providers and derives an end-to-end set of services. It has responsibility for the end to end service QoS to the customer.

Service Profile (SProf): a service specific subscription profile component.

Service Provider (SP): See 3GPP TR 21.905 [1].

subscribed services profile: contains identifications of subscribed services, their status and reference to service preferences; this is a component of the subscriber profile.

subscriber: See 3GPP TR 21.905 [1].

subscriber profile: The set of data managed and stored by Subscription Management (SuM) for a subscriber for the management of associated users and subscribed services and the limits relative to their use.

subscription: See 3GPP TR 21.905 [1].

Subscription Management (SuM): set of capabilities that allow Operators, Service Providers (SPs), and indirectly subscribers, to provision, control, monitor the subscription profile.

subscription profile: The set of data managed and stored by network domains and subsystems for the operation and execution of the services provided to a specific user associated with a subscriber.

subscription profile component: discrete subset of the subscription profile that may be stored or managed separately from other subsets e.g. components that may be stored in different domains, subsystems or replicated using different synchronization rules.

trusted third party: organization that performs an agreed role on behalf of two or more other organizations (e.g. authentication, trust, market place services etc.).

user: See 3GPP TR 21.905 [1].

Value Added Service Provider (VASP): See 3GPP TR21.905 [1].

3.2 Abbreviations

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

2G	Second Generation Mobile
3G	Third Generation Mobile
API	Application Programming Interface
AuC	Authentication Center
B2B	Business to Business
CS	Circuit Switch
DDM	Data Definition Method
EIR	Equipment Identity Register
GTT	Global Text Telephony
GUP	Generic User Profile
HLR	Home Location Register
HSS	Home Subscriber Server
IMS	IP Multimedia Subsystem
IRP	Integration Reference Point (see 3GPP TS 32.102 [17])
MMS	Multimedia Messaging Service
MWIF	Mobile Wireless Internet Forum
NPDB	Number Portability Data Base
OAM	Operations, Administration and Maintenance
OSA	Open Services Access
OSS	Operations Support System
PS	Packet Switch
QoS	Quality of Service
SP	Service Provider
SProf	Service Profile
SuM	Subscription Management
TOM	Telecom Operations Map (TMF)
UICC	Universal Integrated Circuit Card
USIM	Universal Subscriber Identity Module
VASP	Value Added Service Provider
VHE	Virtual Home Environment
VPLMN	Visited Public Land Mobile Network

4 General description

4.1 Subscription Management (SuM) concept

The 3G environment requires more complex service delivery mechanisms than in 2G. The following drivers are leading to a need to standardize SuM Interfaces:

- Use of different vendor's equipment for 2G/2.5G and 3G.
- The trend in 2/2.5G toward the support of Virtual Network Operators and Content Providers requiring standardized interfaces amongst them.

Service delivery and support across multiple vendors' solutions and organizations is a feature of other industries, and the solutions are adopted are secure supply chain solutions based upon mainstream e-commerce principles, methods and technologies.

SuM is an area of service operation management that permits Service Providers and Operators to provision services for a specific customer service subscription.

Specific 3G areas that SuM requirements must address are:

- Subscription information is distributed across in a number of locations including the Home Network, the Visited Network, the User Equipment, Application VASP equipment (e.g. servers accessed by the subscriber for content and information based services).
- SuM will allow Service Providers and Operators to provision, control and monitor the subscription information.
- SuM is not simply an internal matter for a single operator but a capability that is achieved by linking together features across multiple Operators' Operations Support Systems (OSSs).
- SuM will need to manage subscription information in e.g. the OSSs, HSS, UE, OSA, MMS and IMS subsystems.
- The common components between the GUP and the subscription profile.

The conceptual model for SuM is illustrated in figure 1.

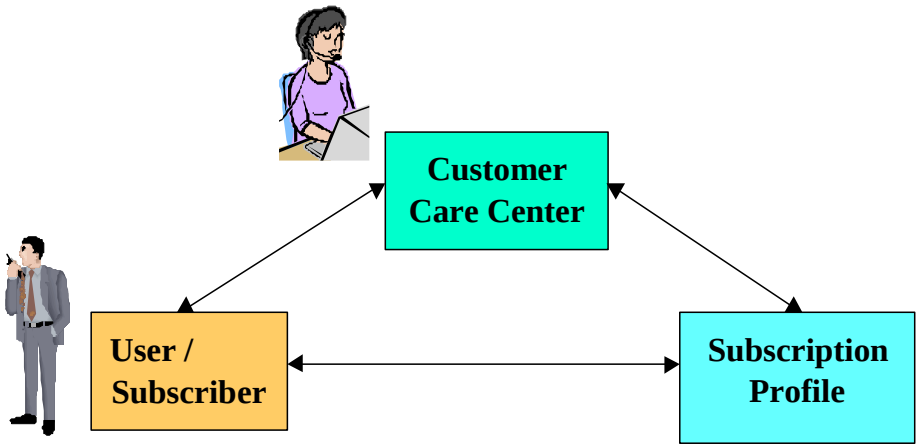

Figure 1: High level view of Subscription Management (SuM)

SuM is concerned with provisioning the subscription profile throughout all the systems and trading partners needed to realize the customer service, SuM provides specifications that define the interfaces and the procedures that interconnect the three points of the SuM triangle: Customer Care Center, the User and the network (s) where the Subscription profile resides (such as HSS, USIM, etc.).

4.2 Partnership with TMF's Telecom Operations Map (TOM)

The TMF Telecom. Operations Map as defined in GB910 [3] provides a comprehensive framework for operating and running a network. The TOM model introduced the concept and flows of information through a Fulfilment Assurance and Billing (FAB) process. TOM also addresses the need to forecast growth and plan the network evolution and growth.

SuM, in particular the configuration of resources, aligns with subset of the TOM model in the area of fulfilment.

Table 1: Relationship between SuM and the TMF TOM model GB 910 [3]

Functions within the TOM Fulfilment Process	Applicable to SuM	Refer to the Telecom Operations Map (TOM) GB910 [3]; Fulfilment being depicted in figure 6.1 of TOM.
Sales Enquiry	**No**	SuM in release 6 does not extend to publishing the set of potential services or capabilities a subscriber can negotiate to use.
Order Handling (status and completion)	**No**	Supply chain management is not within the scope of SuM
Service Configuration	**Yes**	This extends to provisioning resources within the home network.
Customer re-configuration	**Yes**	This is to support the concepts of customer Self-service and customer self care.
Network Provisioning	**Yes**	
Network Inventory Management	**No**	No functions exist within SuM to ensure that the resources are available to support and create a new service.
Network Configuration and Routing	**No**	
Installation	**No**	
Access Security	**Yes**	
Test Management	**No**	

4.3 SuM operations viewpoint

Figure 2 positions SuM from the viewpoint of operations management.

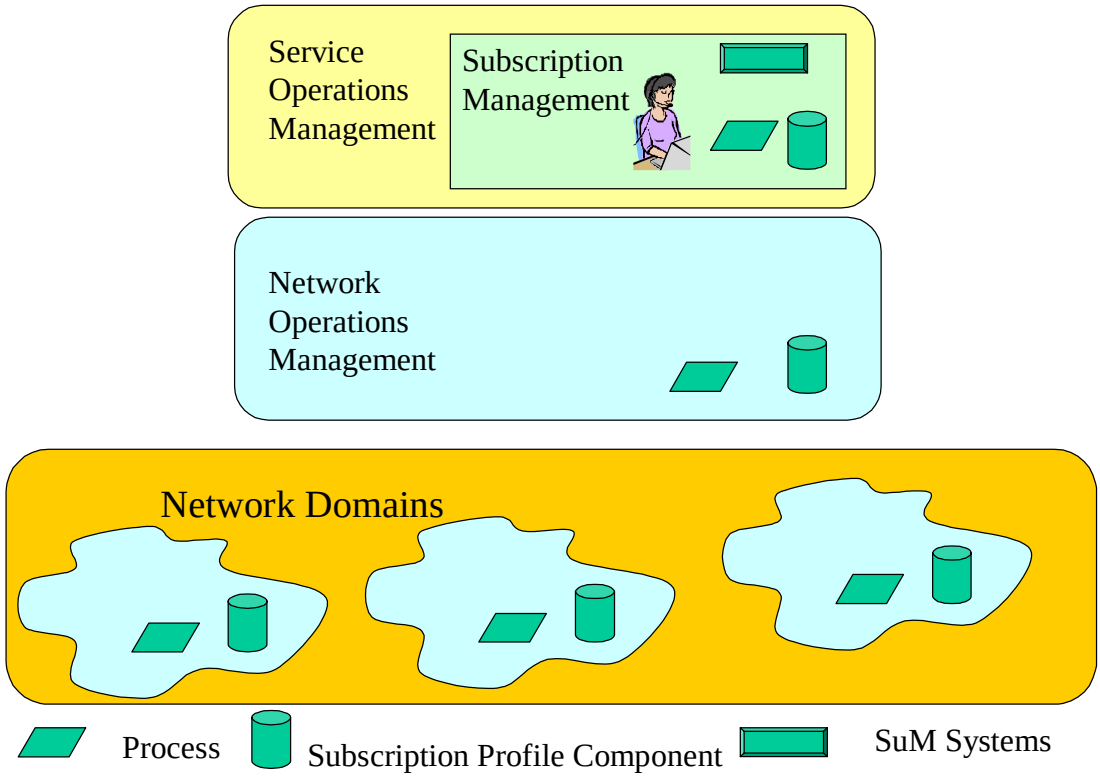

Figure 2: SuM context within operations management

SuM manages Subscriptions in the form of Subscription profile components. The subscription profile components may be distributed across Service Operations, Network Operations Management and Network domains in order to easily configure resources and support services at the Network Operations Management level.

4.3.1 Functional overview

As the telecommunications now entering into the 3G, more powerful terminal and access technology allows the telecommunications networks to offer new wireless Multimedia and Internet services.

Accordingly, SuM is a telecommunications management framework that allows the Operators to leverage their network resources to:

- Validate (register, authenticate, and authorise.) a request for service from a user;
- Collect, store, update, and distribute the Service Profile information for the user;
- Select the trusted network resources to manage access, distribution, and control of the profile data information for the user; and
- Direct the network resources to promptly deliver the service requested to the user according to said profile information.

SuM fulfils the following essential 3G requirements:

- The "**Device Diversity**" allows access to telecommunications networks by a variety of UEs and devices that are available for the user at the time.
- The "**Access Diversity**" allows the telecommunications networks to offer a variety of access network options such as UTRAN, GERAN, WLAN, etc. to the user.
- The "**Service Diversity**" allows the Telecommunications networks to provide a variety of services delivered to the user from third party application Service Providers (VASP) or from other telecommunications networks (VPLMN).

4.4 Management of subscription profiles

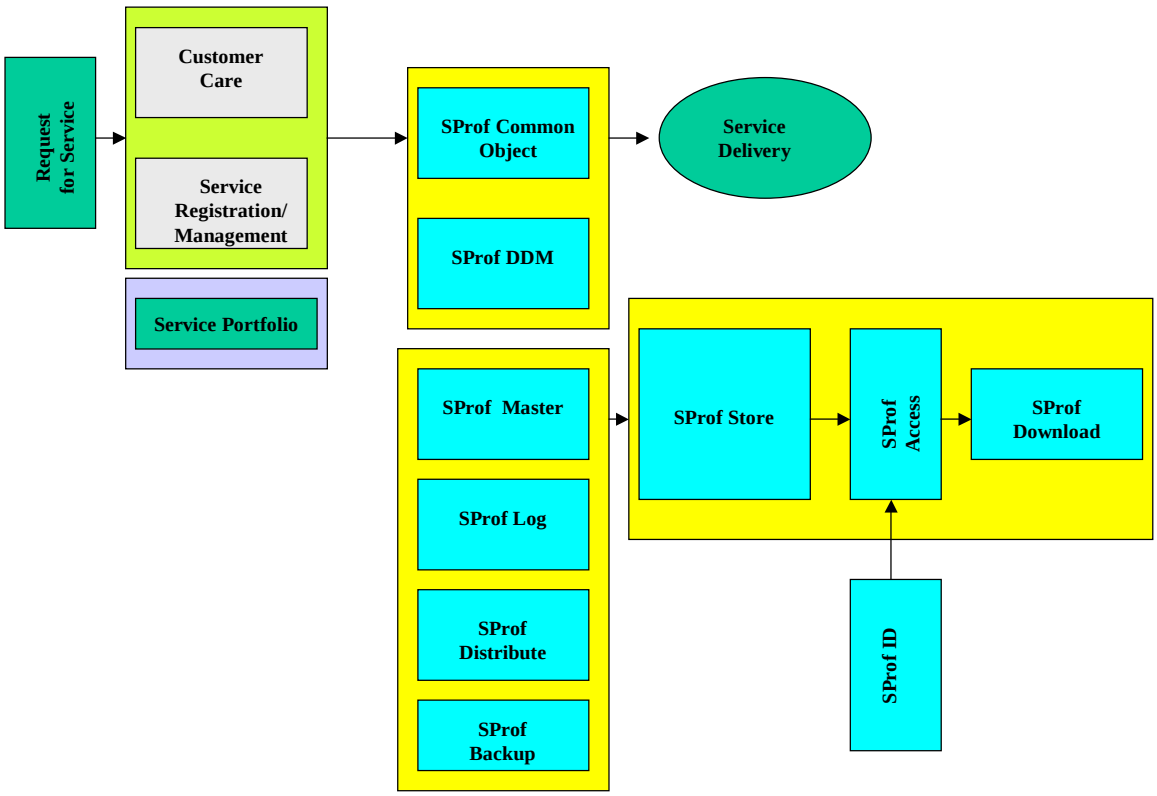

Figure 3: Architecture for management of subscription profile components

4.4.1 Requirements for subscription profile component management

SuM does not extend to the management of services.

However it is necessary to provide network entities with the subscription profile components needed for service fulfilment:

1. Subscription profile management shall support the fulfilment of requests for service from users, application services, and user equipment.
2. Subscription profile management shall support requests for subscription creation, modification and deletion. These requests may originate from users, subscribers, Network Operators, and Service Providers.
3. The above requests may be associated with the service entities in this release such as the MMS, IMS etc.
4. It shall be possible to relate each request for service with the corresponding Service Profile (SProf) information
5. The subscription profile information shall be maintained in the HSS.
6. In order to fulfil services, subscription profile information shall be distributed among the various network entities.
7. A subscription profile log shall be created to track changes related to creation and modification of subscription profiles and subscription profile components.
8. A backup copy of the subscription profile shall be created.
9. Subscription profile information shall be secured by authorised access and control mechanisms.

4.4.2 Requirements for network and terminal provisioning

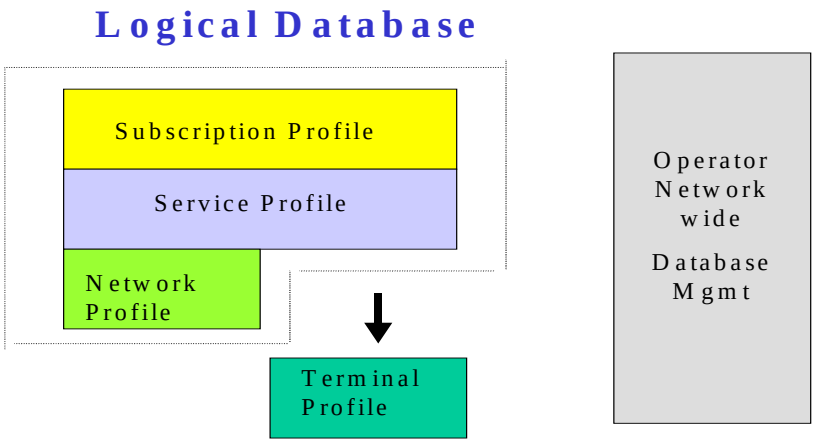

Figure 4: SuM network and service provisioning

The following steps define a logical sequence of events required for granting a request for service.

a) A request for service is issued by a user (via the UE).

b) Network receives the request for service and attempts to locate a subscriber ID.

c) Once a subscriber ID is identified, it is authenticated if there has not already been an initial authentication.

d) A request for service shall be denied if the subscriber cannot be identified and authenticated.

e) For those requests for service that are authenticated, the corresponding subscription profile components are obtained if they have not already been obtained at initial authorization.

f) The subscription profile component provides information on the services that are available to the subscriber and correlate the service request with a specific subscribed service.

The service is properly set up according to the profile (e.g. QoS, etc.) in order to prepare for the fulfilment and delivery of the service.

4.4.3 Profile management evolution

For subsequent releases there will be several external entities including 3rd party Service Providers, visited operator networks, etc., and additional requirements for access control will be needed to ensure security.

For SuM stage 2 or 3, SP can expand from the current definition of subscriber data (3GPP TS 23.008 [7]), GUP data (3GPP TS 22.240 [11]), etc. when appropriate.

Subscription profile supports:

- Preference management;
- Service customization;
- Terminal management;
- Information sharing;
- Access permission via a unique key identifier.

The profile data will be distributed (using the Service Profile download capability) to configure the necessary architectural entities (UE, Servers etc.).

Future releases of subscription profile will include the Service Profile for VASPs.

Subscription profile data needs to be consistently managed across all the entities within the network that use the profile. The data may be controlled from a central point, or be distributed, hence the logical database depicted in figure 4. The management capabilities relate to the definition, modification and synchronization of the data mainly in core network entities. This may extend to data needed in Terminal Devices, Network Elements, Core Network entities and Application Servers.

4.5 SuM: relationship to Network Entities and other subsystems

4.5.1 General

The SuM Feature provides management functions for subsystems, domains and components some of which are defined in the 3GPP Network Architecture 3GPP TS 23.002 [2]. However the Network Architecture does not address the Mobile Equipment or the Open Services Architecture nor non 3GPP defined subsystems. Figure 5 shows this relationship with these entities, many of which are closely related to the Home Subscriber Server (HSS).

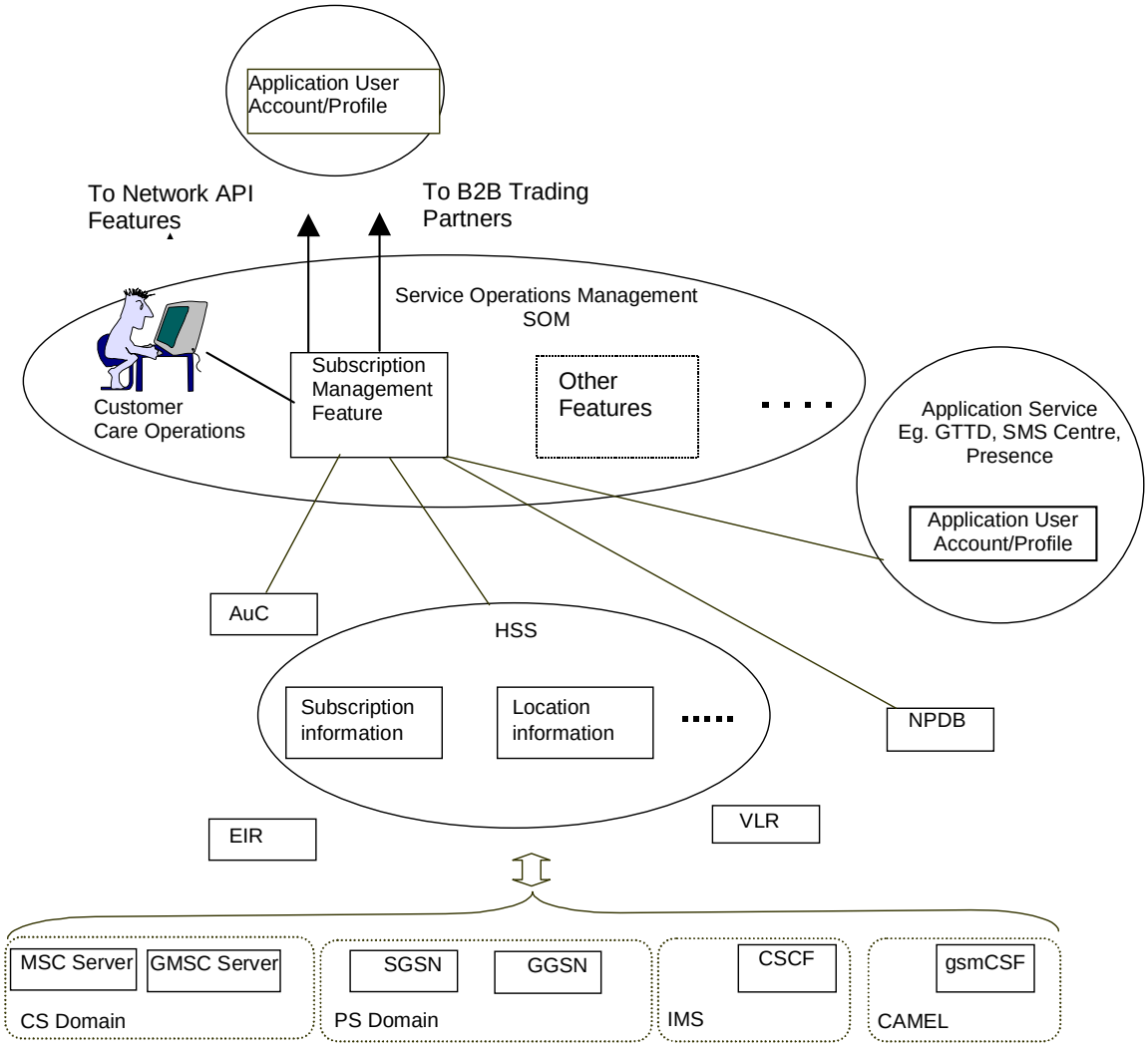

Figure 5: Examples of SuM relationships with Network Architecture

Figure 5 is based upon entities identified in the 3GPP Network Architecture 3GPP TS 23.002 [2].

The Network Architecture identifies a number of entities that use subscription profile information for their operation.

The SuM feature provisions and audits the subscription profile information (either directly, or indirectly):

- **Core Network entities:**

1) Home Subscriber Server (HSS) including Home Location Register (HLR), Authentication Centre and HSS Logical functions;

2) Visitor Location Register (VLR);

3) Equipment Identity Register (EIR);

4) SMS.- GMSC;

5) SMS Interworking MSC.

- **Circuit Switched Domain:**

  1) MSC Server;

  2) Gateway MSC (GMSC).

- **User Equipment/Mobile Station:**

  - Specific entities of the Mobile System as:

    1) IP Multimedia System (IMS);

    2) CAMEL Entities;

    3) Number Portability Database (NPDB);

    4) Global Text Telephony (GTT) entities.

SuM also provides capabilities to support B2B trading interfaces to other trading partners: VASP, Virtual mobile Operators etc.

Figure 5 also implies a set of relationships from SuM to:

- User Equipment Management that is assumed to configure and provision all aspects of the User Equipment and Terminals, including the possibility of configuring UICC/USIM profile information, using MeXe where appropriate.

- Application Service provided by third parties including trusted third parties that may configure some USIM via network interfaces, for example banks and other financial institutions. These services may also be provided by the Network Operator performing the role of Application Service provider.

- Network Service provided by Network Operators (e.g. SMS, presence).

4.5.2 Relationship to Generic User Profile (GUP)

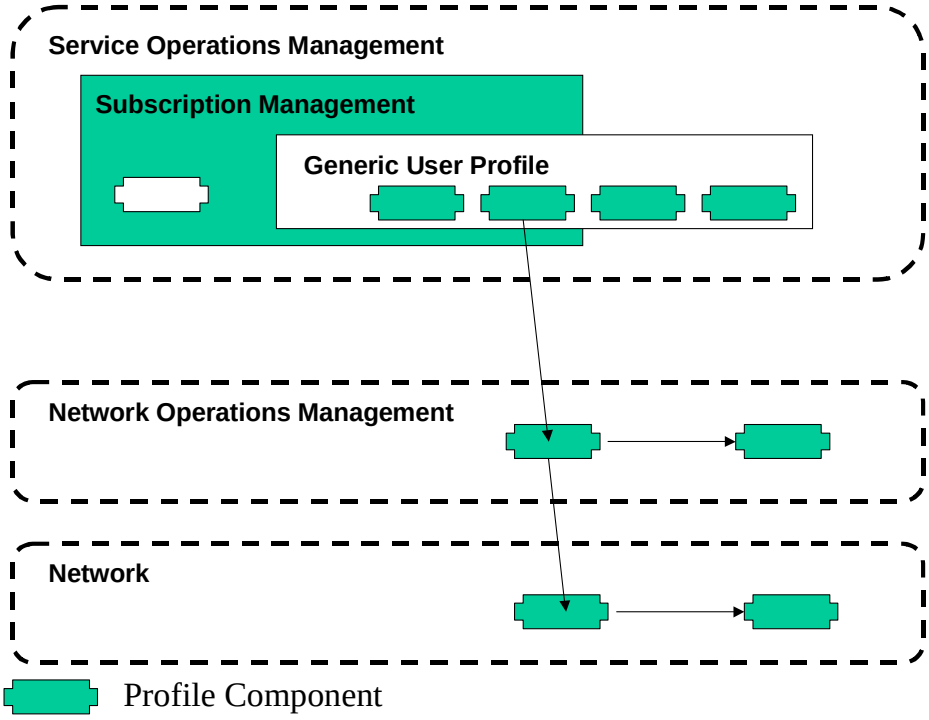

Figure 6: Relationship between SuM and GUPs

- The concept of a GUP is defined in 3GPP TS 22.240 [11].

The main focus is on the definition of:

- A User profile constructed from one or more User Profiles components.
- Each User Profile components that comprise one or more data types with formal definition.

The emphasis is on defining data types especially those that have to be held or replicated in User Equipment.

GUP assumes that User Profile components may be distributed and replicated across a number of network domains and systems. SuM is a feature that allows subscription profile components to be distributed across Systems and Network Domains. Some subscription profile components and some Generic Use Profile components are common. These common components affect the user experience and hence are part of the GUP. SuM Processes are supported by processes and functions provided in the Service Operations, the Network Operations and the Network Domains.

SuM provides the management means to create, read, modify and delete data. SuM also provides for the management of the integrity of the subscription profile components - and implicitly those common with GUP - by providing the mechanisms for its distribution and synchronization across Systems and Network Domains.

5 SuM assumptions and methods

The following assumptions are made in developing the SuM requirements.

5.1 Business model assumptions

1. The provider of the service package to the subscriber may be different from either the Service Provider or the Network Operator.
2. The model shall allow for retailers, distributors and third parties that are independent of the Service Provider and the Network Operator.

5.2 Network and control assumptions

1. The invocation of a service feature in real time shall be the responsibility of the network and any associated control.

5.3 Use case method

Use cases are developed using the techniques defined in 3GPP TR 32.803 [18].

An illustrative set of use cases using the method can be found in annex B.

6 High-level requirements

6.1 General

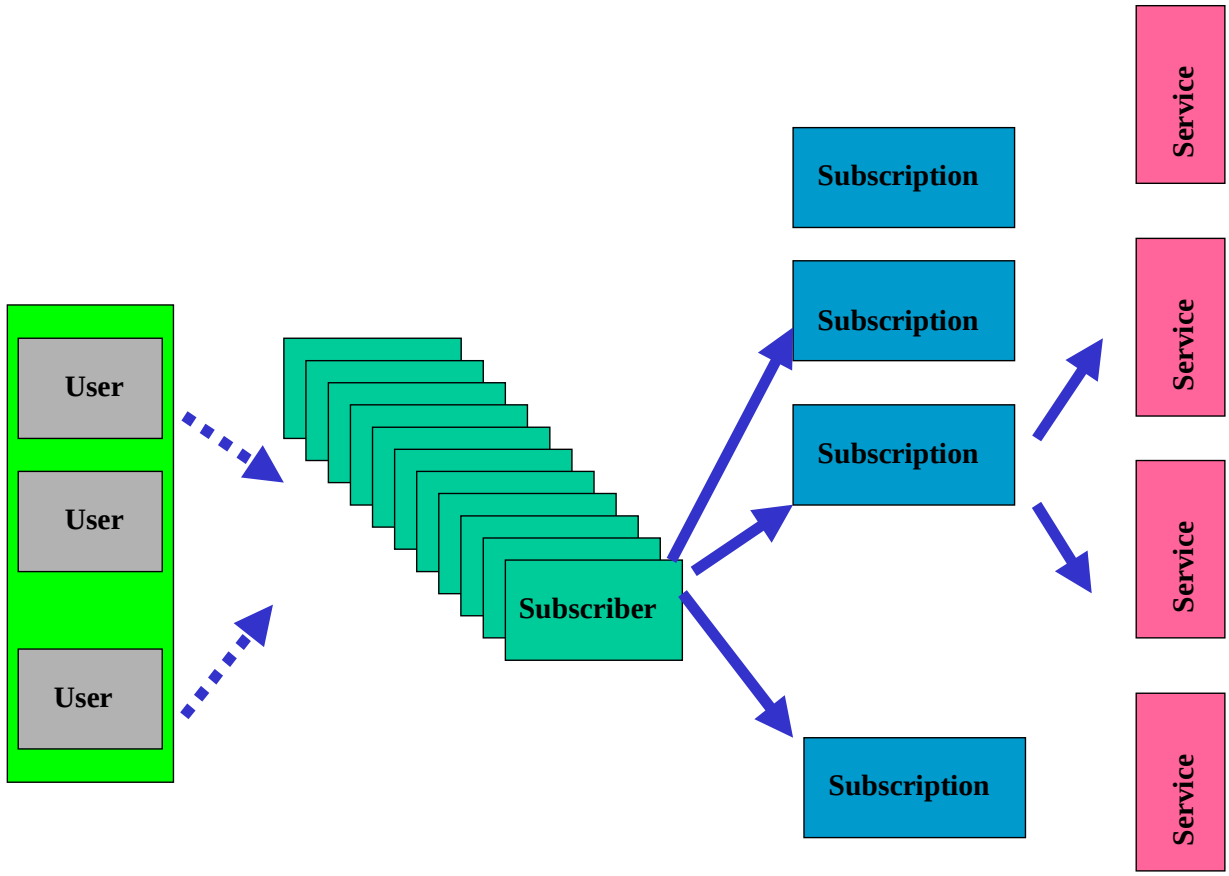

Figure 7: SuM Entities - Relations

Figure 7 shows the relationships between users, subscribers, subscriptions and services.

According to the way in which Operators do business:

- Each Operator has many subscribers;
- Each subscriber can have several users; and
- Users can request a service. The request will be granted if for the user, a contract for the requested service has been signed between the service provider and a subscriber.

6.1.1 Pre-requisites for service

These assertions address some of the operator's concerns, prior to granting a service request to a user:

1. find a subscriber entity that can match with the user;
2. identify and verify the subscriber's subscription profile; and
3. ensure the request for service is consistent with the subscription profile.

6.2 Feature requirements

SuM shall provide:

1. The management of the subscription profile information in the home PLMN.
2. It shall be possible to replicate and distribute the subscription profile components.
   - Support for subscription profile information across administrative, network and systems domains (e.g. VLR in visited networks).
3. The control and modification of subscription profile information consistent with the customer care needs including self help, self diagnosis and fault diagnosis.
   - SuM shall provide a process to support subscribers wishing to check their Subscription Configuration (e.g. support self care).

6.2.1 Requirements on HSS/HLR

The master database where subscription profile components are stored is in the HSS/HLR, which is used by the network for distribution and replication of this data in other subsystems such as the PS, CS and IM domains, CAMEL, etc.

1. SuM shall allow for the creating, reading, updating and deleting of subscription profile data in the HSS/HLR.
2. SuM shall support the data described in 3GPP TS 23.008 [7].

6.2.1.1 PS domain

1. SuM shall manage subscription profile components within the HSS for the PS Domain.

6.2.1.2 CS domain

1. SuM shall manage subscription profile components within the HSS for the CS Domain.

6.2.1.3 IM CN Sub-system (IMS)

1. SuM shall manage subscription profile components within the HSS for the IMS defined in reference 3GPP TS 23.228 [8].

6.2.1.4 Authentication Center (AuC)

1. SuM shall be able to manage subscription profile components in the HSS for the Authentication Center.

6.2.1.5 Equipment Identity Register (EIR)

1. SuM shall be able to manage relevant subscription profile components in the HSS for the EIR
2. SuM shall support Subscription Data defined in reference 3GPP TS 22.041 [15], 3GPP TS 23.015 [16].

6.3 Security

1. Specific local, national, and regional security regulations shall be complied with.
2. SuM data shall be safeguarded against unapproved disclosure or usage.
3. SuM data shall be provided in a secure and reliable manner that ensures the information is neither lost nor corrupted.
4. Access to SuM data shall only be permitted in an authorised and secure manner

5. Secure mechanisms shall be available for the transfer of SuM data to, from or between authorised entities. The secure mechanisms to be applied shall be appropriate to the level of confidentiality of the data, the endpoints of the transfer and the routes that are available for the transfer of the data.

6. Audit records should be maintained for all SuM transactions to facilitate resolution of security violations.

Annex A (informative): Business model

A.1 Processes

Processes involved in SuM can be described by the e-Business Telecom Operations Map (TOM) version 2.1. It is the Fulfilment part that describes those processes. The present document mainly focus on the Development and Operations Process, Network and System Management Processes and on the Network Element Management process.

The MWIF business model MTR-002 [4] shows an organizational model for Trading partners co-operating to provide wireless mobile services, the terms used in this example may not coincide exactly with those used in other parts of the present document, e.g. Subscriber and Customer are believed to be equivalent.

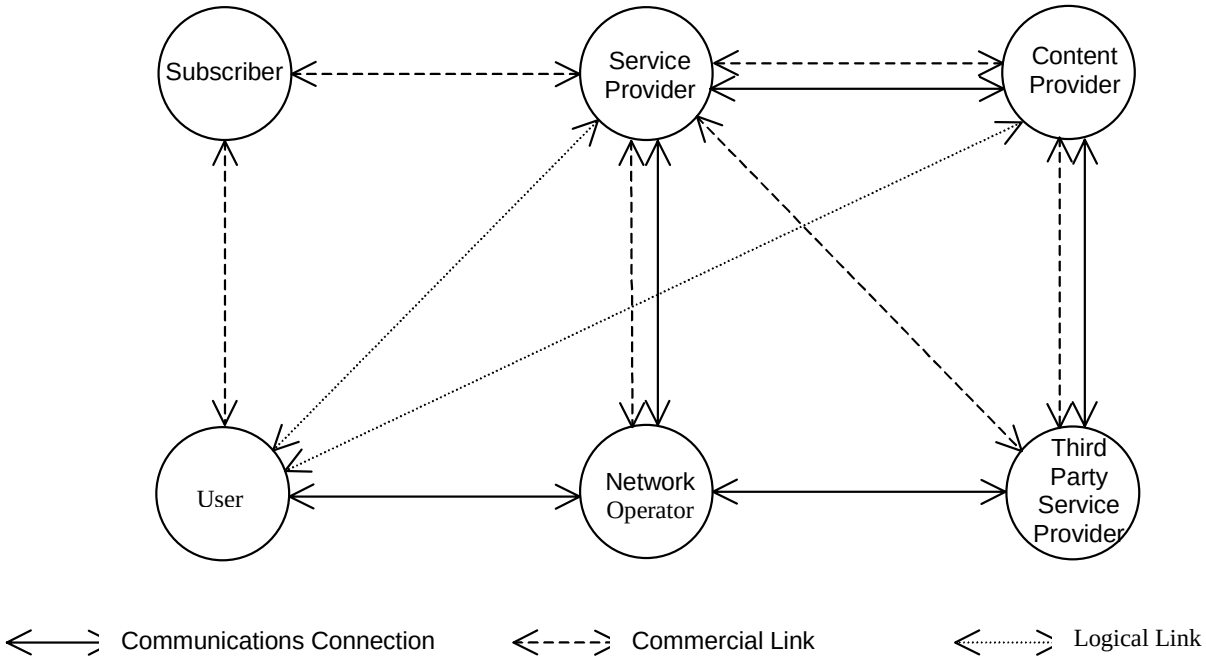

Figure A.1: Assumed Business Model

In this business model the Subscriber is a customer of the Service Provider (SP).

Commercial agreements are set up and maintained between them for the provision of services from the SP to the User via the Network Operator.

The Subscriber may have contracts with multiple SPs and maintains these on behalf of one or more users.

The Subscriber informs the SP which services each user should have access to and may choose to set limits on how much a User can use a particular service. For instance the Subscriber may authorize $x a day of video calls with a high QoS and unlimited video calls with a lower QoS.

The SP must enter into contract(s) with one or more Network Operators in order to deliver services to Users. Other companies may wish to sell services without having a contract with a Network Operator. This can be achieved by adopting the role of Third Party Service Provider and selling service via the SP. Other Companies may wish to sell just content. This is made possible by developing a commercial relationship with either a SP or a Third Party Service Provider.

It is important to note that Service Use, Customer Service Negotiation, etc are roles , and that one Actor may adopt more than one role. For instance an individual may adopt the roles of both Service Use and Customer Service Negotiation. A Company may adopt the roles of Network Operator, SP and Content Provider.

A user initiates a service by requesting it from the Service Provider, not the Network Operator. On receipt of a service request the Service Provider uses Network Operators and Third Party Service Providers to service the request in the best way possible. In the example of the video call the Service Provider may choose to use different Network Operators for high and low QoS calls.

Taking the VHE concept, where HE, HE-VASP are defined and VASP is used:

- The roles Service Provider and Network Operator can be mapped to the actor HE (See 3GPP TS 22.121 [9]).
- The role Service Provider can be mapped to the actor VASP.
- The role Third Party Service Provider can be mapped to the actor HE-VASP, because they both provide services on behalf of an actor having the Service Provider role.

The Subscriber-to-Service Provider relation (indicated as a Commercial Link between Service Provider and Subscriber) defines the agreements under which the Service Provider provides services to a Subscriber. The users associated to the Subscriber consume these services. (See Subscriber definition in 3GPP TR 21.905 [1].)

There are also Business-to-Business relations in the picture, where several actors may be involved in the delivery of services. Examples of such are the Commercial Link between Service Provider and Third Party Service Provider, the Commercial Link between Third Party Service Provider and Content Provider and the Commercial Link between Service Provider and Network Operator.

The present document has the focus on the Subscriber-Service Provider role relation.

A.2 Assumptions concerning actors and roles

Below follows assumptions originated from figure A.1:

- An actor taking the role as a Service Provider offers services to one or several Subscribers.
- An actor Network Operator can take the role as a Service Provider and provide access network services (e.g. PLMN services according to 3GPP TR 21.905 [1] definition) to one or several Subscribers.
- An actor Service Provider may fulfil his role and provide value added services to one or several Subscribers. He can do so by:
  - A pure value added service offering, which may result in established B2B agreements with Network Operators.
  - An aggregated offering of access network services (Network Operator role) and value added services (offering a home environment).
- An actor Service Provider may establish B2B agreements with Network Operators and become an MVNO.
- An actor Service Provider may have B2B agreements with one or several Content Providers, from which he can provide content based services.
- An actor Service Provider may have B2B agreements with and one or several 3rd party Service Providers, from which he can package and provide services from.
- An actor 3rd party Service Provider may have B2B agreements with one or several Content Providers, which can provide content.
- An actor taking the role as a Service Provider may establish one or several subscriptions with a Subscriber.
- When, based on an agreement between a Subscriber and a Service Provider, an access to a provided service exists; it can be associated to a subscription.
- A User consumes services, where the user role in this context is defined by the service consumed.

A.3 SuM scope from actor/role model

SuM is about managing subscriptions tied to one actor taking the Service Provider Role. Systems affected are those within the Service Provider domain (systems that a Service Provider controls and manages) and those systems outside that take part in the service delivery to the user of the service provided. The latter means: Actors having those systems have B2B agreements with a Service Provider for the purpose of delivering services (examples are: 3rd party Service Providers, Content Providers and Network Operators).

A.4 Business model requirements

1. SuM feature shall support the distribution of SuM components across intra operator organizations and administrative domains to support industry business model.
   Annex A provides an example business model from MWIF MTR-002 [4].

2. SuM shall allow for the optional use of third parties to facilitate trading relationship between organizations. This requirement is needed for trusted third parties but not limited to trusted third parties

Annex B (informative): Example use case

There are an expanding number of services that 3G can offer. The network and infrastructure resources that are needed to support the new services are complex, and require a systematic technique to consider the many factors involved.

Use cases provide an iterative analysis technique helpful in determining market potential, business transactions, and the user interactions, etc.

When a use case has been developed (i.e. become stable), possible network solution(s) may be developed.

It is anticipated that future complex services will require a systematic analysis method to evaluate the network impacts.

There is a desire to migrate away from developing a solution for each service opportunity on an individual case-by-case basis, and to deploy a consistent approach in order that the network architecture solution may be used to provide many different service needs.

B.1 Create a subscription for a new subscriber

Use Case Stage	Evolution / Specification	<<Uses>> Related use case
Goal	To fulfil a subscription for a new subscriber with one or more users in order to allow the users access to the subscribed services. Performance: Near real time	
Actor(s) and Role(s)	Service Provider Network Operator	
Assumptions	(a) Subscriber credit worthiness has been determined by other systems, techniques and mechanisms which are outside the subscription management system boundary. (b) Levels of trust for subscribers and users have been determined by other systems, techniques and mechanisms outside of the subscription management system boundary (c) The Contract contains the number of users and the set of services these may use. (d) For each user the services she/he may use are also defined out of the above mentioned set of subscribed services.	
Pre conditions	(a) The services that can be offered by the network have been defined. (b) Sufficient resources are available to support the anticipated take up of services by users.	
Begins when	A subscriber has signed a new contract with the service provider	
Step 1	Create the subscriber profile and populate it with the set of services subscribed to the subscriber including subscriber specific settings and preferences for the subscribed services. Associated information element(s): Subscriber Profile, Subscribed Services Profile	
Step 2	For each user create a subscription profile using the Add User use case Associated information element(s): Subscription Profile	Add User
Step 3	For each user modify her/his subscription profile to fulfil the services in the network using the Modify User use case. Associated information element(s): Subscription Profile, Service Profile	Modify User
Ends when	The network allows the users to use their subscribed services OR an error condition has been encountered.	
Exceptions	Any of the steps of this use case fails	
Post Conditions	The network allows the users to use their subscribed service. A subscriber profile has been created and populated with the set of subscribed services. The subscription profiles for each user have been created and populated with data necessary for the usage of their subscribed services. Associated information element(s): Subscriber Profile, Subscribed Services Profile, Subscription Profile, Service Profile	
Traceability	Requirements: Each type of services offered requires the ability to uniquely identify it. To support self care it will be necessary to be able to correlate services references in a subscription, to the subscription profiles in the network. It will be necessary to be able to audit the capabilities in a subscription against the subscription profile(s) in the network elements.	

B.2 Modify subscription

Use Case Stage	Evolution / Specification	<<Uses>> Related use case
Goal	To modify the services and related terms and conditions which apply to a particular subscription. This is expected to result from contract re-negotiation, where the resulting changes need to be applied to the affected users within the network. Performance: Near real time	
Actor(s) and Role(s)	Network Operator Service Provider	
Assumptions	The Contract changes are known and may be any variation of: removal of users, addition of new users, removal of services subscribed, newly subscribed services, modified subscribed services The subscriber is still credit and trust worthy. (The checks for this are performed outside of SUM, but SuM needs to have access to this kind of information)	
Pre conditions	(a) The services that can be offered by the network have been defined. (b) Sufficient resources are available to support the anticipated take up of services by users. (c) The Subscriber already exists in the network (d) Users to be modified or deleted already exist in the network	
Begins when	The contractual details have been modified.	
Step 1	Modify the list of subscribed services in the subscriber profile including subscriber specific settings for the subscribed services. Associated information element(s): Subscriber Profile, Subscribed Services Profile.	
Step 2	For each user no longer part of this subscription remove her/his subscription profile by utilizing the Use Case Delete User Associated information element(s): Subscription Profile.	Delete User
Step 3	For each new user create a subscription profile using the Add User use case Associated information element(s): Subscription Profile	Add User
Step 4	For each new user add their subscribed services to her/his subscription profile using the Modify User use case. Associated information element(s): Subscription Profile, Service Profile.	Modify User
Step 5	For each already existing user subject to subscription and service changes modify her/his subscription profile to fulfil the services in the network using the Modify User use case. Associated information element(s): Subscription Profile, Service Profile.	Modify User
Ends when	The network allows the users to use their subscribed services within the contract limits OR an error condition has been encountered.	
Exceptions	Any of the steps of this use case fails.	
Post Conditions	Services in the contract align with services in the subscriber profile and the subscription profiles. Number of users in the contract aligns with the number of users in the network under this subscription. Associated information element(s): Subscriber Profile, Subscribed Services Profile, Subscription Profile, Service Profile.	
Traceability	Requirements: (a) Each type of services offered requires the ability to uniquely identify it. (b) To support self care it will be necessary to be able to correlate services references in a subscription, to the subscription profiles in the network. (c) It will be necessary to be able to audit the capabilities in a subscription against the subscription profile(s) in the network elements.	

B.3 Delete subscription

Use Case Stage	Evolution / Specification	<<Uses>> Related use case
Goal	Remove the Subscriber and all users contained in the contract. Performance: Near real time	
Actor(s) and Role(s)	Network Operator Service Provider	
Assumptions	There is a way of confirming that a user is to be removed from using network services. This is to ensure compliance with any country or region specific legislation regarding access to such things as emergency calls.	
Pre conditions	(a) The Subscriber exists in the network (b) Users to be deleted exist in the network	
Begins when	A subscription expires or has been terminated.	
Step 1	Remove each user contained within the subscription using the Delete User use case. Associated information element(s): Subscription Profile, Service Profile.	Delete User
Step 2	Delete the subscriber profile Associated information element(s): Subscriber Profile, Subscribed Services Profile.	
Ends when	The subscriber's subscriber profile and subscription profiles have been removed from the network elements in this operators network.	
Exceptions	Any of the steps of this use case fails.	
Post Conditions	The users who were contained in the contract are no longer able to use services in this network. Trace Logs, and contractual references are not automatically removed in case of any legal issues that require closure. Only subscription profile data, which would enable access to services, are removed. Associated information element(s): Subscriber Profile, Subscribed Services Profile, Subscription Profile, Service Profile.	
Traceability		

B.4 Get subscription details

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	Get subscription details on number of users and their subscribed services stored in the network. Performance: Near real time	
Actor(s) and Role(s)	Network Operator Service Provider Subscriber	
Assumptions	The information provided for Network Operator is broader than for Subscriber	
Pre conditions	The Subscriber already exists in the network	
Begins when	Network Operator, Service Provider or Subscriber request information on subscription stored in the network elements	
Step 1	Get information contained in Subscriber"s subscriber profile Associated information element(s): Subscriber Profile, Subscribed Services Profile	
Step 2	For each user contained within the subscription get the information contained in her/his subscription profile using the use case "Get User Details" Associated information element(s): Subscription Profile, Service Profile	Get User Details
Ends when	The subscriber's subscriber profile and subscription profiles have been read from the network elements in this operator"s network OR an error condition has been encountered.	
Exceptions	Any of the steps of this use case fails	
Post Conditions	The details contained in the contract and stored in network elements are unchanged. The subscriber"s subscriber profile and subscription profiles details are provided to the requestor. Associated information element(s): Subscriber Profile, Subscribed Services Profile, Subscription Profile, Service Profile	
Traceability		

B.5 Add user - create a subscription profile for a user

Use Case Stage	Evolution / Specification	<<Uses>> Related use case
Goal	To add a new user associated with a subscription to the network. Performance: Near real time	
Actor(s) and Role(s)	Service Provider Network Operator Subscriber	
Assumptions	(a) The services that can be offered by the network have been defined. (b) Sufficient resources are available to support the delivery of services to users. (c) The Contract contains the set of services the user may use.	
Pre conditions	(a) The Subscriber already exists in the network	
Begins when	A subscriber has signed a new contract with the service provider or has extended an existing contract with additional user(s).	
Step 1	Create the user"s subscription profile and populate it with the set of identifications and other data common to services. Associated information element(s): Subscription Profile	
Ends when	The user is known in the network. OR an error condition has been encountered.	
Exceptions	Any of the steps of this use case fails	
Post Conditions	The network holds the subscription profile for the user. Associated information element(s): Subscription Profile	
Traceability		

B.6 Modify user

Use Case Stage	Evolution / Specification	<<Uses>> Related use case
Goal	To modify the set of identifications and/or the services and related settings and preferences which apply to a particular user. This is expected to result either from a new contract or from contract re-negotiation, where the resulting changes need to be applied to the affected users within the network. Performance: Near real time	
Actor(s) and Role(s)	Network Operator Service Provider Subscriber	
Assumptions	The Contract changes are known and may be any variation of: Change of user"s set of identifications, removal of services subscribed, newly subscribed services, modified service settings and preferences	
Pre conditions	The user already exists in the network	
Begins when	The user has been newly added to the network or the contractual details concerning a user or the services subscribed for him have changed (which may be both additions and/or withdrawals)	
Step 1	IF the user"s set of identifications and other data common to services are to be modified align her/his subscription profile. Associated information element(s): Subscription Profile	
Step 2	IF the user has access to services which are no longer part of the contract, then delete them from the user"s Subscription Profile using the Use Case Delete Service Associated information element(s): Subscription Profile, Service Profile	Delete Service
Step 3	Modify the existing subscription profile to fulfil the subscribed services in the network using the Add Service use case. Associated information element(s): Subscription Profile, Service Profile	Add Service
Step 4	Modify existing service profiles in the user"s subscription profile to fulfil the services in the network using the Modify Service use case. Associated information element(s): Subscription Profile, Service Profile	Modify Service
Ends when	The network allows the user to use his subscribed services within the contract limits. OR an error condition has been encountered.	
Exceptions	Any of the steps of this use case fails	
Post Conditions	Services in the contract align with services in the subscription profile. Associated information element(s): Subscription Profile, Service Profile	
Traceability		

B.7 Delete user

Use Case Stage	Evolution / Specification	<<Uses>> Related use case
Goal	Remove a user contained in the contract Performance: Near real time	
Actor(s) and Role(s)	Network Operator Service Provider Subscriber	
Assumptions	There is a way of confirming that a user is to be removed from using network services. This is to ensure compliance with any country or region specific legislation regarding access to such things as emergency calls.	
Pre conditions	The user already exists in the network	
Begins when	A subscription expires or the number of users contained in the subscription is reduced	
Step 1	Remove the user that is no longer contained within the subscription by deleting his subscription profile. Associated information element(s): Subscription Profile, Service Profile	
Ends when	The user's subscription profile has been removed from the network elements in this operators network.	
Exceptions	Any of the steps of this use case fails	
Post Conditions	The user who was removed from the subscription is no longer able to use services in this network. Trace Logs, and contractual references are not automatically removed in case of any legal issues that require closure. Only subscription profile data which would enable access to services are removed. Associated information element(s): Subscription Profile, Service Profile	
Traceability		

B.8 Get user details

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	Get details for the user contained in the subscription and stored in the network Performance: Near real time	
Actor(s) and Role(s)	Network Operator Service Provider Subscriber User	
Assumptions	The information provided for Network Operator is broader than for Subscriber, which might still be broader than that for the user.	
Pre conditions	The user already exists in the network	
Begins when	Network Operator, Subscriber or User request information on User stored in the network elements	
Step 1	Get the information contained in the subscription profile for the user Associated information element(s): Subscription Profile, Service Profile	
Ends when	The user's subscription profile has been read from the network elements in this operator"s network.	
Exceptions	Any of the steps of this use case fails	
Post Conditions	The details contained in the contract and stored in network elements are unchanged Associated information element(s): Subscription Profile, Service Profile	
Traceability		

B.9 Add service

Use Case Stage	Evolution / Specification	<<Uses>> Related use case
Goal	To fulfil a subscription for a new subscriber or subscription extension for an existing subscriber with one or more users or a service has been added to the contract for the user in order to allow the user access to a service. Performance: Near real time.	
Actor(s) and Role(s)	Service Provider Network Operator Subscriber	
Assumptions	(a) The services that can be offered by the network have been defined. (b) Sufficient resources are available to support the delivery of services to users. (c) The Contract contains the set of services the user may use.	
Pre conditions	(a) The user already exists in the network (b) The user has no access to the service	
Begins when	A subscriber has signed a new contract with the service provider or has extended an existing contract with additional user(s) or has extended the services the existing user may use.	
Step 1	Within the user"s subscription profile create the service profile and populate it with the set of preferences and settings subscribed. Associated information element(s): Subscription Profile, Service Profile.	
Ends when	The user can use the service in the network. OR an error condition has been encountered.	
Exceptions	Any of the steps of this use case fails.	
Post Conditions	The network holds the extended subscription profile for the user. Associated information element(s): Subscription Profile, Service Profile.	
Traceability		

B.10 Modify service

Use Case Stage	Evolution / Specification	<<Uses>> Related use case
Goal	To modify the set of settings and preferences which apply to a service for a particular user. This is expected to result from contract re negotiation, where the resulting changes need to be applied to the affected users within the network or subscriber or user initiated changes. Performance: Near real time	
Actor(s) and Role(s)	Network Operator Service Provider Subscriber User	
Assumptions	The Contract changes are known and may be any variation of: Change of user"s preferences Change of user"s service related settings	
Pre conditions	(a) The user already exists in the network (b) The user has access to the service	
Begins when	The contractual details have been modified or a decision for settings and preferences changes has been taken	
Step 1	Within the user"s subscription profile modify the existing service profile to change the service preferences and settings in the network Associated information element(s): Subscription Profile, Service Profile	
Ends when	The network allows the user to use his subscribed services within the contract limits. The updated set of settings and preferences are now operative. OR an error condition has been encountered.	
Exceptions	Any of the steps of this use case fails	
Post Conditions	The service settings and preferences defined and agreed in the contract or wanted by the user now align with service settings and preferences in the service profile. Associated information element(s): Subscription Profile, Service Profile	
Traceability		

B.11 Delete service

Use Case Stage	Evolution / Specification	<<Uses>> Related use case
Goal	Remove a service contained in the contract for one user Performance: Near real time	
Actor(s) and Role(s)	Network Operator Subscriber	
Assumptions	There is a way of confirming that a user is to be denied access to certain network services. This is to ensure compliance with any country or region specific legislation regarding access to such things as emergency calls.	
Pre conditions	(a) The user already exists in the network (b) The user has access to the service	
Begins when	A subscription expires or Subscriber credit worthiness or trust have been lost or existing user(s) are deleted from the contract or a service is deleted from the contract for all or only for one user	
Step 1	In the user"s subscription profile delete the existing service profile to inhibit access to the service in the network Associated information element(s): Subscription Profile, Service Profile	
Ends when	The user's subscription profile has been removed from the network elements in this operators network.	
Exceptions	Any of the steps of this use case fails	
Post Condition	The user who was contained in the contract is no longer able to use services in this network. Trace Logs, and contractual references are not automatically removed in case of any legal issues that require closure. Only subscription profile data which would enable access to services are removed. Associated information element(s): Subscription Profile, Service Profile	
Traceability		

B.12 Get service details

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	Get details (settings and preferences) of the user"s access to a service stored in the network Performance: Near real time	
Actor(s) and Role(s)	Network Operator Service Provider Subscriber User	
Assumptions	The information provided for Network Operator is broader than for Subscriber, which might still be broader than that for the user.	
Pre conditions	(a) The user already exists in the network (b) The user has access to the service	
Begins when	Network Operator, Subscriber or User request information on service settings and preferences stored in the network	
Step 1	Get the information contained in the service profile within the user"s subscription profile Associated information element(s): Subscription Profile, Service Profile	
Ends when	The service profile within the user's subscription profile has been read from the network elements in this operator"s network.	
Exceptions	Any of the steps of this use case fails	
Post Conditions	The details contained in the contract and stored in network elements are unchanged Associated information element(s): Subscription Profile, Service Profile	
Traceability		

Annex C (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Mar 2002	SA_15	SP-020012	--	--	Submitted to SA#15 as v1.0.0 for Information	1.0.0	--
Dec 2002	SA_18	SP-020728	--	--	Submitted to SA#18 as v1.1.1 for Information	1.1.1	--
Mar 2003	SA_19	SP-030041	--	--	Submitted to SA#19 as v2.0.0 for Approval	2.0.0	6.0.0
Sep 2003	SA_21	SP-030404	001	--	Correction to figure 3 (Architecture for management of Subscription Profile components)	6.0.0	6.1.0
Mar 2004	SA_23	SP-040108	002	--	Subscription Management TS-family (32.14x and 32.17x) title alignment ("SM" becomes "SuM" and delete "Services operations management")	6.1.0	6.2.0
Mar 2004	SA_23	SP-040110	003	--	Update the use cases in SuM	6.1.0	6.2.0
Dec 2004	SA_26	SP-040764	004	--	Editorial corrections and updates of Subscription Management (SuM) requirements	6.2.0	6.3.0
Dec 2004	SA_26	SP-040764	005	--	Change the Introduction clause to reflect what capability SuM is offering in Rel-6	6.2.0	6.3.0

History

Document history		
V6.3.0	December 2004	Publication