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Foreword

This ETSI GSM Technical Specification has been produced by the TC SMG Technical Committee of the European Telecommunications Standards Institute (ETSI).

Introduction

text

1 Scope

This ETSI Technical Specification (ETS) describes the principles of Service Management in the Universal Mobile Telecommunications System (UMTS).

UMTS is a system that delegates service management to the service provider, value added service provider and user roles, enabling these roles to elaborate their parts of creation and control of services based on UMTS service capabilities. The Virtual Home Environment enables for service provision in visited networks, and a presentation of the service in accordance to a user managed profile. The profile is divided in a Subscriber Profile and a User Profile. Based on these, the services can be configured by the service provider, based on the user location, commercial agreements, network capabilities and time of day. Some aspects of numbering, such as Support of number portability, is also defined from a service management perspective.

2 References

This ETR incorporates by dated or undated references, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of the publications apply to this ETR only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] DTR/SMG-050102U (UMTS 01.02): " Special Mobile Group (SMG): Vocabulary for Universal Mobile Telecommunications System (UMTS)"

[2] DE/SMG-0102201U (UMTS 22.01): " Special Mobile Group (SMG): Universal Mobile Telecommunications System (UMTS); Service Aspects; Service Principles"

[3] DE/SMG-0102101U (UMTS 21.01): " Special Mobile Group (SMG): Universal Mobile Telecommunications System (UMTS); System Concept and reference model"

[4] DE/SMG-0102205U (UMTS 22.05): " Special Mobile Group (SMG): Universal Mobile Telecommunications System (UMTS); Service Aspects; Service Capabilities"

3 Abbreviations and definitions

For the purposes of this ETR the following abbreviations and definitions apply. ~~More~~ Abbreviations and definitions can be found in the Vocabulary for UMTS [1] .

3.1 Abbreviations

ANO Access Network Operator
CNO Core Network Operator
NO Network Operator
SP Service Provider
VHE Virtual Home Environment

3.2 Definitions

Virtual Home Environment (VHE): A system concept for personalised service portability across network borders.

4 General

4.1 Aims of UMTS Service Management

The final responsibility for UMTS service control and management is held by the UMTS service provider that issued the subscription. This ETS outlines principles by which the service provider can manage UMTS service provision sufficiently to be able to control the complete service provision, security and billing at the highest hierarchical level.

Principles are also outlined for the delegation of privileges regarding service management, customisation of services, charging matters etc. to users, value added service providers and third party service providers.

Different levels of service profiles enable the management of distributed service provisioning, and customisation.

The number profile, subscriber profile and user profile defines the user. The maximum and minimum limits of these profiles are enabling and limiting factors for the user/subscriber service management. The profiles enable differentiation based on variations of time of day, available networks/services, which user is calling, the user role (home/private/business/custom/…) or type of location (at home/at work/etc.).

Services configured individually or by the SP, based on UMTS service capabilities, must be made available as far as possible in all home and visited networks. Access to and presentation of the services (standard, SP unique or customised) shall be uniform with respect to variations in the users location. The Virtual Home Environment enables this.

Numbering management enables the user to

- maintain his number(s) while changing SP (number portability);
- use single numbers or multiple numbers for different services;
- relate the calling party number to variations in the user profile.

4.2 Implications from the UMTS Role Model

The UMTS role model defines the commercial roles present in UMTS [2]. The management of services and service capabilities affect relations with all the defined roles. These roles are:

- User
- Subscriber
- Access Network Operator (ANO)
- Core Network Operator (CNO)
- Service Provider (SP)
- Value Added Service Provider (VASP)

The service provider has the sovereign responsibility for the management of services. Depending on commercial agreements, such as a subscription, users and value added service providers are given privileges to manipulate certain service parameters and service contents. All service privileges given are at the service providers discretion, subject to legal requirements on openness (call interception, VASP interface, legal user rights to be provided with certain services etc.).

The service management, at the service providers, is the UMTS service integration point. A SP may have agreements with several ANOs and CNOs. Unless the user/subscriber is allowed network selection preferences, the SP decides the routing of calls to the ANO and CNO of its preference, in order to provide the wished service, quality and functionality with a controlled cost/revenue margin. Normally, the user-SP and SP-NO taxation for the same services have no direct relation in order to let the SP act as a service broker.

Call routing for multi-mode services comprising UMTS and pre-UMTS systems is controlled by the UMTS SP.

The UMTS home environment is the area covered by NOs that have a direct commercial agreement with the SP that sold the subscription. User authentication for the use of a network and service management is done by a service provider with a direct commercial relation with the actual NO.

In order to allow user roaming into visited networks outside of the home environment, while keeping access to the subscribed services, principles of the virtual home environment (VHE) apply. The VHE is commercially a SP-SP relation. Technically, this may (ffs) imply download of service logic or require a link to the home service logic.

Service creation is a matter for SP, VASP and CNO. (ANO ffs). CNO bearer services and service logic has the main influence on the service capability. SP/VASP service logic is secondary. The SP uses its routing privilege to obtain a suitable basic service capability and enhances it with additional service logic before presenting it to the user.

5 Virtual Home Environment

5.1 Definitions related to the virtual home environment

The UMTS user does not have a home network in the pre-UMTS sense, where the subscription is tied to a home access network, connected to a core network and a set of services. The UMTS home networks (plural form) corresponds to one or more networks directly associated, via commercial agreements, with a service provider [2]. The home networks area is limited to the commercial agreements in force and not by national or any other borders.

The services available at a specific point within the home networks is determined by the subscription and the available service capabilities in the reachable access networks, the possible core networks and the home service nodes. (The subscription as a limiting factor, and the other capabilities as enabling factors).

In visited networks (networks that do not have a commercial agreement with the subscribed service provider), services are available to the user only if a roaming agreement exists between the home SP and a SP with commercial agreements to the networks that offer services in that location.

The services available in visited networks is determined by the subscription and the available service capabilities in the reachable access networks, the possible core networks and the capabilities of the visited SP's service nodes in combination with home SP logic.

The "home network" is also a virtual home network. In a visited network, the following differences apply:

- The home SP has a roaming agreement with the visited SP.
- The visited SP is responsible for authenticating the user.
- The visited SP has commercial relationships with the used access and core networks, thus is responsible for the routing of the call and selection of networks.
- Service logic is primarily executed by the [home, visited ??] SP, based of standardised service capabilities [and adaptations supplied by the home SP where differences exist. (ffs)]
- The execution of home SP unique service logic is [ffs, cost of signalling should be considered, there are benefits of executing service logic in the visited network, but how? Cost of code storage and management, copyright etc].

5.2 Mechanisms of the VHE

No main differences exist in home and visited networks with regard to the selection of bearers for a specific service, with the exception of it being controlled by the visited SP in the visited networks.

The execution of service logic is based of standardised service capabilities and application software that is SP specific.

[Problems:

- Execution of service logic in the home network (as in GSM) cost long distance signalling. To execute logic in the visited network requires storage and management functions to handle all visiting users correctly. When is software transferred, how is it stored, invoked, updated etc.?

- To what extent shall the (logic) service capabilities be standardised? To a far extent means that parameters can be passed to the visited network and software executed there. To less extent means difficulties, possibly only functions that can relay signalling to the home network.

- Which capabilities shall be standardised?

End of problems]

Although the service capabilities and the service logic provided by the visited network environment can differ from that of the home environment, the VHE enables the user to access and use the services in the same way as in his home environment. Possible variation in the technical realisation of the service are not necessarily brought to the users attention. Service restrictions or service extensions are only notified to the user, when any reaction from the user could be necessary.

The user interface offered to him by the UMTS terminal is the same he is accustomed to by his home network. This could either be realised by a uniform terminal software or by downloading from the service management function in the home network.

The VHE enables the visited network to gain information about the service capabilities and service logic required for the service invocation. Together with the information on the users service profile the VHE can provide an emulation of the requested service behaviour when needed.

Within the VHE concept different principles in the service execution are possible: The visited network can be transparent for most of the services and the execution is mainly located in the home network, or the execution of a service is mainly located in the visited network (ffs).

Possible procedures of service execution when applying the VHE concept are subject of Fig. 1. The figure does not claim to be complete but tries to give an overview of the performance of the VHE concept.

If the service can be extended in the visited environment, then the user is informed about this possible add-on and the service is executed with additional functionality to that known by the user in his home environment. As an example the user has within his service set the Multi Party service. The visited environment offers the Multi Party with the extension of video telephony. If the roaming agreement between the home and visited environment does not preclude such an extension and the user has agreed on it, the Multi Party service is offered also with video telephony.

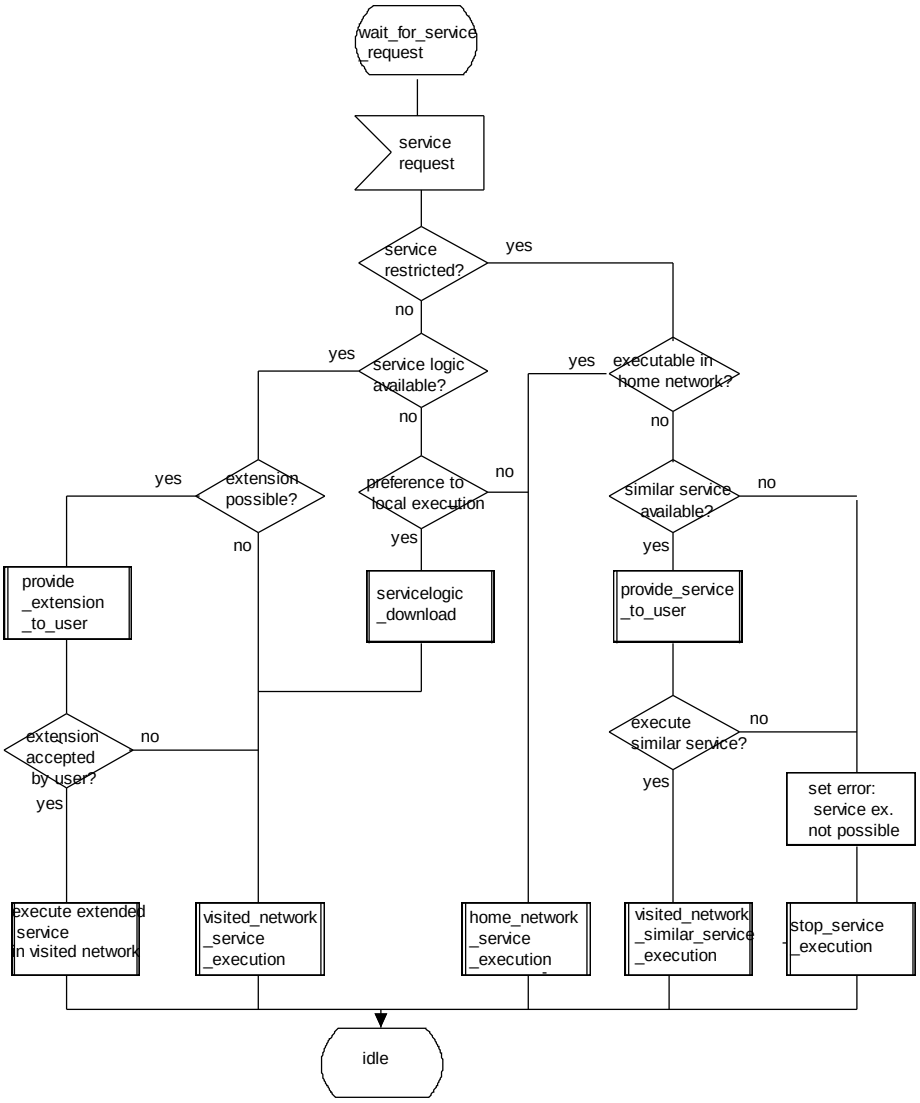

Figure 1: Service execution support by the VHE concept

[Editors Note: This SDL drawing is not representative of any implementation, it illustrates possible functionality realised with the VHE concept.]

The VHE also provides the execution of similar services. If e.g. the user wants to use his data transmission service with 2000kbit/s, but the visited network only offers an 144 kbit/s data service, the user is informed about this. The VHE enables a service execution from the users perspective where the only difference is the used data rate.

If the visited environment can not offer certain parts of the subscribed services the user shall have the option of being notified. The user profile will regulate acceptable tolerances of each service and when to trigger notifications.

6 Subscriber Profiles

[Editors note/initial topic list: Subscription profile - fixed basic profile, enabling and limiting, general preferences by the subscriber. User profile - individual user preferences and setting within the limits of the subscription. Contents of user profile. Entities controlled by user data. Principles for management of user profile. Securing privacy of user data. Access to on-line billing.]

6.1 Introduction

The requirement for flexible management and control of service profiles in UMTS is be an important factor in the design and realisation of new services. The UMTS service profiles offer subscribers the ability to tailor the services they use to their own needs and is one method by which service providers can distinguish their products from competitors.

6.2 Service Profile Hierarchy

Ultimate control of subscribers service profiles lies with the service provider since it is the service provider who updates service capability, corrects mistakes in profiles and is able to protect him/her self against fraud. The service provider has the ability to override any options enabled by the subscriber or the user at any time.

It is possible for the subscriber to enable, disable or alter service related information within the limitations of the subscription negotiated with the service provider. Where more than one USIM is associated with a subscription the subscriber is able to decide upon the services and level of user control to be allocated to particular USIMs. It is possible for the subscriber to deny the user any control of the services subscribed to.

The user has the ability to control those service related parameters which are delegated to him/her by the subscriber.

Depending upon the final architecture of the system it may be required to grant the user and subscriber some private area in their respective domains which cannot be accessed from a higher domain. For example if the user profile is stored on the USIM the user may use short codes such as "home" or "office" to dial some numbers and he/she may not want the service provider or subscriber to know the short code.

Figure 2 shows the hierarchy of service profile management.

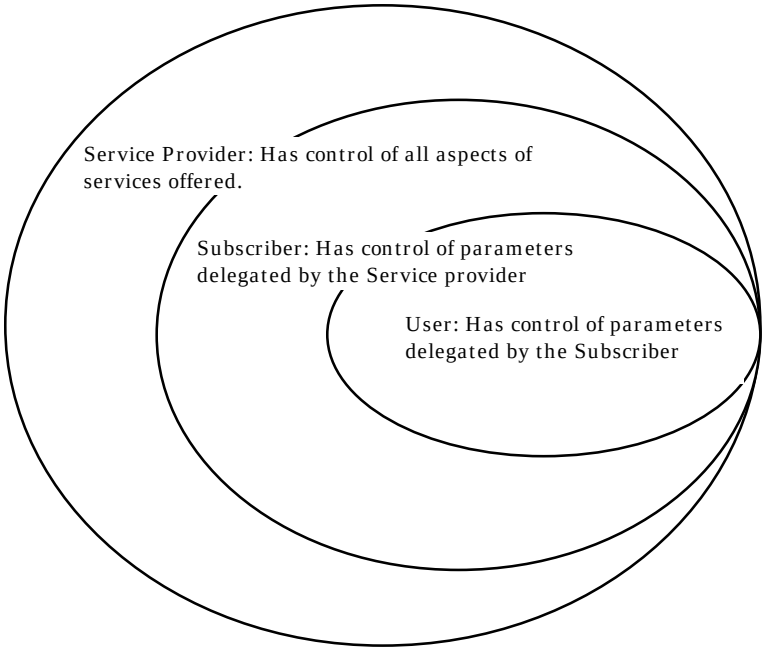

Figure 2:

6.3 Service Profile Type and Contents

1) Subscriber Profile. The subscriber profile contains details of those services and supplementary services to which the subscriber has access. The service profile contains all the information which is required in order that a particular service is delivered to the subscriber in the manner they have defined. Where a subscription relates to more than one USIM, details relating to individual USIMs is kept such as:

   - call forwarding or call restriction options;

- parameters that may be altered by the user of a particular USIM;
- charging/credit limit information associated with individual cards and with the subscription as a whole.

2) User Profile. The user profile contains details about the current state of service parameters which are in the control of the user such as call forwarding.

6.4 Access to Service Profiles

The service provider is responsible for the security and privacy of stored information relating to subscribers and users. The transfer of information to other entities such as network operators which is necessary for efficient service delivery is done in a secure manner. The service provider has the ability to change any aspect of a subscriber profile and if necessary to communicate those changes to another entity such as a network operator.

The subscriber has the ability to change those service parameters which are within the limitations of the subscription. The subscriber has the ability to revoke control privileges delegated to individual user profiles. Any changes made by the subscriber to the subscriber or user profiles is done in a secure manner.

The user has the ability to change only the status of those parameters which are delegated by the subscriber. Changes to the user profile made by the user is done in a secure manner.

6.5 General Principles for Service Profile Management

1) Changes made to service profiles take effect as soon as is practicable.
2) The procedure for changing subscriber or user profiles shall be easy for the subscriber/user to understand.
3) Notification that a change to the service profile has been accepted or rejected shall be available to the person requesting the change.
4) Any changes made to subscriber or user profiles while roaming is notified to the service provider. The subscriber may incur a charge for this notification.
5) Any changes to subscriber or user profiles shall be done in a secure manner and cannot be subsequently denied by the person requesting the change.

7 Support of number portability

Ownership of user number

The user is the owner of one or more personal numbers. A set of personal numbers may be of correlated or uncorrelated numbers. Correlation may be in terms of sub-adresses.

The user number can be a single number for all services. A sub-adresess system facilitates the adressing of specific services from networks that can not sufficiently adress specific services. The user can choose to use separate numbers for different services.

Subscriptions not tied to personal numbers may be submitted. In this case the SP issues the number and owns the number.

All numbers, personal or not, can be changed on request from the user.

Management of user numbers

User control

Numbers in the set of personal numbers can be permanently or temporary assigned to specific tasks. This is managed through the user profile.

Operator control

text…

Routing issues

(National domain)

UMTS domain

FPLMTS domain

8 Control and creation of services and service capabilities

8.1 Creation of services

8.1.1 Creation of Core and Access Network related services

8.1.2 Creation of Service Provider related services

8.1.3 Creation of Value Added Service Provider related services

8.2 Control of services

8.2.1 Control of Core and Access Network related services

8.2.2 Control of Service Provider related services

8.2.3 Control of VAS Provider related services

9 Configuration of functionality

Configuration of services, location and time dependent.

Service logic configuration

Call interception, call monitoring

Interpretation of user profile and subscription data

History

Date	Status & Version	Comment
26 August 1996	Draft - 0.0.1	very first draft, agreed structure, no agreed contents
28 August 1996	Draft - 0.0.2	More on virtual home environment, very early draft
11 October 1996	Draft - 0.0.3	3rd set of text proposals - still no text reviewed by WPC