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Universal Mobile Telecommunications System (UMTS);
Service aspects;
Virtual Home Environment (VHE)
(UMTS 22.70 version 3.0.0)

TR 22.70 V3.0.0 (1998-03)

Technical Report

**Universal Mobile Telecommunications System (UMTS);
Service aspects;
Virtual Home Environment (VHE)
(UMTS 22.70 version 3.0.0)**

UMTS

Universal Mobile
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Contents

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Foreword

This Technical Report (TR) has been produced by ETSI Special Mobile Group (SMG).

1 Scope

This document describes the Virtual Home Environment (VHE) concept and its constituent parts. It aims to identify how VHE will be realised.

A concept called Service Environment is introduced to describe how VHE services will be made available on demand to a user travelling with her terminal in any location.

The concept of Virtual Terminal is discussed to describe how VHE can be made available in any terminal.

2 References.

References may be made to:

a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or

b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or

c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or

d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] UMTS 22.71: "Universal Mobile Telecommunications System (UMTS); Automatic Establishment of Roaming Relationships".

[2] UMTS 22.07: "Universal Mobile Telecommunications System (UMTS); UMTS Terminal and Smart Card Concepts".

[3] UMTS 22.05: "Universal Mobile Telecommunications System (UMTS); Services and Service Capabilities.

3 Definitions and abbreviations

3.1 Definitions.

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

Service Profile: (check 22.20, what is user profile)

Service Provider:

Value Added Service Provider: (Check 22.01)

3.2 Abbreviations.

For the purposes of the present document, the following abbreviations apply:
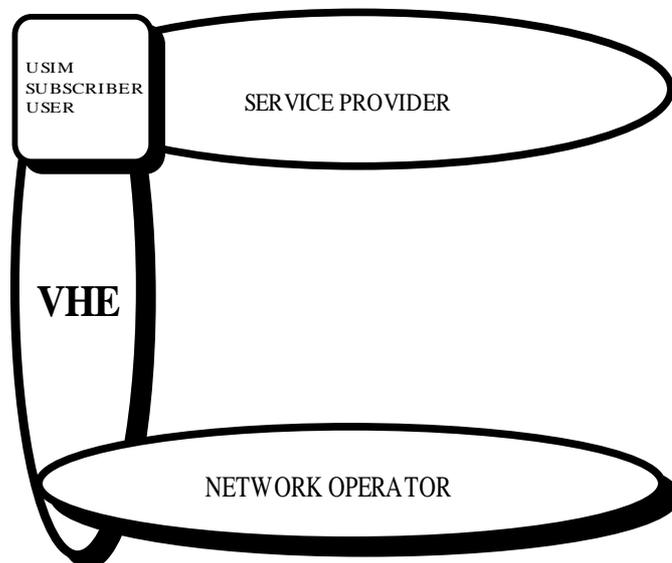
VHE Virtual Home Environment

4 Virtual Home Environment concepts and requirements

4.1 The Virtual Home Environment concept.

Virtual Home Environment (VHE) is defined as a system concept for personalised service portability across network boundaries and between terminals.

The concept of the VHE is such that UMTS users are consistently presented with the same personalised features, User Interface capabilities and services in whatever network and whatever terminal, where ever the user may be located. The exact configuration available to the user at any instant will be dependent upon the capabilities of the USIM, Terminal Equipment and Network currently being used or on the subscription restriction (user roaming being restricted). A user with her USIM in another terminal, should receive maximum capability provided depending on the limitation of the terminal. For example if the terminal currently in use does not support a specific service then this will not be available to the user, however the user should be made aware of this in a straightforward manner.

VHE will be created by a combination of capabilities located in the service provider, network operators and terminal equipment. In effect the VHE can be considered as a distributed user profile. The profile outline will be owned by the service provider, at any instant it may be distributed between the Terminal Equipment, USIM, Network Operator and Service Provider. It should not be necessary for any network operator to permanently store any information relating to a Users VHE.

Figure 1: VHE MODEL

Figure 1 shows the Virtual Home Environment model and its components. The roles and component involved in realisation of VHE consist of the following:

- One Service Provider;

- One or more Value Added Service Provider;

- One USIM;

- One IC Card;

- One Subscriber;

- One Subscription;

- One User;

- One or more Terminal (simultaneous activation of terminal providing the same service is not allowed);

- One or more Network Operator.

A UMTS user is associated with one service provider. The Service Provider provide VHE according to the subscription. The Service Provider can utilise a plethora of network operators and terminals to support VHE for the User.

4.2 Multiple VHE

In the situation where there are multiple subscriptions in a terminal, for each active subscription its associated VHE is also active. This requires the standard to support the use of multiple active VHEs on the same terminal.

4.2.1 Terminal view of VHE

The terminal indicates the service profile in VHE mode. It presents the same degree of look and feel depending on the limitation of the serving network and the capabilities of the terminal in use. The VHE terminal representation, either visual or audio, should be intuitive. Any limitations in the terminal for example the class of the terminal will be indicated to the user when terminals change. For instance if a user changes terminal of a different class, for example, from a mobile phone to a PDA terminal, the display (if that is the presentation mode chosen by the user) will be consistent in the use of icons, given the limitation of the terminals screen size. Services that are available/unavailable will be displayed in a way that is familiar to the user no matter what class of terminal is used.

4.2.2 User view of VHE

Individual Users can have a VHE which is based on a subset of the total service. For instance the look and feel may be entirely down to the User. However whilst the User may have a set of services he would expect to be offered these will only be offered if permitted by the Subscriber and Service Provider for example language comparability check.

From the users point of view the use of the network is hidden, however the service behaves in a similar manner irrespective of the serving network (the user is made aware of any limitation).

The user is made aware of the following using the personalised presentation mode chosen (e.g User Interface) and agreed by the network at the time of operation:

- addition and cancellation of service subscription;

- modification of user/subscriber data;

- presentation of error messages and session progress signals in the same language and format;

- presentation of various choices which can be selected in case of quality reduction;

- presentation of the service depending on the destination;

- presentation of charging credit control and security checks;

- modification of environment to use local resource available;

- access to list of services offered by service providers attached to the serving network;

- support of comfort services for disabled people.

4.2.3   Subscriber View of VHE

This could equate to a set of restriction/permissions on the Users of the service (e.g Credit Limits or Call Forwarding Limits). It may also include the method used to provide billing etc.

4.2.4   Network view of VHE

The network should not need to be aware of the VHE. The user/service provider may request transport capabilities in line with the VHE and may (if offered) request services of the network in line with the VHE. It may have to be aware of restrictions placed on the User, for example, call forward limits etc.

The Network Operator need to know:

- how to find the appropriate service provider to bill;

- whom to bill and how, for traffic and signalling;

- how to interpret the QoS negotiation;

- how to interpret the addressing;

- how to interpret the service logic of services demanded;

- how to account for services delivered;

- how to route incoming signals;

- how interpret the User Interface received from the user/subscriber's terminal into session control information or service provider dialogues;

- how to maintain transient data in sync with data held by the service provider;

- translation function to support disabled people e.g text to speech conversion or speech to braille conversion.

The originating network particularly needs to know:

- how to charge for traffic transiting his network;

- how to interwork between networks;

- how to charge for signalling;

- how to route sessions;

- how to route signals;

- how to maintain transient data if necessary.

4.2.5   Service Provider view of the VHE

To the service provider the VHE will appear as a list of capabilities, preferences and settings appropriate to the User and Subscriber. Some of this data must be held by the Service Provider since it is related to subscription capabilities and ultimately charges to the Subscriber. Some of this data could be held by the USIM or terminal.;

A service provider needs to know the following about a user who is located in a network.

- the location of the user and routing of incoming sessions;

- authentication of the user and services in the network;

- how addition, cancellation of service subscription is to be managed;

- how modification of user / subscriber profile is to be managed;

- how accounting for signalling traffic is to be managed;

- how to account for traffic;

- how distribution of user interface logic for new services is to be managed;

- how distribution of service logic for new services is to be managed;

- how remote interpretation of addressing in case of need is to be managed;

- how to allow access to services;

- how to cease subscription to a service when the subscriber departs;

- how service quality packages are negotiated such as throughput and signal level.

4.2.6   Value Added Service Provider view point on VHE.

The value added service provider are typically content provider examples of such services are:

- Video on Demand;

- Language translation;

- Speech to text Translation;

- Text to Braille translation;

- Entertainment information provider.

4.3   Service Profile Hierarchy

The Service Provider is the core of the VHE and provides a set of features/services, some of which can only be changed by the Service Provider. The Subscriber, as the next level is allowed to change her service depending on the limitations of the Service Provider. The User, is limited to the features/services offered by the Subscriber and is therefore not allowed to change any services not permitted by the Subscriber or Service Provider. The level of changes permitted by the User may be limited to the things like "look and feel" of the working environment and personal address book .
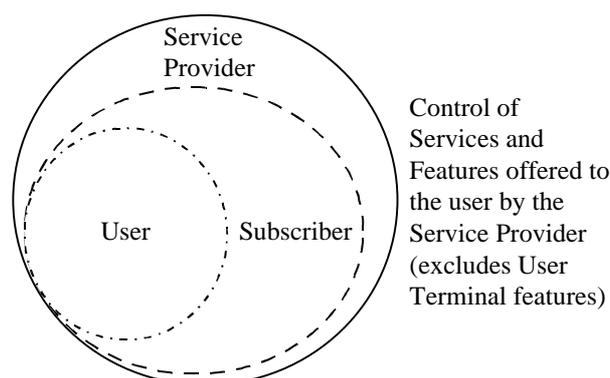
Figure 2: VHE RELATIONSHIPS

Figure 2.shows the hierarchy of service profile management. The Service provider has control over ALL the services on offer. The Subscriber has control over a subset of these services, while the User has the most restricted level of control over services. The types of service the User has control over include such things as the look and feel of the terminal and personal data. It should be noted that the set of services controlled by the Subscriber and User could be coincident.

4.4 Roaming Relationships in VHE.

VHE is primary of importance when user is roaming. UMTS roaming relationship for full service (including VHE) is covered in UMTS 22.71. Commercial relationships will be required between Service Provider and Network Operator either directly or indirectly.

When roaming, a user has the capability of accepting the local environment, this is part of VHE services, provided that this option is part of the service profile agreed with the Service Provider. VHE can be modified but can not be changed without the permission of the Service Provider.

In a situation where for some reason commercial roaming is not established between the Service Providers and a Network Operator full service (including VHE) will not be offered but mandatory basic services i.e. emergency calls will be provided. The user will be notified in an appropriate manner.

4.5 Service Environment.

The service environment describes the scenario where the user is allowed to use all the services he is accustomed to given limitations of the network and terminal.

It will be possible for a user to optionally view and obtain new services that are available in the serving network, these may be services beyond those normally available to the user. The ability to download and use the new service depends on the type of subscription with the Service Provider.

The service capabilities (specified in UMTS 22.05) are the basic building blocks which can be used to build service provider specific supplementary services which are VHE services. These services, are used to complement and personalise the basic telecommunication services (bearer services and teleservices).

The following service capabilities may be required (this list is not exhaustive):

- address translation;

- call origination;

- call control;

- answering calls;

- call termination;

- user to user information.

4.6 Virtual Terminal Environment

The concept of Virtual Terminal describes how VHE is made available in any terminal irrespective of the terminal that was registered as the users terminal.

UMTS terminal does not restrict the functionality of terminals in anyway [see UMTS 22.07]. The standards shall allow terminal specific features and functions to exist. The terminal shall contain mandatory function specified in UMTS 22.07 such as terminal IC card interface, SP and network registration and extra features as specified in UMTS 22.07.

The IC card will interpret the interactions from the User Interface and translates them into the required set of commands to the network operator or service provider. The IC card will also interpret messages and indications from the network as required.

4.6.1 Terminal Classes

A set of terminal classes will be defined according to the types of service capability they support. VHE will allow

a familiar set of services depending of the class of terminal, higher, lower or identical class. Early identification of terminal capabilities is necessary as this will save the network resources in case of incompatible terminals. The user terminal shall identify basic capabilities when attached to the network. Further negotiation of enhanced capabilities and features has to be done according to VHE services (basic capabilities has been identified in UMTS 22.07). Any limitations will be made known to the user in a straight forward manner.

4.6.2   IC Card Functionality

A USIM application on an IC card in combination with other components such as SP, NO etc (see UMTS 22.07) provides a Virtual Home Environment. It is possible to have more than one USIM application on an IC card hence more than one VHE, on an IC card. IC card functionality is covered in UMTS 22.07.

- Terminal should be able to interrogate USIM to determine which VHE is active.

- Terminal should be able to support activation and deactivation of VHE with appropriate security.

4.7   Service Aspects and Requirements

Services and Service Access are supplied to the user on bearers supplied by the Serving Network Operator. Basic bearer or teleservices are supplied by the Network Operator, with the service provider or providers being responsible for authentication and charging during session establishment..

Routing and addressing of sessions is made using a subset of the complete world-wide addressing space. The type of address used may belong to a number of address domains (e.g E.164, E.191 or IP Address)

Value added services are made available by selected value added service providers on the basis of known or predictable costs.

A process of negotiation of QoS will take place between the network and the user regarding the service capabilities necessary for service and the capabilities available in the network. This process of negotiation may need to be standardised in all networks.

If implemented in this way a separation of Service Logic and Invocation Logic may take place in the terminal with the connection being made by encrypted logic on the USIM.

5   Recommendations for realisation of VHE Concept.

The following clause outlines different mechanisms that could be adapted for the realisation of Virtual Home Environment.

5.1   Service Emulation

Service Emulation:- for the support of VHE, can be realised by the transfer of service related data/software or the necessary parameters from the Service Provider to the serving network and/or the terminal/USIM. This maybe be achieved by downloading of service logic, Java Applets, Agents, usage of an evolved SIM Toolkit, usage of an evolved MEXE approach etc. This are useful for audio/video codec download, UI/MMI upgrade/adoption.

Requirements:

- Secure and standardised mechanism for transport of software parameters.

- Secure and standardised execution environment for USIM, Terminal and Network.

- Standardised API for service execution environment.

- Certification of software.

- Unique identification of services/software.

5.2   Remote Service Execution

Remote Service Execution gives the user the possibility to use VHE services although the serving network might not be able to support the desired service or the storage and execution of the appropriate software/data. Possible solutions are evolved CAMEL approach, and Client-Server approach.

The serving network may or may not execute the Service Provider's comment.

Requirements:

- Standardised API in the network.

- Transparent Signalling to the Service Provider.

6.0   Standardisation

The following standards are needed to realise VHE:

- Standardised execution environment for terminal, IC card and Network

- Standardised APIs.

- Network Architecture. The following interfaces are required for standardisation, for downloading VHE profile:

  - Service Provider/Network Operator for service emulation.

  - Service Provider/Network Operator for remote service execution.

  - Network/Mobile Terminal Interface.

  - Service Provider/Mobile Terminal Interface.

  - Service Provider/USIM Interface.

  - Mobile Terminal/USIM interface.

Annex A (informative):
Change history

Change history					
SMG No.	**TDoc. No.**	**CR. No.**	**Section affected**	**New version**	**Subject/Comments**
SMG#25				3.0.0	Version 3.0.0 Approved at SMG#25