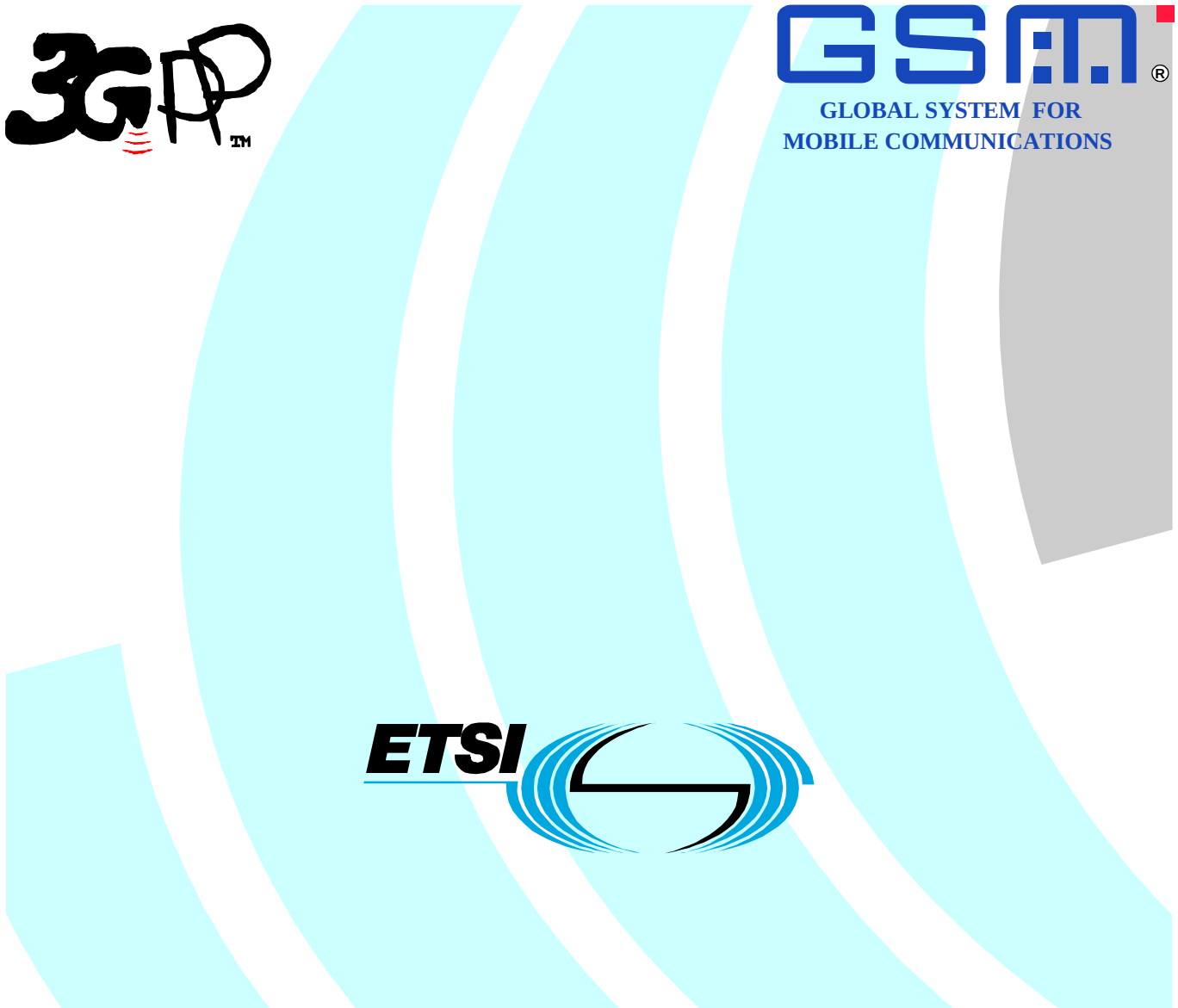
ETSI TR 122 121 V5.3.1 (2002-06)

Technical Report

Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
Service aspects;
The Virtual Home Environment;
Stage 1
(3GPP TR 22.121 version 5.3.1 Release 5)



Reference
RTR/TSGS-0122121v531

Keywords
GSM, UMTS

ETSI

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

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

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

Important notice

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

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

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

If you find errors in the present document, send your comment to:
editor@etsi.fr

Copyright Notification

Intellectual Property Rights

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

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

Foreword

This Technical Report (TR) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under www.etsi.org/key .

Contents

Foreword

This Technical Report 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:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies the content of the Stage 1 requirement for realisation of VHE.

Virtual Home Environment (VHE) is defined as a concept for Personal Service Environment (PSE) portability across network boundaries and between terminals. The concept of VHE is such that users are consistently presented with the same personalised features, User Interface customisation and services in whatever network and whatever terminal (within the capabilities of the terminal and the network), wherever the user may be located.

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 22.057 Mobile Execution Environment (MExE); Service description”.

[3] 3GPP TS 22.078: “Customised Applications for Mobile network Enhanced Logic (CAMEL); Service definition - Stage 1”.

[4] 3GPP TS 22.038: “3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; USIM/SIM Application Toolkit (USAT/SAT); Service description; Stage 1”.

[5] 3GPP TS 22.101: “Service Aspects; Service Principles”.

[6] 3GPP TS 22.105: “Services and Service Capabilities”.

[7] ITU-T Recommendation Q.1701: “Framework for IMT-2000 networks”.

[8] ITU-T Recommendation Q.1711: “Network Functional Model for IMT-2000”.

[9] 3GPP TS 23.127: “Virtual Home Environment/Open Service Architecture”.

[10] 3GPP TS 22.127: “Open Services Access (OSA) ”.

[11] World Wide Web Consortium Composite Capability/Preference Profiles (CC/PP): A user side framework for content negotiation (www.w3.org).

[12] 3GPP TS 22.115 “Charging and Billing”

3 Definitions and abbreviations

3.1 Definitions

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

HE Services: services, which are provided by the home environment

HE-VASP: Home Environment Value Added Service Provider. This is a VASP that has an agreement with the Home Environment to provide services. The Home Environment provides services to the user in a managed way, possibly by collaborating with HE-VASPs, but this is transparent to the user. The same service could be provided by more than one HE-VASP and each HE-VASP can provide more than one service.

Home Environment: responsible for overall provision and control of the Personal Service Environment of its subscribers.

Local Service: See definition in [1].

OPERATOR SPECIFIC SERVICES (OSS) are not standardised and could be implemented at the PLMN entities (e.g. HLR) on a vendor specific basis or using toolkits (CAMEL, USAT, MExE). These tool-kits use standardised interfaces to the underlying network (e.g. CAP, MAP) or use Bearers to transport data, for example, from the MExE service environment of USAT server to the UE/USIM. The implementation of these operator specific services on the different platforms (CSE, MExE service environment or USAT Server, UEs) is done in a completely vendor specific way and uses only proprietary interfaces.

Personal Service Environment: contains personalised information defining how subscribed services are provided and presented towards the user. Each subscriber of the Home Environment has her own Personal Service Environment. The Personal Service Environment is defined in terms of one or more **User Profile**s.

Services: set of functions offered to a user by an organisation.

Service Toolkits : bearers defined by parameters, and/or mechanisms needed to realise services.

Standardised services: standardised services (Supplementary Services, Tele-Services, etc.) are implemented on existing PLMN entities (e.g. HLR , MSC/VLR and terminal) on a vendor specific basis, using standardised interfaces (MAP, etc.) for service communication (e.g. downloading of service data). Availability and maintenance of these Services is also vendor dependent.

User: is a logical entity, which uses PLMN services.

User Services Profile: contains identification of subscriber services, their status and reference to service preferences. This is part of the User profile information.

User Profile: A set of information necessary to provide a user with a consistent, personalised service environment, irrespective of the user location or the terminal used (within the limitations of the terminal and the serving network). The user can define one or more User Profiles according to the user's needs. The user's Home Environment manages the User Profile(s).

Value Added Service Provider: provides services other than basic telecommunications service for which additional charges may be incurred. The user may access services directly from Value Added Service Providers and the serving network. The Home Environment does not support services obtained directly from VASPs or serving network outside home network. VASP has no service agreement with the Home Environment.

Virtual Home Environment: concept for personal service environment portability across network boundaries and between terminals.

Further definitions are given in [5]

3.2 Abbreviations

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

API	Application Programming Interface
CAMEL	Customised Application for Mobile Network Enhanced Logic
CAP	CAMEL Application Part
CDR	Call Detail Record
CSE	CAMEL Service Environment
HE	Home Environment
HE-VASP	Home Environment Value Added Service Provider
HLR	Home Location Register
MAP	Mobile Application Part
ME	Mobile Equipment

MExE	Mobile Execution Environment
MSC	Mobile Switching Centre
OSA	Open Service Access
PSE	Personal Service Environment
SAT	SIM Application Toolkit
SIM	Subscriber Identity Module
UE	User Equipment
USAT	Universal SIM Application Toolkit
USIM	User Service Identity Module
VASP	Value Added Service Provider
VHE	Virtual Home Environment

4 General Description of the VHE

Virtual Home Environment (VHE) is defined as a concept for personal service environment portability across network boundaries and between terminals. The concept of the VHE is such that users are consistently presented with the same personalised features, User Interface customisation and services in whatever network and whatever terminal (within the capabilities of the terminal and network), where ever the user may be located.

The key requirements of the VHE are to provide a user with a personal service environment which consist of:

- personalised services;
- personalised User data (within the capabilities of terminals);
- consistent set of services from the user's perspective irrespective of access e.g. (fixed, mobile, wireless etc. Global service availability when roaming.

The standards supporting VHE requirements should be flexible enough such that VHE can be applicable to all types of future networks as well as providing a framework for the evolution of existing networks. Additionally the standards should have global significance so that user's can avail of their services irrespective of their geographical location. This implies that VHE standards should:

- provide a common mechanisms for accessing services;
- enable the creation of services;
- enable personal service environment to be recoverable (e.g. in the case of loss/damage of user equipment).

Roles and components involved in realisation of VHE consist of the following also see figure 1:

- home environment;
- users;
- possibly HE-VASP(s);
- possibly value added service providers;
- personal service environment; (set of User Profiles).

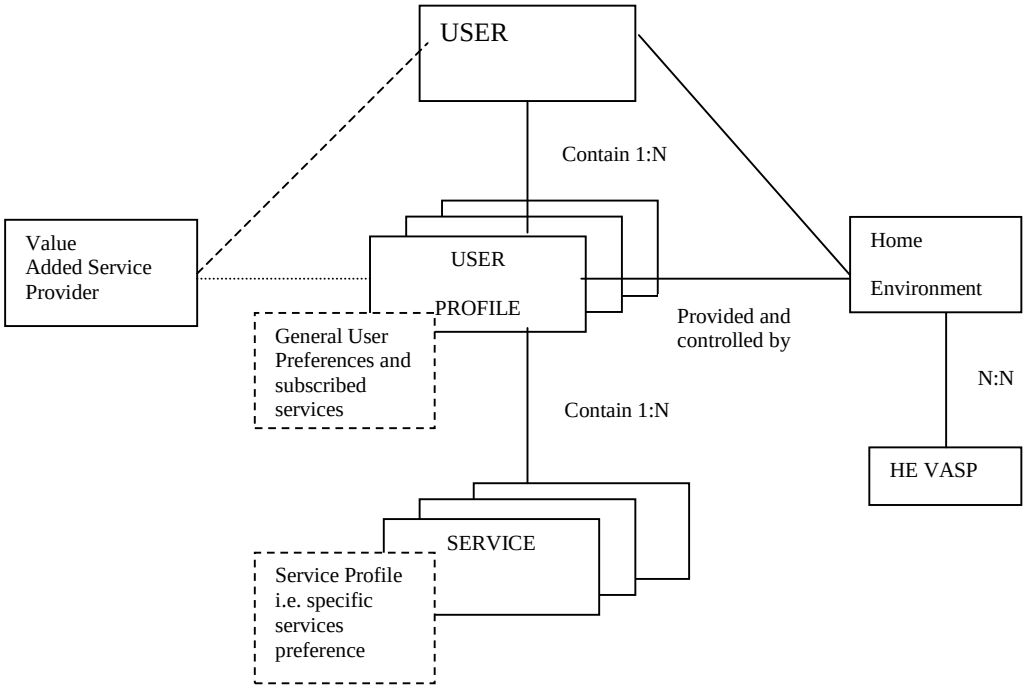


Figure 1: Logical VHE Role Model (User's View)

A user's VHE is enabled by user profiles as logically depicted in figure 1 "Logical VHE Role Model (User's View)". The home environment shall:-

- enable the user to manage one or more user profiles (e.g. activate, modify, deactivate etc.);
- enable the home environment and HE-VASP to manage one or more user profiles (e.g. activate, modify, deactivate etc.);
- enable the identification of a user's personalised data and services information directly or indirectly from the user's profile(s);
- enable authorised HE-VASPs to access the user's profile(s);
- enable VASPs controlled and limited access to the user's profile(s) (e.g. for general user preferences and subscribed services information).

A set of one or more user profiles is defined for the user in the HE. Within the HE, the user may activate one of its user profiles. The service behaviour of the services depends on the active User profile. Services provisioned to the user may allow or require personalisation by the user. It is the activated User Profile, which personalises the user's services in the HE. The user may have a number of user profiles, which enable her to manage communications according to different situations or needs, for example being at work, in the car or at home.

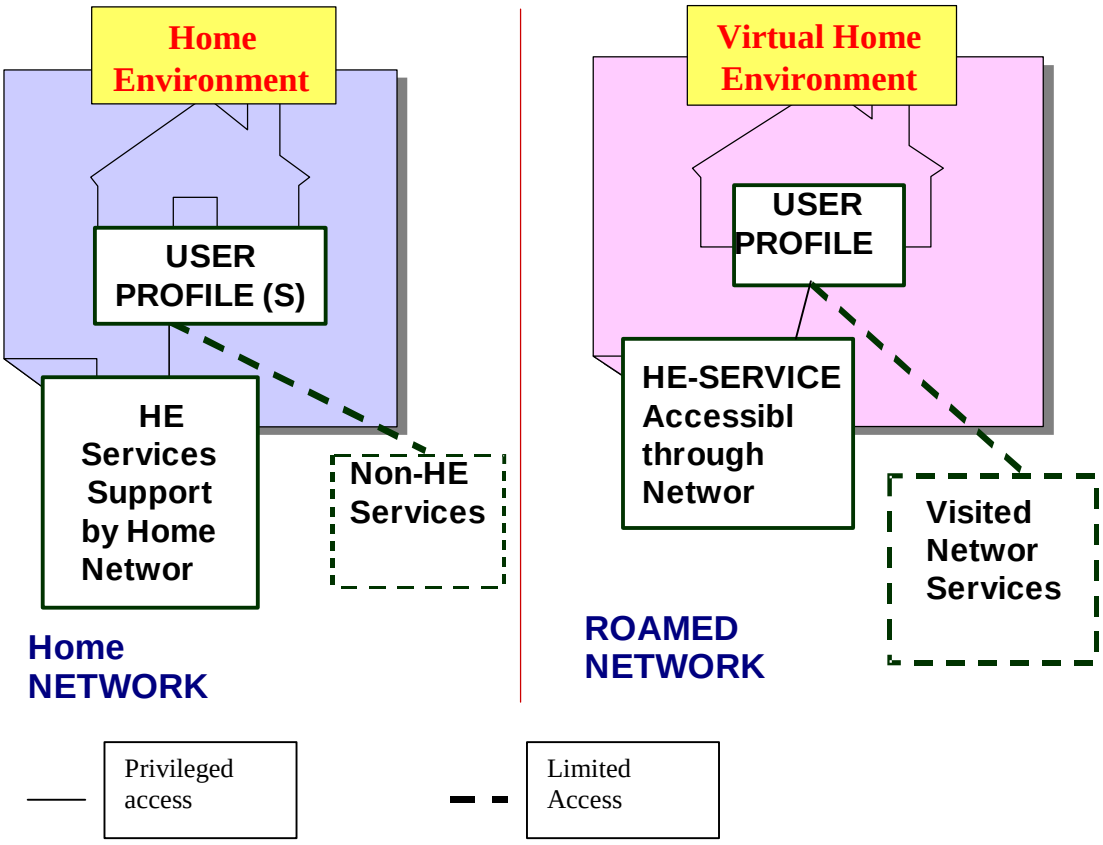


Figure 2: Logical VHE Role Model (Operator'sHome Environment's View)

The home environment's view of the Virtual Home Environment concept is logically depicted in figure 2 " Logical VHE Role Model (Home Environment's View)". The home environment shall:-

- be able to provide and control services to the user in a consistent manner also if the user is roaming;
- provide the necessary means to create and maintain a set of user profiles;
- Support the execution of services – through its Service Toolkits in the network, the USIM and in the ME;
- uniquely identify the user in the telecommunication networks supported by the Home Environment.

Services can be created from enhanced version of existing Service Toolkits. (e.g. CAMEL, MExE, OSA and USAT) plus any new service toolkits with possible addition of IP capabilities.

The following options shall be available in the standards to enable service creation and delivery in the new architecture:

- Toolkits enhanced to control IP multimedia services, which will allow services to be deployed in a vendor independent manner
- The VHE concept that enables toolkits not standardised by 3GPP to be used to deliver services (e.g. adoption of IP recommendations to facilitate the IP services).
- Mechanisms which allow the network to understand the limitations of the terminal and thereby take appropriate actions.

5 Support of services within the VHE

VHE shall support VHE services from previous releases and new services built on Service Toolkits. Later 3GPP developments will provide support for a wider range of services in later releases.

3GPP services will generally not rely on the traditional detailed service engineering (evident for supplementary services in second-generation systems), but instead provides services using generic toolkits.

Services can be built using network and/or terminal functions offered via Service Toolkits ([2], [3], [4], [9], [10]). The set of services available to a user within the VHE is personalised by a set of **User Profile**s unique to that user.

The following are examples of services offered through VHE:

- standardised services;
- operator specific services;
- other services.

Other services like OSS, are not standardised. These services s will be implemented using Service Toolkits (Bearers, Mechanisms). The functionality offered by the different Service Toolkits is defined by them directly, and can be used by the service designers to build their services .

Within the network Service Toolkits are accessible via standardised APIs, for example, OSA APIs.

Within the terminals functionality is accessible via APIs, for example, MExE and USAT APIs.

The terminal can communicate, using bearers services, with services in the network via functionality optionally realised for MExE service environment and USAT-servers.

The above example list of services is not exhaustive.

6 High Level VHE Requirements

6.1 User Requirements

The user shall have the possibility to manage services as well as the appearance of the services. It shall be possible for the user to:

- personalise services;
- personalise User data (within the capabilities of terminals);
- access services from any network or terminal subject to network capabilities, terminal capabilities and any restrictions imposed by the Home Environment;
- use services in a consistent manner irrespective of serving network and terminal, within the technical limitations;
- access new services in the Home Environment;
- modify a **User Profile** (for example to include new services) from any location, within the technical limitations
- activate or deactivate user services;
- interrogate current user service and user interface settings;
- select a particular User Profile;
- indicate (on a session by session basis if necessary) to which subscription charges are to be applied;
- recover UE resident User Profile information to protect against loss or damage of user equipment;
- discover services offered by the Home Environment and HE-VASPs;
- not be restricted from discovering and accessing local services;
- be aware of limitations of services, which may result from different terminals and or serving network capabilities.

6.2 Home Environment Requirements

It shall be possible for the home environment to:

- control access to services depending on the location of the user, and serving network;
- control access to services on a per user basis e.g subject to subscription;
- control access to services depending on available Service Toolkits in the serving network, and terminals;
- manage service delivery based on for example end to end capabilities and/or user preferences;
- request version of specific services supported in serving network and terminal;
- request details (e.g. protocol versions and API versions) of available Service Toolkits supported in the serving network, and terminals;
- define network support of User Profile management (e.g. activate, modify) in a standardised manner;
- handle charging for services (as defined in clause 11);
- deploy services to users or groups of users;
- enable users or groups of users to discover services offered by the Home Environment and HE-VASPs;
- manage provision of services to users or groups of users;
- recover UE resident User Profile information to protect against loss or damage of user equipment.

6.3 HE-VASP Requirements

The Home Environment Value Added Service Provider offers services to a user through the home environment within the Virtual Home Environment. From a user's perspective this may be transparent or non-transparent. The HE-VASP may store user related, service specific information in servers outside the Home Environment. This information can be requested by authorised HE-Services using references in the User Profile (e.g. in the form of an URL), managed by the Home Environment (cp. clause 7). There are no requirements for standardisation of HE to HE-VASP access, and the HE-VASP may use capabilities provided by the home environment.

The Home Environment Value Added Service Provider shall be able to:

- manage references in User Profiles related to its service specific data outside the Home Environment;
- request user terminal capability information via standardised mechanisms subject to limitation of what is known in the HE;
- support user discovery of services offered by HE-VASPs through the Home Environment;
- dynamically offer new services to a user;
- have secure access to User Profile data as authorised by the Home Environment;
- manage access to HE-VASP Services;
- process HE-VASP services chargeable events at the discretion of the HE (cf. clause 10);
- refresh current HE-VASP User Profile information on request from HE.

6.4 Visited Network Requirements

The visited network is not required to be aware of the services offered via the Home Environment.

The user/Home Environment may request information on capabilities, which are necessary to support, the Home Environment services.

It shall be possible for the visited network to perform the following:

- support user access to services in the Home Environment;
- support user discovery of services offered by the Home Environment;
- dynamically provide information on the available Service Toolkits in its network;
- provide transparent communication between clients and servers in terminals and networks;
- exchange the charging information (type of charging, threshold for prepaid services and behaviour if the threshold is reached) for any service possibly required by the user;
- handle the service according to the instructions received by the Home Environment regarding charging activities;
- inform the Home Environment of the chargeable events (e.g. send CDRs, …).

6.5 Relationships within VHE

6.5.1 Home Environment VASP (HE-VASP)

The Home Environment may allow HE-VASPs access to its Service Toolkits in the network, the USIM and in the ME for the execution of services provided by the HE-VASP. The Home Environment provides mechanisms to support identical services provided by HE-VASPs when the user moves across network boundaries and between UEs.

There may be some information, which is shared between the Home Environment and the HE-VASP (for example current capabilities), however this is outside the scope of standardisation.

6.5.2 Value Added Service Provider (VASP)

The user may access services directly from Value Added Service Providers. Services obtained directly from VASPs are not managed by the Home Environment and therefore are not part of the VHE offered by the Home Environment. Mechanisms may be provided which allow the user to discover those services obtained directly from VASPs and personalise those services. These mechanisms are outside of the scope of VHE.

There are no VASP requirements to support VHE. It is noted that with mechanisms such as CC/PP, VASPs may indirectly implement VHE stored User Profiles during Capability Negotiation (e.g. using HTTP next generation), however this is outside the scope of standardisation.

6.5.3 Local Service Relationship to VHE

Local services are not supported by VHE, however VHE should not preclude discovery and access to local services by user.

7 Personal Service Environment

The Personal Service Environment describes how the user wishes to manage and interact with their communications services. The PSE is a combination of a list of subscriptions (detailing provisioned services), preferences associated with those services, terminal interface preferences and other information related to the user's experience of the system. Within the PSE the user can manage multiple subscriptions e.g. both business and personal, multiple terminal types and express location and temporal preferences.

7.1 User Profiles

The User Profile is the collection of all subscriber data, including both Personalised data (e.g UE interface preferences set within the capabilities of the UE and serving network) and User Services Profile (preferences associated with

subscribed services). A logical representation of the data distribution, which may be directly or indirectly identified from the user profile, is depicted in figure 3 "Logical Model of the User Profile".

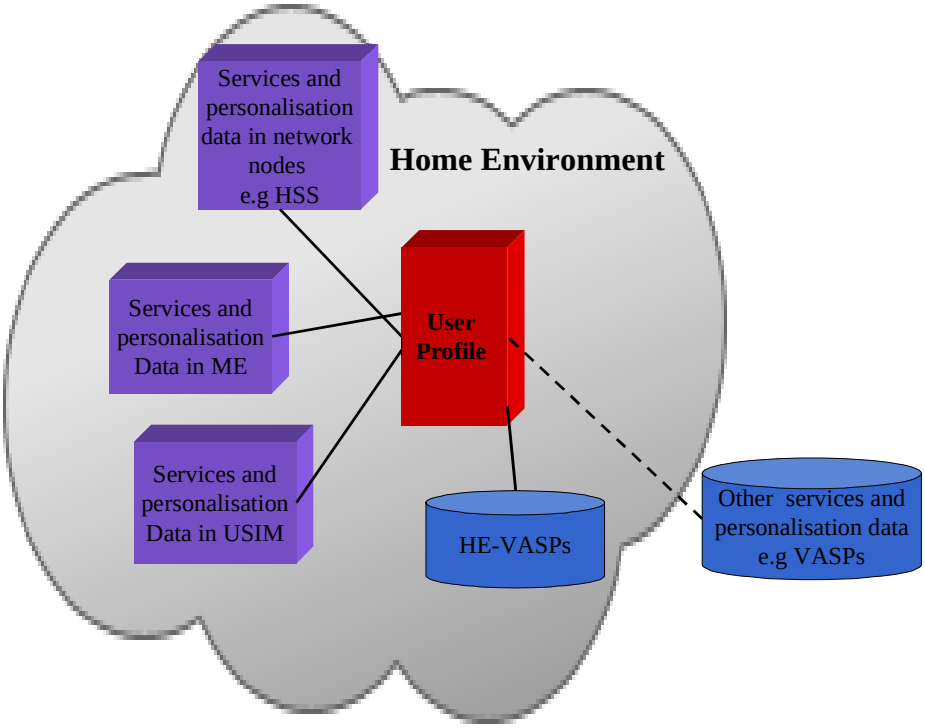


Figure 3: Logical Model of the User Profile Data Distribution

The User Profile data may be either by indirect reference and/or direct inclusion in the User Profile, namely:-

- a set of one or more references (e.g. URLs) in the User Profile where the User Profile data may be found; this method represents the indirect referencing model;
- directly contained in the User Profile identifying services data; this method represents the direct referencing model.

The User Profile may consist of both static and dynamic data, including status information.

Standardised User Profile data may be located in one or more entities, e.g.

- in the Network Entities (like Home Subscriber Services (HSS));
- in the user's (U)SIM application on the UICC;
- on the mobile equipment (ME);
- in application-specific databases in HE and HE-VASP;

however the location or format of such data is specified in stage 2 and 3 documents . Access to the User Profile shall be supported in a secure standardised way.

User information located in application-specific databases in VASPs is outside the scope of standardisation. Standardised Pointers to such information may be located in the User Profile.

The following aspects of the User Profile, subsequently defined, shall be supported:

- Classification;
- Location and distribution;

- Management, provisioning and access;
- Default policies;
- Synchronisation;
- Security and privacy;
- Format.

It is the support of the services and personalisation information in the User Profile, which enables the concept for the user.

7.2 Classification of User Profile data

The User Profile shall support the following types of data:

- Personalised data, are data of the User Profile which are independent of services (e.g UE interface preferences set within the capabilities of the UE and serving network);
- User Service Profile are specific to services of the HE or HE-VASPs (e.g preferences associated with subscribed services).

7.3 Selection and activation of User Profiles

It shall be possible, per user, for the network operator, HE-VASP or user toactivate a User profile. When a User Profile is activated the previously active User Profile is deactivated.

Where the user has more than one User Profile the selection/activation of a particular User profile shall be supported in the following ways:

- *Statically*: the user explicitly selects one of the User Profiles as the active one;
- *Dynamically*: the appropriate User Profile is selected automatically (e.g. selection is based upon some criteria such as time of day, location, terminal used etc.).

Each User Profile shall have a uniquely addressable identity.

At any time there is one and only one User Profile active for any User.

The HE controls and maintains the status information (active/not active) for the User Profiles of its Users.

7.4 Location, distribution and recovery of User Profiles

Location and distribution of the User Profile shall be supported between the following entities:-

- (U)SIM;
- Mobile Equipment (ME);
- Entities of the Home Environment (e.g. network databases (like HSS), location servers etc.);
- Entities of HE-VASPs (e.g. WAP-gateways, MExE servers).

NOTE: To ensure that User Profiles are applicable to as wide a community of terminal and network types as possible, existing work on this topic in other standards fora should be considered. One possibility is the work of the World Wide Web Consortium on the Composite Capability/Preference Profile [11].

The HE must be able to recreate all parts of the User Profile at all times. This may be done in collaboration with its HE-VASPs but this is outside the scope of standardisation. In particular if parts of the User Profile are located within entities of HE-VASPs the responsibility to recreate these parts of the User Profile lie with the respective HE-VASPs

In the event of loss/damage of the UE (USIM or ME), the User Profiles must be fully recoverable and may be used to reconfigure a new UE.

There may be some User information stored outside the User Profile e.g. with VASP or in the UE however this is outside the scope of standardisation. There is no requirement for backup and recovery of this data by the Home Environment.

7.5 Management, provisioning and access to User Profiles

It shall be possible, per user, to permit secure authorised access by the network operator, HE-VASP and user to

- create one or more User Profiles;
- request information contained in a User Profile;
- delete a User Profile;
- modify a User Profile;
- define the default User Profile;
- define the criteria for automatically selecting User Profiles.

7.6 Default policies for User Profiles

It shall be possible, per user, to permit secure authorised access by the network operator, HE-VASP user and user to support policy management for User Profiles, enabling definition of the following for User Profiles feature interaction policy:

- QoS policy;
- Rating plan policy;
- Content filter policy.

Policy management enable the HE to set rules for modifying the content of the user profile. Within the context of such HE-policy, the HE-VASP can modify the user profile content.

7.7 Synchronisation of the User profile

The primary goal is to ensure that a single consistent user profile is used. For recovery purposes those parts of the User Profile, that are stored in the UE (ME and (U)SIM), shall have a backup copy in the Home Environment.

Mechanism(s) shall be standardised to support the mutual synchronisation of the User Profile information stored in the ME, ((U)SIM), with information in the Home Environment. The HE shall be able to perform a synchronisation of the user profile whenever it is deemed to be appropriate. The user shall be able to defer a user profile synchronisation if he so wishes and schedule it for a later time. It shall be possible for the user to pre-define when synchronisation of the User Profile should take place (e.g. when services data is modified).

7.8 Format of the User profile

The format of the User profile data will be handled in stage 2 and 3 document, and shall be standardised in stage 2 and 3 specification.

The semantics and syntax of User Profiles shall be standardised to support access, interoperability and synchronisation, and to ensure access to User Profile data independently of which toolkit was used to create the service. The User Profile shall identify individual personalised data and individual user services (see clause 7.2).

7.9 Security of the User profile

Secure mechanisms shall be available for the transfer of User Profile data to, from or between authorised entities. Access to User Profile data shall only be permitted in an authorised and secure manner. 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. The owner of the data, normally the body storing the master copy of the data, shall be responsible for applying the appropriate level of security to the transfer of the data.

The secure mechanisms available shall include the following:

- Before any user data transfer takes place, it shall be possible for the sender of the data to verify the identity of the recipient.
- It shall be possible for the recipient of data to identify the sender.
- It is permissible for either the sender or recipient of data to employ the services of a third party, known to, and trusted by, both in order to provide authentication of identity.
- The validity of an authentication of identity shall, if required, be subject to a maximum time limit.
- It shall be possible for the sender of data to render the data to be unreadable by any party not authorised to receive it.
- It shall be possible for the recipient of data to detect whether the sender has made any change to the data subsequent to its transmission.
- The security mechanisms shall provide verification that the data has been sent by the sender and received by the recipient (non-repudiation).
- It shall be possible for the sender and/or the recipient to create an audit log of all data transfer transactions of a specified type, provided that this requirement is made known before any transfer takes place.

8 Components of VHE

The user's services in the Virtual Home Environment shall be enabled by support of: -

- the User Profile;

together with any combination of:-

- the generic bearers (defined by QoS);
- call control (e.g. IP multimedia or circuit switched);
- and any combination of the Service Toolkits (i.e. MExE[2], CAMEL[3], USAT [4], OSA[10]) on which the services are built .

Additionally, non-3GPP standardised Service Toolkits from the IT and IP world may be used to enhance VHE services.

9 Usage of existing toolkits

Improvements for VHE to support IP multimedia services shall be supported, e.g. improvements to service toolkits, service capability servers and User Profile etc. This will give operators and 3rd party service developers the opportunity to create IP multimedia services and services for networks supporting IP services.

Existing 3GPP toolkits (such as CAMEL, MExE, USAT and OSA), and non-3GPP toolkits shall be used when available.

VHE shall include new (if required) and enhanced service toolkits to support IP multimedia services.

9.1 CAMEL

Release 5 shall be able to use CAMEL plus any improvements for CAMEL [3].

VHE shall be able to use CAMEL improvements on previous CAMEL releases (e.g. Phase 4) of TS 22.078.

The VHE requirements on CAMEL are FFS:

- Users shall be able to use their existing CAMEL services in a consistent manner with both CS services and IP multimedia services. This shall occur in a transparent fashion and the user need not be aware of whether the service is either circuit switched or packet switched. The same look and feel of the service shall be maintained.

9.2 MExE

Release 5 shall be able to use MExE improvements on previous MExE releases [2].

- There needs to be harmonisation between the MExE user profile and **User Profile**. This could also require a mechanism to interrogate the terminal about its user terminal profile.

9.3 USAT

Release 5 shall be able to use USAT improvements on previous USAT releases [4]

- There needs to be harmonisation between the USAT user profile and **User Profile**.
- USAT terminals interact with the USIM using capability negotiation, and it shall be possible to continue usage of the capability negotiation for IP multimedia services.

9.4 Open Service Access (OSA)

Release 5 shall be able to use OSA improvements on previous OSA releases [10].

10 Charging requirements

Services, which are provided as part of the VHE, may be subject to charge at the discretion of the home environment

There are several forms of charging which shall be available to the Home Environment. It shall be possible for the Home Environment to charge in the following instances:

- subscription:
  - the user's registration to use services may be subject to charge.
- service transfer:
  - the transfer of services and/or information to the user UE or USIM may be subject to charge.
- service upgrading:
  - the upgrading of previously transferred services to the user's UE or USIM may be subject to charge (automated upgrading of services may be subject to a different charge).
- service usage:
  - the usage of services by a user may be subject to a charge.
- roaming:
  - the usage of VHE services when roaming may be subject to additional charges.
- inform the serving network of the type of charging (i.e. prepaid or/and postpaid) for any required service;

- inform the serving network of the threshold set for a given service required by the user and charged on a prepaid account;
- inform the serving network how to manage a service for which the threshold has been reached;
- manage the prepaid accounts (e.g. increase, decrease the credit, or pass the information to any services which manages the credit);
- access of the **User Profile**.

Refer to [12].

Other charging requirements may be identified and are FFS.

11 Security requirements

The mechanisms supporting VHE shall maintain a secure environment for the user and home environment.

The specific security requirements are FFS.

For User Profile security requirement refer to sub clause 7.9.

Annex A:
Change history

TSG SA#	SA Doc.	SA1 Doc	Spec	CR	Rev	Rel	Cat	Subject/Comment	Old	New	Work Item
SA#04			22.121							3.0.0	
SP-05	SP-99442	S1-99809	22.121	002		R99	B	Virtual Home Environment.	3.0.0	3.1.0	
SP-05	SP-99442	S1-99845	22.121	003		R99	B	Addition of IP4 Addressing	3.0.0	3.1.0	
SP-05	SP-99442	S1-99535	22.121	004		R99	B	Charging capabilities	3.0.0	3.1.0	
SP-07	SP-000067	S1-000107	22.121	005		R99	F	Clarification of service capabilities	3.1.0	3.2.0	
SP-07	SP-000067	S1-000156	22.121	006		R99	C	Information Transfer service capability feature	3.1.0	3.2.0	
SP-08	SP-000204	S1-000267	22.121	007		R99	F	Modification of section 10.2.6 on reducing the scope of the VHE/OSA reqirements	3.2.0	3.3.0	
SP-08	SP-000204	S1-000283	22.121	008		R99	F	Removal of section 10.2.3 Address Translation SCF	3.2.0	3.3.0	
SP-08	SP-000204	S1-000285	22.121	009		R99	F	Modification of section 10.2.9 to reduce scope of User Profile Management service capabilities	3.2.0	3.3.0	
SP-08	SP-000204	S1-000334	22.121	010		R99	F	Alignment of VHE Stage 1 top VHE/OSA Stage 2 and stage 3	3.2.0	3.3.0	
SP-09	SP-000387	S1-000566	22.121	011		R4	C	VHE in R00 User Profile	3.3.0	4.0.0	
SP-09	SP-000387	S1-000565	22.121	012		R4	C	VHE in R00	3.3.0	4.0.0	
SP-09	SP-000381	S1-000640	22.121	013		R4	D	Change of MExE name	3.3.0	4.0.0	
SP-09	SP-000387	S1-000564	22.121	014		R4	D	Realisation of Application interface	3.3.0	4.0.0	
SP-09	SP-000387	S1-000569	22.121	015		R4	B	Synchronisation of distributed user profiles	3.3.0	4.0.0	
SP-09	SP-000387	S1-000570	22.121	016		R4	B	Uniquely addressable user profiles	3.3.0	4.0.0	
SP-09	SP-000387	S1-000571	22.121	017		R4	D	VASP indirect support of VHE	3.3.0	4.0.0	
SP-11	SP-010059	S1-010169	22.121	019		Rel-5	B	The Virtual Home Environment (Release 5) Addition of User profile requirement and changes for clarification	4.0.0	5.0.0	VHE1
SP-12	SP-010247	S1-010377	22.121	020		Rel-5	F	Changes to TS 22.121 Release 5 to update Release 5 TS	5.0.0	5.1.0	VHE1
SP-14	SP-010671	1277	22.121	021	1	Rel-5	F	Defintion of Local Services	5.1.0	5.2.0	IMS
SP-15	SP-020045	S1-020457	22.121	023	-	Rel-5	F	Editorial CR to correct terms and references	5.2.0	5.3.0	CORRECT
SP-16	SP-020235		22.121			R99		Converted to TR	5.3.0	5.3.1	

History

Document history		
V5.3.0	March 2002	Publication as TS 122 121
V5.3.1	June 2002	Publication