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| **Source:** | **SIEMENS AG** |
| **Title:** | **Modifications and Improvements on VHE** |
| **Document for:** | **Discussion / Decision** |

Related chapters (4, 5, 6, 11 and 15) are based on the outcome of the VHE ad hoc Dublin meeting (28th and 29th April 1999). All related chapters are attached to this document.

# 4 General Description of the VHE

Virtual Home Environment (VHE) is defined as a concept for personalised service 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 Interface (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 framework for accessing services in future networks;
- represent a common development for all types of network (i.e. not form part of a specific network development);
- be supported by future networks.
- Enable the creation of services,

The full scope of VHE might not be supported within release 99. Requirements not applicable for R99 will be explicitly indicated.

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

- Home Environment

- One or more unique Identifiers

- One User

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

- One or more Serving Network Operator

- One Subscription

- Possibly one or more Value added service providers.

*Reason to replace the figure below with the figure above:*

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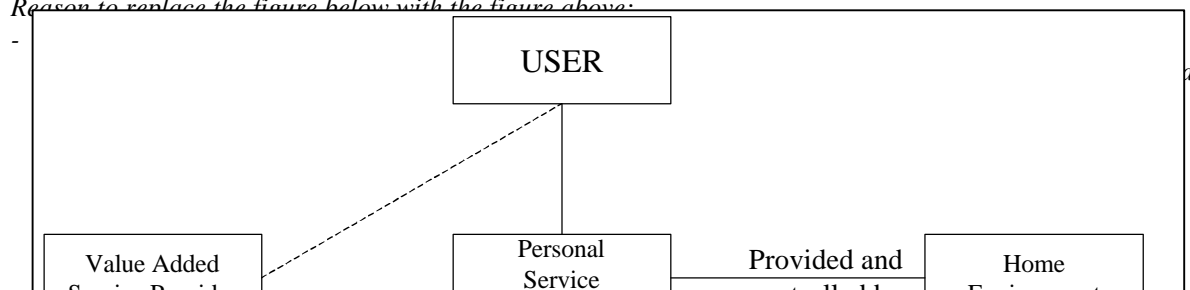
- *The additional boxes in the dotted lines shall show the relation of the user profile and preferences to the service Profile but also the relation of services and service profile. This shall modification shall be understood as a consequent continuation of the discussion on user profile from the last meeting. The separation of user profile and service profile tries to show that one part of the profile is more relevant for the user herself while the other service profile is the result of the negotiation between the user and service provider, i.e. how a specific service shall appear for the user.*
- *The modification on the Home Environment shall make it clear what the role of the HE is. As stated in a later chapter, it is to provide, control and maintain the access to services.*
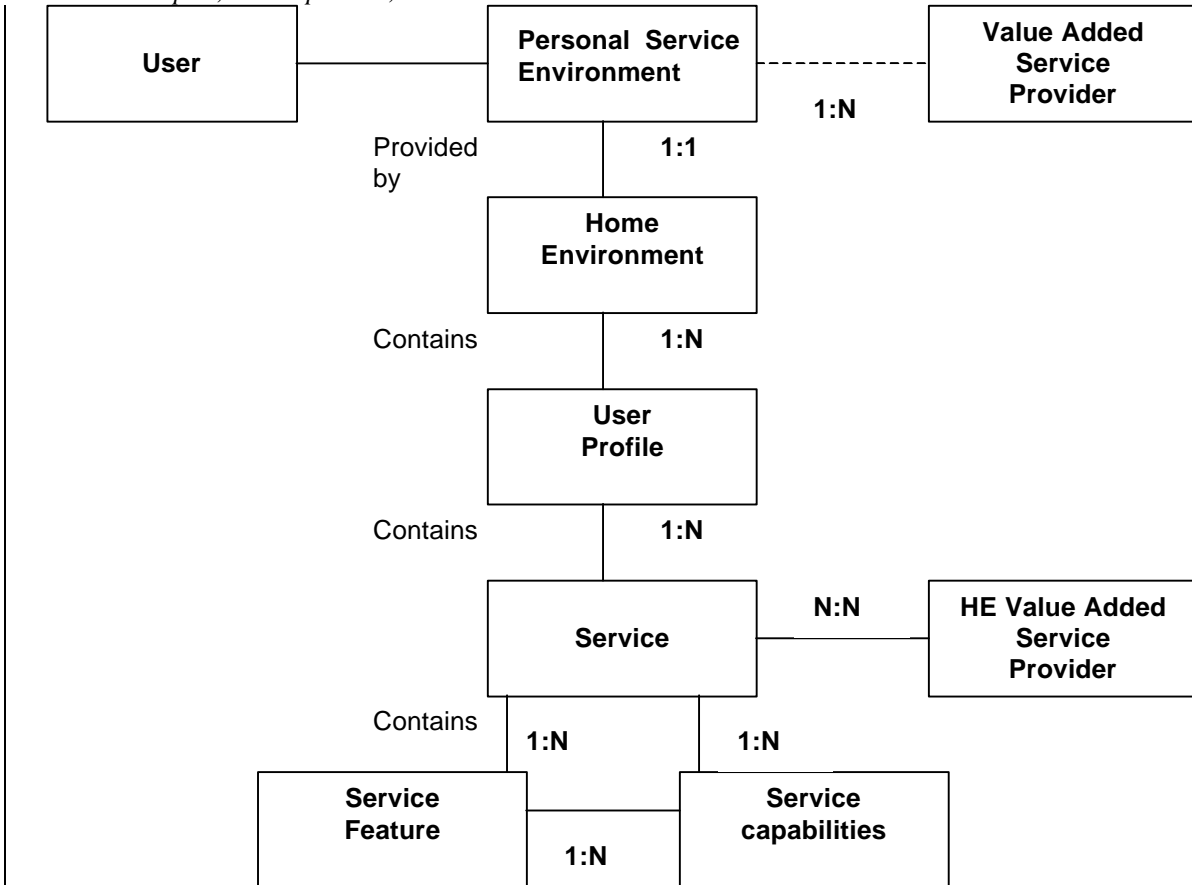
Fig 1: Role of Components involved in Realisation of VHE

The Home Environment ~~is responsible~~provides and controls ~~for providing~~ services to the user in a consistent manner. The user may have a number of ~~user~~ service profiles which enable~~s~~ her to manage communications according to different situations or needs, for example being at work, in the car or at home. The User's personal service environment is ~~a combination~~ the description of services, user preferences and user profiles. The user profile and the user preferences describe the user´s personalised information. For each Service profile a user profile and preferences shall exist. ~~(which contain personalisation information)~~. Services provisioned for the user may contain preferences according to the users needs and wishes. Each service may hold a service profile. The Home Environment may collaborate ~~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 HE-VASP can provide more than one service.

Additionally, but not subject to standardisation, the user may access services directly from Value Added Service Providers. Services obtained directly from VASPs are not managed by the Home Environment. . A mechanism may be provided which allows the user to automate access to those services obtained directly from VASPs and personalise those services. However such a mechanism is outside of the scope of this specification.

*The paragraphs below were moved unchanged to the begin of the chapter. We do believe that the containt is important and that it shall appear earlier in the chapter.*

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- provide a common framework for accessing services in future networks;
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- be supported by future networks.
- Enable the creation of services,

# 5. Framework for Services

This framework for services will provide the scope for the users to personalise the operation of services to some degree.

VHE in release 99 shall support both GSM phase 2+ release 99 teleservices, bearer services and supplementary services as applied in TS 22.00 and new services built by service capabilities.

The goal of standardisation in UMTS with respect to services is to provide a framework within which services can be created based on standardised service capabilities. UMTS 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 are realised based on a number of service features or service capabilities features[2.1 [2],[3],[4],[9], [10]]. Service features in turn are realised based on service capabilities features, with standardised interfaces between them (see figure 2).  Figure 2 does not impose specific implementation techniques of the interfaces shown.

Service Features are not required in release 99.

VHE enables the creation of services by providing access to service features and service ~~capabilities~~ capability features by means of standardised interfaces. Personalisation of services and user interface will be supported across network and terminal boundaries by providing the services to users with the same "look and feel" irrespective of the network type and within the limitations of the network and terminal.

In addition to services implemented on top of service capabilities ~~(OSS)~~, a generic interface towards the service capabilities shall be provided.
This will enable third party service providers to get access to service capabilities without having detailed knowledge of the service capabilities and of the infrastructure of certain network operators.

The generic interface shall be:
- Independent of vendor specific solutions,
- Independent of the location where service capabilities are implemented,
- independent of supported server capabilities in the network and,
- independent of programming languages of service capabilities.

In addition to that, ~~the~~ same kind of service capability features shall be made visible by a single, generic interface. The generic interfaces in the VHE concept is encapsulated and made visible through the Service Capability Features. The ~~interface~~ relation between Service Capability Features and the Service Capabilities could be implemented using a middleware layer. Further studies are ~~requested~~ required in this area.

The objective to introduce the open service architecture (OSA) is to allow secure access to core and advanced capabilities embedded in the UMTS network by third party service.

Access to these Service Features and Service Capability Features shall be realised using distributed object oriented access technologies. The access shall be secure, scaleable, extensible and independent of vendor´s technology.

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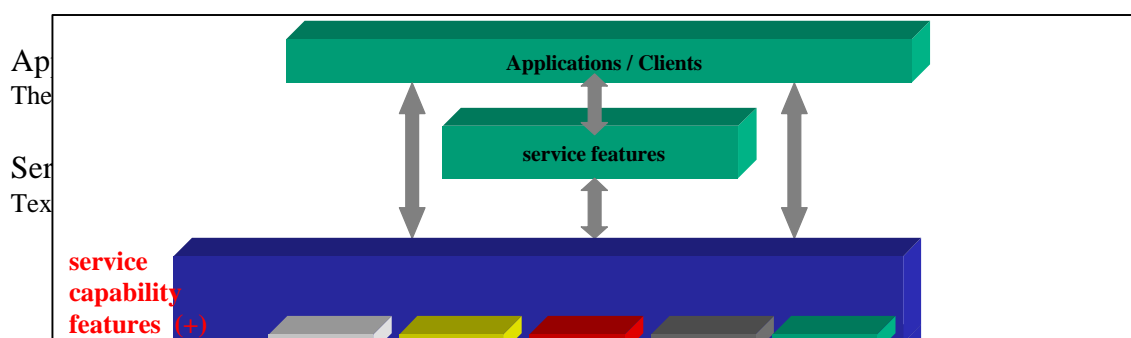
Service Features:
Service Features provides sets of service capability features. Such sets – especially in the area of call handling - may serve as building blocks for more complex applications provided by third parties.
The above idea should be used to improve Service Features descriptions.

It is assumed to refer to service capabilities as CSE, HLR, MEXE, SAT server and network entities. The latter in the list needs more considerations for the forthcoming meetings.

~~The figure 2.0 above shows the different possibilities to implement services as existed in a GSM network and proposed for a UMTS network.~~

## 5.1 ~~Guidance on the~~Methods to realise ~~implementation of~~ services:

**STANDARDISED SERVICES** (Supplementary Services, Tele-Services, etc.) are implemented on existing GSM/UMTS 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.

**OPERATOR SPECIFIC SERVICES** (OSS) are not standardised and could be implemented at the GSM/UMTS entities (e.g. HLR) on a vendor specific basis or using GSM ph 2+ mechanisms (CAMEL, SAT, MExE). These tool-kits use standardised interfaces to the underlying network (CAP, MAP) or use GSM Bearers to transport applications and data from the MExE/SAT server to the MS/SIM. The implementation of these operator specific services on the different platforms (CSE, MExE/SAT Server, MSs) is done in a completely vendor specific way and uses only proprietary interfaces.

Other **APPLICATIONS** are like OSS not standardised. These applications will be implemented using standardised interfaces to the Service Capabilities (Bearers, Mechanisms). The functionality offered by the different Service Capabilities ~~will be~~are defined by ~~a set of so-called~~ Service Capability Features. This set will be standardised and can be used by the application designers to build their applications.

 Within the terminals  Service Capabilities are accessible via the existing MExE and SAT APIs, i.e. there will be no service capability features and thus no service features within the terminal.
The terminal can communicate, using GSM/UMTS bearers, with applications in the network via the service capability features defined for MExE- and SAT-servers.

~~The implementation of the Service Capability Features on the different Service Capabilities is still manufacturer specific, i.e. each manufacturer has to implement the functionalities of these standardised interfaces (Service Capability Features) on his platform.~~
~~Service Features offer high level functionality via standardised interfaces by combining individual Service Capability Features. Service Features are fully based upon Service Capability Features themselves.~~
~~This would leave it to the application designers to use either the Service Features to build their applications or base them directly on the Service Capability Features.~~

NOTE:   Within the Open Service Architecture Work Item it is assumed to apply open standardised interfaces to GSM/Bearer, MExE and SAT Servers although these servers are not yet defined. These parts of the above figure are indicated as grey squares and arrows (Further clarifications requested)

# 6        Open Service Architecture (OSA)

*The next paragraph is moved unchanged to chapter 5.*

~~The objective to invent open service architecture is to allow secure access to core and advanced capabilities embedded in the UMTS network.~~

*The next paragraph is unnecessary to move because it is already explained in chapter 5.*
~~From a service designer point of view, the most important goal to be achieved is to provide a generic interface to the network as described in sub-clause "chapter 5"~~

*The next 2 paragraphs are moved to chapter 5. They are unchanged in sense but reworded.*
~~Access to these Features and Capability Features shall be realised using distributed object oriented access technologies.~~

~~The access to Features and Capability Features shall be independent of vendors technology used. It shall be secure, scaleable and extensible.~~

**Model for Implementation of Open Interfaces (APIs)**
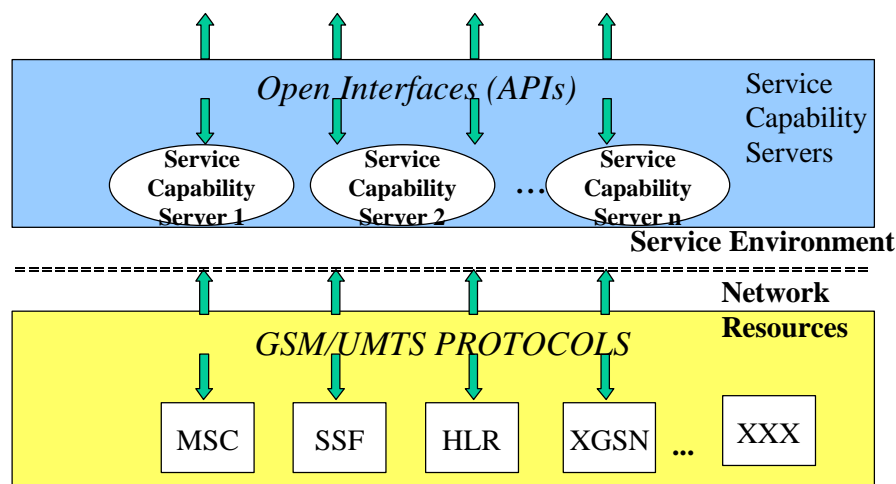


~~Fig 4.0  Open Service Architecture principle (to be redrafted)~~
*The figure above does not give additional clarifications to what is shown in figure 2, therefore it is proposed to be deleted.*

*The complete chapter 6.1 is both, a repetition of the definition section and a description of  Service Capability Servers in a more detailed level as it may be needed. We propose to delete it in the present form and, if needed, to re-introduce it in a streamlined format. If re-introduced, the description shall focus on the requirements to allow "interworking" where needed, e.g. between user and application, between application and service capabilities,....*

## 6.1 ~~Service Capability Servers~~

~~The Service Capability Servers reflect the service capabilities in UMTS phase1, i.e. access to bearers, call control, mobility management, tele services or supplementary services. CAMEL-, MExE- and SIM-Toolkit-capabilities may also be accessed. The functionality of these can further be subdivided into server components.~~
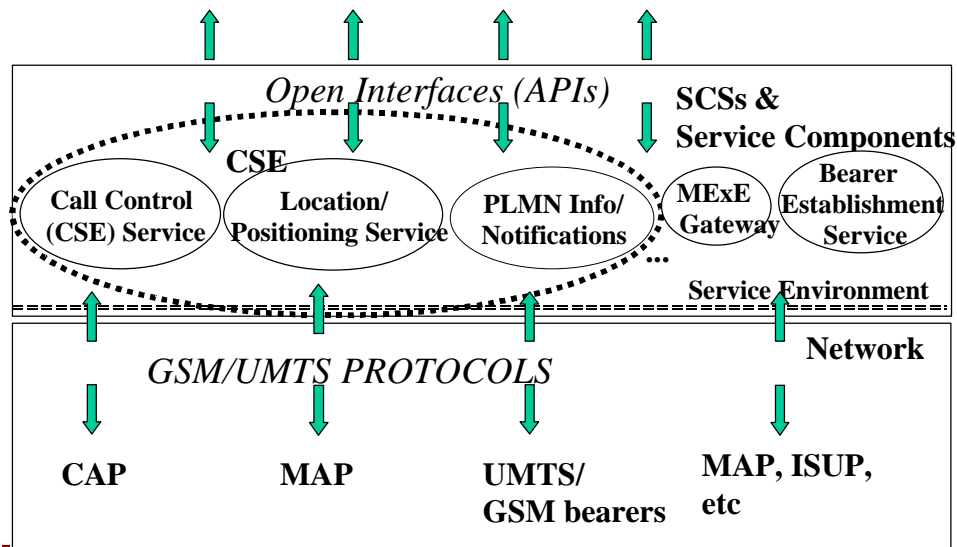
Fig. 5.0  UMTS service capabilities (to be redrafted)

A service capability server consists of one or several service components. Taking CAMEL Services as an example, the service components could be Call and session Control, Location/Positioning, PLMN Information & Notifications.

The same kind of capability of service components implemented in one or several service components is encapsulated and made visible using a service capability feature.

Access to service capability features is implemented independent of technologies and defined by standardised interface.

Service capability Features will have access to service components over non-standardised, platform dependent procedures.

The communication between service components and the core network is implemented by using GSM/UMTS protocols.

# 11 Service Capability Features

Services Capability Features are open, technology. independent and extensible interface. This interface shall be applicable for a number of different business and applications domains (including beside the telecommunication network operators also service provider, third party service providers, etc.).
All of these businesses have different requirements, ranging from simple telephony and call routing, virtual private networks, fully interactive multimedia and using MS based applications.

This interface shall provide an secure and open access to service capabilities (e.g. CSE, MExE, etc) of the underlying UMTS network.
It is proposed that two categories of access should be defined:

- Service interfaces, which offers the applications the access to a range of network capabilities.

- Framework interface, shall be commonly used providing "surround" capabilities necessary for the Service interfaces to be open, secure, resilient and manageable.

## 11.1 Framework interface

These Service capability Features offered by this interface will be used e.g. for authentication, registration, notification, etc..
Other commonly used service capabilities has to be defined (FFS).

### 11.1.1 Authentication

This capability shall provide the authentication of a application by the network. i.e. before any application can interact with the network a service agreement will have to be established or an existing agreement will need modification or indeed termination if it is superseded.

Once an application has been authorised to use one, more or all service capability features, no further authorisation is required as long as the "allowed" service capability features are used.

### 11.1.2 Registration

This capability deals with the registration of functionality ~~that a services provides~~provided by service capabilities. After the registration of new functionality of a service capability ~~this functionally~~it could be used by authenticated applications.

### 11.1.3 Notification

This capability provide the functionality to the applications to enable, disable and receive notifications of service related events that have occurred in the underlying UMTS network, e.g. indication that a new call is set-up or a message is received.

A Notification is defined as an event which occurs in the UMTS network. It is monitored by the Notification Capability and reported to the application / client.

### 11.1.4 Discovery

The discovery interface provides common functions for applications to dynamically determine what services capability Features are available during run-time. The domain of available services capability features is created through the *registration* process.

## 11.1.5 FFS

There might be other capability, e.g. for charging and billing of services, for logging or fault management. This is currently for further study.

# 11.2 Service interface

These service capability features provide the application the access to network capabilities. The set of service capabilities features will be defined in such a generic way to hide the network specific or Service components specific implementation.
To provide such a generic interface it is necessary to identify the specific functionality offered by the different service component and to generalise functionality which is offered by more then one server component e.g. Call control, messaging services etc.

In the following sections it is proposed to define such generic service capabilities e.g. for call control, messaging services etc. and to show how this generic functionality could be mapped to the specific server components

## 11.2.1 Call Control Service

This section details the requirements for the service capabilities for the Call Control service which will be used by the applications. The Call Control service capabilities shall offer the functionality to establish, maintain, modify and release calls.

To define the necessary service capabilities it is proposed to use a generic a call model (including also the call leg handling).

The following call control service capabilities were identified:
- Create call
- release call
- route call to destination
- establish new call leg
- release call leg
- attached call leg
- detach call leg
- request call status information
- define call duration
- supervise call

The mapping to service capabilities server components is for further study. (It shall be investigated to which extend the requirements above fit to CAMEL, MEXE and other service capabilities.)

The sections below are deleted due to the description shall follow the above one. It is not intended to delete the content, but to seek for a more generic description model.

## 8.1 Security/Privacy features
- presentation of or restriction of information associated with a party involved in a call or a session (e.g. calling line ID, calling name, location...);

- encryption of user data and signalling;

## 8.2 Access Control features

The access control features are defined to provide access to the UMTS network to the UMTS users over the serving network's air interface. These features include;

- user registration;

- user de-registration;

- mutual authentication.


## 8.3 Address Translation Features

This address translation feature shall allow UMTS to offer the wide range of addressing options including;

- E.164 Numbering (e.g. GSM MS-ISDN);

- ASEA Numbering (ATM);

- IP v6 Numbering;

- X.25 Numbering;

- Internet symbolic naming.


## 8.5 Location Features

Location features shall also be supported, to allow new and innovative location based services to be developed;

- to identify and report in a standard format (e.g. geographical co-ordinates) the current location of the user's terminal.

   The precision of the location shall be network design dependent, i.e. an operator choice. This precision may vary from one part of a network to another. It may be chosen to be as low as hundreds of meters in some place and as accurate as 5 meters in other place. It is required that a minimum precision of around 50 meters can be achieved in all types of terrestrial radio environment. Technical issues may constrain the precision to be mobile state dependent as well (mobile idle / mobile in communication). Several design optional features (e.g. size of the cell, adaptive antenna technique, path loss estimation technique...) shall allow the network operator to reach cost effectively the target precision.

   Because there may be very different uses of the location information;

   - It shall be possible to make the information available to the user, HE/SN and value added service providers. The user shall be able to restrict access to the location information (permanently or on a per call basis). The restriction can be overridden by the network operator when appropriate (e.g. emergency calls).

   - It shall be possible to set the delay to get the location information (the situation is quite different whether the information is needed for call routing or if it is needed by a user application).

   - It shall be possible to select the frequency of the location information update.

   If the terminal is switched off, then the last known position and time/date shall be available. The time of last known location shall be recorded and be made available in universal time.

- to identify and report when the user's terminal enters or leaves a specified geographic area.

- It shall be possible to specify the area as a circular zone (centre and radius) to a resolution that will be limited by the accuracy capability of the part of the serving network where the user is registered.


## 8.6 Messaging features

Messages are a block of data that may range from a few bytes to megabytes. Message delivery may involve store and forward of messages in transit. To be able to exchange and to control the exchange of messages between user the following service features shall be supported;

- capability to send messages;

- capability to receive messages;

- capability to request confirmation of receipt;

- capability to modify the content as well as the recipient of message;

- capability to reject a outgoing and/or incoming message;

- capability to re-route a message.

# 8.7 Service control features

To allow the support of HE/SN specific services the following service features shall be supported;
- capability to download service software to network nodes;

- capability to download service software to terminals;

- capability to download service software to the USIM;

- capability to negotiate of supported capabilities between USIM, terminals, HE and SN;

- capability to negotiate bearer services and service capabilities

# 8.8 User Interaction Features

To allow the support of HE/SN specific user interfaces, databases containing user profiles shall be provided. This user profile functionality shall provide the following interaction features :
- capability to indicate information to the user;

- capability to collect user information;

- capability to activate and deactivate a special user profile;

- capability to change the user profile.

# 15 Security requirements

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

The specific security requirements are FFS.

Proposed text:

Security Requirements for applications:
The security concept shall allow to authenticate applications. The authenication procedure shall be flexible enough to allow different level of access (security level). Once an application is authenticated, it shall be allowed to access Service Capability Features. The range of SCF´s to be accessed by the application depends on the security level.

Security requirements for users:
In addition to the UMTS Security concept to get access to the UMTS network, an application may request the user to authenticate her. The authentication procedure between user and application is outside the scope of this specification.