

# TS 22.21 V1.00.7.0 (1999-01)

*Technical Specification*

## **Universal Mobile Telecommunications System (UMTS); Provision of Services in UMTS - The Virtual Home Environment (Highlighting release 99 requirement)**

**UMTS**

Universal Mobile  
Telecommunications System



*European Telecommunications Standards Institute*

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Reference

DTR/SMG-0122.80U (I400100s.PDF)

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Keywords

UMTS, VHE, IMT-2000, GSM

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# Contents

|  |                         |
|--|-------------------------|
| Intellectual Property Rights.....                              | 4                       |
| Foreword .....   | 4                       |
| 1 Scope .....  | 5                       |
| 2 References.....  | 5                       |
| Normative references.....                                      | 5                       |
| 2.2 Informative references .....                               | 6                       |
| 3 Definitions and abbreviations .....                          | 6                       |
| 3.1 Definitions .....  | 6                       |
| 3.2 Abbreviations .....  | 6                       |
| 4 General Description of the VHE .....                         | 7                       |
| 5. Framework for Services.....                                 | <del>89</del>           |
| 6 User Requirements of VHE .....                               | <del>12</del> <u>13</u> |
| 6.1 User Profiles .....  | <del>13</del> <u>14</u> |
| 7 Home Environment Requirements on VHE .....                   | <del>13</del> <u>15</u> |
| 8 Requirements of the Serving Network to Support the VHE ..... | <del>14</del> <u>15</u> |
| 9 VASP Requirements on VHE .....                               | <del>14</del> <u>16</u> |
| 10 Service Features .....                                      | <del>15</del> <u>16</u> |
| 11 VHE execution environment.....                              | <del>15</del> <u>16</u> |
| 12 Charging requirements.....                                  | <del>15</del> <u>17</u> |
| 13 Security requirements .....                                 | <del>16</del> <u>17</u> |
| Annex A.....   | <del>16</del> <u>17</u> |
| History .....  | <del>17</del> <u>18</u> |

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## Foreword

This draft ETSI Technical Specification has been produced by Special Mobile Group (SMG) of the European Telecommunications Standards Institute (ETSI). The purpose of this ETS is to describe the how services will be provided in UMTS by means of the Virtual Home Environment.

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# 1 Scope

This document specifies the content of the stage one requirement for realisation of VHE.

This ETSI Technical Specification defines the stage one description of the Virtual Home Environment (VHE). Stage one is an overall service description, primarily from the point of view of the User in her Home Environment.

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), wherever the user may be located.

Requirements not applicable for R99 will be explicitly indicated.

This document will contain OSA requirements due the agreed (and affirmed at TSG-SA #2 meeting) merger of the VHE specification and Open Service Architecture (OSA) specification draft stage 1.

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# 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.

## Normative references

- [1] GSM 01.04 (ETR 350): "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms"
- [2] GSM 02.57: "Digital cellular telecommunication system (Phase 2+); Mobile Station Application Execution Environment (MExE); Service description"
- [3] GSM 02.78: "Digital cellular telecommunication system (Phase 2+); Customised Applications for Mobile network Enhanced Logic (CAMEL); Service definition - Stage 1"
- [4] GSM 11.14: "Digital cellular telecommunication system (Phase 2+); Specification of the SIM Application Toolkit for the Subscriber Identity Module - Mobile Equipment; (SIM - ME) interface"
- [5] UMTS TS 22.01: "Universal Mobile Telecommunications System (UMTS); Service Aspects; Service Principles"
- [x6] UMTS TS 22.05: "Universal Mobile Telecommunications System (UMTS); 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] WI Open Service Architecture OSA

[10] UMTS TS 22.00 UMTS phase 1

## 2.2 Informative references

- [1] UMTS TR 22.70: "Universal Mobile Telecommunications System (UMTS); Virtual Home Environment"

# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of this TS, the following definitions apply:

**HE-VASP:** Home Environment Value Added Service Provided. This is a VASP that has an agreement with the Home Environment to provide services.

**Local Service:** A service exclusively provided in the current serving network by a Value added Service Provider.  
**Service Capabilities:** Bearers defined by QoS parameters and/or mechanisms needed to realise services.

**Service Capability Feature:** Functionality offered by a service capability mechanism that is accessible via open standardised interfaces.

**Service Feature:** Functionality that a UMTS system shall offer to enable provision of services. Services are made up of different service features.

**Service Personalisation:** Modification and behaviour that may involve the service feature or data of a service, within the limitations set by the provider of the service.

**Home Environment:** responsible for overall provision of services to users

**User Interface Personalisation:** Modification of the user interface within the capabilities of the terminal and serving network.

**Value Added Service Provider:** provides services other than basic telecommunications service for which additional charges may be incurred.

**Virtual Home Environment:** A concept for personalised service portability across network boundaries and between terminals.

Further UMTS related definitions are given in UMTS TS 22.01.

## 3.2 Abbreviations

For the purposes of this TS the following abbreviations apply:

|       |  |
|-------|--|
| API   | Application Programming Interface                        |
| CAMEL | Customised Application For Mobile Network Enhanced Logic |
| CORBA | Common Object Request Broker Architecture                |
| DAT   | Service Profile/Data                                     |
| EXE   | Service Execution Environment                            |
| FFS   | For Further Study  |
| IN    | Intelligent Network                                      |
| ME    | Mobile Equipment   |
| MExE  | Mobile Station (Application) Execution Environment       |
| MMI   | Man Machine Interface                                    |
| MMIC  | MMI Control  |
| MS    | Mobile Station   |

|      |   |
|------|---|
| PLMN | Public Land Mobile Network              |
| PRG  | Service Program                         |
| SAT  | SIM Application Tool-Kit                |
| SIM  | Subscriber Identity Module              |
| SMS  | Short Message Service                   |
| USIM | User Service Identity Module            |
| USSD | Unstructured Supplementary Service Data |
| VASP | Value Added Service Provider            |
| VHE  | Virtual Home Environment                |

Further GSM related abbreviations are given in GSM 01.04. Further UMTS related abbreviations are given in UMTS TS 22.01.

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## 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), where ever the user may be located.

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.

The key attributes, which characterise aVHE, may be summarised as:

- A portfolio of services offered by a Home Environment and a user, profile which may be managed by the user;
- Capabilities to access Value Added Services from any VASP, possibly subject to appropriate agreements with the Home Environment.

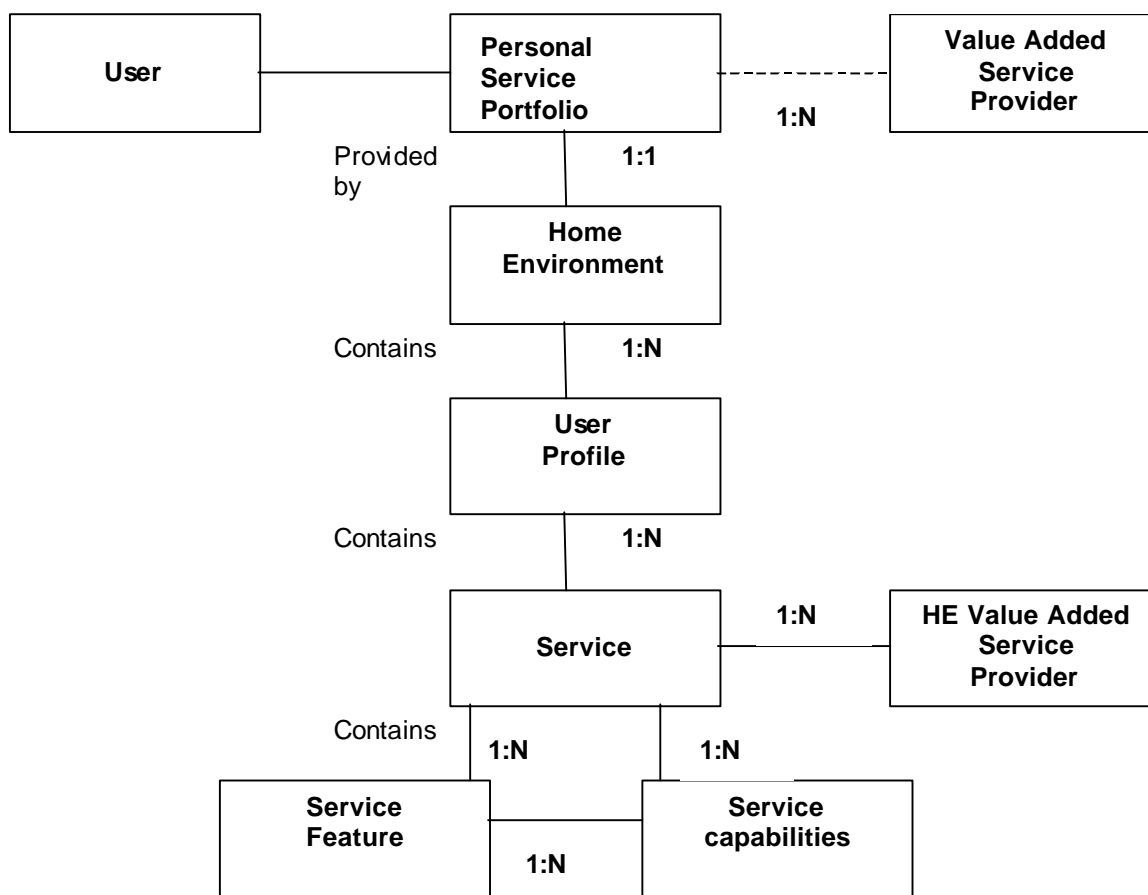


Fig 1: Role of Components involved in Realisation of VHE

The Home Environment is responsible for providing services to the user in a consistent manner. 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. The user's VHE is a combination of services, profiles and personalisation information that forms the user's personal service portfolio. 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.

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 and therefore are not part of the VHE offered 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.

---

## 5. Framework for Services

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 features. 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 [2.1 [2],[3],[4],[9], [10]]. Service features in turn are realised based on service capabilities, with standardised interfaces between them. Figure 2 does not impose specific implementation techniques of the interfaces shown. The service features are not required in release 99 pending clarification from UMTS 22.05.

VHE enables the creation of services by providing access to service features and service capabilities 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.

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.

VHE may support a set of service examples through the service features and capabilities as identified in annex A. The support of such service examples is not mandatory. The list provided is not exhaustive.

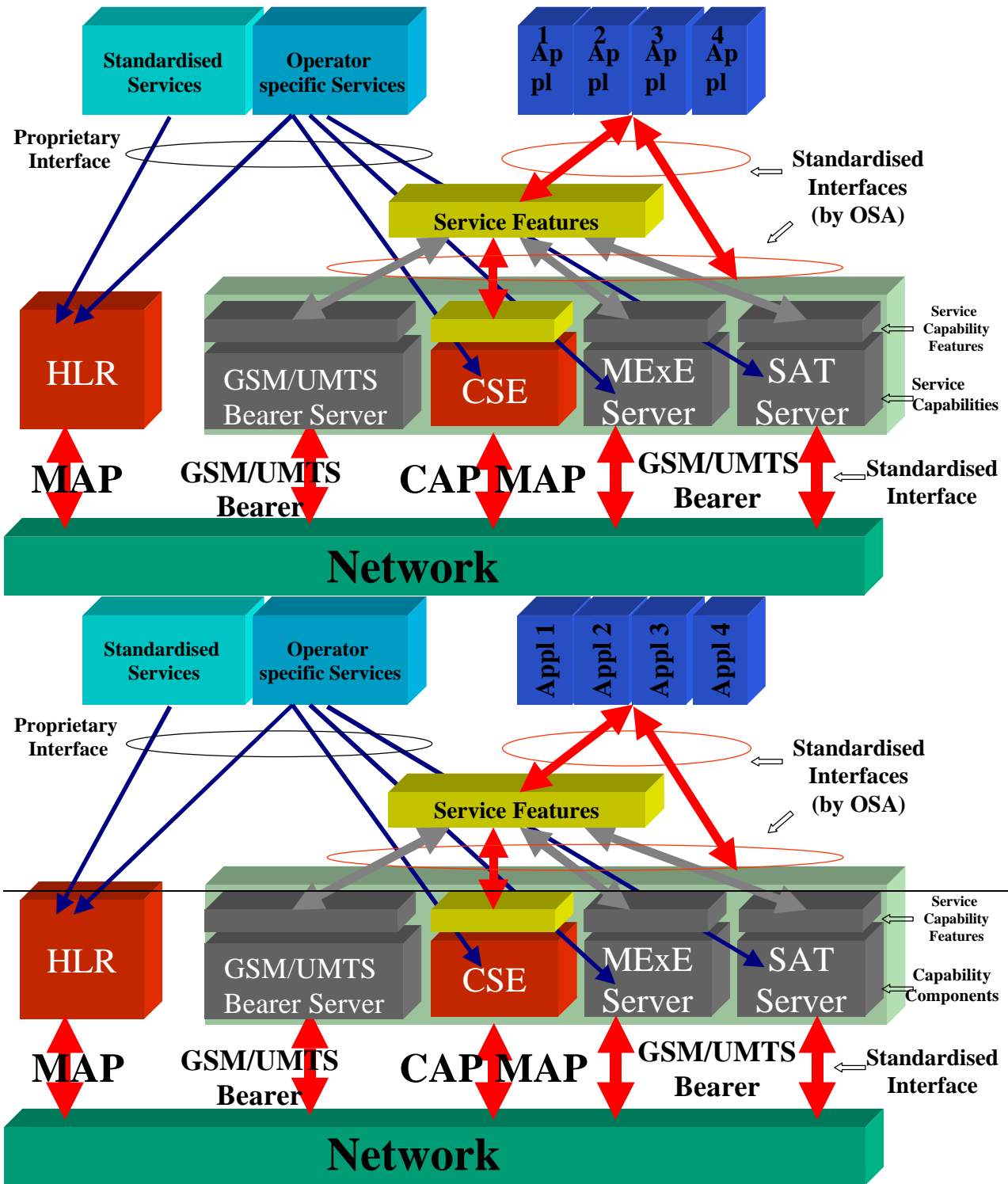


FIG 2.0 Evolution of service provisioning from network point of view. For R99 the service feature layer is not requested-pending clarification.

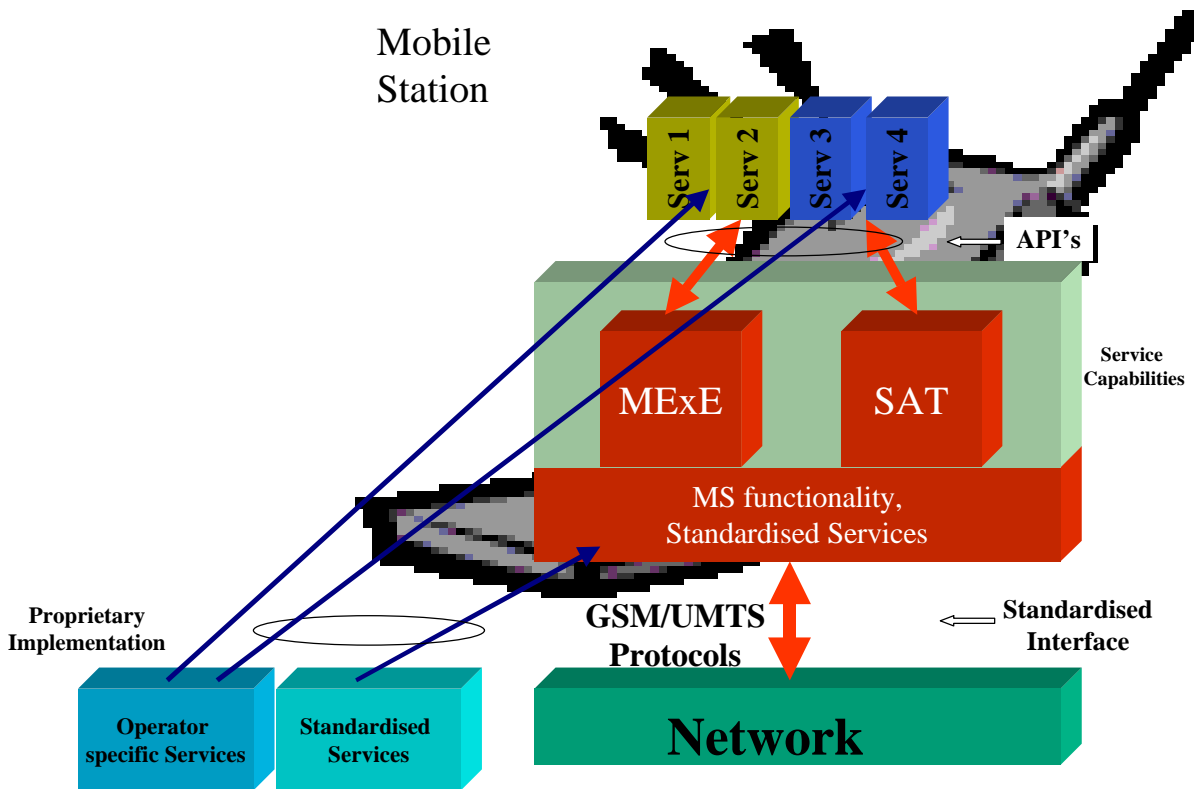


FIG 3.0 Evolution of service provisioning from terminal point of view.

The figures 2.0 and 3.0 above shows the different possibilities to implement services in a GSM and a UMTS network.

**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.

**UMTS 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 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)

This framework will provide the scope for the users of these services to personalise to some degree the way in which the services operate.

The key requirements of the VHE are to provide a user with:

- 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, cordless 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,

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## 6 Open Service Architecture (OSA)

Text to be included in subsequent version of specification

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## 7 User Requirements of VHE

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.
- Personalised User Interface (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
- Activate or deactivate user services.
- Discover which local services are available
- Access local services in a secure manner.
- Interrogate current service settings

Be aware of limitations of services, which may result from different terminals and or serving network capabilities.

## 76.1 User Profiles

This section describes the function of the user profile and lists some typical profile information. For a definition of the user profile see UMTS 22.01 [5].

The user profile may consist of one or more user profiles for a user, and contains the characterisation and personalisation of the user's personal service portfolio as defined by the user and the home environment. It acts as a repository identifying the details of the user's personal service portfolio, such as:-

- Identification of subscribed/provisioned services  
e.g. permitted services, classification etc.
- Service personalisation  
e.g. date/time activation, priorities, optional functionalities selected etc.
- User Interface personalisation  
e.g. menu settings, icons, additional menu items, phone setting etc.

The information available in the user profile enables the service capabilities (SAT, MExE and CAMEL toolkits in R99) and existing GSM services to support the user's virtual home environment across network boundaries and different terminals. It is through the user profile that the user has access to personalised services and user interface across a virtual home environment.

It shall be possible for the service capabilities to access the user profile information from the home environment.

### 76.1.1 Management of the user profile

As multiple user profiles may be defined, the user is able to set up or receive calls/connections associated with different user profiles simultaneously by activating a user profile (with each user profile being associated with at least one unique address).

The user's characterisation of the VHE in the user profile may be modified at any time by the user and the home environment, and changes affected at the earliest possible opportunity.

The user profile maybe stored in the MS (the SIM or the ME), and/or the home environment.

The home environment shall be able to update the user profile to reflect any user or home environment modification of the user's VHE.

The characteristics of the VHE which require to be maintained, as part of the user profile will be fully identified by the VHE stage 2.

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.
- Control access to services depending on available service capabilities 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 capabilities supported on the serving network, and terminals.
- Define the scope for management of services by the user, for services provided by the HE.
- Handle charging for services (as defined in clause 11)
- Deploy services to users or groups of users
- Manage provision of services to users or groups of user

## 87.1 Interaction of Services

Editors note: Provisional text FFS

[A service can not make a general assumption that it is the only service being run. Where several services use the same interface the service itself and / or the protocols used over that interface must be able to handle contention].

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## 98 Requirements of the Serving Network to Support the VHE

The serving network should not need to be aware of the services offered via the home environment.

The user/home environment may request capabilities, which are necessary to support, home environment services.

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

- The serving network shall support user access to services in the home environment;
- The serving network shall provide the necessary service capabilities to support the services from the home environment as far as possible;
- Dynamically provide information on the available service capabilities in the serving network;
- Provide transparent communication between clients and servers in terminals and networks;
- Provide information on, and access to, local services, which are available in the serving network.

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## 109 VASP Requirements on VHE

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. A mechanism should 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. VASPs, which are not HE-VASPs, do not generate requirements for VHE.

There may be some information, which is shared between the Home Environment and the HE-VASP (for example current capabilities). The Home Environment may grant the HE-VASP access to standardised (service features not for R99- pending clarification in UMTS 22.05) service capabilities in order to allow the development and deployment of services on behalf of the Home Environment.

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## 110 Service Features

The service features are not required in release 99-pending clarification in UMTS 22.05.

The purpose of service features is to provide a service capability independent set of functionality which can be used by application developers to create services.

The following functionality is required  
As in UMTS 22.05 clause 8: Service Features (to be reviewed).  
Others.

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## 124 VHE execution environment

The following service execution environments shall be standardised and could be used to provide a VHE for the user:

- User equipment execution environment
- IC card execution environment
- Network execution environment not required for R99

For UMTS release 99 the execution environments shall be provided by one or more of the following:

- MExE
- SIM Application Tool kit (SAT)
- CAMEL

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## 132 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 MS or USIM may be subject to charge;
- Service upgrading;  
the upgrading of previously transferred services to the user's MS 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;

Other charging requirements may be identified and are for FFS.

## 143 Security requirements

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

The specific security requirements are FFS.

## Annex A (Informative)

The following table shows the service examples to be considered in VHE

| Benchmark Services                    | Abb  | Priority |
|---------------------------------------|------|----------|
| Abbreviated Dialling                  | ABD  | A        |
| Account Card Calling                  | ACC  | B        |
| Automatic Alternative Billing         | AAB  | A        |
| Call Distribution                     | CD   | A        |
| Call Forwarding                       | CF   | A        |
| Call Hold                             | CH   | A        |
| Call Rerouting Distribution           | CRD  | A        |
| Call Transfer                         | TRA  | A        |
| Call Waiting                          | CW   | A        |
| Completion of Call to Busy Subscriber | CCBS | A        |
| Conference Calling                    | CON  | A        |
| Credit Card Calling                   | CCC  | B        |
| Destination Call Routing              | DCR  | A        |
| Follow-Me Diversion                   | FMD  | A        |



|   |      |            |
|---|------|------------|
| Freephone                                     | FPH  | A          |
| Global Virtual Network Service                | GVNS | A          |
| Hot Line                                      | HOT  | A          |
| International Telecommunication Charge Card   | ITCC | B          |
| Internetwork Freephone                        | IFPH | A          |
| Internetwork Mass Calling                     | IMAS | A          |
| Internetwork Premium Rate                     | IPRM | A          |
| Internetwork Televoting                       | IVOT | A          |
| Malicious Call Identification                 | MCID | A          |
| Mass Calling                                  | MAS  | A          |
| Message store and forward                     | MSF  | A          |
| Multimedia                                    | MMD  | B          |
| Originating Call Screening                    | OCS  | A          |
| Premium Rate                                  | PRM  | A          |
| Security Screening                            | SEC  | A          |
| Selective Call Forward on Busy / Dont' answer | SCF  | A          |
| Split Charging                                | SPL  | A          |
| Televoting                                    | VOT  | A          |
| Terminating Call Screening                    | TCS  | A          |
| Terminating Key Code Protection               | TCKP | B          |
| Universal Access Number                       | UAN  | B          |
| Universal Personal Telecommunication          | UPT  | A          |
| User-Defined Routing                          | UDR  | B<br>(FFS) |
| Virtual Private Network                       | VPN  | A          |

Benchmark services listed above could be realised by service capability features.

## History

| Document history |         |   |
|------------------|---------|---|
| Date             | Version | Comment   |
| Sep 1998         | 0.0.0   | Initial Draft at Ipswich  |
| Oct 1998         | 0.1.0   | Initial Draft at Uxbridge Meeting                               |
| Nov 1998         | 0.2.0   | Draft at Newbury Meeting  |
| Jan 1999         | 0.3.0   | Draft after Stockholm meeting                                   |
| Jan 1999         | 0.4.0   | Draft to include requirement for R99                            |
| Feb 1999         | 0.5.0   | Draft to include corrections from Ericsson and TTC requirements |
| Feb 1999         | 0.6.0   | Draft to include changes made after adhoc meeting in Vienna     |

|   |              |  |
|---|--------------|--|
| March 1999  | 0.7.0        | Change to include text to fig 2 and 3 and for presentation to v1.0 |
| <u>March 12 99</u>                                  | <u>1.0.0</u> | <u>Input text to state the inclusion of OSA requirements</u>       |
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