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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

Reference
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Contents

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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.

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 to the agreed (and affirmed at TSG-SA #2 meeting) merger of the VHE specification and Open Service Architecture (OSA) specification draft stage 1 (see annex B for proposed text).

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/ormechanisms 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.

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.

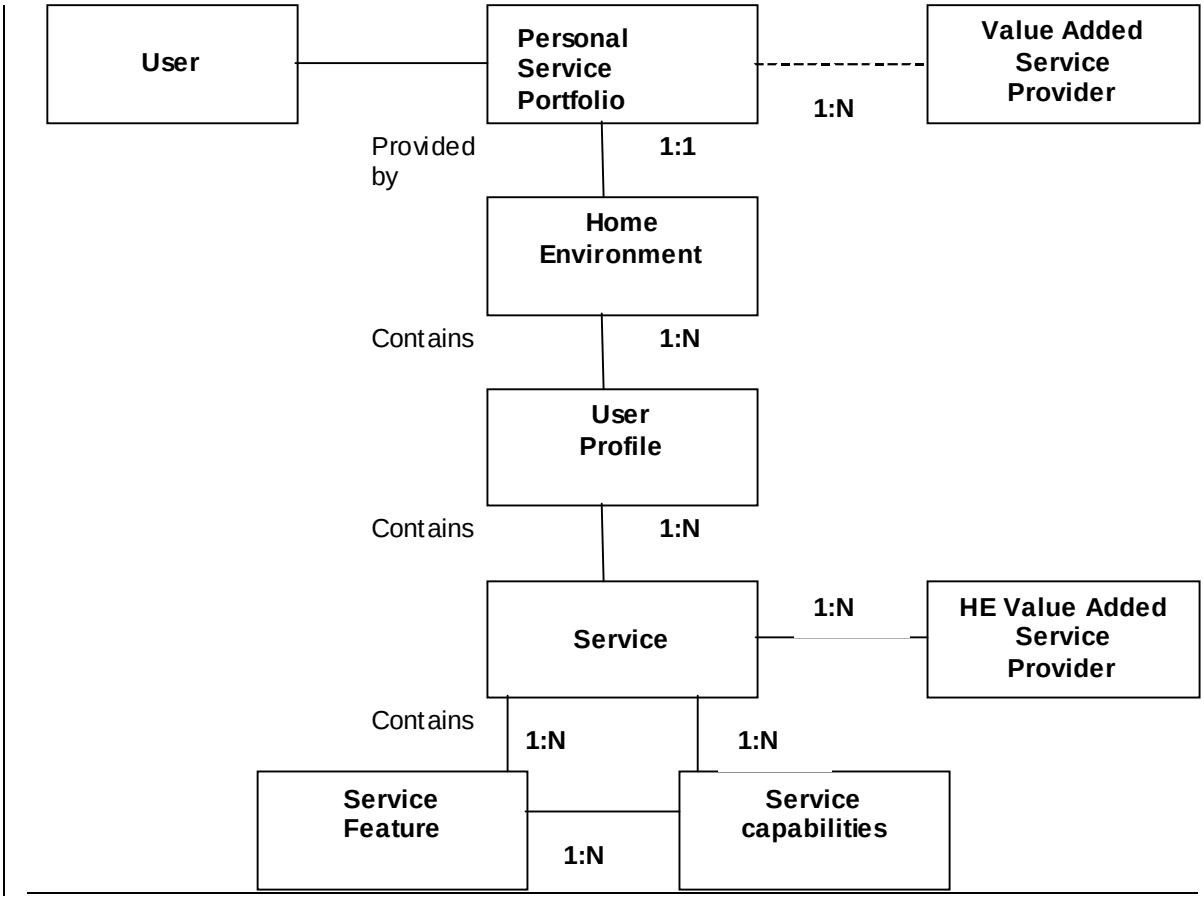

Fig 1: Role of Components involved in Realisation of VHE

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 99pending 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.

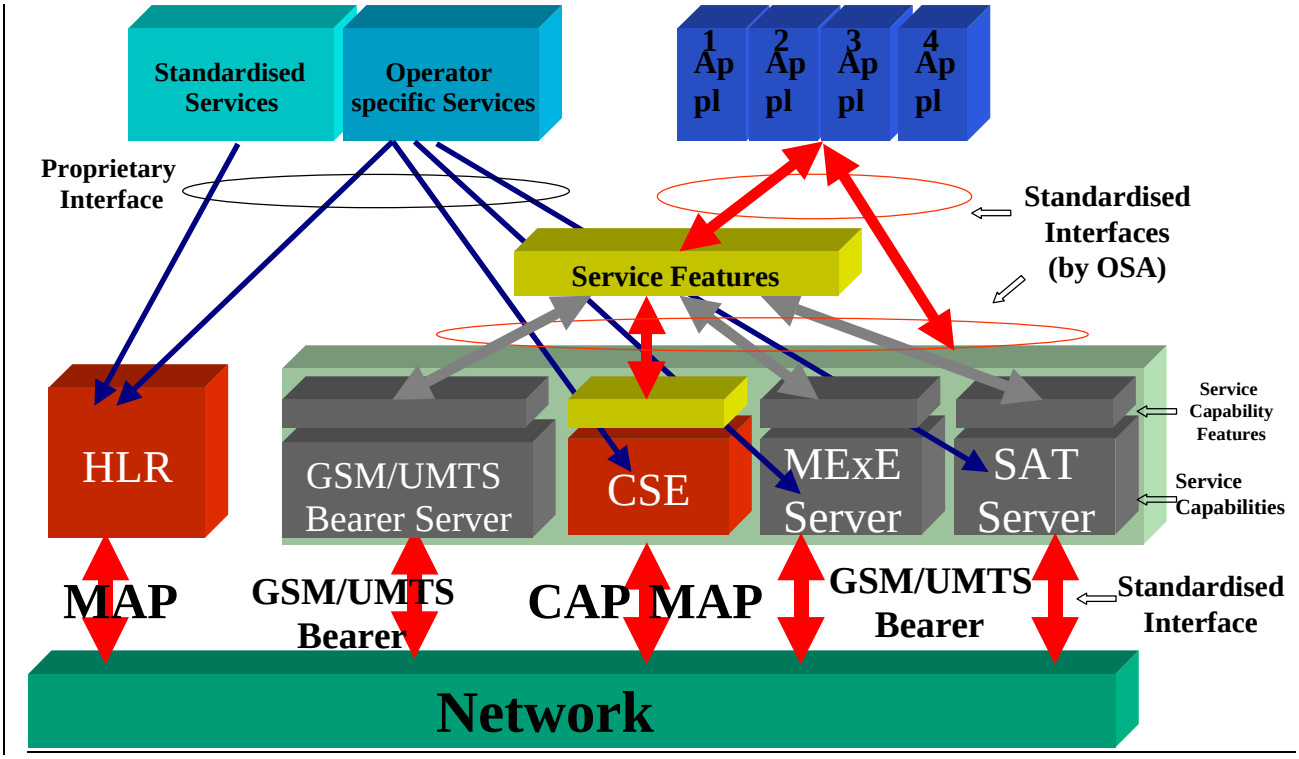

FIG 2.0 Evolution of service provisioning from network point of view.
For R99 the service feature layer is not requested-pending clarification.

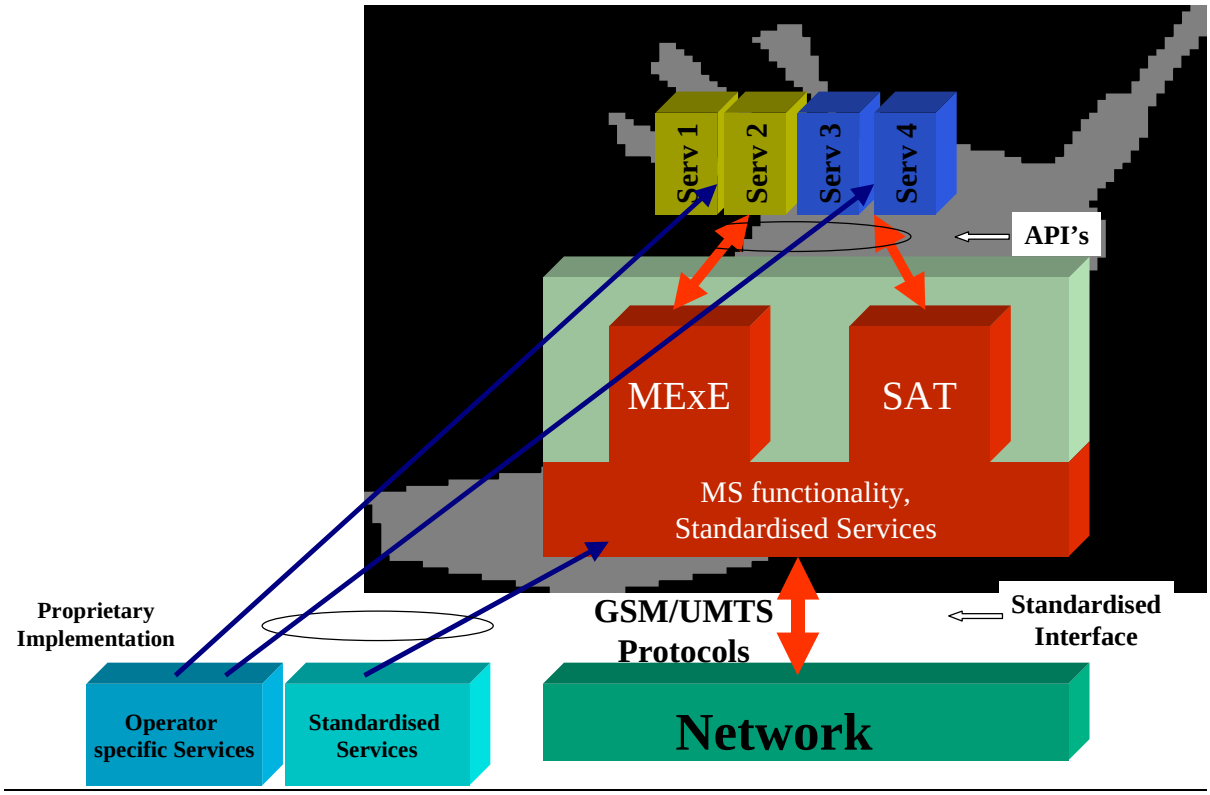

FIG 3.0 Evolution of service provisioning from terminal point of view.

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,

6 Open Service Architecture (OSA)

Text to be included in subsequent version of specification

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.

7.1 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.

7.1.1 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.

8 Home Environment Requirements on VHE

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

8.1 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].

9 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.

10 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.

11 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.

12 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

13 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 tothe 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.

14 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 (FFS)
Virtual Private Network	VPN	A

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

Annex B Open Service Architecture (OSA)

The text in this annex is proposed for inclusion in the Open Service Architecture sub clause at a later stage. It is the intention that the requirements will be applicable for R99.

B.1 Introduction

To cope with future market needs, UMTS will standardise service capabilities and not the services themselves as outlined in ETS 22.01. Service capabilities consist of bearers defined by QoS parameters and the mechanisms needed to realise services. These standardised capabilities will provide a platform which will enable the support of speech, video, multi-media, messaging, data, other teleservices, user applications and supplementary services and enable the market for services to be determined by users and home environment. The best way to achieve the standardised capabilities and provide a flexible and time-proof system is by defining Application Programming Interfaces (APIs). These could be used by many services instead of trying to hypothesise what the future services might be and rigidly defining these services. However, it should be noted that in designing an API assumptions will inevitably be incorporated about the kinds of features the API will be required to support. Therefore mechanisms will also be needed to evolve APIs (i.e. the APIs should be designed with forwards compatibility mechanisms). Additionally, this will reduce the time required to deploy new services in the network.

For this purpose, open interfaces (Application Programming Interfaces (APIs)), based on distributed object techniques like CORBA should be used, with PLMN specific protocols hidden for the service/application designers. These open

interfaces are provided by so-called service capability server reflecting the service capabilities specified for VHE (see figure 4.0).

Home Environments (HEs), Value-Added Service Providers (VASPs) or 3rd party developers (like equipment vendors) on behalf of HEs or VASPs can use the open interfaces for service/application design.

Model for Implementation of Open Interfaces (APIs)

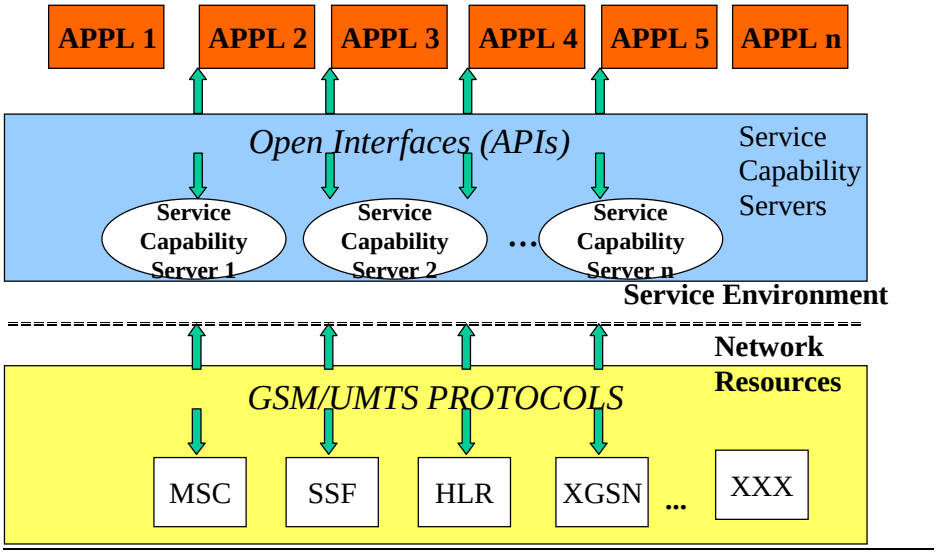

Fig 4.0 Open Service Architecture principle

B.1.1 Service Capability Servers

The Service Capability Servers reflect the service capabilities in UMTS phase1, i.e. access to bearers, CAMEL, MExE and SIM-Toolkit. The functionality of these can further be subdivided into server components dedicated to specific tasks.

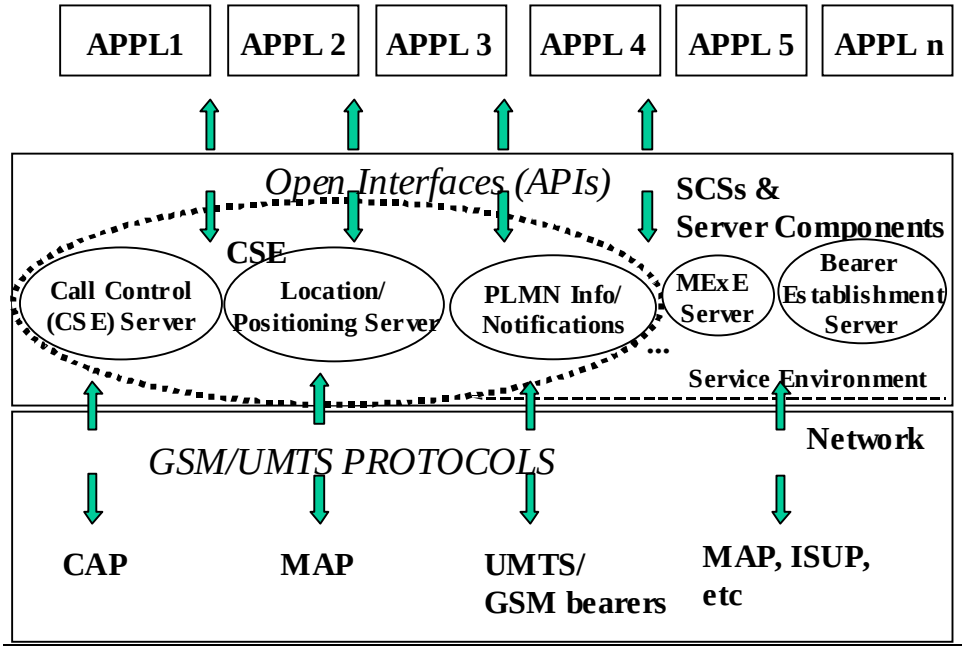

Fig. 5.0 UMTS standardised service capabilities

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

server components offers its services via defined open interfaces, and implements these by using GSM/UMTS protocols. The functionality offered by a server components is expressed as a set of service capability features. Each service capability feature offer its services via standardised interfaces and implements these using GSM/UMTS protocols.

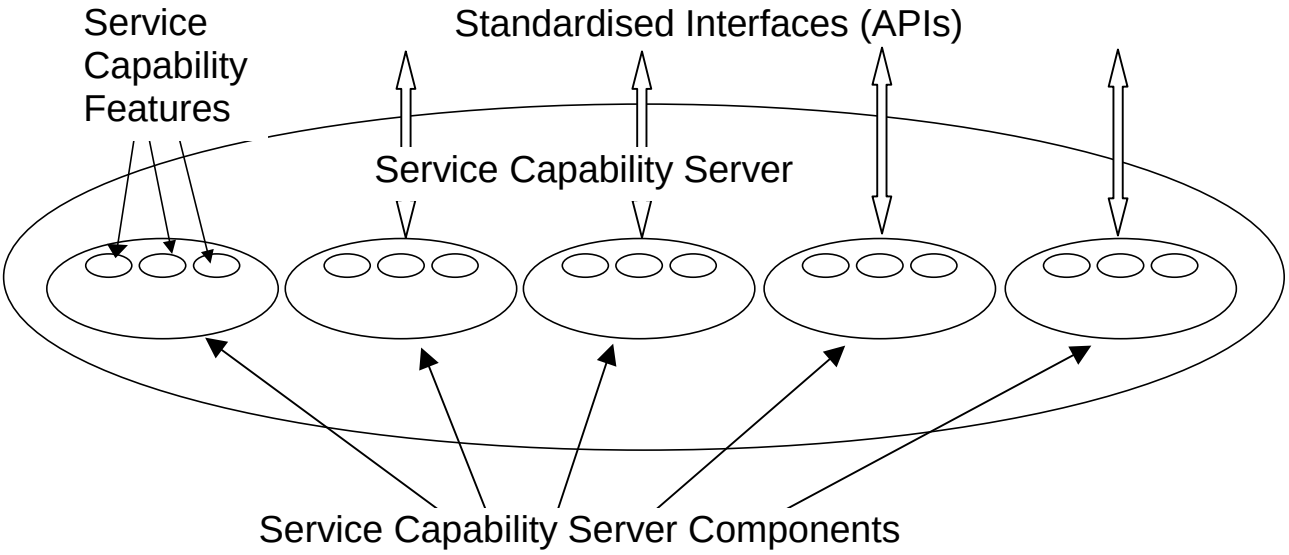

Fig. 6.0 Service Capability features

Each server component can exist and work alone. It communicates with applications/service features and other server components via its standardised interfaces.
Characteristics of SCS Components and its associated service capability features:

- building blocks used by service/application developers.
- accessible via their published programmable interfaces (standardised interfaces)..
- can be used by applications/service features and other SCSs. can use functionality offered by other SCSs.
- not complete applications but can be combined with other SCS components and application logic to form service features and applications.
- useable in many combinations to fulfil service feature and application requirements.

SCS components interact with other SCS components, service features and applications over address spaces, programming languages, operating systems and networks.

SCSs can be used to design services/applications for both circuit and packet switched accesses.

B.2 Service Capability Features

B.2.1 CAMEL

B.2.1.1 Call Control

It shall be possible for the application to request the set-up of a new call.

It shall be possible for the network to request the application for call set-up instructions. These instructions shall include:

- The possibility to release the call at any time
- The possibility to continue with the current call
- The possibility to continue the call with modified call information
- The possibility to add additional call parties to an established call
- The possibility to remove call parties from an established call.
- The possibilities to put call parties on hold
- The possibility to resume the call with the call parties previously on hold

B.2.1.2 Charging

It shall be possible for the application to:

- Add application specific charging information in network generated CDRs
- Provide AoC information to the subscriber

The network shall have the possibility to request the application for real-time charging information. The application shall have the possibility:

- To indicate the allowed call/session time
- Release the call/session
- Provide the subscriber with a warning that the call shall be released

B.2.1.3 User Interaction

The application shall have the possibility to request the network to:

- Play a message to a call party
- Receive information from a call party

B.2.1.4 Subscriber profile management

The application shall have the possibility to change a subscriber's data in the network.
The network shall have the possibility to notify the application about changes in the subscribers profile stored in the network.

B.2.1.5 Subscriber Location management

The application shall have the possibility to request the location and status of a subscriber.
The network shall have the possibility to send the current location and status of a subscriber to the application.

B.2.2 MExE

B.2.2.1 WAP component

It shall be possible for the application to send information to the subscriber. This information may result in the mobile station request remote invocation of applications.
It shall be possible for the subscriber to request information from an application without a corresponding previous event issued by the application.

B.2.2.2 WTA component

Editor's note: This is for further study.

B.2.2.3 JAVA component

Editor's note: This is for further study.

B.2.3 SIM Application Toolkit (SAT)

Editor's note: This is for further study, but is include for sake of completeness

B.2.4 Bearers

The service capability server is intended for the establishment of a communication link between the application in the mobile station and the application in a server in order to transfer data between application and MS.

B.2.4.1 USSD component

It shall be possible to receive an incoming USSD request. Upon reception of the request the application shall have the possibility to respond to the request, either be returning information or by requesting more information from the subscriber. It is the responsibility of the application to indicate the end of the request handling.

The application shall have the possibility to either send information to the subscriber or request information from the subscriber. It is the responsibility of the application to indicate the end of the information exchange.

B.2.4.2 SMS Component

It shall be possible for the application to transfer information to the subscriber (MT SMS).

It shall be possible for the subscriber to transfer information to the application (MO SMS).
There shall be support for :

- Notification
- Receipt notification
- Alerting notification

B.2.3.3 GPRS session

It shall be possible for the application to transfer information to the subscriber.
It shall be possible for the subscriber to transfer information to the application.

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
March 12/99	1.0.0	Input text to state the inclusion of OSA requirements
March 17/99	1.1.0	Addition of Annex B, OSA text

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