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European digital cellular telecommunications system (Phase 2); Technical realization of supplementary services (GSM 03.11)

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) Technical Committee (TC) of the European Telecommunications Standards Institute (ETSI).

This ETS defines the technical realization of supplementary services for the European digital cellular telecommunications system (Phase 2).

This ETS corresponds to GSM Technical Specification (GSM-TS) GSM 03.11 version 4.8.1.

The specification from which this ETS has been derived was originally based on CEPT documentation, hence the presentation of this ETS may not be entirely in accordance with the ETSI/PNE rules.

Reference is made within this ETS to GSM-TSs (NOTE).

Reference is also made within this ETS to GSM xx.xx series. The specifications in the series can be identified, with their full title, within the normative reference Clause of this ETS by the first two digits of their GSM reference number e.g. GSM 09.xx series, refers to GSM 09.01, GSM 09.02, etc.

NOTE: TC-SMG has produced documents which give the technical specifications for the implementation of the European digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TSs). These TSs may have subsequently become I-ETTs (Phase 1), or ETs (Phase 2), whilst others may become ETSI Technical Reports (ETRs). GSM-TSs are, for editorial reasons, still referred to in current GSM ETs.

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1 General

1.1 Scope

This technical specification describes the general aspects on how supplementary services in the GSM system are realized from a technical point of view.

Description of technical realization for specific supplementary services can be found in GSM 03.8x and 03.9x-series technical specifications.

All supplementary services may require signalling on the radio path. Signalling procedures and messages used are defined in the GSM 04.8x and 04.9x-series of technical specifications.

For some supplementary services information needs to be transferred between the home location register (HLR), the visitor location register (VLR) and the mobile services switching centre (MSC). Signalling procedures for such information transfer are defined in technical specification GSM 09.02.

Definitions and descriptions of supplementary services are given in the GSM 02.8x and 02.9x-series of technical specifications.

Definitions are given in technical specification GSM 02.04.

NOTE 1: The technical specifications on the technical realization of supplementary services do not distinguish between subscriber, user and customer, since all three do not fully cover the textual needs. Generally the term "subscriber" is used, even if this person is not having the subscription.

NOTE 2: The terms "he", "his" and "him" are used as abbreviation of "he/she", "his/her" and "him/her" respectively.

1.2 Normative references

[SIST ETS 300 529 E1:2003](https://standards.iteh.ai/catalog/standards/sist/45e62d69-9f04-4417-883f-021087113630/sist-ets-300-529-e1-2003)

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

- [1] GSM 01.04 (ETR 100): "European digital cellular telecommunications system (Phase 2); "Abbreviations and acronyms".
- [2] GSM 02.04 (ETS 300 503): "European digital cellular telecommunications system (Phase 2); General on supplementary services".
- [3] GSM 02.30 (ETS 300 511): "European digital cellular telecommunications system (Phase 2); Man-Machine Interface (MMI) of the Mobile Station (MS)".
- [4] GSM 03.81 (ETS 300 542): "European digital cellular telecommunications system (Phase 2); Line identification supplementary services - Stage 2".
- [5] GSM 03.82 (ETS 300 543): "European digital cellular telecommunications system (Phase 2); Call Forwarding (CF) supplementary services - Stage 2".
- [6] GSM 03.83 (ETS 300 544): "European digital cellular telecommunications system (Phase 2); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2".
- [7] GSM 03.84 (ETS 300 545): "European digital cellular telecommunications system (Phase 2); Multi Party (MPTY) supplementary services - Stage 2".

- [8] GSM 03.85 (ETS 300 546): "European digital cellular telecommunications system (Phase 2); Closed User Group (CUG) supplementary services - Stage 2".
- [9] GSM 03.86 (ETS 300 547): "European digital cellular telecommunications system (Phase 2); Advice of Charge (AoC) supplementary services - Stage 2".
- [10] GSM 03.88 (ETS 300 548): "European digital cellular telecommunications system (Phase 2); Call Barring (CB) supplementary services - Stage 2".
- [11] GSM 03.90 (ETS 300 549): "European digital cellular telecommunications system (Phase 2); Unstructured supplementary services operation - Stage 2".
- [12] GSM 04.80 (ETS 300 564): "European digital cellular telecommunications system (Phase 2); Mobile radio interface layer 3 supplementary services specification Formats and coding".
- [13] GSM 04.81 (ETS 300 565): "European digital cellular telecommunications system (Phase 2); Line identification supplementary services - Stage 3".
- [14] GSM 04.82 (ETS 300 566): "European digital cellular telecommunications system (Phase 2); Call Forwarding (CF) supplementary services - Stage 3".
- [15] GSM 04.83 (ETS 300 567): "European digital cellular telecommunications system (Phase 2); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3".
- [16] GSM 04.84 (ETS 300 568): "European digital cellular telecommunications system (Phase 2); Multi Party (MPTY) supplementary services - Stage 3".
- [17] GSM 04.85 (ETS 300 569): "European digital cellular telecommunications system (Phase 2); Closed User Group (CUG) supplementary services - Stage 3".
- [18] GSM 04.86 (ETS 300 570): "European digital cellular telecommunications system (Phase 2); Advice of Charge (AoC) supplementary services - Stage 3".
- [19] GSM 04.88 (ETS 300 571): "European digital cellular telecommunications system (Phase 2); Call Barring (CB) supplementary services - Stage 3".
- [20] GSM 04.90 (ETS 300 572): "European digital cellular telecommunications system (Phase 2); Unstructured supplementary services operation - Stage 3".
- [21] GSM 09.02 (ETS 300 599): "European digital cellular telecommunications system (Phase 2); Mobile Application Part (MAP) specification".

1.3 Definitions and abbreviations

Abbreviations used in this specification are listed in GSM 01.04.

2 Activation, deactivation, registration, erasure, interrogation and invocation

2.1 General

Activation, deactivation, registration, erasure, interrogation and invocation are defined independently from a particular supplementary service. Whether they are applicable to a particular supplementary service or not is defined in the corresponding TS GSM 03.8x and 03.9x-series.

The invocation of a supplementary service is executed as described in the corresponding stage 2 description and always includes a MSC and a location register.

When a MSC receives a request for either activation/deactivation or registration/erasure or an interrogation, it invokes one of the following procedures.

The MSC then can:

- contact only the current VLR (e.g. interrogation of a call forwarding conditional supplementary service);
- contact only the HLR (e.g. interrogation of the supplementary service call forwarding unconditional);
- contact the HLR, after which the HLR updates the VLR (e.g. registration of a forwarding number for a conditional call forwarding supplementary service).

Which of the above listed procedures is applied for a call independent supplementary service operation is described in the corresponding TS GSM 03.8x and 03.9x-series.

Successful activation, deactivation, registration and erasure change the service state at the HLR. These transitions (if applicable to a particular service) are defined in the GSM 03.8x and 03.9x-series. Note that the HLR may also change the service state due to "HLR Induction" (see section 2.1.1).

In connection with supplementary service operations the served subscriber or remote subscribers may get notifications from the network.

2.1.1 Definition of "state vectors"

In order to provide a tool to define service states the concept of a "state vector" is introduced. The state vector is used to represent the state of the service in terms of four variables:

- 1) Provisioning State,
possible values are "Provisioned" or "Not Provisioned";
- 2) Registration State,
possible values are "Registered", "Erased", or "Not Applicable";
- 3) Activation State,
possible values are "Not Active", "Active and Operative" or "Active and Quiescent";
- 4) HLR Induction State,
possible values are "Induced" or "Not Induced".

The state vector represents the state of the service by using all four variables together. The state vector is represented using the notation:

(Provisioning State, Registration State, Activation State, HLR Induction State)

e.g.: (Provisioned, Registered, Not Active, Not Induced).

Note that the state vector is a logical (not a physical) representation of the service state. Note also that though some parts of the state vector are similar to elements of SS-Status the mapping between the state vector and SS-Status is not one to one. The use of state vectors is not intended to specify any particular implementation internally in a node. There is a relationship specified between the state vector and parts of the transfer syntax. This relationship is not a direct one-to-one mapping.

The following text specifies the semantics of each variable in the state vector.

The three variables "Provisioning State", "Registration State" and "Activation State" are used to represent the state of the service according to the normal behaviour based on service provider and user actions.

The "HLR Induction State" records whether or not the HLR has temporarily induced the service (e.g. if the VLR does not support CUG, the HLR may induce an outgoing barring service). The Provisioning State, Registration State and Activation State are not affected by HLR induction of a service.

Provisioning State

- has value "provisioned", if the subscriber has a subscription to the service;
- has value "Not Provisioned" otherwise.

Registration State

- has value "Not Applicable", if registration is not applicable to the service;
- has value "Registered", if registration is applicable, and there is registration data available;
- has value "Erased" otherwise.

Activation State

- has value "Active and Operative", if the service is in a state where it can be invoked (and this is not due to HLR induction);
- has value "Active and Quiescent", if the service is in a state where it cannot be invoked, but where it will automatically move to the "Active and Operative" state when conflicting conditions are removed;
- has value "Not Active" otherwise.

HLR Induction State

- has the value "Induced" if the HLR has induced the service (e.g. if the VLR does not support CUG, the HLR may induce an outgoing barring service);
- has the value "Not Induced" otherwise.

For further information about how HLR induction applies to particular services refer to the GSM 03.8x and 03.9x-series.

2.1.2 Handling of service states at the HLR

Valid states (represented by state vectors) are defined on a service-by-service basis in the GSM 03.8x and 03.9x-series. For each service the set of valid states represents the logical states that can exist in the HLR. The HLR contains the master copy of service state information.

2.1.2.1 Encoding of SS-Status

To send service state information to the VLR or the MS, the HLR often uses the SS-Status parameter. This parameter contains four bits (referred to here as the "P bit", "R bit", "A bit" and "Q bit"). In a phase 2 context the HLR shall encode the SS-Status using the mapping defined in this section from the service states to SS-Status.