# SLOVENSKI STANDARD
## SIST-V ETSI/EG 201 988-1 V1.1.1:2003

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Services and Protocols for Advanced Networks (SPAN) - Service Provider Access Requirements (SPAR) - Open Service Access for API requirements - Part 1: Version 1

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*ETSI Guide*

**Services and Protocols for Advanced Networks (SPAN);
Service Provider Access Requirements (SPAR);
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# Foreword

This ETSI Guide (EG) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

The present document is part 1 of a multi-part deliverable covering Service Provider Access Requirements (SPAR), as identified below:

**Part 1:    "Version 1";**

Part 2:    "Version 2".

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# 1      Scope

The present document applies to the first phase of the Service Provider Access Requirements (SPAR) work, aiming primarily at fixed PTNs, e.g. Public Switched Telecommunications Networks (PSTNs) and Integrated Services Digital Networks (ISDNs). This first phase is described by two documents, Service Provider Access Requirements; Enhanced telephony services [1] and Network operator's requirements for the delivery of Service Provider Access [2]. The present document shows how these requirements can be fulfilled using an Application Programming Interface (API) base open Service Access, Application Programming Interface ES 201 915 Series of Specifications (12 Parts) [11]. This specification is addressing the Multi-Party Call Control service.

# 2      References

The following documents contain provisions, which through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

[1]          ETSI EG 201 722: "Intelligent Network (IN); Service provider access requirements; Enhanced telephony services".

[2]          ETSI EG 201 807: "Network Aspects (NA); Intelligent Network (IN); Network operators' requirements for the delivery of Service Provider access".

[3]          ISO/IEC JTC 1 Directives, Supplement 2: "Guidelines for API Standardization".

[4]          ETSI ETS 300 335: "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 1; Test specification".

[5]          ETSI EN 300 090: "Integrated Services Digital Network (ISDN); Calling Line Identification Restriction (CLIR) supplementary service; Service description".

[6]          ETSI ETR 322: "Intelligent network (IN); Vocabulary of terms and abbreviations for CS-1 and CS-2".

[7]          ETSI TS 123 127: "Universal Mobile Telecommunications System (UMTS); Virtual Home Environment/Open Service Architecture (3GPP TS 23.127 version 3.2.0 Release 1999)".

[8]          ITU-T Q-series Recommendations Supplement 29: "Service Modelling: Evolution to the Use of Object Oriented Techniques".

[9]          ITU-T Recommendation Q.65 (2000): "The unified functional methodology for the characterization of services and network capabilities".

[10]         ETSI ETS 300 128 (1992): "Integrated Services Digital Network (ISDN); Malicious Call Identification (MCID) supplementary service; Service description".

[11]         ETSI ES 201 915 (all parts): "Open Service Access (OSA); Application Programming Interface (API)".

# 3      Definitions and abbreviations

## 3.1      Definitions

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

**application:** entity in a Service Provider's domain that provides a service (see definition of **service** below)

**Application Programming Interface (API):** boundary across which application software uses facilities of programming languages to invoke services (see ISO/IEC JTC 1 Directives)

**Calling Line Identity (CLI):** number that uniquely identifies a subscriber line that is used for a call

**end user:** See "**service user**" definition.

**network API gateway:** API entity that provides access to the public telecommunications network

**Network-Network Interface (NNI):** interface at a network node which is used to interconnect the node with another network node (see EG 201 722)

**network-provided calling line identity:** that is provided by the originating public telecommunications network to a call set-up request, if the calling party has not provided any calling line identity or the user-provided calling line identity has not passed a verification in the network (see ETS 300 335)

**presentation-restricted calling line identity:** calling line identity that is associated with a marking informing the terminating local exchange not to display this calling line identity to the called party (see EN 300 090)

**Public Telecommunications Network (PTN):** telecommunications network which provides telecommunications services to the general public (see ETR 322)

**Public Telecommunications Network Operator (PTNO):** entity which is responsible for the development, provisioning and maintenance of telecommunications services to the general public and for operating the corresponding networks (see ETR 322)

**service:** that which is offered by an administration or recognized private operating agency (i.e. a public or private Service Provider) to its customers in order to satisfy a telecommunication requirement (see ETR 322)

**Service Capability Feature (SCF):** functionality offered by service capabilities that are accessible via the standardized OSA interface (see TS 123 127)

**Service Provider (SP):** entity which provides services to its service subscribers on a contractual basis and who is responsible for the services offered

   NOTE:      The same organization may act as a public telecommunications network operator and a Service Provider (see ETR 322).

**Service Provider Access (SPA):** access facility that enables a Service Provider to access specific functionality of a public telecommunications network (see EG 201 722)

**Service Provider Access Interface (SPAI):** interface between a public telecommunications network and a Service Provider's equipment for enabling the Service Provider to access specific functionality of a public telecommunications network (see EG 201 722)

**Service Provider Access Requirement (SPAR):** requirement for access by a Service Provider to specific functionality of a public telecommunications network (see EG 201 722)

**service subscriber:** entity that contracts for services offered by Service Providers (see ETR 322)

**service user:** entity external to the network that uses the services offered by the PTNO or SP (see ETR 322)

**User-Network Interface (UNI):** interface between the terminal equipment and a network termination point at which the access protocols apply (see EG 201 722)

**user-provided calling line identity:** network number that has been provided by the calling party (see ETS 300 335)

**user-provided, not screened calling line identity:** network number that has been provided by the calling party and has been passed forward by the originating public telecommunications network without performing any screening function for verification purposes (see ETS 300 335)

**user-provided, verified and passed calling line identity:** network number that has been provided by the calling party and has been successfully verified in the originating public telecommunications network (see ETS 300 335)

## 3.2      Abbreviations

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

| | |
|---|---|
| 3GPP | Third Generation Partnership Project |
| API | Application Programming Interface |
| CAMEL | Customized Applications for Mobile Enhanced Logic |
| CAP | CAMEL Application Part |
| CLI | Calling Line Identity |
| CS-1 | Capability Set One |
| IP | Internet Protocol |
| ISDN | Integrated Services Digital Network |
| ITU-T | International Telecommunications Union - Telecommunication standardization sector |
| IVR | Interactive Voice Response |
| MCID | Malicious Call IDentification |
| NNI | Network-Network Interface |
| NTP | Network Termination Point |
| O-O | Object Oriented |
| OSA | Open Service Architecture |
| PoP | Point of Presence |
| PTN | Public Telecommunications Network |
| PTNO | Public Telecommunications Network Operator |
| SCF | Service Control Function |
| SMTP | Simple Mail Transmission Protocol |
| SP | Service Provider |
| SPA | Service Provider Access |
| SPAI | Service Provider Access Interface |
| SPAR | Service Provider Access Requirement |
| UML | Unified Modelling Language |
| UNI | User-Network Interface |
| URL | Universal Resource Locator |

## 4      Background

An overview of an API is presented in clause 5, and mappings between the Service Provider access requirements and the API methods are presented in clause 6. Sequence diagrams for example services are available in APIs for Open Service Access ES 201 915 [11], and further information on service modelling is available in ITU-T documentation [8] and [9].

API ES 201 915 [11] implementation issues, which are not covered in the present document, include the following:

- dimensioning and scalability of operations;

- number and efficiency of operations;

- object management;

- error control, including error detection and recovery, needs to be considered for all operations over the API. Those error control requirements specifically defined in the Service provider access requirements; Enhanced telephony services [1] have been addressed in the API mapping examples in the present document, but other error control mechanisms are defined in APIs for Open Service Access service applications ES 201 915 [11];

- some of the requirements defined in the Service provider access requirements; Enhanced telephony services [1] may require access to PTN hosted user profile information, e.g. incoming call barring and call diversion information. The means of accessing such information is not defined in the present document. This is a management plane requirement, as shown in [1];

The call leg methods for multiparty are supported in the API ES 201 915 [11].

# 5 Architecture

## 5.1 API overview

An Application Programming Interface (API) is a means of supporting the Service Provider access requirements identified by ETSI. This API is defined using the Unified Modelling Language (UML), which is an Object Oriented (O-O) technique [8] and [9].

Detailed descriptions of the API can be found in ES 201 915 [11], but an overview of the API architecture is shown in figure 1.
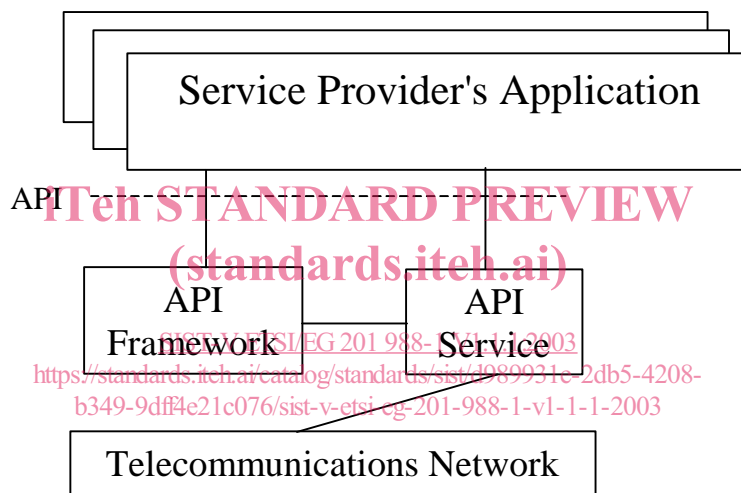


**Figure 1: API Architecture**

Service providers' applications (telecommunications services) and the PTN's service capability features use the API to utilize each others resources in delivering services to end users. A contractual agreement and physical access interface must exist between the Service Provider and network operator for the API to be used, the nature of these is dependent upon commercial agreements between the parties involved and may be subject to national regulations.

This API, which is based on ES 201 915 [11], contains an API Framework and one or more API Service, where the API Framework provides control of the service-surround capabilities, and API Service provide control of the real time network capabilities.

API Framework includes the following:

- trust and security management, which is used to make initial contact with a framework provider, to authenticate the application and framework, and to obtain access to other framework interfaces and service capability features. This includes service capability feature selection and electronically signing service agreements;

- service discovery, which is used by the application to get the identities of the service capability features that are available from the underlying network. The identities are used during authentication to select the required service capability features;

- integrity management, which is used for load management, fault management, heartbeat management, heartbeat and operation, administration and maintenance;

- service subscription, which is used to manage the contractual agreement between the parties.

API Service include:

- generic call control service, which is used to enable and disable call notifications, to notify call events, and to control and manage simple calls consisting of one or two legs;

- INAP-1/2/3 call control service (INAP CS-1, CS-2, CS-3), which enhances the generic call control service by allowing more complex call behaviour to be used;

- CAP call control service (Phases 1, 2, 3), which enhances the generic call control service to allow more control over charging for mobile terminals;

- multi party call control service, which enhances the generic call control service with call leg control;

- multi media call control service, which enhances the enhanced call control service to allow the control of specific media channel characteristics;

- conference call control service, which enhances the enhanced call control service to allow the creation of sub-conferences and the ability to move legs between sub-conferences, or merge sub-conferences;

- multi media conference call service, which enhances the conference call control and multi media call control services to allow interworking with network signalled conference protocols, manipulation of media, and the handling of multi media conference policies;

- generic messaging service, which is used to send, store and receive electronic and voice mail;

- user location service, which is used to establish the geographic location and status of fixed, mobile and IP-based telephony users;

- user location CAMEL service, which supplements the user location service to provide network related information;

- user location emergency service, which supplements the user location service with specialized functionality to handle emergency calls;

- user status service, which is used to request the current status, or the reporting of a change of status, of fixed, mobile or IP-based telephony users;

- generic user interaction service, which is used to interact with end users;

- call user interaction service, which is used in conjunction with another service interface (only the generic call control service at present) to send information to, or gather information from, an end user.

Detailed example sequence diagrams can be found in APIs for third party service applications ES 201 915 [11], but an overview is given below.

When an Application starts, the following is a typical outline sequence of events:

1) application initiates client authentication;

2) mutual authentication of client and Framework Interface;

3) application discovers service capability features;

4) application selects required service capability features;

5) mutual signing of service agreement, e.g. by electronic signature.

At this point the agreed network operator service capability features become available to the Application. If the agreed service capability features include inbound calls, the Application requests call notifications on the appropriate Service Interface. The service capability features, and any call notifications, remain active until one of the parties chooses to either terminate the service agreement, or disable the call notifications.

If call notifications have been enabled, the following is a typical outline sequence of events:

1) a call arrives in network and is identified as requiring a Service Provider;

2) a call object is created. (Other objects may also be created, e.g. call leg object);

3) a call event notification is sent to the appropriate application over the API;

4) the application sends all appropriate information for call treatment, including routing and reporting requirements;

5) network applies the call treatment and reports outcome, if requested;

6) the application provides subsequent instructions, if required;

7) the network provides subsequent reports, if and when required.

The above sequence is repeated for each call received and an unlimited number of calls may co-exist.

If the Application initiates calls, the following is a typical outline of events:

1) the application creates a call object. (Other objects may also be created e.g. call leg object);

2) the application sends all appropriate information for call routing and reporting;

3) the network routes the call and provides requested reports;

4) the application provides subsequent instructions, if required;

5) the network provides subsequent reports, if required.

The above sequence is repeated for each call initiated and an unlimited number of calls may co-exist.

## 5.2 Description of classes

Framework and service interface classes are defined in the ETSI document: APIs for Open Service Access applications ES 201 915 [11].

## 5.3 Interface class diagrams

Interface class diagrams are defined in the ETSI document: APIs for Open Service Access applications ES 201 915 [11].

# 6 An API approach to modelling the SPA requirements

## 6.1 Introduction

Information flows and API mapping examples for each of the Service Provider phase 1 requirements, as defined in Service Provider Access Requirements; Enhanced Telephony Services [1], are presented below. Only the mappings, parameters and their values that directly relate to the individual requirements are shown in this clause. The complete definitions of the API methods, parameters and parameter values can be found in the API Specifications for Open Service Access applications ES 201 915 [11].

The API mapping examples may be modified by the appropriate standardization groups and the regulatory considerations have been included for information only. The network operators' requirements, as defined in network operators' requirements for the delivery of Service Provider access [2], have been included where appropriate. The screening and charging aspects of the network operators document ([2], clauses 5.5.1 and 5.5.2, respectively) apply to all the requirements and have not been shown, as these have no direct impact on the information flows between Service Providers and network operators.

The circuit related and non-circuit related requirements have been combined to show the logical information flows, which make no assumptions about the actual implementation. In all cases below, the application is assumed to have been authenticated.

It should be noted that the API methods fall into two categories, asynchronous and synchronous. Asynchronous methods, which are identified by the suffix 'Req' (Request), may receive explicit responses identified with the suffixes 'Err' (Error) or 'Res' (Result). Synchronous methods, which have no suffix, may receive implicit responses (return values) when the methods terminate. These implicit responses are not shown in the API mapping examples.

PTNs will need the ability perform functions not defined in the network operators requirements [2], e.g. to monitor calls for charging, operational and regulatory reasons, and to perform legal intercept, which are not included in the mapping examples.

# 6.2 Calling party information handling capabilities

The implementation of the Service Provider functional requirements relating to the CLI should be in conformance with the general European Commission and national regulations and with bilateral agreements where they exist.

## 6.2.1 Reception of the calling line identity

The Service Provider needs to receive the Calling Line Identity (CLI) from the PTN with a call or call indication, if the CLI is available in the PTN in accordance with EG 201 722 [1], clause 5.2.1 and EG 201 807 [2], clauses 5.2.1 and 5.2.2. If the calling party is using the services of the Service Provider and national regulations and/or legislation allows it, this requirement also applies to a CLI marked as 'presentation-restricted'. All the indicators associated with the CLI need also to be delivered.
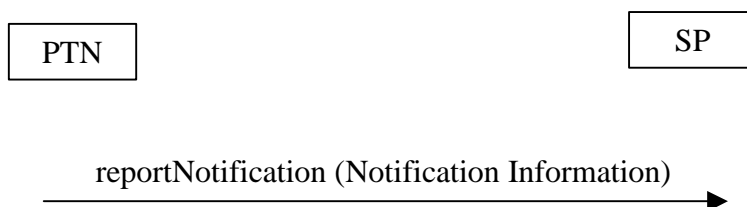
**Information flows:**



**Figure 2: Reception of the calling line identity**

**API mapping example:**

Pre-conditions: call event notifications have been enabled using createNotification () and CLIs are supported in the underlying PTN.



**Figure 3: Reception of the calling line identity**