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Services and Protocols for Advanced Networks (SPAN) - Service Provider Access - Service Provider Access Requirements in a Fixed and Mobile Environment

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Foreword

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

1 Scope

The present document lists the second set of network access requirements that service providers (SP) have in delivering telecommunication services including, but not limited to, second and third generation mobile, cordless and fixed services, over one or more operator's networks. As used here, telecommunication services include: voice telephony, multimedia and data, to name a few areas. The network requirements also include mobility-, Internet- and broadband-related aspects that were not yet covered by the preceding EG 201 722 [4] which address the first set of access requirements that service providers (SPs) have in delivering services over one or more public telecommunications networks (PTNs), primarily fixed PTNs, A companion document, EG 201 807 [5] addresses network operators' requirements for the delivery of service provider access.

The scope of the present document is to describe generic functional requirements regarding the service provider access (SPA). The priority of each requirement is based on the need perceived from the service provider's viewpoint. To fulfil these requirements, appropriate protocols may have to be enhanced or developed based on information flows and taking into account network integrity considerations expressed in the present document.

Clause 4 contains introductory text describing the background and motivations of the second set of requirements of a SPA. Clause 5 contains a summary of requirements regarding the service provider access interface (SPAI) and a framework that helps the reader to get an overview. Clause 6 contains a description of the requirements involving circuit-related (CR) and non-circuit related (NCR) aspects of the SPAI.

The present document relates to the role of the SP and the role of the public network operator (PNO), with the realization that market players may act in multiple roles. This is in alignment with the current EC directives.

Service interaction aspects are outside the scope of the present document.

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 ETR 322: "Intelligent Network (IN); Vocabulary of terms and abbreviations for CS-1 and CS-2".

[2] Directive 98/10/EC of the European Parliament and of the Council of 26 February 1998 on the application of open network provision (ONP) to voice telephony and on universal service for telecommunications in a competitive environment.

[3] Directive 97/33/EC of the European Parliament and of the Council of 30 June 1997 on interconnection in Telecommunications with regard to ensuring universal service and interoperability through application of the principles of Open Network Provisions (ONP).

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

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

[6] ETSI EG 201 899: "Services and Protocols for Advanced Networks (SPAN); Service Provider Access; Modelling service provider access requirements using an API approach".

[7] ETSI ETS 300 374-1: "Intelligent Network (IN); Intelligent Network Capability Set 1 (CS1); Core Intelligent Network Application Protocol (INAP); Part 1: Protocol specification".

[8] ETSI EN 301 140-1: "Intelligent Network (IN); Intelligent Network Application Protocol (INAP); Capability Set 2 (CS2); Part 1: Protocol specification".

[9] Directive 97/66/EC of the European Parliament and Council on the processing of personal data and the protection of privacy in the telecommunications sector.

[10] ETSI ES 201 158: "Telecommunications Security; Lawful Interception (LI); Requirements for network functions".

[11] ETSI EG 201 781: "Intelligent Networks (IN); Lawful interception".

[12] ETSI ETR 339: "Intelligent Network (IN); IN interconnect business requirements".

[13] ETSI TR 101 664: "Intelligent Network (IN); IN interconnect security features".

[14] CEPT/ECTRA Recommendation of 12 March 1998 on a Set of Guidelines on Responsibilities for ensuring maintenance of Network Integrity (NI) in an interconnected environment.

[15] ETSI TR 101 365: "Intelligent Network (IN); IN interconnect threat analysis".

[16] ETSI EN 301 152-1: "Intelligent Network (IN); Intelligent Network Capability Set 1 (CS1) extension; Intelligent Network Application Protocol (INAP); Customised Applications for Mobile network Enhanced Logic (CAMEL); Part 1: Protocol specification".

3 Definitions and abbreviations

3.1 Definitions

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

calling line identity: number that uniquely identifies a subscriber line that is used for a call

circuit-related interface: signalling connection between a public telecommunications network operator and a service provider, with the extension of the call connection from the public telecommunications network to the service provider's equipment

end user: see "**service user**" definition

network-network interface: interface at a network node which is used to interconnect a network node with another network. This interface is used for Inter-connection of two or more networks

non-call-related: call-unrelated

non-circuit-related interface: control connection between a public telecommunications network operator and a service provider, without the extension of the call connection from the public telecommunications network to the service provider's equipment

public telecommunications network operator: entity which is responsible for the development, provisioning and maintenance of telecommunications services to the general public and for operating the corresponding networks

public telecommunications network: telecommunications network which provides telecommunications services to the general public

public telecommunications network originating: PTN to which either the originating line is directly connected or in which an incoming call initiates a service

public telecommunications network terminating: PTN to which either the terminating line is directly connected or in which the terminating line's user profile is stored

service provider access requirement: requirement for access by a service provider to specific functionality of a public telecommunication network

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

service provider: entity which provides services to its service subscribers on a contractual basis and who is responsible for the services offered. The same organization may act as a public telecommunications network operator and a service provider

service provider access: access facility that enables a service provider to access specific functionality of a public telecommunications network

service provider access interface: 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

service provider originating: service provider that provides either services relating to the originating line (or to the originating profile), or services acting on the information coming from the originating or incoming call

service provider terminating: service provider that provides either services relating to the terminating line (or to the terminating profile), or services acting on the call-related information coming from the terminating party's line

service subscriber: entity that contracts for services offered by service providers

service user: entity external to the network that uses its services

user-network interface: interface between the terminal equipment and a network termination point at which the access protocols apply

3.2 Abbreviations

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

API	Application Programming Interface
ATM	Asynchronous Transfer Mode
CAMEL	Customized Applications for Mobile Network Enhanced Logic
CdPy	Called Party
CgPy	Calling Party
CLI	Calling Line Identity
CR	Circuit-Related
CS2	IN Capability Set #2
EC	European Commission
ETSI	European Telecommunications Standards Institute
GPS	Global Positioning System
ID	Identifier
IMSI	International Mobile Subscriber Identity
IN	Intelligent Network
INAP	Intelligent Network Application Protocol
IP	Internet Protocol
ITU-T	International Telecommunications Union -Telecom sector
NCR	Non-Circuit-Related
NNI	Network-Network Interface
NRA	National Regulatory Authority
PNO	Public Network Operator
PTN	Public Telecommunications Network
PTNO	Public Telecommunications Network Operator
PTNorig	originating Public Telecommunications Network
PTNterm	terminating Public Telecommunications Network
PTNv	visited Public Telecommunications Network
SMS	Short Message Service
SP	Service Provider
SPorig	originating Service Provider
SPterm	terminating Service Provider
SPA	Service Provider Access
SPAI	Service Provider Access Interface
SPAR	Service Provider Access Requirements

SSL	Secure Socket Layer
SVC	Switched Virtual Circuit
UNI	User-Network Interface
USIM	User Services Identity Module

4 Introduction

4.1 Current situation

Different types of network control (or signalling) interfaces exist within a public telecommunications network (PTN), between PTNs and for those accessing the PTNs.

There are provisions in two of the open network provisions directives of the European Commission [2] and [3] that provide a regulatory framework for organizations delivering publicly available telecommunications services. These provisions request non-discriminatory access to the networks of those public telecommunications network operators (PTNOs) which have been determined as having "significant market power" (SMP).

Therefore, in order to enable service providers (SPs) to deliver services by utilizing the network functionality of one or more PTNs, a specific service provider access interface (SPAI) may become necessary.

Document EG 201 722 [4] defines the first set of service providers' access requirements leading to enhancements of the existing network-to-network interfaces (NNI) and user-to-network interfaces (UNI) to have the necessary functionality to meet the SPA requirements. A companion document, EG 201 807 [5] addresses network operators' requirements for the delivery of service provider access. Document EG 201 899 [6] on modelling service provider requirements using an API approach is next in a sequence leading to API definitions in ES 201 915.

The present document defines an enhanced set of service providers' access requirements for mobile, Internet and broadband networks and includes issues deferred from EG 201 722 [4].

The existing IN interfaces defined within the ETSI and ITU-T as part of INAP CS1 [7] were designed primarily for intra-network use with IN CS2 [8] offering an initial inter-network IN control relationship, neither were specifically designed to meet the requirements of an "open" access interface or to incorporate features that ensure network access integrity and security.

It is seen, therefore, as desirable to develop standardized interfaces to meet the SPA requirements that include features to ensure network integrity and security. There may also be a need to consider service feature interaction. These standardized interfaces are referred to, in the present document, as service provider access interface (SPAI).

4.2 Regulatory aspects

The EC directives that address Access and Interconnect matters are the Voice Telephony Directive (98/10 [2]) and the Interconnect Directive (97/33 [3]). The former is limited to fixed telephony networks and services, whilst the latter includes both mobile and fixed networks and services.

The Interconnect Directive [3] requires that certain organizations meet all reasonable requests for access at points other than the network termination points offered to the majority of end users. It will be a matter for the national regulatory authorities (NRA) in respective countries to interpret and implement this clause into their national regulations or authorization policies.

The current regulatory regime in the EC is now under review and the Commission are intending in the near future to restructure and rationalize the existing telecommunication legislation and ultimately to create a new regulatory framework. The new framework is likely to focus on a number of specific directives - licensing, access and interconnection, universal service, and data protection, and therefore the regulatory issues concerned with access may be revised.

All the functional requirements in the present document that are related to the usage and delivery of the calling line identity (CLI) must be in accordance with the legal and regulatory provisions in each country, as well as the general provision of the European directive of privacy and data protection [9].

Also the technical requirements of legal interception [10] and [11] will need to accord with the specific national regulations on security and interception that are in the force in the respective countries.

Those service providers wishing to operate in one or more countries will need to comply with the specific regulatory requirements of the different NRAs. This may entail some kind of authorization or other rules which are applicable in various countries. Such rules may for instance include the procedures by which the service providers are allocated numbers for their specific services.

The emerging ETSI technical specifications or standards relating to the service provider access interfaces that will be based on the functional requirements specified in the present document may be used in all commercial negotiations between an SP seeking access and a PNO offering access. As already stated, any regulatory requirements relevant to the provision of access will be a matter for NRAs in respective countries.

4.3 Security aspects

End users, SPs and PTNOs have a range of different business objectives and requirements regarding the provision of telecommunication services over PTNs. A number of those objectives have been identified [12]. In order to meet them, security aspects need to be carefully considered in a new environment with a multitude of interconnections and access configurations for service providers.

From the viewpoint of the end users, the key requirements are:

- availability of the services;
- correct billing;
- fraud protection;
- confidentiality; and
- privacy.

From the viewpoint of the SPs and PTNOs, the key requirements are:

- availability of the network, services, and maintenance;
- correct charging;
- capability of tracing individual calls;
- protection of subscriber-related data against intruders; and
- elimination of fraudulent use of the equipment of the PTNOs and SPs.

Security violations may have a significant negative business impact for both SPs and NOs, e.g. loss of income, reputation and market share.

In particular, network integrity is a key issue when inter-network relationships are established between PTNOs and SPs. In the connection of the SPA, a basic set of facilities may be needed to secure the interfaces between the PTNOs and SPs [13] and [14]. A threat analysis of IN-based interconnections is presented in TR 101 365 [15], and some guidelines on the relevant security measures are given in TR 101 664 [13].

Screening and mapping functions are used to control and secure bilateral agreements on the interfaces between the PTNs. Today, the PTNOs have screening and mapping facilities on some of the inter-connecting NNIs, such as the ISUP connections. These facilities and functions need to be gradually extended to cover all of the interfaces between the PTNOs and SPs.

Further security aspects associated with mobile, Internet and broad-band networks include transfer of terminal/personal identity information (e.g. IMSI, Electronic Signature, etc.) between the User Environment and the service provider, or the support of secure end-end transmission between the user terminal and the service provider application (e.g. Secure Socket Layer (SSL) and ciphering technologies).