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Services and Protocols for Advanced Networks (SPAN) - Service Provider Access - Service Provider Access Management Requirements for Open Network Access

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Foreword

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

Introduction

The present document applies to the management plane interface between the Service Provider role and the Public Telecommunications Network operator role. The requirements listed in clause 5 are based on service provider access requirements which contain management aspects selected from the service provider access requirements published in ETSI deliverables. To fulfil these management requirements, appropriate protocols will be required, based on the information flows contained in the present document, taking into account network integrity considerations. Where appropriate protocols are not available, either existing protocols will have to be enhanced or new protocols developed based on the management information to be exchanged between the Service Provider and the Network Operator.

1 Scope

The present document specifies management requirements for open network access.

EG 201 722 [1] lists the first set of Service Provider Access Requirements (SPAR) to support delivery of services over one or more, but primarily fixed, public telecommunications networks (PTNs).

EG 201 807 [2] addresses network operators' requirements for the delivery of service provider access.

EG 201 897 [5] lists the second set of service provider access requirements (SPAR) to support the delivery of telecommunication services including, but not limited to, fixed, cordless and mobile networks. Examples of Telecommunication services include: voice telephony, multimedia and data services. The network requirements also include support for mobility, Internet and broadband related aspects.

The present document is applicable to the management plane interface between the Service Provider equipment and the Public Telecommunications Network operator equipment. Each requirement, listed in clause 5, is based on the SPAR studies as published in the above deliverables. The present document identifies whether each SPAR has a management implication. To fulfil these management requirements, appropriate protocols will be required, based on the information flows contained in the present document. Where appropriate protocols are not available, either existing protocols will have to be enhanced or new protocols developed.

The management requirements covered in the present document can be split into:

- Traffic Related Capabilities (e.g. setting switch triggers, datafill, etc), necessary in order to enable from an operational perspective one or more of the Service Provider Access Requirements (SPAR).
- Performance Management Capabilities, e.g. monitoring performance of SP/PTN links, link reconfiguration, etc.
- Electronic Bonding/Ordering.

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] ETSI EG 201 899: "Services and Protocols for Advanced Networks (SPAN); Service Provider Access; Modelling Service Provider Access Requirements using an API approach".

[4] ETSI ES 201 915-1: "Open Service Access; Application Programming Interface; Part 1: Overview".

[5] ETSI EG 201 897: "Services and Protocols for Advanced Networks (SPAN); Service Provider Access; Service Provider Access Requirements in a Fixed and Mobile Environment".

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

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

[8] CEPT/ECTRA Recommendation (98)01 of 12 March 1998 on a Set of Guidelines on Responsibilities for ensuring maintenance of Network Integrity (NI) in an interconnected environment.

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

[10] ETSI EG 201 916: "Services and Protocols for Advanced Networks (SPAN); Service Provider Access; Development of standards to support open inter-network interfaces and service provider access".

[11] ETSI EG 201 988-1: "Services and Protocols for Advanced Networks (SPAN); Service Provider Access Requirements (SPAR); Open Service Access for API requirements version 1".

[12] ETSI EG 201 988-2: "Services and Protocols for Advanced Networks (SPAN); Service Provider Access Requirements (SPAR); Open Service Access for API requirements version 2".

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

NOTE 1: This interface is used for inter-connection of two or more networks.

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: telecommunications network which provides telecommunications services to the general public

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 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: 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

NOTE 2: 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 access requirement: requirement for access by a service provider to specific functionality of a public telecommunication network

service provider originating: service provider that provides either services relating to the originating line (or to the originating line's user 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 line's user 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
CAMEL	Customized Applications for Mobile Network Enhanced Logic
CLI	Calling Line Identity
IMSI	International Mobile Subscriber Identity
IN	Intelligent Network
INAP	Intelligent Network Application Protocol
IP	Internet Protocol
NNI	Network-Network Interface
PINT	PSTN Internet Telephony
PTNO	Public Telecommunications Network Operator
SLA	Service level Agreement
SP	Service Provider
SPA	Service Provider Access
SPAI	Service Provider Access Interface
SPAR	Service Provider Access Requirements
UNI	User-Network Interface

4 Background to the subject

Different types of network control (or signalling) interfaces exist within a public telecommunications network (PTN), between PTNs and for those accessing the PTNs. The Service Provider Access Interface (SPAI) has been specifically designed to enable Service Providers to deliver services by utilizing the network functionality of one or more PTNs.

The following ETSI documents have been produced:

- EG 201 722 [1] 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 Service Provider Access (SPA) requirements.
- EG 201 807 [2] addresses network operators' requirements for the delivery of service provider access.
- EG 201 899 [3] models service provider requirements using an API approach that leads to API definitions in ES 201 915-1 [4] and documents EG 201 988-1 [11] and EG 201 988-2 [12] cover open service access API requirements.
- EG 201 897 [5] defines an enhanced set of service providers' access requirements for mobile, Internet and broadband networks.

The present document describes management plane requirements to enhance the standardized interface referred to, as the service provider access interface (SPAI) in [1], [2] and [5].

4.1 Security aspects

End users, SPs and PTNOs have a range of business objectives and requirements regarding the provision of telecommunication services over PTNs. A number of those objectives have been identified [6]. In order to meet them, security aspects need to be 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 and integrity 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.

Network integrity is a key issue when any inter-network relationships are established. In the connection of the SPA, a basic set of facilities may be needed to secure the interfaces between the PTNOs and SPs [7] and [8]. A threat analysis of IN-based interconnections is presented in TR 101 365 [9], and some guidelines on the relevant security measures are given in TR 101 664 [7].

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. Equivalent facilities and functions need 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 Equipment 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).

4.2 Charging aspects

The standard charging mechanisms allow the charging of a successful call, i.e. between the called party's answer and the release of the call. Some requirements from the service providers imply the usage of the PTNO's network outside this standard case, and the implementation of a related charging mechanism between the PTNO and the SP is therefore necessary, in order to cover such a usage. This is true e.g. in the case of the following requirements of the service providers:

- requesting the PTN to open a backward in-band message path to the calling party immediately upon the arrival of a confirmation of the call set-up, without returning an "answer" signal;

- conveying the indication of an unsuccessful call from the terminating PTN, i.e. either when an indication other than "ringing" is returned to the calling party, or when a "no reply" situation occurs;
- providing call destination and routing information for controlling the destination and routing of the call;
- interacting with the service user before any service charging begins;
- sending data to and receiving data from the service provider's NTP without an alerting signal, such as "ringing";
- call charging and billing aspects, as seen from the PTNO's perspective, are considered in EG 201 807 [2].

In the case where end user charging is suspended, delayed, altered or in other ways different from standard call charging mechanisms, the appropriate events have to be created for possible logging e.g. thus providing the necessary data for appropriate accounting between the SP and PTNO.

For example, demand is emerging in the market place for:

- subscription-based billing for Internet access;
- included minutes in pre-pay subscription for fixed and mobile service; and
- pay-per-use without having a subscription.

All these cases require real-time accounting (hot billing) over a secure data interface.

5 Management requirements for open network access

Service provider access requirements have been compiled into a tabular arrangement in EG 201 916 [10] and these form the basis for determining Service Provider Access Management Requirements for Open Network Access. Figure 1 illustrates the logical architecture assumed for this study.

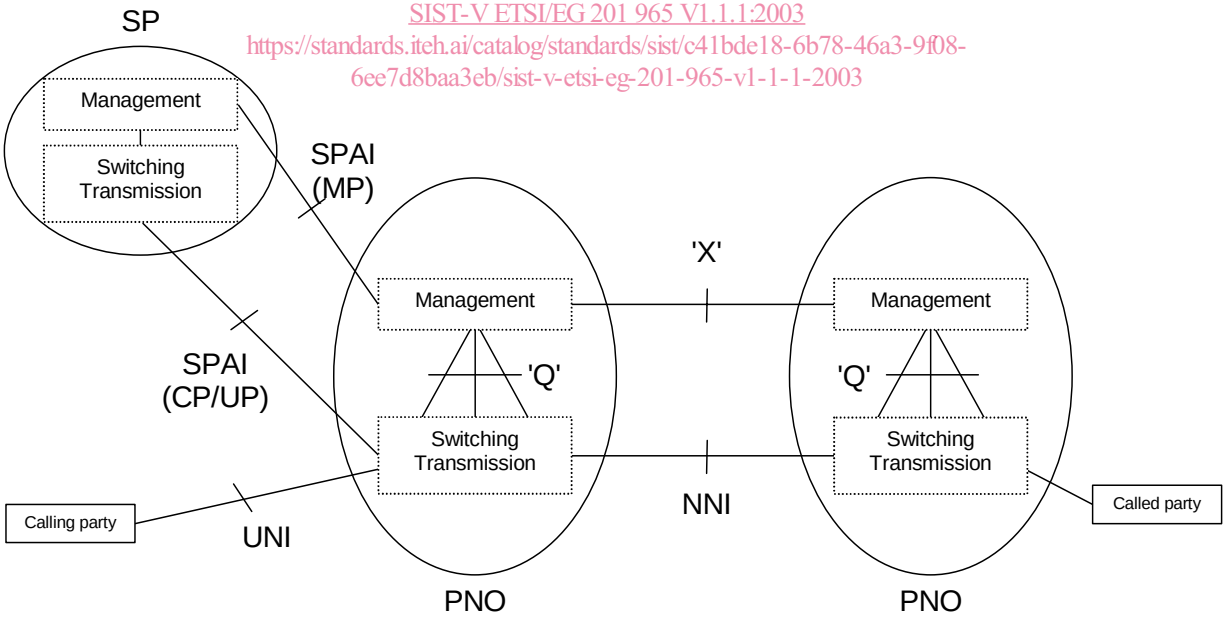

Figure 1: Reference Architecture for SP-PTN management requirements