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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), and is now submitted for the ETSI standards Membership Approval Procedure.

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, edition number, version number, etc.) or non-specific.

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

- For a non-specific reference, subsequent revisions do apply.

[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 Rec (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.
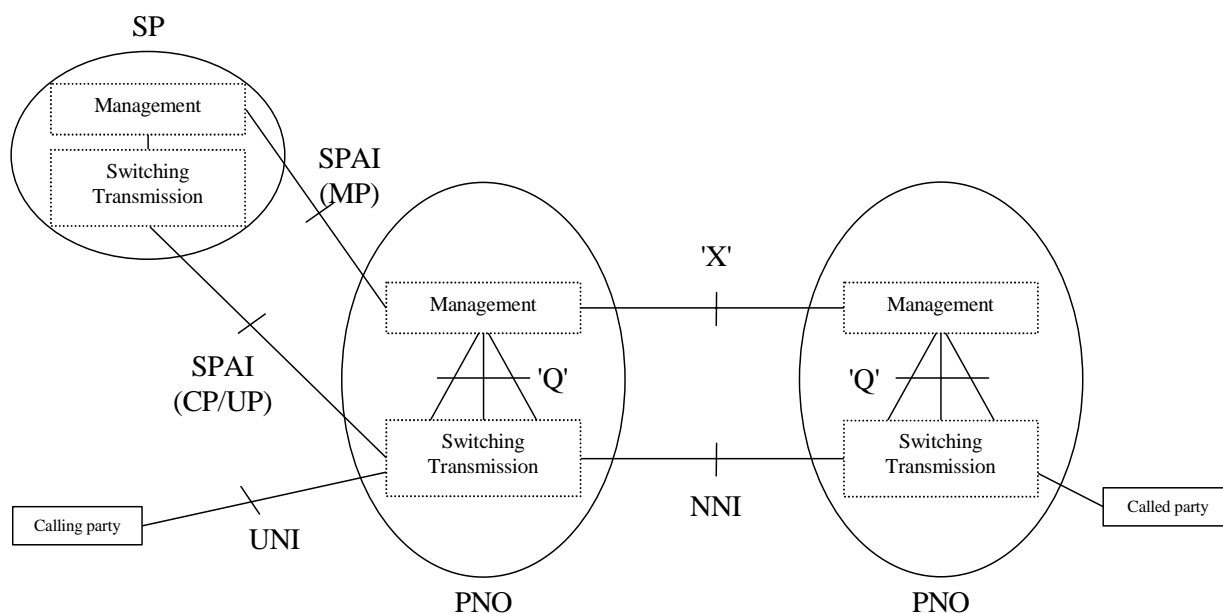
Figure 1: Reference Architecture for SP-PTN management requirements

Figure 2 shows a possible reference architecture and interfaces for SP-PTN management, where the PTN is an IN-based network interworking with an IP-based network.
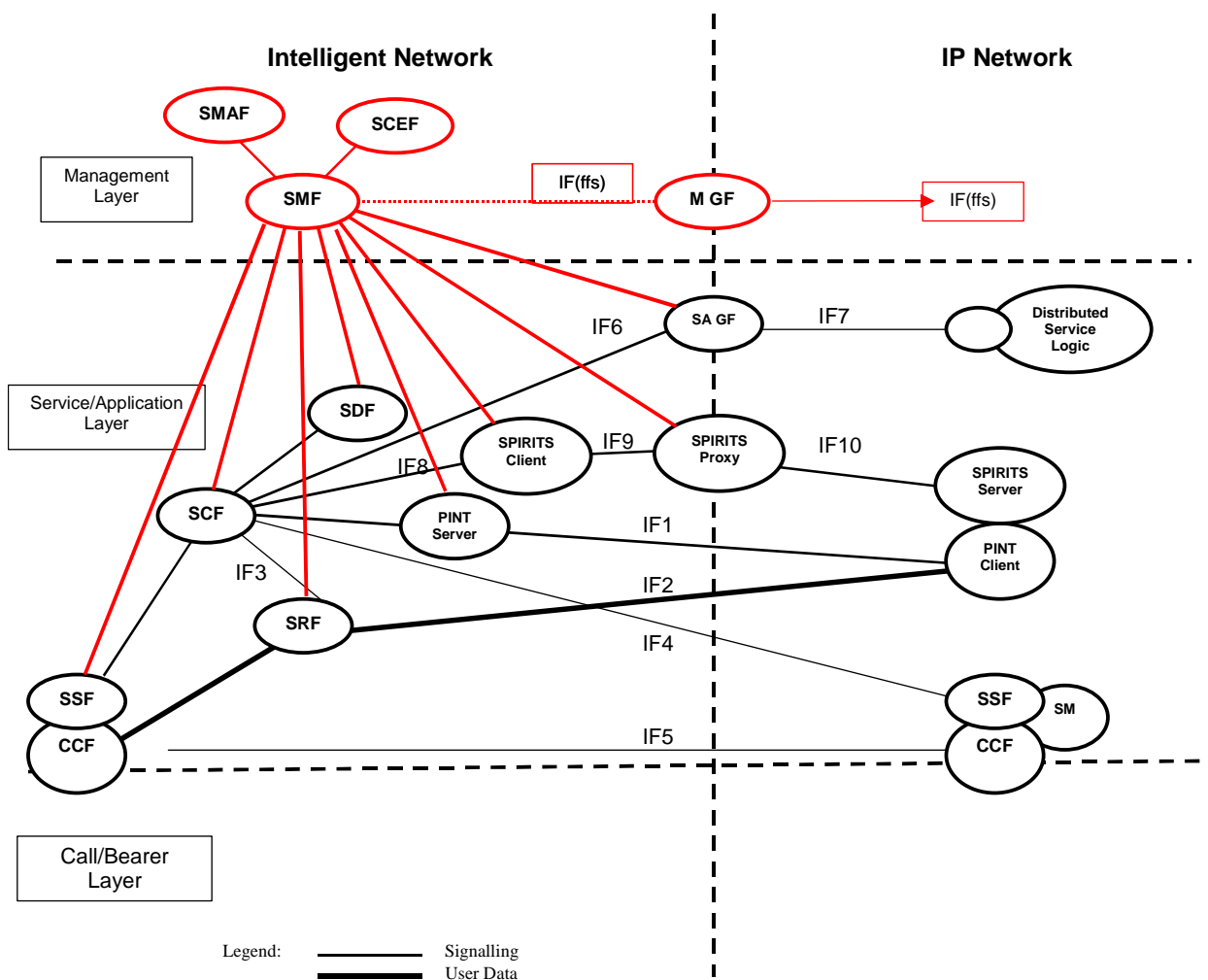
Figure 2: Reference Architecture for an IN/IP-based PTN

Figure 2 shows the relationship between elements in the services part of the management layer with the corresponding elements in the service/application layer. Other elements not shown in this figure comprise the TMN part of the management layer.

Table 1 lists the SPAR requirements and the sources where more detailed descriptions can be found.

Table 1: Service provider access requirements contained in ETSI deliverables [1] to [3]

| No.	Requirement	Reference
A1	Reception of the calling line identity - Application of the CLIR supplementary service	[1] 5.2.1, [3] 5.2.2
A2	Presentation of the complete CLI information to the PTN	[1] 5.2.2
A3	Addition or substitution of a calling line identity	[1] 5.2.3
A4	Provision of CLI information to an SP-initiated call	[1] 5.2.4
A5	Relaying of the malicious call identification data of a received call	[1] 5.2.5, [3] 5.2.1
A6	Network Location Determination	[2] 5.1.1
A7	Geographic Location Determination	[2] 5.1.2
A8	Determination of the terminal capabilities of the SP's service user	[2] 5.2.1
B1	Return speech path connection from the terminating PTN to the calling party	[1] 5.3.1
B2	Routeing of an originating or incoming call from the PTN to the SP	[1] 5.3.2
B3	Indication of an originating or incoming call from the PTN to the SP	[1] 5.3.3
B4	Routeing of a terminating call from the PTN to the SP	[1] 5.3.4
B5	Indication of a terminating call from the PTN to the SP	[1] 5.3.5
B6	Reception of a notification of the cause of an unsuccessful call	[1] 5.3.6
B7	Provision of information for the destination and routeing of a call	[1] 5.3.7
B8	Call drop-back	[1] 5.3.8
B9	User interaction without service charging of the end user	[1] 5.3.9
B10	Reception of the originally dialled digits by the SP	[1] 5.3.10
B11	Reception of the originally dialled digits by the PTN	[3] 5.3.1
B12	Disconnection of a call in progress	[1] 5.3.11
B13	Connection of a call to an interactive voice response unit in the PTN.	[1] 5.3.12
B14	Alternate routeing of calls or the indications of calls to another 'point of presence' of the SP	[1] 5.3.13
B15	Alternate routeing of a call or the indication of a call to another 'point of presence' of the PTN	[3] 5.3.2
B16	Indication of the disconnection of a call	[2] 5.4.1
B17	Supervision of a dropped-back call	[2] 5.4.5
B18	Join operation of individual legs of a call	[2] 5.4.2
B19	Split operation of individual legs of a cal	[2] 5.4.3
B20	Multimedia Multiparty call control	[2] 5.4.7
B21	User Interaction for Text Delivery	[2] 5.4.8
B22	User-Plane resource negotiation and selection	[2] 5.4.9
C1	Interrogation of a network termination point for data delivery	[1] 5.4.1
C2	Overriding of the 'incoming call barring' supplementary service	[1] 5.4.2
C3	Bypassing of the 'call diversion' supplementary service	[1] 5.4.3
C4	Message waiting indication	[1] 5.4.4
C5	Application contents screening	[3] 5.5.1
C6	Modification of the terminal capabilities of the SP's service user	[2] 5.2.2
C7	Modification of the Personality Device/ module of the SP's service user	[2] 5.2.3
C8	Alteration of the profile of the SP's service subscriber	[2] 5.3.1
C9	Delivery of information to the SP's service user prior to alerting	[2] 5.4.4
D1	Changes in the charging rate of a call - Dynamic	[1] 5.5.1
D2	Charging mechanisms between SP and PTNO - Dynamic	[3] 5.5.2
D3	Provision of call charging information in real time	[2] 5.6.1
D4	Exchange of charge detail record information in real time	[2] 5.6.2
E1	Event traceability requested by the SP	[1] 5.6.1
E2	Event traceability requested by the PTN	[3] 5.4.1
E3	Traffic control capabilities controlled by the SP	[1] 5.6.2
E4	Traffic control capabilities controlled by the PTN	[3] 5.4.2
E5	Avoidance of the cyclical routeing of a call	[1] 5.6.3, [3] 5.4.3
E6	Avoidance of the cyclical routeing of signalling or user messages	[2] 5.4.6
F1	Reporting of network events for measuring the quality of service	[2] 5.5.1
F2	Reporting of network events for the purpose of fault diagnostics	[2] 5.5.2
F3	Request for event monitoring and subsequent reporting	[2] 5.5.3
F4	Electronic ordering of network management functions	[2] 5.5.4

These requirements were analysed to identify whether they contain a management requirement for the support of service provider access. The requirements F1-F4 as categorized in EG 201 916 [10] under a management heading were used as the starting point for the analysis. Each requirement and supporting information flows contained in ETSI deliverables [1], [2] and [5] were examined to identify whether management information has to be exchanged between the SP and the PTNO, if so, that a delivery mechanism has to be specified.

It was observed that for each requirement, a Service Level Agreement (SLA) has to be produced giving details on the information to be exchanged between the SP and the PTNO and what mechanism shall be used for this purpose. Additionally, the need to exchange this information on a per call basis was examined. The results of the analysis are summarized in table 2.

Table 2: Analysis of service provider access for management requirements

No.	Requirement	Management Activity Precondition Support Mechanism and Parameters	Management Activity Activation Support Mechanism and Parameters	Management Activity De- activation Support Mechanism and Parameters
A1	Reception of the calling line identity - Application of the CLIR supplementary service	A SLA will describe which CLI information (where available) shall be included in signalling messages across the SPAI when routing a call or a call indication from the PTNO to the SP.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
A2	Presentation of the complete CLI information to the PTN	A SLA will describe which CLI information (where available) shall be included in signalling messages across the SPAI when routing a call or a call indication from the SP to the PTNO.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
A3	Addition or substitution of a calling line identity	A Service Level Agreement will describe how to provide CLI information to be included in signalling messages across the SPAI to support routing of a call or call indication containing CLI information added or substituted by the SP through the network from the SP to the PTNO.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
A4	Provision of CLI information to an SP-initiated call	A Service Level Agreement will describe how to provide CLI information to be included in signalling messages across the SPAI to support routing of a SP-initiated call or call indication containing CLI information provided by the SP from the SP to the PTNO.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
A5	Relaying of the malicious call identification data of a received call	A Service Level Agreement shall ensure MCID information in requirements A1-A3 will be relayed transparently through the SP.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
A6	Network Location Determination	A Service Level Agreement will describe how the SP can request the PTNO for the network location (e.g. Cell Identity, Port Address, Routeing Address) of a SP's service user.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
A7	Geographic Location Determination	A Service Level Agreement will describe how the SP can request the PTNO for the geographic location of a SP's service user and the format and periodicity of the response.	None required on a per-call basis.	None required on a per-call basis.
A8	Determination of the terminal capabilities of the SP's service user	This is a management requirement since information stored in the PTNO's management system may be requested when the network based line capabilities are required by the SP in order to subsequently access the terminal capabilities. A Service Level Agreement will describe what information is to be requested and the response time for the result and the format of the data.	None required on a per-call basis.	None required on a per-call basis.
B1	Return speech path connection from the terminating PTN to the calling party	A Service Level Agreement will include information on the provision for the PTN to support the establishment of a return speech path from the terminating PTN to the calling party.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.

No.	Requirement	Management Activity Precondition Support Mechanism and Parameters	Management Activity Activation Support Mechanism and Parameters	Management Activity De- activation Support Mechanism and Parameters
B2	Routeing of an originating or incoming call from the PTN to the SP	This is a management activity requiring a SLA which will describe information needed to populate PTN's routing tables to support delivery of calls from the PTN to the SP.	Configuration by Requirement#F3. None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B3	Indication of an originating or incoming call from the PTN to the SP	This is a management activity requiring a SLA which will describe information needed to populate PTN's triggering tables (or event conditions) to support delivery of call indications from the PTN to the SP.	Configuration by Requirement#F3. None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B4	Routeing of a terminating call from the PTN to the SP	This is a management activity requiring a SLA which will describe information needed to populate PTN's routing tables to support delivery of calls from the PTN to the SP.	Configuration by Requirement#F3. None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B5	Indication of a terminating call from the PTN to the SP	This is a management activity requiring a SLA which will describe information needed to populate PTN's triggering tables (or event conditions) to support delivery of call indications from the PTN to the SP.	Configuration by Requirement#F3. None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B6	Reception of a notification of the cause of an unsuccessful call	This is a management activity requiring a SLA which will describe how the PTN is to report to the SP the cause values within the signalling messages for agreed categories of unsuccessful calls (e.g. busy, no-reply, congestion).	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B7	Provision of information for the destination and routeing of a call	A Service Level Agreement between SP and PTNO needs to be produced. This Service Level Agreement will describe how to provide information in the signalling messages from the SP to the PTN to direct the destination and routing of a call.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B8	Call drop-back	A Service Level Agreement between SP and PTNO needs to be produced. This Service Level Agreement will describe information to enable a PTNO to implement route optimization of dropped back calls when requested and to notify the SP of the drop-back result.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B9	User interaction without service charging of the end user	A Service Level Agreement will describe how Call Detail Records are to be interchanged between the PTNO and the SP.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.

No.	Requirement	Management Activity Precondition Support Mechanism and Parameters	Management Activity Activation Support Mechanism and Parameters	Management Activity De- activation Support Mechanism and Parameters
B10	Reception of the originally dialled digits by the SP	A Service Level Agreement will contain provision for the PTNO to pass, where available, originally dialled digits to the SP contained in signalling messages.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B11	Reception of the originally dialled digits by the PTN	A Service Level Agreement will contain provision for the SP to pass, where available, originally dialled digits to the PTN contained in signalling messages.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B12	Disconnection of a call in progress	This is a management activity requiring a SLA which will describe how the SP is to request in the signalling messages the PTN to disconnect a call.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B13	Connection of a call to an interactive voice response unit in the PTN	This is a management activity requiring a SLA which will describe how management information on network dimensioning and configuration (IVR capabilities, addresses etc.) is to be exchanged.	None required on a per-call basis. Routing information conveyed by signalling protocol.	None required on a per-call basis.
B14	Alternate routeing of calls or the indications of calls to another 'point of presence' of the SP	This is a management activity requiring a SLA which will describe how management information on network configuration (i.e. point of presence addresses, routing rules within the network etc.) is to be exchanged. Also, under which conditions the SP may request the re-configuration to be initiated.	None required on a per-call basis. Re-routing information conveyed by signalling protocol.	None required on a per-call basis.
B15	Alternate routeing of a call or the indication of a call to another 'point of presence' of the PTN	This is a management activity requiring a SLA which will describe how management information on network configuration (i.e. point of presence addresses, routing rules within the network etc.) is to be exchanged. Also, under which conditions the PTN may request the re-configuration to be initiated.	None required on a per-call basis. Re-routing information conveyed by signalling protocol.	None required on a per-call basis.
B16	Indication of the disconnection of a call	A Service Level Agreement will describe how and when the PTNO will report to the SP an indication of the disconnection of a call to be contained within the signalling messages.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B17	Supervision of a dropped-back call	A Service Level Agreement will describe how the SP will maintain the supervision, via signalling message interaction, once the PTN has been requested to handle a supervised dropped back call.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B18	Join operation of individual legs of a call	A Service Level Agreement will describe the signalling method by which the SP will request the PTNO to join individual legs of a call.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B19	Split operation of individual legs of a call	A Service Level Agreement will describe the signalling method by which the SP will request the PTNO to split individual legs of a call.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.

		Management Activity Precondition	Management Activity Activation	Management Activity De- activation
No.	Requirement	Support Mechanism and Parameters	Support Mechanism and Parameters	Support Mechanism and Parameters
B20	Multimedia Multiparty call control	This is a management requirement described in a SLA which will describe the multimedia capabilities provided by the PTN to the SP, how the SP requests control of multimedia multiparty capabilities in the PTN using an agreed set of signalling protocols.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B21	User Interaction for Text Delivery	A Service Level Agreement will describe a signalling mechanism by which to exchange text-based information between the SP and the end user via the PTN.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
B22	User-Plane resource negotiation and selection	This is a management requirement described in a SLA which will describe the User Plane resources provided by the PTN to the SP and the signalling mechanism whereby the SP negotiates with the PTN on the availability and subsequent selection of User plane resources.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
C1	Interrogation of a network termination point for data delivery	A Service Level Agreement will describe the signalling method by which the SP will request the PTNO to interrogate the network terminating point for data delivery.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
C2	Overriding of the 'incoming call barring' supplementary service	This is a management to set-up the necessary criteria, that will describe what signalling messages are to be used and how the source of the request is authenticated within this dialogue, for overriding the Incoming Call Barring Supplementary Service.	Action required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
C3	Bypassing of the 'call diversion' supplementary service	This is a management requirement to set-up the necessary criteria which will describe what signalling messages are to be used and how the source of the request is authenticated within this dialogue for bypassing the call diversion Supplementary Service.	Action required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
C4	Message waiting indication	A Service Level Agreement will describe the signalling method by which to transfer MWI from the SP to the PTNO for delivery to the SP service user's terminal.	None required. Information conveyed by signalling protocol.	None required on a per-call basis.
C5	Application contents screening	A Service Level Agreement will describe the terms under which application contents will be screened, and to agree what actions are to be taken when the agreed thresholds are exceeded.	None required. Information conveyed by signalling protocol.	None required on a per-call basis.
C6	Modification of the terminal capabilities of the SP's service user	This is a management requirement described in a SLA. If the SP does not require this to be carried out transparently, this SLA will describe how the network will support modification of the terminal capabilities and the nature of the requests the SP may make and the PTN will support toward the service user's terminal.	None required. Information conveyed by signalling protocol.	None required on a per-call basis.
C7	Modification of the Personality Device/ module of the SP's service user	This is a management requirement described in a SLA. If the SP does not require this to be carried out transparently, this SLA will describe how the network will support modification of the personality device/module and the nature of the requests the SP may make and the PTN will support toward the service user's personality device/module.	None required. Information conveyed by signalling protocol.	None required on a per-call basis.

No.	Requirement	Management Activity Precondition Support Mechanism and Parameters	Management Activity Activation Support Mechanism and Parameters	Management Activity De- activation Support Mechanism and Parameters
C8	Alteration of the profile of the SP's service subscriber	This is a management requirement described in a SLA which will describe how to exchange User profile data and the maintenance of an audit trail of transactions between the SP and the PTN.	None required. Information conveyed by management protocol.	None required on a per-call basis.
C9	Delivery of information to the SP's service user prior to alerting	A Service Level Agreement will describe the mechanism for delivery of information to a service user prior to alerting,	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
D1	Changes in the charging rate of a call - Dynamic	A Service Level Agreement will describe the signalling mechanism by which the SP requests the PTN to change the accounting charge-rate of a call applied to the service user.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
D2	Charging mechanisms between SP and PNO - Dynamic	A Service Level Agreement will describe the pre-conditions and signalling mechanism by which either the PTN or the SP notifies the other party of a dynamic change to the accounting charge-rate for use of their own resources.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
D3	Provision of call charging information in real time	This is a management requirement for which a SLA will describe the format and exchange of messages related to an on-demand real-time "notification of charging advice" for a particular call and if this information is carried via a management interface or in signalling messages.	Action required on a per-call basis for real-time information exchange. Partial Call detail Record Information may be conveyed by a management protocol or AoC information may be transferred.	None required on a per-call basis.
D4	Exchange of charge detail record information in real time	This is a management requirement for which a SLA will describe the format and exchange of Call Detailed Records (including tariff) related to a pre-configured or real-time request for a sequence of Call Detailed Records (or partial records) for a particular call(s); e.g. prepaid or hot-billing. This may relate to a particular call, calls of a specified type or all calls related to a given service user. These CDRs may be requested for delivery at call set-up, at a specified time interval, at configured cost thresholds, and at call termination.	Required on a per-call basis. Information conveyed by signalling protocol (over NNI).	None required on a per-call basis.
D5	Billing and Accounting mechanisms between SP and PTNO	A Service Level Agreement will describe the billing mechanism the SP and the PTN will apply for the allowed use of each other's resources. This may relate to E-Commerce, E-Banking, E-Ordering, etc.	None required on a per-call basis.	None required on a per-call basis.
E1	Event traceability requested by the SP	This is a management requirement described in a SLA which will describe events for which traceability is to be requested by the SP.	Event trace may be requested on a per call basis. Information conveyed by signalling protocol.	None required on a per-call basis.

No.	Requirement	Management Activity Precondition Support Mechanism and Parameters	Management Activity Activation Support Mechanism and Parameters	Management Activity De- activation Support Mechanism and Parameters
E2	Event traceability requested by the PTN	This is a management requirement described in a SLA which will describe events for which traceability is to be requested by the PTN.	Event trace may be requested on a per call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
E3	Traffic control capabilities controlled by the SP	This is a management requirement described in a SLA which will describe what traffic control capabilities the SP will request from the PTN, under what conditions, and how to collect the corresponding results e.g. via 'X' interface.	None required on a per-call basis. Traffic performance information conveyed by management protocol.	None required on a per-call basis.
E4	Traffic control capabilities controlled by the PTN	This is a management requirement described in a SLA which will describe what traffic control capabilities the PTN will request from the SP, under what conditions, and how to collect the corresponding results e.g. via 'X' interface.	None required on a per-call basis. Traffic performance information conveyed by management protocol.	None required on a per-call basis.
E5	Avoidance of the cyclical routeing of a call	This is a management requirement described in a which will describe the mechanism used to avoid cyclic routing of a call e.g. by setting a maximum value for a hop counter.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
E6	Avoidance of the cyclical routeing of signalling or user messages	This is a management requirement described in a SLA which will describe the mechanism used to avoid cyclic routing of signalling or User messages e.g. by setting a maximum value for a hop counter or transaction number.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
F1	Reporting of network events for measuring the quality of service	This is a management requirement described in a SLA which will describe the QoS metrics provided by the PTN to the SP, an agreed set of network event data to be monitored by the PTNO and how to exchange this information with the SP.	None required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
F2	Reporting of network events for the purpose of fault diagnostics	This is a management requirement described in a SLA which will describe the collection of an agreed set of network performance and event data by the PTNO and how to transfer this information to the SP; e.g. by means of trouble reports or tickets.	None required on a per-call basis. Information conveyed by management protocol.	None required on a per-call basis.
F3	Request for event monitoring and subsequent reporting	This is a management requirement described in a SLA which will describe how the SP can request the PTN to monitor a generic set of events or an agreed set of trigger events and how the SP will receive notification when such events occur in the PTN.	May be required on a per-call basis. Information conveyed by signalling protocol.	None required on a per-call basis.
F4	Electronic ordering of network management functions	This is a management requirement described in a SLA which will describe how the SP can order electronically from the PTNO agreed network management functions e.g. via an 'X' interface.	Not required on a per-call basis. Information conveyed by a management protocol.	None required on a per-call basis.

Table 3 identifies which SPAR has a management requirement that needs a SLA to describe the mechanism to be used to transfer the management information between the SP and the PTN. The two methods for this mechanism that was identified during the analysis of the SPAR requirements are shown:

- Management protocol across the management plane;

- Management protocol across the control signalling plane.

Table 3: Proposed Tabular view of Management Requirements for SPAR

No.	Requirement	Reference	Management Plane used for information transfer	Signalling Plane used for information transfer
A8	Determination of the terminal capabilities of the SP's service user	[2] 5.2.1	✓	
B2	Routeing of an originating or incoming call from the PTN to the SP	[1] 5.3.2		✓
B3	Indication of an originating or incoming call from the PTN to the SP	[1] 5.3.3		✓
B4	Routeing of a terminating call from the PTN to the SP	[1] 5.3.4		✓
B5	Indication of a terminating call from the PTN to the SP	[1] 5.3.5		✓
B6	Reception of a notification of the cause of an unsuccessful call	[1] 5.3.6		✓
B12	Disconnection of a call in progress	[1] 5.3.11		✓
B13	Connection of a call to an interactive voice response unit in the PTN	[1] 5.3.12		✓
B14	Alternate routeing of calls or the indications of calls to another 'point of presence' of the SP	[1] 5.3.13		✓
B15	Alternate routeing of a call or the indication of a call to another 'point of presence' of the PTN	[3] 5.3.2		✓
B20	Multimedia Multiparty call control	[2] 5.4.7		✓
B22	User-Plane resource negotiation and selection	[2] 5.4.9		✓
C2	Overriding of the 'incoming call barring' supplementary service	[1] 5.4.2		✓
C3	Bypassing of the 'call diversion' supplementary service	[1] 5.4.3		✓
C6	Modification of the terminal capabilities of the SP's service user	[2] 5.2.2		✓
C7	Modification of the Personality Device/module of the SP's service user	[2] 5.2.3		✓
C8	Alteration of the profile of the SP's service subscriber	[2] 5.3.1	✓	
D3	Provision of call charging information in real time	[2] 5.6.1	✓	✓
D4	Exchange of charge detail record information in real time	[2] 5.6.2		✓
E1	Event traceability requested by the SP	[1] 5.6.1		✓
E2	Event traceability requested by the PTN	[3] 5.4.1		✓
E3	Traffic control capabilities controlled by the SP	[1] 5.6.2	✓	
E4	Traffic control capabilities controlled by the PTN	[3] 5.4.2	✓	
E5	Avoidance of the cyclical routeing of a call	[1] 5.6.3, [3] 5.4.3		✓
E6	Avoidance of the cyclical routeing of signalling or user messages	[2] 5.4.6		✓
F1	Reporting of network events for measuring the quality of service	[2] 5.5.1		✓
F2	Reporting of network events for the purpose of fault diagnostics	[2] 5.5.2	✓	
F3	Request for event monitoring and subsequent reporting	[2] 5.5.3		✓
F4	Electronic ordering of network management functions	[2] 5.5.4	✓	

Annex A (informative):
Bibliography

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

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

- ETSI TS 122 078: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Customized Applications for Mobile network Enhanced Logic (CAMEL); Service description; Stage 1 (3GPP TS 22.078 version 3.8.0 Release 1999)".

History

<table>
<tr><th colspan="4">Document history</th></tr>
<tr><td>V1.1.1</td><td>September 2001</td><td>Membership Approval Procedure</td><td>MV 20011109: 2001-09-11 to 2001-11-09</td></tr>
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