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Recommendations for Short Term Solutions to support a Service Provider Access Interface

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PNO-ISC INFORMATION DOCUMENT 010

Recommendations for Short Term Solutions to support a Service Provider Access Interface

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0.2 Normative information

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0.3 Contents

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0.4 History

Revision	Date of Issue	Editor	Description
Issue 1	2.3.98	J.D.Humphrey, GPT Limited	Initial issue

0.5 Issue control

PAGE	ISSUE	DATE
All	Issue 1	2.3.98

0.6 References

[1] ITU-T Recommendation Q.931 DSS1 (Digital Subscriber Signalling System No1

[2] OFTEL Revised CLI Code of Practice revised (PNO-ISC/CCRG/CP/014 Draft)

0.7 Glossary of terms

CD Call Deflection
CLI Calling Line Identity
CLIP Calling Line Identity Presentation
CLIR Calling Line Identity Restriction
CPE Customer Premises Equipment
DSS1 Digital Subscriber Signalling System No 1
ECT Explicit Call Transfer
ISUP ISDN Services User Part
IUP Interconnection User Part
MCID Malicious Call IDentification
MF Multi Frequency
MWI Message Waiting Indication
NNI Network to Network Interface
NP Network Provided
NTP Network Termination Point
OSS Operational Support Systems
SP Service Provider
SPI Service Provider Interface
SPIG Service Provider Interest Group
SS7 Signalling System No7
UNI User Network Interface
UPNV User Provided Not Verified
UPVP User Provided Verified and Passed
USBS User Signalling Bearer Service

0.8 Scope

This document describes the recommended short term solutions to support a Service Provider Access Interface. The functional requirements upon which these recommendations are based, are described in Annex B. It should be noted that whilst this document develops a set of capabilities not all Service Providers will require all capabilities.

0.9 Assumptions

In the development of this document a number of assumptions have been made. The validity of these assumptions is a pre-requirement for the successful operation of the solutions proposed:

1. The current CLI Code of Practice states that only Licensed Network Operators are allowed to receive a withheld CLI. Some Service Providers are Licensed OLOs and others are Non-Licensed. OFTEL will introduce a new CLI Code of Practice during 1998 [2], it is assumed that this new Code of Practice will include a modification which will

allow all Service Providers to received and handle CLI information with the same restrictions as any other Licensed Network Operator.

2. Handling and availability of CLI information is summarised in Annex A.
3. Phase 1 of the Service Provider Interface requirements are limited to fixed network numbers (geographic or non-geographic numbers), this restriction will not prevent a mobile number being used for subsequent routing onwards.
4. 'Short Term' means 1st January 1998, this is to coincide with the European Directive on Voice Telephony for Special Network Access. Therefore all solutions recommended in this document are based on what can be provided now with minimal changes to existing interfaces. Solutions which require more extensive changes to these interfaces or IN based options will be considered as long term.
5. The existing DSS1 UNI [1] will be used as the basis for the Service Provider Access Interface. Access via NNI is not considered.
6. Operational Support System (OSS) Interfaces are outside the scope of this document. It is assumed that any 'unbundled' network capabilities offered by a network operators, will be supported by the OSS interface(s) necessary to enable their viable usage (e.g. configuration control, network usage information, statistics, provision and repair management, etc.) by Independent Service Providers.
7. Independent Service Providers will not necessarily be located in the same network as its customers. Also, more than one Service Provider may be involved in the call chain. Refer figure 1 for the assumed network architecture.

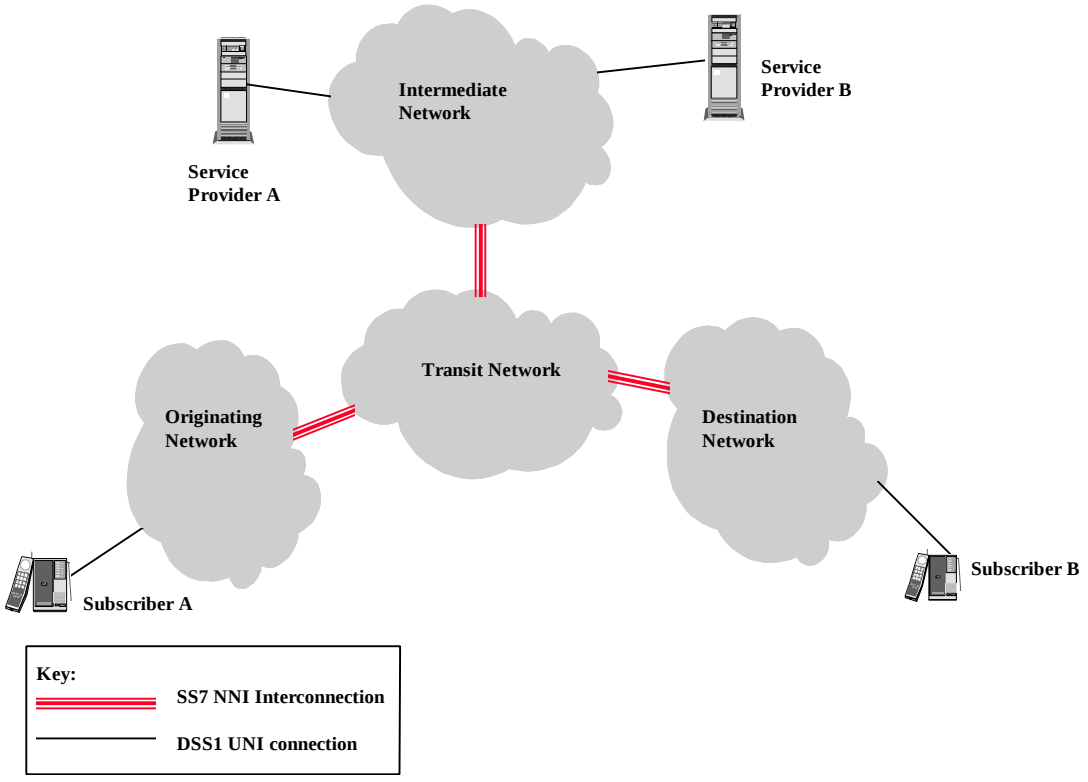

Figure 1 Network Architecture Model

1 RECEIPT OF CLIS BY THE SERVICE PROVIDER

1.1 Description

Circuit switched calls delivered to Service Providers are required to include an unambiguous identity of the Network Termination Point from which the call is originated, including CLIs marked as withheld. The CLI must therefore be accepted as valid by the originating network, note that the CLI may have been provided by another Service Provider. The originating access will need the ability to provide the network with the extension number digits where appropriate.

The CLI is required in order, for example, to perform geographic based routing or originating line verification type services.

1.2 Recommendation

This requirement should be satisfied by either of the following options:

Option 1 - DSS1 Access supporting the 2 number delivery service, this will provide the following capabilities:

1. The DSS1 Calling Party Number element (if present) will always contain the Network Number (which will either be Network Provided (NP) or User Provided Verified and Passed (UPVP)) and a presentation number of type User Provided Not Verified (UPNV). This number will identify the ingress point to the public network. Note that for the 2 number delivery service only the following combinations are valid; Network Provided Network Number (NP-NN), or User Provided Verified and Passed Network Number (UPVP-NN), or User Provided Not Verified Presentation Number (UPNV-PN) and a Network Provided Network Number (NP-NN).
2. The following restrictions apply to network numbers:

    a) **NP Network Number** - this is an unambiguous number which directly identifies the Network Termination Point, it is also the administration number which is used for MCID. Only this type of originating number can be provided for an analogue interface.

    b) **UPVP Network Number** - the network does not check that the user has provided a number which will identify the particular line from which the call is made; only that the number is valid within the range of numbers allocated to the user. This number directly identifies the Network Termination Point and is used for MCID. This number may not be passed across all networks, interworking with the different signalling protocols may result in the CLI type being lost e.g. an analogue interface or IUP and ISUP with no SIM interchange.

3. Calling party numbers marked as presentation restricted (withheld) will always be carried through the network with the restriction marking. Refer to the revised CLI Code of Practice [2] for the definition of 'withheld'.
4. The presentation number can only be relied upon for display purposes
5. The format of a CLI which has been carried across an international interface is preserved (i.e. E.164 format) but its contents and validity may not. It should be noted that calls originating within the UK may have a foreign CLI for example, mobile roamers.
6. Interaction with CLIR override service is required to receive the withheld CLI. This will be covered by the new CLI Code of Practice [2].

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7. Calling Party Number marked as unavailable will not be provided to the Service Provider. Refer to the revised CLI Code of Practice [2] for a definition of 'unavailable'.

Option 2 - DSS1 Access supporting Single Number Delivery. The use of this interface is more restrictive than option 1 as the Network Number may not be available. A single number will be delivered which will be one of:

a) Network Number marked Network Provided
b) Network Number marked User Provided Verified and Passed
c) Presentation Number marked Network Provided
d) Presentation Number marked User Provided Verified and Passed
e) Presentation Number marked User Provided Not Verified

The Screening Indicator will be provided but no indication is given as to whether the number is a Network or Presentation number except in case (e), where the number is known to be a presentation number. Note that the limitation of the single number delivery is that a Presentation Number will be provided to the access in preference to a Network Number.

Items 3, 4, 5, 6 and 7 of Option 1 also apply to option 2.

2 POPULATION OF CLIS BY THE SERVICE PROVIDER IN OUTGOING CALLS

2.1 Description

Circuit switched calls originated from (or dropped back from) a Service Provider are required to carry the network CLI of the Service Provider, the CLI of the Original Calling Customer and the CLI that the SP wants to send to the called customer. Unsolicited calls may also be originated by the Service Provider.

Possible service scenarios for this requirement are; (a) voice messaging, where the call is related to a message received, in this case the CLI used for presentation would be that of the originator of the message and (b) call related to other services, in this case the CLI used for presentation should be that of the Service Provider. Note that case (a) may be considered a violation of the CLI Code of Practice [2].

2.2 Recommendation

For calls originatedby the Service Provider, the Network Number will always be the number of the Service Provider NTP (either NP or UPVP). For the services which require a presentation number CLI which is other than the Service Providers number (e.g. the originator of the call) then, in order of preference, either UPNV, UPVP or NP CLI of the incoming call leg should be used. If the classification of the incoming CLI was withheld then the Service Provider should not include the CLI in the outgoing leg furthermore, the Service Provider CLI should also be marked as withheld. This reuse of the originators CLI as an unscreened Presentation Number will be allowed by the ë98 CLI Code of Practice[2].

In order to support this recommendation the Special Arrangement for the Service Provider access will be required. However, if the special arrangement does not apply then the user provided number from the incoming leg of the call will only be used if it passes verification by the Service Provider's access network.

3 INDICATION TO THE SERVICE PROVIDER OF OUTGOING CALL ATTEMPT

3.1 Description

When a Service Providers customer goes on-line (off hook) the Service Provider is to receive an indication of this attempt (circuit related and non circuit related). This may apply to all call attempts or just selective calls. As a result of Service Provider intervention a new number may be provided and this could include a new destination number and/or additional digits to determine the network through which the call should be routed.

The network will be required to 'trap' certain calls (e.g. emergency, Government Telephone Preference Scheme) rather than indicating the call attempt to the Service Provider.

3.2 Recommendation

3.2.1 Circuit Related

It is assumed that in the short term indication to the Service Provider will only occur after dialled digits therefore, this will not effect the handling of emergency calls. Other options are possible but these are for further study. With this assumption for the short term, the existing routing mechanisms will be used to support the requirements to direct all (or specific) call attempts to the Service Provider. No changes to these routing mechanisms are currently foreseen. Only Indirect Access will be available, Equal Access will be available in the long term.

3.2.2 Non-circuit Related

A signal is required to inform the Service Provider that one of his customers wishes to initiate a call. In the short term there is no mechanism to support this.

4 INDICATION TO THE SERVICE PROVIDER OF AN INCOMING CALL

4.1 Description

This only applies to customers with ordinary geographic numbers and not special numbers such as 07 personal numbers. There is no requirement for DDI numbers to be included, in the short term this excludes the extension digits, use of full DDI number will be a long term requirement. This referral to the Service Provider may be as a consequence of the number dialled, line identity (of the calling and/or called party) or the status of the called user (e.g. busy, no answer). The indication to the Service Provider must be sent before applying ringing to the destination

In the case of circuit related calls, when a call destined for a Service Providers customer is identified, a circuit switched call is set up to the Service Provider. For non-circuit related, a request for instructions is sent to the Service Provider.

As a result of intervention by the Service Provider, a new destination number may be provided which could also include digits to determine the network through which the call is subsequently routed toward the Service Providers customer.

This requirement is to support Personal Numbering type service and time of day routing options.

4.2 Recommendation

4.2.1 Circuit Related

The existing Call Diversion service can be used to satisfy this requirement however, this would mean tromboning of calls through the Service Provider. No changes to the signalling procedures are foreseen however, the issues of CLI as described in section 1.2 of this document also apply. If the network is to perform the evaluation of the DDI number for the Service Provider, then the new ETSI service Selective Call Forwarding could be used. If the PBX is to perform the DDI evaluation then the PBX can use the Call Deflection service to forward the call to the Service Provider..

NOTE: If following the call diversion to the Service Provider, the call is routed back to the original customer line this implies that a second number should be allocated to that customer line to avoid looping back to the Service Provider.

4.2.2 Non-circuit Related

A signal is required to inform the Service Provider that there is an incoming call destined to one of his customers. In the short term there is no mechanism to support this.

5 ACCESS TO VARIOUS IN-TYPE TRIGGERS AND EVENTS

5.1 Description

This applies to circuit related and non-circuit related calls. For incoming calls to a Service Providers customer, the Service Provider requires indication if the call is not answered e.g. busy and no reply. This indication is required before tones other than ringing are returned to the calling party. On receipt of these indications, the Service Provider will return instructions on how the call should be handled.

A ring-no-reply service is one potential service, voice mail and personal number type service are also a possibility.

5.2 Recommendation

5.2.1 Circuit Related

In the case of incoming calls to a Service Provider customer the calls reaching busy and no reply would be forwarded to the Service Provider (for Voice Mail service the calls could be automatically forwarded onto a specialised platform). Note that only ISUP will provide a diverting reason, NUP and IUP will not provide a distinction between busy, no reply, unconditional and in the case of mobile not reachable.

5.2.2 Non-circuit Related

There is no solution in the short term.

6 ON-LINE MESSAGE WAITING INDICATION

6.1 Description

Service providers require the ability to remotely control message waiting indication on the customers line.

6.2 Recommendation

The new ETSI service Message Waiting Indication (MWI) [reference documents ETS 300 650 Stage 1, ETS 300 745 DSS1 Stage 3 and ETS 300 754 (TC Stage 3] could be used however, as this is a new service, it may not be available from all networks. The ETSI MWI services provides for both the receiving end (the user to whom the indication of a waiting message is given) and the controlling end (the user who gives out the indication of a waiting message i.e. voice mail box). The service provides the access and network signalling to carry the indication. If the terminating user is non-ISDN, an alternative mechanism could be used for the access indication (i.e. stuttered dial-tone, special lamp on a feature phone) however, this indication is outside the scope of the ETSI service. The use of such alternative mechanisms is for further study.

7 ABILITY TO DIRECT ROUTING AND DESTINATIONS OF CALLS

7.1 Description

To enable the Service Provider to provide call destination and routing information (e.g. specific network to be used) for calls from any customer who dials a Service Provider customer identified by a non geographic (but not mobile) number e.g. 08xxxx, 07xxxxx.

As a result of intervention by the Service Provider, a new destination number may be provided which could also include digits to determine the network through which the call is subsequently routed toward the Service Providers customer. Note that Service Providers will only use 1xxx transit selection number.

7.2 Recommendation

7.2.1 Circuit Related

The call will be routed to the Service Provider for further processing as a result of the call being forwarded from the Service Provider customer. Call Deflection could be used if the Service Provider does not need to answer the call. Another option is to use Explicit Call Transfer (ECT) where a new call would be set-up to the Service Provider customer, the call is then transferred to join the original call to the new call. Both solutions would result in the call being tromboned through the Service Provider local exchange/network.

7.2.2 Non-circuit Related

A signal should be sent to the Service Provider to request handling instructions for the call. No short term solution available.

8 DELIVERY AND COLLECTION OF TELEMETRY INFORMATION

8.1 Description

The Service Provider requires to send data to or receive data from an Network Termination Point without alerting the customer. The types of information which will either be downloaded or received are: meter readings, telemetry and routing information.

8.2 Recommendation

In the short term there is no support for this requirement.

Use of no-ring calls is a possible long term solution but this is not available yet. ISUP and IUP will eventually support no ring calls. Further investigation is needed to determine whether DSS1 can originate no-ring calls. A CPE solution may also be possible in the long term, the NTP recognising the Service Providers CLI in an incoming call and answering this itself. Another possibility is the new ETSI ISDN service, User Signalling Bearer Service (USBS) which enables an out of band signalling conversation. However, as this service is currently under development it can only be considered as a possible long term solution.

9 ROUTE OPTIMISATION

9.1 Description

The ability, following Service Provider intervention, to drop the call back towards the originating exchange prior to onwards routing to its new destination. Call drop back will be required after the Service Provider has collected MF digits i.e. after answer this will allow, for example, the collection of MF digits by the Service Provider. The call will then be dropped back from the Service Provider to the network and then from the network to the originating DLE (which could be in another network).

9.2 Recommendation

The DSS1 service Explicit Call Transfer could be used without change however, call drop back may be limited to just the local exchange of the Service Provider and not the origin of the call.

10 SUPERVISION OF DROPPED-BACK CALLS

10.1 Description

When using a non-circuit related interface calls are not 'dropped back' but are set up according to instructions provided by the Service Provider. These instructions could include request for notification of events such as no answer, busy, follow-on call, clear down etc. With a circuit related interface once the call has been dropped back the Service Provider is no longer in the call path. Note that the dropped back call could be within a different network to that which the Service Provider is connected.

10.2 Recommendation

If ECT is used (as described in section 7.2.1) then by delaying the transfer of the call until the Service Provider customer has answered the call, this would allow busy and no reply to be detected. The Service Provider could then determine how to proceed with the call.

11 ABILITY TO RECEIVE MF DIGITS BEFORE ANSWER

11.1 Description

This is the ability for the Service Provider to receive MF digits before a call is answered.

11.2 Recommendation

There is no short term solution, given that with ISDN a forward path is not switched through until answer therefore MF digits can only be available after answer.

12 Ability to receive originally dialled digits

12.1 Description

The Service Provider requires to know the original number (i.e. the destination number called) which was dialled in the case, for example, of an 08xxx or 07xxx number.

12.2 Recommendation

This depends on how the call has been delivered to the Service Provider. When directly dialled to the Service Provider then the number dialled will be received in the called party number. If the call has been delivered via an IN (e.g. a number translation service has been performed) or via a Service Provider then the original destination number may not be available.

Annex A - CLI Availability with UK networks

A.1 Definitions

Calling Line Identification (CLI)

A generic name for the identity of a line from which a call is originated. There are various types of CLI, those with specific relevance to service provider interfaces are the Network Number and Presentation Number. (See below.)

Network Number

"the digits that comprise a unique E.164 number that unambiguously identifies the ingress port to the public network, i.e. network termination point (NTP).
Note: where the ingress port consists of multiple access, e.g. a PBX group, a single network number may apply to the whole group."

[ref. revised OFTEL - Code of Practice for Network Operators in Relation to Calling Line Identification Display Services and Other Related Services. Amendments made by the ISC Code of Practice Review Group.[2].]

NOTE: The above wording has changed from the current OFTEL Code of Practice.
E.164 relates to ITU-T Recommendation E.164 "Numbering Plan for the ISDN Era."

Presentation Number

"the digits that comprise an E.164 number that identifies the NTP to which a return call can be made."

[Ref. revised OFTEL - Code of Practice for Network Operators in Relation to Calling Line Identification Display Services and Other Related Services. Amendments made by the ISC Code of Practice Review Group[2]]

NOTE: The above wording has changed from the current OFTEL Code of Practice.
E.164 relates to ITU-T Recommendation E.164 "Numbering Plan for the ISDN Era."

Network Provided Numbers

Network provided numbers are provisioned by the network administrator against a specific ingress port and it cannot be changed by the user. These numbers are marked as "network provided" when they are used in the network. There are two relevant types of network provided numbers:-

1. Network Number (Mandatory) - Used for network administration purposes, such as billing and malicious call identification.
2. Presentation Number (Optional) - Used for displaying to the called user.

User Provided Numbers

Any number provided by a user on a call-by-call basis. User provided numbers are marked as "user provided" when used in the network, and they may be subject to verification (screening) by the network (see Verification below). User provided numbers may be used as:-

1. Network Numbers - Used for identifying the calling line and marked as "user provided, verified and passed" (see Verification below).
2. Presentation Numbers - Used for displaying to the called user and marked as "user provided, verified and passed" or "user provided not verified" (see Verification below).

Verification (Screening) of Numbers

Verification of user provided numbers may be undertaken by the network operator. If numbers pass the verification process they are usually marked as "user provided, verified and passed". Numbers failing the verification process are discarded.

Special Arrangement

A DSS1 service that allows users to provide CLIs on a call-by-call basis, which are not screened by the network operator. The provision of unscreened (not verified) numbers is covered by agreements between the users concerned and the network operator. These numbers are marked as "user provided not screened" (or "user provided not verified") and treated as Presentation Numbers.

A.2 Summary of CLI Capabilities of DSS1

CLIs delivered to service providers over a DSS1 interface

CLIs are delivered over a DSS1 interface using the Calling Line Identification Presentation (CLIP) service. The CLIP service uses a parameter known as the Calling Party Number information element to deliver one or two CLIs, as described below. Two number delivery is an optional service and may not be supported by all network operators.

If there is a "user provided, not verified" number available, i.e. the Special Arrangement is supported, two Calling Party Numbers will be delivered if the two number delivery service is supported:-

1. The "user provided, not verified" number, which should be interpreted as a Presentation Number. (See below for more details of user provided CLIs.)
2. A "network provided" number, which should be interpreted as a Network Number.

If a "user provided, not verified" number is not available, only one Calling Party Number will be delivered:-

1. A "network provided" or "user provided verified and passed" number. (See below for more details of user provided CLIs.)

If a "user provided, not verified" number is available, i.e. the Special Arrangement is supported, and the two number delivery service is not supported, the Calling Party Number delivered is:-

1. The "user provided, not verified" number.

NOTE: The Calling Party Number information element includes an indicator, known as the screening indicator, to show if the number is "user provided, not verified", "network provided" or "user provided verified and passed". User provided numbers are only delivered when:-

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1. All or part of the number has been supplied by the calling user.
2. The number supplied has been verified and passed by the network, unless the special arrangement applies.
3. The originating local exchange is configured to use user provided digits.

User Provided CLIs

User provided CLIs may be one of the following:-

1. Direct Dial In extension digits.
2. A Multiple Subscriber Numbering (MSN) digit.
3. A full ISDN number (ITU-T Recommendation E.164).

If the special arrangement does not apply, these numbers will be completed into full ISDN numbers and verified by the network. Numbers passing the verification are marked as "user provided, verified and passed", otherwise they are discarded. These numbers may be used as Network Numbers or Presentation Numbers, depending upon the network implementation or configuration.

When the special arrangement applies, the network does not screen user provided numbers. In this case the numbers are marked as "user provided, not screened" and always used as Presentation Numbers.

Withheld Numbers

CLIs marked as presentation restricted (withheld) are carried through the network with the restriction marking. This does not affect their availability, but only their presentation at the Network Termination Point (NTP). The release of restricted numbers is subject to Oftel's "Code of Practice for Network Operators in Relation to Calling Line Identification Display Services and Other Related Services." Calls originating on networks which do not supply CLI information, or do not support the withholding of CLIs, have their CLIs marked as "unavailable".

Withheld CLIs may be delivered using CLIR Override, which is an optional part of the Calling Line Identification Presentation (CLIP) service. This service is stated to be a national matter by ETSI and is not defined, therefore any current service offerings are implementation dependent.

A.3 References

DSS 1 Basic Service:-

European Telecommunication Standard ETS 300 403-1 November 1995
Integrated Services Digital Network (ISDN);
Digital Subscriber Signalling System No. one (DSS1) protocol;
Signalling network layer for circuit-mode basic call control;
Part 1: Protocol specification.
[ITU-T Recommendation Q.931 (1993), modified]

Corrigendum ETS 300 403-1 June 1996
This corrigendum modifies the European Telecommunication Standard ETS 300 403-1 (1995).

ITU-T Recommendation Q.931 (03/93)
Digital Subscriber Signalling System No. 1 Network Layer.
Digital Subscriber Signalling System No. 1 (DSS1) - ISDN User-Network Interface Layer 3 Specification for Basic Call Control.

DSS1 CLIP service:-

European Telecommunication Standard ETS 300 092 March 1992
Integrated Services Digital Network; Calling Line Identification Presentation (CLIP) supplementary service. Digital Subscriber Signalling System No. one (DSS1) protocol. (Plus amendments 1 and 2.)

ITU-T Recommendation Q.951 (03/93)
Stage 3 Description for Supplementary Service Using DSS 1
Stage 3 Description for Number Identification Supplementary Services Using DSS1
Clause 3 Calling Line Identification Presentation (CLIP)

IUP/NUP:-

BT Network Requirement BTNR 167.
Signalling System CCITT No. 7 (BT) National User Part. Issue 3 July 1987.
Note: Current network installation is to Issue 2.

Note: Interconnect User Part (IUP) is a standard version of NUP.

PNO-ISC/SPEC/006 Issue 1 Draft G. 4 December 1996.
C7 Interconnect User Part (IUP).

PNO-ISC/SPEC008 Issue 1 Draft 11. 17 March 1997.
C7 IUP - UK ISUP Interworking Requirements.

ISUP:-

PNO-ISC/SPEC/007 Issue 2 Draft P. June 1997.
PNO-ISC Specification Number 007. ISDN User Part (ISUP)

European Telecommunication Standard ETS 300 356-1 February 1995
Integrated Services Digital Network (ISDN);
Signalling System No. 7;
ISDN User Part (ISUP) version 2 for the international interface;
Part 1: Basic services.
[ITU-T Recommendations Q.761 to Q.764 (1993), modified.]

ITU-T Recommendation Q.761 (03/93)
Functional Description of the ISDN User Part of Signalling System No. 7.

ITU-T Recommendation Q.762 (03/93)
General Function Messages and Signals of the of the ISDN User Part of Signalling System No. 7.

ITU-T Recommendation Q.763 (03/93)
Formats and Codes of the ISDN User Part of Signalling System No. 7.

ITU-T Recommendation Q.764 (03/93)
Signalling System No. 7 - ISDN User Part Signalling Procedures.

ITU-T Recommendation Q.699 (1997)
Interworking Between ISDN Access and Non-ISDN Access Over ISDN User Part of Signalling System No. 7.

European Telecommunication Standard Draft prETS 300 899 May 1997
Integrated Services Digital Network (ISDN);
Signalling System No. 7;
Interworking between ISDN User Part (ISUP) version 2 and Digital Subscriber Signalling System No. one (DSS1)
[ITU-T Recommendations Q.699, modified.]

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Annex B

Service Provider Interface Functional Requirements

Introduction

This document is based on the earlier document:-

> 'Output from SP/PTO Technical Interface Study Group for Consideration by ISC Ranked Priorities (switched telephony) for Consideration by ISC - Issued after comments from Study Group Date: 23rd September 1997'

At the request of the PNO-ISC working party on SP interfaces further detail and explanation has been added to the requirements at a meeting on 20/11/97 between Ashley Mirfin (Cellcom), David Stanfield (INMS), Keith Morrill (BT) and Rob Spindley (BT). The name of the requirement and its high level description are reproduced from the earlier document.

Draft A of this document was discussed at the SP/PTO Technical Interface Study Group on 3 December. Draft B included comments made at that meeting and it was discussed at the meeting on 13 January in order to agree the document for release to PNO-ISC. Draft C was produced as a result of the comments received from the meeting on the 13th January and it is now issued as Version 1 following the meeting on 9th February 1998 at Oftel.

Requirements

1. Receipt of CLIs by the Service Provider, including withheld CLIs.

1.1. High Level Description - Importance A, Urgent

Circuit switched calls delivered to service providers are required to include the identity of the line from which the call is originated. This applies to CLIs marked as with-held. The type of CLIs required (network, presentation etc.) requires further discussion.

1.2. Details and Explanation

The Network CLI must be available to the SP and this must unambiguously identify the calling line (User-Network Interface). This CLI must therefore be accepted as valid by the originating network (but note that it may have been provided by another Service Provider, as detailed in 2.2). Note that the originating access will need the ability to provide the network with the extension number digits where appropriate. This CLI is required in order, for example, to perform geographic based routing or originating line verification.

2. Population of CLIs by the SP in outgoing calls from the SP

2.1. High Level Description - Importance A, Urgent

Circuit switched calls originated from, or dropped back from, SP to contain the CLI of the originating caller to be delivered to the called line.
Malicious call identification must be considered e.g. the ability to carry the SP's CLI to the destination exchange and validation of CLIs.

Marking of CLI must be considered, e.g. Presentation CLI, User Provided, Network Provided, Screened, etc.

2.2. Details and Explanation

The SP must be able to provide the network with a CLI for delivery to the destination for presentation purposes at the called customer. This is to enable the called party to receive, for example, the original callers CLI. The SP may also wish to originate 'unsolicited calls' and provide an appropriate CLI for display.

3. An indication to the SP of a call attempt by a customer of the SP and having received that indication, the SP can then determine how that call is routed

3.1. High Level Description - Importance A, Urgent

1. Circuit related (CR).
e.g. When an SP's customer goes on-line (off hook), a circuit switched call is automatically set up to the SP.
2. Non-circuit related (NCR).
When an SP's customer goes on-line, a request for instructions is sent to the SP containing details such as CLI.
Comments:-
Access to emergency services and Government Telephone Preference Scheme must be considered.

3.2. Details and Explanation

For a circuit related SP i/f there are no signalling issues although there are OSS implications for setting the appropriate data against the calling line. For non-circuit related a signal is required to inform the SP that one of his customers wishes to initiate a call. The network may be required to 'trap' certain calls e.g. emergency calls, rather than indicating the call attempt to the SP. The ability to send the signal after the customer has dialled (off hook + analysed info) is required. For CR and NCR the SP will provide the network with a new number which could include the destination number and also digits to determine the network through which the call is routed.

4. An indication to the SP that someone has dialled one of the SP's customers and having received that indication, the SP can then determine how that call is routed. The number dialled to be either an individual number or a number block.

4.1. High Level Description - Importance A, Urgent

1. Circuit related.
When a call destined for an SP's customer is identified, a circuit switched call is set up to the SP.
2. Non-circuit related.
When a call destined for a SP's customer is identified, a request for instructions is sent to the SP

4.2. Details and Explanation

This requirement applies to customers with ordinary geographic numbers (initially excluding extension number digits though eventually based on the full DDI number) and not special e.g. 07, numbers. For CR there are no signalling implications beyond those in 1. For NCR the requirements is to provide an indication that a call is destined for an SP customer's line, before applying ringing. This could be done by analysing the digits dialled prior to the call arriving at the destination exchange or by detecting that a call has arrived at the customer's line, this might be achieved by an

interaction between the network and PBX prior to call delivery. For CR and NCR the SP will provide the network with a new number which could include the destination number and also digits to determine the network through which the call is routed.

5. Access to various IN-type triggers and events, e.g. Ring No-Reply etc.

5.1. High Level Description - Importance A, Urgent

1. Circuit related.
Indication of e.g. busy or no reply, for a call incoming to an SP customer's line.
SP originated circuit switched calls are also required to provide indication of e.g. ringing, answer, busy, number unobtainable and call cleardown.
2. Non-circuit related.
Calls routed in response to instructions from an SP require the ability to request instructions from the SP when ringing no reply or busy are encountered, and notify occurrence of answer, number unobtainable and call cleardown.
Comments:-
Call charging and billing must be considered.

5.2. Details and Explanation

The SP requires an indication if a call is not answered successfully by an SP's customer e.g. busy or no reply and call clear down. This indication is required before tones other than ringing are returned to the caller. The SP will then return instructions as to how the call should be handled. For CR the call would be transferred to the SP, for NCR a signal is sent to the SP requesting instructions.

6. On-line message waiting indication

Note - as an expedient solution is to be provided (i.e. Call Mapping) based on DPNSS then meeting this requirement should not delay the provision of solutions to the other requirements. However in the longer term a replacement for the expedient solution will be required.

6.1. High Level Description - Importance A, Urgent

SP is provided with the ability to remotely control message waiting indication on its customers' lines.

6.2. Details and Explanation

Ideally it should not be necessary for the SP to set up a call to the network to achieve this requirement.

7. Ability to direct routing and destinations of calls.

7.1. High Level Description - Importance A, Urgent

Provide call destination and routing information e.g. specific network to be used.
Comments:-
Routings may not be allowed to certain destinations.
Call charging and billing must be considered.

7.2. Details and Explanation

This requirement applies to calls from any customer who dials an SP customer identified by a non geographic (but not mobile) number e.g. 08xxxx, 07xxxxx. For CR the call is routed to the relevant SP. For NCR a signal is sent to the SP to request instructions for handling the call. For CR and NCR the SP will provide the network with a new number which could include the destination number and also digits to determine the network through which the call is routed.

8. Interrogation of an SP customer's NTP for delivery / collection of telemetry.

8.1. High Level Description - Importance B, Urgent

Example implementation could be no-ring calls.

8.2. Details and Explanation

The SP requires to send data to or receive data from an NTP without alerting the customer. In the longer term it should be possible to do this without setting up a call across the network(s). Note that different solutions may be applicable to ISDN destinations. A CPE solution may be possible based on the NTP recognising the SP's CLI in an incoming call and answering this itself.

9. Route optimisation

9.1. High Level Description - Importance B, Less Urgent

SP drops back call to network.
Network drops back call to originating point (could be on another network).
Comments:-
Drop back may not be allowed to certain destinations.
Call charging and billing must be considered.

9.2. Details and Explanation

The route optimisation (e.g. call drop back) is after answer by the SP e.g. in order to collect MF digits. The originating point is the originating DLE.

10. Supervision of dropped-back calls.

10.1. High Level Description - Importance C, Least Urgent

e.g. Indication of engaged, no answer, follow-on call, clear down. Note that the dropped back call could be within a different network to that which the SP is connected.

10.2. Details and Explanation

When using an NCR interface calls are not 'dropped back' but are set up according to instructions provided by the SP. These instructions could include request for notification of events such as no answer.

With a CR interface once the call has been dropped back the SP is no longer in the call path and major enhancements would be needed to re-establish the call to the SP if it did not complete.

11. Ability to receive MF digits before answer.

11.1. High Level Description - Importance D, Least Urgent

MF digits could be available only after answer and be dependent on the originating terminal, this is not considered to be a problem hence 'least urgent' marking.

11.2 Details and Explanation

With ISDN a forward path is not switched through until answer.

12. Ability to receive originally dialled digits.

12.1. High Level Description - Importance D, Least Urgent

Originally dialled number is to be passed to the SP.

12.2. Details and Explanation

The SP requires to know the original number which was dialled in the case, for example, of an 08xxx or 07xxx number. Could be a similar solution to Non-Geographic Number Portability (NGNP) for CR. NCR would include original number in signalling message requesting instructions. If multiple SPs are involved in a call then it should be possible for each of them to receive the original dialled digits.

Footnote:

'It should be noted that the task group is not specifically considering Operational Support System (OSS) interfaces. It is assumed that any 'unbundled' network capabilities offered by a network operator, will be supported by the OSS interface(s) necessary to enable their viable usage (e.g. configuration control, network usage information, statistics, provision and repair management, etc.) by ISPs.'

END OF PNO-ISC/INFO/010