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SERIES I: INTEGRATED SERVICES DIGITAL NETWORK

Service capabilities – Supplementary services in ISDN

Community of interest supplementary services:

Support of Private Numbering Plans

ITU-T Recommendation I.255.2

(Previously "CCITT Recommendation")

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FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation I.255.2 was revised by ITU-T Study Group 1 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 19th of July 1996.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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COMMUNITY OF INTEREST SUPPLEMENTARY SERVICES: SUPPORT OF PRIVATE NUMBERING PLANS

(revised in 1996)

1 Definition

This supplementary service allows a subscriber to use a Private Numbering Plan (PNP) for communication across one or more networks between nominated user access interfaces. The SPNP supplementary service provides a group of users with the capability to place calls by using digit sequences having different structures and meanings than provided by the public numbering plan.

2 Description

2.1 General description

Application of this service will allow a subscriber to use a PNP to establish calls between nominated user access interfaces whilst using the resources of one or more networks. For example, a business having multiple offices could have a numbering plan which would appear the same to all users regardless of their geographical location. A business can also assign Private Numbers (PNs) to locations outside the business (e.g. business customers, suppliers) and allow the business's users to reach these locations via the assigned PNs that are part of the business private numbering plan. (The locations outside the business in this example are not considered Members of a PNP Group.)

The PNP could be used to assign numbers to accesses connected to the public network via an NT1 or via an NT2, such as an Integrated Services PBX.

An access is assigned one private number, unless the user subscribes to other supplementary services (e.g. MSN, DDI).

The SPNP supplementary service may provide the user with the capability, from a terminal, to assign or de-assign private numbers to the group.

The SPNP supplementary service can be used as a building block for service concepts such as city-wide centrex and virtual private networks.

A PNP can be used instead of the ISDN numbering plan on a call by call basis or be nominated by the subscriber as the sole numbering plan available for calls at a user access interface. A user may belong to more than one PNP.

Members of a PNP Group can make and receive PNP calls within the PNP Group. Virtual Members of a PNP Group can only receive, but cannot make, PNP calls within the PNP Group. The handling of calls from a Virtual Member of a PNP Group is outside the scope of this Recommendation. Such calls will be handled as normal ISDN calls. A Virtual Member of a particular PNP Group will have the same PNP Group Identification (PNG) as the Members of that PNP Group. A Member of a PNP Group can make PNP calls to Virtual Members of the same PNP Group. A Member of a PNP Group may also make calls to public numbers.

The inclusion of one or more Virtual Members per PNP Group is a subscription option.

The SPNP supplementary service allows the address digits and sequences of digits sent by users in this PNP Group to have a different structure and significance than the same digit sequence when sent by users outside the PNP Group. Particular digits or digit sequences may signify a request to escape from the PNP and access users using the ISDN numbering plan. As an alternative, an explicit indication of the numbering plan may be given.

Members of the PNP Group may have both private numbers and ISDN numbers. This permits users outside the PNPGroup to call PNP Group users with normal calling procedures (e.g. without assistance of an attendant).

In some cases, the private numbers may consist of the least significant digits of the ISDN numbers, where these digits are sufficient to uniquely identify the PNP Group Member.

2.2 Specific terminology

2.2.1 private number plan (PNP): A subscriber defined numbering plan which may have different structures and meanings than provided by the public numbering plan.

2.2.2 PNP group: A PNP Group consists of the set of users who are each allocated a number (or possibly several numbers) in the same PNP in order to make and receive PNP calls.

2.2.3 PNP call: A PNP call is a call which is made by a Member of a PNP Group to another Member or Virtual Member of the same PNP Group by the means of the PNP.

2.2.4 virtual member of a PNP group: A Virtual Member of a PNP Group is a user who can be identified by a number in a private numbering plan, i.e. the user can receive calls from Members of that PNP Group, but cannot originate calls using that private numbering plan.

2.2.5 PNP group identification (PNG): A PNP group identification (PNG) is a piece of information which is used to distinguish between PNP Groups.

2.3 Qualifications on the applicability to telecommunication services

No restrictions identified.

3 Procedures

3.1 Provision/withdrawal

The SPNP supplementary service is subscribed by prior arrangement with the service provider.

The PNP used is established by agreement between the subscriber and the service provider.

At provision, numbers belonging to a user-defined numbering are accesses or groups of accesses belonging to the PNP Group(s).

Withdrawal of the SPNP supplementary service is made by the service provider upon request by the subscriber or for service provider reasons.

Withdrawal implies erasure of all PNP numbers allocated to the accesses or group of accesses belonging to the PNP Group(s).

Subscription option subscribed per Access (see 2.1)

Subscription options	Value
Member of Multiple PNP Groups	Yes, with PNGs No

Subscription options subscribed per PNP Group (see 2.1)

Subscription options	Value
PNP as a sole numbering plan	Yes No
Virtual members allowed	Yes No

As a service provider option, a Member of a PNP, who belongs to more than one PNP Group, may be given the option to designate one of the PNP Groups as the default PNP Group.

3.2 Normal procedures

3.2.1 Activation/deactivation/registration

The SPNP supplementary service is activated at provision and deactivated at withdrawal, under the control of the service provider.

Registration is done at provision and erasure is done at withdrawal.

3.2.2 Invocation and operation

When originating a PNP call, if the calling user belongs to more than one PNP Group, the PNG must be indicated when identifying the called user. If no information identifying the PNP Group associated to the call is supplied by the calling user, then the call shall be rejected, unless the service provider offers the possibility of a default PNP Group, and one has been designated. (See 3.1.)

When originating a PNP call, if the calling user belongs to only one PNP Group, a PNG is not required.

The called user shall be informed that the call is a PNP call. If the called user belongs to more than one PNP Group, then the called user shall be informed of the PNP Group to which the call belongs.

3.3 Exceptional procedures

3.3.1 Activation/deactivation/registration

3.3.2 Invocation and operation

For unsuccessful outcome due to incorrect use of the PNP, for example, use of a number which does not have a defined network location, the calling party shall be given an indication which may be accompanied by an in-band tone or announcement.

3.4 Alternative procedures

None identified.

4 Network capabilities for charging

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information. It shall be possible to charge the subscriber accurately for the service.

5 Interworking requirements

The SPNP supplementary service can operate over several networks.

5.1 Interworking with non-ISDNs

It is envisaged that the SPNP supplementary service can be used to reach destinations on any non-ISDN with which the ISDN interworks. When interworking with a PSTN, private numbers (e.g. conforming to ISO/IEC 11571) must be translated to and from E.164 numbers by the SPNP supplementary service provider.

5.2 Interworking with private ISDNs

Private ISDNs can contain multiple PNPs and these PNPs may also contain users which are attached to the public ISDN. Thus, the private ISDN and the public ISDN shall identify the PNP when calls on which the SPNP supplementary service was invoked across the access between the public ISDN and the private ISDN.

Note that in this case, it is the private network operator who subscribes to the public network SPNP supplementary service.

PNP numbers can also be assigned to accesses connected to a private ISDN. These numbers may be related to the numbers allocated by the direct dialling-in supplementary service, i.e. consist of the last n digits in the number allocated through the direct-dialling-in supplementary service.

Alternatively, PNP numbers not related to the direct-dialling-in supplementary service can be allocated to a group of accesses, connecting a private ISDN as individual numbers or number series.

5.3 Interworking with public ISDNs

When interworking with a public ISDN, private numbers (e.g. conforming to ISO/IEC 11571) must be translated to and from E.164 numbers by the SPNP supplementary service provider.

6 Interaction with other supplementary services

6.1 Call Waiting

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.2 Call Transfer

Assume that user A has an established call with user B and wishes to transfer this call with user B to user C. The numbers presented to the users B and C after successful transfer should be in accordance with the PNP if all users are group members of the same PNP. Otherwise, the numbers should be in accordance with the ISDN (E.164) numbering plan.

6.3 Connected Line Identification Presentation

The called user has a private number and can also have a public number. If no ISDN number exists, the default number of the access can be used.

The type of number is determined by the numbering domain of the called number, i.e:

- in the case that the call is made to a Member or a Virtual Member of a PNP Group, the connected line identity is the private number. The private number which is presented to the caller shall belong to the PNP of the calling user's PNP Group. However, if an E.164 number is provided by the connecting user, the connected line identity is the E.164 number, or as a service provider option the corresponding PNP number will be used. Furthermore, if the call is forwarded into another numbering domain, the connected line identification is the E.164 number;
- in the case that the call is made to an ISDN number (E.164), the connected line identity is the ISDN number (E.164). However, if a private number is provided by the connected user, the network shall translate the PNP connected party number to the corresponding E.164 number (if not available, the E.164 default number shall be used). The private number will not be used. Furthermore, if the call is forwarded to a PNP destination, the connected line identity is the E.164 number.

6.4 Connected Line Identification Restriction

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.5 Calling Line Identification Presentation

The calling user has a private number and can also have a public number. If no ISDN number exists, the default number of the access can be used.

The type of number is determined by the numbering domain of the called number, i.e.:

- in the case that the PNP call is made to a Member of the calling user's PNP Group, the calling line identity is the private number. However, if an E.164 calling number is provided by the caller, the calling line identity is the E.164 number or, as a service provider option the corresponding PNP number will be used. Furthermore, if the call is forwarded into another different numbering domain, the calling line identity is the E.164 number;
- in the case that the call is made from a Member of a PNP Group to an ISDN number (E.164) or a Virtual Member of a PNP Group, the calling line identity is the ISDN number (E.164). However, if a private number is provided by the calling user, the network shall translate the PNP calling party number to the corresponding E.164 calling party number (if any). The private number will not be used. If the call is forwarded to a PNP destination, the calling line identity is the E.164 number.

6.6 Calling Line Identification Restriction

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.7 Closed User Group

CUG restrictions must be met for all calls established by means of a PNP.

6.8 Conference Calling

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.9 Direct-Dialling-In

Several private numbers can be assigned to an access by subscribing to the DDI supplementary service.

When a user subscribes to both the DDI supplementary service and the SPNP supplementary service, then the DDI supplementary service will deliver the PNP numbers to the called user on PNP calls made to Members of the calling user's PNP Group. Instead, as a user option, the DDI supplementary service may always use the ISDN number.

Calls using ISDN numbers will be presented as normal calls by the DDI supplementary service.

6.10 Call Diversion

6.10.1 Call Forwarding Busy

See 6.10.3 (CFU).

6.10.2 Call Forwarding No Reply

See 6.10.3 (CFU).

6.10.3 Call Forwarding Unconditional

A user who subscribes to the SPNP supplementary service may use a private number to identify the forwarded-to-user, e.g. on activation of the service.

A private number may be used to identify the forwarding user. If this user can also be uniquely identified by an E.164 number, calls to this E.164 number shall also be forwarded. Similarly, if the forwarding user is identified by an E.164 number, calls made to the corresponding PNP number (if any) shall also be forwarded.

PNP calls which undergo forwarding to a Member of the same PNP Group will use the private number for identification of the calling user, forwarding user and forwarded-to user. Notifications for calls forwarded between PNPs will use E.164 numbers.

If a non-PNP call is forwarded to a Member of the forwarding user's PNP Group, the identification of the users should be:

- information about the calling user to the called (forwarding) user should be in accordance with the ISDN (E.164) numbering plan;
- information about the original call (calling party address and original called number) should be presented to the forwarded-to-user in accordance with the ISDN (E.164) numbering plan while the information about the forwarding call (called party number and last forwarding number) should be presented in accordance with the PNP;
- information to the calling user should be in accordance with the ISDN (E.164) numbering plan.

If a PNP call is forwarded to a (non-PNP) ISDN number or a Virtual Member of a PNP Group, the identification of the users should be:

- information about the calling user to the served (forwarding) user should be:
  a) in accordance with the PNP if the forwarding user is a Member of the calling user's PNP Group;
  b) in accordance with the ISDN (E.164) numbering plan if the forwarding user is a Virtual Member of the calling user's PNP Group;
- information to the forwarded-to user should be in accordance with the ISDN (E.164) numbering plan;
- information to the calling user should be in accordance with the ISDN (E.164) numbering plan if the PNP call is forwarded to a (non-PNP) ISDN number. Information to the calling user should be in accordance with the PNP if the PNP call is forwarded to a Virtual Member of the PNP Group, if a private number is available; otherwise, an E.164 number is used.

6.11 Line Hunting

A specific private number may be used in the selection algorithm for line hunting.

6.12 Three-Party Service

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.13 User-To-User Signalling

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.14 Multiple Subscriber Number

Several private numbers can be assigned to an access by subscribing to the MSN supplementary service.

When a user subscribes to both the MSN supplementary service and the SPNP supplementary service, then the MSN supplementary service will deliver the private number to the called user on PNP calls made to PNP Group Members of the calling user's PNP Group. Instead, as a user option, the MSN supplementary service may always use the ISDN number.

Calls using ISDN numbers will be presented as normal calls by the MSN supplementary service.

6.15 Call Hold

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.16 Advice of Charge

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.17 Multi-Level Precedence and preemption

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.18 Priority

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.19 Support of Private Numbering Plan

Not applicable.

7 Dynamic description

The dynamic description is the same as for the basic services.

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