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Automatic network invocation of relay services

This document describes the handling of number information between public communications networks in Sweden for automatic network invocation of relay services for relay services and their users based on ETSI ES 202 975.

Reference

ITS WG NI

Keywords

National Interconnections, number format, BBB, NDC, N(S)N, Call forwarding, CFU, Relay service.

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Foreword

This Application Guide has been produced by ITS Working Group Network Interworking (WG NI).

Introduction

This Application Guide will be released in its second edition which describes information elements to be used in the transfer of number information across the interface between public communications networks for automatic network invocation of calls to relay service serving platform producing relay services provided by the relay service provider [1].

1 Scope

This Application Guide describes the number information based on ETSI ES 202 975 [1], sent over the POI between the PSTN / PLMN and the Automatic Invocation Service Network for automatic network invocation of relay services for their end users.

1 General overview

The document specifies means to create conditions for users of relay services to be part of the general electronic communications market. Users of relay services will be offered and be able to make and receive telephone calls on similar terms as other telephone subscribers and have equal opportunities in the electronic communications market. User can be called and make calls using public telephone numbers.

This Application Guide is aligned with [1] - Annex B, chapter B.1.3 "One step calling" and option 5 which is described more in detail in chapter B.1.3.2.5 Option 5: A user profile stored by the service provider. The mechanism in this Application Guide is entirely based on option 5.

To enable the fixed or mobile users of application for relay services (example Bildtelefoni.net) to receive incoming calls from any originating network, the PSTN or PLMN where the primary user has subscription forwards these incoming calls via interconnection interface for routing to a relay service serving platform (figure 2).

User of the UA, types in and activates the existing supplementary service Call Forwarding Unconditional (CFU) using a destination number (i.e. forwarded-to-number) format including a new dedicated routing number BBB. When the PSTN or PLMN receives a normal incoming call, the CFU supplementary service will forward the call using the routing number to the operator of the automatic invocation service network which routes the call to the relay service serving platform which sends the invite to the relay service application in the users own UA.

Of importance is that the Call Forwarding feature is of a kind which does not redirect SMS messages since SMS is out of relay service scope.

A relay service is an electronic communications service as outlined in figure 1 that enables users of different modes of communication to interact by providing conversion between the modes of communication.

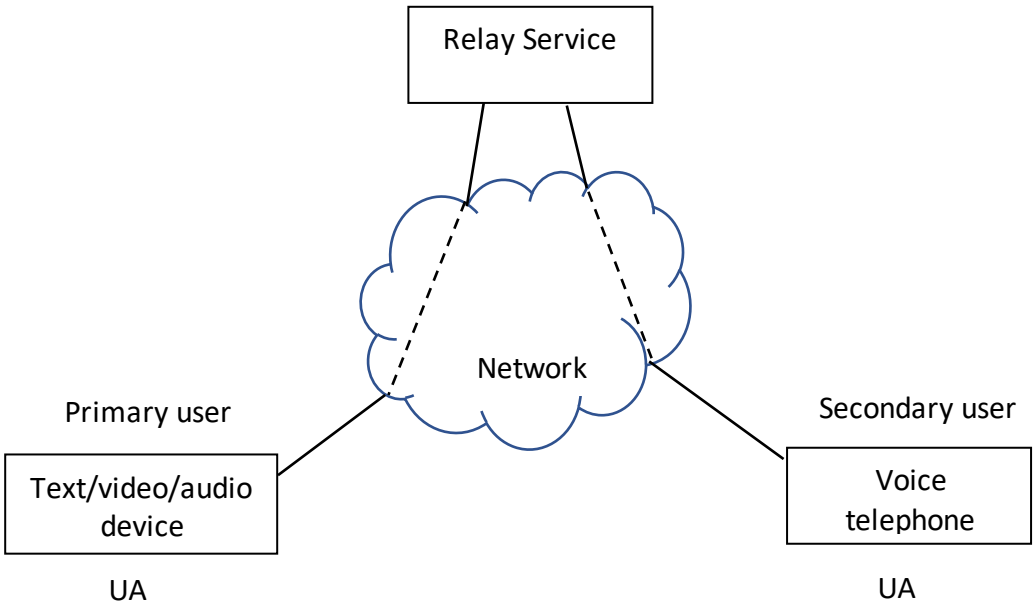

Figure 1: General illustration of communication via an automatic relay service over networks

It also describes the functional contents of the information elements. It does not deal with the corresponding internal information in each operator's network.

The document is concerned with technical issues. It is assumed that the public communications operators concerned sign mutual commercial agreements on interconnection, traffic cases, routing, services, traffic volumes, accounting procedures, prices, etc. The extent to which this guide shall be applied will be settled in those agreements.

In the automatic invocation service network solution ordinary public telephone numbers are used.

The primary user´s Calling Party number is related to the primary user´s SIP address and the primary user´s preferred relay service (for example video relay service, text relay service, speech to speech relay service).

Automatic network invocation of relay service will also allow users to make calls with automatic invocation of relay services to and from other countries. Activation of the automatic invocation service network can only be done in Sweden.

2 References

The following informative documents contain provisions, which through reference in this text constitute provisions of this Application Guide. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this Application Guide are encouraged to investigate the possibility of applying the most recent editions of the informative documents indicated below. For undated references, the latest edition of the informative document referred to apply.

[1] ETSI ES 202 975 V2.1.1 (2015-09)	Human Factors (HF); Requirements for relay services
[2] RFC SIP 3261	SIP: Session Initiation Protocol
[3] ITS ApG 9 Utgåva 10	Transfer of number information in national Interconnections based on ISUP; An Application Guide for handling number information between public communications networks
[4] Telia Company spec 8211-A335	ISDN-ISDN signalling interface for Sweden
[5] Telia Company spec 1/8211-A335	ISDN-ISDN signalling interface for Sweden, Annex 1
[6] ITS ApG XX Utgåva 1	Transfer of number information in national interconnections based on SIP and SIP-I; An Application Guide for handling number information between public communications networks.
[7] PTS Beslut om ändring av telefoni-nummerplanen – PTS dnr. 22-6527	Ändring av telefoninummerplanen (E.164) avseende allokering av dirigeringsadress (NDC 388) för användning i samband med aktivering och uppkoppling av samtalsförmedlande tjänst (på engelska "relay service") för den registrerade slutanvändare som använder en sådan tjänst i enlighet med denna ITS ApG 30.

Note: Telia Company specifications are available at: https://www.teliawholesale.se/

3 Terms and definitions

Automatic invocation service network: A network containing and connecting the Service platform where the functionality is implemented for serving the User of relay services (example Bildtelefoni.net).

The automatic invocation service network can be a PSTN or PLMN reached by the routing prefix BBB.

Dialed number: The number dialed by the subscriber during call to Called Party Number (either by primary or secondary user).

Originating network: The network where the calling party is located.

Primary user: intended (target) user of a relay service who needs some communication modality conversion support in order to communicate with voice users.

Relay service: Electronic Communications Service that enables users of different modes of communication (e.g. text, sign and speech), to interact by providing conversion between the modes of communication, normally through an interpreter or a communication assistant (e.g. human operator).

Relay service provider: The entity providing conversion between the modes of communication, normally through an interpreter or a communication assistant e.g. a human operator.

Relay Service Serving platform: It also contains the communication platform for the relay service and all the features needed for mediation off calls and the software tools for acting as agent interpreters in the relay service. The relay service network can also contain relay service apps for the primary user for downloading and register on devices or in a web browser. The Relay Service serving platform is responsible for delivering data for charging service.

Secondary user: persons other than primary users, using the relay service for communication with primary users.

UA: User application used by user of relay services, example application Bildtelefoni.net.

UE: User equipment used by user of relay services, typically a fixed phone, mobile phone, PC or tablet.

4 Abbreviations

ApG	ITS Application Guide
BBB	Routing Number for automatic network invocation of relay services. The Routing Number point out the automatic invocation service network. NDC 388 is allocated for this purpose by PTS [7].
CFB	Call Forwarding at Busy
CFNR	Call Forwarding at No Reply
CFU	Call Forwarding Unconditional
DB	Database with subscriptions for all primary users. DB is hosted in the Automatic Invocation Service Network
GUI	Graphical User Interface
ISUP	ISDN User Part
NDC	National Destination Code
NoA	Nature of Address
NTP	Network Termination Point
P2P	Point to Point
PLMN	Public land Mobile Network
PSTN	Public Switched Telephone Network
POI	Point of Interconnection
SIP	Session Initiation Protocol
SMS	Short Message Service
SN	Subscriber Number
UA	User Application
UE	User Equipment

5 Network overview

5.1 Logical network functions

Originating, PSTN or PLMN and automatic invocation service network can be one, two or three physical networks.

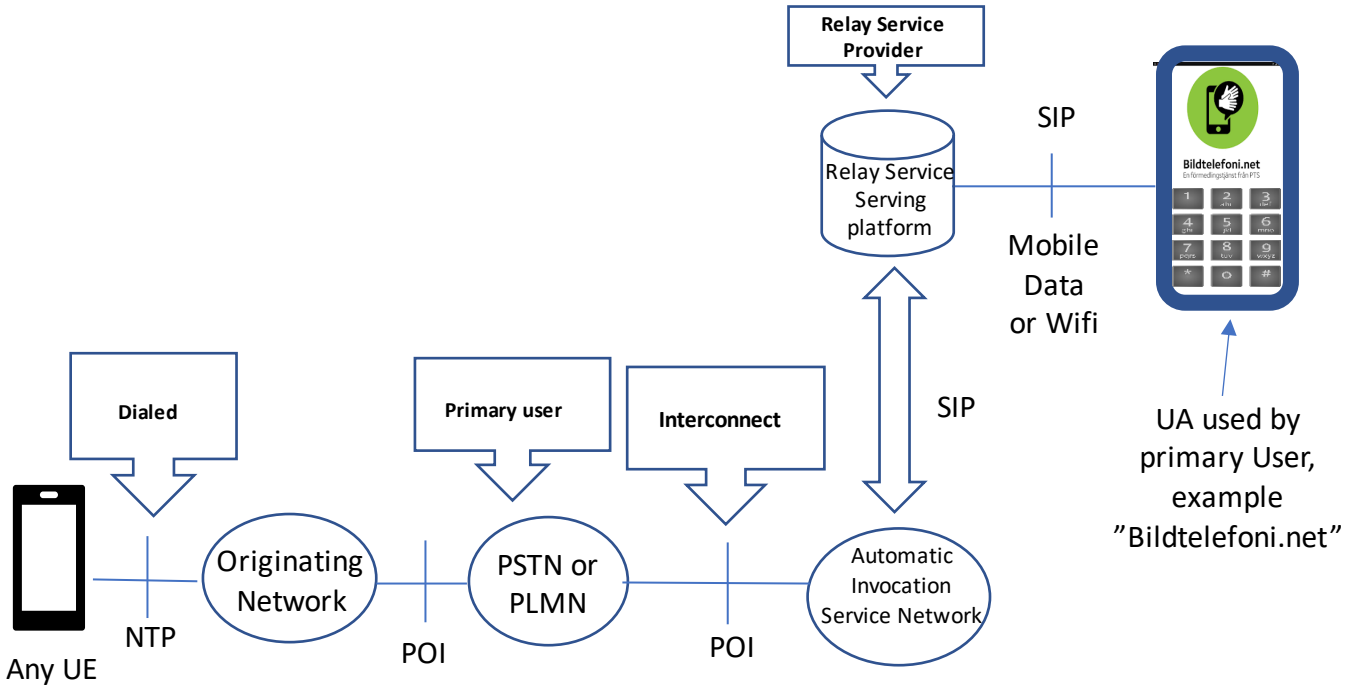

Figure 2: Interconnected public communication networks for routing to a relay service serving platform for relay services

5.2 Call Routing

Overview of call routing when calling from secondary users to primary users.

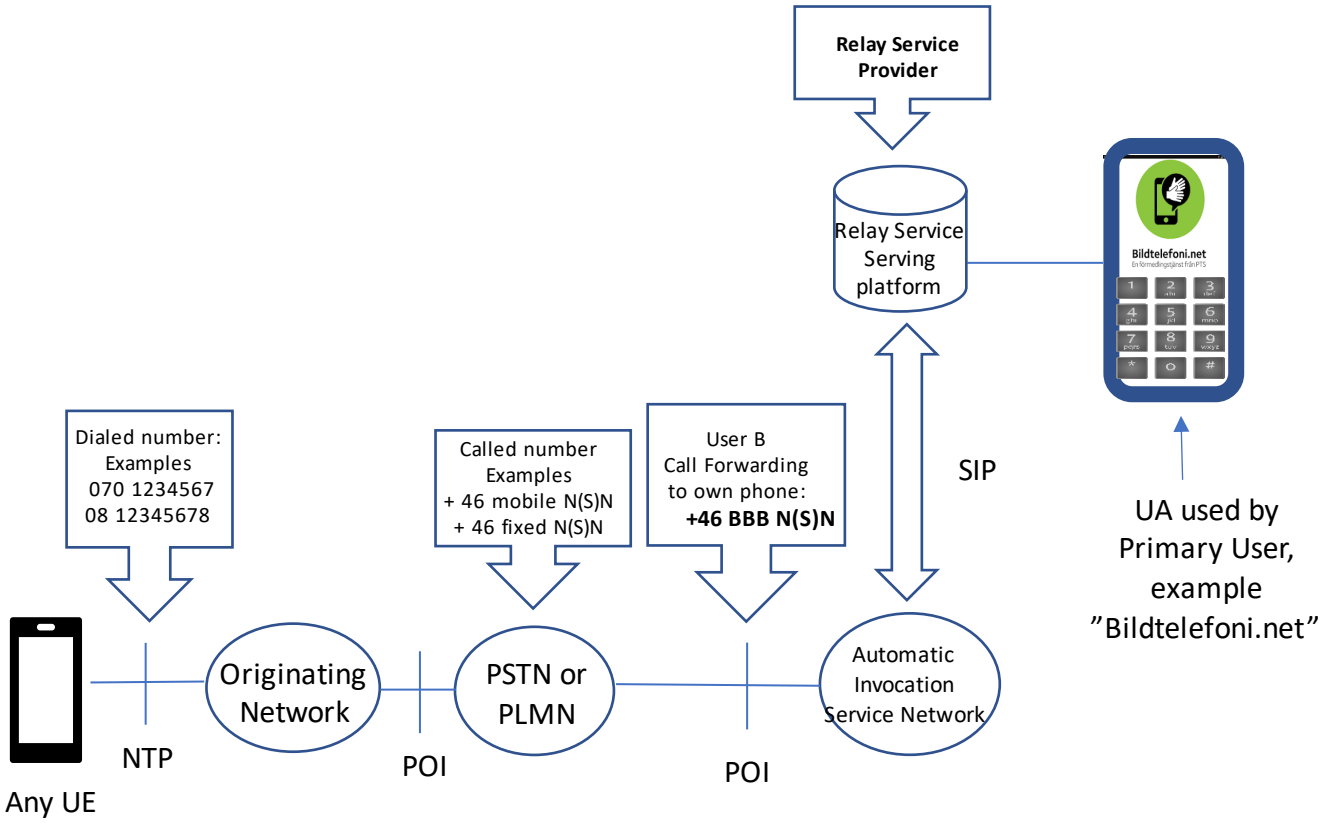

Figure 3: Example of call routing, including example numbers for call made to relay service user

Explanation of Called number from the Originating Network egress POI as they appear in figure 3:

- 46 Country code of Sweden
- 70 1234567 Swedish mobile telephone number N(S)N i.e. mobile NDC (NDCs 70, 72, 73, 76 and 79) + SN
- 8 12345678 Swedish fixed telephone number N(S)N
- N(S)N National (Significant) Number for the user using relay services (example application Bildtelefoni.net). Note! N(S)N includes a mobile NDC of 70, 72, 73, 76, 79 or fixed NDC.

Explanation of Called number from the PSTN/PLMN egress POI as shown in figure 3.

- 46 Country code of Sweden
- BBB 3-digit Routing Number (RN), allocated by PTS, that points out and is used for routing to the automatic invocation network.

BBB is only used for routing purposes and not known by secondary end users, except by primary user when activating CFU for the relay service.

The BBB cannot be a mobile NDC.

BBB must be dialable for the relay service end user during supplementary service (CFU) activation procedure but shall be rejected from being used as a dialed number for all other end users not registered in the automatic network invocation service.

Moreover: BBB cannot be any occupied Swedish national NDC and BBB must not start with a zero.

5.3 Database for Called Party Number lookup

Overview of call signaling using database lookup when calling from primary users to secondary users.

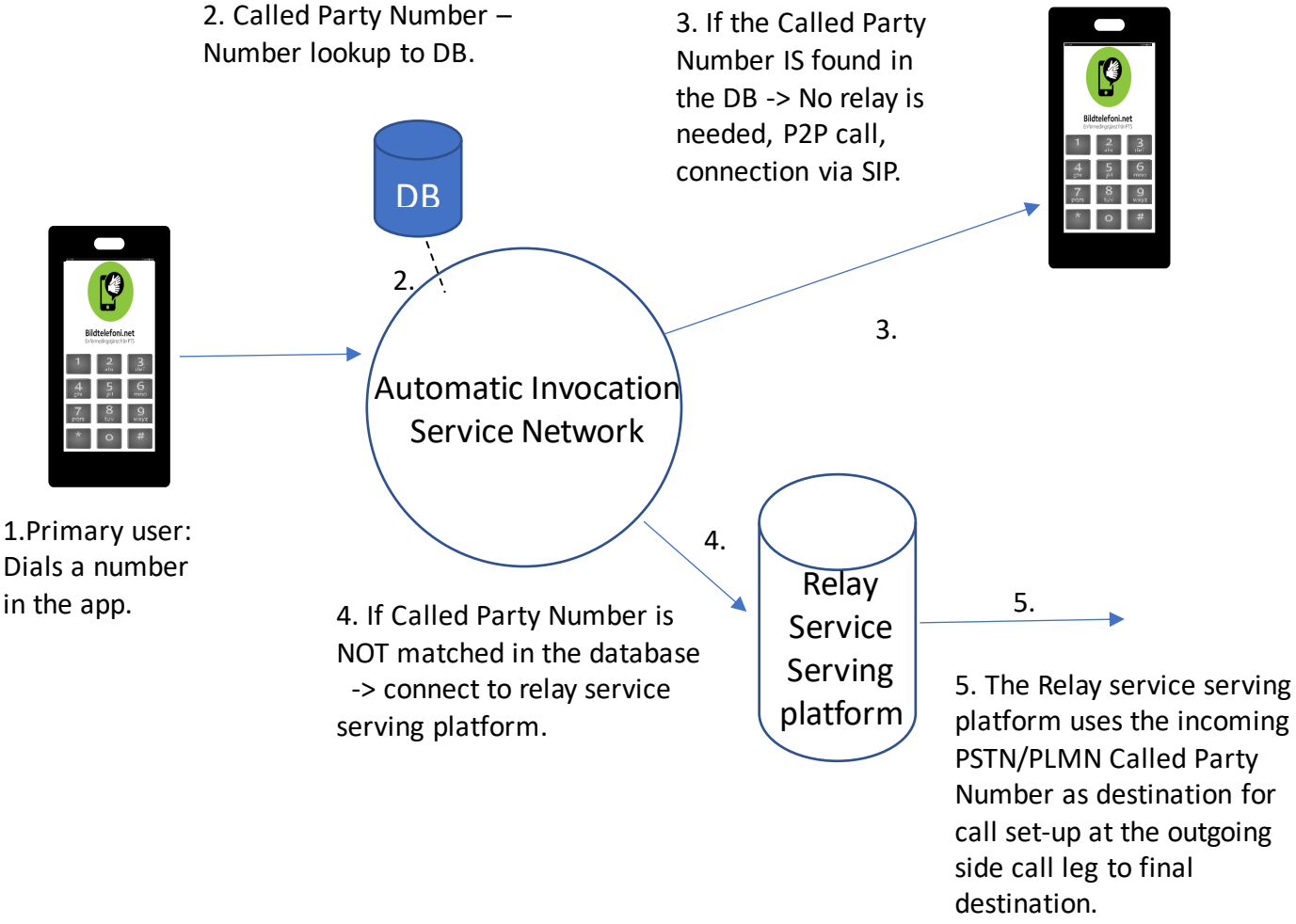

Figure 4: Illustration of dialed number look up during call made from relay service user

5.4 Primary user Incoming call - using CFU

CFU is applicable when user receiving an incoming call from secondary user. Invocation of the relay service at incoming call is initiated by the CFU supplementary service mechanism. The primary user must activate CFU in advance to invoke the automatic relay service for calls from secondary user.

Note: Note: CFNR and CFB are not recommended for the invocation of the relay service since the relay service would only be triggered when the user is busy or does not reply. In addition, incoming call when user is roaming abroad may not work.

5.5 Supplementary service code and number format for CFU activation

The CFU service is activated with *21*BBB plus primary user's own phone number#. This activation shall only be done in Sweden.

There are several optional ways for the primary user to activate CFU. All of them are alternatives for the primary user and equivalent in terms of automatic invocation service functionality.

In some smartphones and their settings and menus or operators web GUI this can be done instead of dialing.

Examples:

Domestic

- *21*0BBB701234567# (mobile)
- *21*0BBB812345678# (fixed)

or

- *21*0046BBB701234567# (mobile)
- *21*0046BBB812345678# (fixed)

or

- *21*+46BBB701234567# (mobile)

Note:

- the leading 0 in 0BBB in the first example above must be included when activating CFU.
- the national trunk prefix 0, after BBB in the number string, must be excluded when activating CFU, like in the three examples above.

5.6 Structure of destination address

The structure of the destination address is: +46 BBB N(S)N

- 00 International prefix in Sweden
- 46 Country Code
- BBB three digits
- N(S)N is NDC + SN maximum 9 digits in Sweden:
    - 2 digits NDC = mobile National Destination Code, examples 70, 72, 73, 76, 79
    - 1,2 or 3 digits NDC = fixed National Destination Code, examples 8, 31, 934
    - SN = Subscriber Number 5-8 digits

5.7 Primary user Outgoing call

When a primary user wants to make an outgoing call the user starts the UA and dials a telephone number within the application. For an originating call from a primary user, the UA is triggered directly by the UE.

The call from a primary user is enquiring the database in the Automatic invocation service network and if the B-number is present in the database the call is routed directly to another primary user. If the number is not present the call is routed to the relay service serving platform and a leading announcement message is played while waiting for free interpreter. When an interpreter takes the call the B-address populates the interpreter's outgoing side of the serving platform and the interpreter starts and finalizes the total call when appropriate.

CFU or Routing Number BBB does not apply for primary user outgoing calls.

6 Routing information

6.1 SIP

The address signals sent in the SIP Request URI. Details as described in ITS ApG xx [6].

Transfer of information for Automatic Invocation of Relay Services.

The number format for transfer of information for routing between operators:

Mobile:

- SIP +46 BBB701234567

Fixed:

- SIP +46 BBB812345678

6.2 ISUP

The address signals sent in the ISUP called party address field. Details as described in ITS ApG 9 [3].

Transfer of information for Automatic Invocation of Relay Services.

The number format for transfer of information for routing between operators:

Mobile:

- ISUP NoA=3 - BBB701234567

Fixed:

- ISUP NoA=3 - BBB812345678

Document history

Edition	Date of publication	Changes
1	May 2022	First edition
2	September 2024	Second edition