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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Supplementary services for multimedia

Number portability interworking between ITU-T H.323 and switched circuit networks

Recommendation ITU-T H.460.2

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Recommendation ITU-T H.460.2

Number portability interworking between ITU-T H.323 and switched circuit networks

Summary

Recommendation ITU-T H.460.2 describes the procedures and the signalling protocol for Service Provider and Location Portability, while interworking with SCN (using SS No. 7 signalling) interfaces in an ITU-T H.323 network.

Service Provider Portability allows subscribers to keep their existing phone numbers/addressing scheme even when changing from one service provider to another without changing their location, and without changing the nature of the service offered.

Location Portability allows subscribers to retain their existing phone numbers/addressing scheme even when moving from one location to another.

This Recommendation makes use of the "Generic extensibility Framework" specified in Recommendation ITU-T H.323 version 4.

This revision introduces a number of corrections and clarifications by incorporating technical and editorial corrections from the ITU-T H.323-series Implementers Guide (03/2011).

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T H.460.2	2001-07-29	16
2.0	ITU-T H.460.2	2013-03-16	16

FOREWORD

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The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

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Number portability interworking between ITU-T H.323 and switched circuit networks

1 Scope

This Recommendation specifies the Number Portability interworking procedures between ITU-T H.323 and SCN networks.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T H.225.0] Recommendation ITU-T H.225.0 (2009), *Call signalling protocols and media stream packetization for packet-based multimedia communication systems*.

[ITU-T H.323] Recommendation ITU-T H.323 version 4 (2009), *Packet-based multimedia communications systems*.

[ITU-T Q.769.1] Recommendation ITU-T Q.769.1 (1999), *Signalling System No. 7 – ISDN user part enhancements for the support of number portability*.

[ITU-T Q.850Add.1] Recommendation ITU-T Q.850 (1998), *Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN user part*, Addendum 1 (2000).

[ITU-T T.35] Recommendation ITU-T T.35 (2000), *Procedure for the allocation of ITU-T defined codes for non-standard facilities*.

[ITU-T X.680] Recommendation ITU-T X.680 (2008) | ISO/IEC 8824-1:2008, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation*.

[ITU-T X.681] Recommendation ITU-T X.681 (2008) | ISO/IEC 8824-2:2008, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification*.

[ITU-T X.691] Recommendation ITU-T X.691 (2008) | ISO/IEC 8825-2:2008, *Information technology – ASN.1 encoding rules – Specification of Packed Encoding Rules (PER)*.

3 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ARJ RAS Admission Reject

ARQ RAS Admission Request

ASN.1 Abstract Syntax Notation one

DN Directory (or Dialled) Number

IAM Initial Address Message

ISUP Integrated Services Digital Network User Part

LRJ RAS Location Reject

LRQ RAS Location Request

NoA Nature of Address indicator

NP Number Portability

NPSI Number Portability Status Indicator

NRN Network Routing Number

PSTN Public Switched Telephone Network

RAS Registration, Admission, and Status

SCN Switched Circuit Network

TON Type Of Number

4 Interworking description

Number Portability in the SCN is specified in [ITU-T Q.769.1].

There are several schemes used for transporting the parameter.

- Separate Directory Number Addressing Method: clause 6.1 of [ITU-T Q.769.1].
- Separate Network Routing Number Addressing Method: Annex B of [ITU-T Q.769.1].
- Concatenated Addressing Method: Annex A of [ITU-T Q.769.1].

If the query returns no NRN, then the Called Party Number parameter in the IAM message contains the Directory Number (dialled-digits). The IAM may contain the Number Portability Forward Information parameter (see Annex E of [ITU-T Q.769.1]).

The following information needs to be conveyed across ITU-T H.323 network to support Number Portability.

1) Network Routing Number (NRN).
2) Directory Number (DN).
3) NP Status indicator (NPSI).
4) Regional Parameters (This parameter may be used to carry national specific or Regional Number Portability standards specific information).

4.1 Messages and signalling

It is proposed that the NP parameters listed above be transported as follows in the ITU-T H.225.0/RAS messages using the generic extensibility framework:

1) The **genericData** parameter (containing the **NumberPortabilityInfo** sequence) should be used in the ITU-T H.225.0 Call Signalling (Setup) or RAS (ARQ and LRQ) messages. The **genericData** parameter identifies Number Portability feature and contains the **NumberPortabilityData**. The **NumberPortabilityInfo** of the **NumberPortabilityData** contains the appropriate fields populated.
2) The ISUP NRN is always carried in the ITU-T H.225 Called Party Number IE with its **TypeOfNumber** (TON) set to **National** (significant) Number.

3) A new **NumberPortabilityInfo** ASN.1 definition is introduced to transport the directory number (DN), NPSI, NRN and **regionalParams** parameters.

4) A concatenated ISUP NRN and DN are carried concatenated in the Called Party Number IE and the **NumberPortabilityInfo** parameter.

5) When a Gatekeeper receives an ARQ or LRQ and determines that the destination number is ported out of the network and it may wish to invoke number portability Query on Release (QoR) procedures (as specified in Annex C of [ITU-T Q.769.1]). In such cases, the Gatekeeper must respond with ARJ or LRJ that contains a reject reason of **genericDataReason**. The Gatekeeper should include the **genericData** of the ARJ/LRJ that contains the **NumberPortabilityGenericData** with the **numberPortabilityRejectReason**. The **numberPortabilityRejectReason** now will have a value of **qorPortedNumber** (=1). This maps to the ISUP release cause value = #14 (QoR: ported number) as specified in [ITU-T Q.850Add.1].

4.2 ISUP-to-H.225 ingress interworking

NP Parameters in ISUP →	ITU-T H.225 and **NumberPortabilityInfo** (inside **genericData**) Parameters in Setup, ARQ, LRQ →
NPSI	**NumberPortabilityInfo.numberPortabilityData.addressTranslated** (if NPSI = query not done, it is not necessary to create a NumberPortabilityInfo parameter; it will be necessary for some downstream switch to do a query) (if NPSI = query done, set addressTranslated = TRUE)
Network Routing Number (NRN) in Network Routing Number parameter, DN in Called Party Number parameter	a) The NRN is mapped as follows: Called Party Number (Setup) or **destinationAddress** (ARQ, LRQ messages) (TON=National(significant)Number) and **NumberPortabilityInfo.numberPortabilityData.routingAddress** (Setup, ARQ, LRQ messages). (**portabilityTypeOfNumber** = **routingNumber**) b) The DN is mapped as follows: **NumberPortabilityInfo.numberPortabilityData.portedAddress**
Directory number (DN) in Called Directory Number parameter, NRN in Called Party Number parameter	a) The NRN is mapped as follows: Called Party Number (Setup) or **destinationAddress** (ARQ, LRQ messages) (TON=National(significant)Number) and **NumberPortabilityInfo.numberPortabilityData.routingAddress** (Setup, ARQ, LRQ messages). (**portabilityTypeOfNumber** = **routingNumber**) b) The DN is mapped as follows: **NumberPortabilityInfo.numberPortabilityData.portedAddress**
Concatenated NRN + DN in Called Party Number parameter	Called Party Number (Setup) or **destinationAddress** (ARQ,LRQ) (TON = National(significant)Number) and **NumberPortabilityInfo.numberPortabilityData.routingAddress** (Setup, ARQ, LRQ). (**portabilityTypeOfNumber** = **concatenatedNumber**)
Regional Parameters	**NumberPortabilityInfo.numberPortabilityData.regionalParams**

If an NPSI indicating that a query has been done is present in the IAM, or if an NRN is present in the IAM, the **genericData** parameter (containing the **NumberPortabilityInfo** sequence) should be used in the ITU-T H.225.0 Call Signalling (Setup) or RAS (ARQ and LRQ) messages. The **genericData** parameter identifies Number Portability feature and contains the **NumberPortabilityData**. The **NumberPortabilityInfo** of the **NumberPortabilityData** contains the appropriate fields populated as shown in the table above.

The **portabilityTypeOfNumber** field indicates the TypeOfNumber (TON) of the NRN or DN present in the IAM message.

If the NoA of the Routing Number in the IAM message is set to either Routing Number or Concatenated Number, then the **routingAddress** in **NumberPortabilityInfo** shall be populated with the Routing Number and its **typeOfAddress** is set to **routingNumber** or **concatenatedNumber** respectively.

If the NoA of the Routing Number in the IAM message is set to National(significant)Number, then the interworking function may not populate the **routingAddress** in **NumberPortabilityInfo**.

If the Gatekeeper performs an NP query, it shall provide the **NumberPortabilityInfo** as a **genericData** parameter in ACF and LCF messages as specified above. The ingress interworking function, receiving this info in ACF shall send it in Setup message and the egress interworking function shall send it in the IAM message.

NOTE – Egress interworking is specified in clause 4.3.

If the ingress interworking function sends the **NumberPortabilityInfo** in the ARQ message and the Gatekeeper does not return it in the ACF message, then the ITU-T H.225.0 Setup message shall contain the **NumberPortabilityInfo** as sent in the ARQ message.

4.3 ITU-T H.225-to-ISUP egress interworking

ITU-T H.225 and **NumberPortabilityInfo** (inside **genericData**) parameters in Setup.	Parameters to compose IAM according to the chosen addressing method (see [ITU-T Q.769.1])
NumberPortabilityInfo.numberPortabilityData.addressTranslated	NPSI (if supported)
NumberPortabilityInfo.numberPortabilityData.routingAddress	Network Routing Number
NumberPortabilityInfo.numberPortabilityData.portedAddress	Directory Number (DN)
NumberPortabilityInfo.numberPortabilityData.routingAddress (**portabilityTypeOfNumber** = **concatenatedNumber**)	Concatenated NRN, DN
NumberPortabilityInfo.numberPortabilityData.regionalParams	Regional Parameters

The egress interworking function shall compose the IAM message using the addressing method in operation at that interface using the LNP parameters that are provided by the Setup message.

5 ITU-T H.225.0 generic data usage

Generic extensibility framework shall be used to specify the Number Portability feature interworking with RAS and Annex G of [ITU-T H.225.0] as described below.

Data Specification

NumberPortabilityID: Identifies the Number Portability feature using the standard field of **GenericIdentifier** with a unique integer value.

Generic Extensibility Type	Fields	Field name	Value
GenericIdentifier	**–**	**standard**	2

NumberPortabilityData: This is the data sent in ARQ/LRQ/H.225.0 Setup messages and Annex G of [ITU-T H.225.0] Access Request messages to notify or communicate the number portability information. It is an **EnumeratedParameter** with unique identification using the standard field and the content is a raw field consisting of the ASN.1 PER encoded **NumberPortablityInfo** as specified in the ASN.1 notation in Annex A.

Generic Extensibility Type	Fields	Field name	Value
EnumeratedParameter			
GenericIdentifier	**id**	**standard**	1
Contents	**content**	**raw**	ASN.1 PER encoding of the **NumberPortabilityInfo**
Parameter Cardinality			Once and only Once

NumberPortabilityDescriptor: This is a **FeatureDescriptor** used for feature negotiation using the generic extensibility framework.

Generic Extensibility Type	Fields	Field name	Value
GenericIdentifier	**id**	**standard**	**NumberPortabilityID**

6 Description of ASN.1 types and fields

NumberPortabilityInfo – Allows specification of parameters needed by ISUP-H.323 Number Portability interworking functions. Currently, the fields are used in the context of the dialled number or E.164 address, while in future other **AliasAddress** fields such as the **email-ID**, **h323-ID** may be used in portability services.

numberPortabilityRejectReason – Identifies the reason for rejection of ARJ/LRJ to invoke cases such as Number Portability Query On Release.

addressTranslated – This field is set to TRUE, if an NP query has been made.

portedAddress – This field contains the original Address (ITU-T E.164 number or dialled digits or the **AliasAddress**) in the context of Number Portability.

routingAddress – This field contains the routing Address (ITU-T E.164 number or dialled digits or the **AliasAddress**) in the context of Number Portability. This may be populated only when the NoA of NRN in IAM message is set to routing number or concatenated number. In other cases, it may optionally be used. If this field is present, the egress interworking function shall use it to compose the NRN in the IAM message.

regionalParams – This field may be used to carry Regional Number Portability Standards specific or National specific Information. The **regionalData** field contains the country specific information encoded as per the regional standard.

typeOfAddress – If the **typeOfAddress** field is present in the fields of type **PortabilityAddress**, it qualifies the **typeOfNumber** present in the **AliasAddress** of **PortabilityAddress** including **email-ID**, **h323-ID** etc. The **typeOfAddress** field, if present, has precedence over **typeOfNumber**, if any, present in the **aliasAddress**.

portabilityTypeOfNumber – Identifies the type of NP used, such as the **portedNumber** or the **routingNumber** or **concatenatedNumber**.

publicTypeOfNumber – This field identifies the numbering plan in public networks/E.164 address. This field shall be chosen when the number is not a routing or ported number.

partyTypeOfNumber – This field identifies the numbering plan in private networks/numbers. This field shall be chosen when the number is not a routing or ported number.

Annex A

ITU-T H.460.2 message syntax (ASN.1)

(This annex forms an integral part of this Recommendation.)

This annex shows the ASN.1 syntax for the Number Portability feature.

The **t35CountryCode** element shall identify the country, as described in Annex A of [ITU-T T.35]. The **t35Extension** element shall contain a country code extension that is assigned nationally, unless the **t35CountryCode** is binary "1111 1111", in which case this field shall contain the country code found in Annex B of [ITU-T T.35]. **VariantIdentifier** is assigned nationally to identify specific national variants.

In order to comply with this Recommendation, a description of the national use and how to encode that usage in the **regionalParams** field should be provided to ITU-T SG 16. The description of the national use will be published as Appendix I.

```
NUMBER-PORTABILITY DEFINITIONS AUTOMATIC TAGS ::=
BEGIN
     IMPORTS
          PublicTypeOfNumber,
          PrivateTypeOfNumber,
          AliasAddress
     FROM H323-MESSAGES;

NumberPortabilityInfo ::= CHOICE
{
     numberPortabilityRejectReason         NumberPortabilityRejectReason,
     nUMBERPORTABILITYDATA SEQUENCE
     {
          addressTranslated       NULL OPTIONAL,
          portedAddress           PortabilityAddress OPTIONAL,
          routingAddress          PortabilityAddress OPTIONAL,
          regionalParams          RegionalParameters OPTIONAL,
          ...
     },
     ...
}

NumberPortabilityRejectReason ::= CHOICE
{
     unspecified             NULL,
     qorPortedNumber         NULL,
     ...
}

PortabilityAddress ::= SEQUENCE
{
     aliasAddress            AliasAddress,
     typeOfAddress           NumberPortabilityTypeOfNumber OPTIONAL,
     ...
}

NumberPortabilityTypeOfNumber ::= CHOICE
{
     publicTypeOfNumber           PublicTypeOfNumber,
     privateTypeOfNumber          PrivateTypeOfNumber,
     portabilityTypeOfNumber      PortabilityTypeOfNumber,
     ...
}
```

```
PortabilityTypeOfNumber ::= CHOICE
{
     portedNumber            NULL,
     routingNumber           NULL,
     concatenatedNumber      NULL,
     ...
}

RegionalParameters ::= SEQUENCE
{
     t35CountryCode          INTEGER(0..255),
     t35Extension            INTEGER(0..255),
     variantIdentifier       INTEGER(1..255) OPTIONAL,
     regionalData            OCTET STRING,
     ...
}

END
```

Appendix I

Number portability within the United States

(This appendix does not form an integral part of this Recommendation.)

I.1 Introduction

The United States, as with many other countries, has a variant of the ITU-T SS No. 7 specifications. As a result, it is not possible to perform number portability within the United States without also carrying additional information within the **regionalParams** sequence.

I.2 Coding the RegionalParameters Sequence

Systems that perform number portability shall include the **regionalParams** element of the **numberPortabilityData** sequence. The **variantIdentifier** shall be omitted. The **regionalData** element shall contain the Jurisdiction Information Parameter (JIP) as specified in [b-T1.113-1995].

Endpoints shall assume that if the **variantIdentifier** is present, the coding of the field is not in accordance with this appendix.

Bibliography

[b-T1.113-1995] T1.113-1995*, *Signalling System No. 7*, *ISDN User Part*.

* T1 standards are maintained since November 2003 by ATIS.

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