

IPWorks MNP-SRF MAP Interface

INTERWORK DESCRIPTION

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1 Introduction

The document describes the MAP v3 protocol used between IPWorks and Mobile Number Portability (MNP) Signaling Relay Function (SRF) node for MNP information retrieval.

Scope

This document covers the following topics:

- Interface Overview
- Services
- Procedures
- Information Model
- Formal Syntax or Schema

Target Groups

This document is intended for personnel needing to understand the logical entity, including interfaces and protocols, of the IPWorks.

1.1 Prerequisites

N/A

1.2 Related Information

Trademark information, typographic conventions, definition, and explanation of acronyms and terminology can be found in the following documents:

- *Trademark Information*, Reference [1]
- *Glossary of Terms and Acronyms*, Reference [2]
- *Typographic Conventions*, Reference [3]



2 Interface Overview

The MAP v3 protocol is used between IPWorks and Mobile Number Portability Signaling Relay Function (MNP SRF) node for Mobile Number Portability (MNP) information retrieval.

The standard MAP version 3 ANY TIME INTERROGATION (ATI) operation and MAP version 3 SEND ROUTING INFORMATION (SRI) operation are utilized by IPWorks to interrogate the MNP SRF to retrieve portability information for a subscriber.

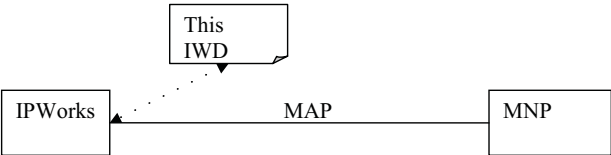


Figure 1 Interface Overview

2.1 Interface Role

IPWorks uses the Subscriber Mobile Number Portability status retrieval services provided by MNP SRF, and in this context IPWorks simulates the role of gsmSCF that is defined in chapter 12 of Reference [6].

2.2 Services

The user services used by the MNP SRF are shown in Table 1

Table 1 Used Services

Used Service	Description
CAMEL_Provide_MNP_Info with ATI	MNP SRF returns the MNP information to the requesting node as requested by the node via the Any Time Interrogation procedure. IPWorks triggers the service request upon receiving ENUM queries which fall into some pre-configured number series, and the MNP information reply will be used by IPWorks to compose the ENUM response.
CAMEL_Provide_MNP_Info with SRI	MNP SRF returns the MNP information to the requesting node as requested by the node via the Send Routing Information procedure. IPWorks triggers the service request upon receiving ENUM queries which fall into some pre-configured number series, and the MNP information reply will be used by IPWorks to compose the ENUM response.



2.3 Encapsulation and Addressing

The MAP v3 ANY TIME INTERROGATION (ATI) operation and the MAP v3 SEND ROUTING INFORMATION (SRI) are transported over TCAP, Reference [5] defines how MAP operation makes use of TCAP and lower layers of Signalling System No.7 (SS7).

For SCCP layer routing, both Signaling Point Code (SPC) + Subsystem Number (SSN) and Global Title Translation (GTT) routing mechanisms are supported. If GTT routing is chosen, the TT default value is 0, but can be configured.

IPWorks supports SIGTRAN as the transport vehicle.

3 Procedures

This section describes the procedures used in connection with the used interfaces of IPWorks.

3.1 Overview

3.1.1 ATI

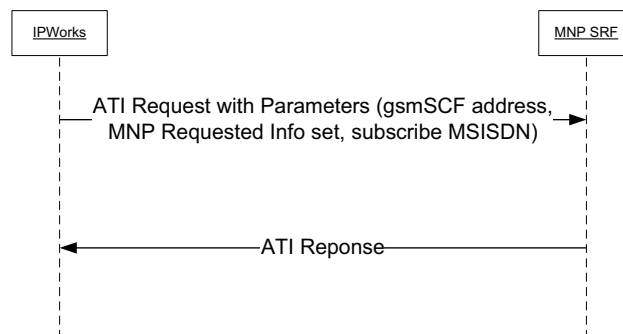


Figure 2 ATI Request and ATI Response

The ATI Response could be ATI Ack or some ATI negative responses. In some cases, IPWorks cannot get any response and a preset timer fires.

3.1.2 SRI

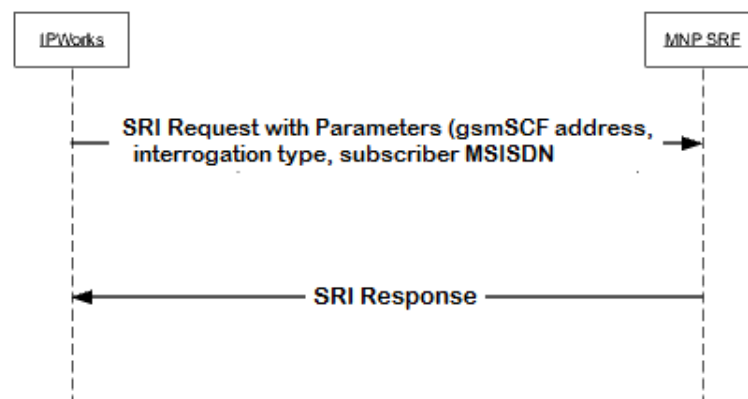


Figure 3 SRI Request and SRI Response

The SRI Response could be SRI Ack or some SRI negative responses. In some cases, IPWorks cannot get any response and a preset timer expires.

3.2 Lower Level Procedures

N/A

3.3 Detailed IPWorks Procedures

3.3.1 CAMEL_Provide_MNP_Info with ATI

The CAMEL_Provide_MNP_Info with ATI service provided by MNP SRF is utilized by IPWorks to retrieve MNP status for a subscriber number. The detailed IPWorks procedure is shown in the following figure.

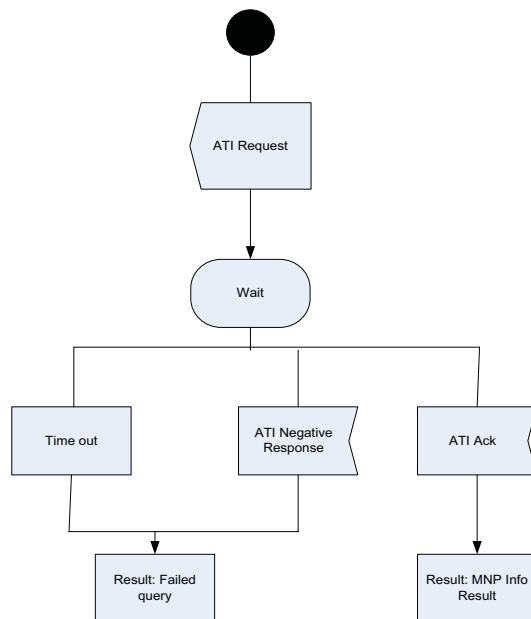


Figure 4 IPWorks ATI handling procedure

3.3.1.1 ATI Request

IPWorks triggers ATI request operation towards the external MNP SRF upon receiving ENUM queries that fall into some pre-configured number series.

3.3.1.2 Wait

The default waiting timer value is 3 seconds, which can be configured. Operator could adjust it according to the real network condition.



3.3.1.3 ATI Ack

IPWorks receives the `ATI Ack` message if MNP SRF could provide the requested MNP information for the subscriber.

3.3.1.4 ATI Negative Response

If MNP SRF does not know the MNP status of the requested subscriber: “Unknown subscriber” or does not provide the ATI service: “ATI Not Allowed”, IPWorks can receive the Negative Response.

3.3.1.5 Time Out

After waiting for the configured time length without receiving response from MNP SRF, the waiting time will fire.

3.3.1.6 Result: MNP Info Result

The subscriber MNP information contained in the `ATI Ack` is used by IPWorks for further internal function processing. This is the end of MAP ATI operation for this subscriber number.

3.3.1.7 Result: Failed query

IPWorks also take this information as input to proceed with other function processing. No further MAP ATI operation is done for the specific subscriber number.

3.3.2 CAMEL_Provide_MNP_Info with SRI

The `CAMEL_Provide_MNP_Info with SRI` service provided by MNP SRF is utilized by IPWorks to retrieve MNP status for a subscriber number. The detailed IPWorks procedure is shown in the following figure.

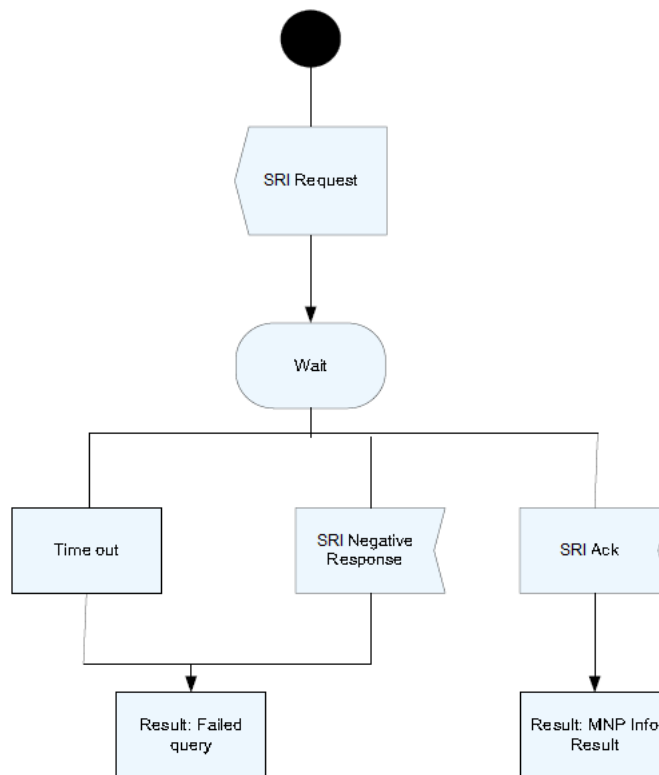


Figure 5 IPWorks SRI handling procedure

3.3.2.1 SRI Request

IPWorks triggers SRI request operation towards the external MNP SRF upon receiving ENUM queries that fall into some pre-configured number series.

3.3.2.2 Wait

The default waiting timer value is 3 seconds, which can be configured. Operator could adjust it according to the real network condition.

3.3.2.3 SRI Ack

IPWorks receives the SRI Ack message if MNP SRF could provide the requested MNP information for the subscriber.

3.3.2.4 SRI Negative Response

If MNP SRF does not know the MNP status of the requested subscriber: “Unknown subscriber” or does not provide the SRI service: “SRI Not Allowed”, IPWorks can receive the Negative Response.



3.3.2.5 Time Out

After waiting for the configured time length without receiving response from MNP SRF, the waiting time will expire.

3.3.2.6 Result: MNP Info Result

The subscriber MNP information contained in the *SRI Ack* is used by IPWorks for further internal function processing. This is the end of MAP SRI operation for this subscriber number.

3.3.2.7 Result: Failed query

IPWorks also take this information as input to proceed with other function processing. No further MAP SRI operation is done for the specific subscriber number.





4 Information Model

This section describes the information model including mandatory and optional parameters of each service operation.

4.1 General

Each Information Element (IE) is marked as M, C, S, E, or -.

Table 2 Element Description

M	Mandatory	An “M” IE must always be included.
C	Conditional	A “C” IE must be included if the sending entity has the necessary information to populate the IE.
S	Specific conditions	The conditions for the inclusion of an “S” IE are shown in the “Description” column of the definition table.
E	Mutually Exclusive	When a set of “E” IEs is shown in the definition of an Information Flow or compound IE, only one of those IEs can be included.
-	Not applicable	A “-” IE must always be omitted.

The following principle applies for the handling of the IEs by IPWorks:

- IPWorks discards any IEs that are not functionally supported by IPWorks.

4.2 Any Time Interrogation Request

This MAP operation is used by IPWorks to request the MNP information for subscribers from the MNP SRF at any time. The information elements contained in MAP layer for MNP are described below:

Table 3 MNP information element for ATI request

Information element name	Status	Description
gsmSCF Address	M	This IE indicates the address of IPWorks in MNP context, IPWorks simulates part function of gsmSCF.

Information element name	Status	Description
Requested Info	M	This IE indicates the type of subscriber information that is requested. It must have the following value: - MNP Requested Info (Refer to Reference [6])
Subscriber Identity	M	This IE identifies the subscriber for which the information is requested. The identity must be: - MSISDN.

4.3 Any Time Interrogation Ack

The ATI Ack is used by the MNP SRF to provide the requested MNP information for the subscriber to the gsmSCF (IPWorks in our case). The MNP Information Result element is used to contain related MNP information.

Table 4 MNP Information Result-1

Information element name	Status	Description
MNP Information Result	M	This IE contains the MNP information for the subscriber. It is described in a table below.

MNP Information Result contains the following information:

Table 5 MNP Information Result-2

Information element name	Status	Description
Routing Number	C	This IE must be present, if requested by the gsmSCF. Refer to Reference [4]. IPWorks takes this element as optional though it is conditional parameter according to Reference [4].
IMSI	C	This IE must be presented, if requested by the gsmSCF. Refer to Reference [4]. IPWorks takes this element as optional though it is conditional parameter according to Reference [4].



Information element name	Status	Description
MSISDN	C	<p>This IE must be present, if requested by the gsmSCF. Refer to Reference [4].</p> <p>IPWorks takes this element as optional though it is conditional parameter according to Reference [4].</p>
Number Portability Status	C	<p>This IE must be present, if requested by the gsmSCF. It can have one of the following values:</p> <ul style="list-style-type: none"> • Not Known To Be Ported • Own Number PortedOut • Foreign Number Ported To Foreign Network • Own Number Not Ported Out • Foreign Number Ported In <p>IPWorks takes this element as optional though it is conditional parameter, see Reference [4].</p>

4.4 Any Time Interrogation Negative Response

There could be many types possible ATI negative response. IPWorks does not distinguish them and treat all the negative response as failed MNP query.

4.5 Send Routing Information Request

This MAP operation is used by IPWorks to request the MNP information for subscribers from the MNP SRF at any time. The information elements contained in MAP layer for MNP are described below:

Table 6 MNP information element for SRI request

Information element name	Status	Description
gsmSCF Address	M	This IE indicates the address of IPWorks in MNP context, IPWorks simulates part function of gsmSCF.

Information element name	Status	Description
Interrogation Type	M	This IE indicates the type of interrogation.
MSISDN	M	This IE identifies the subscriber for which the information is requested.

4.6 Send Routing Information Ack

The SRI Ack is used by the MNP SRF to provide the requested MNP information for the subscriber to the gsmSCF (IPWorks in our case). The MNP Information contains following information.

Table 7 MNP Information

Information element name	Status	Description
MSRN	C	<p>This IE must be present, if requested by the gsmSCF. Refer to Reference [4].</p> <p>Depend on the Number Portability Status, it may contain following information:</p> <ul style="list-style-type: none"> • Not Known To Be Ported: no routing number + MSISDN • Own Number PortedOut: routing number + MSISDN • Foreign Number Ported To Foreign Network: routing number + MSISDN • Own Number Not Ported Out: no routing number + MSISDN • Foreign Number Ported In: no routing number + MSISDN <p>IPWorks takes this element as optional though it is conditional parameter according to Reference [4].</p>
IMSI	C	<p>This IE must be presented, if requested by the gsmSCF. Refer to Reference [4].</p> <p>IPWorks takes this element as optional though it is conditional parameter according to Reference [4].</p>



Information element name	Status	Description
MSISDN	C	<p>This IE must be present, if requested by the gsmSCF. Refer to Reference [4].</p> <p>IPWorks takes this element as optional though it is conditional parameter according to Reference [4].</p>
Number Portability Status	C	<p>This IE must be present, if requested by the gsmSCF. It can have one of the following values:</p> <ul style="list-style-type: none">• Not Known To Be Ported• Own Number PortedOut• Foreign Number Ported To Foreign Network• Own Number Not Ported Out• Foreign Number Ported In <p>IPWorks takes this element as optional though it is conditional parameter, see Reference [4].</p>

4.7 Send Routing Information Negative Response

There could be many types possible SRI negative response. IPWorks does not distinguish them and treat all the negative response as failed MNP query.





5 Formal Syntax or Schema

Refer to Reference [5] for the interface used by MAP v3 ATI operation, and SRI operation.





6 Related Standards

This interface is based on Reference [6] .

This interface does not fully comply with the whole specification:

- Only the chapter 12 “Subscriber Mobile Number Portability status retrieval” service is supported.
- IPWorks simulates the role of gsmSCF in the MNP service.
- For the information elements which are conditional parameters in ATI Ack and SRI Ack, IPWorks treats all them as optional.





Reference List

IPWorks Library Documents

- [1] *Trademark Information*
- [2] *Glossary of Terms and Acronyms*
- [3] *Typographic Conventions*

Standards

- [4] [3GPP TS 23.066 3rd Generation Partnership Project; Technical Specification Group Core Network; Support of Mobile Number Portability \(MNP\); Technical realization; Stage 2 \(Release 6\)](#)
- [5] [3GPP TS 29.002 3rd Generation Partnership Project; Technical Specification Group Core Network; Mobile Application Part \(MAP\) specification; Release 6](#)
- [6] [3GPP TS 23.078 3rd Generation Partnership Project; Technical Specification Group Core Network; Customised Applications for Mobile network Enhanced Logic \(CAMEL\) Phase 4; Stage 2 \(Release 6\)](#)