

# Routing Server

OPERATIONAL DIRECTIONS



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## 1

## GENERAL

In a private network that consists of IP trunks that interconnect the nodes, the Routing Server feature enables storing of all IP routing information, for the entire network, in one central database. This information can then be retrieved, as required, by prepared nodes to route calls to the required destination. Prepared means that these nodes support the Routing Server feature. Without this feature, if an IP address has to be changed anywhere in the network, the routing tables have to be updated locally at each node, in a non-automatic process.

The Routing Server stores the information specific to IP networks between various MX-ONE systems (also known as satellites) in Private Network Routing destination tables. When calls are made between the satellite exchanges, requests are performed towards the Routing Server to fetch information of the IP network. The fetched IP network information are stored in the Satellites based on the destination. Further calls to the same node use the earlier fetched temporary information instead of calling the Routing Server. If a call fails, the temporary data are deleted and new data are fetched from next call.

For this function to work the satellites (clients) will require Licenses depending on the value of the OPT, option parameter (6 Procedure on page 5 and 7 Execution on page 7 ).

The required IP network information is retrieved by the satellite during establishment of a call or execution of a feature towards a destination (for example, Diversion or Deflection). The information is retrieved either locally or from the Routing Server.

For a description of private network routing and the tables involved in the routing analysis, see operational directions for *ADMINISTRATION OF ROUTES* section PNR - PRIVATE NETWORK ROUTING.

**Note:** Routing Server can also be configured with Manager.

## 2 DATA STRUCTURE

The Routing Server feature uses the LC commands. With LC commands it is possible to initiate tables concerning Private Network Routing data in addition to IP information data for the execution of the Routing Server.

The Routing Server makes use of the following PNR tables:

- Private Network Routing destination table (PNR).
- Fictitious Route Choice table (RCT).

### 2.1 PRIVATE NETWORK ROUTING DESTINATION TABLE

A number of entries can be defined in the PNR table. Each entry in this table consists of data fields for: ENTRY, PRE, PRE1, TRC, TRC1, FRCT, OPT, IP1, IP2, RROUID, and RDEST.

See operational directions for *LEAST COST ROUTING, LC*. See the description for *CAPACITIES*.

The attributes OPT, IP1, IP2, RROUID, and RDEST are introduced in an existing PNR table by the Routing Server feature. (The Routing Server is a functional addition to the existing Private Network Routing.)

### 2.2 FICTITIOUS ROUTE CHOICE TABLE

A number of entries can be defined in the Fictitious Route Choice Table (FRCT). Each entry stores the data field PRE, which contains data for the external analysis.

## 3 PREREQUISITES

For the Routing Server feature to work, External Destination number series (ED or EC) must be initiated for all Private Network Routing access codes. See operational directions for *NUMBER ANALYSIS, NA*.

The following licenses are required:

- For the server, the license is called: ROUTING-SERVER - SERVER
- For the client, the license is called: ROUTING-SERVER - CLIENT

The license file can be checked with the command *license\_print*.

## 4 TOOLS

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## 5 REFERENCES

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## 6 PROCEDURE

### 6.1 DATA IN THE ROUTING SERVER

The OPT parameter states the type of IP configuration data for a specific destination. The parameter values for OPT, which can be used in the Routing Server, are 3, 5, and 6.

For the Routing Server functionality in the server, a dialed number for IP routes is analyzed in the PNR table. If no match is found the number will be analyzed in the external analysis. An entry in the PNR destination table is affiliated with an index in the Fictitious Route Choice Table, where the digits that are to be used in the external analysis are found. The external analysis might indicate that an Individual Number Translation shall be performed for the selected route choice. This information is fetched from the PNR destination table and is used as editing information on the dialed number.

In addition to this information, IP addresses and a Remote Route identifier for each entry are stored in the PNR tables. The IP information stored in the PNR will be used as local IP data from the Routing Server to other destinations during calls or feature executions. Also there will be routine checks for the ENTRY in the PNR tables to discover faulty IP connection.

On requests from the Clients (the Satellite Exchanges), the information stored in PNR tables for the specific Entries are returned.

**Table 1**

Value of OPT	Purpose	Requirement of Server License Object
OPT = 3	IP data are stored as permanent data in the PNR table and can be fetched by a satellite. The data are routinely checked.	Yes
OPT = 5	This is similar to option 3. The only difference is that when the routine check is made the data will not be marked faulty or the alarm 359 will be given if the check fails, BUT if the check succeeds the option 5 is changed to option 3 in the PNR table.	Yes
OPT = 6	This is used for Satellites which will never respond to a routine check but the data stored in the Server can be fetched by a Satellite, a routine check is never made on this entry.	Yes

## 6.2

## DATA IN THE SATELLITES

The OPT parameter states the type of IP configuration data for a specific destination. The parameter values for OPT, which can be used in the Satellites, are 1, 2 and 4.

For the Routing Server functionality in the satellites, a dialed number for IP routes is analyzed in the PNR table. If no match is found the number will be analyzed in the external analysis. An entry in the PNR destination table is affiliated with an index in the Fictitious Route Choice Table, where the digits that are to be used in the external analysis are found. The external analysis might indicate that an Individual Number Translation shall be performed for the selected route choice. This information is fetched from the PNR destination table and is used as editing information for the dialed number.

In addition to this basic information for PNR, the Routing Server functionality adds some extra information related to IP trunks. A Remote Route Identifier and two IP addresses for each ENTRY are stored in the PNR tables. This information can be local or fetched from the Routing Server.

The destination code to the Routing Server is programmed as a normal destination code with the command *RODDI*, using the optional parameters IP and RROUID.

**Table 2**

Value of OPT	Purpose	Requirement of Client License Object
OPT = 1	The satellite PNR table contains IP data which can be used to route the call over the IP network.	Yes
OPT = 2	IP data (IP1, IP2, RROUID) and number translation information (PRE, TRC, PRE1 and TRC1) must be fetched from the routing server for the specific ENTRY in the PNR table. The fetched data are then stored locally as temporary data so it does not need to be fetched for every call. If a call fails, though, the temporary data is deleted and new data must be fetched on the next call. In addition, this option supports the PNR table splitting function. See the description for <i>ROUTING SERVER</i> section PNR Table Splitting in the Satellite.	Yes
OPT = 4	If the length of the destination number in the satellite is shorter than that of the destination number in the server, no temporary data can be stored in the Satellite for the PNR entry in this case, so the data needed are to be fetched on a call-by-call basis. Splitting will not be executed.	Yes

# 7 EXECUTION

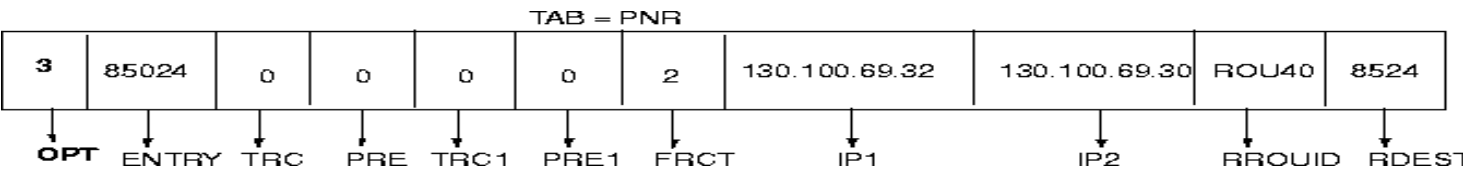
## 7.1 PRIVATE NETWORK ROUTING DESTINATION TABLE

### 7.1.1 INITIATE PNR TABLE DATA IN ROUTING SERVER

**General**

A number of one to many digit entries can be put into the PNR. See the description for *CAPACITIES*.

For example, a PNR in a Routing Server might look like:



**Figure 1:**

Leading digits or the complete number 85024 represents an external destination (ED) to any co-operating MX-ONE.

FRCT = 2 indicates the index to the Fictitious Route Choice Table where the digits that are to be used in the external analysis are found.

TRC, PRE, TRC1 and PRE1 represent the set of individual number translation information (optional).

OPT can have values 3, 5, and 6 for the Routing Server. If the value 6 is chosen, RDEST is not used.

IP1 and IP2 specify the IP address for an ENTRY. Up to two IP addresses can be stated for each ENTRY.

RROUID specifies the Remote Route Identifier for the ENTRY (if required).

RDEST specifies the destination code for the Satellites. It is used by time based routines to check for any faulty IP address.

**Prerequisites**

An IP Route must exist towards the different Satellites connected to the Routing Server.

**Execution**

Table 3

		Measure/Question	Observation/ Comment
<b>Flow</b> <pre> graph TD     START([START]) --&gt; 1[1]     1 --&gt; 2{2}     2 -- Y --&gt; 3{3}     2 -- N --&gt; 4[4]     3 -- Y --&gt; 5[5]     3 -- N --&gt; 4     4 --&gt; 5     5 --&gt; 6{6}     6 -- Y --&gt; 7[7]     6 -- N --&gt; 2     7 --&gt; STOP([STOP])           </pre>	1	Key the command <i>LCDDP</i> to verify the existence of data.	
	2	Do the data to be initiated already exist?	
	3	Are the data correct?	
	4	Key the command <i>LCDDI</i> to initiate the data.	
	5	Key the command <i>LCDDP</i> to verify the result.	
	6	Are all data inserted?	
	7	Proceed with initiation of the corresponding data in the RCT table.	

## 7.1.2

## INITIATE PNR TABLE DATA IN SATELLITES

**General**

A number of one to many digit entries can be put into the PNR. See the description for *CAPACITIES*.

For example, a PNR in a Satellite might look like:

TAB = PNR										
2	85024	0*	0*	0*	0*	4	130.100.69.32*	130.100.69.30*	ROU40*	8534
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
OPT	ENTRY	TRC	PRE	TRC1	PRE1	FRCT	IP1	IP2	RROUID	RDEST

\*) Data are received from the Routing Server



**Figure 2:**

Leading digits or the complete number 85024 represents an external destination (ED) to the satellite connected to the Routing Server, for which the Fetch of IP information may be desired.

FRCT = 4 indicates the index to the Fictitious Route Choice Table (FRCT) where the digits that are to be used in the external analysis are found.

TRC, PRE, TRC1, and PRE1 represent the set of individual number translation information.

OPT can have the values 2 and 4 for the satellites.

IP1 and IP2 specify the IP address for an ENTRY. Up to two IP addresses can be stated for each ENTRY.

RROUID specifies the Remote Route Identifier for the ENTRY (in this case the connected MX-ONE satellite for which the IP information may be requested).

RDEST specifies the destination code for the Routing Server.

**Prerequisites**

An IP Route must exist towards the Routing Server and other satellites.

**Execution**

Table 4

		Measure/Question	Observation/ Comment
<b>Flow</b> <pre> graph TD     START([START]) --&gt; 1[1]     1 --&gt; 2{2}     2 -- Y --&gt; 3{3}     3 -- Y --&gt; 4[4]     3 -- N --&gt; 1     2 -- N --&gt; 4     4 --&gt; 5[5]     5 --&gt; 6{6}     6 -- Y --&gt; 7[7]     7 --&gt; STOP([STOP])     6 -- N --&gt; 1           </pre>	1	Key the command <i>LCDDP</i> to verify existence of data.	
	2	Do the data already exist?	
	3	Are the data correct?	
	4	Key the command <i>LCDDI</i> to initiate the data.	
	5	Key the command <i>LCDDP</i> to verify the result	
	6	Are all data inserted?	
	7	Proceed with initiation of the corresponding data in the RCT table.	

## 7.1.3

## ERASE PNR TABLE DATA

**General**

Erasure of data in PNR tables is based on the ENTRY field or on deletion of the whole table.

**Prerequisites**

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**Execution**

Table 5

		Measure/Question	Observation/ Comment
<b>Flow</b> 	1	Key the command <i>LCDDP</i> to verify existence of data.	
	2	Are there data in the table?	
	3	Are there data to be erased in the table?	
	4	Key the command <i>LCDDE</i> to erase data.	
	5	Are all data to be erased removed?	
	6	Key the command <i>LCDDP</i> to verify the result.	

7.1.4 CHANGE PNR TABLE DATA

General

There is no specific command to change data in a table. Change is performed by the command *LCDDI* with new values for the data. Previous values will be replaced.

Prerequisites

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Execution

6 Procedure on page 5 or 7.1.1 Initiate PNR Table Data in Routing Server on page 7 or 7.1.2 Initiate PNR Table Data in Satellites on page 8.

7.1.5 PRINT PNR TABLE DATA

Key the command *LCDDP* (with IPOPT=Y) for a printout of IP information along with normal routing information in the PNR tables.

### 7.1.6 ERASE TEMPORARY IP INFORMATION IN SATELLITE

Key the command *LCIPE*.

The data fetched from the Routing Server are stored in the satellites so that they can be fetched locally. But if a call fails, the temporary data are deleted and new data must be fetched on the next call. The data stored in the satellites can also be deleted by command. Command *LCIPE* will erase all temporary routing data in the PNR table and will initiate the updating routine towards the Routing Server.

Key the command *LCDDP* to verify the erasure of IP information stored in the PNR tables.

### 7.1.7 STOP TIME-BASED UPDATE ROUTINE

Key the command *LCUDE*.

In the satellite the command will stop the time-based update routine in the PNR for all the destination entries stated.

In the server the command will stop the time-based satellite check routine in the PNR.

**Note:** If command *LCIPE* is keyed after *LCUDE* in satellites then time based routines will **not** be stopped, as the command *LCIPE* not only initiates temporary data in Satellites but also will initiate the updating routine towards the Routing Server. In order to erase temporary data in satellites and also to stop time based routines commands must be keyed in the following order: *LCIPE* first, and then *LCUDE*.

### 7.1.8 START TIME SUPERVISION IN PNR

Key the command *LCUDI*.

In the satellite the command will start the time-based update routine in the PNR for all the destination entries stated.

In the server the command will start the time-based satellite check routine in PNR.

### 7.1.9 HANDLE SPLIT PNR TABLE

Alarm 360 indicates that the reload data have been changed in the PNR and that a system dump should be made.

See fault locating directions for *FAULT CODE 360*.

## 8 TERMINATION

If exchange data have been altered a dump to backup media must be done.