

Number Conversion and Bearer Capability Substitution

OPERATIONAL DIRECTIONS



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GENERAL

The function Number Conversion, Bearer Capability and High-Level Compatibility substitution (NU) is based on a number of programmable data tables, which are initiated, erased, and printed using commands.

It is possible to convert the following numbers:

- Received B-number
- Sent A-number
- Sent connected number
- Received A-number
- Received connected number

Conversion is performed whenever a number is sent or received to or from the network, independently of the type of signaling system. The number conversion can be made for the whole system or depending on the route number of the route that delivers or receives the call.

It is possible to substitute received Bearer Capability and High-Level Compatibility, depending on the received called number and COS of the incoming route. Number conversion is executed before Bearer Capability and High-Level Compatibility substitution, in case both are required.

In addition, it is possible to perform number conversion when the number is sent internally.

1.1

CONVERSION OF THE RECEIVED B-NUMBER

The following types of number can be received by a MX-ONE Service Node:

- Unknown public number
- International number
- National number
- Network specific number
- Local public number
- Unknown private number
- Local private number
- Level 1 Regional number

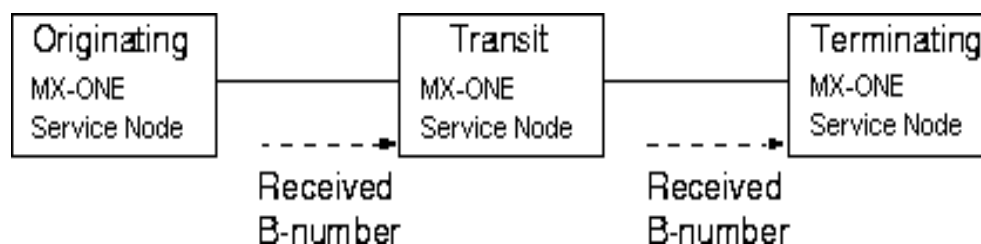
With the number conversion function it is possible to convert all these numbers in order to get the right directory number.

It is possible to delete up to 20 digits and to add up to 10 digits. The result of the conversion can be between 1 and 26 digits.

If the public external line does not support the transfer of type of number, the default value Unknown public number is used.

If the tie line does not support transfer of type of number, the default value Unknown private number is used.

The received B-number can be converted in a terminating or a transit MX-ONE Service Node.



The received B-number can be converted in one or two steps:

One-step conversion

1. Delete, add, or change the number.

Two-step conversion

1. Delete, add, or change the prefixes (international, national, local public, level 1 Regional, or route access code).
2. Convert the internal directory number.

For two-step conversion, the parameter CONT is used in step 1 to indicate whether the conversion continues in the internal directory number table (step 2).

1.2

CONVERSION OF THE SENT A-NUMBER AND THE SENT CONNECTED NUMBER

These numbers consist of two parts: the exchange number and the user's directory number. For sent connected numbers, the conversion is performed on the user's directory number.

The MX-ONE Service Node distinguishes between private and public destinations when the sent A-number is to be converted. In both cases it is the sent A-number, the TON, or the route directory number that can be converted.

Conversion of the sent A-number or TON is possible depending on the outgoing route and destination. However, this conversion can be done depending on the additional category defined. If the category is set, the sent A-number or TON can be converted depending on the outgoing route or destination specified. At the originating exchange, if the category is not set, then TON conversion is not possible, nor is conversion on the outgoing destination. At the transit exchange, if the category is not set, then it is only the route directory number that can be converted based on the outgoing route.

Conversion of the sent A-number and/or TON is also supported for calls to a SIP extension. For extensions there is no additional number conversion category, so this type of conversion will always be done if initiated.

Depending on sent A-number, the number and its TON can be converted.

The following types of number can be converted for a sent A-number by a MX-ONE Service Node:

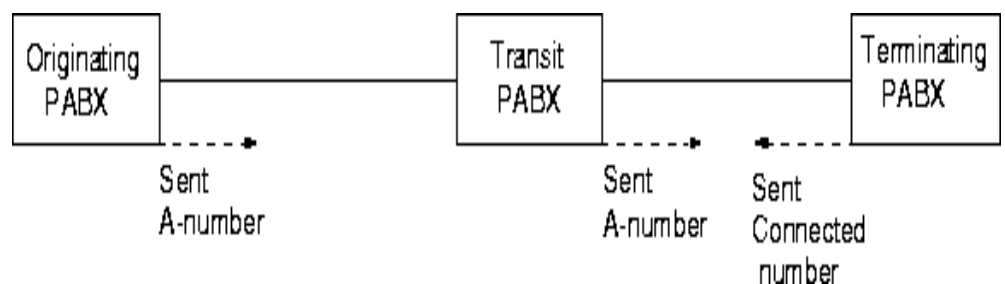
- Unknown public number
- International number
- National number
- Network specific number
- Local public number

- Unknown private number
- Local private number
- Level 1 Regional number

It is possible to convert the directory number in two ways, one for sending it to the public network and the other for sending the number to the private network.

For a sent A-number and sent connected number, the MX-ONE Service Node can delete up to 20 digits and add up to 20 digits. The result of the conversion can be between 1 and 20 digits.

The sent A-number can only be converted in the originating and transit MX-ONE Service Node, and the sent connected number only in the terminating MX-ONE Service Node. The conversion of the sent A-number in transit exchanges is controlled by the outgoing destination Class Of Service (ADC). For conversion in the transit MX-ONE Service Node, see 1.3 Conversion of the Received A-Number and the Received Connected Number on page 5 .



1.3

CONVERSION OF THE RECEIVED A-NUMBER AND THE RECEIVED CONNECTED NUMBER

The following types of numbers can be received by a MX-ONE Service Node:

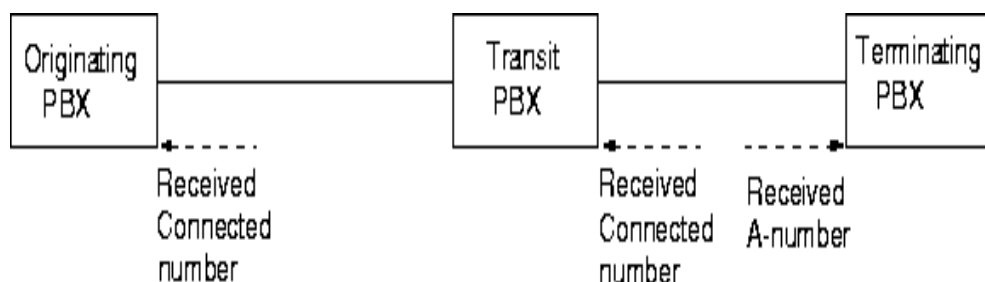
- Unknown public number
- International number
- National number
- Network specific number
- Local public number
- Unknown private number
- Local private number
- Level 1 Regional number

With the number conversion function it is possible to convert all these numbers in order to get the right number.

It is also possible to change the type of number after the conversion.

The received A-number can be converted in the terminating MX-ONE Service Node, and the received connected number in the originating and transit MX-ONE Service Node.

It is possible to delete up to 20 digits and add up to 10 digits. The result of the conversion can be between 1 and 20 digits in public network and between 1 and 10 digits in private network.



1.4 SUBSTITUTION OF RECEIVED BEARER CAPABILITY AND HIGH-LEVEL COMPATIBILITY

The Bearer Capability and High-Level Compatibility substitution may be initiated to avoid call rejection.

Depending on received B-number, received Bearer Capability and High-Level Compatibility can be substituted.

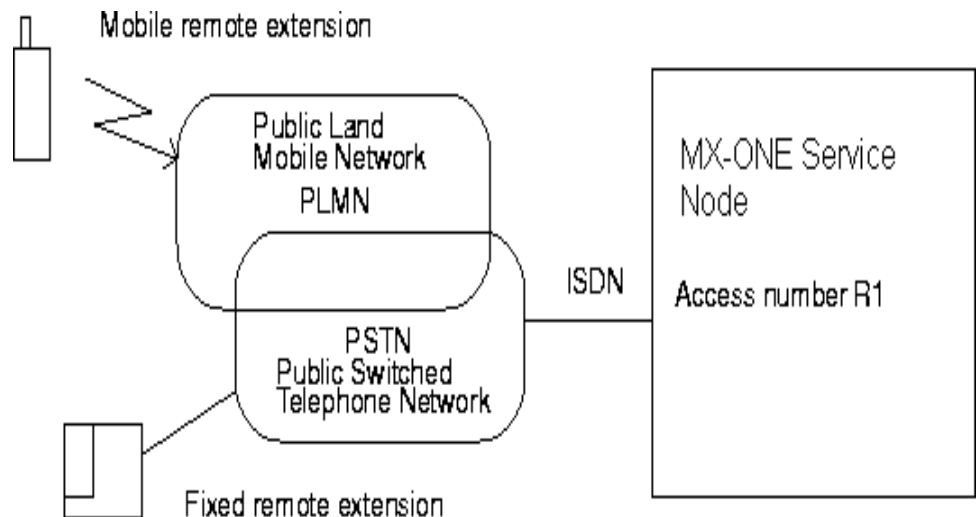
1.5 INBOUND CONVERSION

When dialing an internal extension, it is possible to convert the sent (dialed) number. That makes it possible to have an internal numbering plan with extension numbers exceeding five digits.

Note: Make sure that conversion of the sent and the connected internal number is made.

1.6 NUMBER CONVERSION FOR MOBILE REMOTE EXTENSIONS AND FIXED REMOTE EXTENSIONS

On calls from a public terminal using the R1 access number (a mobile remote extension or a fixed remote extension) to the MX-ONE Service Node, conversion to a remote extension number must be done if an A-number is received. Suppose a MX-ONE Service Node exchange connected to the public network as follows:



A public terminal (mobile or fixed) could act as a MX-ONE Service Node remote extension after conversion. When there is a call from the public terminal to MX-ONE Service Node and reception of A-number is possible, the A-party validation is done by sending the received A-number to the number conversion tables. If the A-number is not found in the number tables, the call is rejected. Otherwise, the call proceeds using the remote extension number given by the number conversion function.

1.7

NUMBER CONVERSION, BEARER CAPABILITY, AND HIGH-LEVEL COMPATIBILITY TABLES

Each number entry to the number conversion tables is defined as a data block consisting of the following data fields used as parameters:

ENTRY	Leading digits of the number to be converted
CNVTYP	Type of traffic case.
NUMTYP	Type of number to be converted
PRE	Pre-digits to be inserted in the beginning of the number
ROU	Route number of the route for which number conversion shall be done
TRC	Number of digits to delete in the number to be converted.
NEWTYP	New type of number after the conversion.
CONT	Indicates whether conversion continues.
BCAP	Bearer Capability value that shall substitute the Bearer Capability received from the network.
HLC	High-Level Compatibility value that shall substitute the High-Level Compatibility received from the network.
TARDST	Route access code for the external destination for which number conversion shall be done.

2

AIDS

I/O terminal.

3

REFERENCES

In these operational directions references are made to the following documents:

Operational directions:

Route Data

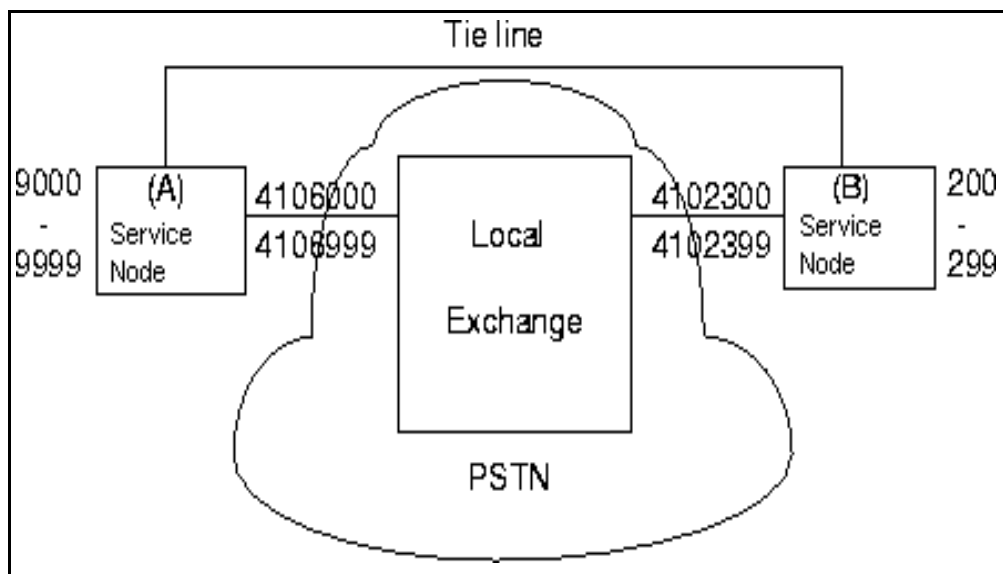
Command description:

Number Conversion and Bearer Capability Substitution Route Data, RO

4 EXECUTION

4.1 EXAMPLE 1

Suppose two MX-ONE Service Node exchanges connected to a public network as follows:



The numbering plan of this scenario is as follows:

Internal Directory Numbers	Public Numbers
MX-ONE Service Node (A) 9000 - 9999	4106000 - 4106999
MX-ONE Service Node (B) 200 - 299	4102300 - 4102399
Tie Line	
MX-ONE Service Node (A)	9000 - 9999
MX-ONE Service Node (B)	8200 - 8299

The route access code to the public network is 0. This example describes the necessary conversions in MX-ONE Service Node (A).

The route access code to the MX-ONE Service Node (B) is 8.

4.1.1 CONVERSION OF THE RECEIVED B-NUMBER

The conversions for any call from the public network to the MX-ONE Service Node (A) will be as follows:

Type of Received Number	Number to Convert	Number of Digits to Delete	Digits to Add	Converted Number
International	341-4106XXX	6	-	6XXX
National	91-4106XXX	5	-	6XXX
Local	4106XXX	3	-	6XXX

Internal directory number	6XXX	1	9	9XXX
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In the example above, the conversions are made in two steps:

- Deletion of the prefixes (international, national, and local public).
- Conversion of the received directory number to the corresponding internal directory number in MX-ONE Service Node (A).

For a private call to MX-ONE Service Node (A), no conversion is needed.

4.1.2

CONVERSION OF THE SENT A/CONNECTED NUMBER

When sent to the public network

The conversion of the sent A/connected number in MX-ONE Service Node (A) when sent to the public network is made by changing the directory number

9XXX to 6XXX

When sent to the private network

No conversion is needed for MX-ONE Service Node (A) when the number is sent to the private network.

When sent to an extension (SIP)

Conversion of the sent A-number or the connected number in MX-ONE Service Node when sent to a SIP extension, is made by converting the A-number and possibly also the TON.

4.1.3

CONVERSION OF THE RECEIVED A/CONNECTED NUMBER

The conversions for any number received in MX-ONE Service Node (B) will be

Type of Received Number	Number to Convert	Number of Digits to Delete	Digits to Add	Converted Number
International	341-XXXXXXX	-	0	0341-XXXXXXX
National	91-XXXXXXX	-	0	091-XXXXXXX
Local public	4102XXX	-	0	0-4102XXX
Local private	2XX	-	8	82XX

The conversion in this example for the public type of numbers is made by adding the route access code 0 to the received A-numbers.

4.1.4

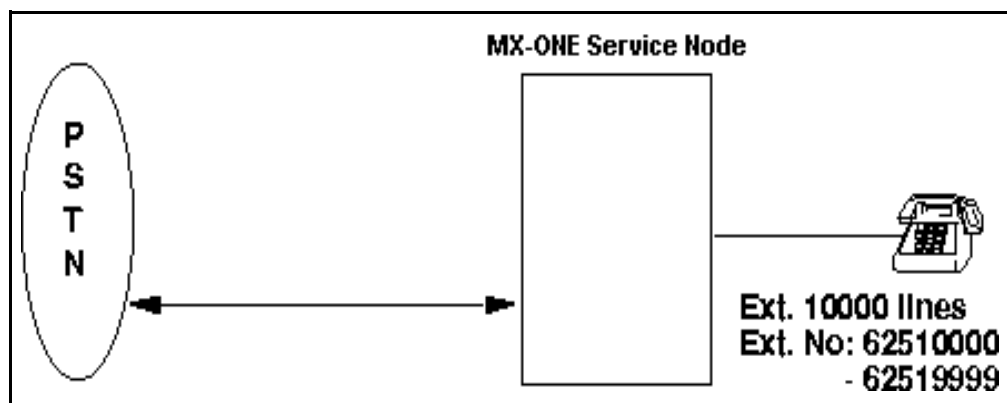
ROUTE-DEPENDENT CONVERSION

The conversions described above can be made dependent on the route number that delivers or receives the call.

4.2

EXAMPLE 2

Consider the scenario where the local extension numbers of the PSTN are eight digit, and the extension numbers of the MX-ONE Service Node are 62510000 to 62519999, which belong to the numbering plan of the local PSTN.



If the public subscriber in the PSTN area makes a call to a MX-ONE Service Node extension, the number 6251xxxx is dialed directly. If the MX-ONE Service Node extension makes an outgoing call to a public subscriber in the PSTN, is not necessary to dial any route access code, since the subscriber number is dialed directly. In addition, if an extension of this MX-ONE Service Node needs to make an internal call, eight digits must be dialed.

4.2.1

CONVERSION OF THE RECEIVED B-NUMBER

When the MX-ONE Service Node receives a number from the PSTN, the following conversion takes place:

Type of Received Number	Number to Convert	Number of Digits to Delete	Digits to Add	Converted Number
Local public	6251XXXX	4	-	XXXX

(4.1.1 Conversion of the Received B-Number on page 9).

4.2.2

CONVERSION OF THE SENT A/CONNECTED NUMBER

When sent to the public network

No conversion is needed in the MX-ONE Service Node when the number is sent to the public network.

4.3

NUMBER CONVERSION INITIATE

		Measure/Question	Observation/Comment
<p>Flow</p> <pre> graph TD START([START]) --> D1{1} D1 -- N --> D10{10} D1 -- Y --> S2[2] S2 --> D3{3} D3 -- Y --> S4[4] D3 -- N --> S5[5] S4 --> S5 S5 --> S6[6] S6 --> D7{7} D7 -- Y --> S2 D7 -- N --> D8{8} D8 -- Y --> S2 D8 -- N --> S9[9] S9 --> D10 D10 -- Y --> D11{11} D10 -- N --> S2 D11 -- Y --> S12[12] D11 -- N --> S2 S12 --> STOP([STOP]) </pre>	1	Are there any numbers to be converted?	If NO, proceed to step 10.
	2	Key the command <i>number_conversion_print</i> to read the number before initiating it.	
	3	Are the digits already initiated?	If NO, proceed to step 5.
	4	Be sure that the previous conversion is not needed.	The numbers initiated will be changed.
	5	Key <i>number_conversion_initiate</i> to initiate the number conversion.	
	6	Key <i>number_conversion_print</i> to verify that the number has been converted.	
	7	Are there more digits to initiate or change?	If YES, return to step 2.
	8	Has the route already category for number conversion?	If YES, proceed to step 10.
	9	Key the command <i>ROCAC</i> to change the category to permit number conversion.	See the command description for <i>ROUTE DATA</i> .
	10	Is this a transit exchange?	If NO, proceed to STOP.
	11	Is A-number conversion not required?	The received A-Number conversion is allowed by default in transit exchanges. If NO, proceed to STOP.
	12	Key the command <i>ROCAC</i> to change the category to permit number conversion.	See the command description for <i>ROUTE DATA</i> .

4.4

NUMBER CONVERSION END

		Measure/Question	Observation/Comment
<p>Flow</p> <pre> graph TD START([START]) --> D1{1} D1 -- N --> STOP([STOP]) D1 -- Y --> P2[2] P2 --> D3{3} D3 -- N --> P5[5] P5 --> D6{6} D6 -- Y --> P2 D3 -- Y --> P4[4] P4 --> P5 D6 -- N --> STOP </pre>	1	Are there any numbers to be deleted?	
	2	Key the command <i>number_conversion_print</i> to read the number before changing.	
	3	Are the numbers already converted?	
	4	Key the command <i>number_conversion_end</i> to end the number conversion.	
	5	Key the command <i>number_conversion_print</i> to verify that the number has been ended.	
	6	Are there more numbers to delete?	

4.5

NUMBER CONVERSION PRINT

		Measure/Question	Observation/Comment
<p>Flow</p> <pre> graph TD START([START]) --> D1{1} D1 -- N --> STOP1([STOP]) D1 -- Y --> P2[2] P2 --> D1 P2 --> STOP2([STOP]) </pre>	1	Are there any numbers to be printed?	If NO, proceed to STOP.
	2	Key the command <i>number_conversion_print</i> to print the numbers.	

4.6

BEARER CAPABILITY AND HIGH-LEVEL COMPATIBILITY
SUBSTITUTION INITIATE

		Measure/Question	Observation/Comment
<p>Flow</p> <pre> graph TD START([START]) --> D1{1} D1 -- N --> STOP([STOP]) D1 -- Y --> S2[2] S2 --> D3{3} D3 -- N --> S5[5] D3 -- Y --> S4[4] S4 --> S5 S5 --> S6[6] S6 --> D7{7} D7 -- N --> D8{8} D7 -- Y --> S2 D8 -- N --> S9[9] S9 --> STOP D8 -- Y --> S5 </pre>	1	Are there any BCAP or HLC to be substituted?	If NO, proceed to STOP.
	2	Key the command <i>number_conversion_print</i> to read the number before initiating it.	
	3	Is any substitution for the number already initiated?	If NO, proceed to step 5.
	4	Be sure that the previous substitution is not needed for these digits.	The numbers initiated will be changed.
	5	Key the command <i>number_conversion_initiate</i> to initiate the BCAP or HLC substitution.	
	6	Key the command <i>number_conversion_print</i> to verify that the BCAP or HLC has been initiated for this number.	
	7	Are there more digits to initiate or change?	If YES, return to step 2.
	8	Has the route already category for BCAP or HLC substitution?	If YES, proceed to STOP.
	9	Key the command <i>ROCAC</i> to change category to permit BCAP or HLC substitution.	See the command description for <i>ROUTE DATA</i> .

4.7

BEARER CAPABILITY AND HIGH-LEVEL COMPATIBILITY
SUBSTITUTION END

		Measure/Question	Observation/Comment
<p>Flow</p> <pre> graph TD START([START]) --> D1{1} D1 -- N --> STOP([STOP]) D1 -- Y --> P2[2] P2 --> D3{3} D3 -- N --> P5[5] D3 -- Y --> P4[4] P4 --> D6{6} D6 -- Y --> P2 D6 -- N --> STOP </pre>	1	Are there any numbers to be deleted?	If NO, proceed to STOP.
	2	Key the command <i>number_conversion_print</i> to read the number before changing.	
	3	Are the numbers already initiated?	If NO, proceed to step 6.
	4	Key the command <i>number_conversion_end</i> to end the BCAP or HLC substitution.	
	5	Key the command <i>number_conversion_print</i> to verify that the number has been ended.	
	6	Are there more numbers to delete?	If YES, return to step 2.

4.8

BEARER CAPABILITY AND HIGH-LEVEL COMPATIBILITY
SUBSTITUTION PRINT

		Measure/Question	Observation/Comment
Flow <pre>graph TD; START([START]) --> D1{1}; D1 -- N --> STOP1([STOP]); D1 -- Y --> P2[2]; P2 --> STOP2([STOP]); STOP2 --> D1;</pre>	1	Are there any numbers to be printed?	If NO, proceed to STOP.
	2	Key the command <i>number_conversion_print</i> to print the numbers.	

5

TERMINATION

If exchange data have been altered, a dump to back up media must be performed.