

LNP, operators lookup and mimport for Mexico

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About

The Mizu VoIP server number portability module can be used to alter the routing if the number is ported to another operator (MNP/LNP).

This documentation described the Mexico specific operator and LNP lookup process implemented by the Mizu VoIP server, developed for TV Rey de Occidente S.A. de C.V.

Step-by-step setup

You can follow these steps to configure your server with the Mexico operator and LNP lookup functionalities:

1. Prerequisites
 - a. Check the [tutorial](#), the [routing guide](#) and the “Routing” chapter and the [MAdmin guide](#) to have a good understanding of the Mizu VoIP server configuration and usage, especially the routing process
 - b. Have a look at the most important [database tables](#)
 - c. Backup the database before to make any changes
2. Configure the server for operator and LNP lookup as described [here](#)
3. Use the [mimport](#) tool to import the data from the raw source format as stored on the FTP at 201.159.38.84.
4. Add SIP servers (manually at “Users and Devices” form or via some automation), groups (manually at “Groups” form or via some automation) and any other data which might be required to achieve your goals
5. Configure the number transformation and routing rules
 - a. Configure the Routing (manually at “Routing” form or via some automation)
 - b. Add Rules for number transformations after your needs ("After caller DB details" and/or "At routing end") (manually at “Rules” form or via some automation). You can also force or suppress the LNP lookup with the “Numport” operation
 - c. Modify the v_checkdialplan after your needs (manually or via some automation)
 - d. More details about the routing process can be found [here](#).
6. Test.

You should make tests on a server dedicated for this by calling specific number and inspecting the server logs if something goes wrong.

Mizutech will require the following details for any related support requests:

 - SIP Call-ID of the failed call (or CDR details: id/datum/caller/called)
 - Detailed and exact description about the issue (What went wrong?)
 - Expected result (How the server should have route the call correctly? What should be the correct outbound route and number?)

Server configuration

The most important parameters to be set are the followings:

(Global config options to be set from the “Configurations” form)

- **checknumport**

Possible values:

- -1: auto
- 0=not check
- 1=check for changed prefix only (replace)
- 2=check for changed number only (change the called number as specified by the newnumber field)
- 3=check for changed domain only (route the call to the server specified by newdomain:newport. The fwdtootherdomains must have to be set to at least 1 for domain routing to have effect.)
- 4=check for changed server id only (route the call to the SIP server specified by sipserverid or by carrierid with a lookup from tb_carriermap)
- 5=check for changed prefix only (insert: add a prefix to the called number as specified by the providerpx field)
- 6=prefix insert
- 9=check all

Recommended for Mexico: 6 (if only the discussed prefix insert have to be done) or 9 (if other operations might be also performed)

This global config option can be overwritten for each call from the Rules “Numport” operation.
Do disable (no LNP and operator lookup) set both CHECKDIR and CHECKLNP to 0.

- **numporttype**

Possible values: 0: default, other: country specific
Set to 2 for Mexico!

Other configuration options (these has meaningful default values)

- numportstrict: specify if to check also with/without country prefix: -1=auto, 0=no, 1=a little, 2=strict (default is 2)
- spidrewrite: not relevant for Mexico: 0=no, 1=yes, 2=block if not exists (default is 0)
- numdircache: cache tb_directions: -1: auto, set to 0 to disable, 1 to cache queried, 2= to cache all, 3+ to precache x items (order by cachehit desc) (default is 2)
- mustsetnumdir: must set direction name for CDR records: 0=never, 1=no, 2=yes (also on high load) (default is 1)
- lookupcdrcalldirection: 0: no, 1: important only, 2: yes (default is 2)
- checknumportnumonly: 0: check all target URI, other: check phone numbers only above this length (default is 8)
- checknumportpx1,2,3...: set the prefixes when LNP lookup have to be performed (will be applied if at least one prefix is set)
- nochecknumportpx1,2,3...: set the prefixes when LNP lookup have NOT to be performed
- numportnumlen_min/numportnumlen_max: min/max prefix length in tb_portednumbers. calculated automatically to speedup v_check_numport (ignoring the lookup if number is smaller/longer)

Database

Database upgrade

For old databases, the following changes are required (already done for the Trey server):

- ALTER TABLE tb_directions ADD [idd] [int] NULL
- ALTER TABLE tb_directions ADD [mpp] [tinyint] NULL
- ALTER TABLE tb_portednumbers ADD [mpp] [tinyint] NULL
- update v_check_numport: select TOP 1 tb_portednumbers.* from tb_portednumbers with(nolock) where number = @number

Database tables

The data required for the Mexico operator and LNP lookup operations are stored in the following tables:

- **tb_directions**

Contains the data needed for operator lookup imported from pnn_co.csv and pngng_co.csv.

Instead of using ranges, the data is transformed by mimport to shortest prefix match to speed up the lookup operations.

Fields:

- id: autoincrement index
- type: any 3 digit type indication such as NAT for national and INT for international directions
- name: operator/carrier/country name
- prefix: best match prefix for lookups (will load longest match)
- spid: operator id (not used for now) (not used for Mexico)
- cnl: extra prefix (not used for Mexico)
- idd: operaor id
- mpp: 1 if yes, 0 if no

Notes:

- import from pnn_co.csv and pngng_co.csv
- from - to (nir + serie + range)
- operator id (tb_carriermap)
- any additional prefix if needed:
- used in routing -> called prefix -> "ranglookup" (this will be the first routing entry)
- directions can be also imported from general CSV files (MManage -> Tools menu -> Configure -> Database -> Setup -> Import directions)
- the tb_directions can be optimized from MManage -> Tools menu -> Configure -> Database -> Setup -> Normalize directions

- **tb_portednumbers**

Contains the LNP number list imported from LNP_Initial and LNP_Daily folders

Fields:

- id: autoincrement index
- number: original (normalized) called (B) number (clustered index)
- sipserverid: change the SIP server id to this if set (not used for now)
- carrierid: new operator id (RCR field -> IDD)
- providerpx: new prefix (for example instead of 3630 changed to 3620)
- newnumber: the changed number (not used for Mexico)
- newdomain: the new service provider ip or domain (not used for Mexico)
- newport: service port (defaults to 5060) (not used for Mexico)
- priority: checked for duplicate numbers
- datum: record insertion date
- mpp: 1 if yes, 0 if no

You must have the providerpx OR sipserverid OR carrierid OR newnumber OR newdomain:newport specified.

For Mexico the important fields are: number, carrierid and mpp which can be used add a prefix for the incoming number (There is no need to lookup for any SIP server or carrier. The IDD will be used as-is as a prefix string).

You can set the ported numbers form the MManage "Number Portability" form or you can automate the process by programmatically changing the tb_portednumbers database table. The Export/Import wizard from the file menu can be used to easily populate this table (from CSV or other sources).

If certain numbers must go to certain carriers (SIP servers) then you might use the tb_carriermap table to add the carriers and just use the carrierid in the tb_portednumbers table. This way you can easily manage the carriers used for LNP.

- **tb_carriermap**

Contains the operator name - ID mapping imported from Participants.xml. Not really used at this moment because (the operator name is also present in tb_directions and tb_portednumbers).

Might be used as a helper table for operators id -> name or it can be used also to map a sip server to an operator
Import from Participants.xml (operator name, operator id, others)

Optimizations

The following operator and LNP lookup related optimizations have been performed to increase speed and throughput:

- data stored in denormalized tb_directions table for fast lookup
- optimized CSV and XML parsers for mimport
- tb_directions is cached on all app servers. two level cache: file and memory

- tb_directions number lengths are preloaded to avoid like% usage (so we can use exact equal tests)
- todo: numportcachex (tb_portednumbers is cached on all app servers if required. Number exists check only)

The routing process

Routing step-by-step

1. First a transformation might be done using the Rules functionality (this is done by the Trey team by creating rules manually or using some automation).

Note that numbers can be transformed also by other rules as specified in the [MAdmin guide](#) (especially at the “Normalize numbers” chapter)

Normalize to 10 digits (remove 01 or add same caller prefix). Nothing to do by Mizutech, will be handled by Rules:

- a. This is done by the Trey team by creating rules manually or using some automation
 - b. When customer calls National Long Distance they use 01+phone number, we strip the 01
 - c. If the call is LOCAL LAND LINE will be either 7 or 8 DIGITS so we need to complete the number with its area code to 10 digits
 - d. if the call is LOCAL MOBILE LINE will be 13 digits 044+10 digits, we strip 044 and check the number to LNP and original owner, then send the number as IDD+IDO+044+10digits
 - e. whether the routing have to perform the following two steps, can be set from Rules
2. Lookup in tb_portednumbers. if number found, the prefix the number with operator ID and eventually with 9 if MPP
 - a. check lnp -> returns IDD + 10digit
 - b. if number is MPP, prefix it with 9
 3. Lookup in tb_directions (operators number ranges) if number not found in previous LNP lookup step. If prefix found, the prefix the number with operator ID and eventually with 9 if MPP. To the routing the number will always come in IDD + MPP + 10digit format
 4. Routing decision depending on any criteria such as group and IDD (this is done by the Trey team by creating rules manually or using some automation)
 5. Additional outgoing number transformation might be done from the Rules and/or using the v_checkdialplan stored procedure (this is done by the Trey team by creating rules manually or using some automation)
 - a. change number after routed to whatever case needed: IDD + IDO + (044/045) + 10digit
 - b. before call goes out the SIP trunk might add the IDO to the number and maybe some other codes
 - c. example for longest out number format: IDD+IDO+MOBILE LONG DISTANCE CODE+phone number

Example

3531038689 -> LNP IDD=188 -> 188 3531038689 ->

-> route A -> 188 146 044 3531038689

-> route B -> 188 146 045 3531038689

where

188: IDD

146: IDO (our operator code)

044/045/01 mobile/landline (sometime added sometime not? This is up to the Trey team)

Examples from the Trey team:

- 146 is my company local ID and 245 for long distance
- if the NATIONAL LONG DISTANCE call was to LAND LINE and IDD is 125 the number will look like this 125+146+01+10digits which is composed by IDD+IDO+LONG DISTANCE CODE+phone number
- if the NATIONAL LONG DISTANCE was to MOBILE LINE and IDD is 188 the number will look like this 188+146+045+10digits which is composed by IDD+IDO+MOBILE LONG DISTANCE CODE+phone number

Por ejemplo:

- 1.- Destinos AT&T modalidad MPP con el tren de dígitos 190(IDD)+146(TVREY)+10dig
- 2.- Destinos AT&T modalidad CPP con el tren de dígitos 190(IDD)+146 (TVREY) +044+10dig

- 1.- Destinos TELCEL modalidad MPP con el tren de dígitos 188(IDD)+245 (TVREY) +10dig
- 2.- Destinos TELCEL modalidad CPP con el tren de dígitos 188(idd)+245 (TVREY) +045+10dig

Notes, abbreviations, tricks

- 146 is my company local ID and 245 for long distance (only these, no others codes). MOST OF THE TIME WE USE 146, WE ARE ELIMINATING THE USE OF 245 LITTLE BY LITTLE WE USE 245 IF THE NUMBER IS 800
- 044,045: mobile prefix (in/out). THIS WILL BE CONFIGURED BY US DEPENDING ON THE GROUP THE CALL WAS ORIGINATED, IF THE CALL IS ORIGINATED ON GROUP 353 AND CALL IS TO A NUMBER ON 188353 THEN WE USE LOCAL 044 ANYTHING ELSE WILL USE 045
- 01: landline prefix (in/out)
- IDD: ID for the destination operator
- IDO: ID for the source operator
- if MPP is true, add 9 prefix
- MPP means Receiving Party Pays
- CPP means Caller Party Pays
- LD means LONG DISTANCE

- we can return a sip server, a routing entry or a target group after the Inp/operator lookup if you wish (otherwise decide in routing)
- you mentioned that you wish to route based on groups. please note that there are currently no prioritization between group members, but we can easily add it if you wish
- the "reloadnumdircache" command will reload the tb_directions cache (issued by the mimport tool automatically)
- question: what the Action means in the LNP XML's (it is always "Port"?)

- In the Rules you can specify LNP and operator lookup with an operation (Numport). This means that instead of setting a flag, you need to duplicate any rule when you need to disable LNP and operator lookup (just clone and set the get data/set data to nothing). If required (if this would generate too much duplicate rules) we might add a separate flag instead which can be applied for any rule instead of specifying as an operation in a separate rule) You will need the latest MManage for this which can be downloaded from [here](#).

You can also specify when to check or not check with the checknumportpx1,2,3 and nochecknumportpx1,2,3 global config options.

Mimport

Mimport is an executable tool to import the data required for Mexico operator lookup and LNP from the raw source format as stored on the FTP at 201.159.38.84.

Download from [here](#).

Notes

- It can run as an application with GUI (graphical user interface) or as a console app from command line.
- As the data source you can specify a file, a folder or an FTP location.
- Internally uses a highly optimized CSV parser, XML parser and DB bulk uploader.
- Mimport is capable to remember already imported data. This is done by remembering the file names and its sizes when applicable. Can be forced to forget by using "Clear history".
- The mimport application should be run on the DB server for fast database access.
- It might take a long time (even hours) to import large data set (such as the initial LNP and all daily diff first time)
- At first time the mimport tools should be run manually to import all the base data and then it can be scheduled to run at a specific interval (MManage -> Scheduled tasks or by the Windows Task Scheduler) to keep the database in sync (for example import tb_carriermap and tb_directions once per month and import tb_portednumbers from LNP_Daily every day)
- You should run MManage -> Tool menu -> Server Setup -> Normalize directions once the initial import have been done by mimport. This might further compact the tb_directions table (backup db first!). The normalization might take some time to complete (run in off-peak only!)
- In case if you encounter any issue running the mimport application, Mizutech support will require the full log of the app (as displayed or the generated log file)

Usage

The import tasks can be run manually (from GUI) or auto scheduled (command line from windows task scheduler or "Scheduled tasks" from MManage).

Below you can find the most important use cases (working examples for command line usage, just replace *** with the correct ftp or db passwords):

- first time:
 - Import operators from Participants.xml to tb_carriermap using the GUI or from command line:
`mimport /nogo /show /oop 5 /file "ftp://201.159.38.84/Participants" /usr "usuarioMizu" /pwd "****" /db "Provider=SQLOLEDB.1;Password=***;Persist Security Info=True;User ID=sa;Initial Catalog=mserver;Data Source=127.0.0.1,2223"`
 - Import ranges from the Range folder to tb_directions using the GUI or from command line:
`mimport /nogo /show /oop 6 /file "ftp://201.159.38.84/Range" /usr "usuarioMizu" /pwd "****" /db "Provider=SQLOLEDB.1;Password=***;Persist Security Info=True;User ID=sa;Initial Catalog=mserver;Data Source=127.0.0.1,2223"`
 - Import LNP from the LNP_Initial folder to tb_portednumbers using the GUI or from command line:
`mimport /nogo /show /oop 7 /sep "COMMA" /file "ftp://201.159.38.84/LNP_Initial" /usr "usuarioMizu" /pwd "****" /db "Provider=SQLOLEDB.1;Password=***;Persist Security Info=True;User ID=sa;Initial Catalog=mserver;Data Source=127.0.0.1,2223"`
 - Import LNP from the LNP_Daily folder to tb_portednumbers using the GUI or from command line:
`mimport /nogo /show /oop 7 /sep "COMMA" /file "ftp://201.159.38.84/LNP_Daily" /usr "usuarioMizu" /pwd "****" /db "Provider=SQLOLEDB.1;Password=***;Persist Security Info=True;User ID=sa;Initial Catalog=mserver;Data Source=127.0.0.1,2223"`
- periodically:
 - Re-Import ranges from the Range folder to tb_directions every month from scheduled tasks:
`mimport /go /exit /oop 6 /type "diff" /file "ftp://201.159.38.84/Range" /usr "usuarioMizu" /pwd "****" /db "Provider=SQLOLEDB.1;Password=***;Persist Security Info=True;User ID=sa;Initial Catalog=mserver;Data Source=127.0.0.1,2223"`
 - Import LNP from the LNP_Daily folder to tb_portednumbers every day from scheduled tasks:

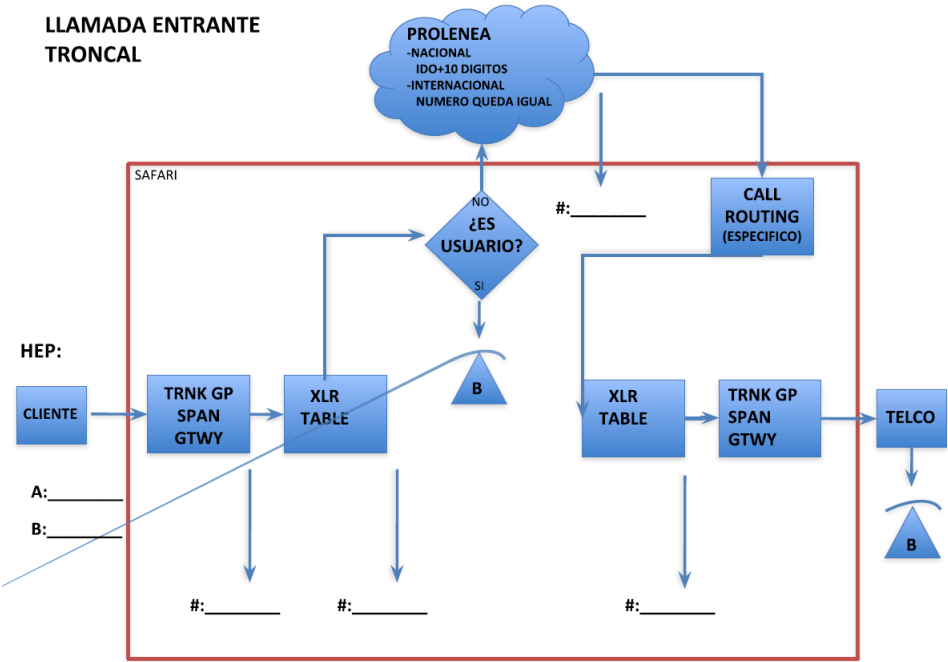
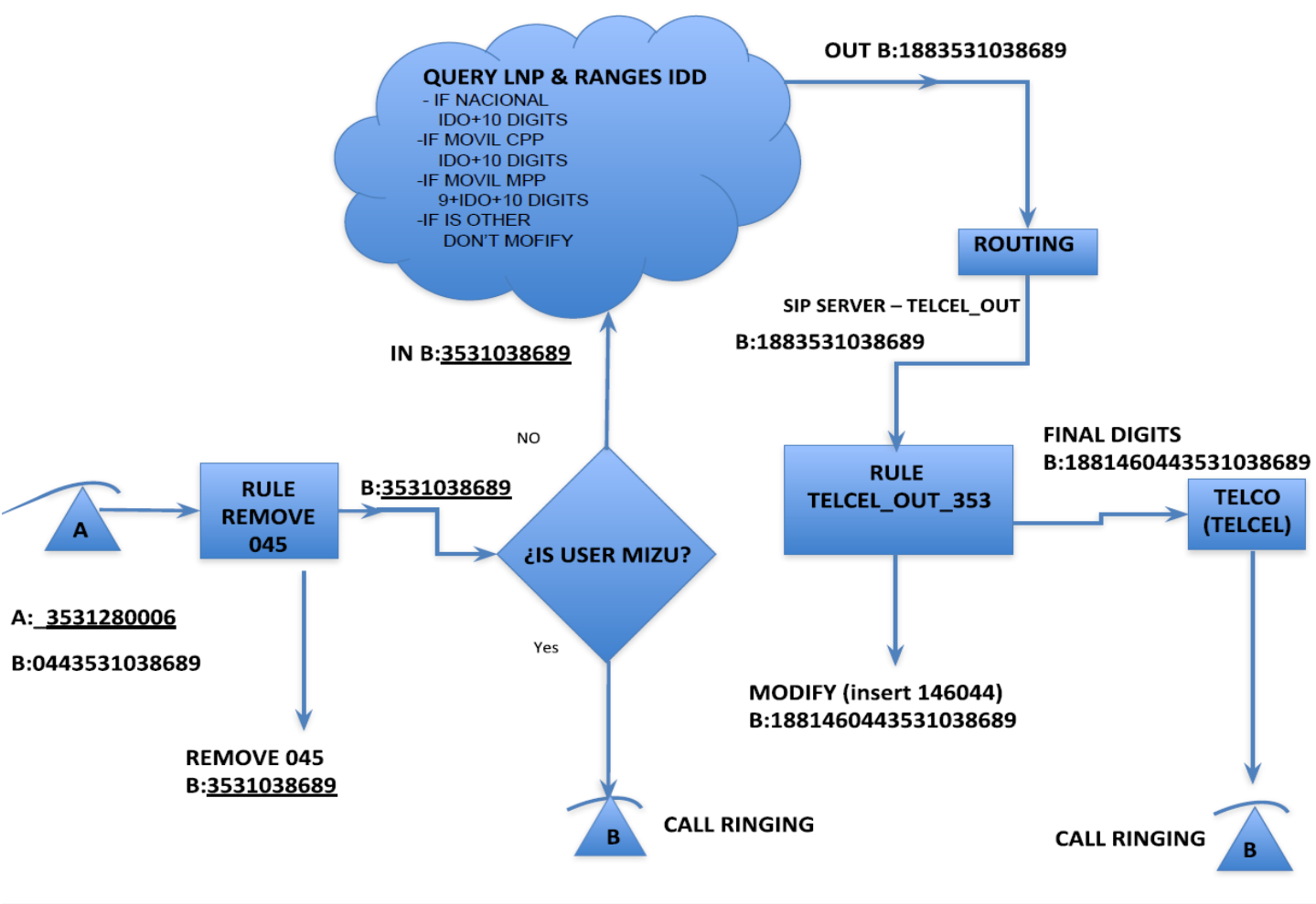
```
mimport /go /exit /oop 7 /type "diff" /sep "COMMA" /file "ftp://201.159.38.84/LNP_Daily" /usr  
"usuarioMizu" /pwd "****" /db "Provider=SQLOLEDB.1;Password=***;Persist Security Info=True;User  
ID=sa;Initial Catalog=mserver;Data Source=127.0.0.1,2223"
```

Parameters

- **To DB (db):**
Target mizu voip database ADO connection string
- **Source (file):**
Data source (csv or xml file format, local, ftp or http. Folder path is also accepted)
- **Username/Password (usr/pwd):**
Used for ftp or http authentication if required
- **Separator (sep):**
CSV column separator (by default will be auto guessed from first lines)
- **Prefix (prefix):**
Country prefix to insert before numbers or prefixes.
- **Ignore first line (ignore):**
Will skip the first line in the CSV (for example if header or comment)
- **SQL concurrency (md):**
Will set the MAXDOP value. Default is 4.
- **Diff (diff):**
If set, then will skip already processed files.
If not diff then an exact file should be provided and that will be parsed
If diff, then check if the specified URL is a http index file or ftp dir list. The file locations will be extracted from here
Will remember already downloaded files and will not download it again (the history can be cleared by deleting the history.dat file)

Flow charts

diagrama proceso llamada:

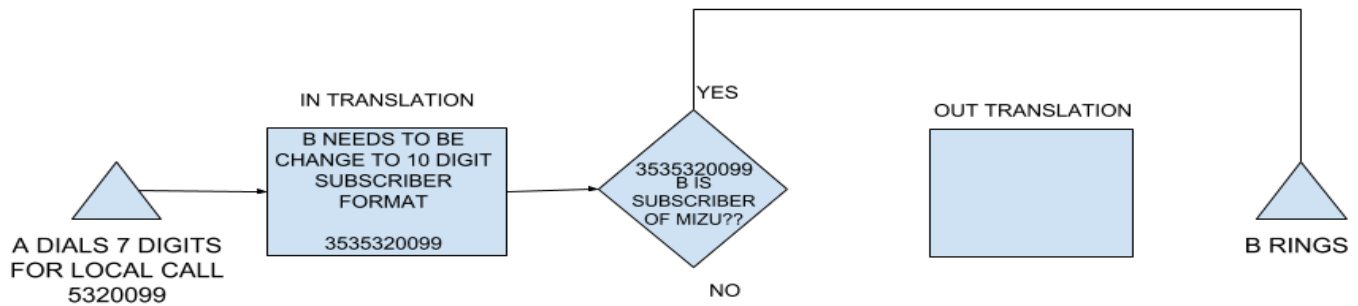


scenario 1 switch:

A calls B both subscribers of MIZU same local area GROUP 353

A 3535325844

B 3535320099

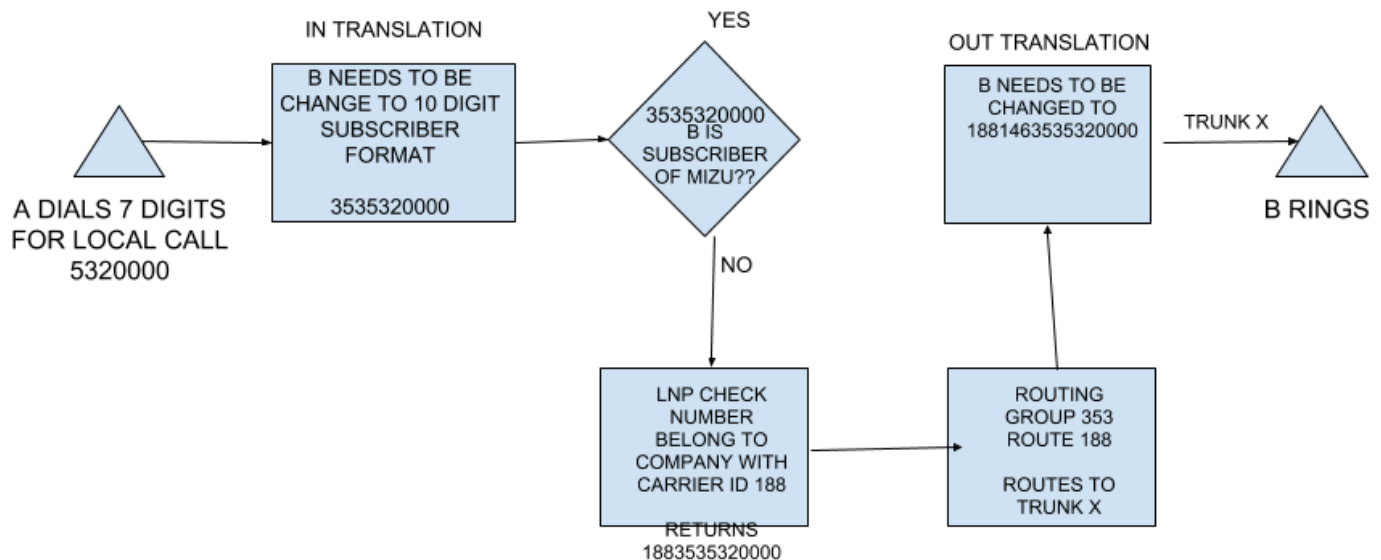


scenario 2 switch:

A calls B same local area

A 3535325844 MIZU SUBSCRIBER GROUP 353 (MIZU CARRIER ID 146)

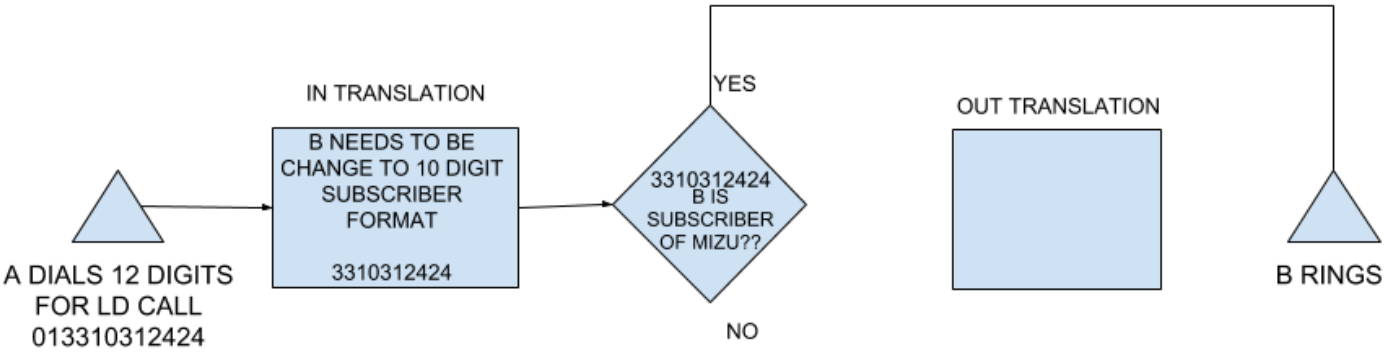
B 3535320000 DIFFERENT COMPANY



scenario 3 switch:

A calls B BOTH MIZU SUBSCRIBER DIFFERENT ÁREA CODES

A 3535325844 MIZU SUBSCRIBER GROUP 353
B 3310312424 MIZU SUBSCRIBER GROUP 33



Misc/notes/chat history

The text below is about mizutech random notes and the discussion between Mizutech and the TV Rey team in an unstructured format, usable mostly only with keyword search:

Old todo A:

- +add P-Asserted-Identity with cpc=ordinary
- +CheckNumberPortatibily
- +server review tb_directions usage and caching (like it was done with spid)

LNP_Daily should import only above the date when the LNP_Initial was imported ? 4/25/2017
search for all related settings from config.h and "Server settings and upgrade" chapter such as spidnumlength
add a flag for rules to check/nocheck the LNP (0=def,1=no check,2=check lnp, 4=check dir, 5=check both)
later: rules: ability to use fields replace for rules (for example insert prefix [MPP] [ip] etc)
cache portednumbers option: cache also the prefix and other data or only num exists/not exists?
write doc

email:

- question: what the Action means in the lnp (it is always "Port"?)
- +load MPP from the MODALIDAD field? (pnn_co.csv)
- question: any other fields in pnn_co than what we are using? NIR, SERIE, NUMERACION_INICIAL, NUMERACION_FINAL, MODALIDAD (check if MPP), ID_OPERADOR, NOMBRE_CORTO + RAZON_SOCIAL (as carrier name for informational purposes only)

+old todo:

mimport

- +import participants / operators xml
- +import lnp
create function TStringList* RangeToPrefixList(StringEx from,StringEx to); (maybe like MManage -> Tools -> Server

Setup -> Normalize Directions)

- +import ranges (also ranges diff: PutToDebugLog("ftp directory detected"); ...for daily diff)
-subsequent ranges can contine
+if from.length() != to.Length() then expand the smaller with 0/9
- +finish mimport

+ability to check file size for duplicates: It will be able to remember already imported files (LNP) and also it will be able to check if file was already imported (pnn, pngng).

- +tests
+XML::Process replace sl->Text with FileRead char* buffer
+test with current parameters
+test loading LNP diff from directory/rar
+mserver: cache portednumbers to map (just the "exists" flag)
+review split file for xml
+load files/dirs in order (date order which is the same as file name order)
+test range import:
+added 791260 numbers from 93321 csv lines
+problem with line 82325: 0 - 9999 should remove prefix altogheiter. test also for 1000-1999

(should return 1)

- +test ftp download: FTPDownloadAll download to a dir first, and then process from there in a sorted order

+later:

- +flag to check history for dir parse if it was initiated after unzip
- +ability to specify directory
- +auto unzip files . also search for .csv
- how should we handle the lnp deleted files? (just delete the number from the number portability table? what does that means? number is back to previous or original operator? or number no longer exists?)
- +change OPTION (MAXDOP 1)

tb_carriermap:

- import from Participants.xml
- operator name, operator id, others

tb_routingranges:

import from pnn_co.csv
from - to (nir + serie + range)
operator id (tb_carriermap)
any additional prefix if needed:
used in routing -> called prefix -> "rangelookup" (this will be the first routing entry)

number portability lookup:

RCR field -> IDD
simple using the tb_portednumbers table. the hard part is the import here!

example:

3531038689 -> Inp IDD=188 -> 188 3531038689 ->
-> route A -> 188 146 044 3531038689
-> route B -> 188 146 045 3531038689
where
188: IDD
146: IDO (our operator code)
044/045/01 mobile/landline (sometime added sometime not?)

examples from hugogodi:

146 is my company local ID and 245 for long distance

if the NATIONAL LONG DISTANCE call was to LAND LINE and IDD is 125 the number will look like this 125+146+01+10digits
which is composed by IDD+IDO+LONG DISTANCE CODE+phone number

if the NATIONAL LONG DISTANCE was to MOBILE LINE and IDD is 188 the number will look like this 188+146+045+10digits
which is composed by IDD+IDO+MOBILE LONG DISTANCE CODE+phone number

Por ejemplo

- 1.- Destinos AT&T modalidad MPP con el tren de dígitos 190(IDD)+146(TVREY)+10dig
- 2.- Destinos AT&T modalidad CPP con el tren de dígitos 190(IDD)+146 (TVREY) +044+10dig

- 1.- Destinos TELCEL modalidad MPP con el tren de dígitos 188(IDD)+245 (TVREY) +10dig
- 2.- Destinos TELCEL modalidad CPP con el tren de dígitos 188(idd)+245 (TVREY) +045+10dig

+questions:

+from where the IDO is coming in the above example? ...it is our IDO number
when to decide whether must go through all these Inp/ranges process?
when to add the out prefix? (checkbox in rules?)

+mobile

*044,045 are mobile prefix, 521 is international incoming prefix. will be manipulated by hugogodi from the dial plan

044/045/01 mobile/landline sometime added sometime not?

MOBILE PREFIXES ARE 044, 045 AND INTERNATIONAL INCOMING 521, WE WILL MANIPULATE THIS ON DIALPLAN
from where we know if we need to add 045? (remembered original if it was with mobile prefix? using originalnumber in rules)

THIS WILL BE CONFIGURED BY US DEPENDING ON THE GROUP THE CALL WAS ORIGINATED, IF THE CALL IS
ORIGINATED ON GROUP 353 AND CALL IS TO A NUMBER ON 188353 THEN WE USE LOCAL 044 ANYTHING ELSE WILL USE 045

*146 is my company local ID and 245 for long distance

MOST OF THE TIME WE USE 146, WE ARE ELIMINATING THE USE OF 245 LITTLE BY LITTLE WE USE 245 IF THE NUMBER IS 800
when we need to use this 245 prefix?
are there any other "magic" numbers like this?

+what about the tollfree numbers?

pnnng_co.csv: pnnng_co.zip - Contains the active national non-geographic numbering plan. (original owners for 800 toll free)

We use 10 digits in our numbers and in 800 toll free numbers we use 10 and 11 digits, and we maintain 2 different tables no special handling:

tricks:

146 is my company local ID and 245 for long distance (only these, no others codes). MOST OF THE TIME WE USE 146, WE ARE ELIMINATING THE USE OF 245 LITTLE BY LITTLE WE USE 245 IF THE NUMBER IS 800
044,045: mobile prefix (in/out). THIS WILL BE CONFIGURED BY US DEPENDING ON THE GROUP THE CALL WAS ORIGINATED, IF THE CALL IS ORIGINATED ON GROUP 353 AND CALL IS TO A NUMBER ON 188353 THEN WE USE LOCAL 044 ANYTHING ELSE WILL USE 045
01: landing prefix (in/out)
IDD: ID for the destination operator
IDO: ID for the source operator
if MPP is true, add 9 prefix
MPP Receiving Party Pays
CPP Caller Party Pays
LD LONG DISTANCE

the routing process:

bypass (nothing to do, handled by rules and/or routing) ?rules or routing?
normalize to 10 digits (remove 01 or add same caller prefix). nothing to do by mizutech, will be handled by rules
When customer calls National Long Distance they use 01+phone number, we strip the 01
If the call is LOCAL LAND LINE will be either 7 or 8 DIGITS so we need to complete the number with its area code to 10 digits
if the call is LOCAL MOBILE LINE will be 13 digits 044+10 digits, we strip 044 and check the number to LNP and original owner,
then send the number as IDD+IDO+044+10digits
check lnp -> returns IDD + 10digit
if number is MPP, prefix it with 9
check owner range
(in the routing the number will always come in IDD + 10digit format, without
routing decision depending on group and IDD. nothing to do, handled by routing
change number after routed to whatever case needed: IDD + IDO + (044/045) + 10digit
Before call goes out the SIP trunk we must add the IDO to the number and maybe some other codes
longest number out: IDD+IDO+MOBILE LONG DISTANCE CODE+phone number
I understand IDO an 044,045,01 can be added after routed at the rules
I understand we can add GROUPS to perform this changes based on what is LD to every customer

doc:

+add idd to tb_directions from mmanage and also for the default db
+add mpp to tb_portednumbers and tb_directions
-add groupid input parameter for v_checkdialplan ? (or should just query)
+remove left join tb_carriermap from v_check_numport
+set the checknumportpx1,2,3 if needed to the prefixes that should be checked
+checknumport = -1; //0=not check,1=check for changed prefix,2=check for changed number,3=check for changed domain,4=id, 5=check

all

optimizations:

data stored in denormalized tb_directions table for fast lookup
tb_directions is cached on all app servers. two level cache: file and memory
tb_directions number lengths are preloaded to avoid like% usage (so we can use exact equal tests)
tb_portednumbers is cached on all app servers (todo: cache also the prefix and other data or only num exists/not exists)

reloadnumdircache

we can return a sip server, a routing entry or a target group after the lnp/operator lookup if you wish

you mentioned that you wish to route based on groups. please note that there are currently no prioritization between group members,

but we can easily add it if you wish

config:

numporttype: 2
numportstrict: 2
spidrewrite 0
numdircache 2
mustsetnumdir 1
checknumport: 6 or 9 (def is 6 for mexic)

search for: numdircachex, numportcachekey/numportcacheval

The structure of FTP folders is as follows. FOLDERS STRUCTURE

* LNP_Daily

It contains a compressed file in zip (YYYY.MM.DD.zip) and inside it has 2 xml files (.ZIP file with two xml daily files for ported and reverse ports)
NumbersPorted-YYYYMMDD.xml - Contains the information of all the portabilities of the day. (ported numbers for that day)
NumberDeleted-YYYYMMDD.xml - Contains information of all the reverses of the day. (reverse to original owner of that day)

* Range

pnn_co.zip - Contains the active national numbering plan. (original owners)
pnng_co.zip - Contains the active national non-geographic numbering plan. (original owners for 800 toll free)

* LNP_Initial

It contains a compressed file in zip that contains several xml files with information for (initial file, can be updated at any time so you do not have to process to the daily files to initiate your database)
initialize the database of ported numbers.

* Participants

It contains an xml file with the ids of the telephony operators. (information for all operators)

The information in the xml files comes in the pdf that I had previously sent to you from Telcordia.

NPCData>

```
<MessageName>Porting Data</MessageName>
<Timestamp>20180714220500</Timestamp>
<NumberOfMessages>11780</NumberOfMessages>
<PortDataList>
  <PortData>
    <PortID>102201807132029325542</PortID>  ID FOR FOLLOWING PURPOSE AND TROUBLESHOOTING
    <PortType>8</PortType>
    <Action>Port</Action>
    <NumberRanges>
      <NumberRange>
        <NumberFrom>5563612548</NumberFrom>  IN CASE A WHOLE RANGE IS PORTED IT ASSIGNS INITIAL NUMBER AND FINAL  ALL NUMBERS
        IN THIS RANGE ARE PORTED
        <NumberTo>5563612548</NumberTo>
        <isMPP>N</isMPP>  IS MPP? NO
      </NumberRange>
    </NumberRanges>
    <RIDA>102</RIDA>
    <RCR>102</RCR>  THIS IS THE IDD TO USE  YOU WILL RETURN THIS VALUE  102+10DIGIT NUMBER  IN THIS EXAMPLE  1025563612548
    <DIDA>155</DIDA>  OWNER BEFORE PORT
    <DCR>155</DCR>
    <AssigneeIDA>102</AssigneeIDA>
    <AssigneeCR>102</AssigneeCR>
    <actionDate>20180716020000</actionDate>  DATE NUMBER IS PORTED (IN CASE IT IS PROGRAMED FOR DIFERENT DAY)
  </PortData>
</PortData>
....
```

Reading your information on LNP i have found a very similar process for call in Mexico, to summarize what we do here i will quote some examples.

We use 10 digits in our numbers and in 800 toll free numbers we use 10 and 11 digits, and we maintain 2 different tables:

ORIGINAL OWNER keeps which operator owns the full range of numbers when first assigned, looks like this:

idInfo	claveSensal	poblacionmunicipio	estado	central	preSubscripcion	region	asl	nir	serie
	numeracionInicial	numeracionFinal	ocupacion	tipoDeRed	modalidad	estatus	razonSocial		
	nombreCorto	idOperador	oficioReserva	fechaReserva	oficioAsignacion	fechaAsignacion	fechaConsolidacion		
	fechaMigracion	nirAnterior	puntoEntrega	ido	ida				
1	140230001	CIUDAD GUZMAN	ZAPOTLAN EL GRANDE	JAL	MSC GUADALAJARA 2	P	3	120	
	341	411	5000	9999	5000	MOVIL CPP	A	RADIOMOVIL DIPSA, S.A. DE C.V.	TELCEL 188
		CFT/D04/AGIT/DGPFT/3109/01	12/02/2001 12:00:00 a.m.	01/09/2001 12:00:00 a.m.	01/06/1999 12:00:00 a.m.				
	341	MSC GUADALAJARA 2	188	188					

The important fields are colored for your easy understanding IDOPERADOR speaks for itself and it is the ID for the owner of the range of 341411 from 5000 to 9999 so initial number in that serie is 3414115000 and final number is 3414119999

PORTED NUMBERS keeps only the numbers that have been ported out of their original owner series, if a number is ported back to the original owner we eliminate it from ported numbers table

id	archivo	portId	portType	action	number	isMpp	rida	rcr	dida	dcr	actionDate	portado
6382	146201704211114338001_1	123200810091714058013	5	Port	8003368624	N	123	123	0			
	0	20081010235900	1									
3	146201704211114338001_1	131201302231243489896	6	Port	5518816555	N	131	131	188			
	188	20130305020000	1									

In portednumbers we keep the number at 10 digits under NUMBER field and RIDA which is the operator ID of the new owner of that specific number

examples

for this examples we will use this nomenclature

Destination Operator ID= IDD

Source Operator ID=IDO

- When customer call international it has a 00+CountryCode+ number we do nothing and route based on 00+Country Code

- When customer calls National Long Distance they use 01+phone number, we strip the 01 and search for dialed number (10 digits) in LNP table (always first) or ORIGINAL OWNER TABLE (ranges, second), the number must be in one of this tables and need the number to be changed to

IDD+10 digits (+ sign is not used, just using for explanatory purpose)

Call is then routed using the IDD which is the ID for the destination operator

Before call goes out the SIP trunk we must add the IDO to the number and maybe some othe codes

146 is my company local ID and 245 for long distance

if the NATIONAL LONG DISTANCE call was to LAND LINE and IDD is 125 the number will look like this 125+146+01+10digits which is composed by IDD+IDO+LONG DISTANCE CODE+phone number

if the NATIONAL LONG DISTANCE was to MOBILE LINE and IDD is 188 the number will look like this 188+146+045+10digits which is composed by IDD+IDO+MOBILE LONG DISTANCE CODE+phone number

If the call is LOCAL LAND LINE will be either 7 o 8 DIGITS so we need to complete the number with its area code to 10 digits and then checket for LNP or ORIGINAL OWNER TABLES to be routed as IDD+IDO+10digits

if the call is LOCAL MOBILE LINE will be 13 digits 044+10 digits, we strip 044 and check the number to LNP and original owner, then send the number as IDD+IDO+044+10digits

So basically what we need to do is :

- NORMALIZE NUMBER TO 10 DIGITS
- CHECK TO LNP IF NOT THERE TO ORIGINAL OWNER
- IF IT EXIST IN EITHE TABLES THEN ADD THEIR IDD TO THE NUMBER
- ROUTE NUMBER BASED ON IDD
- CHANGE NUMBER AFTER ROUTED TO WHATEVER CASE NEEDED

We can add any registries to any table we just need an example of what and where to do it to populate the LNP and ORIGINAL OWNER

I understand IDO an 044,045,01 can be added after routed at the rules

I understand we can add GROUPS to perform this changes based on what is LD to every customer

If needed we can do a skype call

Basically every Carrier ID needs to be routed to a sip server or multiple for backup, balancing purpose.

One or multiple Carrier ID can use the same Sip server this is called transit

One Carrier ID could have multiple digit construct due to a single Carrier serving fixed and mobile customer

MPP being the lesser should have a prefix mpp if text can be routed or a 9 if not

Por ejemplo

1.- Destinos AT&T modalidad MPP con el tren de dígitos 190(IDD)+146(TVREY)+10dig

2.- Destinos AT&T modalidad CPP con el tren de dígitos 190(IDD)+146 (TVREY) +044+10dig

1.- Destinos TELCEL modalidad MPP con el tren de dígitos 188(IDD)+245 (TVREY) +10dig

2.- Destinos TELCEL modalidad CPP con el tren de dígitos 188(idd)+245 (TVREY) +045+10dig

- You should keep the same routing structure you have, (GROUPS, ROUTES) since we can use different routes based on the GROUP assigned to a customer, this is due to location based centrals for carriers, also sometimes we close different carriers to a GROUP of customers depending on their agreements.

The routing scheme used in mizu right now fits good to the Routing on carrier id base, since we can select a group for a route or group of routes. This is used for FAILOVER, BALANCING and delivering calls to a central office which may serve a specific region (group)

1.

LNP and operator selection will be applied for absolutely all calls which will traverse our softswitch, or do you plan to have some traffic not affected by all these?

(For example some separate transit traffic from carrier A to carrier B which has nothing to do with the Mexico operator rules and number portability)

NOT USING LNP QUERY

- CALLS TO SUBSCRIBER OF MIZU (IF SUBSCRIBER IS IN MIZU RING DIRECTLY TO SUBSCRIBER)

- CALLS STARTING WITH INTERNATIONAL PREFIX 00 CAN BE OMITED FROM QUERY

- CALLS FROM CARRIERS GOING TO DIFFERENT COUNTRY CAN BE OMITED NORMALY USE PREFIX AND DIALED NUMBER IS LARGER THAN 15 DIGITS

USING LNP QUERY

-ALL NATIONAL CALLS HAVE TO GO THROUGH LNP EVEN CALLS THAT DO TRANSIT TO NATIONAL CARRIERS

-IF A QUERY RETURNS 146 WHICH IS MY CARRIER ID IT WILL ALSO BE ROUTED TO MY TANDEM SWITCH (IF NOT MIZU SUBSCRIBER)

2.

On "SIP Server" I mean a SIP server entry in our "Users and devices" database (One domain or IP address where the signaling will be sent for the outgoing call).

At first we are going to determine the target operator (from the LNP or by looking for the number range).

The question is:

The SIP Server selection depends only on the Operator (carrier) or it might depend also on some other factors? (Such as the number is mobile or landline or on the IDD number or any other factor?).

If the target SIP server depends only on the operator, then we can make a simple mapping like this:

Operator 1 -> SIP Server A

Operator 2 -> SIP Server A

Operator 3 -> SIP Server B

IT WILL DEPEND ALSO ON THE GROUP THE SUBSCRIBER IS

WE SEPARATE OUR SUBSCRIBER PER LOCATION BASIS WHICH IN MIZU WE PLAN TO USE GROUP, DEPENDING ON THE GROUP THE SAME IDD CAN HAVE A DIFFERENT ROUTE

EXAMPLE -----

GROUP 353 (Describes subscribers in a local area in state MICHOACAN)

GROUP 441 (Describes subscribers in a local area in state QUERETARO)

If a subscriber calls a 3531038689 the LNP query will return 1883531038689 which is 188 for RADIOMOVIL DIPS TELCEL

SUBSCRIBER IN GROUP 353 will call 0443531038689 query returns 1883531038689 and we route to SIP SERVER A in REGIONAL CARRIER CENTRAL GUADALAJARA using digits 1881460443531038689

SUBSCRIBER IN GROUP 441 will call 0453531038689 query returns 1883531038689 and we route to SIP SERVER B in different REGIONAL CARRIER CENTRAL IN MEXICO using digits 1881460453531038689

So each carrier can have more than one route for traffic to be sent, also failover routes can be used through different centrals or even through transit through a different carrier

3.

You wrote this:

Basically every Carrier ID needs to be routed to a sip server or multiple for backup, balancing purpose.

How do you think that we could define the backup SIP Server?

(This would require another level of indirection which would complicate the things a bit. A global failover route would be still easy to add which is not related to carrier or LNP decisions)

I THINK YOU SHOULD SEPARATE THE LNP PROCESS FROM ROUTING, YOUR ROUTING PROCESS IMPLEMENTED IN MIZU WORKS GREAT WITH THE SCENARIO NEEDED FOR THIS

AS I SEE PROCESS SHOULD BE AS FOLLOWS

1 CALL COMES IN WE STRIP NUMBERS OR COMPLETE NUMBERS TO NORMALIZE 10 DIGITS GROUP RULE APPLIED (NO CHANGE IN MIZU)

2 BEFORE GOING TO ROUTING PROCESS LNP QUERY NEEDED AND NUMBER RETURNED IDD+10DIGITS

3 ROUTE DECISION DEPENDING ON GROUP AND IDD+10DIGITS (NO CHANGE, WE CAN ADD AS MANY SIP SERVERS AND CHOOSE ALGORITHM IN THE SYSTEM AS IT IS)

4 NUMBER IS NORMALIZED TO EXIT THROUGH SELECTED ROUTE IDD+IDO+NUMBER OR IDD+IDO+04(4-5)+10DIGITS

5 CALL SENT TO CARRIER

IF IT WORKS FOR YOU I THINK YOU CAN ADD IN STEP 1 ON THE RULE A CHECKBOX FOR US TO ACTIVATE IF CALL IS NEEDED TO RUN THROUGH LNP QUERY, SINCE IN THIS TABLE WE MATCH DIALED NUMBERS TO BE NORMALIZED TO WHATEVER CALL IS PERMITTED

4.

How exactly do you plan to use the Groups related to operators and number portability?
You will use Group to define routing sources? Or define target servers? Other? How?

MEXICAN CONFIGURATION NEEDS NUMBERS TO BE GROUPED BY LOCATION TO DEFINE DIALING RULES DEPENDING ON WHAT IS LOCAL AND WHAT IS LONG DISTANCE FOR EACH AREA CODE BASED ON THIS ASSUMPTION WE WILL DEFINE ROUTING BASED ON ORIGIN GROUP

(i know it is stupid mexican LD and Local still used even when tariffs are the same)

5.

You wrote this:
I understand we can add GROUPS to perform this changes based on what is LD to every customer

What "LD" means here?
LONG DISTANCE

6.

You wrote this:
if the NATIONAL LONG DISTANCE call was to LAND LINE and IDD is 125 the number will look like this 125+146+01+10digits
which is composed by IDD+IDO+LONG DISTANCE CODE+phone number

I have a few questions regarding this:

A.
How exactly we know that that this is landline? (How we will differentiate landline vs mobile calls?)

WE KNOW WHICH CARRIERS ID ARE FIXED AND WICH MOBILE LINES, WE WILL CONFIGURE THIS WHEN NORMALIZING NUMBERS TO BE SENT TO CARRIERS AFTER ROUTING (THIS IS DEFINED IN CONTRACTS AND DOCUMENTS WE HAVE)

B ,
As I see, IDD and IDO is always the same in the owner range table. Is this normal? (Then why should we add the same number twice?)

YES IDD AND IDO IS THE SAME. WE USE THIS TO DISTINGUISH WHO IS THE ORIGINATOR AND WHO THE DESTINATION. THE TABLE SHOULD HAVE IDD/IDO

IF THE CALL IS SENT TO A CARRIER TELCEL THEN THEY ARE THE DESTINATION (IDD= ID DESTINATION) SO 188 IS THE FIRST CODE TO BE USED IN OUR DIGITS IDD+IDO+04(4-5)+10 DIGITS 188146+04(4-5)+10DIGITS

IF TELCEL SENDS A CALL TO US THES WE WILL BE THE DESTINATION AND TELCEL THE ORIGINATION (IDO= ID ORIGINATION) SO 146 WICH IS MY ID WILL BE FIRST IDD+IDO+10DIGITS 146188+10DIGITS

SO BASICALLY THE NAME IS CHANGED BASED ON IF YOU ARE ORIGINATING OR RECEIVING THE CALL

C.

I see that IDO is a field in the owner range table.
From where do we have IDO if the number is found in the LNP database? (So if the number was ported, we don't need to check the range table anymore if I am right, however IDO number is only in the range table and not in the LNP)

YOU ARE RIGHT

NO YOU DO NOT CHECK THIS ON CALLS, MY BILLING SYSTEM DOES THIS AFTERWARD SO I KNOW WHAT TO CHARGE EACH CARRIER

7.

You write this:
if the NATIONAL LONG DISTANCE was to MOBILE LINE and IDD is 188 the number will look like this 188+146+045+10digits
which is composed by IDD+IDO+MOBILE LONG DISTANCE CODE+phone number

From where the MOBILE LONG DISTANCE CODE is coming? (From where do we obtain this?)

THIS WILL BE CONFIGURED BY US DEPENDING ON THE GROUP THE CALL WAS ORIGINATED, IF THE CALL IS ORIGINATED ON GROUP 353 AND CALL IS TO A NUMBER ON 188353 THEN WE USE LOCAL 044 ANYTHING ELSE WILL USE 045

WHEN RULE TO NORMALIZE OUTGOING CALL TO CARRIER AFTER ROUTING IS USED WE WILL SET THIS

HOPE I WAS CLEAR ON MY EXPLANATIONS

1.

If I understand correctly, your requirement from us is to just do the followings:

- create an app to import the operator ranges and LNP data (also scheduled task to import the daily LNP changes)
- lookup for these before the routing and prefix the number with IDD (ALSO IF A NUMBER IS MPP PREFIX NUMBER 9)

You wrote that you wish to handle everything other yourself with groups, rules, routing.
Is this true?

YES WE WILL USE THE SQL DIAPLAN, RULES, ROUTING FOR MANIPULATION OF DIGITS

Who will do the outgoing number formatting? You or us?

US UN SQL DIALPLAN AFTER ROUTING

If you will do it then I suppose that you will need some data coming from LNP/operator ranges table such as the MPP field value.
For example if number was found in operator range or LNP table, don't you need some extra data about this for the routing? (such as the MPP field value).
Should we just pass it to the rules? (will create data fields for this so you can use it in rules conditions and also for prefix/suffix/etc)

With other words:

What extra data from the operators/LNP you will need to be passed to the rules and for routing to do your work?

FOR NUMBER MANIPULATION WE ONLY NEED INFORMATION OF ORIGINALDIALEDNUMBER WICH YOU ALREADY SUPPLY IN THE RULES AND IDD

Or maybe some part of the outgoing number rewrite will be done by you (from rules) and some part by us?
Maybe we will add the IDD and IDO and you will add the mobile prefix or any other?
So in this case, the question is that which part have to be done by us and which part have to be done by you?

2.

You wrote: "146 is my company local ID and 245 for long distance"
Questions: Do you have any other codes?

NO ONLY THIS ONES

3.

How do you decide which IDO to use? (146 or 245?)
I know that 146 is for local and 245 is for long distance, but how do you decide whether a number is local or long distance? (if the original incoming number begins with 01?)

MOST OF THE TIME WE USE 146, WE ARE ELIMINATING THE USE OF 245 LITTLE BY LITTLE WE USE 245 IF THE NUMBER IS 800

4.

This is most probably not so important, I am asking just to be sure:

You wrote: "044,045 are mobile prefixes".

Question: Are there any other mobile prefixes? Or we should not care about this as you will handle it entirely with rules?

MOBILE PREFIXES ARE 044, 045 AND INTERNATIONAL INCOMING 521, WE WILL MANIPULATE THIS ON DIALPLAN

5.

This is most probably not so important, I am asking just to be sure:

044 and 045 are for mobile and 01 is for landline, however in your examples I see that usually you add 044 or 045 for the outgoing number but never 01.

If to landline, then the 01 doesn't need to be added? NO, THIS IS A PER CARRIER BASIS, DEPENDING ON EACH CARRIER AGREEMENT

I know that you wrote that this will be done by you with rules, but, can't we just remember the mobile prefix of the original incoming number for this?

You wrote: "if the call is LOCAL MOBILE LINE will be 13 digits 044+10 digits, we strip 044"

If incoming number is coming with 044 prefix, then don't we just have to add the same prefix back? Or the prefix should be changed based on the LNP if the number was changed?

WE MANAGE ALL NUMBERS IN A 10DIGIT BASIS, THIS IS DONE FOR OUR BILLING SYSTEM AND DATABASE, IT SEEMS WRONG TO REMOVE PREFIX TO ADD IT IN A LATER STAGE BUT ALL OUR SYSTEMS WORK ON PROCESSING A 10DIGIT FIELD

6.

You wrote this: "WE KNOW WHICH CARRIERS ID ARE FIXED AND WICH MOBILE LINES, WE WILL CONFIGURE THIS WHEN NORMALIZING NUMBERS TO BE SENT TO CARRIERS AFTER ROUTING (THIS IS DEFINED IN CONTRACTS AND DOCUMENTS WE HAVE)"

Where do you plan to store this data?

Should we add a field for this data in the operators table? NO, WE WILL PROCESS THIS EN DIALPLAN

We are going to create a table for the carriers anyway. Should we add a field for this and pass it also to rules, so you can use it as you wish?

Maybe a prefix field where you can enter (or import) numbers like 044,045 and 01. (Are there any other then these?).

IF THERE IS NO ADDITIONAL TROUBLE YOU CAN ADD THE FIELD, WE WILL ANALYZE WHILE IMPLEMENTING DIALPLAN IF WE CAN USE IT IN OUR PROCESS TO MAKE THINGS EASIER FOR US.

7.

What about the 800 tollfree numbers.

How exactly do we handle the tollfree calls?

How we know if incoming number is tollfree number? What we do with these? Where to route them? How to transform the outgoing number?

All I know is that the pngng_co.csv file is related, but I don't know the meaning of its fields or how/where we should use it.

MOST COMPANIES ALSO HAVE 800 NUMBERS, SO WE ROUTE THEM TO THE SAME TRUNKS JUST USING OUR LONG DISTANCE IDO AND THEIR LONG DISTANCE IDD, PORTING IS ALSO DONE ON 800 NUMBERS SO WE NEED THE SAME PROCESS FOR PORTED AND RANGES TO BE DONE ON 800 SERIES

800 NUMBERS CAN BE EITHER 10 DIGIT O 11 DIGIT SO YOU CAN FIND BOTH CASES

Servidor FTP: 201.159.38.84

Usuario: usuarioMizu

Pass: ****

Puerto: 21

```
/nogo /show /oop 5 /type "exact" /file "C:\Users\secondaryacc\Desktop\LNP\Participants.xml" /usr "usuarioMizu" /pwd "*****" /db  
"Provider=SQLOLEDB.1;Password=mizu2345BBB;Persist Security Info=True;User ID=sa;Initial Catalog=mserver;Data Source=127.0.0.1,2223"
```

4.4.16. Number portability

The number portability module can be used to alter the routing if the number is ported to another operator for MNP (mobile number portability) or LNP (local number portability) reasons.

More specifically it can influence the routing in one of the following ways:

- route the call to the server specified by newdomain:newport (The fwdtootherdomains must have to be set to at least 1 for domain routing to have effect.)
- route the call to the SIP server specified by sipserverid (or by carrierid with a lookup from tb_carriermap)
- change the called number as specified by the newnumber field
- add a prefix to the called number as specified by the providerpx field

You can set the ported numbers from the MManage “Number Portability” form or you can automate the process by programmatically changing the tb_portednumbers database table. The the Export/Import wizard from the file menu can be used to easily populate this table (from CSV or other sources).

You can control the server number portability handling by the “checknumport” global configuration:

-1: auto (will turn to 4 if there are entries in the tb_portednumbers table)

0=not check

1=check for changed prefix only (replace)

2=check for changed number only

3=check for changed domain only

4=check for changed server id only

5=check for changed prefix only (insert)

9=check all

tb_portednumbers:

id: autoincrement database primary key

number: original (normalized) called (B) number

sipserverid: change the SIP server id to this

carrierid: change the SIP server id to this via the tb_carriermap lookup table

providerpx: new prefix (for example instead of 3630 changed to 3620)

newnumber: the changed number

newdomain: the new service provider ip or domain

newport: service port (defaults to 5060)

priority: checked for duplicate numbers

datum: record insertion date

You must have the providerpx OR sipserverid OR carrierid OR newnumber OR newdomain:newport specified.

If certain numbers must go to certain carriers (SIP servers) then you might use the tb_carriermap table to add the carriers and just use the carrierid in the tb_portednumbers table. This way you can easily manage the carriers used for LNP.

An important step for the number portability configuration is the access of the number mapping data. This can be set in the following ways:

- Add the number mapping manually
- Create some tool/script to download the data into the mizu table database (and run in periodically from scheduled tasks)

The data can be extracted from a remote database, http/ftp file download or via an API

- Access the data via an API at runtime (HTTP GET). This can be slow

CADUP/SPID/mimport

For more complex number portability handling with CADUP and SPID rewrite per operator, you can also use the tb_routingprefix and tb_directions table to store these informations (spid and cnl fields). A detailed description about the whole process can be found here.

You might use the mimport application to import the numbers (will require customization for you data source and format).

The current implementation is for Brazil, but that can be adjusted for any country with similar requirements for LNP.

CADUP, portability and mimport

Notes:

- Techprefix is NOT used normally for routing decision. (Use the called prefix instead! You can still set the techprefix for SIP servers to insert a prefix before the number when it sent outbound if that is needed for any reason)
- You don't need to add the country code from "Rules" as this can be done automatically
- No sip servers and routing rules are going to be created automatically anymore
- You should clear the old imported data before starting with the new mimport (backup first):
 - delete from tb_users where comment like '_cadup%' or comment like '_annex5%'
 - delete from tb_routing where name like '_cadup%'
 - delete from tb_routinglist
- Cadup and spid will be stored in tb_directions and ported numbers to tb_portednumbers.
- Remember to convert Annex V (SPID) to simple CSV before importing with mimport

Numbers:

A full number format internally can be represented as DDI + SPID + CNL + DDD + PREFIX + SUFFIX

DDI: means country code in your language (55 for Brazil)

SPID: Operators (carriers) in Brazil has a 4 digit SPID number which can be used as a prefix for routing decisions (to be extracted from Annex V, used in routing called prefix and also for number portability rewrite)

CNL: landline numbers also has a CNL component (loaded from CADUP)

DDD: defines the region, consisting of 2 digits

PREFIX: identifies the carrier (DDD +), formed by 4 or 5 digits

SUFFIX: final complement number consisting of 4 digits.

We usually name PREFIX + SUFFIX as "number"

SPID and CNL are used only internally (not received or sent)

Mimport:

Is a tool to import from CADUP, Annex V (SPID) and number portability (Annex IV)

Latest version can be downloaded from here: <https://www.mizu-voip.com/G/download/mimport.zip>

CADUP:

Is the database with operator name – prefix – CNL (CNL for landline only). Actually it is the Brazil numbering plan.

There are 3 types:

SMP: for mobile (stype in tb_spid is 1)

STFC: landline (with CNL as the penultimate column) (stype in tb_spid is 2)

SME: special mobile (stype in tb_spid is 3)

Can be downloaded from

<http://sistemas.anatel.gov.br/sapn/ArquivosABR/faixaSMP.asp?SISQSm modulo=18099>

<http://sistemas.anatel.gov.br/sapn/ArquivosABR/faixaSTFC.asp?SISQSm modulo=18099>

<http://sistemas.anatel.gov.br/sapn/ArquivosABR/faixaSME.asp?SISQSm modulo=18098>

Example: CLARO S.A.;40432544000147;55;9100;2000;2999;1

means that from number 559100-2000 until 559100-2999 route to Claro S.A.

SPID:

Operators (carriers) in Brazil has a 4 digit SPID number which can be used as a prefix for routing decisions to be extracted from Annex V (convert to simple CSV first!)

used in routing called prefix and also for number portability rewrite

will be imported to tb_directions

Number portability:

Is the database with operator name – number – new SPID

Will be imported to tb_portednumbers

Can be downloaded from FTP:

o Host: ?

o User: ?

o Password: ?

Field 2 Action – constant value corresponding to create Numeric 0 Numeric of which: 0=Create and 1=Delete

Field 3 Telephone Number – TN N(10 or 11) 1288887777 or 11988887777

Field 6 New SPID – Identification of new provider N(4) 0121

There are full (geral) and diff files but that doesn't matter too much because we import all files anyway (handling new/modify/delete automatically) starting from full files and the file format is the same.

Description:

Mimport is a simple windows GUI app, but can be invoked also from command line with the following parameters:

oop, db, file, usr, pwd, sep, prefix, go, nogo, exit

for example: `mimport.exe /oop 1 /file "ftp://10.20.30.40/xxxx.txt" /usr "username" /pwd "password" /db`

`"Provider=SQLOLEDB.1;Password=xxx;Persist Security Info=True;User ID=sa;Initial Catalog=mserver;Data Source=127.0.0.1,2223"`

The import tasks can be run manually (from gui) or auto scheduled (command line from windows task scheduler or "Scheduled tasks" from MManage)

first time:

- import cadup from downloaded csv
- import spid - carrier mapping from downloaded annex V csv
- import full number portability from downloaded csv

periodically:

- import cadup by finding it at <http://sistemas.anatel.gov.br/sapn/ArquivosABR/faixaSMP.asp?SISQSm modulo=18099> and <http://sistemas.anatel.gov.br/sapn/ArquivosABR/faixaSTFC.asp?SISQSm modulo=18099>
- import number portability from ftp

Operations (oop):

Operation to perform:

1. Import CADUP (operator name, DDD + prefix and CNL to tb_directions)
(file name might be also like FAIXA_SMP)
you can specify the html page (<http://sistemas.anatel.gov.br/sapn/ArquivosABR/faixaSMP.asp?SISQSm modulo=18099>) and will extract the file automatically if the "Type" is not set to "Exact"
(Note: if the cnl field is set, it means that the record is for STFC/landline. Otherwise the record is for SMP/mobile)
2. Not used anymore
3. Import SPID - Name mapping (from Annex V)
(file name might be also like BDT...)
convert from xlsx to csv format first with some tool (Excel -> Save As)
this will just store the spid number as tb_directions.spid
have to be run at least one time at the beginning. maybe also later if these could also change
4. Import portability full or diff (Annex IV)
have to be run at the beginning then periodically to import the new files

Parameters:

To DB (db):

Target mizu voip database ADO connection string

From file (file):

Data source (csv file format, local, ftp or http)

Username/Password (usr/pwd):

Used for ftp or http authentication if required

Separator (sep):

CSV column separator (by default will be auto guessed from first lines)

Prefix (prefix):

Country prefix to insert before numbers or prefixes. Set to 55 by default.

Add all operators (addall):

Not used anymore

Ignore first line (ignore):

Will skip the first line in the CSV (for example if header or comment)

SQL concurrency (md):

Will set the MAXDOP value

Type (type):

If Exact then an exact file must be provided and that will be parsed

If other, then check if the specified URL is a http index file or ftp dir list. The file locations will be extracted from here

Will remember already downloaded files and will not download it again (the history can be cleared by deleting the history.dat file)

Server settings and upgrade:

- set global config dbversion to 144
- set global config checknumport to 5 (prefix insert)
- set global config checknumportpx to 55 (so will check only brazil numbers)
- set global config spidrewrite to 1 (0 means no, 1 means check, 2 means reject call if not found)
- set global config lookupcdralldirection to 2
- CREATE TABLE [tb_spid]([id] [int] IDENTITY(1,1) NOT NULL,[spid] [varchar](8) NULL,[styp] [tinyint] NULL,[name] [varchar](165) NULL,[location] [varchar](165) NULL,[area] [varchar](165) NULL)
- CREATE CLUSTERED INDEX [idx_spid_name] ON [tb_spid] ([name] ASC)
- update v_check_numport: select TOP 1 tb_portednumbers.* from tb_portednumbers with(nolock) where number = @number
- upgrade tb_directions (add spid and cnl columns)
- o ALTER TABLE tb_directions ADD [spid] [varchar](8) NULL
- o ALTER TABLE tb_directions ADD [cnl] [varchar](8) NULL
- CREATE UNIQUE CLUSTERED INDEX [idx_directions_prefix] ON [tb_directions]
- set numdircachepxlen to max prefix len (this is deprecated now as it will be detected automatically by the server)


```
select LEN(prefix), count(prefix)
from tb_directions
group by LEN(prefix)
order by count(prefix) desc
```

- Update the v_getprice stored procedure
- Update the v_selpattern2 stored procedure
- Update the v_getpriceexf function

Routing setup:

Use mimport to import cadup, spid and portability

Run MManage -> Tool menu -> Server Setup -> Normalize directions once all imported by mimport. This will compact the tb_directions table (backup db first)

Add sip servers (manually)

Add routing rules (manually)

Add prefix list to routing rules (manually for “called prefix” in tb_routingprefix). The number will come here as SPID + CNL + DDI + DDD + PREFIX + SUFFIX

Call-flow example:

1. If incoming number begins with 00 that means international calls so we skip the whole procedure.
2. Incoming number from user arrives like 0 11 12345678 (DDD + number) for national calls (just a virtual example)
3. Remove 0 and prefix with 55 (DDI country code of brazil 55) so the number will look like 55 11 12345678
4. Then we lookup tb_directions (imported from CADUP and SPID Annex V) and will insert SPID + CNL. (CNL only for landline). Supposing that SPID is 2222 and CNL 3333 the number looks like this: 2222 3333 55 11 12345678 (SPID+CNL+DDI+DDD+num)
5. Then we lookup if the number exists in the tb_portednumbers (imported from Annex IV). The number format here is DDI + DDD + number so we lookup like this. (So in tb_portednumbers there is no SPID and CNL prefixes)
6. If number found, then we replace the spid from tb_portednumbers. If the new spid looks like 8888 then our number will be rewritten like this: 8888 3333 55 11 12345678.

So we will have PORTNUMPREFIX + CNL + rest after this step.

7. Then we pass the number to routing which will select a sip server based on the rules your entered on the “Routing” form in MManage (called prefixes)
8. When sending the call to the outbound SIP server, we remove SPID and CNL so the number sent in SIP INVITE will be: [SIP server tech prefix if any] + DDI+DDD+number. Example: 55 11 12345678
9. On billing, the price (prefix list) will be checked in both the normalized (DDI+ DDD+num) and extended (SPID+CNL+DDI+DDD+num) number formats and the first longest match will be loaded

Test:

Directory normalization should be also tested

This normalization can reduce the size of the tb_direction table with considerable amount

The normalization might take some time to complete (run in offpeak only in production servers)

Backup database first

MManage -> Tools -> Server Setup -> Normalize Directions

Check correctness (tb_direction prefix lookup should be still correct)

Tables:

tb_directions

id: autoincrement index

type: any 3 digit type indication such as NAT for national and INT for international directions

name: operator/carrier/country name

prefix: best match prefix for lookups (will load longest match)

spid: operator id

cnl: extra prefix

tb_spid

just a helper table if there is no simple data source for operator id – name mapping

1. Import CADUP (operator name, DDD + prefix and CNL to tb_directions) [Tellfree Brasil]
2. No OOP [Tellfree Brasil]
3. Import SPID's (from Annex V to tb_directions.spid) [Tellfree Brasil]
4. Import portability (full or diff) (Annex IV) [Tellfree Brasil]
5. Import operators (Participants.xml) [TVREY Mexic]
6. Import ranges [TVREY Mexic]
7. Import LNP (full or diff) [TVREY Mexic]

tests:

```
/nogo /show /oop 6 /sep "COMMA" /file "C:\Users\secondaryacc\Desktop\LNP\test\Range\pnn_co.csv" /usr "usuarioMizu" /pwd "*****" /db  
"Provider=SQLOLEDB.1;Password=mizu2345BBB;Persist Security Info=True;User ID=sa;Initial Catalog=mserver;Data Source=127.0.0.1,2223"
```

```
select * from tb_portednumbers
```

```
select count(*) from tb_portednumbers
```

```
7749545
```

```
--delete from tb_portednumbers
```

```
select top 10 number, carrierid, mpp from tb_portednumbers with(nolock) order by number
```

```
select top 10 * from tb_directions
```

```
select count(*) from tb_directions 23798
```

```
select MAX(id) from tb_directions 60329
```

```
--delete from tb_directions where id > 60329
```

```
select top 1000 * from tb_directions where id > 60329
```

```
select count(*) from tb_directions where id > 60329
```

```
--added 791260 rows, lots of incorrect row
```

Links

Mizutech: <https://www.mizu-voip.com>

VoIP server: <https://www.mizu-voip.com/Software/VoIPServer.aspx>

Tutorial: https://www.mizu-voip.com/Portals/0/Files/mizu_voip_server_tutorial.pdf

Documentation: <https://www.mizu-voip.com/Portals/0/Files/MAdminGuide.pdf>

Routing: https://www.mizu-voip.com/Portals/0/Files/Routing_guide.pdf

More documentation: <https://www.mizu-voip.com/Support/Documentations.aspx>

Support: support@mizu-voip.com