# Installation and Configuration Guide for GX and EX Controller

APPLICATION NOTE

Mitel

**NOTICE**

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TRADEMARKS

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# READING INSTRUCTIONS

**Note!** Important information.

**Tip!** Useful information.

# INTRODUCTION

This document describes a typically scenario for a branch office with survivability and local presence.

It contains both the GX and the EX gateways.

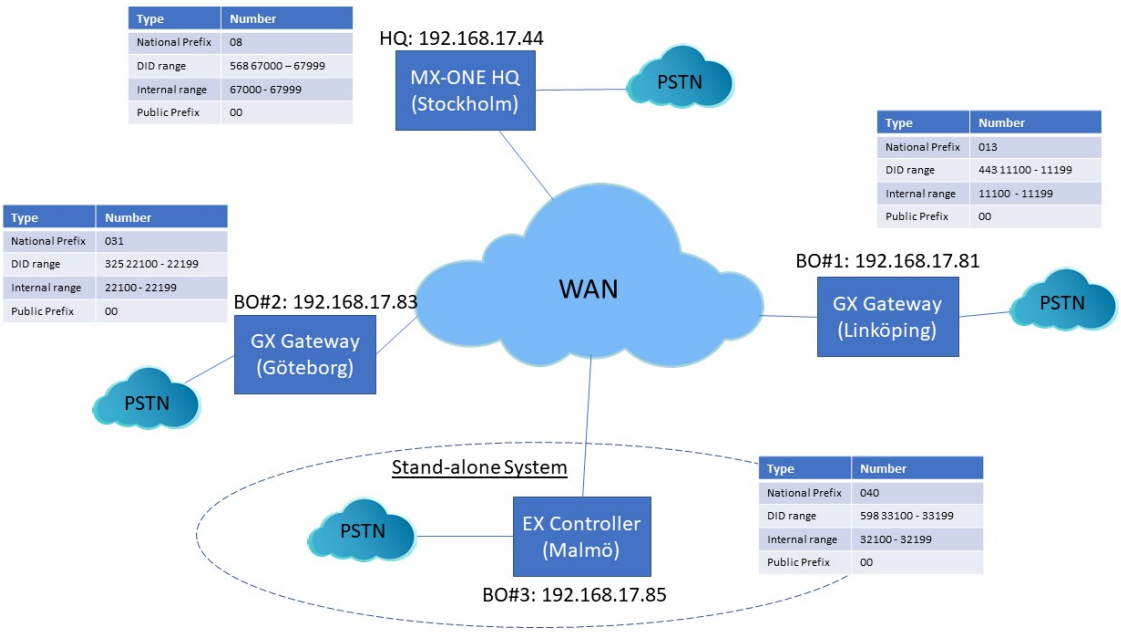



**Figure 1 – EX and GX Controller Gateways**

**Note!** The EX gateway can only be used as a stand-alone system.

# PRE-REQUISITES

When planning the number series in the branch office following must be considered.

- The extension range must be coherent and matching the local DID number series (if local presence is used).
- MX-ONE SW must be at least version 7.0.
- The firmware level of the EX-Controller and GX-Gateway shall be at least ‘Dgw 42.3.1032-MT’ with profile ‘S100-MT-D2000-45’ for GX-Gateway and ‘STNL-MT-D2000-65’ for EX-Controller.

Other considerations/restrictions:

- VDP logon with SCA/SCABR is not working when assigned to a soft key.
- A SIP outbound proxy address must be assigned in the ‘startup.cfg’ file, that is, the SIP outbound proxy address is the local address of the EX-Controller / GX-Gateway.

# 1 SETTING UP MX-ONE FOR GX CONTROLLER

## 1.1 NUMBER ANALYSIS

NUMBER ANALYSIS DATA

| *TYPE OF SERIES* | *NUMBER SERIES* |
|---|---|
| EXTENSION NUMBER SERIES | 10000 - 31999<br>33200 - 49999<br>67000 - 67999 |
| EXTERNAL DESTINATION CODE | 068<br>081 – 088<br>321<br>331<br>81 - 88 |
| LCR ACCESS CODE | 00 |

CALL DISCRIMINATION DATA

| *TYPE OF SERIES* | *NUMBER SERIES* |
|---|---|
| EXTERNAL/INTERNAL NUMBER | CDCAT CUSTOMER |
| NUMBER ANALYSIS DATA | - |

## 1.2 EXTENSION DATA

MDSH> extension -p -d 67820..67822,11101..11106,22101..22106

Directory Number Profile

| Dir | Cust | Lim | Csp | Feature | Lang | Max | Secretary | Max | Security | AMC | Video | BluStar | Third |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Party | Csta | Free | On | Hotline | Hotline | Num | Backup | Num | | Area | | | |
| | | | | level | | | Cost | | Term | Exception | | Client | Mod SIP |
| Client | Supp | Second | Line | | | | | | | Code | | | |
| 11101 | 0 | 1 | 9 | - | - | No | 1 | Yes | No | No | - | | No |
| 00 | 1 | - | - | 08101344311101 | | | 013 | | | | | | |
| 11102 | 0 | 1 | 9 | - | - | No | 1 | Yes | No | No | - | | No |
| 00 | 1 | - | - | 08101344311102 | | | 013 | | | | | | |
| 11103 | 0 | 1 | 9 | - | - | No | 1 | Yes | No | No | - | | No |
| 00 | 0 | - | - | 08101344311103 | | | 013 | | | | | | |
| 11104 | 0 | 1 | 9 | - | - | No | 1 | Yes | No | No | - | | No |
| 00 | 0 | - | - | - | | | - | | | | | | |
| 11105 | 0 | 1 | 9 | - | - | No | 4 | Yes | No | No | - | | No |
| 00 | 0 | - | - | 08101344311105 | | | 013 | | | | | | |
| 11106 | 0 | 1 | 9 | - | - | No | 4 | Yes | No | No | - | | No |
| 00 | 0 | - | - | 08101344311106 | | | 013 | | | | | | |
| 22101 | 0 | 1 | 9 | - | - | No | 4 | Yes | No | No | - | | No |
| 00 | 0 | - | - | 082031325221101 | | | 031 | | | | | | |

22102 0 1 9 - - No 4 Yes No No - No
00 0 - - 082031325221102 031

22103 0 1 9 - - No 4 Yes No No - No
00 0 - - 082031325221103 031

22104 0 1 9 - - No 4 Yes No No - No
00 0 - - 082031325221104 031

22105 0 1 9 - - No 4 Yes No No - No
00 0 - - 082031325221105 031

22106 0 1 9 - - No 4 Yes No No - No
00 0 - - 082031325221106 031

67820 0 1 11 - - No 4 Yes No No - No
00 1 - - - -

67821 0 1 9 - - No 4 Yes No No - No
00 0 - - - -

67822 0 1 9 - - No 1 Yes No No - No
00 1 - - - -

MDSH>

**Common Service Profile 9:**

Cust: 0

Traf : 0103151515

Serv: 11110001100100000000100000300

Cdiv: 111000111010000

Roc: 000001

Npres: 0011000

Offered Time: 0

Forced DisconnectTime: 0

CnnLog: 0

Csp Name: Standard

**Common Service Profile 11:**

Cust: 0

Traf : 0103151515

Serv: 11113001100100000000100000300

Cdiv: 111000111010000

Roc: 000001

Npres: 0011000

Offered Time: 0

Forced DisconnectTime: 0

CnnLog: 0

Csp Name: Intrusion

## 1.3 LEAST COST ROUTING DATA

LEAST COST DESTINATION DATA

EXTERNAL NUMBER TABLE

| ENTRY | TRC | PRE | CONF |
|---|---|---|---|
| 00013443111 | 8 | | N |
| 00031325 | 8 | | N |
| 00040598 | 8 | | N |
| 00084226 | 7 | | N |
| 000856867 | 7 | | N |

END

LEAST COST DESTINATION DATA

NUMBER LENGTH TABLE

| ENTRY | TRC | PRE | CONF | MIN | MAX | ACF |
|---|---|---|---|---|---|---|
| 001 | 0 | | N | 6 | 18 | Y |
| 002 | 0 | | N | 6 | 18 | Y |
| 003 | 0 | | N | 6 | 18 | Y |
| 004 | 0 | | N | 6 | 18 | Y |
| 005 | 0 | | N | 6 | 18 | Y |
| 006 | 0 | | N | 6 | 18 | Y |
| 007 | 0 | | N | 6 | 18 | Y |
| 008 | 0 | | N | 6 | 18 | Y |
| 009 | 0 | | N | 6 | 18 | Y |

LEAST COST DESTINATION DATA

NUMBER TABLE

| ENTRY | TRC | PRE | ACCT | FRCT | TOLL | CBCS | BTON | TNS | OSA |
|---|---|---|---|---|---|---|---|---|---|
| 00013 | 5 | | 0 | 1 | 111111111111111 | | 0 | | |
| 00031 | 5 | | 0 | 2 | 111111111111111 | | 0 | | |
| 00040 | 5 | | 0 | 3 | 111111111111111 | | 0 | | |
| 0008 | 4 | | 0 | 4 | 111111111111111 | | 0 | | |

END

LEAST COST DESTINATION DATA

FICTITIOUS DESTINATION TABLE

| FRCT | TZONE | PRE |
|---|---|---|
| 1 | 1 | 081 |
| 2 | 1 | 083 |
| 3 | 1 | 085 |
| 4 | 1 | 088 |

END

# 1.4 ROUTE DATA

## 1.4.1 ROCAP

**ROUTE CATEGORY DATA**

| ROU | CUST | SEL | TRM | SERV | NODG | DIST | DISL | TRAF | SIG BCAP |
|---|---|---|---|---|---|---|---|---|---|
| 81 | | 7110000000000010 | 4 | 3100000001 | 0 | 30 | 128 | 03151515 | 0111110000A0 001100 |
| 83 | | 7110000000000010 | 4 | 3100000001 | 0 | 30 | 128 | 03151515 | 0111110000A0 001100 |
| 211 | | 7110000000000010 | 4 | 3100000001 | 0 | 30 | 128 | 03151515 | 0111110000A1 001100 |

## 1.4.2 RODAP

**ROUTE DATA**

| ROU | TYPE | VARC | VARI | VARO | FILTER |
|---|---|---|---|---|---|
| 81 | TL66 | H'00000000 | H'00000000 | H'00000000 | NO |
| 83 | TL66 | H'00000000 | H'00000000 | H'00000000 | NO |
| 211 | TL66 | H'00000000 | H'00000000 | H'00000000 | NO |

## 1.4.3 SIP ROUTE

One SIP route to each branch node is specified.

Route 81 towards BO#1 (Linköping)

route : 81
protocol = tcp
profile = Default
service = PUBLIC
uristring0 = sip:?@192.168.17.81
fromuri0 = sip:?@192.168.17.44
remoteport = 5070
accept = TRUNK_INFO
match = user=trunk
register = NO_REG

Route 83 towards BO#2 (Göteborg)

route : 83
protocol = tcp
profile = Default
service = PUBLIC
uristring0 = sip:?@192.168.17.83
fromuri0 = sip:?@192.168.17.44
remoteport = 5070
accept = TRUNK_INFO

match = user=trunk

register = NO_REG

Route 211 towards BO#3 (Malmö)

route : 211

protocol = udp

profile = MXONE-tieline

service = PRIVATE_SERVICES

uristring0 = sip:?@192.168.17.94;tgrp=BO3

fromuri0 = sip:?@192.168.17.44;tgrp=BO3

accept = ALL

register = SET_BY_PROFILE

trusted = TRUST_BY_PROFILE

**Note!** BO#3 is only reached by SIP trunks as it is an EX controller system running an own instance of MX-ONE.

# 2 SETTING UP THE GX GATEWAY

This section describes how to setup BO#1 (Linköping).

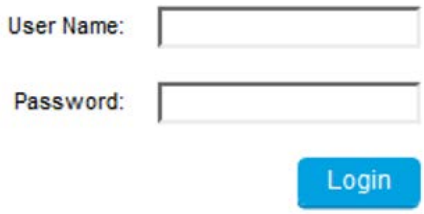
Setting up BO#2 (Göteborg) is similar, only numbering information and own IP-address is changed.

## 2.1 LOGON

This section describes how to setup BO#1.

Factory Reset the EX Controller and plug in the network cable to the ETH1 port on EX Controller (If DHCP is running in the network).

**Note!** If DHCP is not running into the network then, plug in the network cable to the ETH2 port on EX Controller and use the default IP address of 192.168.0.10 to open the EX Controller Interface.




This section describes how to setup BO#1.

1. Factory Reset the EX Controller and plug in the network cable to the ETH1 port on EX Controller (If DHCP is running in the network).

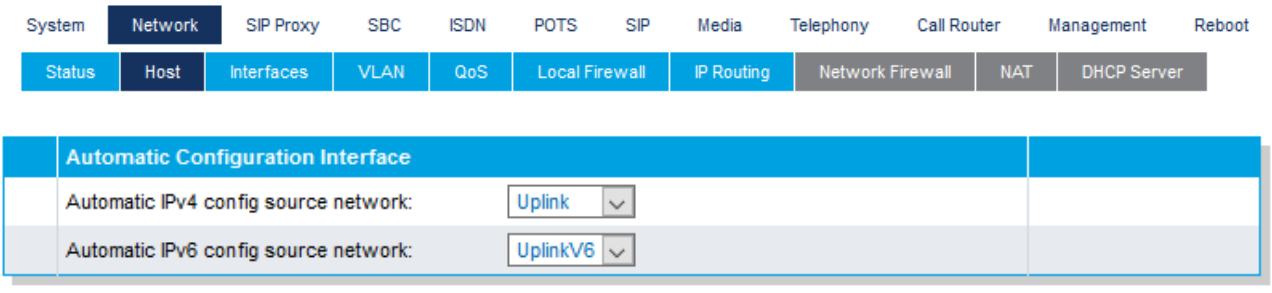
- User name/password: public /
- User name/password: admin/administrator

2. Plug in the analog phone in the FXS port 1 of the EX Controller and dial *#*0 to know the IP address of the EX Controller assigned by using DHCP server.
3. Log into the EX Controller by using the above-mentioned IP address and navigate as described below to configure.

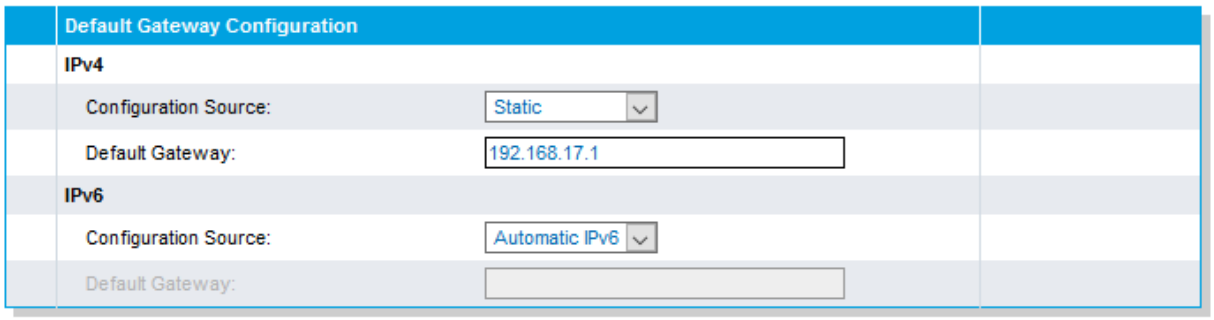
## 2.2 NETWORK SETTINGS

### 2.2.1 HOST

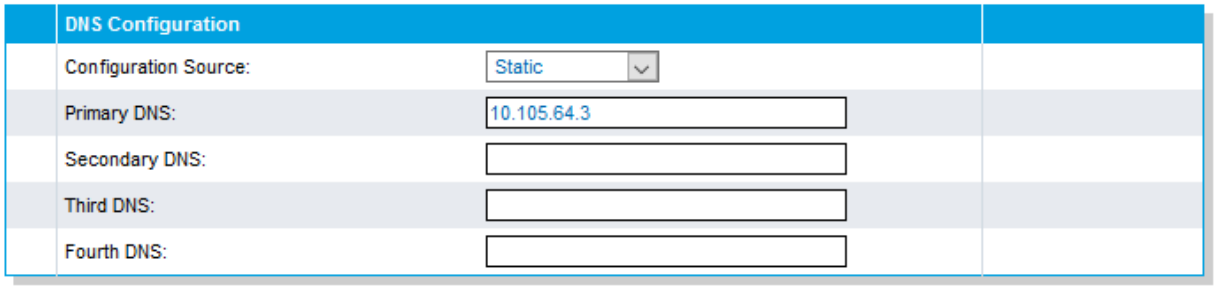
4. Select **Network>Host** and keep the default configuration interface as mentioned below.



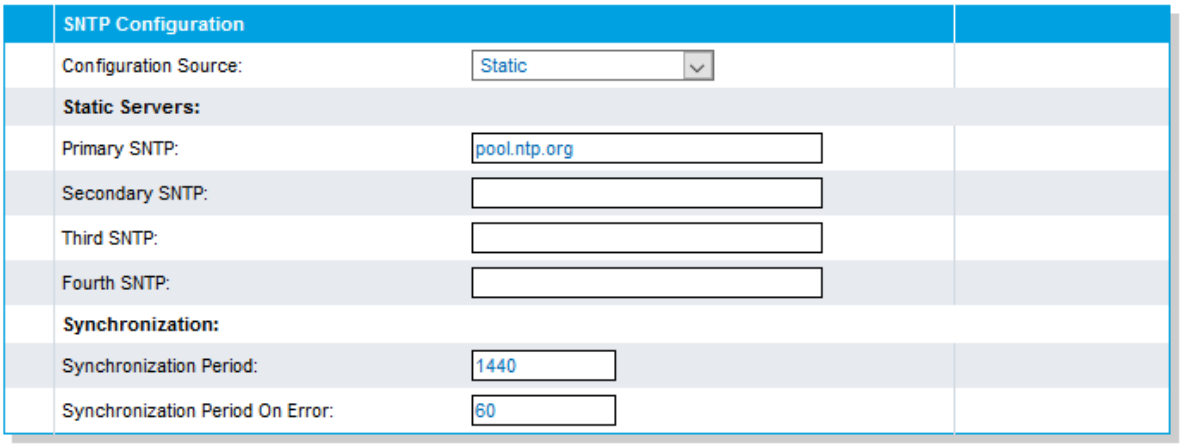

5. Change to Static IP-address and enter default Gateway (GW).




6. Change to static DNS server and enter IP-address or FQDN to DNS server.




7. Change to static SNTP server, enter time server data.




8. Set the **Static Time Zone**.

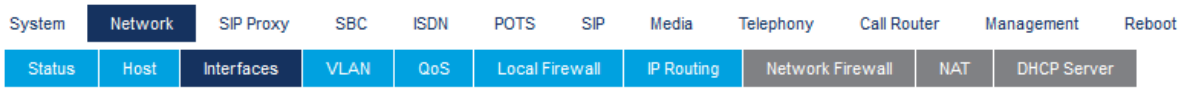
Valid options are:

- Pacific Time (Canada and US) : PST8PDT7,M3.2.0/02:00:00,M11.1.0/02:00:00
- Mountain Time (Canada and US) : MST7MDT6,M3.2.0/02:00:00,M11.1.0/02:00:00
- Central Time (Canada and US) : CST6CDT5,M3.2.0/02:00:00,M11.1.0/02:00:00
- Eastern Time (Canada and US) : EST5EDT4,M3.2.0/02:00:00,M11.1.0/02:00:00
- Atlantic Time (Canada) : AST4ADT3,M3.2.0/02:00:00,M11.1.0/02:00:00
- GMT Standard Time : GMT0DMT-1,M3.5.0/01:00:00,M10.5.0/02:00:00
- W. Europe Standard Time : WEST-1DWEST-2,M3.5.0/02:00:00,M10.5.0/03:00:00
- China Standard Time : CST-8
- Tokyo Standard Time : TST-9
- Central Australia Standard Time : CAUST-9:30DCAUST-10:30,M10.5.0/02:00:00,M3.5.0/02:00:00
- Australia Eastern Standard Time : AUSEST-10AUSDST-11,M10.5.0/02:00:00,M3.5.0/02:00:00
- UTC (Coordinated Universal Time) : UTC0

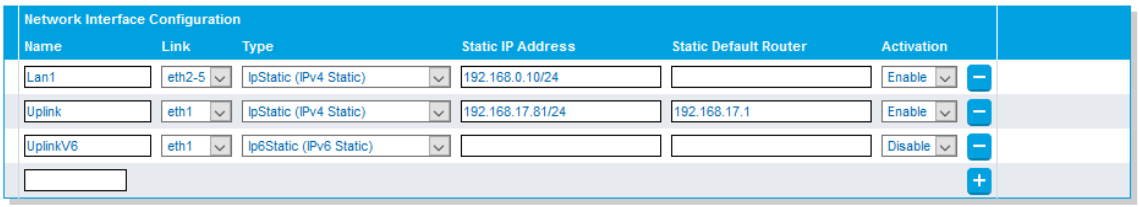

9. Leave all other items as it is and click **Apply** when finished.

## 2.3 INTERFACES

1. Go to **Network**>**Interface.**




2. Change **Uplink** to **IpStatic (IPv4 Static)** and enter the static IP-address and Static Default Gateway.

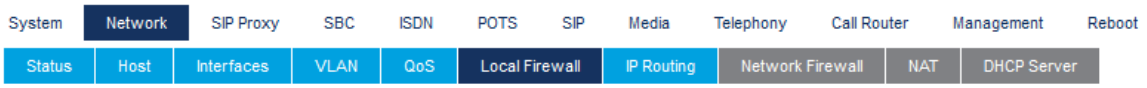



3. Leave all other items as it is and click **Apply** when ready.

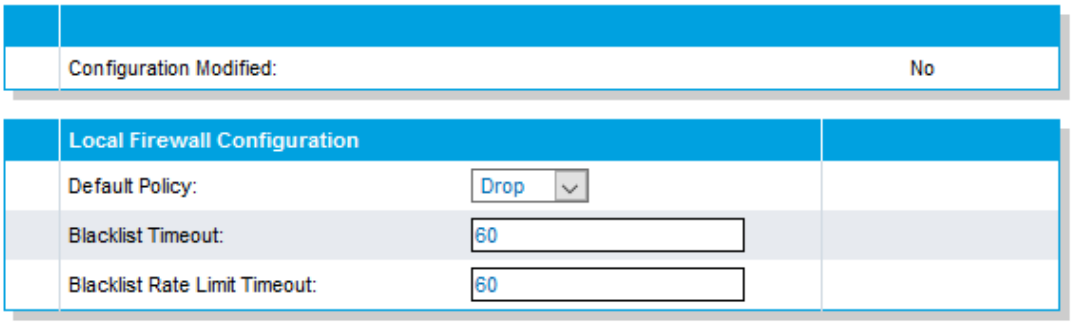
**Note!** When the IP-address is changed the connection is lost and a new logon must be done with the new IP-address.

## 2.4 LOCAL FIREWALLS

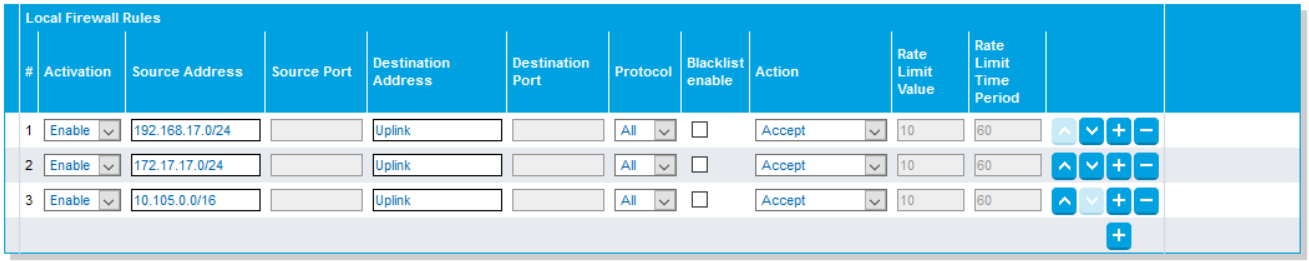
1. Go to **Network**>**Local Firewall**.




2. If local firewall security is needed change default policy to **Drop**.




3. Enter the networks for which traffic can enter from.

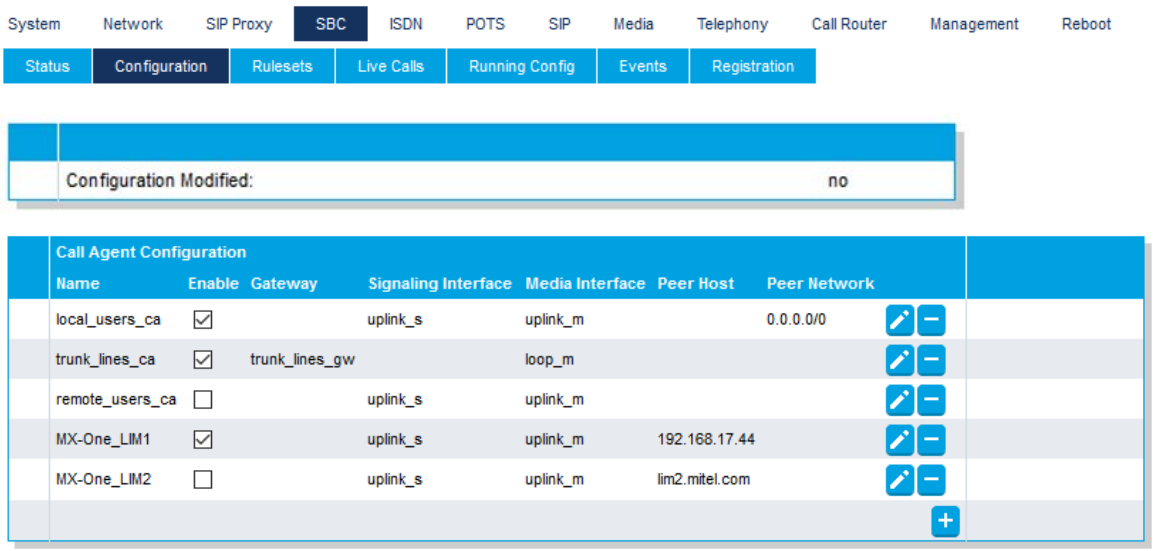



4. Click **Save** or Save & Apply when ready.

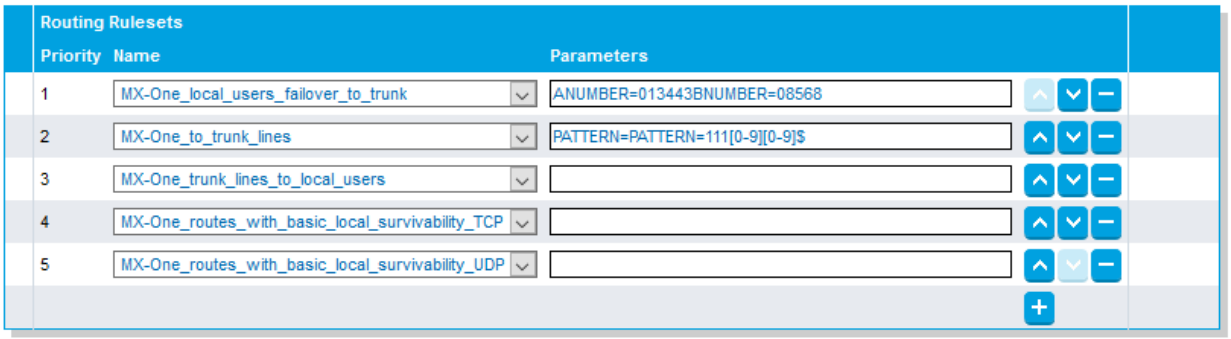
# 2.5 SESSION BOARD CONTROLLER (SBC)

## 2.5.1 CONFIGURATION

1. Go to **SBC**>**Configuration**. The following Call Agents are present.



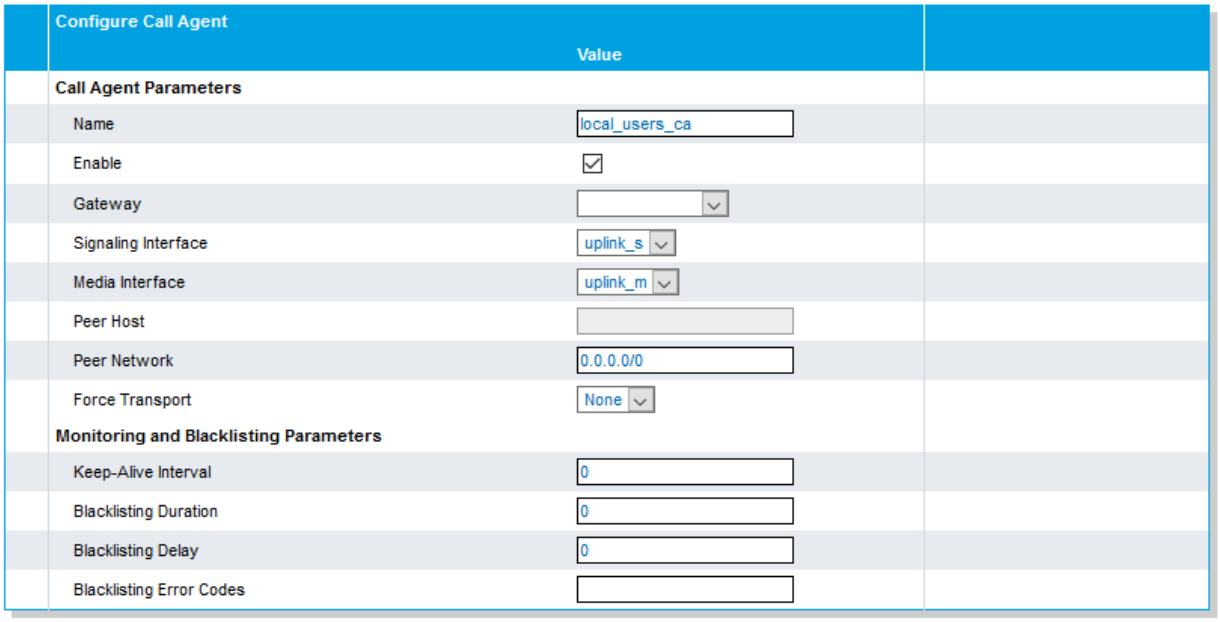

2. Insert A-Number prefix and B-number prefix. These numbers are to be added in front of the numbers in when the GW is in survivable mode, that is, the call is routed to PSTN and thus needs to be prefixed.
3. Enter the number range that is allowed in the branch in the PATTERN parameter. For example, 111[0-9][0-9]$ means that the allowed number range in this branch is 11100 – 11199.

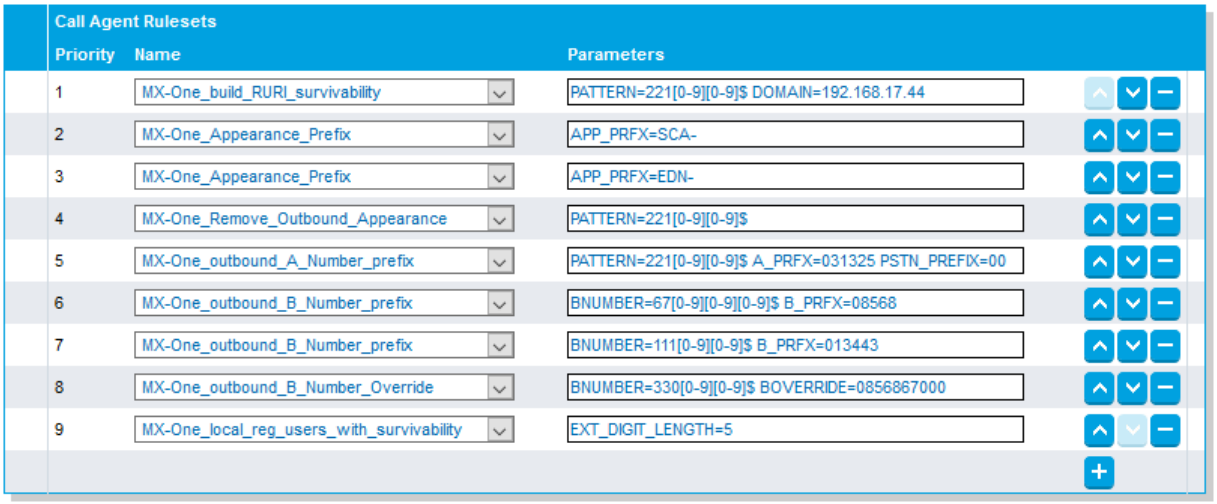



4. Configure each call agent (ca).
5. Click  to enter specific data for each call agent.

### 5.5.1.1 Local_users_ca

- Enter the IP-address of MX-ONE to the DOMAIN variable.
- Enter the number range that is allowed in the branch in the PATTERN parameter. For example, 111[0-9][0-9]$ means that the allowed number range in this branch is 11100 – 11199.
- Insert A-Number prefix and B-number prefix. These numbers are to be added in front of the numbers in when the GW is in survivable mode, that is, the call is routed to PSTN and thus needs to be prefixed.




**Ruleset MX-ONE_build_RURI survivability (ACTIVE ONLY IN SURVIVAL MODE)**

PATTERN=111[0-9][0-9]$

The pattern for the internal range of numbers, in this example the internal range would be 11100 – 11199

Calls to this number range stay always local (do not send to the PSTN in survival mode)

DOMAIN=192.168.17.44

The IP of the headquarter (the main PBX), in this case 192.168.17.44

**Ruleset: MX_ONE_Appearance_Prefix (ACTIVE ONLY IN SURVIVAL MODE)**

NEW: APP_PREFIX=SCA-

This is the prefix for the usernames connected with shared appearance. In this example we have two: “SCA-“ and “EDN-“

**Ruleset: MX-ONE_Remove_Outbound_Appearance (ACTIVE ONLY IN SURVIVAL MODE)**

PATTERN=111[0-9][0-9]$

This rule will remove any prefix used for Shared Call Appearance. The pattern for the internal range of numbers, in this example the internal range would be 11100 – 11199

**Ruleset: MX-ONE_outbound_A_Number_prefix (ACTIVE ONLY IN SURVIVAL MODE)**

PATTERN=111[0-9][0-9]

This defines the local numbers.

A_PRFX=013443

This is the prefix for the local numbers used on outgoing calls to the PSTN (in this example we received a number block 013443xxxxx from the PSTN provider and add the prefix on outgoing calls, so that the calling party number sent to the PSTN is correct)

PSTN_PREFIX=00

Dial this prefix to break out to the PSTN. Here we have configured the “00” (not to be mixed up with the “00” for international calls!)

**Ruleset: MX-ONE_outbound_B_Number_prefix (ACTIVE ONLY IN SURVIVAL MODE)**

This ruleset applies to calls to numbers defined in BNUMBER and will add B_PRFX to the called party number.

BNUMBER=67[0-9][0-9]$

Applies to calls to the specific range of extensions,

B_PRFX=08568

This is the prefix for the Called Party Number. In this case it was build like: National Prefix (08) + Main part of the HQ’s local number: (568), in case somebody dials an extension in the HQ

**Ruleset: MX-ONE_outbound_B_Number_Override (ACTIVE ONLY IN SURVIVAL MODE)**

This ruleset applies to calls to numbers defined in BNUMBER and will use the BOVERRIDE as Called Party Number.

BNUMBER=330[0-9][0-9]$

Applies to calls to the specific range

BOVERRIDE=0856867000

Calls to extensions like BNUMBER will be sent to BOVERRIDE, in this example they will be sent to 0856867000

**Ruleset: MX-ONE_local_reg_users_with_survivability**

(Builds the registration cache for survivability purpose)

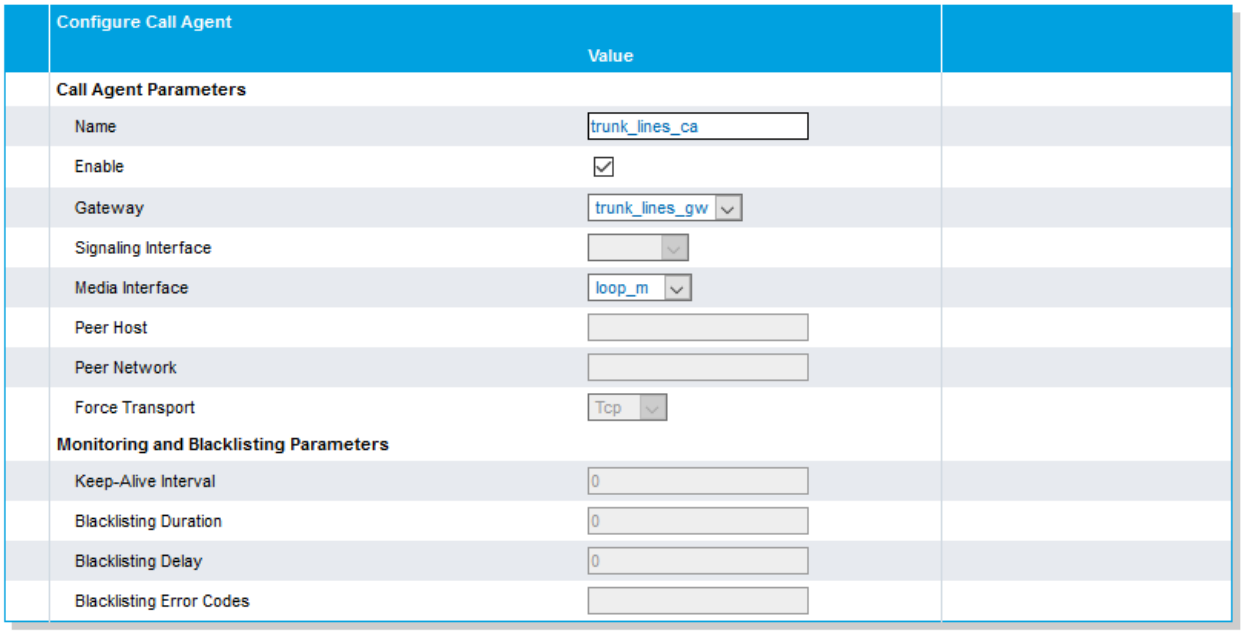
EXT_DIGIT_LENGTH=5

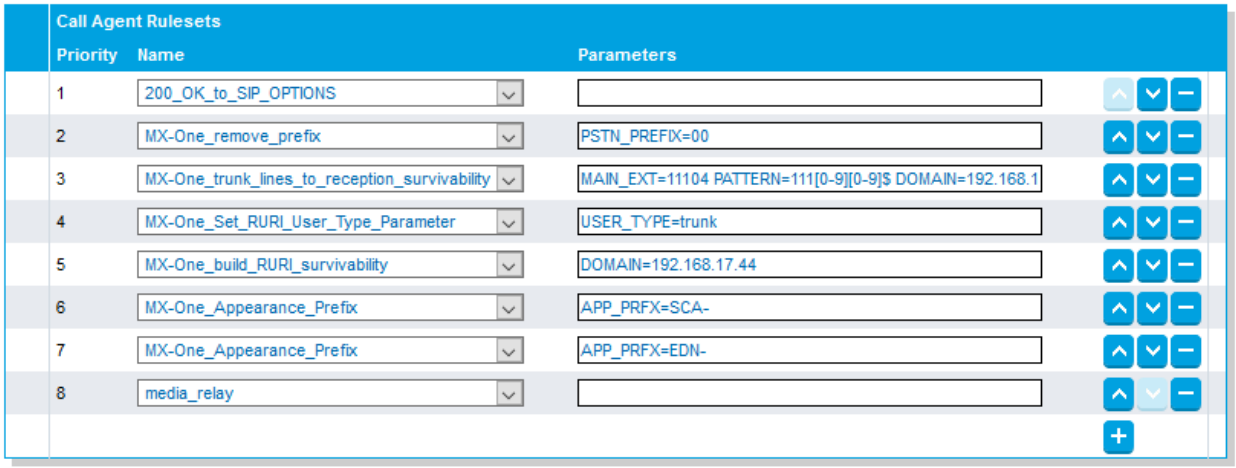
The length of the internal numbers, in this case set to “5”, for numbers like “00001 – 99999”

6. Click **Save** when done.

#### 2.5.1.1.1 Trunk _ Lines _ca

- Enter the IP-address of MX-ONE to the DOMAIN variable (in two places).
- Enter the number range that is allowed in the branch in the PATTERN parameter. For example, 111[0-9][0-9]$ means that the allowed number range in this branch is 11100 – 11199.
- Insert a main extension number in MAIN_EXT parameter, this is could be the local answering position when dialling a vacant number, and so on.
- Enter the PSTN_PREFIX and STRIPNDIGTS, this is used to remove the public access code when dialling PSTN calls in survivable mode.




**Ruleset: MX-One_remove_prefix**

PSTN_PREFIX=00

This is the prefix used to dial out to the PSTN

**Ruleset: MX-One_trunk_lines_to_reception_survivability**

An incoming call in survival mode will be sent to MAIN_EXT destination if not reachable

MAIN_EXT=11104

This will receive the incoming call in case the original destination is not reachable (not defined or not registered)

PATTERN=111[0-9][0-9]$

The pattern for the internal range of numbers, in this example the internal range would be 11100 – 11199

DOMAIN=192.168.17.44

The IP of the headquarter (the main PBX), in this case 192.168.17.44

**Ruleset: MX-One_Set_RURI_User_Type_Parameter**

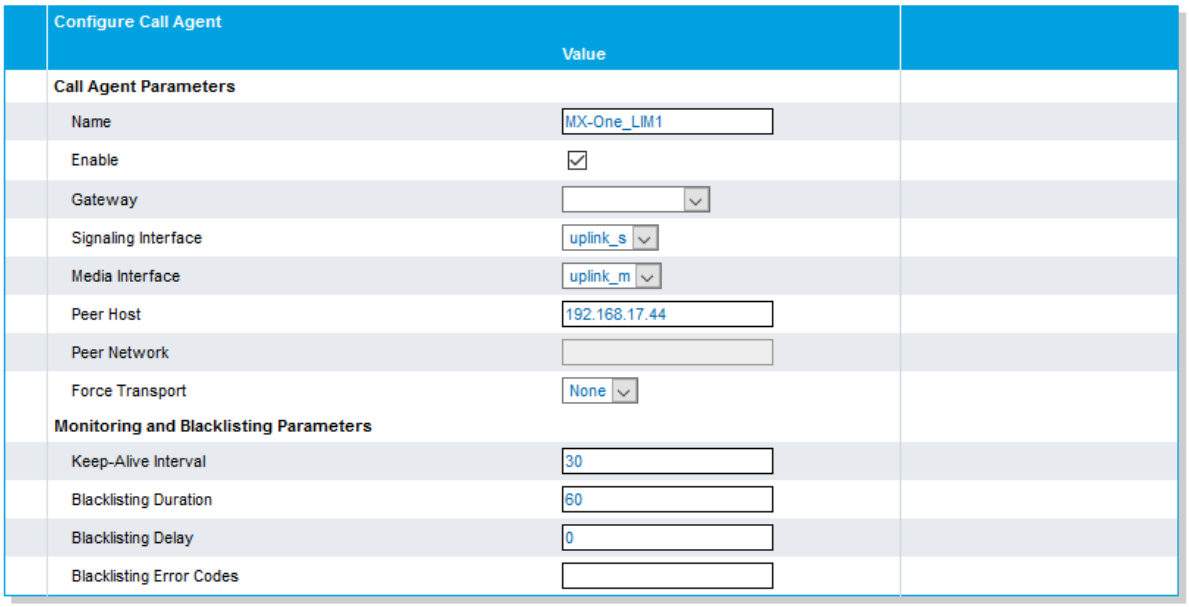
Set RURI User Type Parameter

USER_TYPE=trunk

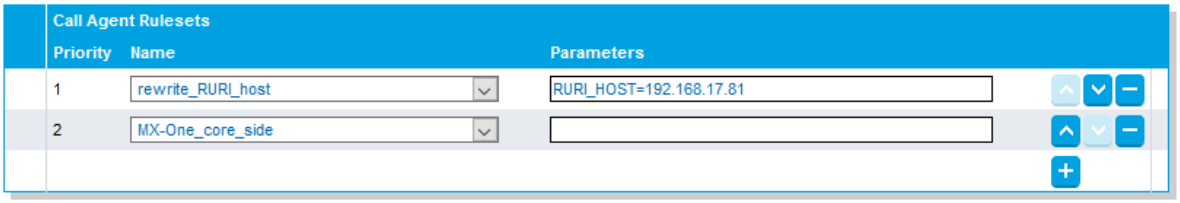
7. Click **Save** when done.

#### 2.5.1.1.2 MX-ONE_Lim1

1. Enter the IP-address of the MX-ONE in the **Peer Host** field.




2. Enter the IP-address of the GW in the **RURI_HOST** parameter.




**Ruleset: rewrite_RURI_host**

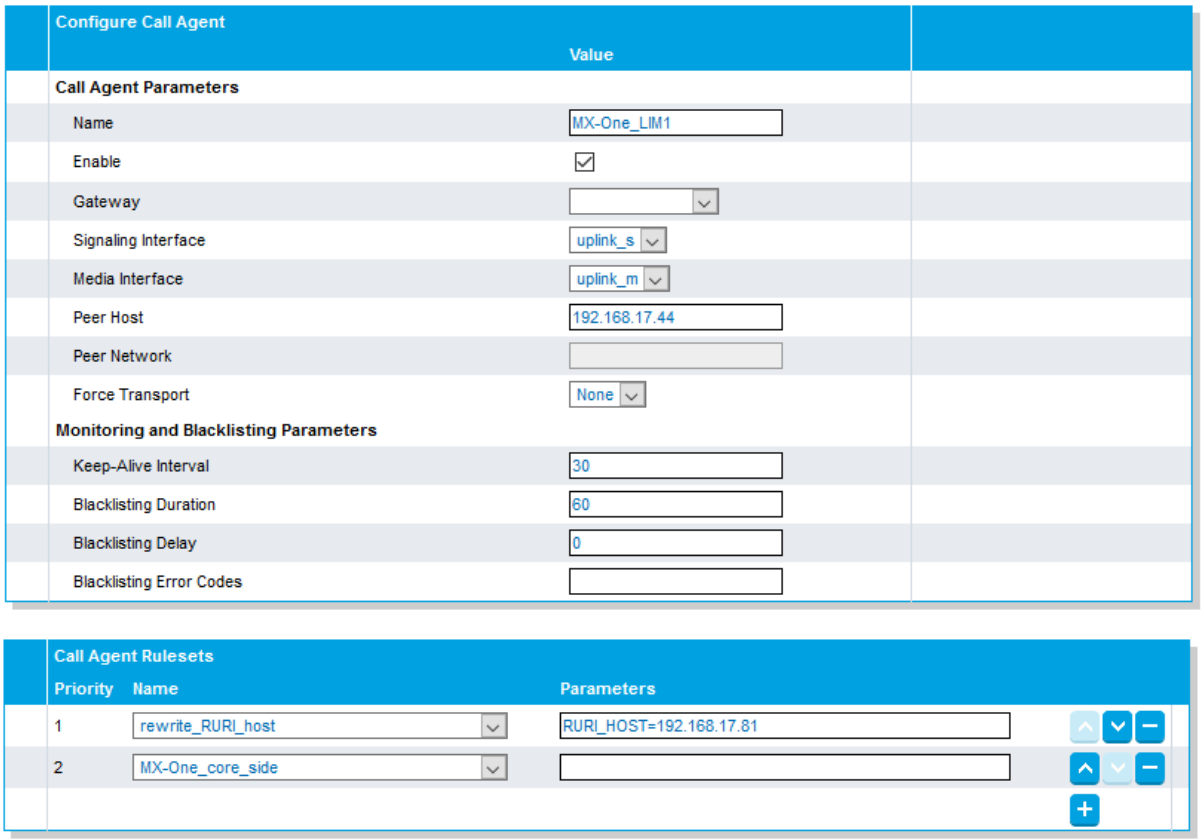
Customize RURI host

RURI_HOST= 192.168.17.81. This is the local IP address.

3. When all the changes for call agents are done, a yellow field is shown indicating that configuration has been modified.
4. Click **Save** when ready.

#### 2.5.1.1.3 MX-ONE_TRUNK

1. Enter the IP-address of the MX-ONE in the **Peer Host** field.




2. When all the changes for call agents are done, a yellow field is shown indicating that configuration has been modified.
3. Click **Save** when ready.

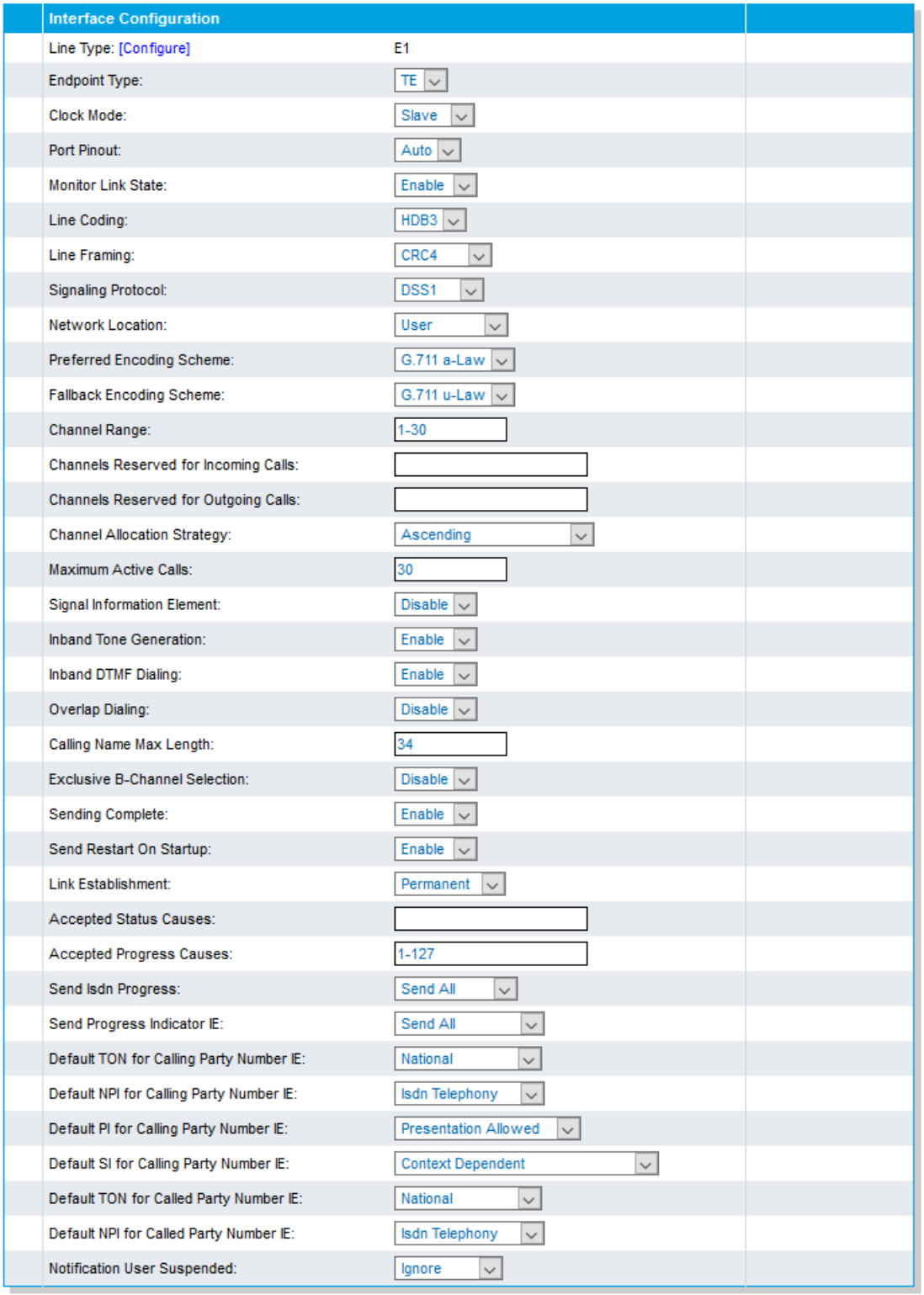

4. If the indication is not removed there are some error in the configuration.
5. Double check changes described above and correct them.

## 2.6 ISDN


If ISDN trunks are used the first action to do is to press ‘Start Sensing’. The system automatically detects certain parameters, for example, number of channels.

### 2.6.1 PRIMARY RATE INTERFACE

1. When sensing is done for several markets, specific parameters can be changed.

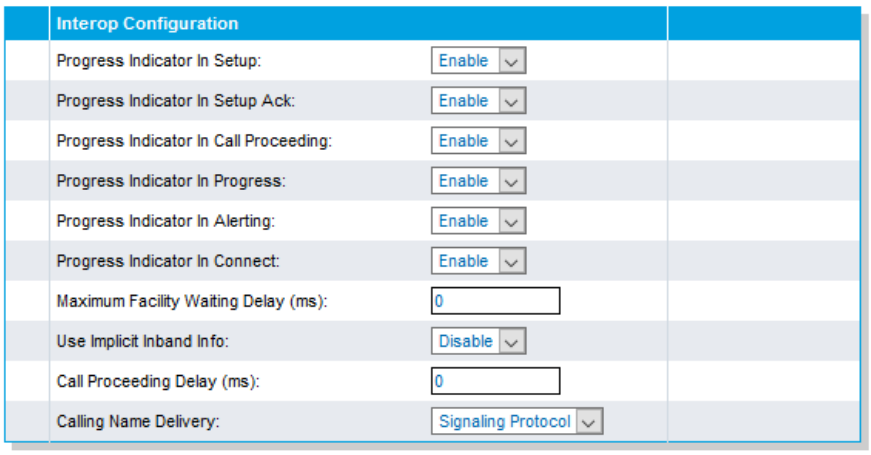


| Interface Configuration | |
|---|---|
| Line Type: [Configure] | E1 |
| Endpoint Type: | TE |
| Clock Mode: | Slave |
| Port Pinout: | Auto |
| Monitor Link State: | Enable |
| Line Coding: | HDB3 |
| Line Framing: | CRC4 |
| Signaling Protocol: | DSS1 |
| Network Location: | User |
| Preferred Encoding Scheme: | G.711 a-Law |
| Fallback Encoding Scheme: | G.711 u-Law |
| Channel Range: | 1-30 |
| Channels Reserved for Incoming Calls: | |
| Channels Reserved for Outgoing Calls: | |
| Channel Allocation Strategy: | Ascending |
| Maximum Active Calls: | 30 |
| Signal Information Element: | Disable |
| Inband Tone Generation: | Enable |
| Inband DTMF Dialing: | Enable |
| Overlap Dialing: | Disable |
| Calling Name Max Length: | 34 |
| Exclusive B-Channel Selection: | Disable |
| Sending Complete: | Enable |
| Send Restart On Startup: | Enable |
| Link Establishment: | Permanent |
| Accepted Status Causes: | |
| Accepted Progress Causes: | 1-127 |
| Send Isdn Progress: | Send All |
| Send Progress Indicator IE: | Send All |
| Default TON for Calling Party Number IE: | National |
| Default NPI for Calling Party Number IE: | Isdn Telephony |
| Default PI for Calling Party Number IE: | Presentation Allowed |
| Default SI for Calling Party Number IE: | Context Dependent |
| Default TON for Called Party Number IE: | National |
| Default NPI for Called Party Number IE: | Isdn Telephony |
| Notification User Suspended: | Ignore |

2. Click **Apply** and restart requested service when done.

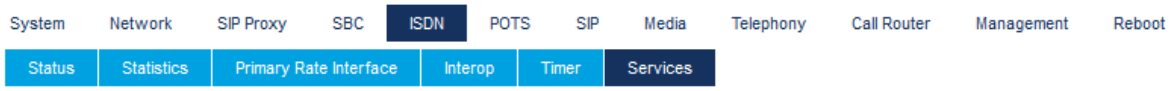
## 2.6.2 INTEROP


1. You can change other parameters dependent on market.

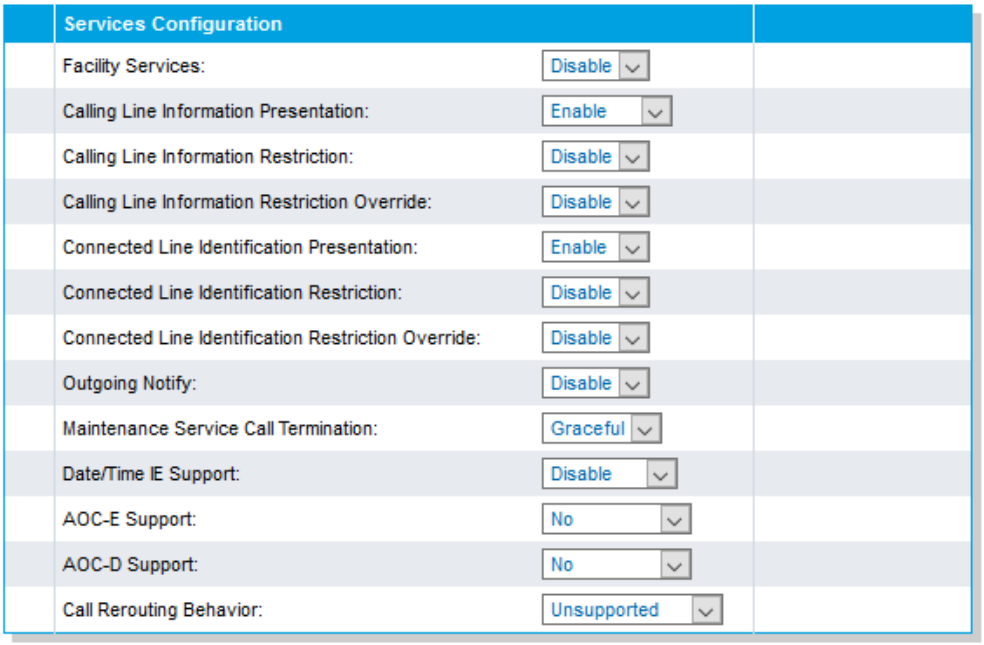



2. Click **Apply** and restart requested service when done.

### 2.6.3 SERVICES




1. Change other parameters dependent on market.

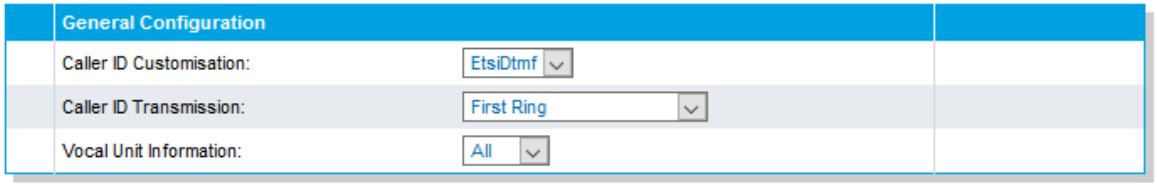



2. Click **Apply** and restart requested service when done.

## 2.7 POTS

### 2.7.1 CONFIG

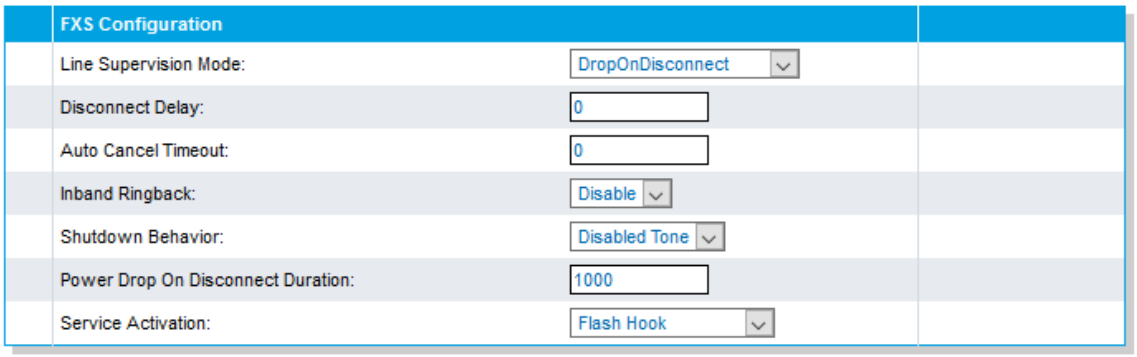

1. Set market specific data for Caller Id handling.

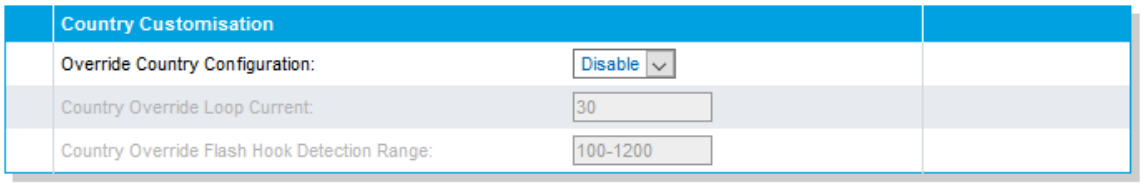



2. Click **Apply** when done and restart service.

### 2.7.2 FXS CONFIGURATION


1. Set analog phone specific data according to market.



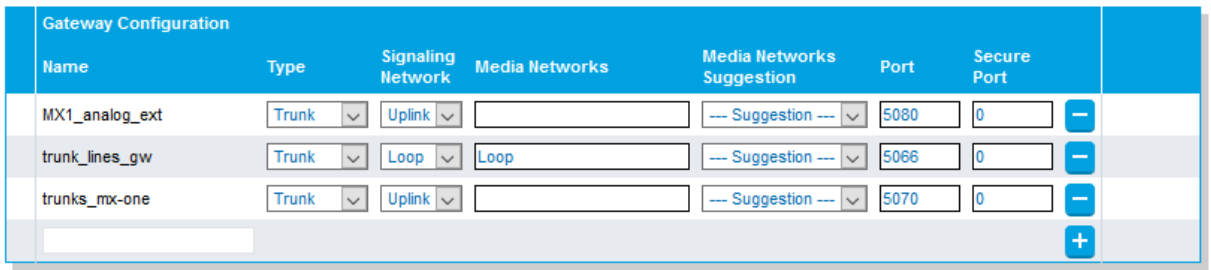

2. Click Apply when done and restart service.

## 2.8 SIP

### 2.8.1 GATEWAYS

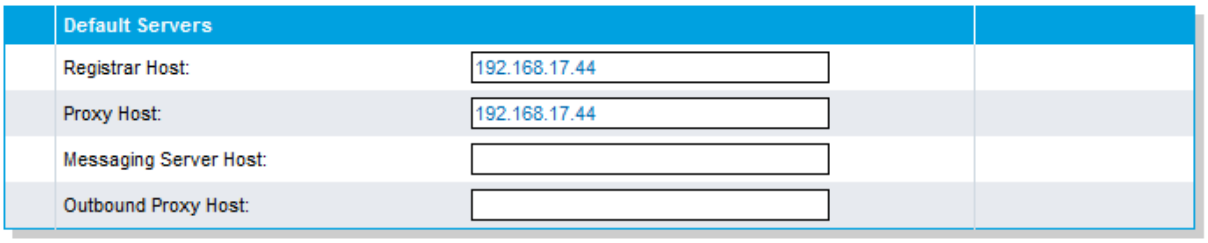
Following gateways and port numbers are pre-defined.


Note that a SIP route must be defined in MX-ONE to handle traffic to and from the ‘trunks_MX-ONE’ gateway.

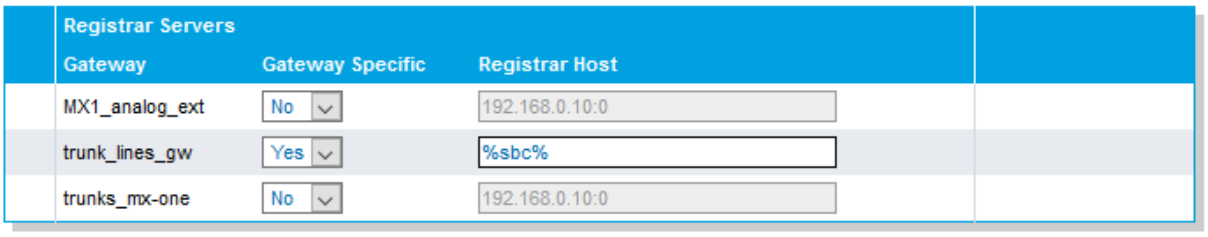


### 2.8.2 SERVERS

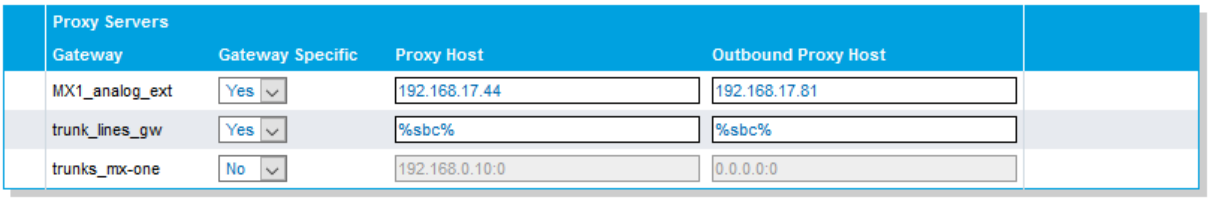

1. Enter IP-address to MX-ONE in both **Registrar Host** and **Proxy Host** fields.



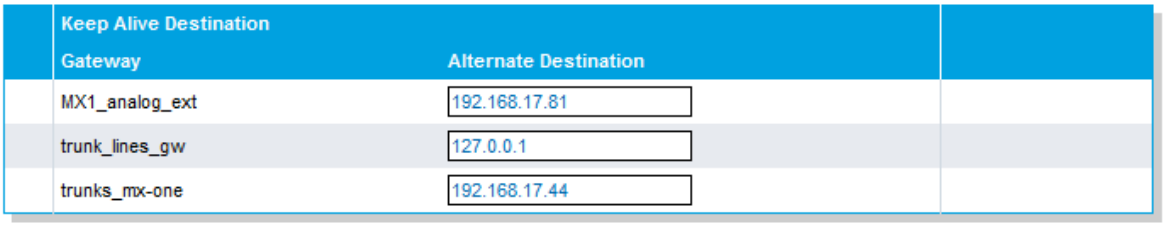

2. Change **trunk_lines_gw** to **Yes** in the drop-down list for Gateway Specific.




3. Enter IP-address of MX-ONE in the **Proxy Host** field.
4. Enter IP-address of the gateway in the **Outbound Proxy Host**.




5. Enter the IP-address of the gateway as **Alternate Destination** for **MX1_analog_ext**.
6. Enter the IP-address of MX-ONE as **Alternate Destination** for **trunks_mx-one**.




7. Click **Apply** when done and restart service.

### 2.8.3 REGISTRATIONS


1. Enter the extension numbers for the analog extensions.

**Endpoints Registration**

| Endpoint | User Name | Friendly Name | Register | Messaging | Gateway Name |
|---|---|---|---|---|---|
| FXO1 | | | Disable | Disable | trunks_mx-one |
| FXO2 | | | Disable | Disable | trunks_mx-one |
| FXO3 | | | Disable | Disable | trunks_mx-one |
| FXO4 | | | Disable | Disable | trunks_mx-one |
| FXS1 | 11104 | | Enable | Disable | MX1_analog_ext |
| FXS2 | 11105 | | Enable | Disable | MX1_analog_ext |
| FXS3 | 11106 | | Enable | Disable | MX1_analog_ext |
| FXS4 | 11107 | | Enable | Disable | MX1_analog_ext |
| PRI1 | | | Disable | Disable | trunks_mx-one |

2. Click **Apply** or Apply and Refresh when done.

## 2.8.4 AUTHENTICATION

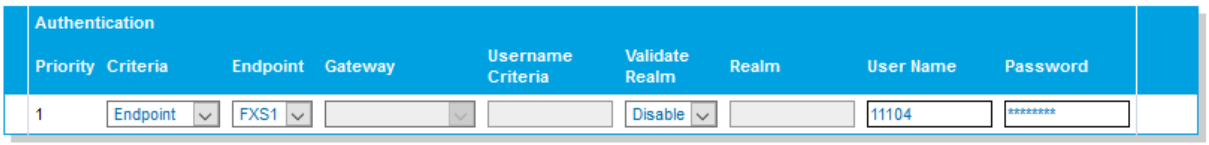

1. If password is required press  for any item.

**Authentication**

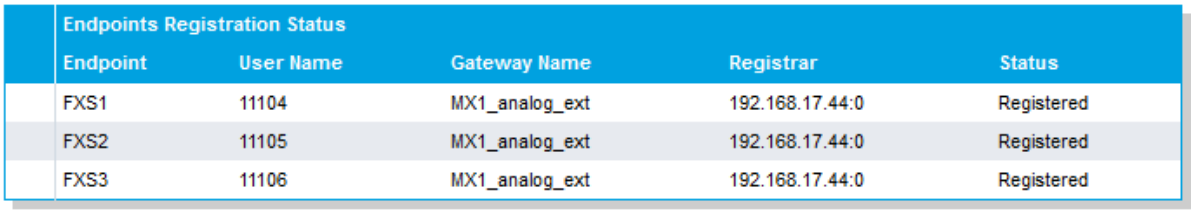
| Priority | Criteria | Endpoint | Gateway | Username Criteria | Validate Realm | Realm | User Name |
|---|---|---|---|---|---|---|---|
| 1 | Endpoint | FXS1 | | | Disable | | 11104 |
| 2 | Unit | | | | Enable | | |
| 3 | Unit | | | | Enable | | |
| 4 | Unit | | | | Enable | | |
| 5 | Unit | | | | Enable | | |
| 6 | Unit | | | | Enable | | |
| 7 | Unit | | | | Enable | | |
| 8 | Unit | | | | Enable | | |
| 9 | Unit | | | | Enable | | |
| 10 | Unit | | | | Enable | | |
| 11 | Unit | | | | Enable | | |
| 12 | Unit | | | | Enable | | |
| 13 | Unit | | | | Enable | | |
| 14 | Unit | | | | Enable | | |
| 15 | Unit | | | | Enable | | |
| 16 | Unit | | | | Enable | | |
| 17 | Unit | | | | Enable | | |
| 18 | Unit | | | | Enable | | |
| 19 | Unit | | | | Enable | | |
| 20 | Unit | | | | Enable | | |

Number of rows to add: 1

2. Indicate for which **Endpoint** and **Criteria** the changes are to apply.
3. Enter the Auth Code, in the **Password** field.
4. Disable **Validate Realm**.

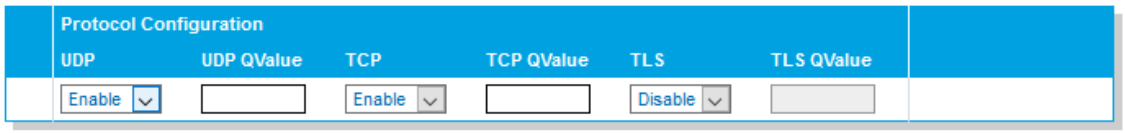



5. Click **Apply** or Apply and Refresh Registration when done and restart service. The result after 'Registration' and 'Authentication' should be like as follows.




## 2.8.5 TRANSPORT

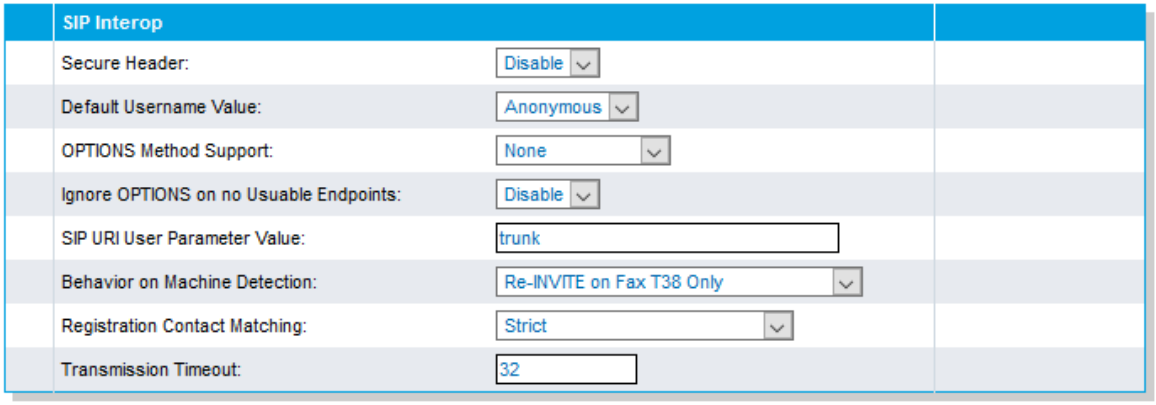

1. Enable UDP if required.




2. Click **Apply** when done and restart service.

## 2.8.6 INTEROP

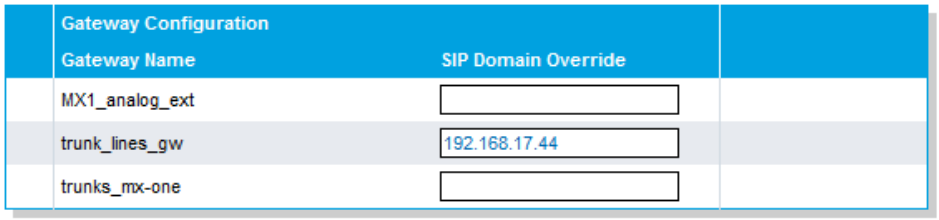

1. Indicate 'trunk' in the **SIP URI User Parameter Value** field.
2. This is used in the 'match' parameter for the SIP route in MX-ONE.




3. Click **Apply** or when done and restart service.

## 2.8.7 MISC

1. Enter the IP-address of MX-ONE in the **SIP Domain Override** filed for **trunk_lines_gw**.

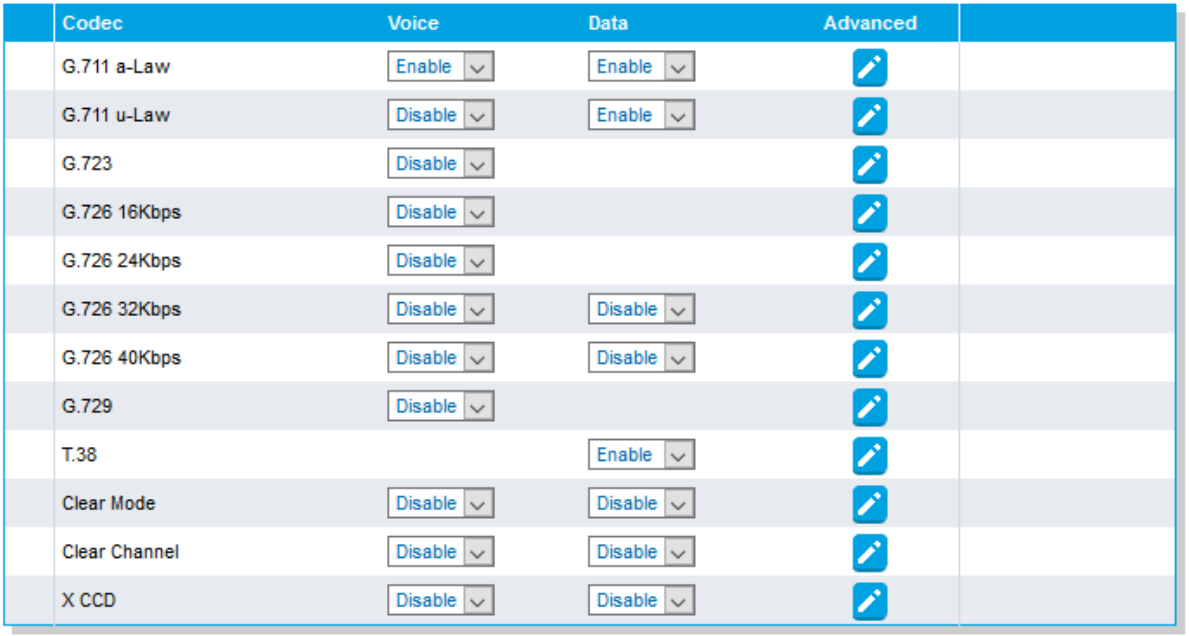



2. Click **Apply** when done and restart service.

## 2.9 MEDIA

### 2.9.1 CODECS


1. Change **Codecs** according to preference.

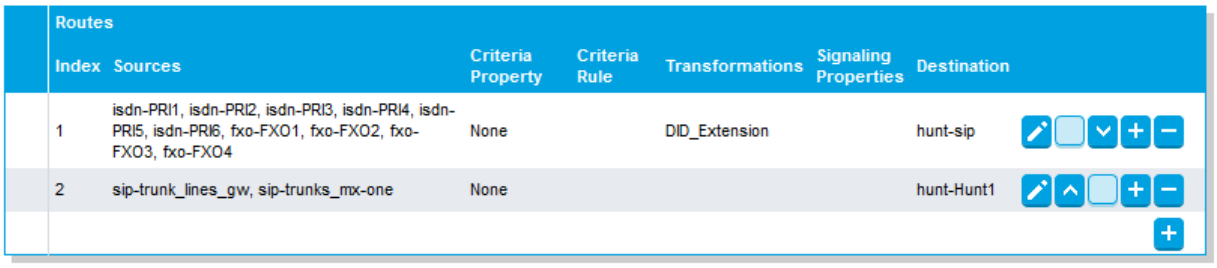



2. Click **Apply** when done and restart service.

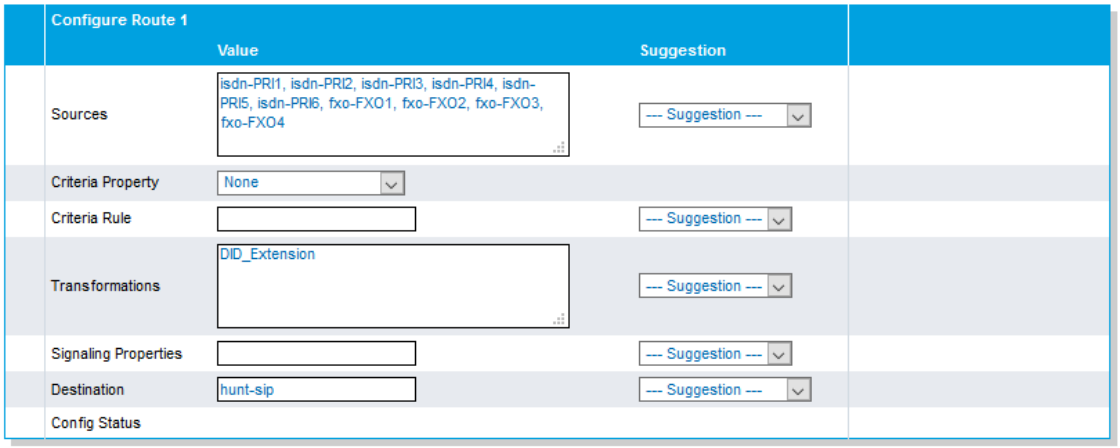
## 2.10 CALL ROUTER

### 2.10.1 ROUTE CONFIG

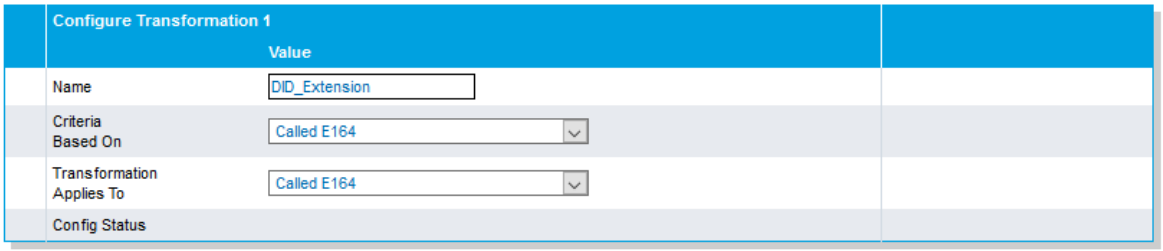

1. Click  for index 1. This is used if the received B-number contains a full number. That is, more digits than the pure DID numbers.



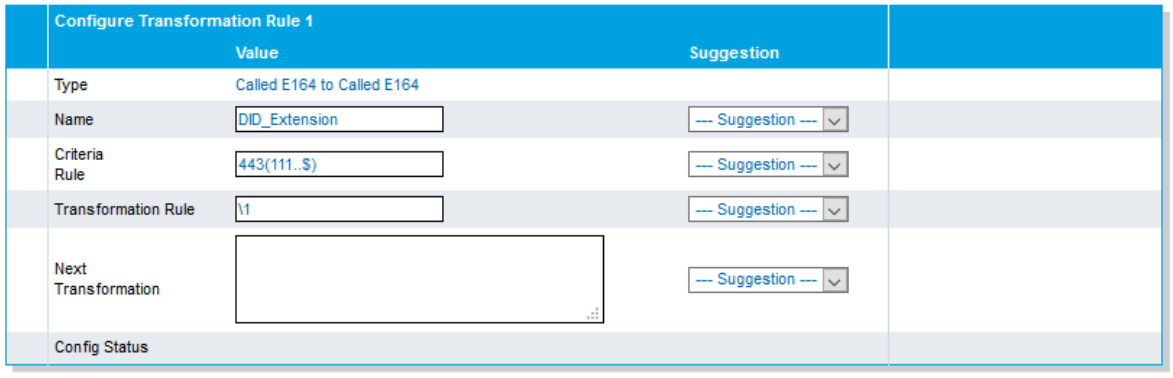

2. In the **Transformations** field add a name for a transformation rule.



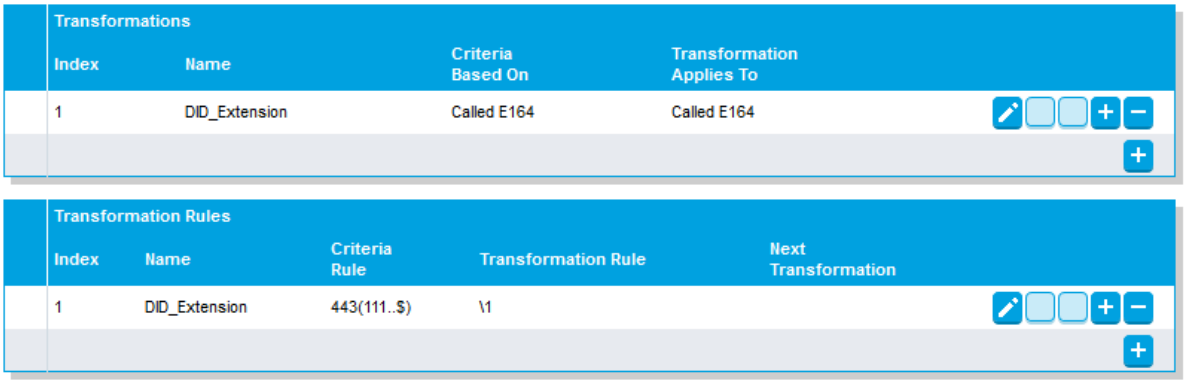

3. Click **Save**.
4. Click  in the first Call Property Transformation and enter the same name as above.
5. Use **Called E164** for both **Criteria Based On** and **Transformation Applies To** fields.




6. Click **Save** or Save and Insert Rule.
7. Click  in the second Call Property Transformation and enter the same name as above.
8. The ‘Criteria Rule’ in this case is 443 (111..)$ and the transformation rule is ‘\1. This means that if a B-number is received containing 44311104, then the 3 first digits (443) are removed before the call is sent to MX-ONE for further processing. (111..)$ means that the number can only be 5 digits starting with 111.



9. Click **Save** or Save and Insert Rule. Now, the ‘Call Property Transformations’ looks like this as shown below.

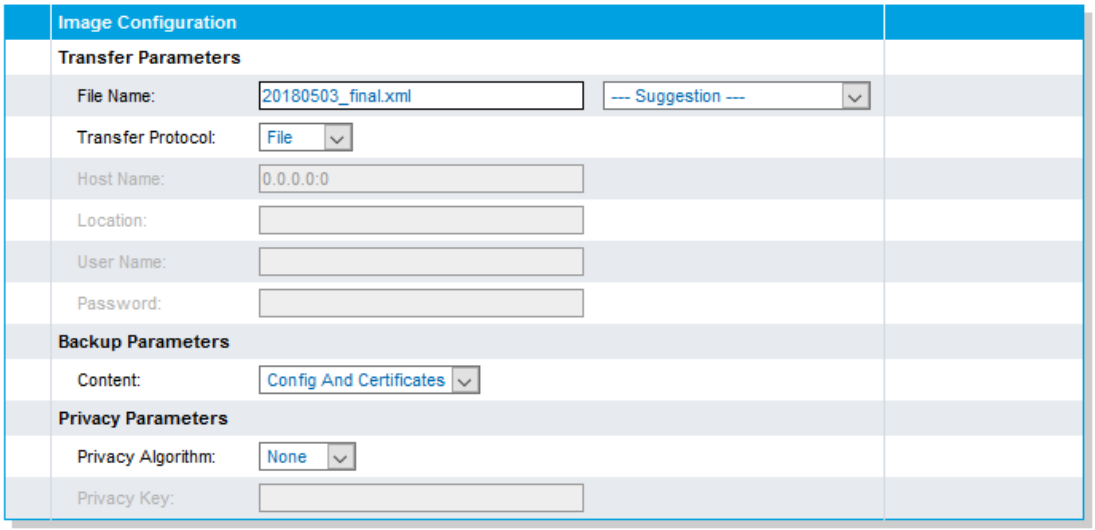



10. Click **Save** if the yellow indication on top of the page is ON.

## 2.11 MANAGEMENT

### 2.11.1 BACKUP/RESTORE

1. Click ”Activate .....”



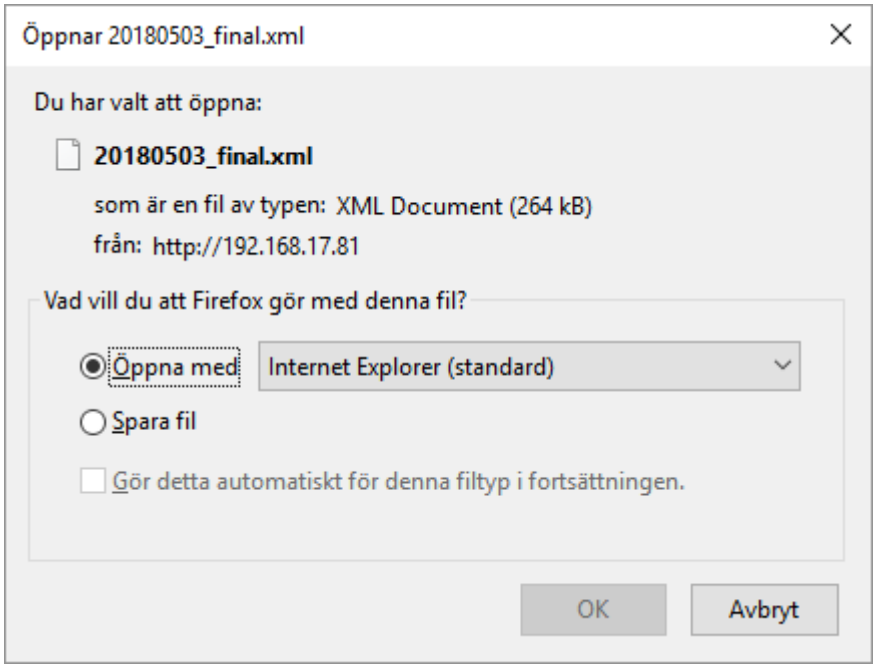

2. Click Apply and Backup Now.

### 2.11.2 FILE

**Internal files**

| Name | Description | Size |
|---|---|---|
| conf/20180503_final.xml | Automatically generated on 03/05/2018 15:50:11. | 264 KB |
| conf/FXO_Country_Defaults.cfg | FXO Country Defaults | 1 KB |
| conf/FXO_North-America_3km.cfg | FXO North-America 3km | 1 KB |
| conf/PRI_China-DSS1.cfg | China DSS1 | 3 KB |
| conf/PRI_Default.cfg | PRI default configuration | 3 KB |
| conf/PRI_NorthAmerica-NI1.cfg | North America NI1 | 3 KB |
| conf/PRI_NorthAmerica-NI2.cfg | North America NI2 | 3 KB |
| conf/Survivability.cfg | Configures the unit to use the SipProxy service for basic use cases. | 1 KB |
| sbc/rulesets/200_OK_to_SIP_OPTIONS.crs | Answer 200 OK to inbound SIP OPTIONS message | 1 KB |
| sbc/rulesets/MX-One_build_RURI_survivability.crs | Builds the RURI when in survivability mode | 6 KB |
| sbc/rulesets/MX-One_core_side.crs | Generic ruleset facing MX-One core | 5 KB |
| sbc/rulesets/MX-One_local_reg_users_with_survivability.crs | local registered users ruleset for MX-One with basic local calling survivability | 11 KB |
| sbc/rulesets/MX-One_local_users_failover_to_trunk.rrs | Failover route from local_users_ca to trunk_lines_ca | 6 KB |
| sbc/rulesets/MX-One_outbound_survivability_prefix.crs | ANumber and BNumber prefix | 2 KB |
| sbc/rulesets/MX-One_remove_prefix.crs | Removes prefix from RURI for outbound calls | 1 KB |
| sbc/rulesets/MX-One_routes_with_basic_local_survivability_TCP.rrs | MX-One - Basic Routes with Survivability | 23 KB |
| sbc/rulesets/MX-One_routes_with_basic_local_survivability_UDP.rrs | MX-One - Basic Routes with Survivability | 21 KB |
| sbc/rulesets/MX-One_to_trunk_lines.rrs | Route from MX-One servers to trunk lines | 5 KB |
| sbc/rulesets/MX-One_trunk_lines_to_local_users.rrs | Route from trunk_lines_ca to local_users_ca | 3 KB |
| sbc/rulesets/MX-One_trunk_lines_to_reception_survivability.crs | Forwards trunk calls to reception number in survivability | 2 KB |
| sbc/rulesets/rewrite_RURI_host.crs | Customize RURI host | 1 KB |
| **21 file(s)** | Total: 366 KB / Available: 6 GB | |

Find the previously made backup image



# 3 SETTING UP MX-ONE FOR AN EX CONTROLLER

The setting up of MX-ONE is not described in this document since it does not differ from an ordinary MX-ONE setup.

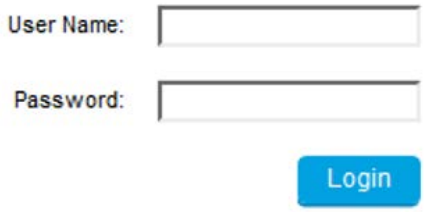
# 4 SETTING UP EX CONTROLLER

## 4.1 LOGON

This section describes how to setup BO#1.

Factory Reset the EX Controller and plug in the network cable to the ETH1 port on EX Controller (If DHCP is running in the network).

**Note!** If DHCP is not running into the network then, plug in the network cable to the ETH2 port on EX Controller and use the default IP address of 192.168.0.10 to open the EX Controller Interface.




This section describes how to setup BO#1.

1. Factory Reset the EX Controller and plug in the network cable to the ETH1 port on EX Controller (If DHCP is running in the network).

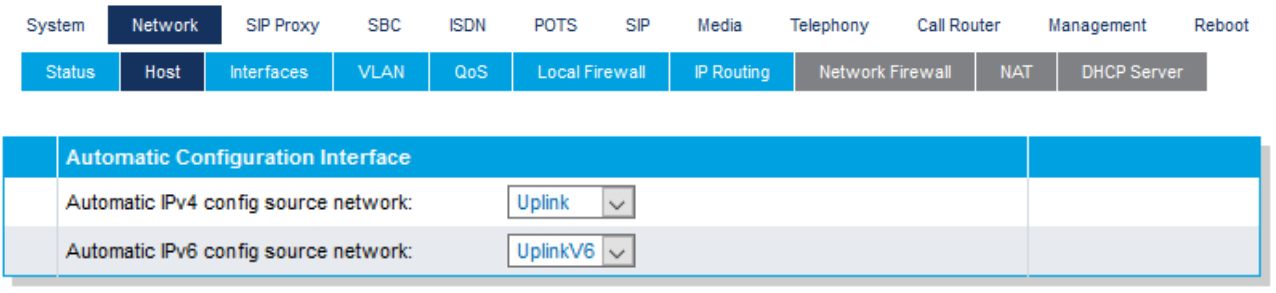
- User name/password: public /
- User name/password: admin/administrator

2. Plug in the analog phone in the FXS port 1 of the EX Controller and dial *#*0 to know the IP address of the EX Controller assigned by using DHCP server.
3. Log into the EX Controller by using the above-mentioned IP address and navigate as described below to configure.

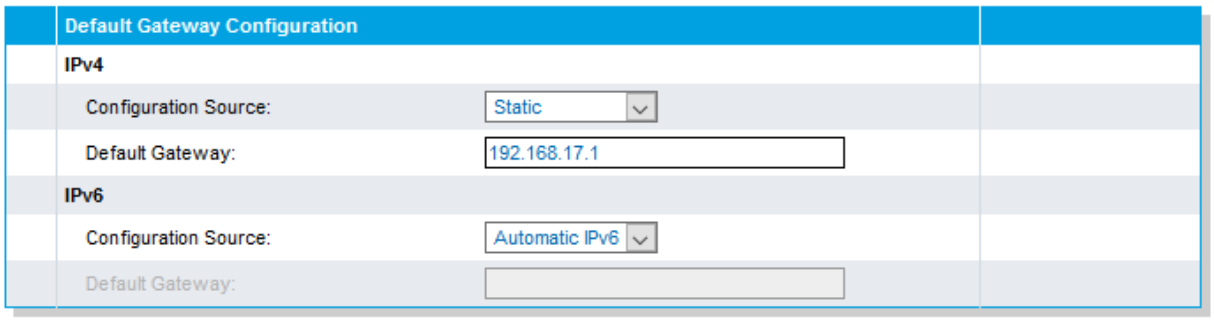
## 4.2 NETWORK SETTINGS

### 4.2.1 HOST

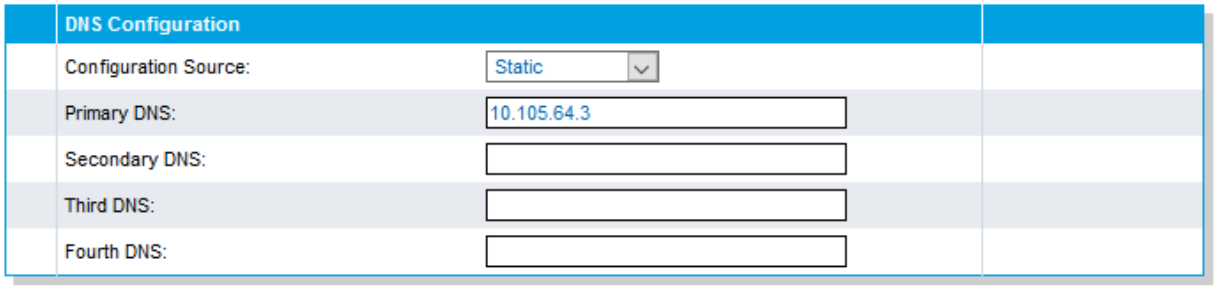
1. Select **Network**>**Host** and keep the default configuration interface as mentioned below.



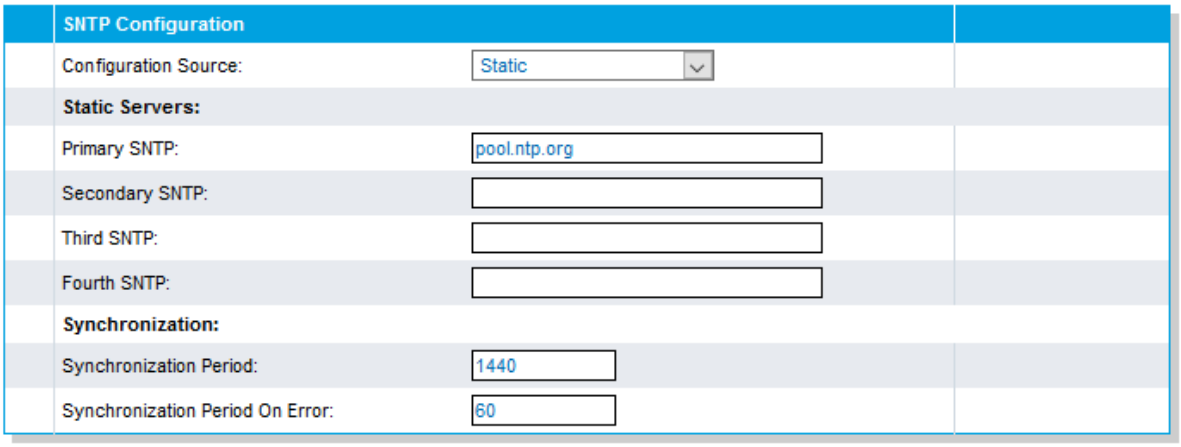

2. Change to Static IP-address and enter default Gateway (GW).




3. Change to static DNS server and enter IP-address or FQDN to DNS server.




4. Change to static SNTP server and enter time server data.




5. Set the **Static Time Zone**.

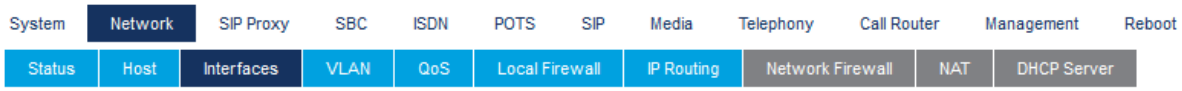
Valid options are:

- Pacific Time (Canada and US) : PST8PDT7,M3.2.0/02:00:00,M11.1.0/02:00:00
- Mountain Time (Canada and US) : MST7MDT6,M3.2.0/02:00:00,M11.1.0/02:00:00
- Central Time (Canada and US) : CST6CDT5,M3.2.0/02:00:00,M11.1.0/02:00:00
- Eastern Time (Canada and US) : EST5EDT4,M3.2.0/02:00:00,M11.1.0/02:00:00
- Atlantic Time (Canada) : AST4ADT3,M3.2.0/02:00:00,M11.1.0/02:00:00
- GMT Standard Time : GMT0DMT-1,M3.5.0/01:00:00,M10.5.0/02:00:00
- W. Europe Standard Time : WEST-1DWEST-2,M3.5.0/02:00:00,M10.5.0/03:00:00
- China Standard Time : CST-8
- Tokyo Standard Time : TST-9
- Central Australia Standard Time : CAUST-9:30DCAUST-10:30,M10.5.0/02:00:00,M3.5.0/02:00:00
- Australia Eastern Standard Time : AUSEST-10AUSDST-11,M10.5.0/02:00:00,M3.5.0/02:00:00
- UTC (Coordinated Universal Time) : UTC0

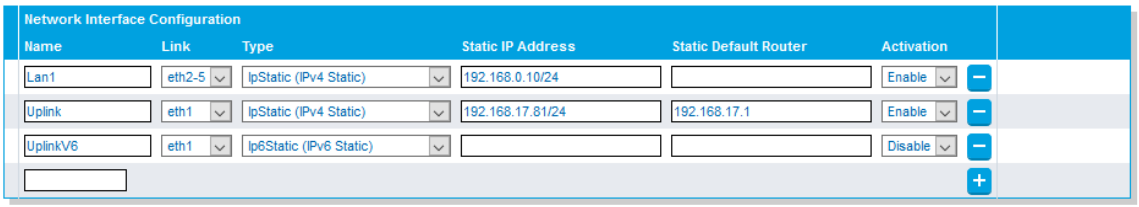

6. Leave all other items as it is and click **Apply** when finished.

## 4.3 INTERFACES

1. Go to **Network>Interface.**



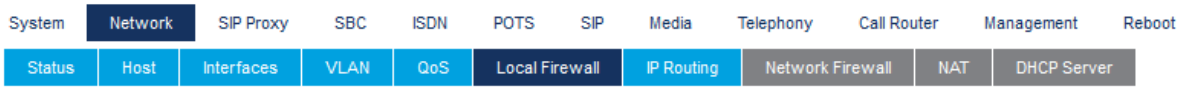

2. Change **Uplink** to **IpStatic (IPv4 Static)** and enter the static IP-address and Static Default Gateway.



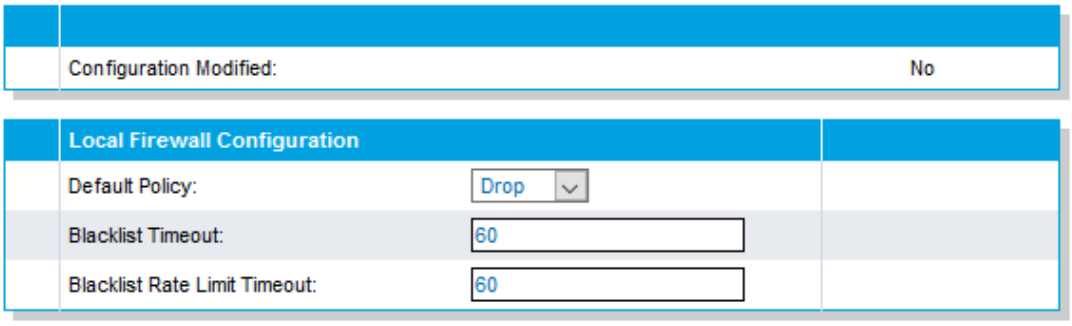

3. Leave all other items as it is and click **Apply** when ready.

## 4.4 LOCAL FIREWALLS

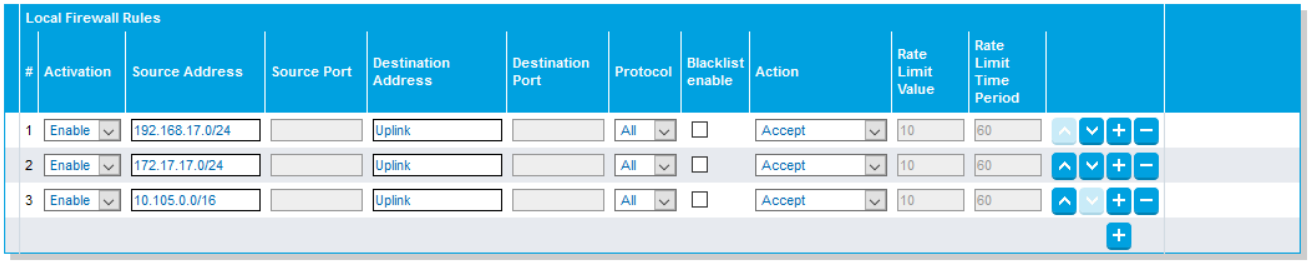
1. Go to **Network>Local Firewall**.




2. If local firewall security is needed change default policy to **Drop**.




3. Enter the networks for which traffic can enter from.

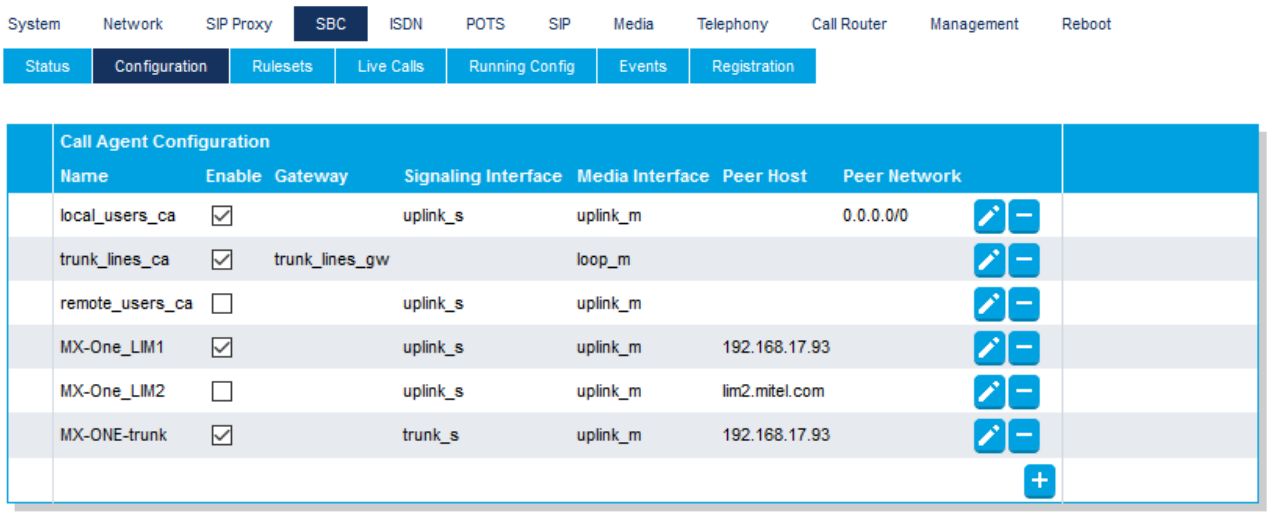



4. Click **Save** or Save & Apply when ready.

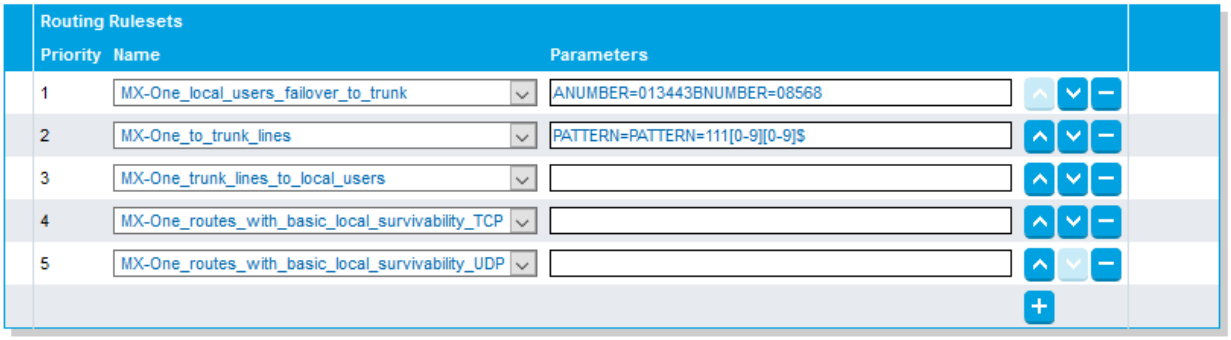
# 4.5 SBC

## 4.5.1 CONFIGURATION

1. Go to **SBC**>**Configuration**. The following Call Agents are present.



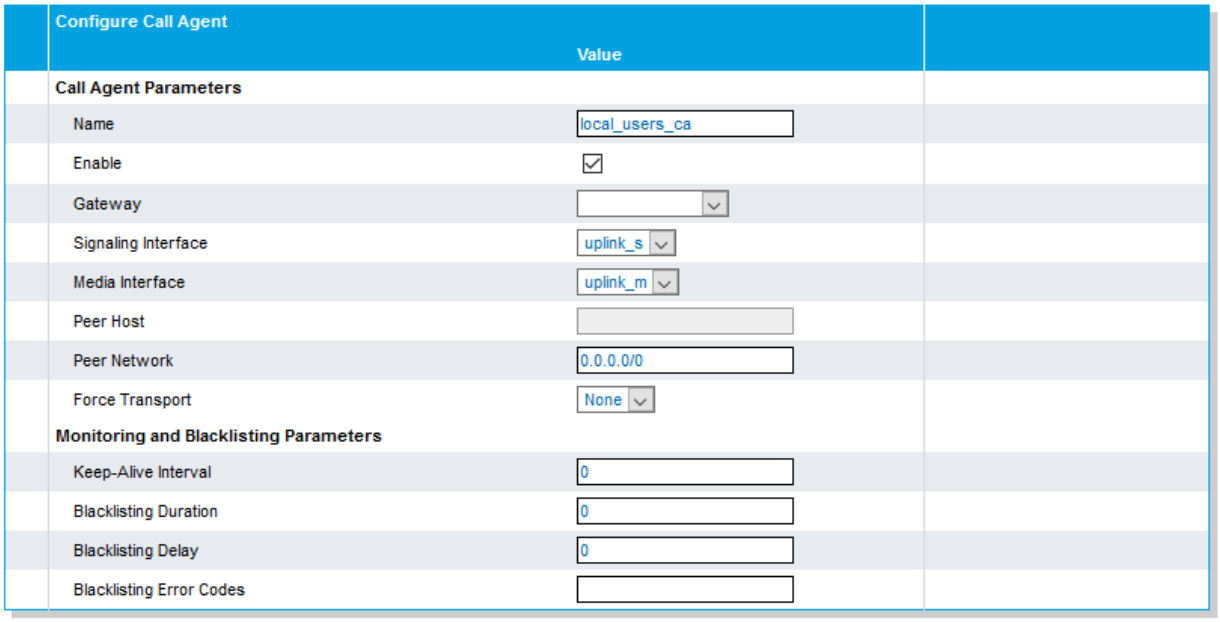

2. Insert A-Number prefix and B-number prefix. These numbers are to be added in front of the numbers when the GW is in survivable mode. That is, the call is routed to PSTN and thus needs to be prefixed.
3. Enter the number range that is allowed in the branch in the PATTERN parameter. For example, 321[0-9][0-9]$ means that the allowed number range in this branch is 32100 – 32199.

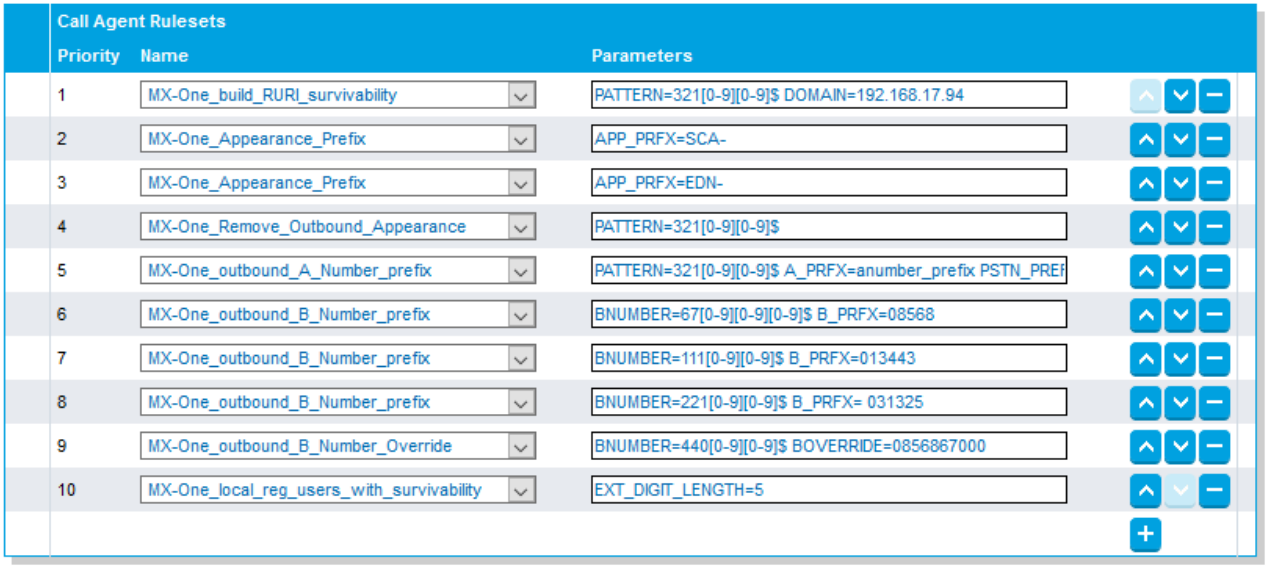



4. Configure each call agent (ca).
5. Click  to enter specific data for each call agent.

### 7.5.1.1 Local_users_ca

- Enter the IP-address of MX-ONE to the DOMAIN variable.
- Enter the number range that is allowed in the branch in the PATTERN parameter. For example, 321[0-9][0-9]$ means that the allowed number range in this branch is 32100 – 32199.
- Insert A-Number prefix and B-number prefix. These numbers are to be added in front of the numbers when the GW is in survivable mode. That is, the call is routed to PSTN and thus needs to be prefixed.




**Ruleset MX-One_build_RURI survivability (ACTIVE ONLY IN SURVIVAL MODE)**

PATTERN=111[0-9][0-9]$

The pattern for the internal range of numbers, in this example the internal range would be 11100 – 11199

Calls to this number range stay always local (would not send to the PSTN in survival mode)

DOMAIN=192.168.17.94

The IP-address of the MX-ONE instance running on the VM, in this case 192.168.17.94

**Ruleset: MX_One_Appearance_Prefix (ACTIVE ONLY IN SURVIVAL MODE)**

NEW: APP_PREFIX=SCA-

This is the prefix for the usernames connected with shared appearance. In this example, you have two: “SCA-“ and “EDN-“

**Ruleset: MX-One_Remove_Outbound_Appearance (ACTIVE ONLY IN SURVIVAL MODE)**

PATTERN=321[0-9][0-9]$

This rule removes any prefix used for Shared Call Appearance. The pattern for the internal range of numbers, in this example the internal range would be 32100 – 32199

**Ruleset: MX-One_outbound_A_Number_prefix (ACTIVE ONLY IN SURVIVAL MODE)**

PATTERN=321[0-9][0-9]

This defines the local numbers.

A_PRFX=040598

This is the prefix for the local numbers used on outgoing calls to the PSTN (in this example, received a number block 013443xxxxx from the PSTN provider and add the prefix on outgoing calls, so that the calling party number sent to the PSTN is correct)

PSTN_PREFIX=00

Dial this prefix to break out to the PSTN. Here, you need to configure the “00” (not to be mixed up with the “00” for international calls!)

**Ruleset: MX-One_outbound_B_Number_prefix (ACTIVE ONLY IN SURVIVAL MODE)**

This ruleset applies to calls to numbers defined in BNUMBER and will add B_PRFX to the called party number.

BNUMBER=67[0-9][0-9]$

Applies to calls to the specific range of extensions,

B_PRFX=08568

This is the prefix for the Called Party Number. In this case, it was build like: National Prefix (08) + Main part of the HQ’s local number: (568), in case somebody dials an extension in the HQ.

**Ruleset: MX-One_outbound_B_Number_Override (ACTIVE ONLY IN SURVIVAL MODE)**

This ruleset applies to calls to numbers defined in BNUMBER and will use the BOVERRIDE as Called Party Number.

BNUMBER=440[0-9][0-9]$

Applies to calls to the specific range

BOVERRIDE=0856867000

Calls to extensions like BNUMBER will be sent to BOVERRIDE, in this example they will be sent to 0856867000

**Ruleset: MX-One_local_reg_users_with_survivability**

(Builds the registration cache for survivability purpose)

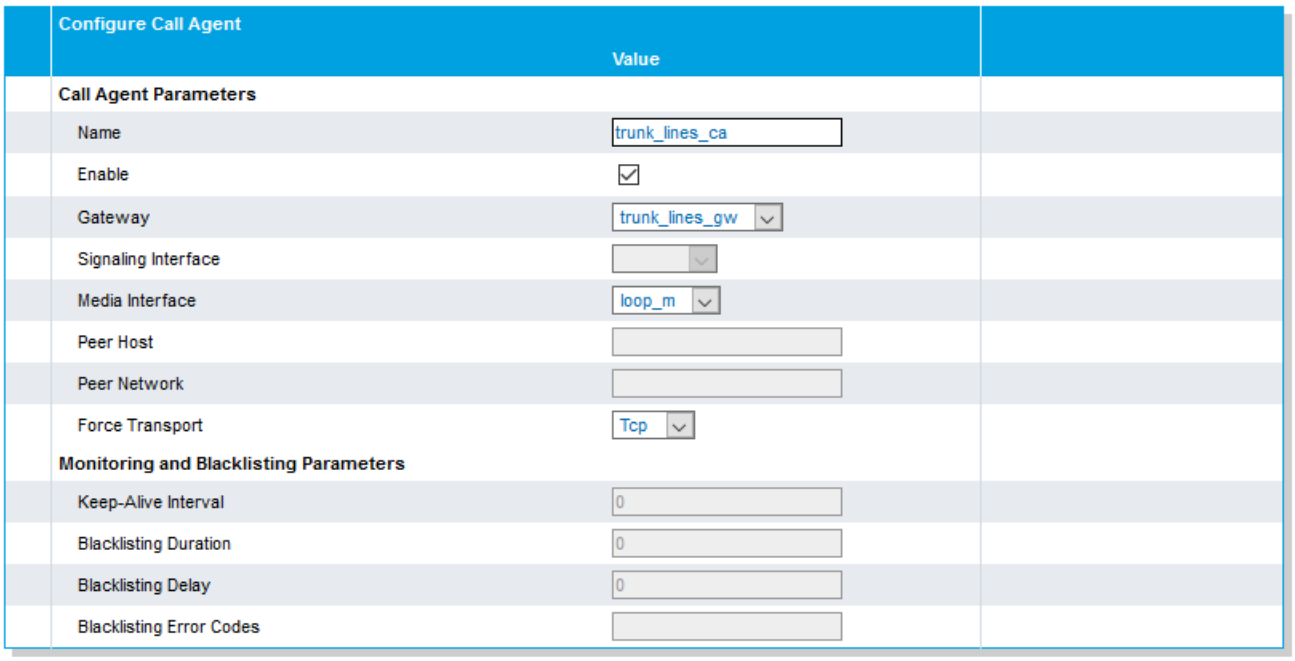
EXT_DIGIT_LENGTH=5

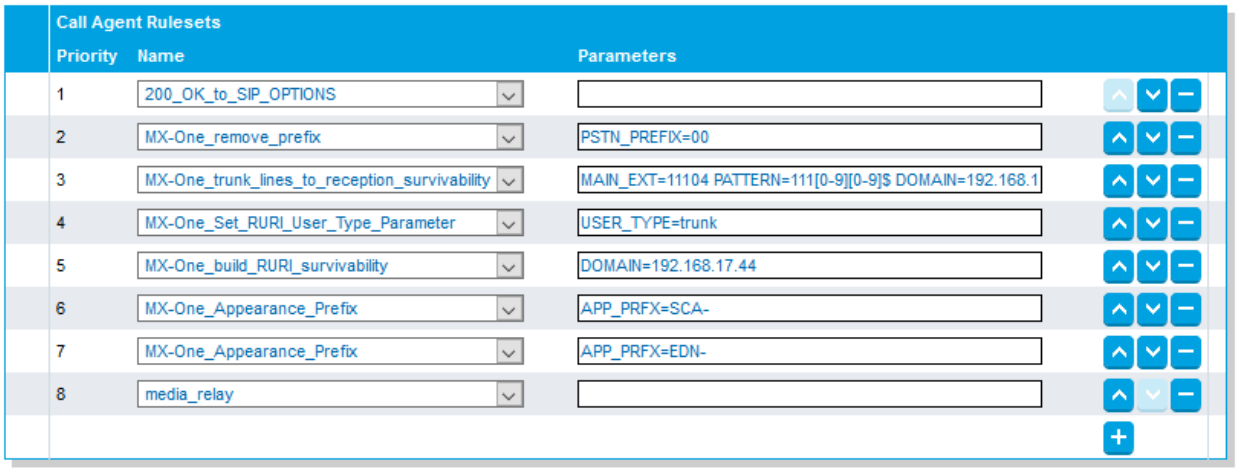
The length of the internal numbers, in this case set to “5”, for numbers like “00001 – 99999”

6. Click **Save** when done.

#### 4.5.1.1.1 Trunk _ Lines _ca

- Enter the IP-address of MX-ONE to the DOMAIN variable (in two places).
- Enter the number range that is allowed in the branch in the PATTERN parameter. For example, 321[0-9][0-9]$ means that the allowed number range in this branch is 32100 – 32199.
- Insert a main extension number in MAIN_EXT parameter, this is could be the local answering position when dialling a vacant number, and so on.
- Enter the PSTN_PREFIX and STRIPNDIGTS, this is used to remove the public access code when dialling PSTN calls in survivable mode.




**Ruleset: MX-One_remove_prefix**

PSTN_PREFIX=00

This is the prefix used to dial out to the PSTN

**Ruleset: MX-One_trunk_lines_to_reception_survivability**

An incoming call in survival mode will be sent to MAIN_EXT destination if not reachable

MAIN_EXT=11104

This will receive the incoming call in case the original destination is not reachable (not defined or not registered)

PATTERN=321[0-9][0-9]$

The pattern for the internal range of numbers, in this example the internal range would be 32100 – 32199

DOMAIN=192.168.17.94

The IP of the headquarter (the main PBX), in this case 192.168.17.94

**Ruleset: MX-One_Set_RURI_User_Type_Parameter**

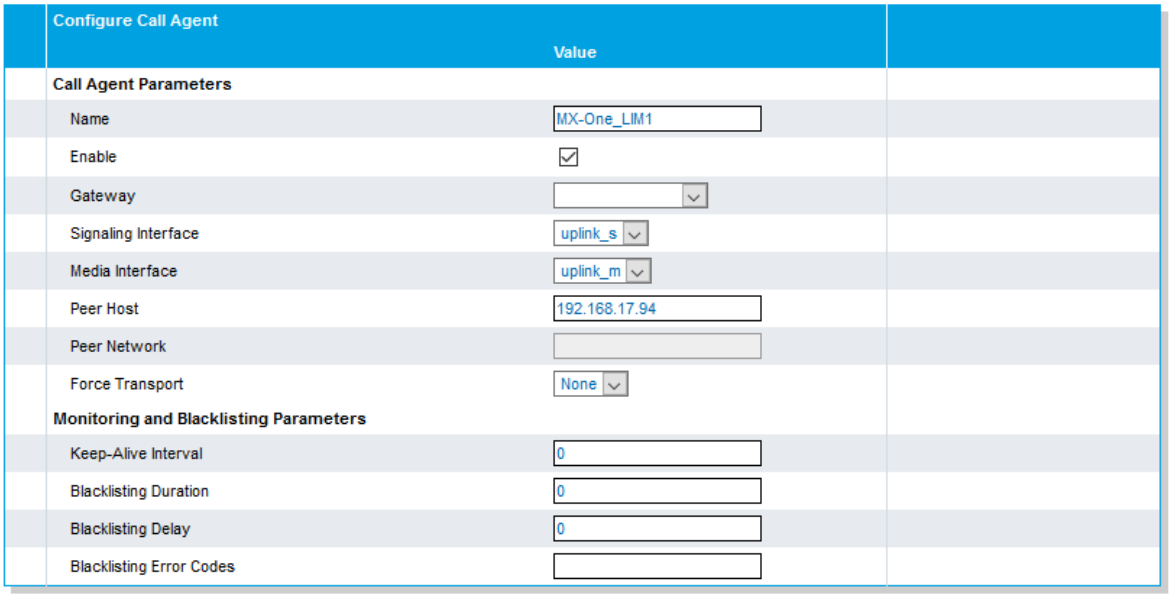
Set RURI User Type Parameter

USER_TYPE=trunk

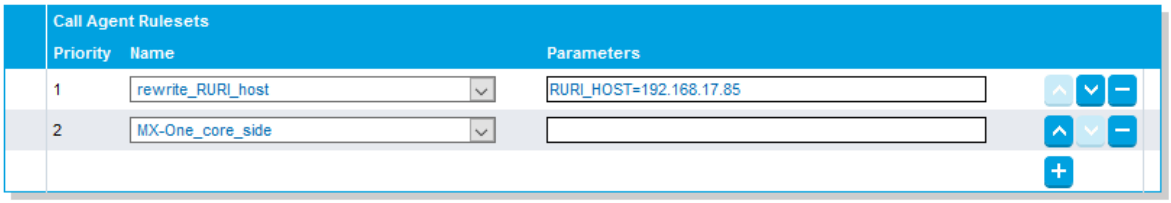
7. Click **Save** when done.

#### 4.5.1.1.2 MX-ONE_Lim1

1. Enter the IP-address of the MX-ONE in the **Peer Host** field.




2. Enter the IP-address of the GW in the **RURI_HOST** parameter.




**Ruleset: rewrite_RURI_host**

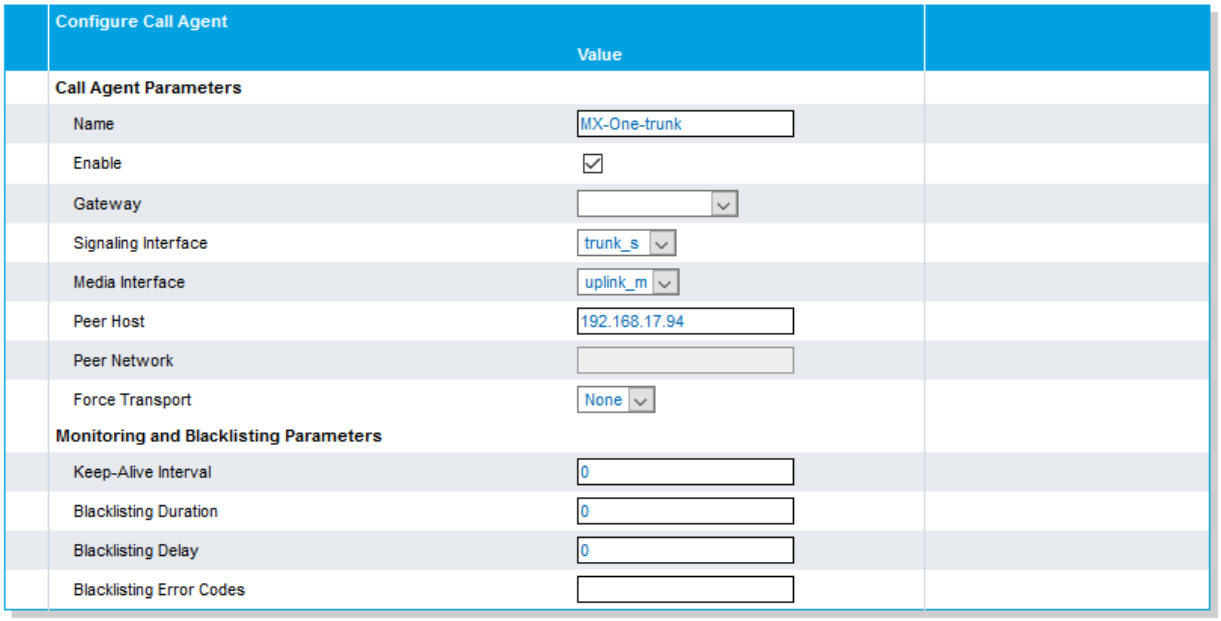
Customize RURI host

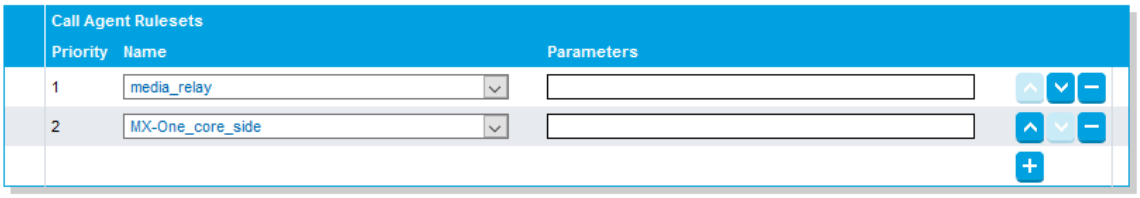
RURI_HOST= 192.168.17.85. This is the local IP address.

3. Click **Save** when ready.

#### 4.5.1.1.3 MX-ONE_TRUNK

1. Enter the IP-address of the MX-ONE in the **Peer Host** field.

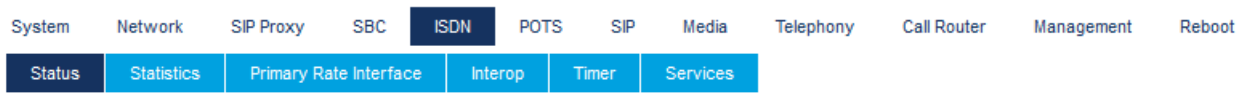



2. When all the changes for call agents are done, a yellow field is shown indicating that configuration has been modified.
3. Click **Save** when ready.


4. If the indication is not removed there are some error in the configuration.
5. Double check changes described above and correct them.

## 4.6 ISDN




If ISDN trunks are used the first action to do is to click **Start Sensing**. The system automatically detects certain parameters, for example, number of channels.

### 4.6.1 PRIMARY RATE INTERFACE

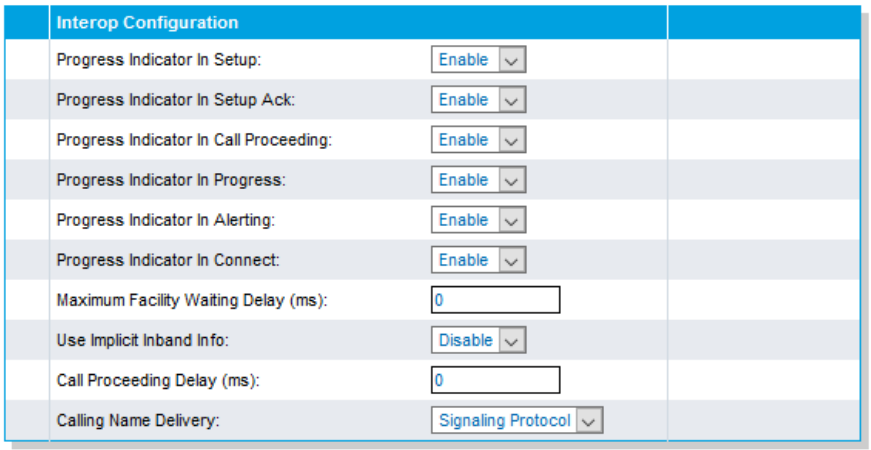
3. When sensing is done for several markets, specific parameters can be changed.

| Interface Configuration | |
|---|---|
| Line Type: [Configure] | E1 |
| Endpoint Type: | TE |
| Clock Mode: | Slave |
| Port Pinout: | Auto |
| Monitor Link State: | Enable |
| Line Coding: | HDB3 |
| Line Framing: | CRC4 |
| Signaling Protocol: | DSS1 |
| Network Location: | User |
| Preferred Encoding Scheme: | G.711 a-Law |
| Fallback Encoding Scheme: | G.711 u-Law |
| Channel Range: | 1-30 |
| Channels Reserved for Incoming Calls: | |
| Channels Reserved for Outgoing Calls: | |
| Channel Allocation Strategy: | Ascending |
| Maximum Active Calls: | 30 |
| Signal Information Element: | Disable |
| Inband Tone Generation: | Enable |
| Inband DTMF Dialing: | Enable |
| Overlap Dialing: | Disable |
| Calling Name Max Length: | 34 |
| Exclusive B-Channel Selection: | Disable |
| Sending Complete: | Enable |
| Send Restart On Startup: | Enable |
| Link Establishment: | Permanent |
| Accepted Status Causes: | |
| Accepted Progress Causes: | 1-127 |
| Send Isdn Progress: | Send All |
| Send Progress Indicator IE: | Send All |
| Default TON for Calling Party Number IE: | National |
| Default NPI for Calling Party Number IE: | Isdn Telephony |
| Default PI for Calling Party Number IE: | Presentation Allowed |
| Default SI for Calling Party Number IE: | Context Dependent |
| Default TON for Called Party Number IE: | National |
| Default NPI for Called Party Number IE: | Isdn Telephony |
| Notification User Suspended: | Ignore |

4. Click **Apply** and restart requested service when done.

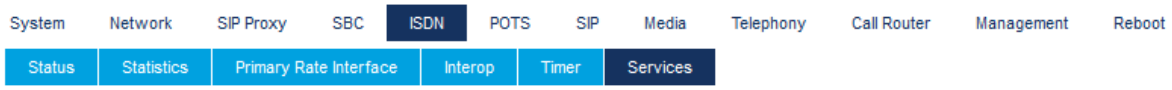
### 4.6.2 INTEROP


3. You can change other parameters dependent on market.

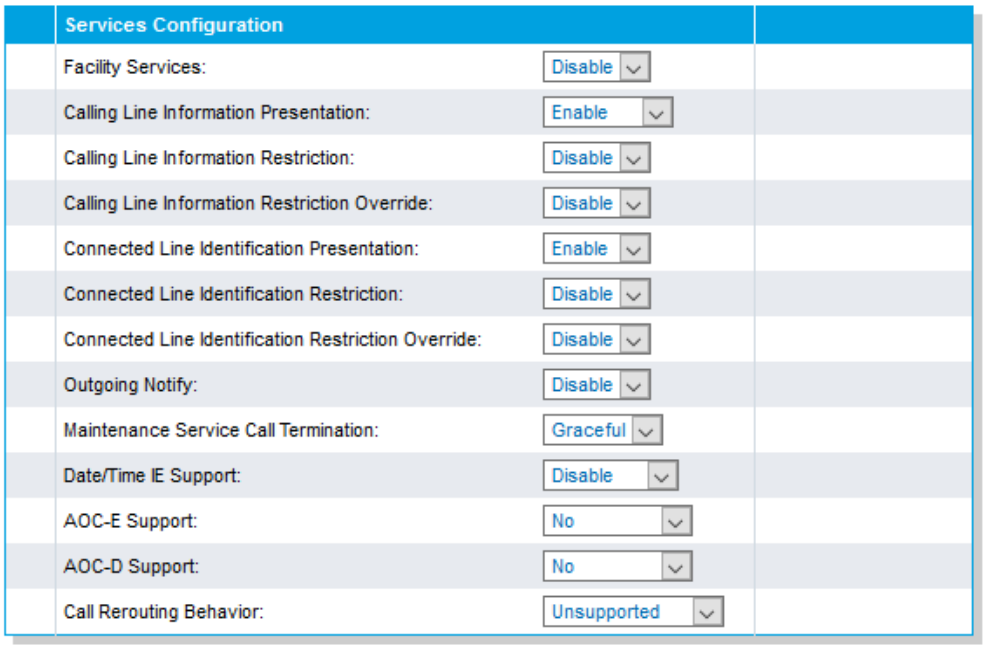



4. Click **Apply** and restart requested service when done.

### 4.6.3 SERVICES




1. Change other parameters dependent on market.

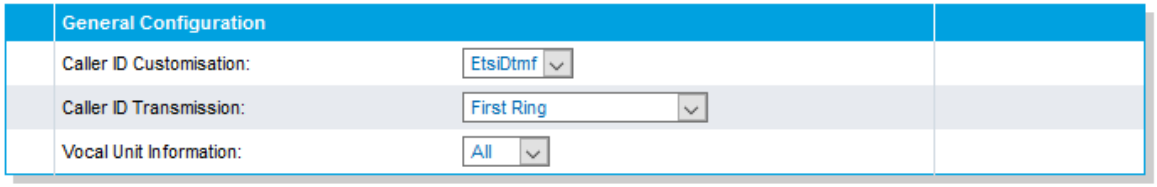



2. Click **Apply** and restart requested service when done.

# 4.7 POTS

## 4.7.1 CONFIG

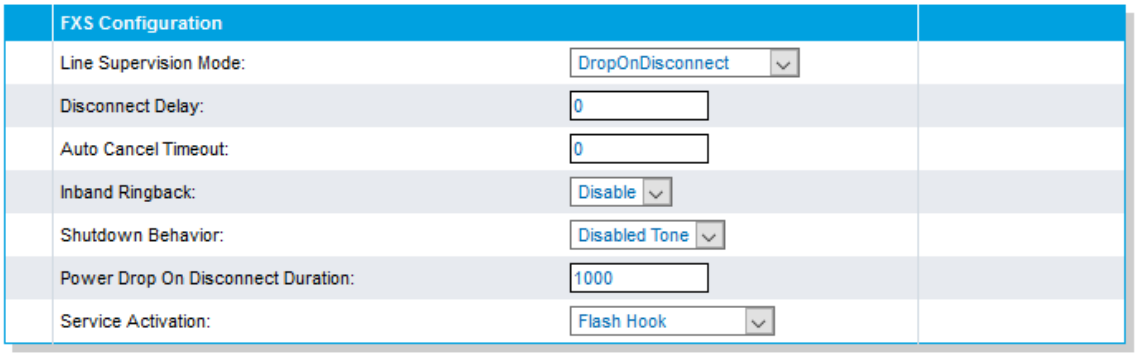

1. Set market specific data for Caller Id handling.

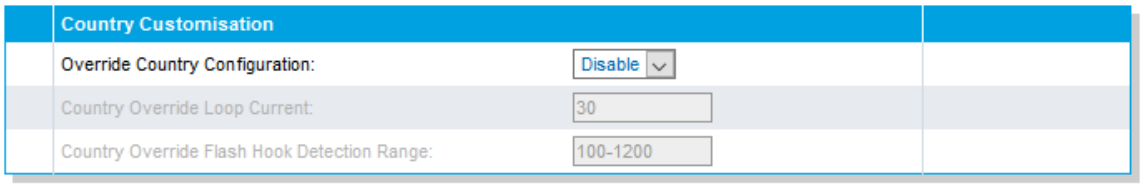



2. Click **Apply** when done and restart service.

## 4.7.2 FXS CONFIGURATION


3. Set analog phone specific data according to market.



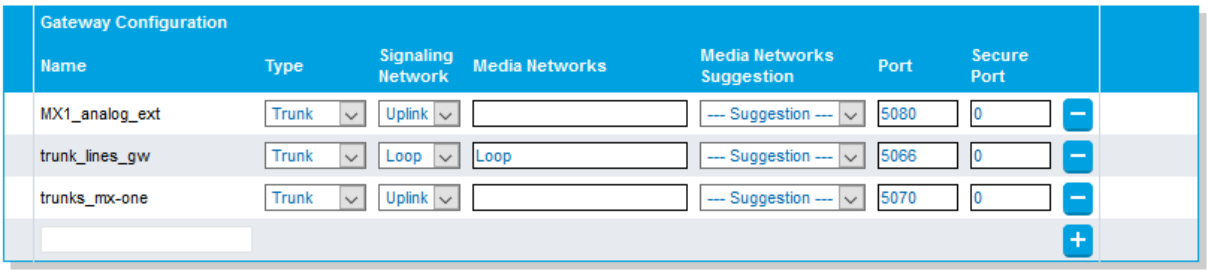

4. Click Apply when done and restart service.

# 4.8 SIP

## 4.8.1 GATEWAYS

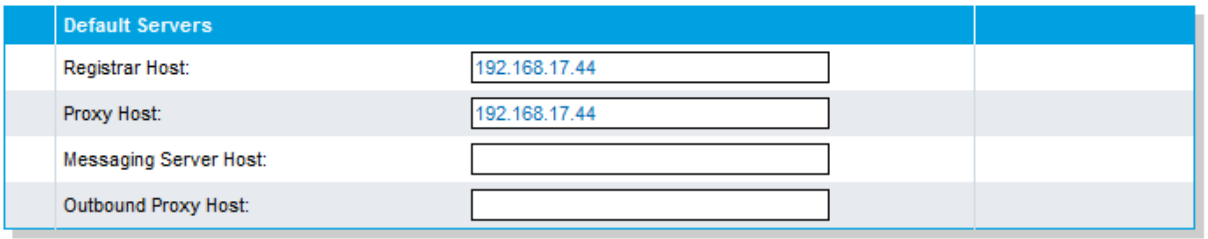
Following gateways and port numbers are pre-defined.


Note that a SIP route must be defined in MX-ONE to handle traffic to and from the ‘trunks_MX-ONE’ gateway.

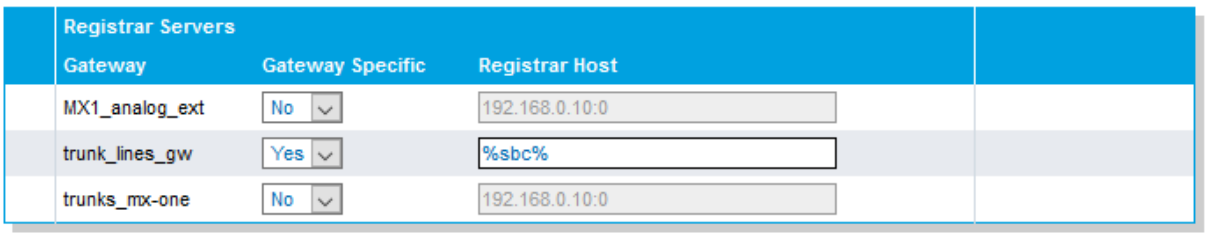



## 4.8.2 SERVERS


1. Enter IP-address to MX-ONE in both **Registrar Host** and **Proxy Host** fields.




2. Change **trunk_lines_gw** to **Yes** in the drop-down list for Gateway Specific.




3. Enter IP-address of MX-ONE in the **Proxy Host** field.
4. Enter IP-address of the gateway in the **Outbound Proxy Host**.


5. Enter the IP-address of the gateway as **Alternate Destination** for **MX1_analog_ext**.
6. Enter the IP-address of MX-ONE as **Alternate Destination** for **trunks_mx-one**.

| Keep Alive Destination | |
|---|---|
| Gateway | Alternate Destination |
| MX1_analog_ext | 192.168.17.85 |
| trunk_lines_gw | 127.0.0.1 |
| trunks_mx-one | 192.168.17.94 |

7. Click **Apply** when done and restart service.

### 4.8.3 REGISTRATIONS

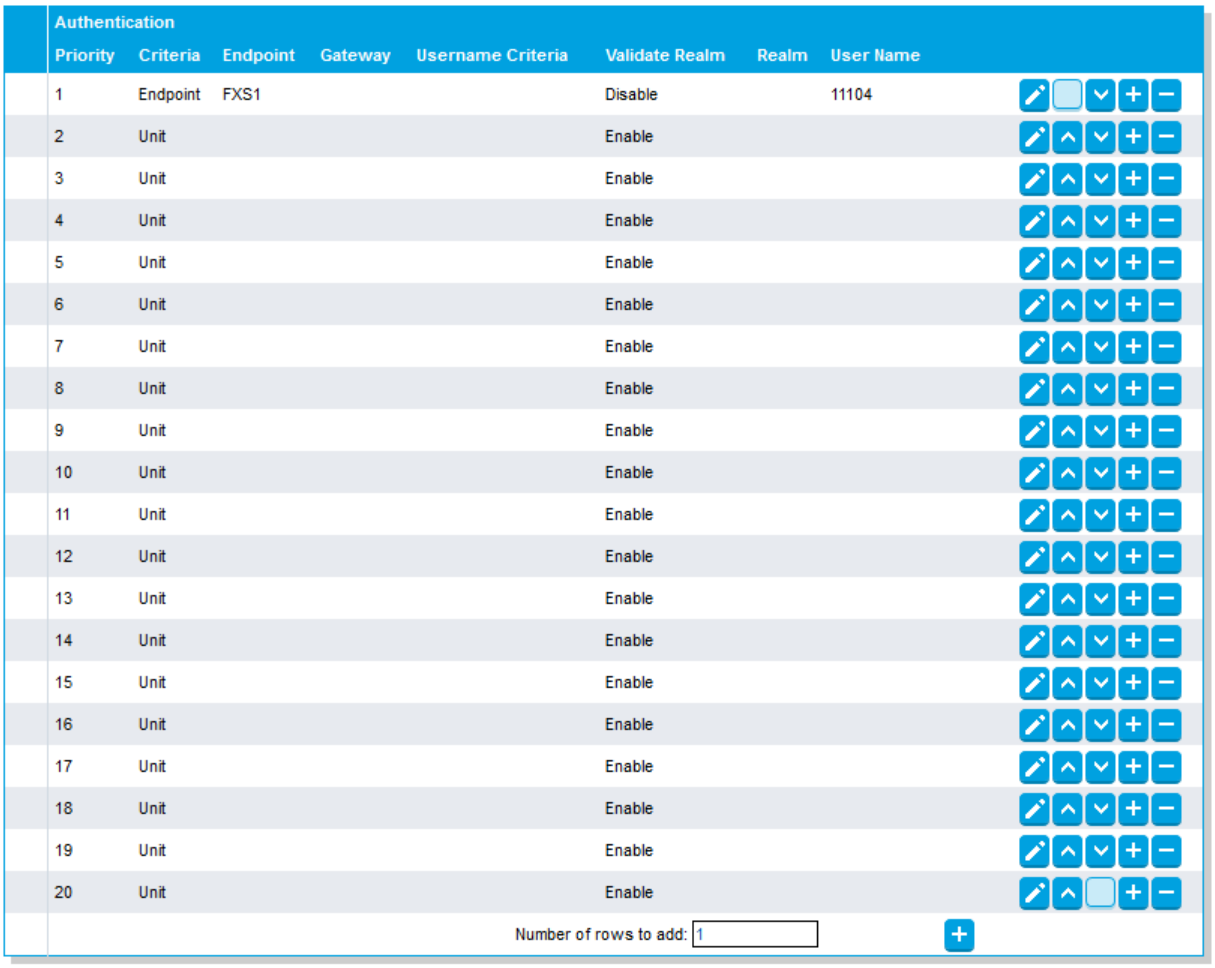

3. Enter the extension numbers for the analog extensions.

| Endpoints Registration | | | | | |
|---|---|---|---|---|---|
| Endpoint | User Name | Friendly Name | Register | Messaging | Gateway Name |
| Slot1/E1T1 | | | Disable | Disable | trunks_mx-one |
| Slot2/E1T1 | | | Disable | Disable | trunks_mx-one |
| Slot3/FXS1 | 32104 | | Enable | Disable | MX1_analog_ext |
| Slot3/FXS2 | 32105 | | Enable | Disable | MX1_analog_ext |
| Slot3/FXS3 | 32106 | | Enable | Disable | MX1_analog_ext |
| Slot3/FXS4 | 32107 | | Disable | Disable | MX1_analog_ext |
| Slot4/E1T1 | | | Disable | Disable | trunks_mx-one |
| Slot5/E1T1 | | | Disable | Disable | trunks_mx-one |

4. Click **Apply** or Apply and Refresh when done.

### 4.8.4 AUTHENTICATION


1. If password is required, click  for any item.

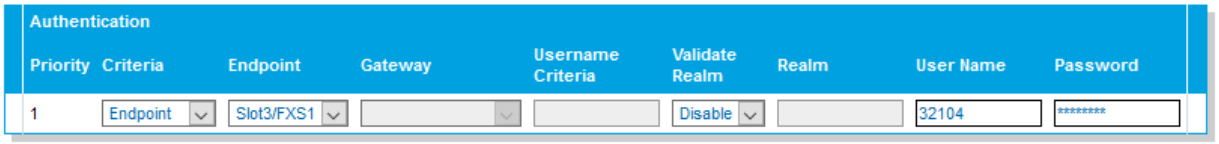


Authentication

| Priority | Criteria | Endpoint | Gateway | Username Criteria | Validate Realm | Realm | User Name |
|---|---|---|---|---|---|---|---|
| 1 | Endpoint | FXS1 | | | Disable | | 11104 |
| 2 | Unit | | | | Enable | | |
| 3 | Unit | | | | Enable | | |
| 4 | Unit | | | | Enable | | |
| 5 | Unit | | | | Enable | | |
| 6 | Unit | | | | Enable | | |
| 7 | Unit | | | | Enable | | |
| 8 | Unit | | | | Enable | | |
| 9 | Unit | | | | Enable | | |
| 10 | Unit | | | | Enable | | |
| 11 | Unit | | | | Enable | | |
| 12 | Unit | | | | Enable | | |
| 13 | Unit | | | | Enable | | |
| 14 | Unit | | | | Enable | | |
| 15 | Unit | | | | Enable | | |
| 16 | Unit | | | | Enable | | |
| 17 | Unit | | | | Enable | | |
| 18 | Unit | | | | Enable | | |
| 19 | Unit | | | | Enable | | |
| 20 | Unit | | | | Enable | | |

Number of rows to add: 1

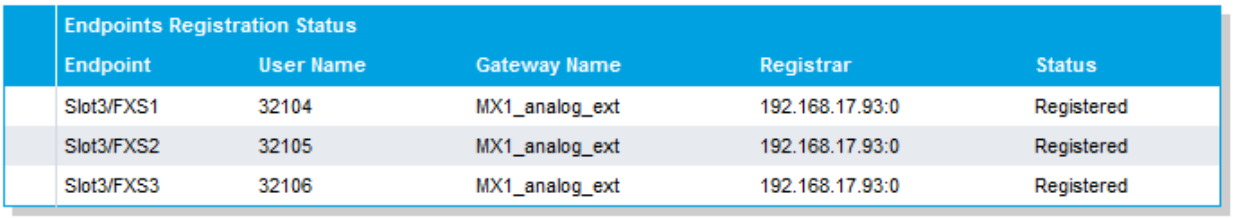
2. Indicate for which **Endpoint** and **Criteria** changes are applicable.
3. Enter the Auth Code, in the **Password** field.
4. Disable **Validate Realm**.



Authentication

| Priority | Criteria | Endpoint | Gateway | Username Criteria | Validate Realm | Realm | User Name | Password |
|---|---|---|---|---|---|---|---|---|
| 1 | Endpoint | Slot3/FXS1 | | | Disable | | 32104 | ******** |

5. Click **Apply** or Apply and Refresh Registration when done and restart service. The result after ‘Registration’ and ‘Authentication’ should be like as follows.

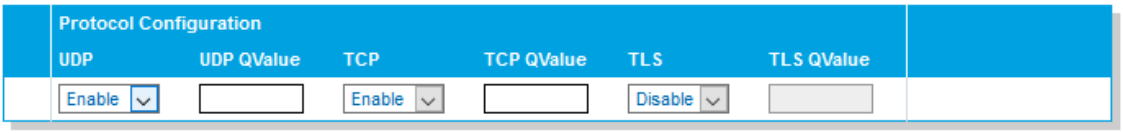


Endpoints Registration Status

| Endpoint | User Name | Gateway Name | Registrar | Status |
|---|---|---|---|---|
| Slot3/FXS1 | 32104 | MX1_analog_ext | 192.168.17.93:0 | Registered |
| Slot3/FXS2 | 32105 | MX1_analog_ext | 192.168.17.93:0 | Registered |
| Slot3/FXS3 | 32106 | MX1_analog_ext | 192.168.17.93:0 | Registered |

## 4.8.5 TRANSPORT

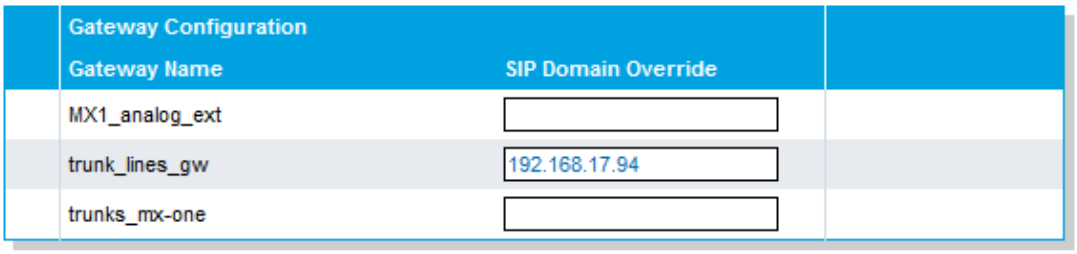

1. Enable UDP if required.




2. Click **Apply** when done and restart service.

### 4.8.6 MISC


3. Enter the IP-address of MX-ONE in the **SIP Domain Override** filed for **trunk_lines_gw**.

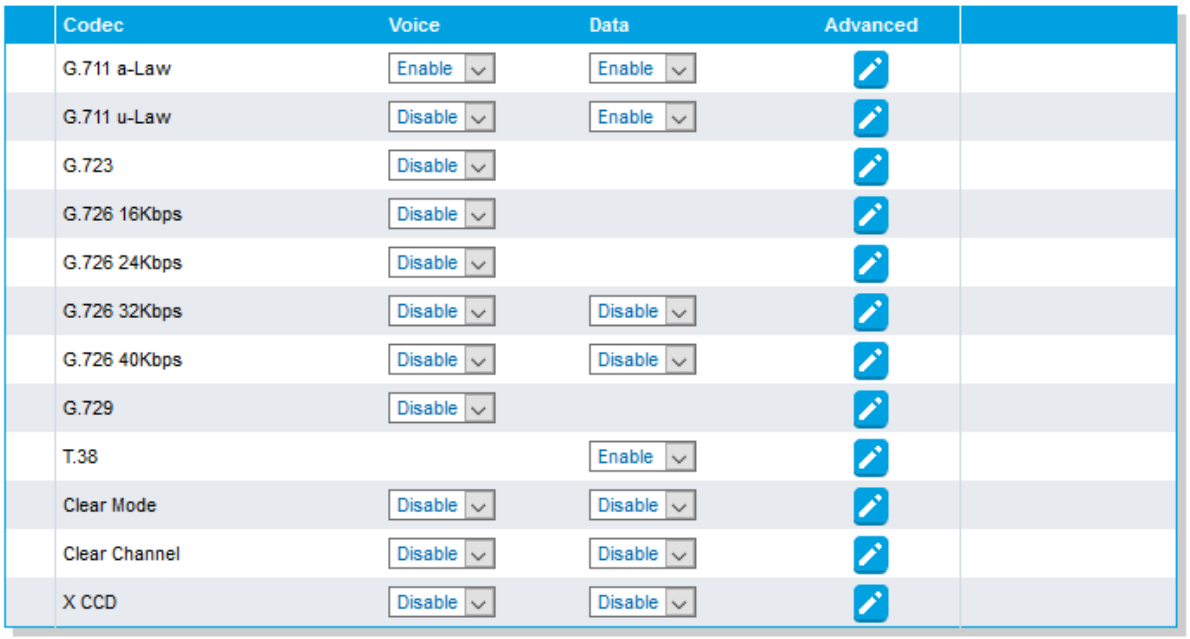



4. Click **Apply** when done and restart service.

## 4.9 MEDIA

### 4.9.1 CODECS


1. Change **Codecs** according to preference.

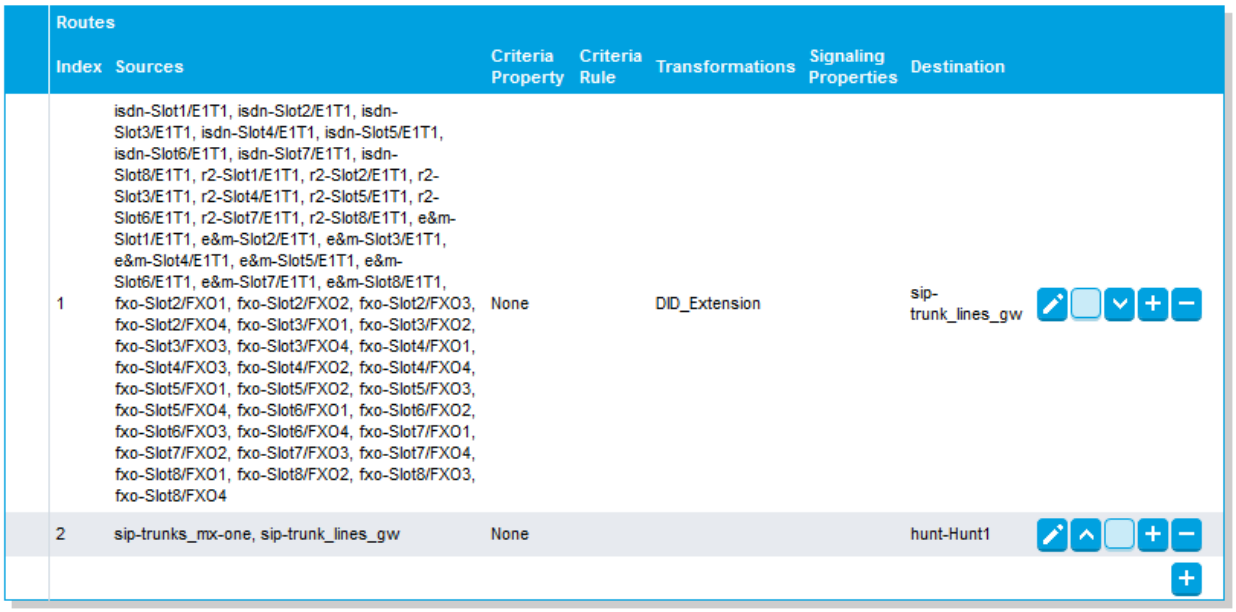



2. Click **Apply** when done and restart service.

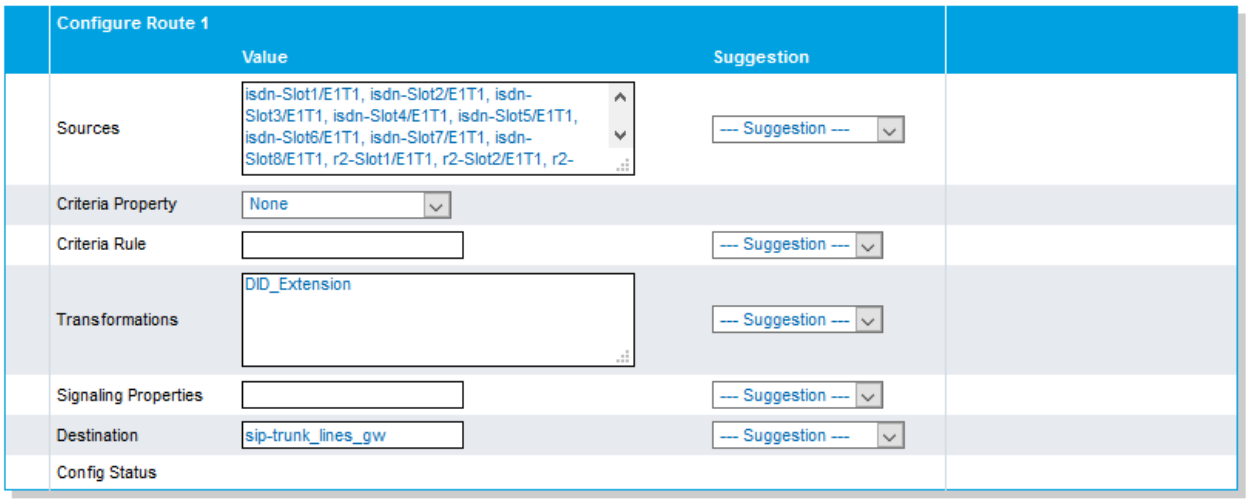
# 4.10 CALL ROUTER

## 4.10.1 ROUTE CONFIG

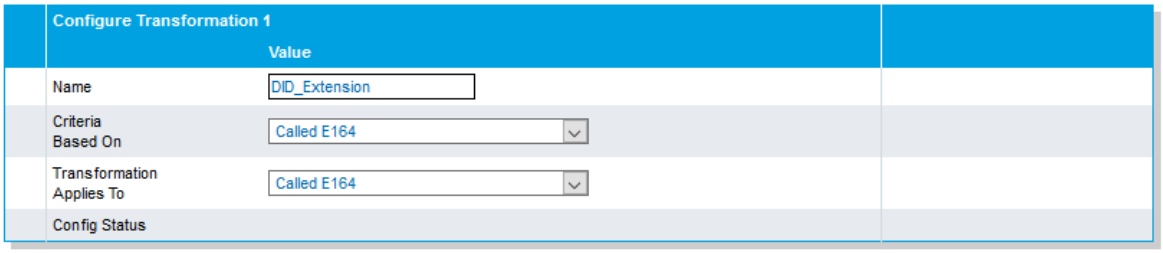

1. Click  for index 1. This is used if the received B-number contains a full number. That is, more digits than the pure DID numbers.



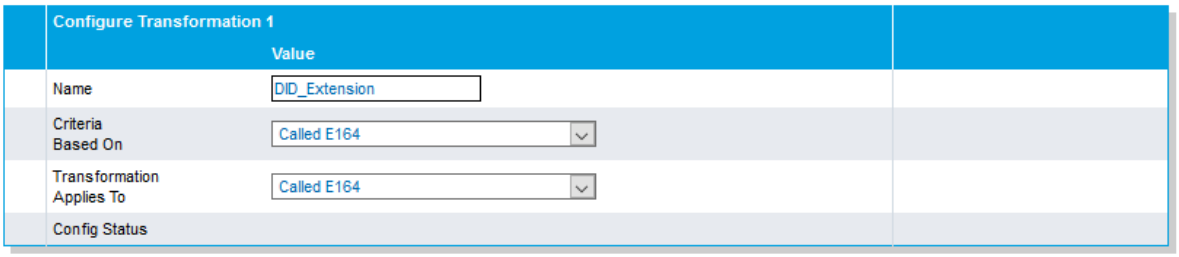

2. In the **Transformations** field add a name for a transformation rule.




3. Click **Save**.
4. Click  in the first Call Property Transformation and enter the same name as above.
5. Use **Called E164** for both **Criteria Based On** and **Transformation Applies To** fields.

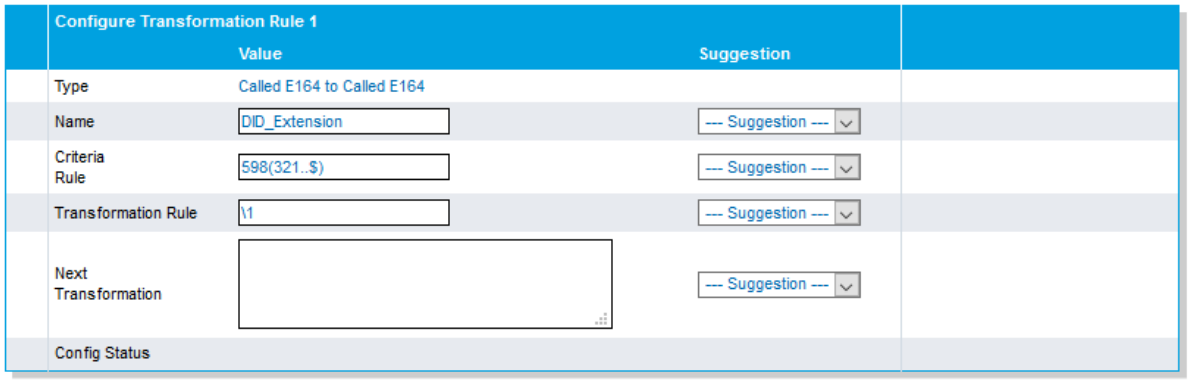



6. Click **Save** or Save and Insert Rule.
7. Click + in the second Call Property Transformation and enter the same name as above.
8. Use **Called E.164** for both **Criteria Based On** and **Transformation Applies To** fields.

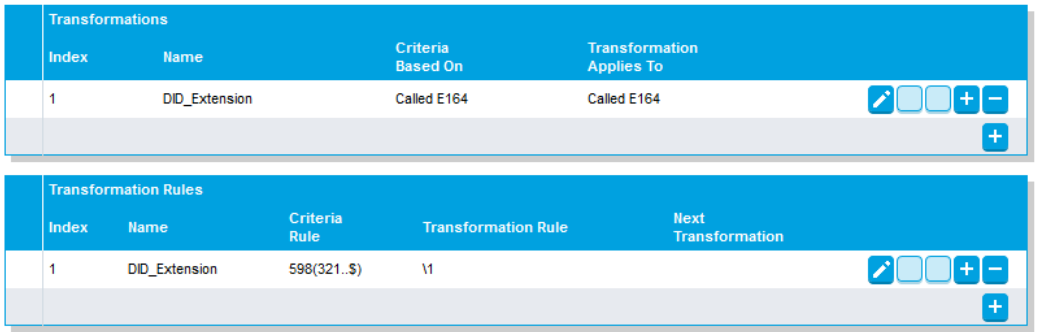



9. Click **Save** or Save and Insert Rule.
10. Click + in the second Call Property Transformation, and enter the same name as above.
11. The **Criteria Rule** in this case is 443(111..)$ and the transformation rule is '\1.

    This means that if a B-number is received containing 44311104, then the 3 first digits (443) are removed before the call is sent to MX-ONE for further processing. (111..)$ means that the number can only be 5 digits starting with 111.




12. Click **Save** or Save and Insert Rule. Now, the 'Call Property Transformations' looks like this as shown below.

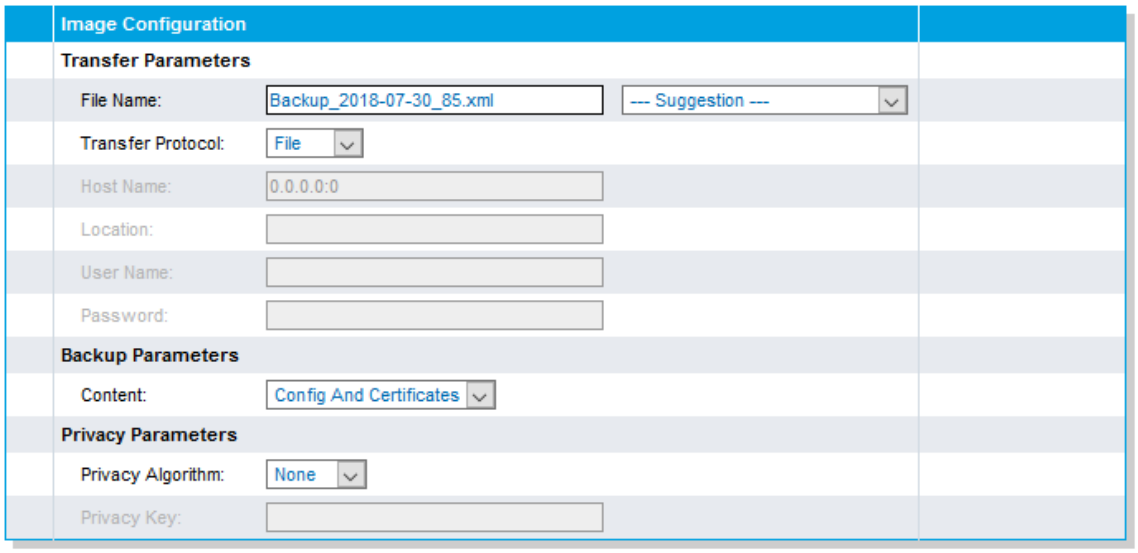



13. Click **Save** if the yellow indication on top of the page is ON.

# 4.11 MANAGEMENT

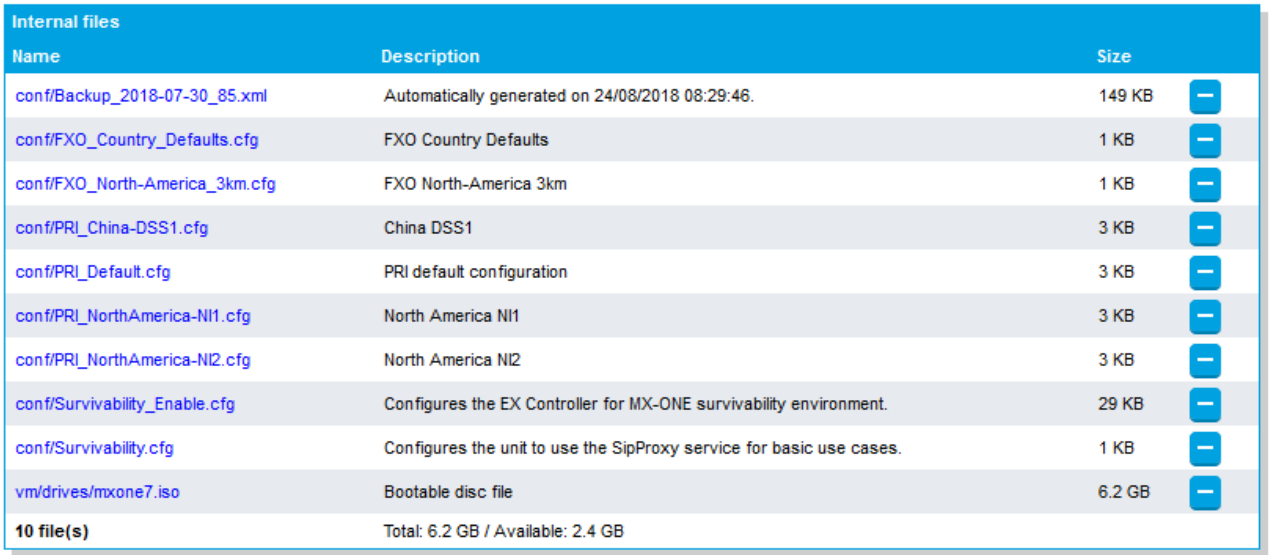

## 4.11.1 BACKUP/RESTORE

1. Click the ”Activate unsecure script transfers through web browser” link.

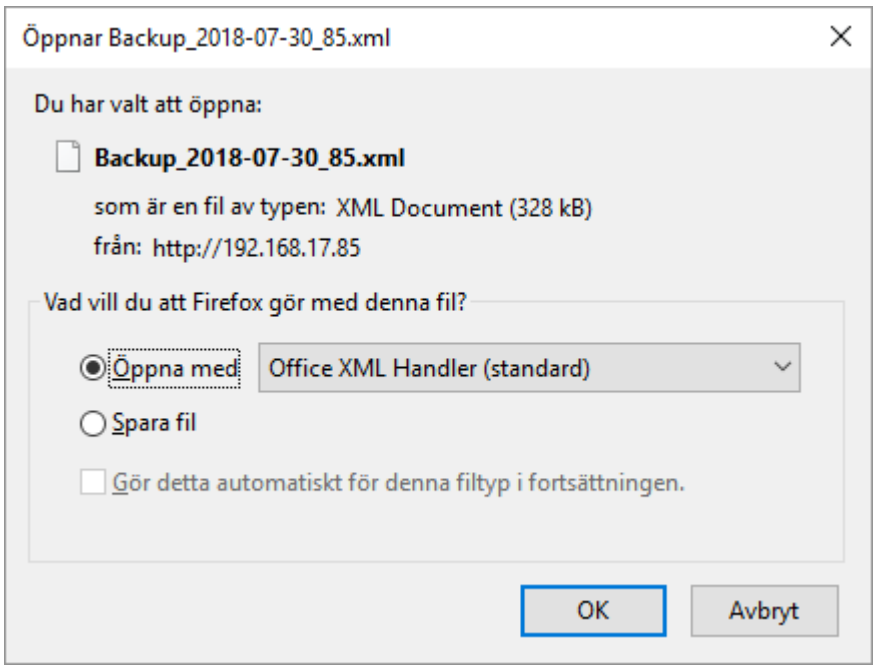



2. Click **Apply** and Backup Now.

## 4.11.2 FILE


1. Find the previously made backup image.




2. Download and store on a secure place.

# 5 KNOWN LIMITATIONS

Below are some known limitations when using the EX-Controller or GX-Gateway.

- When MX-ONE is installed as a virtual machine in the EX-Controller, Provisioning Manger is not allowed to be installed.
- When EX-Controller is used in a multi-server configuration the EX-controller can never ne the master server.
- Maximum 5 servers can exist in a multi-server configuration. When at least one of the servers is an EX-controller.
- When deploying a MX-ONE as a virtual machine the maximum amount of RAM is 7168 Mbytes.