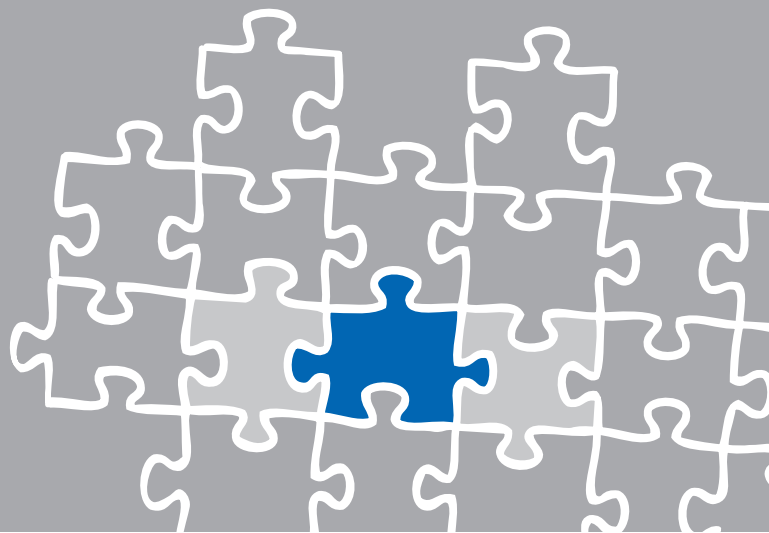


TechNote

Mitel MiVoice Office 400 - R4

May 4, 2017





Introduction

This document is intended to support you with the integration of the latest XCAPI version into an existing environment of the Mitel MiVoice Office 400, formerly known as Aastra 400/470 series.

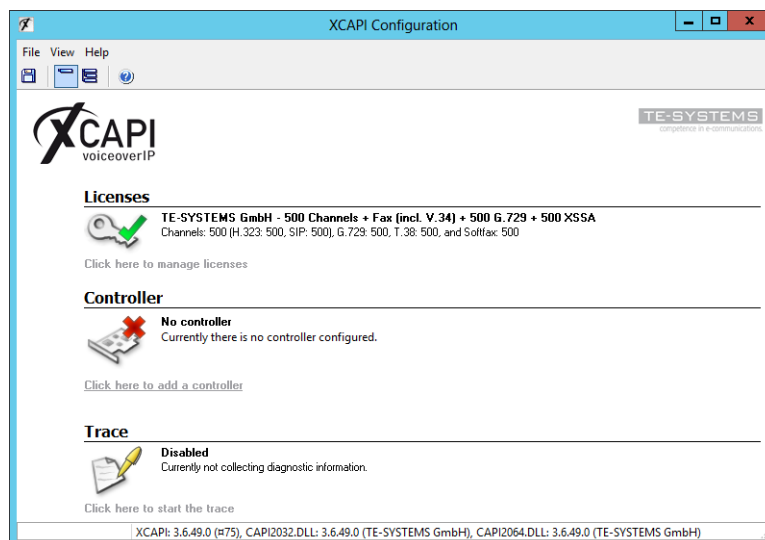
Though being based on the Mitel MiVoice Office 400 R4 and a Communication server Mitel 470, it is applicable to other versions given a few adjustments.

In the following sections we describe the essential configuration steps to allow optimal interworking of both the XCAPI and the Mitel MiVoice Office 400. At this point we suppose that the VoIP environment is in operation which means that the Mitel MiVoice Office 400, XCAPI and CAPI applications are properly installed.

For XCAPI basics please refer to the document **XCAPI TechNote (en) - Quick Start Guide.pdf**, which is available for registered users within our [community](#) download area. We also recommend to visit our [YouTube channel](#) for additional information and hints around XCAPI.

XCAPI Configuration

Please start up the XCAPI configuration to create a new controller assigned to the Mitel MiVoice Office 400. If you've just installed the XCAPI and start the configuration tool for the first time or no controller is available at all, the XCAPI controller wizard will pop up automatically. However, to start up the XCAPI controller wizard manually the hyperlink labeled **Click here to add a controller** on the main page has to be clicked.





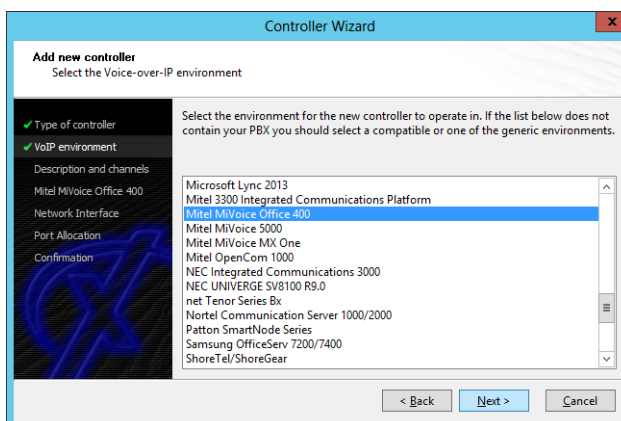
2.1 Type of Controller

On the first page of the controller wizard **PBX or other VoIP System** must be selected. Afterwards, please continue with pushing the **Next** button.



2.2 VoIP Environment

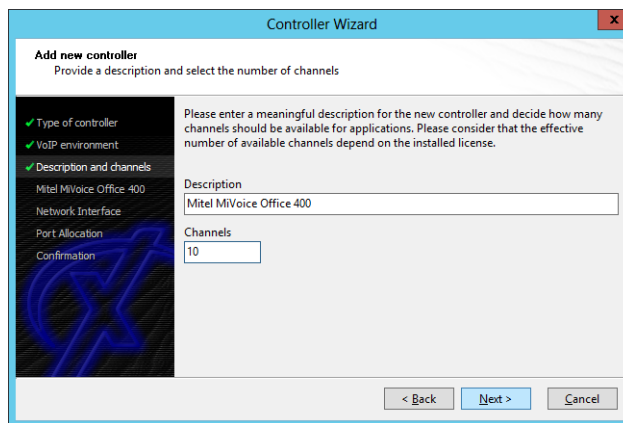
The **VoIP Environment** dialog shows a list of some common Voice-over-IP environments. Selecting one of those will configure the XCAPI controller with a selection of near-optimal presets for the kind of environment you have, sparing you quite a lot of manual configuration.





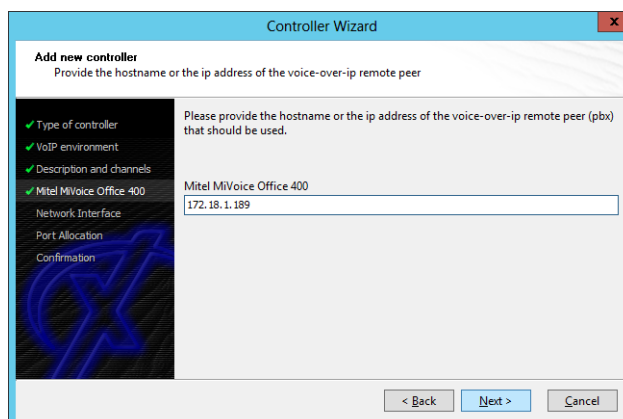
2.3 Description and Channels

When the VoIP environment was selected, the next dialog allows to set a meaningful description for the controller. Also the number of channels that the new controller will be able to provide to the CAPI 2.0 application can be set. So please enter how many simultaneous connections the XCAPI controller should handle when communicating with the Mitel MiVoice Office 400 and the CAPI 2.0 application.



2.4 Gateway Address

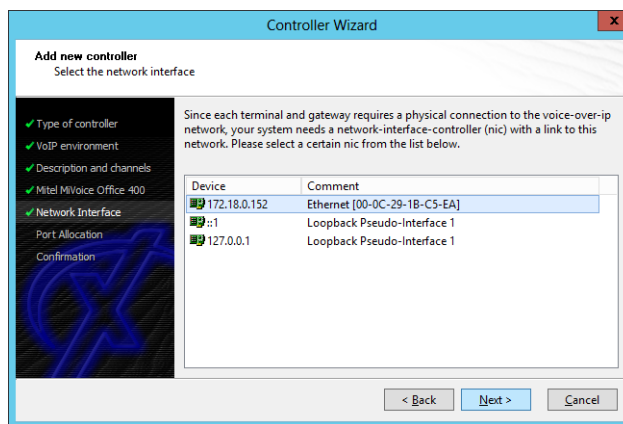
Afterwards, please provide the IP address of the Mitel MiVoice Office 400 gateway.





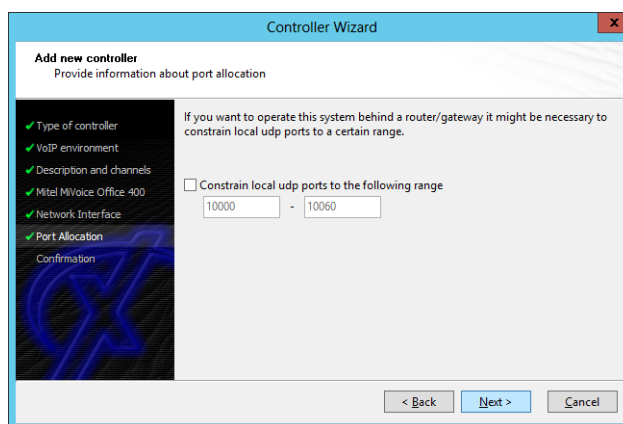
2.5 Network Interface

Next, select the network interface that will be used for the inbound and outbound communication for this controller.



2.6 Port Allocation

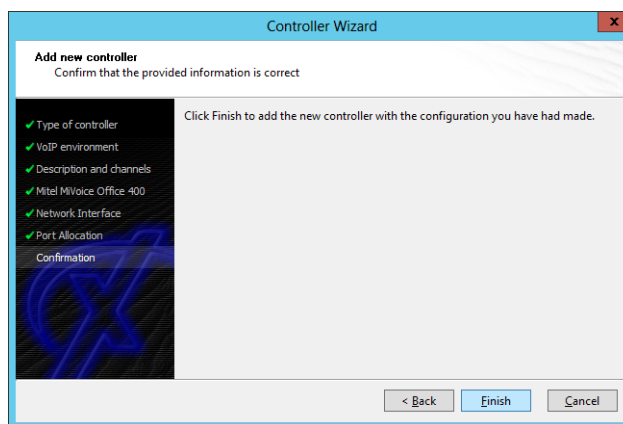
On demand and in the case of any router or firewall restrictions for UDP (RTP/T.38) a port range can be specified. In this example no port range will be set which enables using a random port range between 1024 and 65535.



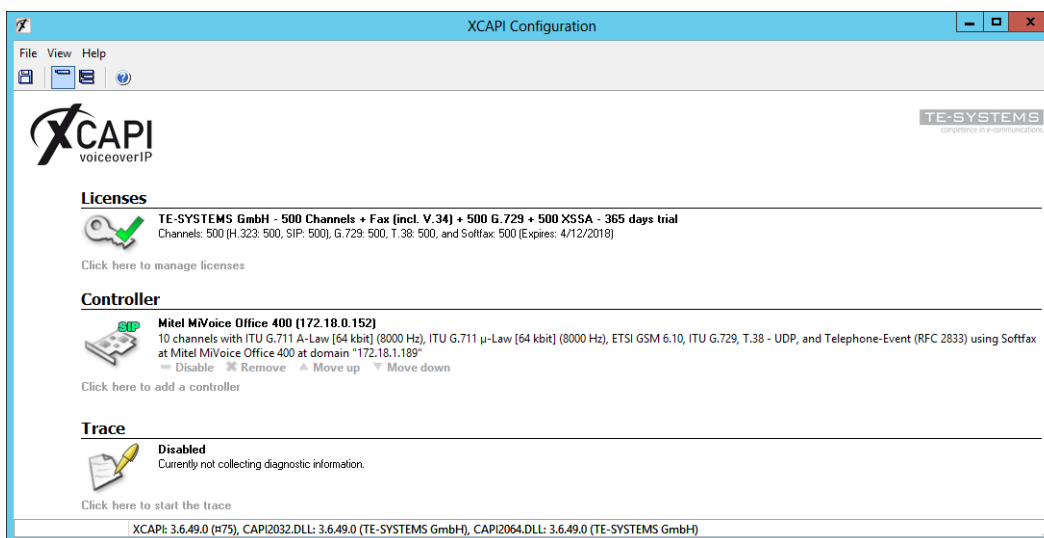


2.7 Confirmation

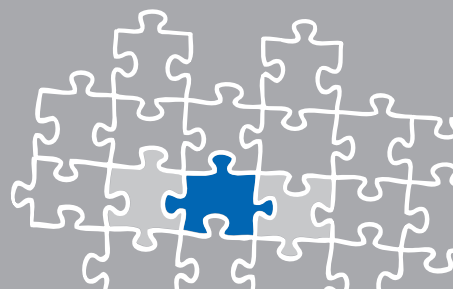
The final wizard dialog performs some checks on the configuration parameters you've made. If any errors are detected here, you can go back to the respective dialogs and correct the erroneous input. If everything is correct just push the **Finish** button in order to finally create the new XCAPI controller.



Now, the new created XCAPI controller appears on the main page of the configuration tool. As all XCAPI related configuration tasks are finished now, please save the changes and exit the configuration tool.



Please note that you always need to restart the bound CAPI application, in meaning of its services, for the changes to take effect. Restarting any XCAPI related services won't help at all. If enabled and on success, the XCAPI diagnostic monitor will pop-up with a reinit notification.



Mitel MiVoice Configuration

In order to establish a connection between the XC-API and the Mitel 400, you need to setup the XC-API as private SIP network (PISN) with all its appropriate configurations. The next chapters show a basic configuration which can't be assigned one-to-one to the environment.

The according configuration dialogs have to be adapted to the PBX environment and hardware and the according CAPI application. Especially the DDI and Call Distribution Elements must reflect the local circumstances as well as specific SIP and numbering related parameters.

3.1 System Overview

First we'll give a short overview of this example's Mitel 470 card integration and system configurations.

The accordance of **VoIP mode VoIP** and **FoIP** channels within the DSP configuration depends on the used cards. In this example only EIP cards are used. In consideration of that there is no need to do any DSP configurations.

Mitel | Mitel 470
Mitel 470 / Aastra 470

System overview

Configuration

- Summary
- Users
- Terminals
- System
- General
- Access control
- Cards and modules
- Interfaces
- DECT/SIP-DECT
- DSP

Standard media switch

Enable

State ● Barred / Disabled

VoIP mode No VoIP

Echo tail length 64 ms

Available VoIP/FoIP channels 0

Active VoIP/FoIP channels 0

DSP resources (allocating audio channels to functions)

Slot	Card/module	DSP device	DECT	VoIP	FoIP	Audio	GSM	CAS
1	CPU1	1	▼	▼	▼	▼	▼	▼
Total			0	0	0	0	0	0

EIP modules

Slot	Card	Slot on card	Module	Enable	State	Max G.711	Max G.729/FoIP	Active G.711 channels	Active G.729 channels	Active FoIP channels
1	CPU1	EIP-1	EIP1-32	<input checked="" type="checkbox"/>	● In service	64	32	0	0	0
4	1PRI	EIP-1	EIP1-32	<input checked="" type="checkbox"/>	● In service	64	32	0	0	0
Total						128	64	0	0	0

Overview VoIP resources

Max G.711 128

Max G.729 64

Max FoIP 64

List of DSP relevant licensed features:

Mobile or External Phone Extensions	-
Audio Record & Play Channels	-
Analogue Modem	-
VoIP Channels for Standard Media Switch	5
Secure VoIP	enabled



This environment uses the default bandwidth area which is related to the preferred codec and frame length **G.711a / 20 ms**. This frame length is also used by default from the XCAPI controller configuration.

Mitel | Mitel 470 / Aastra 470

System overview
Configuration
 Summary
 Users
 Terminals
 System
 General
 Access control
 Cards and modules
 Interfaces
 DECT/SIP-DECT
 DSP
 Dual Homing
 Extended
 Multi site
 Regions
Bandwidth areas

Bandwidth areas		
Area name	Preferred codec	Preferred frame length
Default Area	G.711a	20 ms

WAN links						
Name	Bandwidth area A	Bandwidth area B	Bandwidth (kbit/s)	Bandwidth reserved for audio (kbit/s)	VoIP channels	Preferred codec

Media routing			
Own bandwidth area	Destination bandwidth area	WAN link	VPN peer bandwidth area

Standard media switch / EIP modules						
Node	Card/module	Slot on card	Module	State	IP address	Bandwidth area
0	-	-	-	Barred	172.18.1.189	Default Area
0	1	1	EIP1-32	In service	172.18.1.179	Default Area
0	4	1	EIP1-32	In service	172.18.1.175	Default Area

Also the VoIP settings of the IP Network configuration are used with the system given defaults.

Mitel | Mitel 470 / Aastra 470

System overview
Configuration
 Summary
 Users
 Terminals
 System
 Routing
 Services
 IP network
 IP addressing
 DHCP server
VoIP

SIP	
Signaling port	5060
Session refresh timer for active line supervision (s)	3600

RTP settings						
Slot	Card/module	Slot on card	Module	RTP start port	RTP end port	Bandwidth control area
-	-	-	Standard media switch	-	-	1 - Default Area
1	CPU1	EIP-1	EIP1-32	5004	5130	1 - Default Area
4	1PRI	EIP-1	EIP1-32	5004	5130	1 - Default Area

NAT	
Public NAT gateway address	
SIP public media address	SIP signaling address (RFC3581)

IP system phones settings	
Signalling port	18060
Keep alive time (s)	60
Registration time expires (s)	900
Administrator password (also valid for Mitel SIP phones)	

FAX	
Fax detection mode	Always

QoS settings	
Layer 2: Active for	Nodes only
Layer 2: frame type	Standard (no QoS)
Layer 2: CoS prioritization level	Best effort
Layer 2: VLAN ID	1
Layer 3: DSCP signaling	40
Layer 3: DSCP voice	46
Layer 3: DSCP video	34



Ensure that the required **SIP Access Channels** are available for appropriate SIP trunk interworking.

Mitel | Mitel 470
 Mitel 470 / Aastra 470

System overview

- System information
- Status
- Cards and modules
- Licences

System		
Equipment ID (EID)	901546524743490C02D99AD27600000003C	
Sales channel	DE-Freemarket	
Communication server	Mitel 470	
Release	4.0	
Licence code (LIC)		
Licence code	4038H3H3H1J1EH5G2N3G14ZZY1C0A0F3E50A5DB26AD3MK5fnudd0FJgcsT2y8K0Gq	
Licensable features	Licence state	Additionally available without licence
Software		
Software Release	present	
Software Assurance		
Software Assurance Users		
Features		
Analogue Modem		
Secure VoIP	enabled	
Silent Intrusion		
Resources		
Mitel 470 Expansion		
G.729 Codecs		
VoIP Channels for Standard Media Switch	5	2 in VoIP mode G.711 or Secure G.711 All VoIP channels on EIP modules
Network		
Lync Option for SIP Access Channels		
B-Channels on PRI Cards	20	10 for each PRI port
SIP Access Channels	30	



3.2 Private SIP Networking

XC-API has to be added as new SIP Node within the Private SIP networking configurations of the Mitel communication server.

In this example the new node is added with the **Route only calls to private destinations to the new SIP node** selection. The **SIP remote node name** is entered and the **IP address / host name** is set to the XC-API controller related Ethernet IP address, here IP address **172.18.0.152**. The **Port** is used with the default (port 5060). If the default port will be adjusted the XC-API controllers used listening port (which is also set by default to port 5060) has to be set conform.

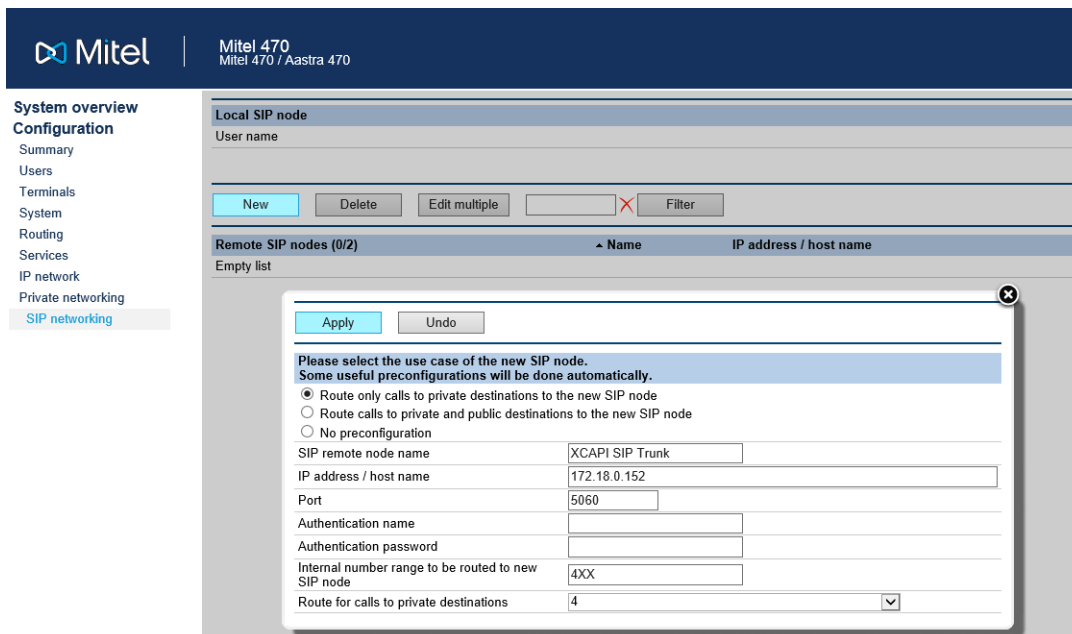
The **Authentication name** and **Authentication password** is left blank as no authentication is used here. The **Internal number range to be routed to new SIP node** is set to **4XX**. The **Route for calls to private destinations** is set to **Route 4**.

As soon as applied, several useful pre-configurations (SIP networking node, PISN user, SIP Trunk, SIP Interface) will be created. The according configuration details will be shown in the referring sections.

At this point the SIP trunk and routing of the PISN user is already in operation up to a certain level.

To allow appropriate routings of and between other nodes additional DDI plan configurations must be made. For example public calls via ISDN or SIP providers which has to related and routed to the PISN users numbering range for XC-API.

However, according to the local requirements and the VoIP environment, such pre-configurations needs additional adjustments which will be shown in the upcoming sections.

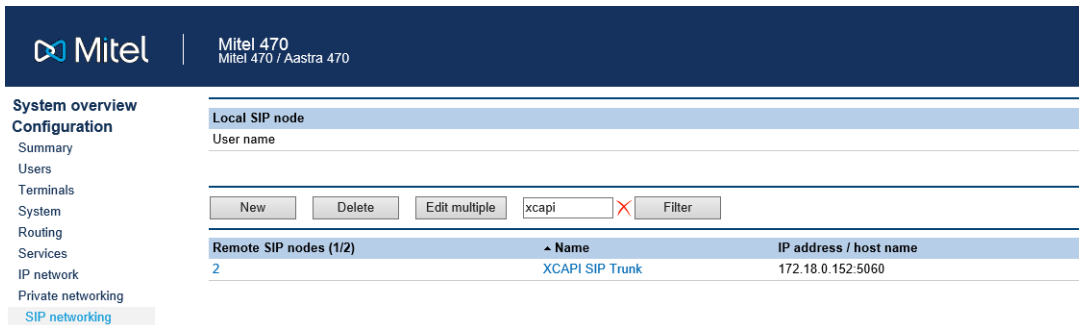


The screenshot shows the Mitel 470 configuration interface. On the left is a navigation menu with 'SIP networking' selected. The main area shows the 'Local SIP node' configuration page. A modal dialog is open for adding a new SIP node. The dialog has the following fields and options:

- Apply** and **Undo** buttons at the top.
- Instruction: "Please select the use case of the new SIP node. Some useful preconfigurations will be done automatically."
- Radio button selection:
 - Route only calls to private destinations to the new SIP node
 - Route calls to private and public destinations to the new SIP node
 - No preconfiguration
- SIP remote node name:** XCAPi SIP Trunk
- IP address / host name:** 172.18.0.152
- Port:** 5060
- Authentication name:** (empty)
- Authentication password:** (empty)
- Internal number range to be routed to new SIP node:** 4XX
- Route for calls to private destinations:** 4



The newly created SIP trunk is now listed in the **SIP networking** overview as new remote sip node entry.



Mitel 470
Mitel 470 / Aastra 470

System overview
Configuration
Summary
Users
Terminals
System
Routing
Services
IP network
Private networking
SIP networking

Local SIP node
User name

New Delete Edit multiple xcap i Filter

Remote SIP nodes (1/2)	Name	IP address / host name
2	XC-API SIP Trunk	172.18.0.152:5060

The XC-API SIP trunk/node is here used with the preconfigured defaults.

Select << 2, XC-API SIP Trunk >>

General
SIP node 2
Name XC-API SIP Trunk
Bandwidth control area 1 - Default Area
Trunk group 1 - XC-API SIP Trunk

IP addressing
IP address / host name 172.18.0.152
Port 5060

SIP signalling
Use '+' as international prefix
Try to make external calls: Timeout (s) 8
'From' field for CLIR Anonymous (RFC 3261)
Send session refresh (RFC 4028)
Use destination URL from 'To' field
Music on hold
Music on hold: Signalling Automatic
Send redirecting information Yes, using 'Diversion header (non-recursing)'
Call transfer mode Re-INVITE
PRACK support (RFC 3262)
Session replacement support

Audio settings
Preferred codec Unspecified
Comfort noise support Off
RTCP support Off

NAT
Enable keep alive
ALG support
Relay RTP data via communication server

Authentication
Local authentication required
User name
Password Show password

Transport protocol
Transport protocol UDP



3.2.1 PISN User

The XCAPI related PISN user is used as shown on the next screenshot. For Softfax (G.711 fax pass through) interworking, **Fax over VoIP (G.711)** must be selected as **Fax device**.

Mitel 470
Mitel 470 / Aastra 470

System overview
Configuration
 Summary
 Users
 Terminals
 System
 Routing
 Services
 IP network
 Private networking
 SIP networking
 Lync
 PISN user

PISN user
 Maximum number of transit PINXs: 4
 Transit route

Name (1)	Call number	Route	External call number	CLIP selection	Fax device
XCAPI SIP Trunk	4XX	4 - XCAPI SIP Trunk	4XX	Normal	No fax device

PISN user configuration details:

- Call number: 4XX
- Name: XCAPI SIP Trunk
- Route: 4 - XCAPI SIP Trunk (Go to route)
- External call number: 4XX
- CLIP selection: Normal
- Fax device: Fax over VoIP (G.711)
- Suppress immediate CFNR:



3.3 DDI Plan

Ensure that the DDI plans and delivered numbers and matchings will be made up to the local requirements. As showcase the DDI number range is here used from **400** to **410** with some Dialing in number variations and related to the **Call distribution elements (CDE)**.

Mitel		Mitel 470 Mitel 470 / Aastra 470	
System overview Configuration			
<input type="button" value="New"/> <input type="button" value="Delete"/> <input type="button" value="Delete range"/> <input type="button" value="Edit multiple"/> <input type="text" value="4*"/> <input type="button" value="Filter"/>			
DDI plan (13/20)	Dialling in number	Call distribution	
2	400	400	
2	401	401	
2	402	402	
2	403	403	
2	404	404	
2	405	405	
2	406	406	
2	407	407	
2	408	408	
2	409	409	
2	410	410	
2	454400	400	
2	53638195454400	400	

The DDI numbering range and single DDI numbers were added as shown below.

Add DDI numbering range

DDI plan: 2

DDI number start value: 400 Create DDI numbering range

Last DDI number: 410

Link matching users: Yes; create also DDI numbers with no matching users

Assign name:

Reuse matching CDE:

CDE creation

Start CDE: 400

Consecutively CDE numbering:

Call destinations for switch position 1

Routing destination: User + UG

User group: 16 Members: None

User: 4XX - XCAPI SIP Trunk

Call destinations for switch position 2

Routing destination: User + UG

User group: 16 Members: None

User: 4XX - XCAPI SIP Trunk

Call destinations for switch position 3

Routing destination: User + UG

User group: 16 Members: None

User: 4XX - XCAPI SIP Trunk

Add DDI number

DDI plan: 2

Dialling in number: 454400 Create DDI numbering range

Call distribution element: 400 Existing CDE (XC-API-SIP-400)

Add DDI number

DDI plan: 2

Dialling in number: 4953638195454400 Create DDI numbering range

Call distribution element: 400 Existing CDE (XC-API-SIP-400)



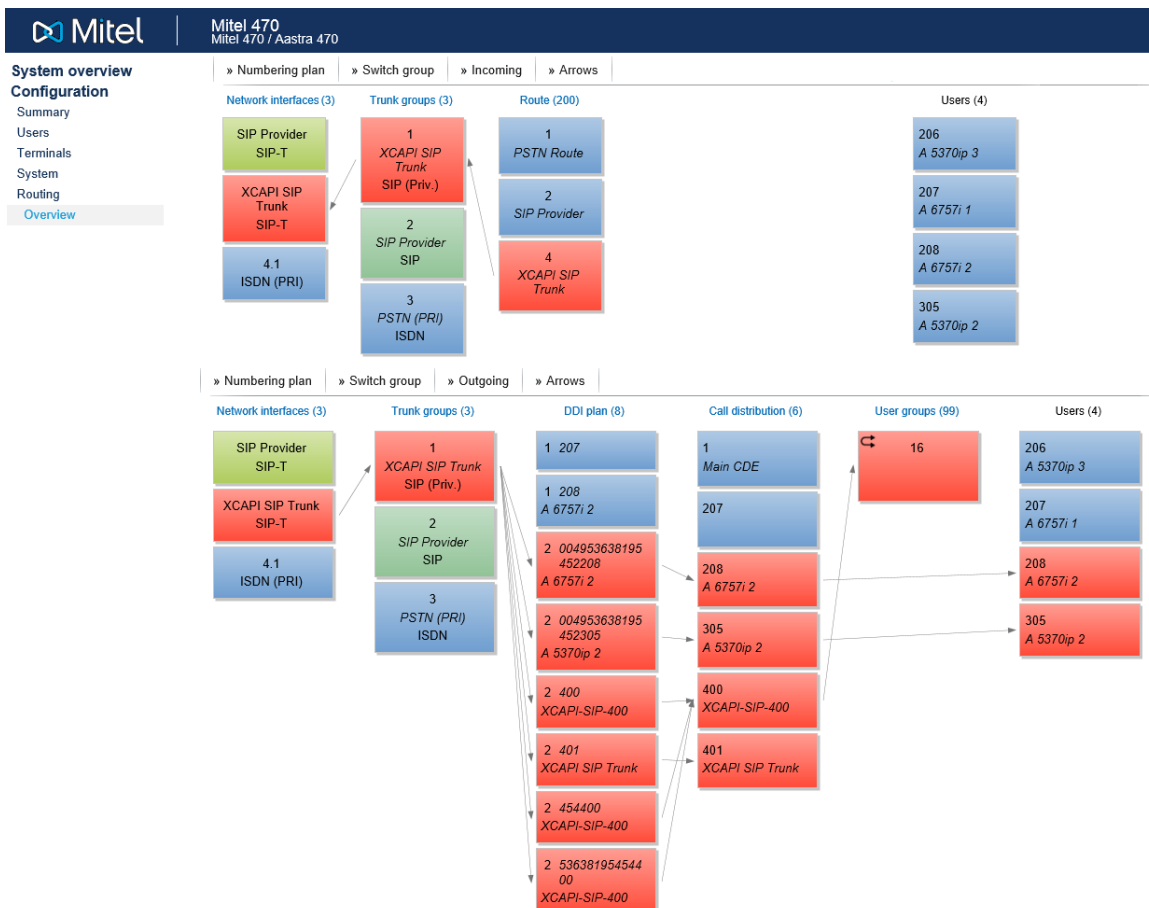
3.4 Call Distribution

The call distribution gives the overview of the configured DDI numbering plan relations.

ID (4/6)	Name	Call number	Switch group	Active	Switch position 1	Switch position 2	Switch position 3	CFNR	CFB	Connected DDIs
208	A 6757i 2		1	✓	User 208	User 208	User 208	-	-	208, 004953638195452208
305	A 5370ip 2		1	✓	User 305	User 305	User 305	-	-	004953638195452305
400	XCAPI-SIP-400		1	✓	User 400 + User group 16	User 400 + User group 16	User 400 + User group 16	-	-	400, 454400, 53638195454400
401	XCAPI SIP Trunk		1	✓	User 4XX	User 4XX	User 4XX	-	-	401

3.5 Routing Overview

The incoming and outgoing numbering plan relations are used as shown next.





3.6 Network Interfaces

The XCAPI related network interface is used as shown next. Please note that enabling **Use '+' as international prefix** requires XCAPI controller adjustments which are not shown in this document. **PRACK support (RFC 3262)** is not supported by XCAPI and thus has to be disabled. **Nat** and **Authentication** is not used at all here. The **Audio settings** are used with the given defaults. The **Transport protocol** is used with the default (UDP).

Mitel | Mitel 470
Mitel 470 / Aastra 470

System overview

Configuration

- Summary
- Users
- Terminals
- System
- Routing
- Overview
- List view
- Network interfaces

Name (3)	Interface	Port	Trunk group
SIP Provider	SIP-T	-	2 SIP Provider
XCAPI SIP Trunk	SIP-T	-	1 XCAPI SIP Trunk
	ISDN (PRI)	4.1	3 PSTN (PRI)

General

SIP node: 2

Name: XCAPI SIP Trunk

Bandwidth control area: 1 - Default Area

Trunk group: 1 - XCAPI SIP Trunk

IP addressing

IP address / host name: 172.18.0.152

Port: 5060

SIP signalling

Use '+' as international prefix:

Try to make external calls: Timeout (s): 8

'From' field for CLIR: Anonymous (RFC 3261)

Send session refresh (RFC 4028):

Use destination URL from: 'To' field

Music on hold:

Music on hold: Signalling: Automatic

Send redirecting information: No

Call transfer mode: Re-INVITE

PRACK support (RFC 3262):

Session replacement support:

Audio settings

Preferred codec: Unspecified

Comfort noise support: Off

RTCP support: Off

NAT

Enable keep alive:

ALG support:

Relay RTP data via communication server:

Authentication

Local authentication required:

User name:

Password: Show password


Transport protocol

Transport protocol: UDP



3.7 Trunk Groups

The XCAPI related trunk group is used as shown below.



Mitel 470
Mitel 470 / Aastra 470

System overview

Configuration

- Summary
- Users
- Terminals
- System
- Routing
- Overview
- List view
- Network interfaces
- Trunk groups

ID (3)	Name	Type of trunk group	Network type	DDI plan	Network interfaces
1	XCAPI SIP Trunk	SIP networking	Private	2	2 - XCAPI SIP Trunk SIP-T
2	SIP Provider	SIP networking	Public	1	1 - SIP Provider SIP-T
3	PSTN (PRI)	ISDN	Public	2	4.1 ISDN (PRI)

Trunk group

Trunk group: 1

Name: XCAPI SIP Trunk

Type of trunk group: SIP networking

Maximum incoming calls: 24

Maximum outgoing calls: 30

Maximum simultaneous connections: 30

Total B channels: 30

Call distribution element: 1

DDI plan: 2

DDI cut: 0

DDI lookup: Left to right

Trunk line selection mode: Linear

Transit route: 4 - XCAPI SIP Trunk

Region: None

Networking

Network type: Private

Ring if NPI is 'Unknown': External

Cut CLIP: 0

Override NPI: No

Ring back tone for incoming calls: Do not generate

Ring back tone for outgoing calls: Generate

Send immediate release in case of busy:

Early media support:

Features

Notification

Send notifications:

Send redirection/redirection information:

ECT information:

Mobile/external phone integration

Allow CLIP authentication even if CLIP is not screened:

Allow enhanced functionality for direct incoming calls:

Blacklist

Apply blacklist to incoming calls: [Go to blacklist](#)

Call identification (CLIP)

Outgoing CLIP

Create CLIP number automatically:

Numbering plan identifier (NPI): Unknown

CLIP number:

Restrict call identification (CLIR):

CLIR for redirection:

Restrict call identification while connected (COLR):

COLR for redirection:

Transit CLIP

Transit CLIP format: National

Transit exchange access prefix:

Send incoming CLIP for trunk-trunk connections:

Network interfaces

Interface	Interface type
2 - XCAPI SIP Trunk	SIP-T



3.8 Route

The XCAPI related route entry is used as shown below.

The screenshot shows the Mitel 470 configuration interface. On the left is a navigation menu with 'Route' selected. The main area displays a table of routes and a detailed configuration window for the selected route.

ID (200)	Name	Call number	Trunk groups
1	PSTN Route		3 PSTN (PRI)
2	SIP Provider		2 SIP Provider
4	XCAPI SIP Trunk		1 XCAPI SIP Trunk

Route	
Route	4
Call number	<input type="text"/>
Name	XCAPI SIP Trunk
Max. outgoing calls	24
Total B channels	30
Send access code	<input type="text"/>
Send delay	0
External digit barring	<input type="checkbox"/>
Numbering plan identifier (NPI)	Unknown
Impulse interval for virtual charges (s)	<input type="text"/>

Trunk group allocation	
Add	
X	1 XCAPI SIP Trunk

Connected users

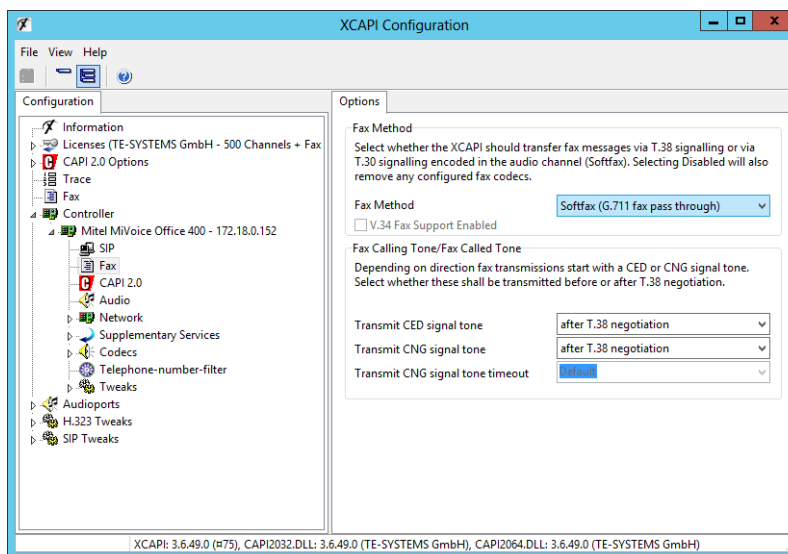


Configuration Notes

In these chapters you'll find some configuration hints and settings for supplementary services such as Softfax (via G.711), message waiting indication or call transfer. Such services are enabled by default to the XCAPI controller configuration. Nevertheless they should be reviewed just as the according gateway parameters for appropriate interworking.

4.1 Softfax (G.711 fax pass through)

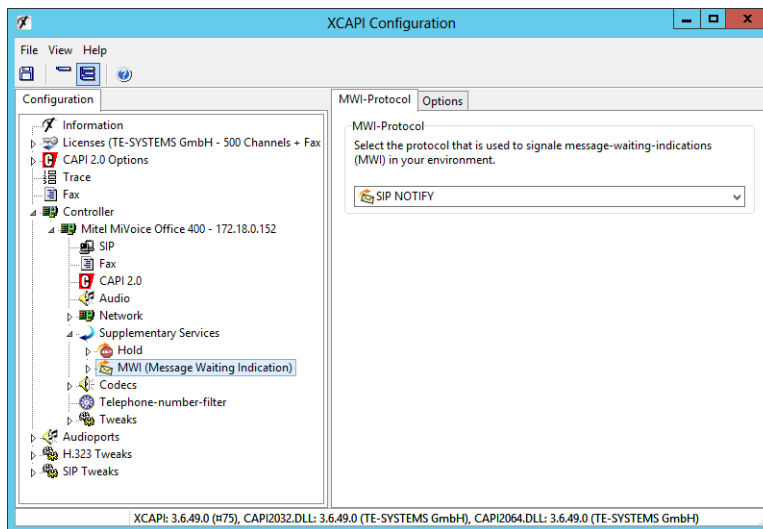
With the Softfax mode, the XCAPI simulates an analogue Fax device by transmitting modulated Fax-signals modem-like through the established G.711 audio channels. For enabling **Softfax (G.711 fax pass through)** it has to be set as **Fax Method** as shown next.





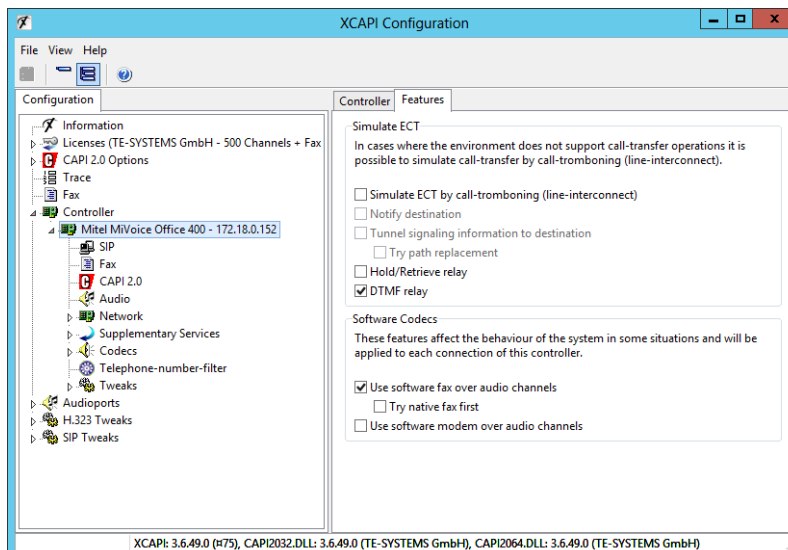
4.2 Message Waiting Indication

For enabling message waiting indications, please ensure that the **SIP NOTIFY** method is set within the XCAPI controller configuration. It's recommended to check if MWI is operable with all the different SIP devices (SIP phone and SIP extensions) that are connected to the Mitel MiVoice Office 400.



4.3 Call Transfer

The **Simulated ECT by call-tromboning (line-interconnect)** parameter within the XCAPI controller **Features** tab must be disabled for allowing call transfer via **SIP REFER**.

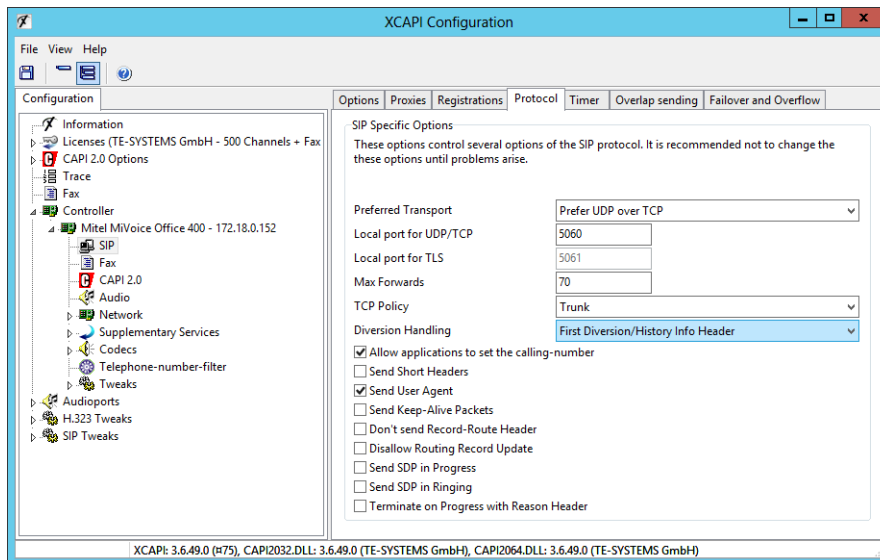




4.4 Redirection Number

Several CAPI applications need to receive a redirection number, in meaning of the gateway generated SIP diversion header, beside of the origins calling number. Please ensure that according parameters are set, such as **Send redirecting information** of the SIP node, as shown in the chapter **Private SIP Networking** starting on [page 10](#). If required, you can also adjust the XCAPI controller's **Diversion Handling**.

Ensure that the XCAPI related trunk group feature parameter **Send redirection/redirecting information** is enabled as shown in the chapter **Trunk Groups** starting on [page 16](#).





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