

# TechNote

## Mitel MiVoice Office 400 - R5

May 18, 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.

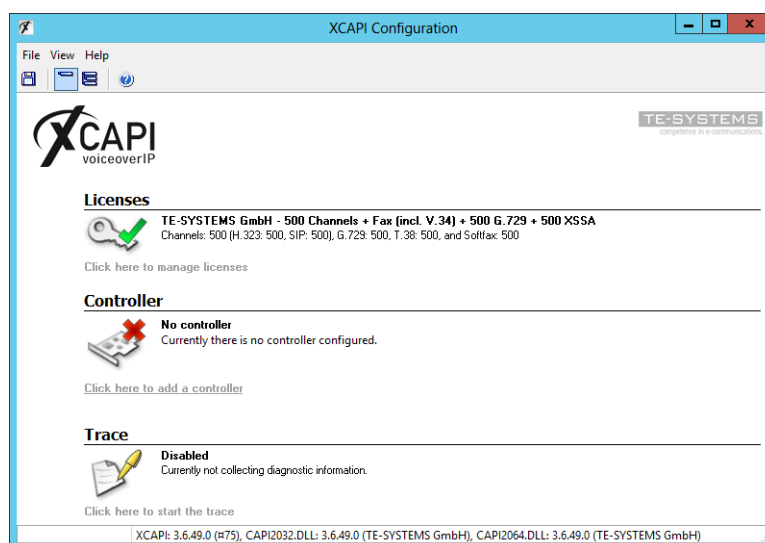
Though being based on the Mitel MiVoice Office 400 R5 and a Communication server Mitel 470, it is applicable to other versions given a few adjustments.

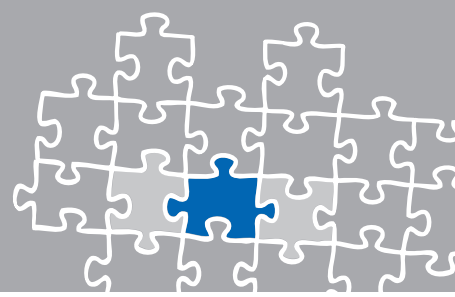
In the following sections we describe the essential configuration steps to allow optimal interworking of both the XCAPI and the Mitel MiVoice Office 400. At this point we suppose that the VoIP environment is in operation which means that the Mitel MiVoice Office 400, XCAPI and CAPI applications are properly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

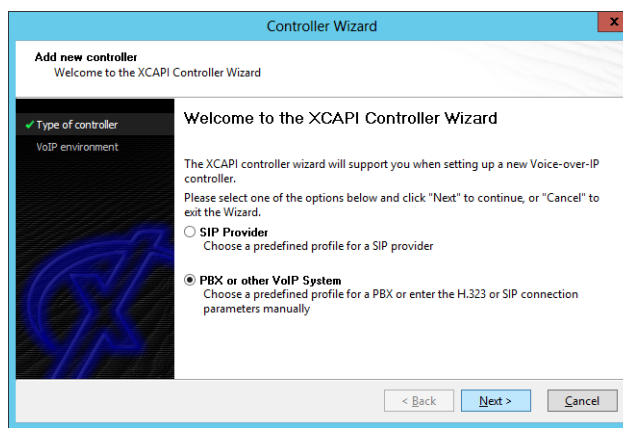
Please start up the XCAPI configuration to create a new controller assigned to the Mitel MiVoice Office 400. If you've just installed the XCAPI and start the configuration tool for the first time or no controller is available at all, the XCAPI controller wizard will pop up automatically. However, to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





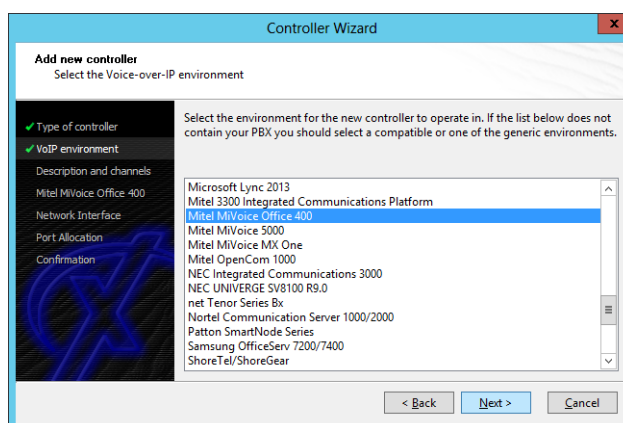
## 2.1 Type of Controller

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

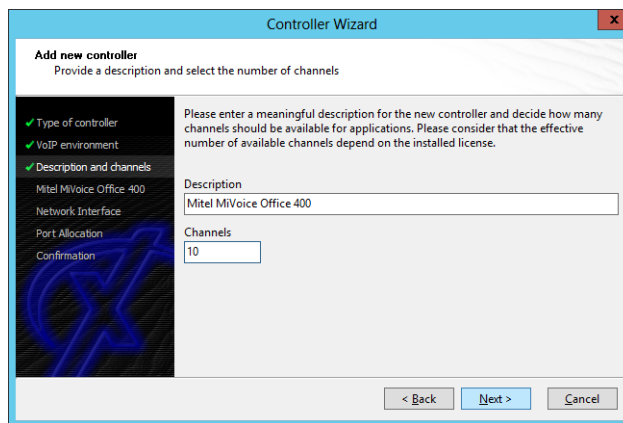
The **VoIP Environment** dialog shows a list of some common Voice-over-IP environments. Selecting one of those will configure the XCAPI controller with a selection of near-optimal presets for the kind of environment you have, sparing you quite a lot of manual configuration.





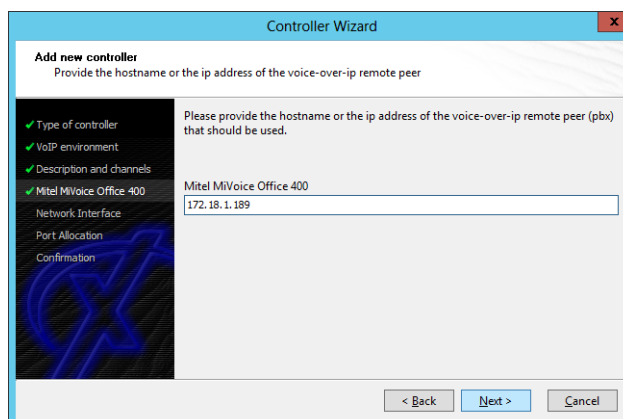
### 2.3 Description and Channels

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

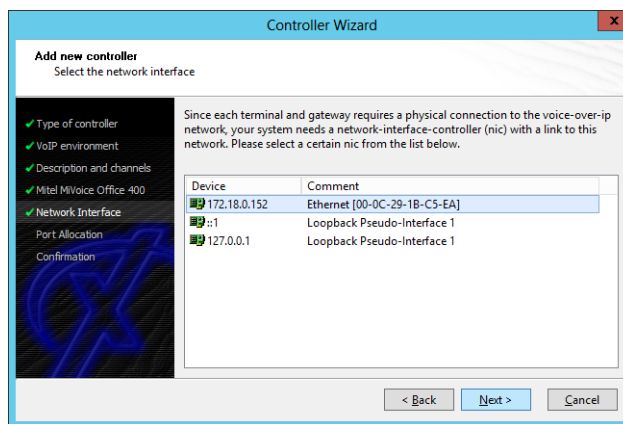
Afterwards, please provide the IP address of the Mitel MiVoice Office 400 gateway.





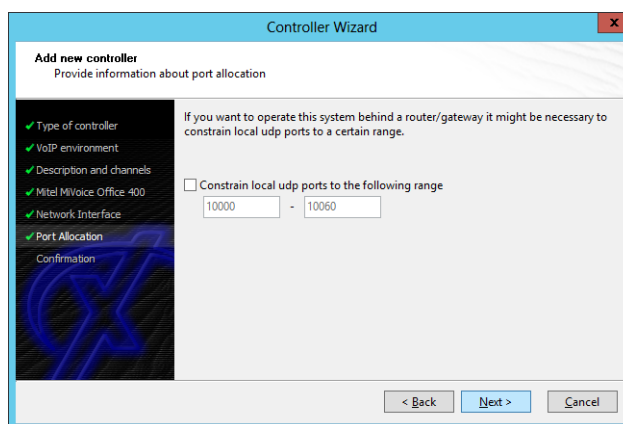
## 2.5 Network Interface

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



## 2.6 Port Allocation

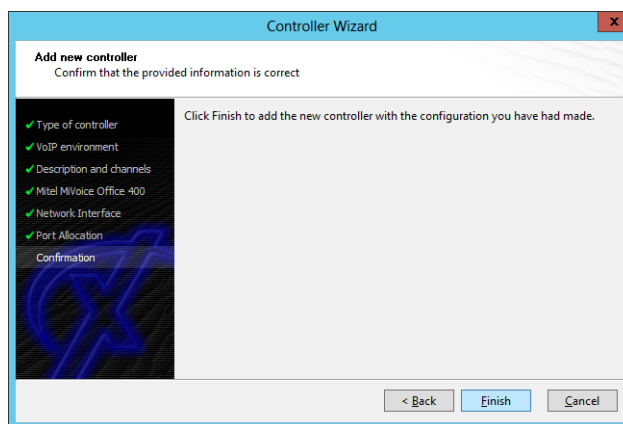
On demand and in the case of any router or firewall restrictions for UDP (RTP/T.38) a port range can be specified. In this example no port range will be set which enables using a random port range between 1024 and 65535.



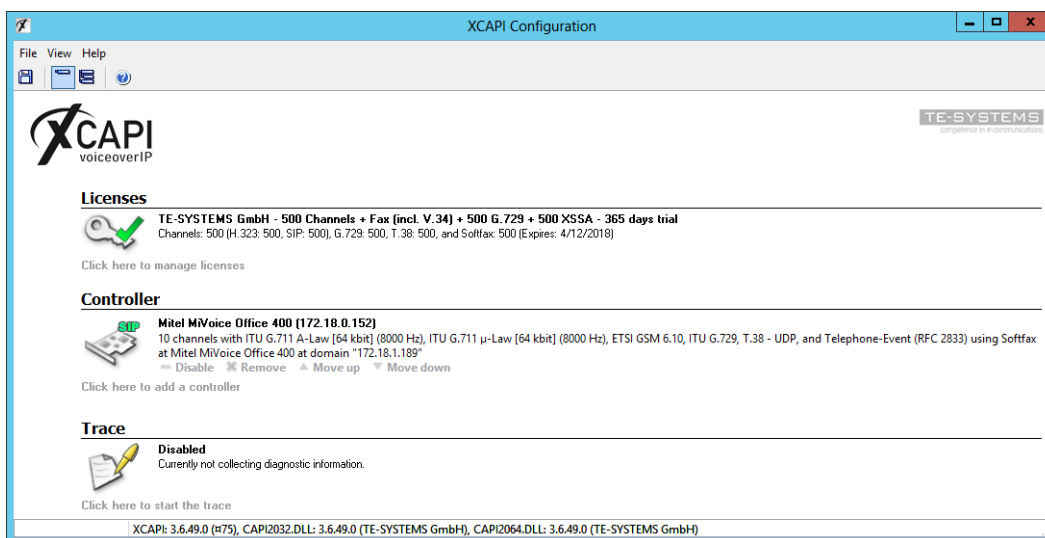


## 2.7 Confirmation

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 Office 400 Configuration

In order to establish a connection between the XCAPI and the Mitel 400, you need to setup the XCAPI 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 installed cards.

Mitel | MiVoice Office 400  
Mitel 470 / Aastra 470

**System overview**

- Configuration
- Summary
- Users
- Terminals
- System
- General
- Access control
- Cards and modules
- Interfaces
- DECT/SIP-DECT
- Media resources

**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	▼	▼	▼	▼	▼	▼
<b>Total</b>			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
<b>Total</b>						128	64	0	0	0

**Overview VoIP resources**

Max G.711	128
Max G.729	64
Max FoIP	64

**Media resources / DSP related licensed features**

Mobile or External Phone Extensions	-
Audio Record & Play Channels	2
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 | MiVoice Office 400  
Mitel 470 / Aastra 470

**System overview**  
Configuration  
Summary  
Users  
Terminals  
System  
General  
Access control  
Cards and modules  
Interfaces  
DECT/SIP-DECT  
Media resources  
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	172.18.1.109	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 | MiVoice Office 400  
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

Internal registration timeout (hours): 1

**RTP settings**

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

**NAT**

Public NAT gateway address: [empty]

SIP public media address: SIP signaling address (RFC3581)

**IP system phones settings**

Signaling port: 18060

Keep alive time (s): 60

Registration time expires (s): 900

Administrator password (also valid for Mitel SIP phones): [empty]

Phone lock level for Mitel SIP phones: Lock phone only locally

**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** license is available for appropriate SIP trunk interworking.

Mitel | MiVoice Office 400  
Mitel 470 / Aastra 470

**System overview**

- System information
- State
- Cards and modules
- Licences

System	
Equipment ID (EID)	901546524743490C02D99AD2765603C5603C
Sales channel	DE-Freemarket
Communication server	Mitel 470
Release	5.0
Support ID	186191
Configured users	4
User licences (used / available / total)	User: 4 / 32 / 36
Software Assurance (SWA)	
SWA state	Active until: 09.12.2020
SWA covered users	50
Configured users requiring SWA	4
Licence (LIC)	
Licence file	901546524743490C02D99AD2765603C_r50_mitel470_de_tesystems_3_20170406.lic <span style="float: right; border: 1px solid #1a3d54; padding: 2px 5px; color: white;">Browse...</span>
Licensable features	
	<b>Licence state</b> <b>Additionally available without licence</b>
Resources	
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

XCAPI 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 XCAPI 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 XCAPI 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 XCAPI.

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

Mitel | MiVoice Office 400  
Mitel 470 / Aastra 470

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

New Delete Edit multiple Filter Filter

Remote SIP nodes

Please select the use case of the new SIP node.  
Some useful preconfigurations will be done automatically.

- 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

IP address / host name 172.18.0.152

Port 5060

Maximum incoming calls 24

Authentication name

Authentication password

Internal number range to be routed to new SIP node 44XX

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 MiVoice Office 400  
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**  **Filter**

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

The XCAPI SIP trunk/node is here used with the preconfigured defaults.

Mitel MiVoice Office 400  
Mitel 470 / Aastra 470

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

Select

<< XCAPI SIP Trunk >>

**General**

SIP node: 2

Name: XCAPI SIP Trunk

Bandwidth control area: Default Area

Trunk group: 1 - XCAPI SIP Trunk

Maximum incoming calls: 24

**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 (indirect switching):

**Authentication**

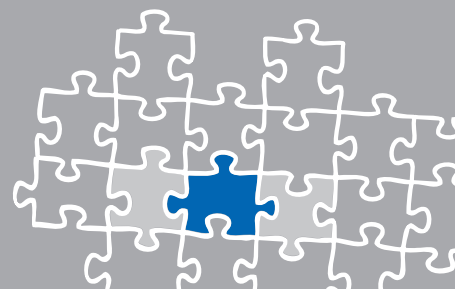
Local authentication required:

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), **Fax over VoIP (G.711)** must be selected as **Fax device**. Additional Softfax information are given in the chapter **Softfax (G.711 fax pass through)** starting on [page 18](#).

The screenshot shows the Mitel MiVoice Office 400 configuration interface. The left sidebar contains a navigation menu with 'PISN user' selected. The main content area displays the configuration for a PISN user. At the top, it shows 'Maximum number of transit PINXs' set to 4 and 'Transit route'. Below this is a table with the following data:

Name (1/2)	Call number	Route	External call number	CLIP selection	Fax device	Suppress immediate CFNR
XCAPI SIP Trunk	4XX	4 - XCAPI SIP Trunk	4XX	Normal	Fax over VoIP (G.711)	<input checked="" type="checkbox"/>

Below the table is a detailed configuration form for the selected PISN user:

- Call number: 4XX
- Name: XCAPI SIP Trunk
- Route: XCAPI SIP Trunk (4) [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 | MiVoice Office 400  
Mitel 470 / Astra 470

System overview

New Delete Delete range Edit multiple
 Filter

DDI(DID) plan (5/13)	DDI(DID) number	Call distribution
2	400	400 - XCAPI-SIP-400
2	401	401 - XCAPI SIP Trunk
2	454400	400 - XCAPI-SIP-400
2	4953638195454400	400 - XCAPI-SIP-400
2	53638195454400	400 - XCAPI-SIP-400

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

**Add DDI(DID) numbering range**

DDI(DID) plan: 2

DDI(DID) number start value: 400  Create DDI(DID) numbering range  
 Copy routing from another range

Last DDI(DID) number: 410

Link matching users: Yes, create also DDI(DID) 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(DID) number**

DDI(DID) plan: 2

DDI(DID) number: 454400  Create DDI(DID) numbering range  
 Copy routing from another range

Call distribution element: 400  Existing CDE (XCAPI-SIP-400)

**Add DDI(DID) number**

DDI(DID) plan: 2

DDI(DID) number: 4953638195454400  Create DDI(DID) numbering range  
 Copy routing from another range

Call distribution element: 400  Existing CDE (XCAPI-SIP-400)



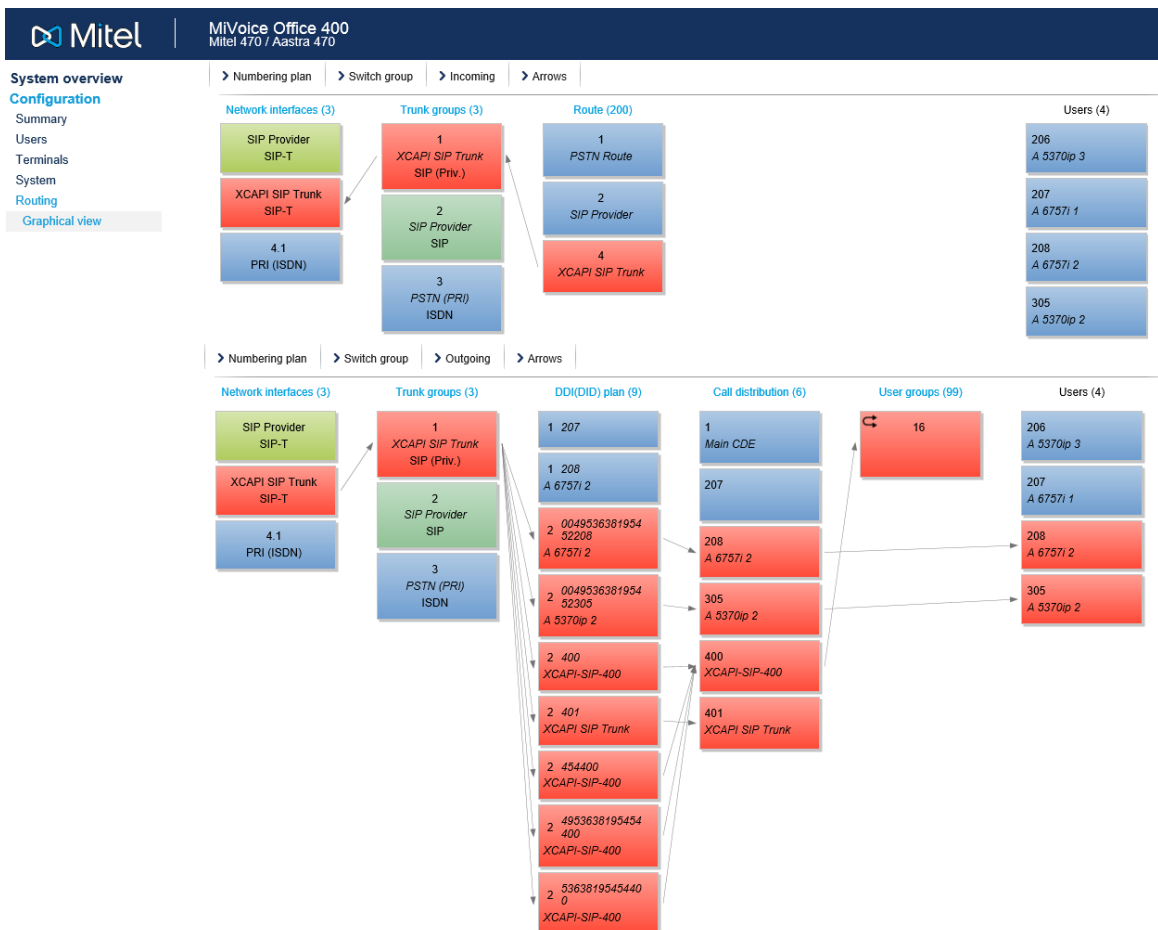
### 3.4 Call Distribution

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

ID (17)	Name	Call number	Switch group	Active	Switch position 1	Switch position 2	Switch position 3	CFNR	CFB	Connected DDI(s)(DDIs)
1	Main CDE		1	✓	PSTN overflow	User group 16	User group 16	-	-	-
207			1	✓	User group 16	User group 16	User group 16	-	-	207
208	A 67571 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	✓	PISN user 400 + User group 16	PISN user 400 + User group 16	PISN user 400 + User group 16	-	-	400, 454400, 53638195454400, 4544400, 49536381954544400
401	XCAPI SIP Trunk		1	✓	PISN user 4XX	PISN user 4XX	PISN user 4XX	-	-	401

### 3.5 Routing Graphical View

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).

The screenshot shows the configuration page for an XCAPI SIP Trunk in the Mitel MiVoice Office 400 system. The page is divided into several sections:

- Summary Table:**

Name (3)	Interface	Port	Trunk group
SIP Provider	SIP-T	-	2 - SIP Provider
XCAPI SIP Trunk	SIP-T	-	1 - XCAPI SIP Trunk
	PRI (ISDN)	4.1	3 - PSTN (PRI)
- General:**
  - SIP node: 2
  - Name: XCAPI SIP Trunk
  - Bandwidth control area: Default Area
  - Trunk group: 1 - XCAPI SIP Trunk
  - Maximum incoming calls: 24
- 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 (indirect switching):
- Authentication:**
  - Local authentication required:
  - User name: [text input]
  - Password: [password input]  Show password
- Transport protocol:**
  - Transport protocol: UDP



## 3.7 Trunk Groups

The XCAPI related trunk group is used as shown below.

Mitel | MiVoice Office 400  
 Mitel 470 / Aastra 470

ID (3)	Name	Type of trunk group	Network type	DDI(DID) plan	Network interfaces
1	XCAPI SIP Trunk	SIP networking	Private	2	2 - SIP-T - XCAPI SIP Trunk

**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(DID) plan: 2

DDI(DID) cut: 0

DDI(DID) lookup: Left to right

Trunk line selection mode: Linear

Transit route: XCAPI SIP Trunk (4)

Region: None

Emergency location: Inherit

Emergency location protocol: No location identifier

**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 for Lync:

**Features**

**Notification**

Send notifications:

Send redirection/redirecting information:

ECT information:

**Mobile/external phone integration**

Allow CLIP authentication even if CLIP is not screened:

Allow enhanced functionality for direct incoming calls:

**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:

Use CLIP for user DDI(DID) lookup:

**Network interfaces**





### 3.8 Route

The XCAPI related route entry is used as shown below.

The screenshot shows the Mitel MiVoice Office 400 configuration interface. The top navigation bar includes the Mitel logo and the system name 'MiVoice Office 400 / Aastra 470'. A left-hand menu lists various system components, with 'Route' selected under the 'Routing' section. The main content area displays a table of route entries:

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
6			
7			

The configuration details for the selected route (ID 4) are shown in a modal window:

- Route:** 4
- Call number:** [input field]
- Name:** XCAPI SIP Trunk
- Max. outgoing calls:** 24
- Total B channels:** 30
- Send access code:** [input field]
- Send delay:** 0
- External digit barring:**
- Numbering plan identifier (NPI):** Unknown
- Suppress LCR:**
- Impulse interval for virtual charges (s):** [input field]

Below the configuration fields is a 'Trunk group allocation' section with an 'Add' button and a list of selected trunks:

- 1 XCAPI SIP Trunk
- 3 PSTN (PRI)

At the bottom of the modal, there is a 'Connected users' section with a right-pointing arrow.

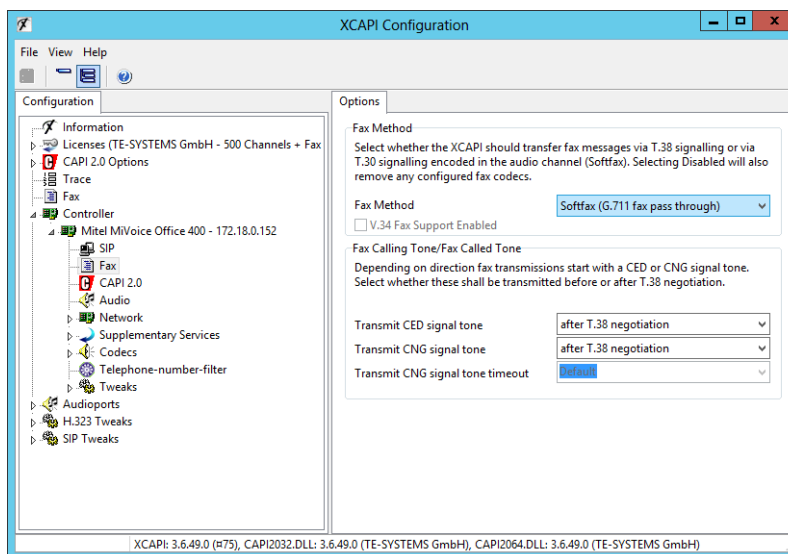


## Configuration Notes

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)

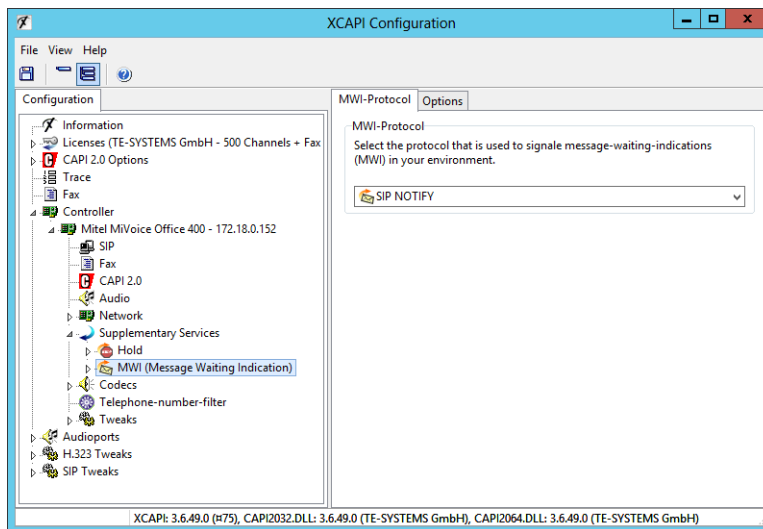
With the Softfax mode, the XCAPI simulates an analogue Fax device by transmitting modulated Fax-signals modem-like through the established G.711 audio channels. For enabling **Softfax (G.711 fax pass through)** it has to be set as **Fax Method** as shown next.





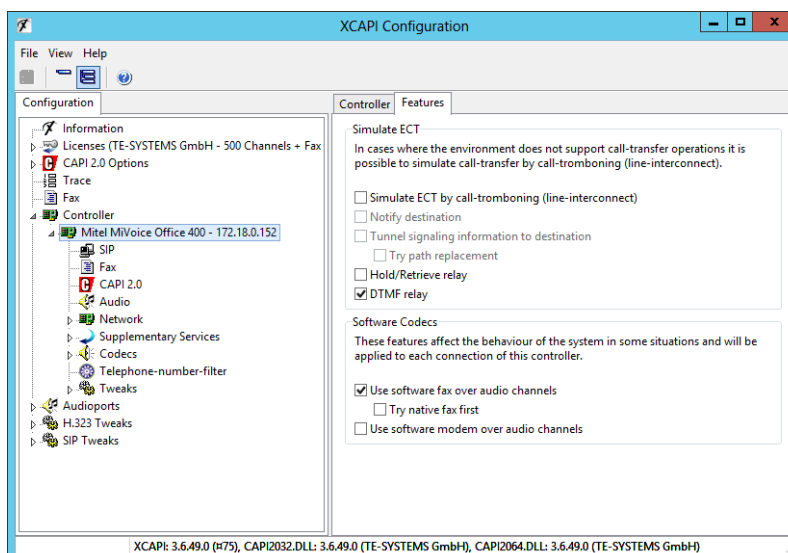
## 4.2 Message Waiting Indication

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**.

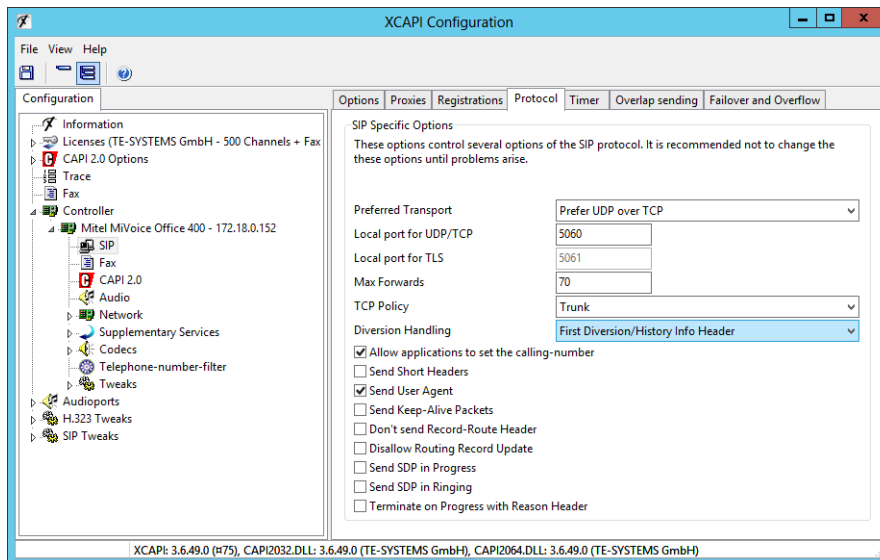




## 4.4 Redirection Number

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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