

3CX Phone System



December 3, 2018

Introduction

This document is intended to support you with the integration of the latest XCAPI version into an existing environment of the 3CX Phone System.

Though being based on the 3CX Phone System V15 series, it is applicable to other versions given a few adjustments.

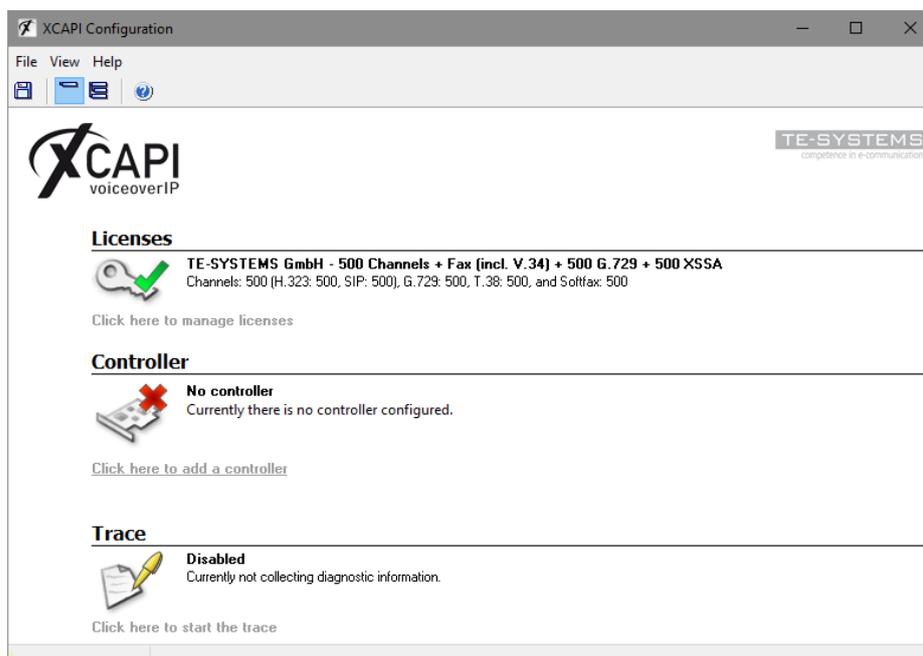
In the following sections we describe the essential configuration steps to allow optimal interworking of both the XCAPI and the 3CX Phone System. At this point we suppose that the VoIP environment is in operation which means that the 3CX Phone System, XCAPI and CAPI applications are properly installed.

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 3CX Phone System. 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.



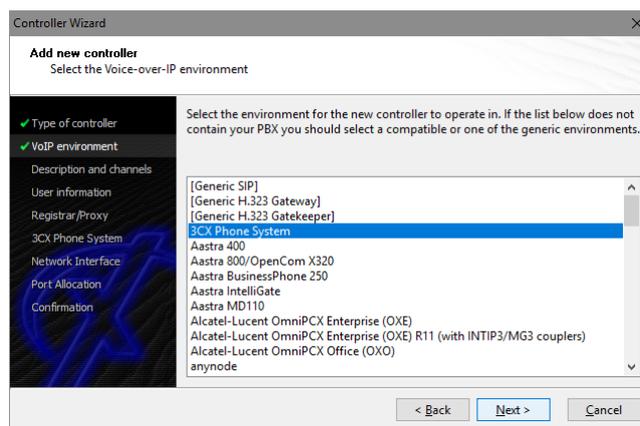
2.1 Type of Controller

On the first page of the controller wizard please select **PBX or other VoIP System** and continue with the **Next** button.



2.2 VoIP Environment

The next dialog of the configuration tool shows a list of some common Voice-over-IP environments. Selecting one of those will configure the XCAPI 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 can be set. So please enter how many simultaneous connections the XCAPI controller should handle when communicating with the 3CX Phone System and the CAPI application.

The screenshot shows the 'Controller Wizard' dialog box with the title 'Add new controller' and the instruction 'Provide a description and select the number of channels'. On the left, a vertical list of steps is shown: 'Type of controller', 'VoIP environment', 'Description and channels' (highlighted with a green checkmark), 'User information', 'Registrar/Proxy', '3CX Phone System', 'Network Interface', 'Port Allocation', and 'Confirmation'. The main area contains a text box for 'Description' with the value '3CX Phone System' and a numeric input box for 'Channels' with the value '10'. A note above the input boxes reads: 'Please enter a meaningful description for the new controller and decide how many channels should be available for applications. Please consider that the effective number of available channels depend on the installed license.' At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

2.4 SIP User Information

Next, please provide the SIP user information for the user you are about to create in the following 3CX configuration. The according 3CX user configuration will be shown in the chapter **3CX Configuration** starting on [page 8](#).

The screenshot shows the 'Controller Wizard' dialog box with the title 'Add new controller' and the instruction 'Provide SIP user information'. On the left, the vertical list of steps is updated: 'Type of controller', 'VoIP environment', 'Description and channels', 'User information' (highlighted with a green checkmark), 'Registrar/Proxy', '3CX Phone System', 'Network Interface', 'Port Allocation', and 'Confirmation'. The main area contains a text box for 'Username (SIP-ID)' with the value '887' and a password input box for 'Password (SIP-PASSWORD)' with masked characters. A note above the input boxes reads: 'The remote device requires an user to authenticate herself. Thus please provide the appropriate user information. If you enter wrong information it probably won't be possible to communicate with the remote device.' At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

2.5 SIP Registrar and Proxy information

In this dialog the 3CX Phone System referring SIP registrar and proxy must be specified as IP address or host name. Please note, port 5060 is used as default for SIP via UDP or TCP which can be changed on demand. Also the local listening port is always set to port 5060 for UDP/TCP which can be changed after the controller wizard configuration steps.

Controller Wizard

Add new controller
Provide information about the SIP registrar and proxy

If you want to use a SIP registrar and/or a SIP proxy please activate the respective checkbox and enter the hostname or IP address.

Registrar
172.18.1.211 Default

Proxy
172.18.1.211 Default

< Back Next > Cancel

2.6 SIP Domain / 3CX Phone System

Afterwards the appropriate IP address or host name of the 3CX Phone System must be set which is the XCAPI controllers used local SIP domain.

Controller Wizard

Add new controller
Provide the hostname or the ip address of the voice-over-ip remote peer

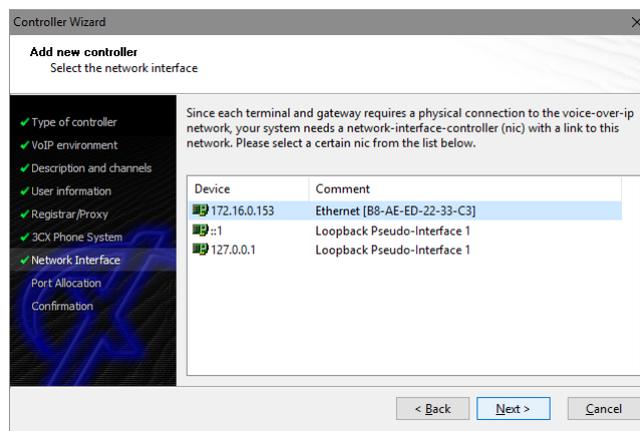
Please provide the hostname or the ip address of the voice-over-ip remote peer (pbx) that should be used.

3CX Phone System
172.18.1.211

< Back Next > Cancel

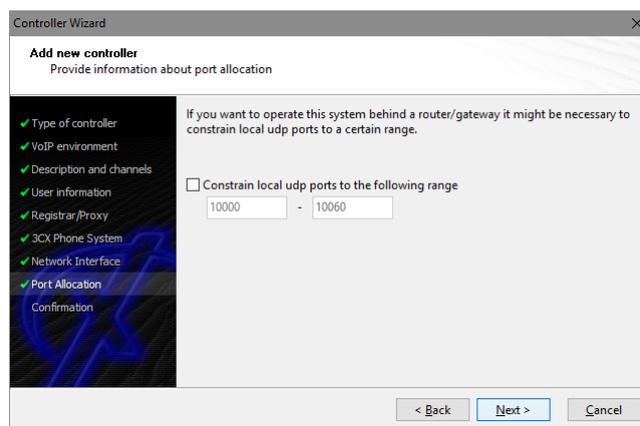
2.7 Network Interface

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



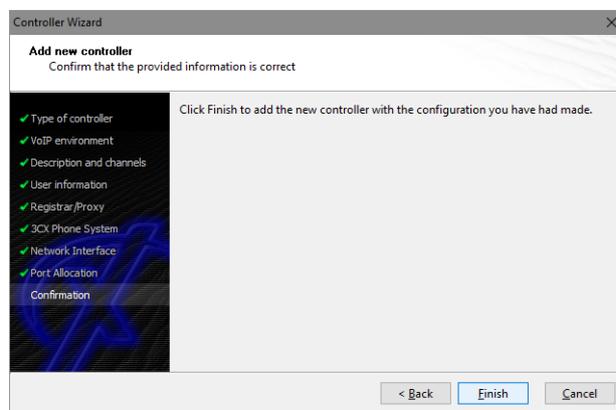
2.8 Port Allocation

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 range will be set which is using a random port range between 1024 and 65535.

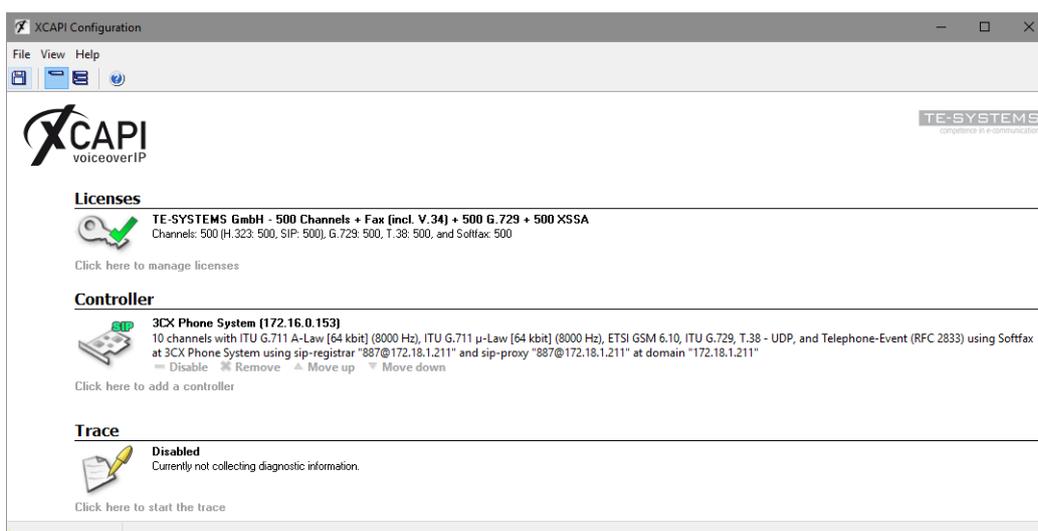


2.9 Confirmation

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 necessary input. If everything is correct please use the **Finish** button in order to finally create the new 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.



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.

3CX Configuration

Currently it's not possible to get an appropriate numbering and routing behavior by setting up a 3CX SIP Trunk or as 3CX Bridge. So it's recommended to create a 3CX SIP extension which the XCAPI controller is registering for.

As a workaround XCAPI could be directly connected to the 3CX related media gateway or SIP provider or anynode, our session border controller, could do the routing decision in front of the 3CX Phone System. For such a workaround, please check our interoperability list and our community if any specific TechNotes are available.

3.1 XCAPI as Extension

According to the XCAPI controller configuration, the SIP extension with using number **887** will be used for appropriate authentication. Note that irrelevant dialogs (Voicemail, BLF, Rights and Integration) are not shown here and will be used with their defaults.

The screenshot shows the 3CX web interface for configuring extension 887. The interface includes a sidebar with navigation options like Dashboard, Phones, Extensions, Groups, Contacts, SIP Trunks, Inbound Rules, Outbound Rules, Digital Receptionist, Ring Groups, Call Queues, Bridges, FAX Extensions, FXS/DECT, Recordings, Backup and Restore, Call Log, Call Reports, and Settings. The main content area is titled '887 Fax/Voice Extension XCAPI' and has tabs for General, Voicemail, Forwarding Rules, Phone Provisioning, BLF, Options, Rights, and Integration. The 'General' tab is active, showing the following fields:

- User Information**
 - Extension: 887
 - First Name: Fax/Voice Extension
 - Last Name: XCAPI
 - Email Address: fax@te-systems.de
 - Mobile Number: Mobile Number
 - Outbound Caller ID: 887
- Authentication**
 - Authentication details used by phones & client. Reprovision after a change
 - ID: 887
 - Password: [masked]
- Direct Inbound Dialing (DID)**
 - Optionally assign a DID to receive calls directly to this extension
 - Buttons: Add a DID/DPI, Delete

Ensure that **Accept multiple calls** is enabled within the **Forwarding Rules** to allow more than one connection at once.

887 Fax/Voice Extension XCAPI

General Voicemail **Forwarding Rules** Phone Provisioning BLF Options Rights Integration

Statuses

If in this status, forward calls as follows

Available

Internal Calls

If I do not answer calls within: seconds. Forward internal calls to:

Forward to Voice Mail

If I am busy or my phone is unregistered, forward calls to:

Forward to Voice Mail

External Calls

After timeout forward external calls to:

Forward to Voice Mail

If I am busy or my phone is unregistered, forward calls to:

Forward to Voice Mail

Options

Ring my mobile simultaneously

Accept multiple calls

Log out from queues

Accept calls from Ring Groups

Greeting

When in this status, use this custom voice mail greeting: Format WAV (PCM, 8 kHz, 16 bit, Mono, Max size: 100MB)

For the **Phone Provisioning** settings, the codecs can be restricted to G.711 (a- and u-law) only. 3CX specific options must be disabled.

887 Fax/Voice Extension XCAPI

General Voicemail Forwarding Rules **Phone Provisioning** BLF Options Rights Integration

Phone Provisioning

+ Add

Your phones

3CX Client

Delete

Network

Network interface for registration and provisioning

172.18.1.211

SIP Transport

UDP

RTP Mode

Normal

DTMF Mode

RFC2833

Enable PUSH for smartphones

Re-provision phone on Startup

Use 3CX Tunnel for remote connections (3CX Client only)

Preferences

Call Control:

Softphone

Access

Block use of 3CX Client

Hide Forwarding Rules

Show Call Recordings

Allow Deletion of Recordings

Codecs

Move codecs up or down to prioritize them. 3CX will attempt to use top codecs first.

+ Add codecs

Delete

Move Up

Move Down

G.711 A-law

Delete

G.711 U-law

Delete

The **Options** parameters are used as shown next. The **SIP ID** is here set to the international number **+4953638195887**. The SIP ID depends of the connected provider or gateway and what is delivered from the 3CX towards XCAPI. You may have to use the 3CX DID or another numbering format (for example 887, 004953638195887, 53638195887).

Ensure that this extension is available and the option **Disable Extension** is not set.

It's recommended to enable the parameter **Support Re-Invites** and to disable the **Support Replaces header**. Disable **PBX Delivers Audio** if possible. If enabled the UDP (RTP/T.38) data will be always streamed through the 3CX server.

887 Fax/Voice Extension XCAPI

General Voicemail Forwarding Rules Phone Provisioning BLF **Options** Rights Integration

Restrictions

- Disable Extension
- Disable External Calls
- Enable PIN Protect For seconds
- Disallow use of extension outside the LAN
- Block Remote Tunnel Connections
- Block Outbound calls outside of Office Hours

Options

- Record all calls
- Screen Calls by requesting caller name using an IVR
- Send email notification on missed call
- Do not show extension in 3CX company phonebook
- Allow user to organize 3CX Webmeeting Video Conferences

SIP ID

Troubleshooting

Potentially overcome compatibility issues with old/incompatible phones with these options

- PBX Delivers Audio
- Support Re-Invites
- Support 'Replaces' header

The registration state of the XCAPI controller can be reviewed in the 3CX **Extensions** or **Phones** dialog or even in the 3CX **Event log**.

Ext	First	Last	Email	Password	Mobile	Caller ID	Phones
887	Fax/Voice Extension	XCAPI	fax@te-systems.de	*****		887	1

Appendix

The appendix gives several information and configuration hints as well as some considerations. If using the XC-API controller wizard with its 3CX template most of the next shown settings are used by default.

The next topics and the shown configurations must be reviewed, checked and tested, especially with the participating 3CX extensions, the VoIP gateway and the SIP provider.

4.1 Recommendations, Considerations and Restrictions

- There is no 3CX support available for SIP trunk or SIP Bridge connections. The routing and numbering behavior can be restricted in that case and may not meet the requirements. Workarounds might be possible if XC-API will be used directly with the involved VoIP Gateway, SIP Provider or even with anynode our Session Border Controller. An example will be given in the according anynode TechNote.
- Check if the 3CX Phone System numbering behavior and the required supplementary services are meeting the expectations for the bound CAPI 2.0 application.
- It's recommended to connect XC-API as SIP extension to the 3CX Phone System.
- Check the overall interworking with the 3CX extensions, the 3CX bound media gateway, SIP provider and in the case of other bridged 3CX Phone Systems. The numbering and supplementary services just had been tested internally, directly between XC-API and the 3CX with its extensions.
- Ensure conform voice and fax codec configurations for appropriate interworking between all 3CX Phone System SIP instances.
- Check the according TechNotes (XC-API TechNote (en) - VMware Virtual Machines or XC-API TechNote (en) - Microsoft Hyper-V) if XC-API will be used in a virtual environment.
- It's strictly recommended to check the fax reliability before the XC-API and the CAPI application will be used in production.
- Check the 3CX Phone System event log for troubleshooting.
- XC-API doesn't support the Remote-Party-ID SIP header as this is no SIP standard which was replaced with the P-Asserted-Identity header.
- The 3CX Phone System seems not supporting any redirection number via Diversion header or History-Info recently.

4.2 Fax

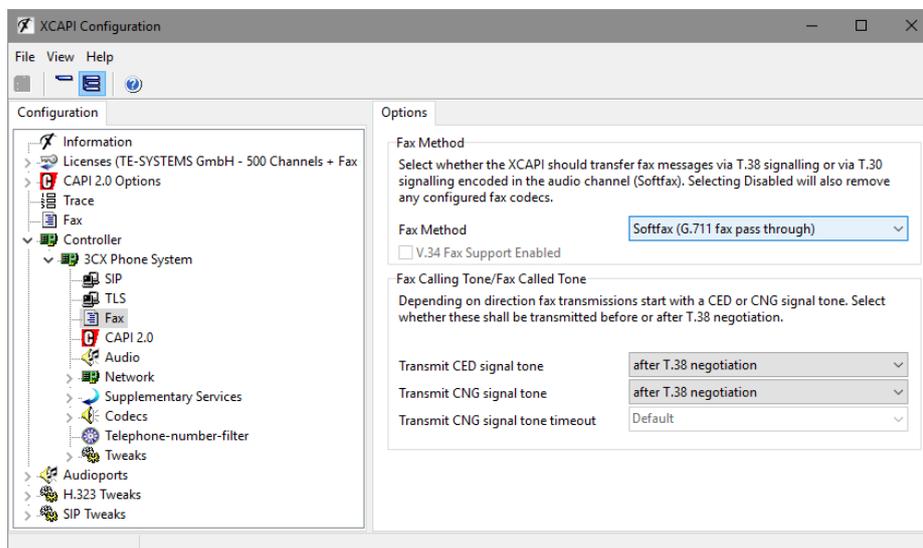
Ensure that the fax method (Softfax – G.711 fax pass through or T.38) is configured conform for all participating instances (the XCAPI controller and the SIP gateway or SIP provider trunk).



Please check closely about the interoperability in combination with the connected SIP provider, especially for fax transmission. The 3CX supported and preferred providers are listed here <https://www.3cx.com/partners/sip-trunks/>. If fax is not supported between 3CX and specific SIP providers you have to think about using a workaround (for e.g. connecting XCAPI directly with the SIP provider if possible, bypassing the 3CX through a Session Border controller.) for enabling fax interoperability.

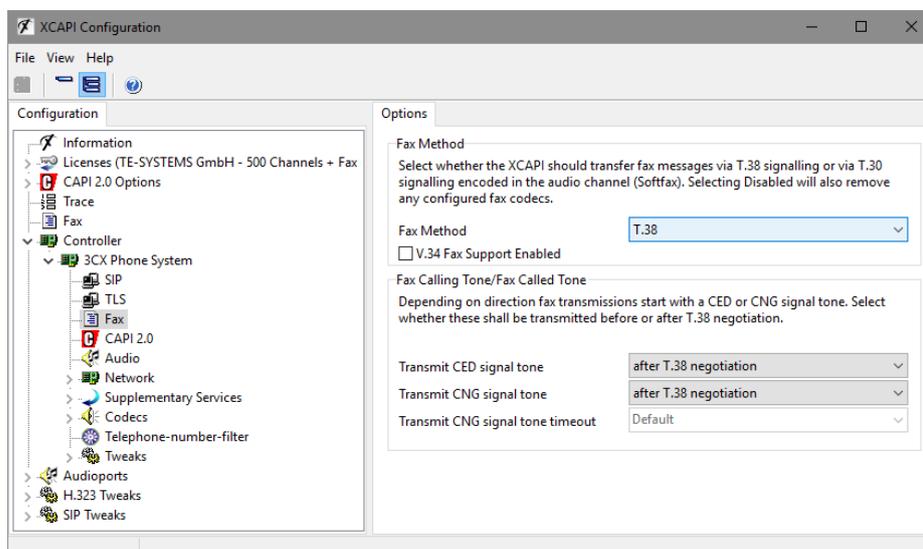
4.2.1 Softfax (G.711 fax pass through)

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 must be set as **Fax Method** as shown next.



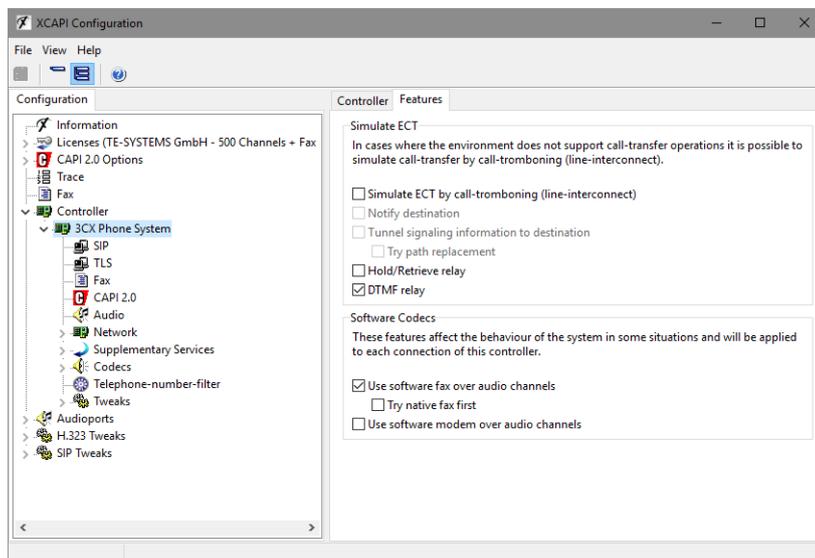
4.2.2 T.38

Ensure that T.38 is supported by the 3CX remote peer (media gateway or SIP provider). For XCAPI, please ensure that **T.38** is selected as **Fax Method** in the according Fax dialog.



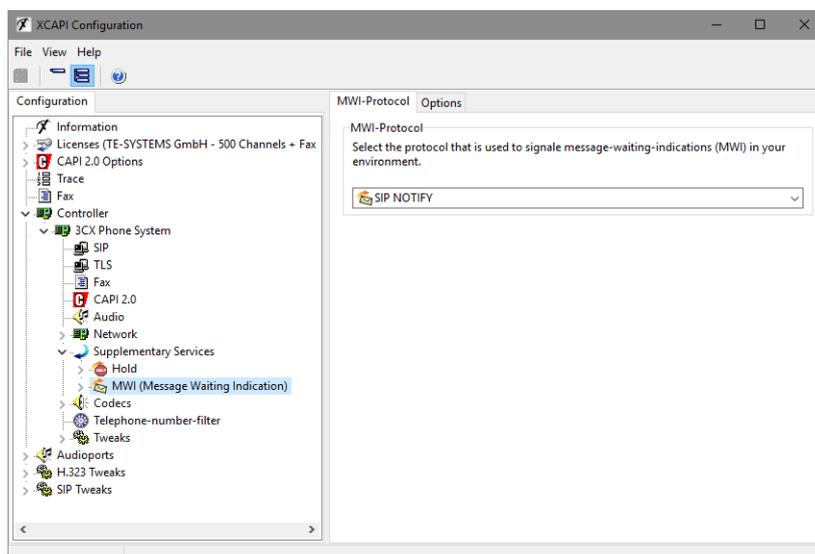
4.3 Call Transfer

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



4.4 Message Waiting Indication

If required, ensure that the MWI support via SIP Notify is enabled. Please check if MWI is operable with the SIP phones and SIP extensions that are connected to the 3CX Phone System.

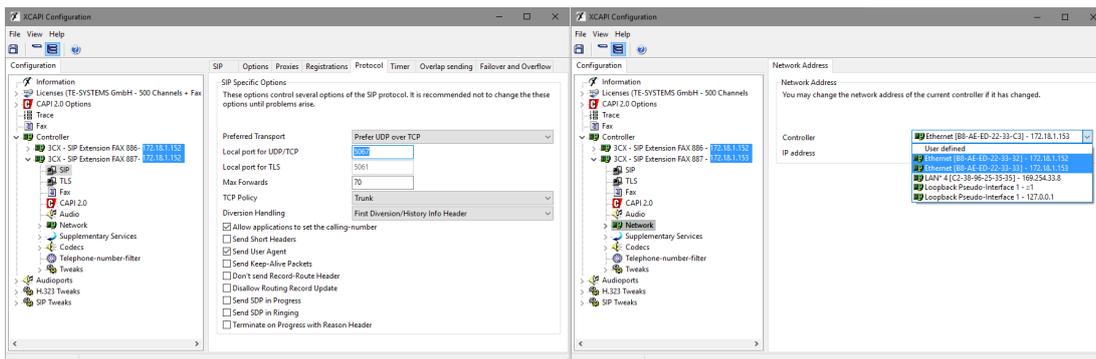


4.5 Multiple XCAPI Controller

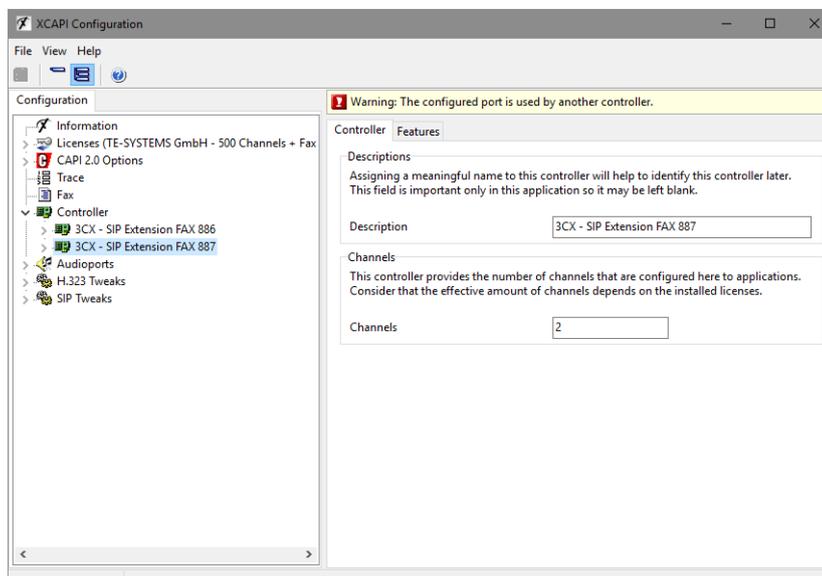
It's possible to use up to 127 XCAPI controllers at once. So multiple SIP extensions could be created, and each XCAPI controller registers as such extension. In this case each of the XCAPI controllers bound Ethernet interface must be related to a unique local listening SIP port (UDP and TCP) and IP address combination. That means, the same local listening port for SIP (by default port 5060) can be used with different NICs (physical or virtual) or different ports must be set for the same NIC.

Please ensure that the multiple controller usage is supported by the bound CAPI 2.0 application and that the network bandwidth is sufficient.

The next screenshot give two examples. One for multiple controllers with using the same NIC and different local listening ports, and another one for using multiple controllers with the same local listening ports and different NICs.



Please note that the XCAPI configuration gives a warning in the case of any IP and port conflicts as shown below.

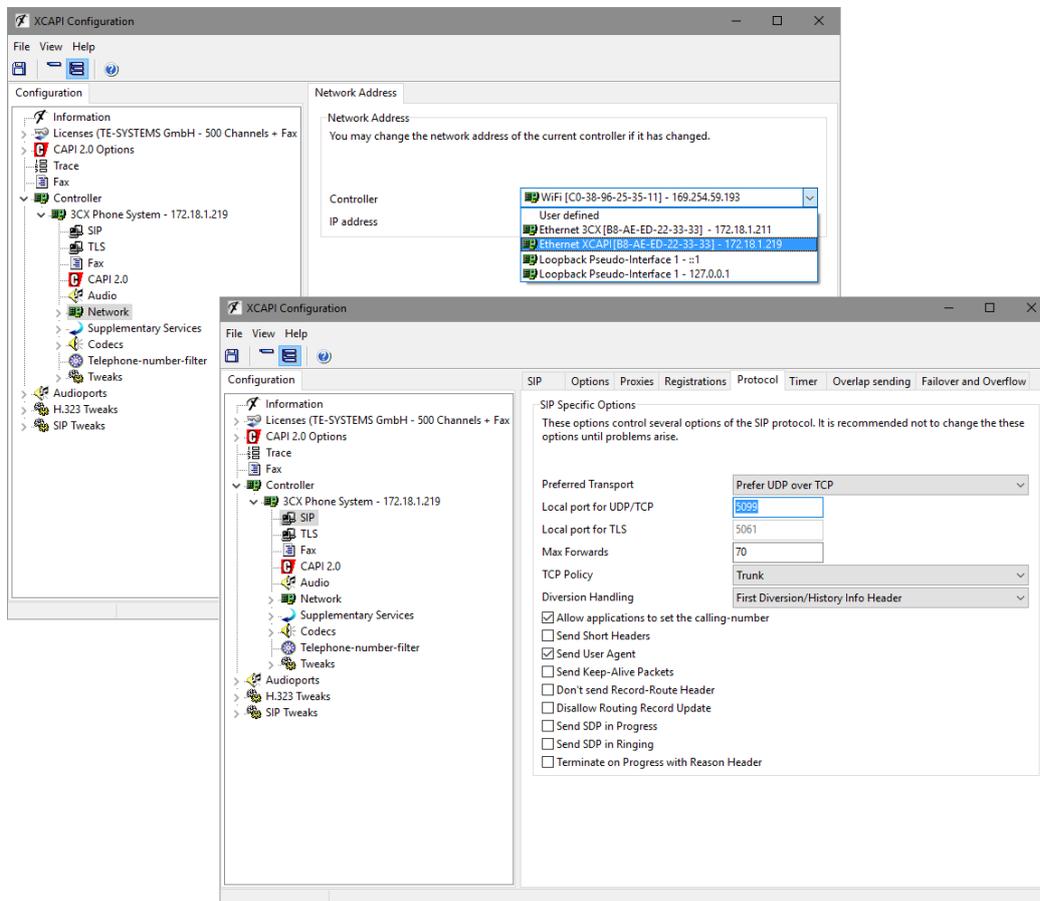


4.6 Running XCAPI on the 3CX Server

It's possible to use XCAPI with its bound CAPI 2.0 application directly on the Microsoft Windows based 3CX Server. In that case, the XCAPI controllers must be set to a local listening SIP port that is not used by the 3CX Phone System or other applications or services. In addition a separate Ethernet interface must be used or at least a second IP address must be set for the available Ethernet controller which has to be related to the XCAPI controller. Using the same interface and ports cause unavoidable conflicts.

It must be ensured that enough bandwidth, CPU and Memory resources are granted for the 3CX Phone System.

The next screenshot shows an example where the 3CX uses IP address 172.18.1.211 with port 5060 SIP. The IP address 172.18.1.219 was added to the NIC and the according Ethernet entry was selected for the XCAPI controller. Ensure that the relevant 3CX IP address 172.18.1.211 (or hostname) must be used as SIP Domain, SIP Proxy and SIP Registrar for the XCAPI controller configuration.



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„MD2, MD4 and MD5 Message Digest Algorithms“ via source code derived from the RSA Data Security, Inc.

„RFC 4634 Secure Hash Algorithm“, via source code derived from the RFC 4634.

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