

TechNote

Unify OpenScape Business V2

April 24, 2017





Introduction

This document is intended to support engineers with the integration of the latest XCAPI version into an existing Unify OpenScope Business environment.

Though being based on the Unify OpenScope Business using firmware R2.1 and XCAPI version 3.6, this document is also almost applicable to other versions with a few adjustments.

The following pages give essential information to allow optimal interworking of both, the Unify OpenScope Business and XCAPI. At this point we suppose that the Unify OpenScope Business environment, the hardware and the operating system where XCAPI and the CAPI 2.0 application is running on, are properly installed and accessible through the IP network.

Additional XCAPI information and documents, for e.g. installation procedures, License on demand, Fax Transmission, Virtual Hardware ID, VMware Virtual Machines, can be found in the TechNote area within our community download section on [XCAPI Website](#).

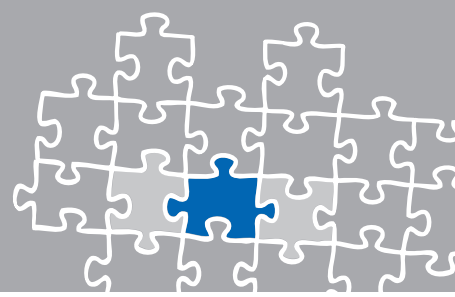
For detailed Unify OpenScope Business configuration procedures, please refer to the respective manufacturer documentations and manuals within the Unify customer support portal.

XCAPI Configuration

Please start up the XCAPI configuration to create a new controller assigned to the Unify OpenScope Business.

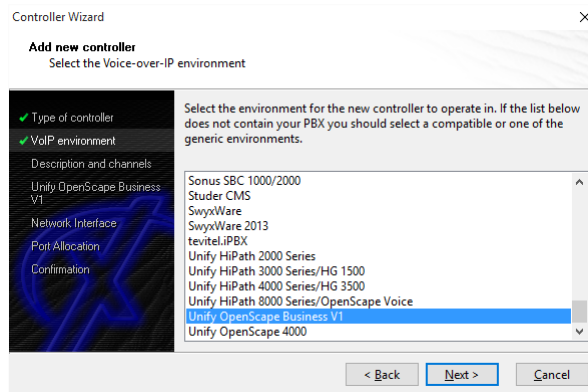
On the first dialog of the XCAPI **Controller Wizard**, select **PBX or other VoIP System** and proceed with the **Next** button.





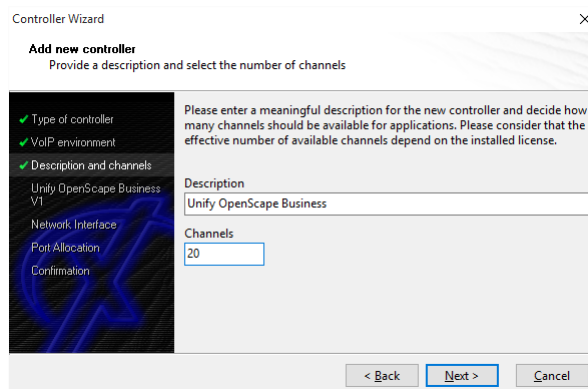
2.1 Voice over IP Environment

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 defaults for the kind of environment you have, saving you a lot of manual configurations. Please select the according **Unify OpenScape Business** entry, which is available from XCAPI version 3.5.0.



2.2 Description and Channels

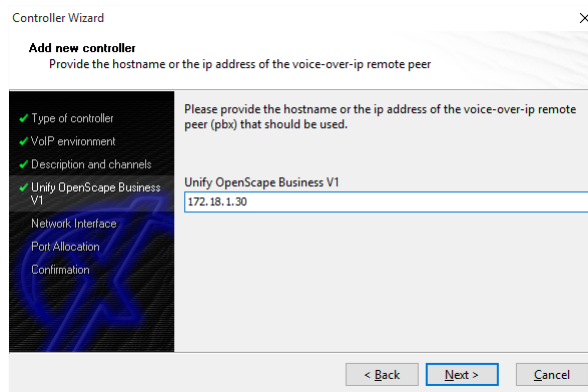
This dialog allows to enter an appropriate controller name and set up the number of available and licensed channels. So please enter the amount of simultaneous channels XCAPI should provide when communicating with the Unify OpenScape Business and the CAPI 2.0 application.





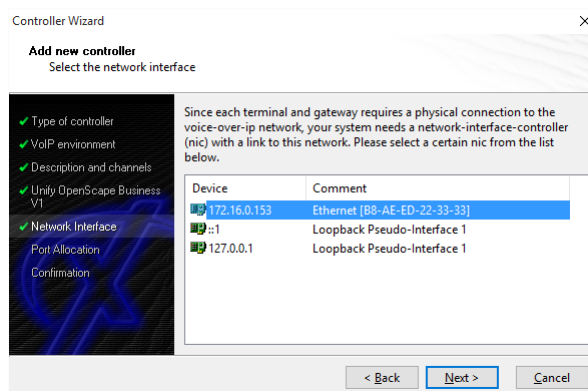
2.3 Gateway Address

Next, the host name or the IP address of the SIP listening Unify OpenScape Business Ethernet interface must be provided. In this example IP address **172.18.1.30** is used. Please note that both, the XCAPI controller and the Unify OpenScape Business, use by default the UDP port 5060 for SIP signaling.



2.4 Network Interface

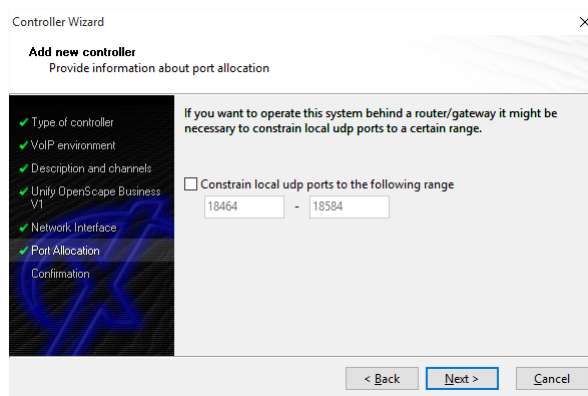
Select the required network interface that'll be used by the newly created XCAPI controller.





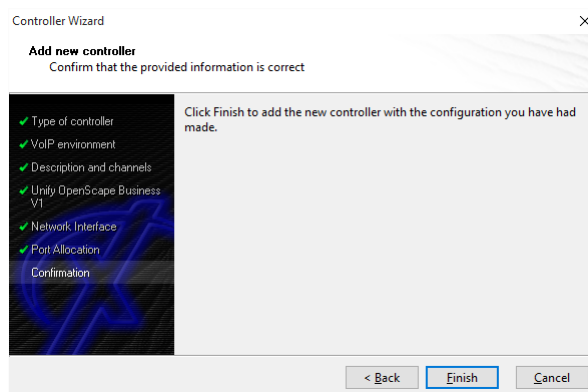
2.5 Port Allocation

On demand a UDP (RTP/T.38) port range can be specified. This port range will be used by the XCAPI controller towards the gateway.



2.6 Confirmation

The final dialog of the controller wizard performs some checks on the configuration parameters you've made. When everything is correct, please use the **Finish** button in order to create the new controller.





The new controller is now listed on the main view and can be finally saved to the XCAPI configuration.



The bound CAPI 2.0 application with its services must always be restarted to take effect on the XCAPI controller changes. Restarting any of the XCAPI services won't help at all. If enabled, the XCAPI diagnostic monitor pop-up with the following message on success:

XCAPI Reinit Notification 2:16:34 PM

The diagnostics application has disconnected itself from the device because the XCAPI has to perform a reinitialization. The diagnostics application will reregister as soon as possible.



Unify OpenScape Business Configuration

In order to establish a connection between XCAPI and the Unify OpenScape Business gateway, you need to setup the XCAPI as **native SIP Server Trunk** with all its appropriate configurations.

3.1 Native SIP Server Trunk

From Unify OpenScape Business V2 the XCAPI SIP trunk must be enabled as **Native SIP Trunk**.

The **Remote Domain Name** and **IP Address / Host name** must be related to the bound Ethernet interface of the XCAPI controller, here **172.16.0.153**. The **Transport protocol** and **Port** is here used with the default **UDP** and **5060**.

Ensure that **Native SIP trunk** is enabled and related to the according **Trunk Identifier in System**, in this example as **ITSP/NS 10**.

Please note that Native SIP Trunking requires a Unify OpenScape Business **Networking** license.

The screenshot shows the configuration for a 'Native SIP Server Trunk'. The left sidebar lists various configuration categories, with 'Native SIP trunk' selected. The main area contains the following settings:

- Trunk Name:** Native SIP trunk
- Enable Trunk:**
- Trunk Identifier in System:** ITSP/NS 10
- Remote Domain Name:** 172.16.0.153
- Transport protocol:** udp
- SIP Server:**
 - IP Address / Host name:** 172.16.0.153
 - Port:** 5060
- STUN Server:**
 - Use STUN:**
 - IP Address / Host name:** (empty)
 - Port:** 5060

3.2 SIP Parameters

The global SIP parameters are used with their default values.

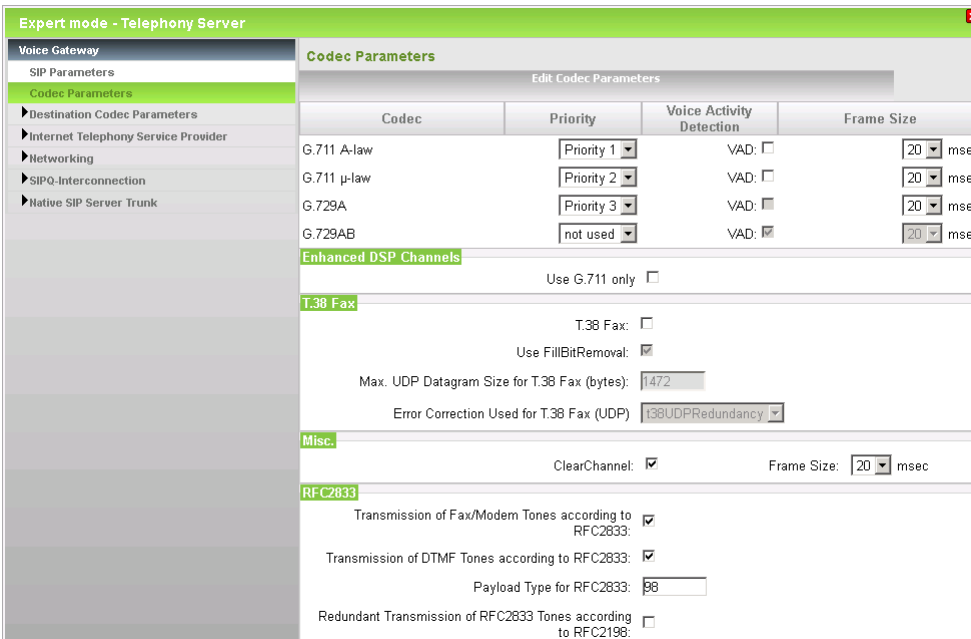
The screenshot shows the configuration for 'SIP Parameters'. The left sidebar lists various configuration categories, with 'SIP Parameters' selected. The main area contains the following settings:

- SIP Transport Protocol:**
 - SIP via TCP:** Yes
 - SIP via UDP:**
 - SIP via TLS:** Yes
- SIP Registrar:**
 - Period of registration (sec):** 120
- RFC 3261 Timer Values:**
 - Transaction Timeout (msec):** 32000
- SIP Session Timer:**
 - RFC 4028 support:**
 - Session Expires (sec):** 1800
 - Minimal SE (sec):** 90
- Provider Calls:**
 - Maximum possible Provider Calls:** 4



3.3 Codec Parameters

Ensure that the codec settings are set conform between the gateway and the XC-API controller. For this, we recommend to review the codec related chapters for **Fax** (starting on [page 15](#)) and **DTMF** (from [page 18](#)).



Expert mode - Telephony Server

Voice Gateway

- SIP Parameters
- Codec Parameters**
 - Destination Codec Parameters
 - Internet Telephony Service Provider
 - Networking
 - SIPQ-Interconnection
 - Native SIP Server Trunk

Codec Parameters

Edit Codec Parameters

Codec	Priority	Voice Activity Detection	Frame Size
G.711 A-law	Priority 1	VAD: <input type="checkbox"/>	20 msec
G.711 μ-law	Priority 2	VAD: <input type="checkbox"/>	20 msec
G.729A	Priority 3	VAD: <input type="checkbox"/>	20 msec
G.729AB	not used	VAD: <input checked="" type="checkbox"/>	20 msec

Enhanced DSP Channels

Use G.711 only:

T.38 Fax

T.38 Fax:

Use FillBitRemoval:

Max. UDP Datagram Size for T.38 Fax (bytes): 1472

Error Correction Used for T.38 Fax (UDP): 138UDPRedundancy

Misc.

ClearChannel: Frame Size: 20 msec

RFC2833

Transmission of Fax/Modem Tones according to RFC2833:

Transmission of DTMF Tones according to RFC2833:

Payload Type for RFC2833: 98

Redundant Transmission of RFC2833 Tones according to RFC2198:

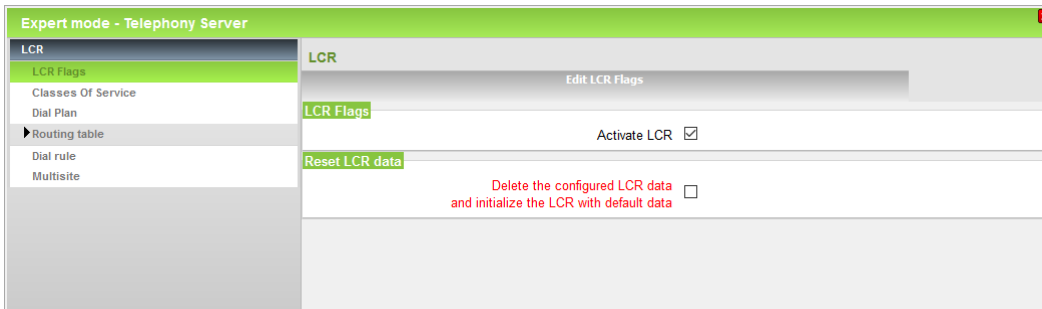


Please note that **Transmission of Fax/Modem Tones according to RFC2833** has to be enabled for fax interoperability. **Redundant Transmission of RFC2833 Tones according to RFC2198** must be disabled.



3.4 LCR

This test environment makes use of the **LCR** (Automatic Least Cost Routing).



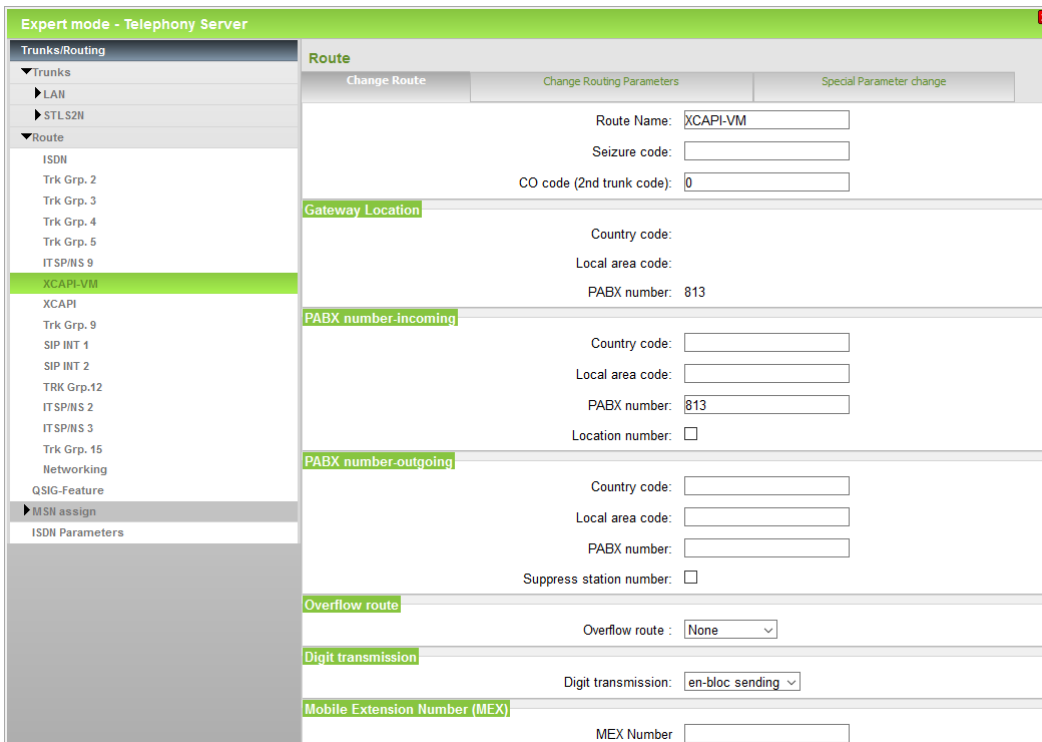
The screenshot shows the 'Expert mode - Telephony Server' interface with the 'LCR' section selected in the left sidebar. The main content area is titled 'LCR' and contains the following elements:

- Edit LCR Flags** button
- LCR Flags** section with an **Activate LCR** checkbox, which is checked.
- Reset LCR data** section with a checkbox labeled **Delete the configured LCR data and initialize the LCR with default data**, which is unchecked.

3.5 Routes

For this test environment the XCAPI route is used as shown below.

Of course the local VoIP environment needs additional configurations and adjustments for a closed or open numbering scheme. The same goes for the **Routing Parameters**, **Special Parameters** and **Dial Plan** configurations.



The screenshot shows the 'Expert mode - Telephony Server' interface with the 'Route' section selected in the left sidebar. The main content area is titled 'Route' and contains the following configuration fields:

- Change Route** | **Change Routing Parameters** | **Special Parameter change** tabs
- Route Name:** XCAPI-VM
- Seizure code:** [empty]
- CO code (2nd trunk code):** 0
- Gateway Location** section:
 - Country code:** [empty]
 - Local area code:** [empty]
 - PABX number:** 813
- PABX number-incoming** section:
 - Country code:** [empty]
 - Local area code:** [empty]
 - PABX number:** 813
 - Location number:** [empty]
- PABX number-outgoing** section:
 - Country code:** [empty]
 - Local area code:** [empty]
 - PABX number:** [empty]
 - Suppress station number:** [empty]
- Overflow route** section:
 - Overflow route:** None
- Digit transmission** section:
 - Digit transmission:** en-bloc sending
- Mobile Extension Number (MEX)** section:
 - MEX Number:** [empty]



3.6 Dial Plan

The according dial plan configuration for the XCAPI is here used with dialed digits **81XZ** and related to the **Routing Table** number **36**.

Dial Plan	Name	Dialed digits	Routing Table	Acc. code	Classes of service	Emergency
36	XCAPI	81XZ	36	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
37			-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
38			-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
39			-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
40			-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
41			-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
42			-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
43			-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

3.7 Dial Rule

The XCAPI related **Dial Rule** entry is here used as shown next.

Rule Name	Dial rule format	Network access	Type
36 XCAPI	E1A	Corporate Network	Unknown
37		Unknown	Unknown
38		Unknown	Unknown
39		Unknown	Unknown
40		Unknown	Unknown

3.8 Routing Table

The XCAPI's **Routing Table** is set to the according **Route** and **Dial Plan** definitions. On demand **min. COS**, **Warning**, **Dedicated Gateway** and **GW Node ID** must be specified.

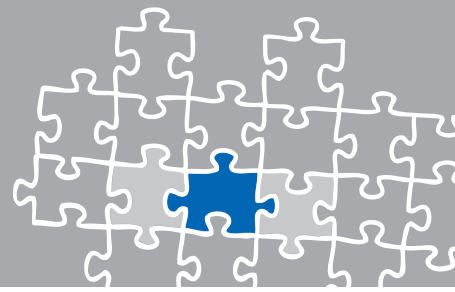
Index	Dedicated Route	Route	Dial Rule	min. COS	Warning	Dedicated Gateway	GW Node ID
1	<input type="checkbox"/>	XCAPI-VM	XCAPI	15	None	No	
2	<input type="checkbox"/>	None	None	15	None	No	
3	<input type="checkbox"/>	None	None	15	None	No	
4	<input type="checkbox"/>	None	None	15	None	No	



3.9 Routing Parameters

For this test environment the **Routing** and **Special Parameters** are used as shown next. Again, we have to mention that all the numbering configurations must be set upon local requirements.

The **Special Parameters** are used as shown below.



3.10 IP Trunks

The IP trunks must be added and related to the according XCAPI route.

Expert mode - Telephony Server

Trunks:Routing

- ▼ Trunks
- ▼ LAN
- ▼ Box: 1, Slot: 1
- ▶ Port 3 Networking
- ▶ Port 4 SIPQ-Interconnection 1
- ▶ Port 5 SIPQ-Interconnection 2
- ▶ Port 7 ITSP/NS 1
- ▶ Port 8 ITSP/NS 2
- ▶ Port 9 ITSP/NS 3
- ▶ Port 10 ITSP/NS 4
- ▶ Port 11 ITSP/NS 5
- ▶ Port 12 ITSP/NS 6
- ▶ Port 13 ITSP/NS 7
- ▶ Port 14 ITSP/NS 8
- ▶ Port 15 ITSP/NS 9
- ▶ Port 16 ITSP/NS 10
- ◆ 7805 0-16-5
 - ◆ 7806 0-16-6
 - ◆ 7807 0-16-7
 - ◆ 7808 0-16-8
 - ◆ 7811 0-16-11
 - ◆ 7812 0-16-12
 - ◆ 7750 0-16-13
 - ◆ 7751 0-16-14
 - ◆ 7752 0-16-15
 - ◆ 7753 0-16-16
- ▶ STLS2N
- ▶ Route
- OSIG-Feature
- ▶ MSN assign
- ISDN Parameters

Trunks

add line

Trunk	Box-SI-Pt-Li	Code	Route	Status	Type
Line 5	LAN 1-0-16-7	7805	XCAPI-VM	active	ITSP/NS 10
Line 6	LAN 1-0-16-8	7806	XCAPI-VM	active	ITSP/NS 10
Line 7	LAN 1-0-16-9	7807	XCAPI-VM	active	ITSP/NS 10
Line 8	LAN 1-0-16-10	7808	XCAPI-VM	active	ITSP/NS 10
Line 11	LAN 1-0-16-1	7811	XCAPI-VM	active	ITSP/NS 10
Line 12	LAN 1-0-16-2	7812	XCAPI-VM	active	ITSP/NS 10
Line 13	LAN 1-0-16-3	7750	XCAPI-VM	active	ITSP/NS 10
Line 14	LAN 1-0-16-4	7751	XCAPI-VM	active	ITSP/NS 10
Line 15	LAN 1-0-16-5	7752	XCAPI-VM	active	ITSP/NS 10
Line 16	LAN 1-0-16-6	7753	XCAPI-VM	active	ITSP/NS 10



Please note that a newly created Native SIP trunk may require a gateway reboot to become active.



3.11 System Parameter Flags

The Transit permission flags must be enabled, others upon local requirements.



The screenshot shows the 'Expert mode - Telephony Server' configuration window. The left sidebar lists various settings categories, with 'System Flags' selected. The main area displays a list of system flags with checkboxes, many of which are checked. The flags are grouped into sections: 'System flags', 'Open numbering scheme', 'Transit permission', 'Special switch', and 'Restriction for UC calls'.

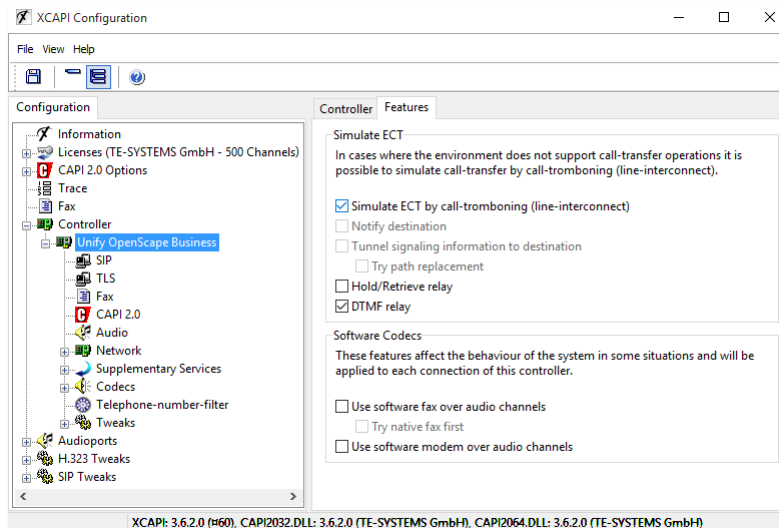
Section	Flag Name	Status
System flags	Through-connection for external FWD on:	<input checked="" type="checkbox"/>
	Call forwarding to main station interface permitted:	<input type="checkbox"/>
	Hunting to external call forwarding destination:	<input checked="" type="checkbox"/>
	Conference tone:	<input type="checkbox"/>
	Warning signal for call pickup groups:	<input checked="" type="checkbox"/>
	Increase volume for optiPoint/OpenStage terminals:	<input type="checkbox"/>
	Relocate allowed:	<input type="checkbox"/>
	More than 1 external conference member:	<input checked="" type="checkbox"/>
	Trunk reservation, automatic:	<input checked="" type="checkbox"/>
	No. redial with a/c code:	<input type="checkbox"/>
	Simplified dialing:	<input type="checkbox"/>
	Use only default number for MSN:	<input type="checkbox"/>
	Path optimization:	<input checked="" type="checkbox"/>
	DTMF automatic:	<input checked="" type="checkbox"/>
	Broadcast with connection:	<input type="checkbox"/>
	Tone from CO:	<input type="checkbox"/>
	Ringback protection:	<input type="checkbox"/>
	Euro-impedance:	<input type="checkbox"/>
	Different phonemail messages Day/Night:	<input type="checkbox"/>
	Display international / national code number:	<input type="checkbox"/>
	Line change for direct call:	<input type="checkbox"/>
	Automatic redial:	<input type="checkbox"/>
	Voice mail Node call number:	<input type="checkbox"/>
	Call Pickup after automatic recall:	<input type="checkbox"/>
	Configurable CLIP:	<input checked="" type="checkbox"/>
Caller list at destination in case of Forward Line:	<input type="checkbox"/>	
Call forwarding after deflect call / single step transfer:	<input checked="" type="checkbox"/>	
Follow call management in case of deflect call / single step transfer:	<input checked="" type="checkbox"/>	
Warning tone during voice recording:	<input checked="" type="checkbox"/>	
E.164 numbering scheme:	<input type="checkbox"/>	
Extended Key Functionality:	<input type="checkbox"/>	
Calling number in pick-up groups / ringing groups / CFN /RNA:	<input checked="" type="checkbox"/>	
SPE support:	<input type="checkbox"/>	
SPE advisory tone:	<input type="checkbox"/>	
SIP Prov. to SIP Prov. transit:	<input checked="" type="checkbox"/>	
Transparent dialing of * and # on trunk interfaces:	<input checked="" type="checkbox"/>	
Add seizure code for MEX:	<input type="checkbox"/>	
CMI MWI Ringer:	<input type="checkbox"/>	
Automatic OpenStage TDM Phone Software Update:	<input checked="" type="checkbox"/>	
Restrict indirect trunk group connections according to CON Matrix:	<input type="checkbox"/>	
Open numbering scheme	active:	<input type="checkbox"/>
	Node callnumber:	<input type="text"/>
Transit permission	Feature transit:	<input checked="" type="checkbox"/>
	Tie traffic transit:	<input checked="" type="checkbox"/>
	External traffic transit:	<input checked="" type="checkbox"/>
Special switch	CALL PROC no send:	<input type="checkbox"/>
	Automatic, cyclical line seizure:	<input checked="" type="checkbox"/>
Restriction for UC calls	Restriction for UC calls:	<input type="checkbox"/>



Simulated Call Transfer

The **Call Transfer** service can be simulated by the XCAPI. Whenever the CAPI application initiates a call transfer between two active participants, the XCAPI starts triggering the call transfer simulation. During this simulation two b-channels are occupied, but from application side the calls are released such as in a real call transfer scenario.

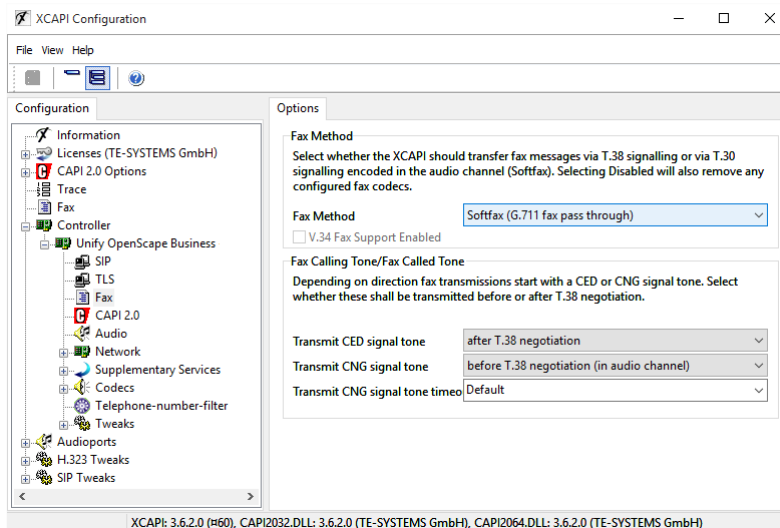
Please review the **Features** tab of the respective XCAPI controller and ensure that the **Simulate ECT by call-tromboning (line-interconnect)** parameter is enabled.





Softfax (G.711 fax pass through)

With the Softfax mode, the XCAPI simulates an analogue facsimile device by transmitting modulated fax-signals modem-like through the established G.711 audio channels. For this please check the XCAPI controller configuration tab labeled **Fax** and ensure that **Softfax (G.711 fax pass through)** is selected as **Fax Method**.





The **Codec Parameter** dialog should be set as shown below. For appropriate fax interworking the **T.38 Fax** flag must be disabled, at least for the Unify OpenScape Business firmware R2.1.

Expert mode - Telephony Server

Voice Gateway

- SIP Parameters
- Codec Parameters**
 - Destination Codec Parameters
 - Internet Telephony Service Provider
 - Networking
 - SIPQ-Interconnection
 - Native SIP Server Trunk

Codec Parameters

Edit Codec Parameters

Codec	Priority	Voice Activity Detection	Frame Size
G.711 A-law	Priority 1	VAD: <input type="checkbox"/>	20 msec
G.711 μ-law	Priority 2	VAD: <input type="checkbox"/>	20 msec
G.729A	Priority 3	VAD: <input checked="" type="checkbox"/>	20 msec
G.729AB	not used	VAD: <input checked="" type="checkbox"/>	20 msec

Enhanced DSP Channels

Use G.711 only:

T.38 Fax

T.38 Fax:

Use FillBitRemoval:

Max. UDP Datagram Size for T.38 Fax (bytes): 1472

Error Correction Used for T.38 Fax (UDP): 138UDPRedundancy

Misc.

ClearChannel: Frame Size: 20 msec

RFC2833

Transmission of Fax/Modem Tones according to RFC2833:

Transmission of DTMF Tones according to RFC2833:

Payload Type for RFC2833: 98

Redundant Transmission of RFC2833 Tones according to RFC2198:



For Softfax please ensure that **T.38 Fax** is disabled for appropriate interworking. Further the option **Transmission of Fax/Modem Tones according to RFC2833** is enabled and **Redundant Transmission of RFC2833 Tones according to RFC2198** is disabled.



T.38

As shown next, the **T.38 Fax** flag must be set for the Unify OpenScape Business and selected as **Fax Method** for the XCAPI controller.

Codec	Priority	Voice Activity Detection	Frame Size
G.711 A-law	Priority 1	VAD: <input type="checkbox"/>	20 msec
G.711 μ-law	Priority 2	VAD: <input type="checkbox"/>	20 msec
G.729A	Priority 3	VAD: <input type="checkbox"/>	20 msec
G.729AB	not used	VAD: <input checked="" type="checkbox"/>	20 msec

Enhanced DSP Channels
Use G.711 only

T.38 Fax
T.38 Fax:
Use FillBitRemoval:
Max. UDP Datagram Size for T.38 Fax (bytes): 1472
Error Correction Used for T.38 Fax (UDP): t38UDPRedundancy

Misc.
ClearChannel: Frame Size: 20 msec

RFC2833
Transmission of Fax/Modem Tones according to RFC2833:
Transmission of DTMF Tones according to RFC2833:
Payload Type for RFC2833: 96
Redundant Transmission of RFC2833 Tones according to RFC2196:

XCAPI Configuration

File View Help

Configuration

- Information
- Licenses (TE-SYSTEMS GmbH)
- CAPI 2.0 Options
- Trace
- Fax
- Controller
 - Unify OpenScape Business
 - SIP
 - TLS
 - Fax
 - CAPI 2.0
 - Audio
 - Network
 - Supplementary Services
 - Codecs
 - Telephone-number-filter
 - Tweaks
 - Audioports
 - H.323 Tweaks
 - SIP Tweaks

Options

Fax Method
Select whether the XCAPI should transfer fax messages via T.38 signalling or via T.30 signalling encoded in the audio channel (Softfax). Selecting Disabled will also remove any configured fax codecs.
Fax Method: T.38
 V.34 Fax Support Enabled

Fax Calling Tone/Fax Called Tone
Depending on direction fax transmissions start with a CED or CNG signal tone. Select whether these shall be transmitted before or after T.38 negotiation.
Transmit CED signal tone: after T.38 negotiation
Transmit CNG signal tone: before T.38 negotiation (in audio channel)
Transmit CNG signal tone time: Default

XCAPI: 3.6.2.0 (t460), CAPI2032.DLL: 3.6.2.0 (TE-SYSTEMS GmbH), CAPI2064.DLL: 3.6.2.0 (TE-SYSTEMS GmbH)



Please also check with the Unify OpenScape Business documentation for T.38 related limitations and recommendations for fax support.



DTMF

The Parameter **Transmission of DTMF Tones according to RFC2833** must be enabled.
The **Payload Type** for RFC2833 value must be conform to the one of the XCAPI controller.
By default both should be set to value **98**.

The screenshot shows the 'Expert mode - Telephony Server' configuration window. The left sidebar shows a tree view with 'Codec Parameters' selected. The main area is divided into several sections:

- Codec Parameters:** A table with columns for Codec, Priority, Voice Activity Detection, and Frame Size.

Codec	Priority	Voice Activity Detection	Frame Size
G.711 A-law	Priority 1	VAD: <input type="checkbox"/>	20 msec
G.711 μ-law	Priority 2	VAD: <input type="checkbox"/>	20 msec
G.729A	Priority 3	VAD: <input type="checkbox"/>	20 msec
G.729AB	not used	VAD: <input checked="" type="checkbox"/>	20 msec
- Enhanced DSP Channels:** 'Use G.711 only'
- T.38 Fax:** 'T.38 Fax' ; 'Use FillBitRemoval' ; 'Max. UDP Datagram Size for T.38 Fax (bytes):' 1472; 'Error Correction Used for T.38 Fax (UDP):' 138UDPRedundancy
- Misc.:** 'ClearChannel' ; 'Frame Size' 20 msec
- RFC2833:** 'Transmission of Fax/Modem Tones according to RFC2833' ; 'Transmission of DTMF Tones according to RFC2833' ; 'Payload Type for RFC2833:' 98; 'Redundant Transmission of RFC2833 Tones according to RFC2198'

Please review the according codec within the XCAPI controller configuration.

The screenshot shows the 'XCAPI Configuration' window. The left sidebar shows a tree view with 'Telephone-Event (RFC 2833)' selected. The main area shows the 'Options' tab for this configuration, with the 'Payload Type' option set to 98.

XCAPI Configuration

Configuration

- Information
- Licenses (TE-SYSTEMS GmbH - 500 Channels + Fax)
- CAPI 2.0 Options
- Trace
- Fax
- Controller
 - Unify OpenScape Business
 - SIP
 - TLS
 - Fax
 - CAPI 2.0
 - Audio
 - Network
 - Supplementary Services
 - Codecs
 - ITU G.711 A-Law [64 kbit] (8000 Hz)
 - ITU G.711 μ-Law [64 kbit] (8000 Hz)
 - ETSI GSM 6.10
 - ITU G.729
 - T.38 - UDP
 - Telephone-Event (RFC 2833)
 - Telephone-number-filter
 - Tweaks
 - Audioports
 - H.323 Tweaks
 - SIP Tweaks

Options

Payload Type
Define the payload-type that should be used to receive telephone-events sent by remote terminals.

Payload-Type (0-127):
Recommendation

XCAPI: 3.6.2.0 (H60), CAPI2032.DLL: 3.6.2.0 (TE-SYSTEMS GmbH), CAPI2064.DLL: 3.6.2.0 (TE-SYSTEMS GmbH)



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