TechNote

Avaya Aura Communication Manager

February 20, 2013

XCAPI voiceoverIP

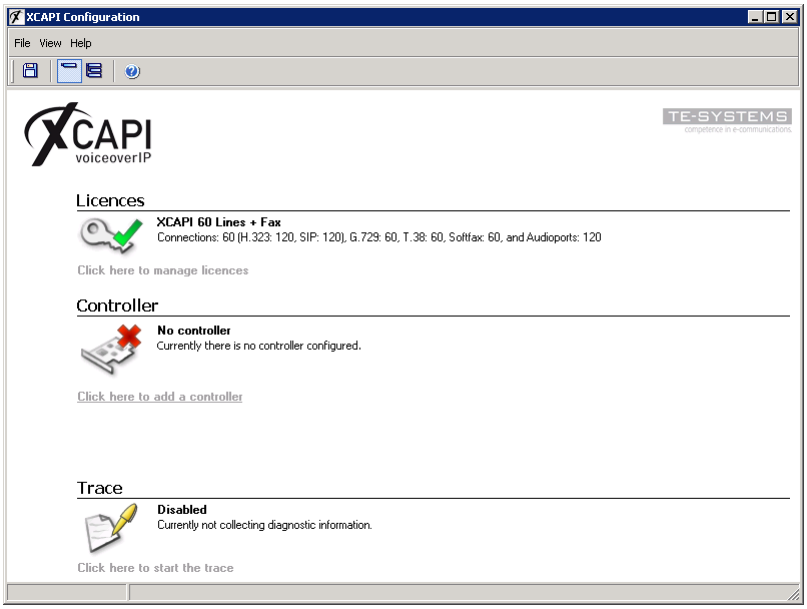
XCAPI Configuration

All in all the XCAPI installation and configuration is an easy process. Please take note of the following documents for additional information about XCAPI related topics:

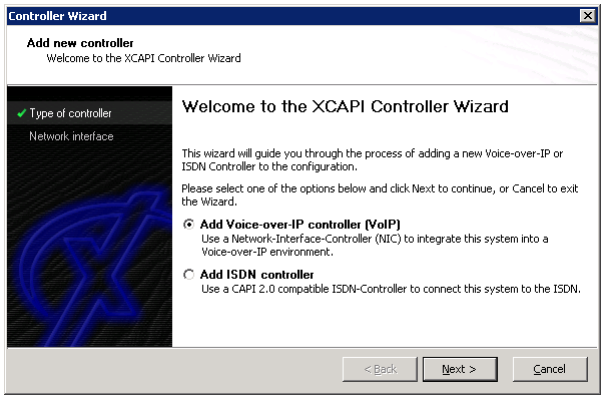
- **XCAPI TechNote (en) - Quick Start Guide.pdf**
- **XCAPI TechNote (en) - VMware Virtual Machines.pdf**
- **XCAPI TechNote (en) - Microsoft Hyper-V.pdf**
- **XCAPI TechNote (en) - XCAPI and Firewalls.pdf**

Please start up the XCAPI configuration to create a new controller assigned to the Avaya Aura Communication Manager.

If you've just installed the XCAPI and start the configuration tool for the first time, the XCAPI controller wizard will pop up automatically. This will also happen if there's no controller configured at all. To start up the XCAPI controller wizard on your own, just click the hyperlink labeled **Click here to add a controller** on the main page of the XCAPI configuration tool.

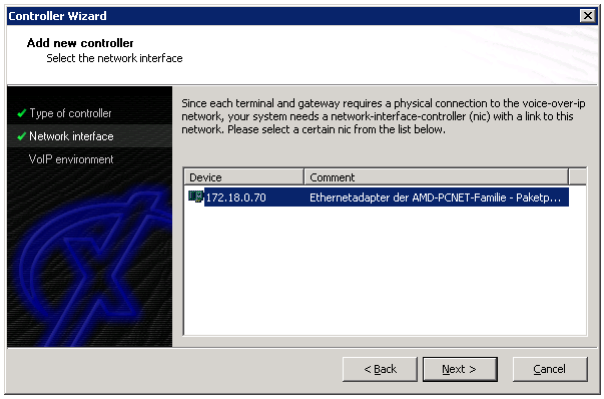


On the first dialog of the controller wizard please select the **Add Voice-over-IP controller (VoIP)** option and continue by clicking on the **Next** button.



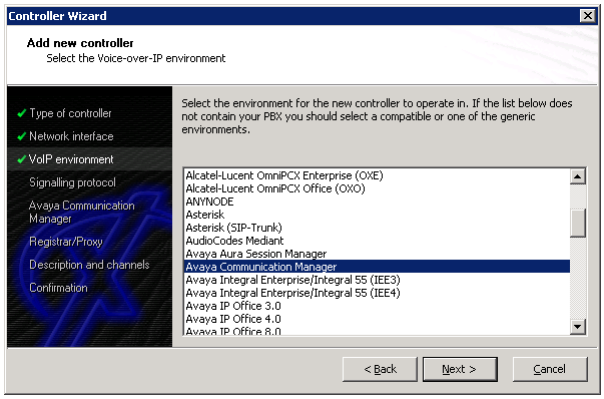
1.1 Network Interface

The second dialog of the controller wizard allows selecting the network interface adapter.



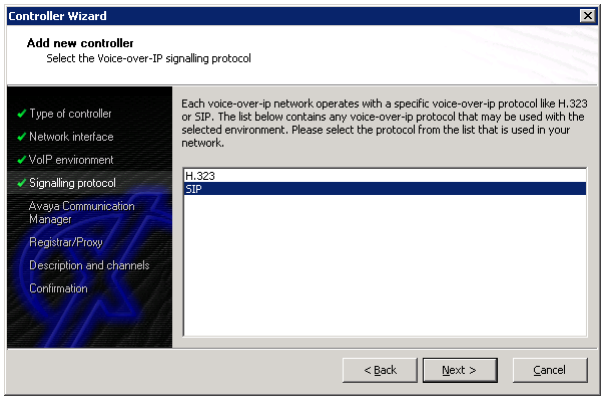
1.2 Voice over IP Environment

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 presets for the kind of environment you have, sparing you quite a lot of manual configuration.



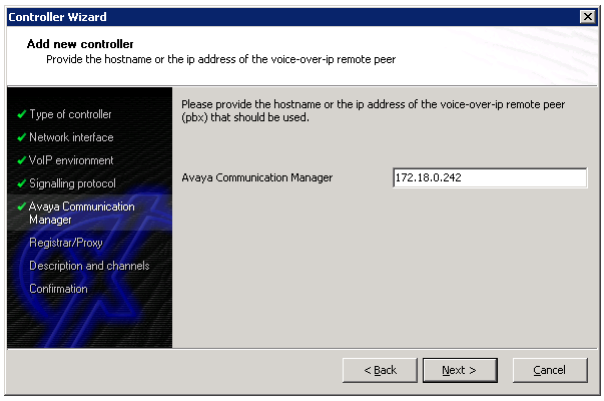
1.3 Signaling Protocol

Please select the appropriate signaling protocol used for this VoIP environment.



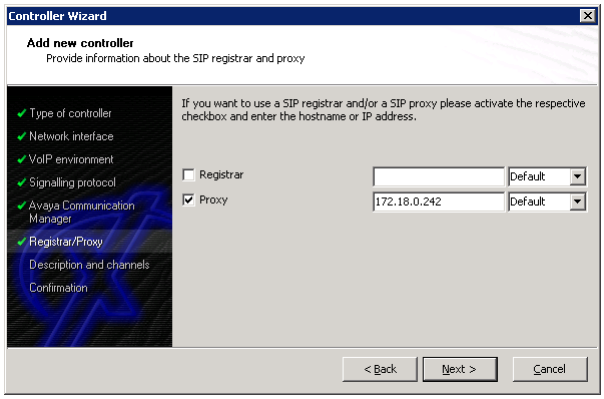
1.4 Gateway Address

Please provide the host name or the IP address (In this example **172.18.0.242** of procr) of the SIP listening Avaya Aura Communication Manager Ethernet interface.



1.5 SIP Registrar and Proxy

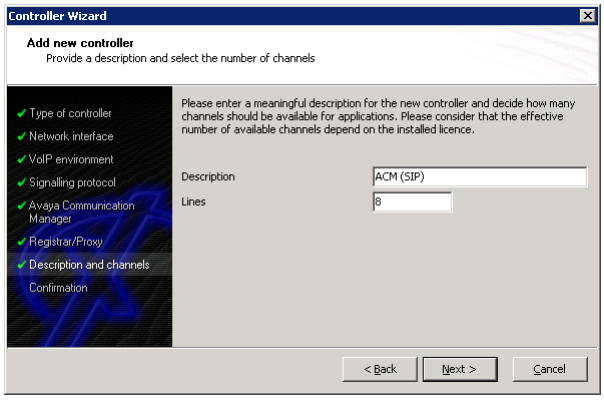
You have to enter the proxy information which is here again the IP address of the procr.



1.6 Description and Channels

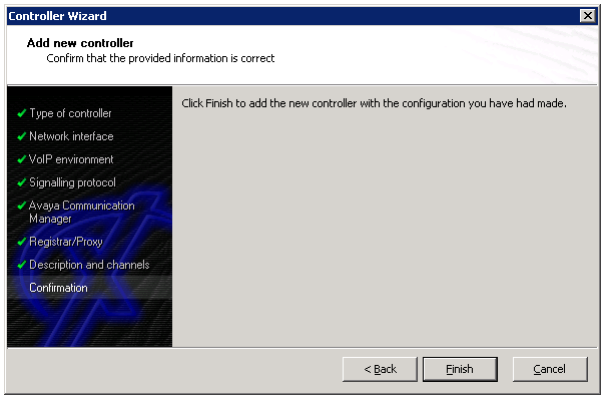
The next-to-final dialog of the controller wizard allows you to configure a meaningful description for the controller you're going to create.

This dialog, however, also allows configuring the number of channels that the new controller will be able to provide. Please enter how many simultaneous connections the XCAPI should handle when communicating with the Avaya Aura Communication Manager.

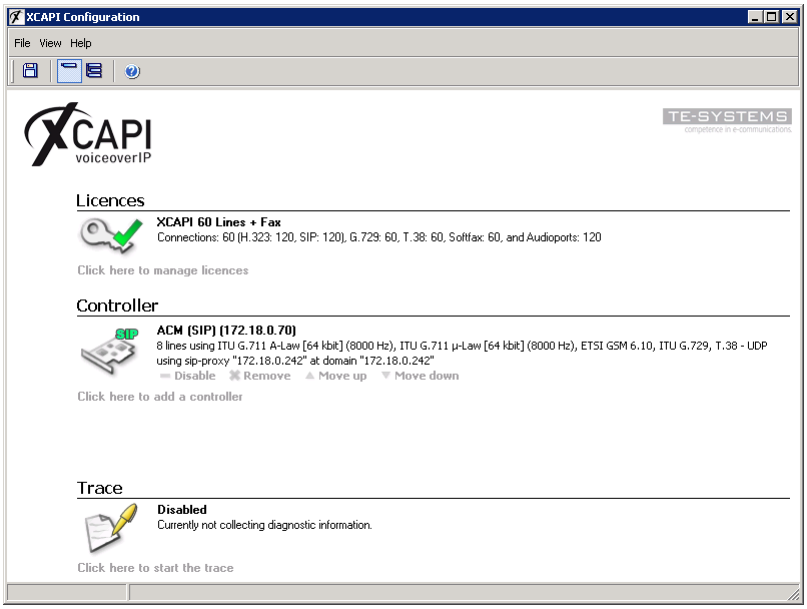


1.7 Confirmation

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



Finally you can save the new created controller which appears now on main view of the XCAPI configuration.



You always need to restart the bound CAPI application, in meaning of its services, for the changes to take effect.

Avaya ACM Configuration

In order to enable the communication between the ACM and the XCAPI, the appropriate SIP trunk configuration must be provided. This chapter reviews the essential SIP trunk configuration, where the ACM covers the typical gateway tasks such as VoIP trunking, codec settings and numbering analyzing. This configuration must of course be adjusted to your VoIP environment.

2.1 Licenses

Please review the ACM's license availability (Maximum Administered SIP Trunks) within the **system-parameters customer-options**.

```
display system-parameters customer-options                    Page   2 of  10
                                OPTIONAL FEATURES

IP PORT CAPACITIES                                               USED
                     Maximum Administered H.323 Trunks: 4000  30
               Maximum Concurrently Registered IP Stations: 2400  2
                 Maximum Administered Remote Office Trunks: 4000  0
Maximum Concurrently Registered Remote Office Stations: 2400  0
                 Maximum Concurrently Registered IP eCons: 50    0
  Max Concur Registered Unauthenticated H.323 Stations: 100   0
                      Maximum Video Capable H.323 Stations: 2400  0
                       Maximum Video Capable IP Softphones: 0     0
                           Maximum Administered SIP Trunks: 4000  69
  Maximum Administered Ad-hoc Video Conferencing Ports: 4000  0
   Maximum Number of DS1 Boards with Echo Cancellation: 80    1
                             Maximum TN2501 VAL Boards: 10    0
                     Maximum Media Gateway VAL Sources: 50    0
            Maximum TN2602 Boards with 80 VoIP Channels: 128   0
           Maximum TN2602 Boards with 320 VoIP Channels: 128   0
   Maximum Number of Expanded Meet-me Conference Ports: 0     0

       (NOTE: You must logoff & login to effect the permission changes.)
```

2.2 System Parameters

For allowing trunk-to-trunk connections and call forwarding to remote locations, you have to ensure that the **Trunk-to-Trunk Transfer** parameter is set to **all**.

```
display system-parameters features                            Page   1 of  19
                            FEATURE-RELATED SYSTEM PARAMETERS
                               Self Station Display Enabled? y
                                    Trunk-to-Trunk Transfer: all
                 Automatic Callback with Called Party Queuing? n
    Automatic Callback - No Answer Timeout Interval (rings): 3
                        Call Park Timeout Interval (minutes): 10
        Off-Premises Tone Detect Timeout Interval (seconds): 20
                                 AAR/ARS Dial Tone Required? n
                             Music/Tone on Hold: tone
              Music (or Silence) on Transferred Trunk Calls? all
                       DID/Tie/ISDN/SIP Intercept Treatment: attd
    Internal Auto-Answer of Attd-Extended/Transferred Calls: transferred
                  Automatic Circuit Assurance (ACA) Enabled? n



            Abbreviated Dial Programming by Assigned Lists? n
       Auto Abbreviated/Delayed Transition Interval (rings): 2
                    Protocol for Caller ID Analog Terminals: Bellcore
   Display Calling Number for Room to Room Caller ID Calls? n
```

2.3 Node Names IP

In this example, **XCAPI** is assigned to 172.18.0.70 which will be utilized in the signaling group, as described in the same named chapter starting on page 13.

```
change node-names ip                                          Page   1 of   2
                                IP NODE NAMES
    Name                         IP Address
ANYNODE                      172.16.3.153
ASM                          172.18.3.249
XCAPIasGK                    172.18.3.61
procr                        172.18.0.242
procr6                       ::
xcapi-h323                   172.18.0.71
xcapi-sip                    172.18.0.70
( 9  of 9    administered node-names were displayed )
Use 'list node-names' command to see all the administered node-names
Use 'change node-names ip xxx' to change a node-name 'xxx' or add a node-name
```

2.4 Codec Sets

The codec settings hast to adapted to your VoIP environment. This example uses **ip-codec-set 1** as shown next. In the case of different network regions and codec set relations, the codecs should be set consistently.

```
change ip-codec-set 1                                         Page   1 of   2

                        IP Codec Set

   Codec Set: 1

   Audio          Silence      Frames   Packet
   Codec          Suppression  Per Pkt  Size(ms)
1: G.711A         n            2          20
2:
3:
4:
5:
6:
7:

    Media Encryption
1: none
2:
3:
change ip-codec-set 1                                         Page   2 of   2

                        IP Codec Set

                            Allow Direct-IP Multimedia? n


                     Mode                 Redundancy
   FAX               off                  0
   Modem             off                  0
   TDD/TTY           off                  0
   Clear-channel     n                    0
```

2.5 IP Network Region

The **ip-network-region** configuration dialog specifies the relations of the within- and between-region connectivity in the given IP region and its related VoIP resources and endpoints. The first page of this configuration dialog is used for the audio and QoS (Quality of Services) settings. Here, the **Authoritative Domain** is not set at all.

Ensure the appropriate **Inter Network Region Connection Management** relations.

```
change ip-network-region 65                                   Page   1 of  20
                                IP NETWORK REGION
  Region: 65
Location:        Authoritative Domain:
    Name: XCAPI
MEDIA PARAMETERS                  Intra-region IP-IP Direct Audio: yes
     Codec Set: 1                 Inter-region IP-IP Direct Audio: yes
   UDP Port Min: 2048                        IP Audio Hairpinning? n
   UDP Port Max: 3329
DIFFSERV/TOS PARAMETERS
 Call Control PHB Value: 46
        Audio PHB Value: 46
        Video PHB Value: 26
802.1P/Q PARAMETERS
 Call Control 802.1p Priority: 6
        Audio 802.1p Priority: 6
        Video 802.1p Priority: 5      AUDIO RESOURCE RESERVATION PARAMETERS
H.323 IP ENDPOINTS                                         RSVP Enabled? n
  H.323 Link Bounce Recovery? y
 Idle Traffic Interval (sec): 20
   Keep-Alive Interval (sec): 5
            Keep-Alive Count: 5
change ip-network-region 65                                   Page   2 of  20
                                IP NETWORK REGION

 RTCP Reporting Enabled? n


change ip-network-region 65                                   Page   3 of  20
                                IP NETWORK REGION

INTER-GATEWAY ALTERNATE ROUTING / DIAL PLAN TRANSPARENCY
 Incoming LDN Extension:
 Conversion To Full Public Number - Delete:    Insert:
 Maximum Number of Trunks to Use for IGAR:
 Dial Plan Transparency in Survivable Mode? n

BACKUP SERVERS(IN PRIORITY ORDER)    H.323 SECURITY PROFILES
 1                                   1   any-auth
 2                                   2
 3                                   3
 4                                   4
 5
 6                                   Allow SIP URI Conversion? y

TCP SIGNALING LINK ESTABLISHMENT FOR AVAYA H.323 ENDPOINTS
   Near End Establishes TCP Signaling Socket? y
                        Near End TCP Port Min: 61440
                        Near End TCP Port Max: 61444

change ip-network-region 65                                   Page   4 of  20

 Source Region: 99    Inter Network Region Connection Management      I         M
                                                                     G   A     t
 dst codec direct   WAN-BW-limits    Video      Intervening      Dyn  A   G     c
 rgn  set   WAN  Units     Total Norm  Prio Shr Regions          CAC  R   L     e
 1    1     y    NoLimit                                        n        t
 2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 14
 15
```

2.6 Trunk Group

For this example the **trunk-group 65** is used as shown next. Ensure the appropriate settings for your environment.

```
change trunk-group 65                                        Page   1 of  21
                                TRUNK GROUP

Group Number: 65                    Group Type: sip          CDR Reports: y
  Group Name: xcapi-sip                      COR: 1    TN: 1     TAC: #65
   Direction: two-way       Outgoing Display? y
 Dial Access? n                                    Night Service:
Queue Length: 0
Service Type: public-ntwrk          Auth Code? n
                                          Member Assignment Method: auto
                                                    Signaling Group: 65
                                                  Number of Members: 8
```

The second page of the **trunk-group** configuration dialog, the **TRUNK PARAMETERS**, is used to modify the system trunk parameters.

```
change trunk-group 65                                        Page   2 of  21
      Group Type: sip

TRUNK PARAMETERS

     Unicode Name: auto

                                          Redirect On OPTIM Failure: 5000

           SCCAN? n                                 Digital Loss Group: 18
                        Preferred Minimum Session Refresh Interval(sec): 1800

 Disconnect Supervision - In? y  Out? y

            XOIP Treatment: auto   Delay Call Setup When Accessed Via IGAR? n
```

The third page of the trunk-group configuration dialog is used to modify some features, such as the **Numbering Format** parameter, which are used as shown next.

```
change trunk-group 65                                    Page   3 of  21
TRUNK FEATURES
          ACA Assignment? n              Measured: none____
                                                  Maintenance Tests? y


                     Numbering Format: unk-pvt
                                                UUI Treatment: service-provider

                                                 Replace Restricted Numbers? n
                                                Replace Unavailable Numbers? n

                                  Modify Tandem Calling Number: no_______________


 Show ANSWERED BY on Display? y
```

Via the **PROTOCOL VARIATIONS** settings, on the fourth page of the trunk-group configuration dialog, some protocol properties might be adjusted upon your needs. Here, the **Telephone Event Payload Type** is used with its default value **101**. The settings of the **IP DTMF TRANSMISSION MODE** parameter within the **system-parameters ip-options** should be also reviewed.

```
change trunk-group 65                                    Page   4 of  21
                              PROTOCOL VARIATIONS

                        Mark Users as Phone? n
              Prepend '+' to Calling Number? n
      Send Transferring Party Information? y

                     Send Diversion Header? y
                   Support Request History? y
             Telephone Event Payload Type: 101


       Convert 180 to 183 for Early Media? n
 Always Use re-INVITE for Display Updates? y
       Identity for Calling Party Display: P-Asserted-Identity
                                Enable Q-SIP? n
```

As determined on the trunk group's first page, eight **members** were added for the XCAPI trunk.

```
change trunk-group 65                                    Page   5 of  21
                                  TRUNK GROUP
                                       Administered Members (min/max):   1/8
GROUP MEMBER ASSIGNMENTS                   Total Administered Members:   8

       Port              Name
  1: T00053            xcapi-sip
  2: T00054            xcapi-sip
  3: T00055            xcapi-sip
  4: T00056            xcapi-sip
  5: T00121            xcapi-sip
  6: T00122            xcapi-sip
  7: T00123            xcapi-sip
  8: T00124            xcapi-sip
  9:
 10:
 11:
 12:
 13:
 14:
 15:
```

2.7 Signaling Group

The **signaling-group 65** is used as shown next. In accordance to the XCAPI configuration, the transport type is set to TCP. The **Near-end** and **Far-end** nodes and listening ports must be set as required.

```
change signaling-group 65                                    Page   1 of   1
                                SIGNALING GROUP

 Group Number: 65              Group Type: sip
  IMS Enabled? n         Transport Method: tcp
       Q-SIP? n                                          SIP Enabled LSP? n
                                                Enforce SIPS URI for SRTP? n
  Peer Detection Enabled? y  Peer Server: Others


    Near-end Node Name: procr                 Far-end Node Name: xcapi-sip
  Near-end Listen Port: 5060                Far-end Listen Port: 5060
                                          Far-end Network Region: 65

Far-end Domain: 172.18.0.242
                                                Bypass If IP Threshold Exceeded? n
Incoming Dialog Loopbacks: allow                     RFC 3389 Comfort Noise? n
        DTMF over IP: rtp-payload            Direct IP-IP Audio Connections? y
Session Establishment Timer(min): 3                    IP Audio Hairpinning? y
         Enable Layer 3 Test? n                 Initial IP-IP Direct Media? n
H.323 Station Outgoing Direct Media? n          Alternate Route Timer(sec): 6
```

2.8 Route Pattern

The **route-pattern** must be related to the according trunk group.

```
change route-pattern 65                                      Page   1 of   3
                  Pattern Number: 65  Pattern Name: XCAPI
                        SCCAN? n     Secure SIP? n
    Grp FRL NPA Pfx Hop Toll No.  Inserted                          DCS/ IXC
    No          Mrk Lmt List Del  Digits                          QSIG
                              Dgts                                Intw
1: 65  0                                                          n    user
2:                                                                n    user
3:                                                                n    user
4:                                                                n    user
5:                                                                n    user
6:                                                                n    user

     BCC VALUE  TSC CA-TSC    ITC BCIE Service/Feature PARM  No. Numbering LAR
     0 1 2 M 4 W    Request                                 Dgts Format
                                                          Subaddress
1: y y y y y n  n             unre                          _    unk-unk  none
2: y y y y y n  n             rest                          _    _        none
3: y y y y y n  n             rest                          _    _        none
4: y y y y y n  n             rest                          _    _        none
5: y y y y y n  n             rest                          _    _        none
6: y y y y y n  n             rest                          _    _        none
```

2.9 AAR Analysis

The **AAR DIGIT ANALYSIS TABLE** is used for routing calls within your company's own private networks. For this example we use prefix **65** which is related to **route-pattern 65**.

```
change aar analysis 65                                    Page   1 of   2
                          AAR DIGIT ANALYSIS TABLE
                                  Location: all            Percent Full: 0

        Dialed          Total     Route    Call   Node  ANI
        String         Min  Max  Pattern  Type   Num   Reqd
    65                 5    5    65       aar    ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
    ___________________ __   __   _____    ____   ___   n
```

2.10 Feature Access Codes

This environment makes use of the feature access codes. So prefix 9 is used for accessing the XCAPI trunk. Along with the aar analysis any matching numbers starting with prefix **65** will be routed to XCAPI.

In reference to the numbering requirements there might be additional configuration tasks such as **uniform-dialplan**, **private-numbering**, **ars analysis**, **public-unknown-numbering** or others.

```
change feature-access-codes                               Page   1 of  10
                          FEATURE ACCESS CODE (FAC)
        Abbreviated Dialing List1 Access Code: ____
        Abbreviated Dialing List2 Access Code: ____
        Abbreviated Dialing List3 Access Code: ____
Abbreviated Dial - Prgm Group List Access Code: ____
                    Announcement Access Code: ____
                     Answer Back Access Code: ____
                       Attendant Access Code: _
    Auto Alternate Routing (AAR) Access Code: 9___
  Auto Route Selection (ARS) - Access Code 1: 0___  Access Code 2: ____
               Automatic Callback Activation: ____   Deactivation: ____
Call Forwarding Activation Busy/DA: ____   All: ____   Deactivation: ____
  Call Forwarding Enhanced Status: ____   Act: ____   Deactivation: ____
                     Call Park Access Code: ____
                   Call Pickup Access Code: ____
CAS Remote Hold/Answer Hold-Unhold Access Code: ____
                 CDR Account Code Access Code: ____
                    Change COR Access Code: ____
                Change Coverage Access Code: ____
          Conditional Call Extend Activation: ____   Deactivation: ____
                  Contact Closure   Open Code: ____    Close Code: ____
```

2.11 Dial Plan Analysis

As required, the feature access code is referenced within the dial plan analysis.

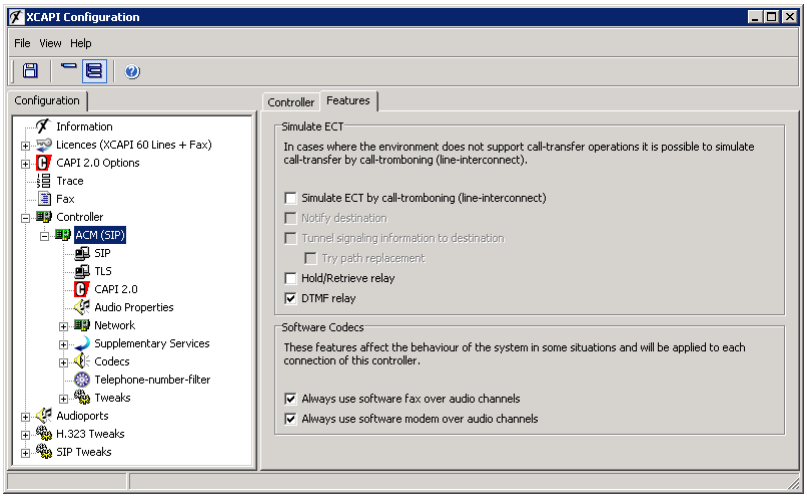
```
change dialplan analysis                                      Page   1 of  12
                          DIAL PLAN ANALYSIS TABLE
                               Location: all            Percent Full: 1

  Dialed   Total  Call      Dialed   Total  Call      Dialed   Total  Call
  String   Length Type      String   Length Type      String   Length Type
  0        1      fac       _____    __     _______   _____    __     _______
  1        3      ext       _____    __     _______   _____    __     _______
  2        3      ext       _____    __     _______   _____    __     _______
  3        3      ext       _____    __     _______   _____    __     _______
  9        1      fac       _____    __     _______   _____    __     _______
  *        3      dac       _____    __     _______   _____    __     _______
  #        3      dac       _____    __     _______   _____    __     _______
  _____    __     _______   _____    __     _______   _____    __     _______
  _____    __     _______   _____    __     _______   _____    __     _______
  _____    __     _______   _____    __     _______   _____    __     _______
  _____    __     _______   _____    __     _______   _____    __     _______
  _____    __     _______   _____    __     _______   _____    __     _______
  _____    __     _______   _____    __     _______   _____    __     _______
```

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, but nevertheless they should be reviewed just as the according gateway parameters for appropriate interworking.

3.1 Softfax

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 this please review the XCAPI controller configuration tab labeled **Features** and ensure that the parameter **Always use software fax over audio channels** is enabled. Ensure that facsimile parameters of the ip-codec set(s) are configured as shown in chapter **Codec Sets** starting on page 9.



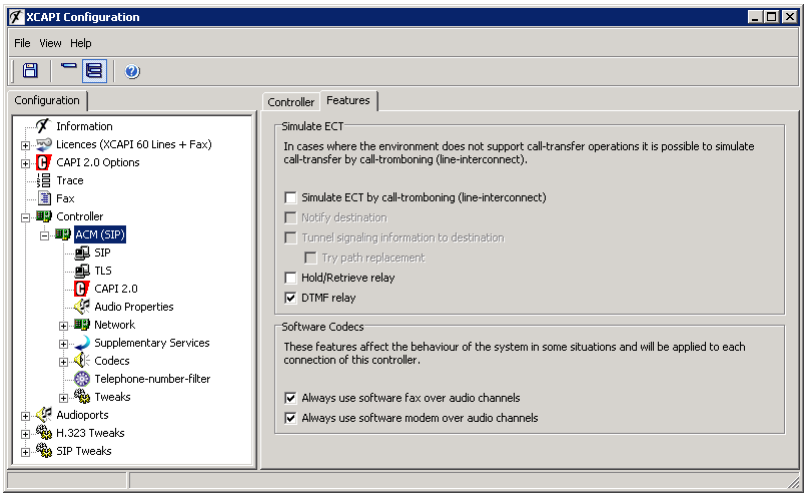
3.2 Clock Source

Please ensure that the clock source is configured in the right way. Wrong synchronization may sporadically abort facsimile transmissions.

```
G450-001(super)# show sync timing
SYNCHRONIZATION CONTROL: --- Local ---

SOURCE     MM or VoIP           STATUS                  FAILURE
---------  -------------------  ----------------------  ---------------
Primary    v2                   Active                  None
Secondary                       Not Configured
Local      v0                   Standby                 None

Active Source: v2               Sync Source Switching: Enabled

Done!
G450-001(super)#
```

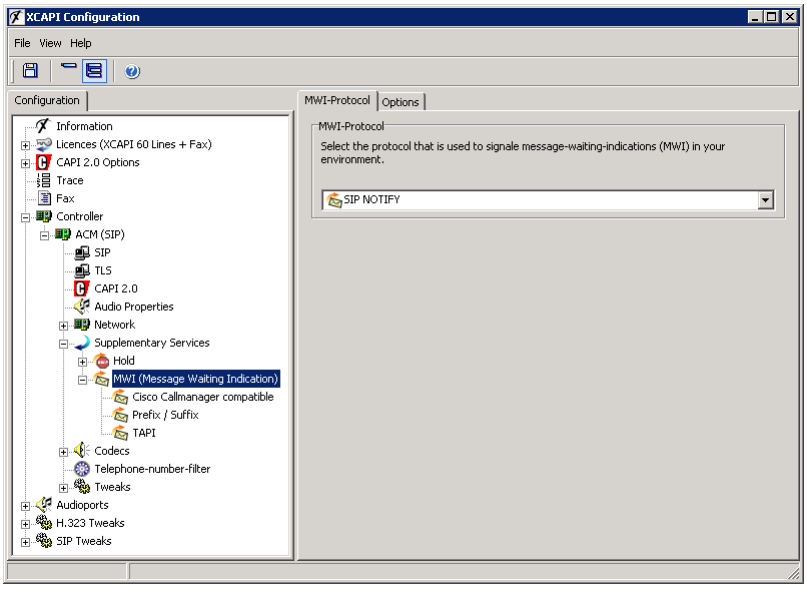
3.3 Call Transfer

For enabling call transfer via SIP refer please ensure that the **Simulate ECT by call-tromboning (line-interconnect)** is disabled within the XCAPI controllers **Features** tab. For the ACM configuration the system parameters and class of restrictions and class of services must be configured properly.



3.4 Message Waiting Indications

For MWI, please ensure that the **SIP NOTIFY** method is enabled within the XCAPI controller configuration for message waiting interoperability.



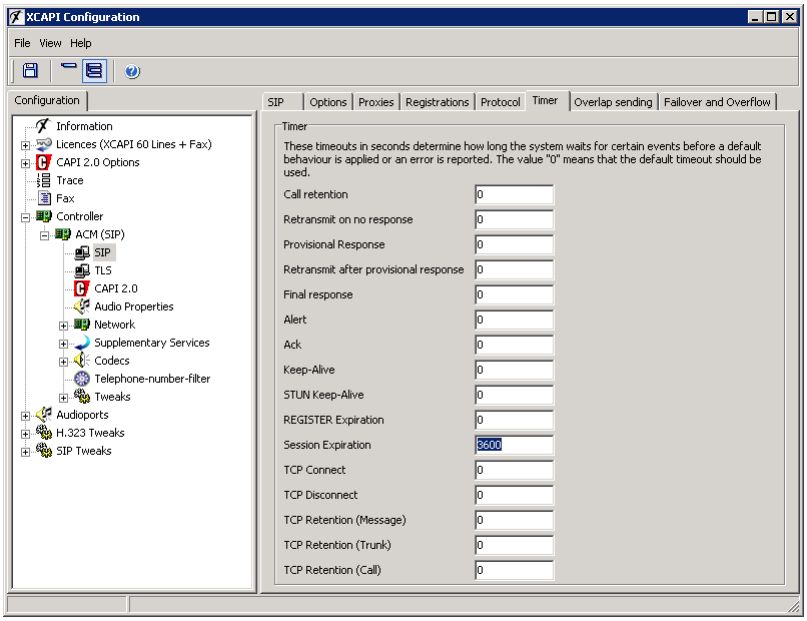
3.5 Redirection Number

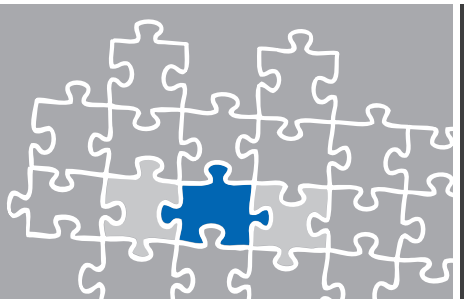
Several CAPI applications need to receive a redirection number, in meaning of the gateway generated SIP diversion header, beside of the origins calling number.

For this the **Send Diversion Header** must be enabled on page 4 of the XCAPI's trunk group, see chapter **Trunk Group** starting on page 11.

3.6 Timer Settings

By default the XCAPI's session expiration timer is set to 3600. The timer value (Preferred Minimum Session Refresh Interval (sec) within the ACM's trunk group configuration on page 2, which is multiplied by 2) should be set conform. This was already shown in the chapter **Trunk Group** starting on page 11.





Exclusion of Liability

Copyright © 2013 TE-SYSTEMS GmbH

Trademarks

Third Party Disclaimer and Limitations

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (http://www.openssl.org/)

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com).

This product includes software written by Tim Hudson (tjh@cryptsoft.com).

This product includes source code derived from the RSA Data Security, Inc. MD2, MD4 and MD5 Message Digest Algorithms.

This product includes source code derived from the RFC 4634 Secure Hash Algorithm software.

Copyright-Notices

All files included in this sample are copyrighted by TE-SYSTEMS GmbH.

All samples and the SDK may only be used in combination with the XCAPI-product.

The SDK contains code from libtiff with the following copyright-notice:

Copyright (c) 1988-1997 Sam Leffler

Copyright (c) 1991-1997 Silicon Graphics, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that (i) the above copyright notices and this permission notice appear in all copies of the software and related documentation, and (ii) the names of Sam Leffler and Silicon Graphics may not be used in any advertising or publicity relating to the software without the specific, prior written permission of Sam Leffler and Silicon Graphics.

THE SOFTWARE IS PROVIDED „AS-IS“ AND WITHOUT WARRANTY OF ANY KIND, EXPRESS, IMPLIED OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL SAM LEFFLER OR SILICON GRAPHICS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER OR NOT ADVISED OF THE POSSIBILITY OF DAMAGE, AND ON ANY THEORY OF LIABILITY, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

TE-SYSTEMS GmbH

Managing Directors Andreas Geiger
Oliver Körber

Address Max-von-Laue-Weg 19
D-38448 Wolfsburg
Germany

Tel. +49 5363 8195-0
Fax +49 5363 8195-999

E-Mail info@te-systems.de
Internet www.te-systems.de
www.xcapi.de