AVAYA

Avaya Solution & Interoperability Test Lab

Application Notes for Biscom FAXCOM Server with Avaya Aura™ Communication Manager Using H.323 Trunks – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Biscom FAXCOM Server to interoperate with Avaya Aura™ Communication Manager using H.323 trunks. Biscom FAXCOM Server is a fax solution that uses the H.323 trunk interface from Avaya Aura Communication Manager to send and receive fax.

Information in these Application Notes has been obtained through DevConnect compliance testing and additional technical discussions. Testing was conducted via the DevConnect Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

These Application Notes describe the configuration steps required for Biscom FAXCOM Server to interoperate with Avaya Aura™ Communication Manager using H.323 trunks. Biscom FAXCOM Server is a fax solution that uses the H.323 trunk interface from Avaya Aura Communication Manager to send and receive fax.

Biscom FAXCOM Server utilizes the Dialogic Brooktrout SR140 Virtual Fax Board to support T.38 fax over the IP network, and integration with Avaya Aura Communication Manager is achieved through the H.323 trunk interface.

1.1. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing.

The feature testing focused on verifying the following on the Biscom FAXCOM Server:

- Proper handling of faxes via the H.323 trunks including send/receive, intra-site, inter-site over ISDN (PRI), inter-site over IP (H.323), different media processor boards, enable/disable media shuffling, simultaneous with bi-directional faxes, and miscellaneous failure scenarios.

- Proper handling of faxes with different pages, resolution, complexity, format, and data rates.

- No adverse impact on the inter-site VoIP calls during VoIP faxes.

The serviceability testing focused on verifying the ability of the Biscom FAXCOM Server to recover from adverse conditions, such as disconnecting/reconnecting the Ethernet cable and stopping/starting the fax service on the Biscom FAXCOM Server.

1.2. Support

Technical support on Biscom FAXCOM Server can be obtained through the following:

- **Phone:** (978) 250-8355
- **Web:** www.biscom.com/support

2. Reference Configuration

As shown in **Figure 1**, both the Local and Remote sites have a Biscom FAXCOM Server. H.323 trunks are used to connect each Biscom FAXCOM Server with the local Avaya Aura Communication Manager. Routing between the two sites include both ISDN PRI and H.323 trunks.

The Local site consists of two Avaya G650 Media Gateways, with each media gateway configured as a separate port network in a separate IP network region.

The detailed administration of routing between the two sites is not the focus of these Application Notes and will not be described.

The administration procedures in these Application Notes are shown for the Local site. Unless specified otherwise, the same procedures need to apply to the Remote site using appropriate values for the Remote site from **Figure 1**.
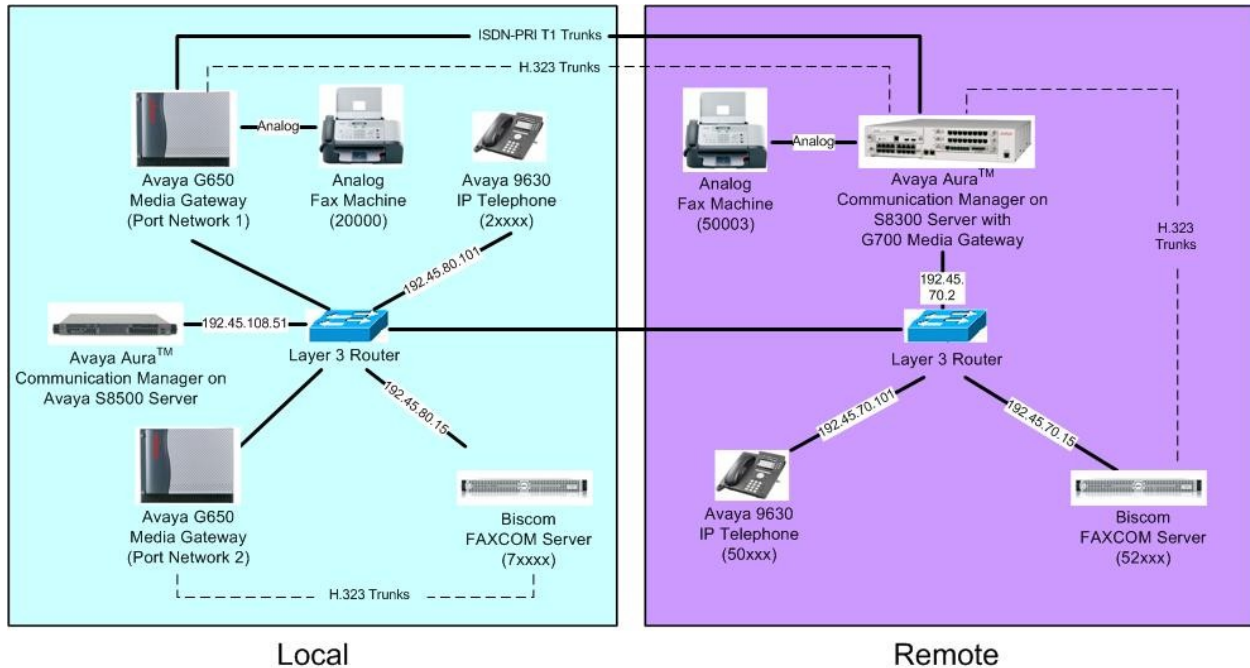
Figure 1: Biscom FAXCOM Server with Avaya Aura Communication Manager Using H.323 Trunks

3. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

Equipment	Software
Avaya S8500 Server	Avaya Aura Communication Manager 5.2, R015x.02.0.947.3
Avaya G650 Media Gateways • TN799DP C-LAN Circuit Pack • TN2302AP IP Media Processor • TN2602AP IP Media Processor	HW01 FW024 HW20 FW118 HW02 FW040
Avaya 9600 Series IP Telephones (H.323)	3.0
Biscom FAXCOM Server with Dialogic Brooktrout Virtual Fax Board • Boston Bfv API • Boston Driver • Boston SDK	6.1.3.0 with fapiconfig version 6.1.4.0 V6.0.00 B11 V6.0.00 B7 V6.0.00 B11

4. Configure Avaya Aura™ Communication Manager

This section provides the procedures for configuring Avaya Aura Communication Manager. The procedures include the following areas:

- Verify Communication Manager license
- Administer IP codec set
- Administer IP node names
- Administer IP network region
- Administer H.323 trunk group
- Administer H.323 signaling group
- Administer H.323 trunk group members
- Administer route pattern
- Administer public unknown numbering
- Administer AAR analysis
- Administer IP network map

4.1. Verify Communication Manager License

Log in to the System Access Terminal (SAT) to verify that the Communication Manager license has proper permissions for features illustrated in these Application Notes. Use the "display system-parameters customer-options" command. Navigate to **Page 2**, and verify that there is sufficient remaining capacity for H.323 trunks by comparing the **Maximum Administered H.323 Trunks** field value with the corresponding value in the **USED** column.

The license file installed on the system controls the maximum permitted. If there is insufficient capacity, contact an authorized Avaya sales representative to make the appropriate changes.

```
display system-parameters customer-options                       Page   2 of  11
                             OPTIONAL FEATURES

IP PORT CAPACITIES                                                     USED
                    Maximum Administered H.323 Trunks: 800    44
            Maximum Concurrently Registered IP Stations: 18000 1
              Maximum Administered Remote Office Trunks: 0      0
Maximum Concurrently Registered Remote Office Stations: 0      0
             Maximum Concurrently Registered IP eCons: 0      0
  Max Concur Registered Unauthenticated H.323 Stations: 0      0
                  Maximum Video Capable H.323 Stations: 0      0
                  Maximum Video Capable IP Softphones: 0      0
                       Maximum Administered SIP Trunks: 800    130
  Maximum Administered Ad-hoc Video Conferencing Ports: 0      0
   Maximum Number of DS1 Boards with Echo Cancellation: 0      0
                            Maximum TN2501 VAL Boards: 10     0
                 Maximum Media Gateway VAL Sources: 0      0
         Maximum TN2602 Boards with 80 VoIP Channels: 128    2
        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.)
```

4.2. Administer IP Codec Set

Use the "change ip-codec-set n" command, where "n" is an existing codec set number that will be used for integration with the Biscom FAXCOM Server. Enter the audio codec type in the **Audio Codec** fields. The only applicable codec types are G.711MU and G.711A. Retain the default values in the remaining fields.

```
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.711MU            n          2        20
  2:
```

Navigate to **Page 2**, and enter "t.38-standard" for the **FAX Mode** field. Retain the default values in the remaining fields.

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

                            IP Codec Set

                            Allow Direct-IP Multimedia? n



                       Mode             Redundancy
     FAX               t.38-standard        0
     Modem             off                  0
     TDD/TTY           US                   3
     Clear-channel     n                    0
```

4.3. Administer IP Node Names

Use the "change node-names ip" command, and add an entry for the local Biscom FAXCOM Server. In this case, "BiscomFax" and "192.45.80.15" are entered as **Name** and **IP Address**. Note the "CLAN2" and "192.45.108.57" entry, which is the node name to the C-LAN board in the second port network, and will be used later to configure the Biscom FAXCOM Server.

```
change node-names ip                                          Page   1 of   2
                            IP NODE NAMES
     Name              IP Address
BiscomFax          192.45.80.15
CLAN1A             192.45.108.55
CLAN2A             192.45.108.57
```

4.4. Administer IP Network Region

Use the "change ip-network-region n" command, where "n" is an existing network region that will be used for integration with the Biscom FAXCOM Server. For the **Codec Set** field, enter the codec set number from **Section 4.2**.

```
change ip-network-region 2                                       Page   1 of  19
                              IP NETWORK REGION
   Region: 2
Location:         Authoritative Domain:
    Name: PN1
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                        RTCP Reporting Enabled? y
 Call Control PHB Value: 46      RTCP MONITOR SERVER PARAMETERS
        Audio PHB Value: 46        Use Default Server Parameters? y
        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
```

Navigate to **Page 3**, and specify the codec set to use for inter-regions. In the compliance testing, the H.323 trunks in the Local site that connect the Biscom FAXCOM Server to the Communication Manager are in network region 2, and the ISDN PRI and H.323 trunks in the Local site that connect to the Remote site are in network region 1.

```
change ip-network-region 2                                       Page   3 of  19

 Source Region: 2     Inter Network Region Connection Management     I      M
                                                                     G  A   e
 dst codec direct   WAN-BW-limits   Video         Intervening    Dyn A  G   a
 rgn set    WAN Units    Total Norm  Prio Shr Regions            CAC R  L   s
 1   1      y     NoLimit                                            n  all
 2   1                                                                  all
```

Similar inter-region setting needs to be applied to the other network region, as shown below.

```
change ip-network-region 1                                       Page   3 of  19

 Source Region: 1     Inter Network Region Connection Management     I      M
                                                                     G  A   e
 dst codec direct   WAN-BW-limits   Video         Intervening    Dyn A  G   a
 rgn set    WAN Units    Total Norm  Prio Shr Regions            CAC R  L   s
 1   1                                                                  all
 2   1      y     NoLimit                                            n  all
```

4.5. Administer H.323 Trunk Group

Administer a H.323 trunk group to interface with the local Biscom FAXCOM Server. Use the "add trunk-group n" command, where "n" is an available trunk group number. Enter the following values for the specified fields, and retain the default values for the remaining fields.

- **Group Type:**   "isdn"
- **Group Name:**   A descriptive name.
- **TAC:**   An available trunk access code.
- **Carrier Medium:**   "H.323"
- **Service Type:**   "tie"
- **Member Assignment Method:** "auto"

```
add trunk-group 3                                           Page   1 of  21
                              TRUNK GROUP

Group Number: 3                    Group Type: isdn         CDR Reports: y
  Group Name: BiscomFax                   COR: 1      TN: 1      TAC: *003
   Direction: two-way        Outgoing Display? n     Carrier Medium: H.323
 Dial Access? n              Busy Threshold: 255  Night Service:
Queue Length: 0
Service Type: tie                      Auth Code? n
                                         Member Assignment Method: auto
                                                    Signaling Group:
                                                  Number of Members: 0
```

Navigate to **Page 3**. Enable the **Send Name** and **Send Calling Number** fields, and enter "public" for **Format**, as shown below.

```
add trunk-group 3                                           Page   3 of  21
TRUNK FEATURES
        ACA Assignment? n              Measured: none
                                Internal Alert? n      Maintenance Tests? y
                              Data Restriction? n      NCA-TSC Trunk Member:
                                  Send Name: y      Send Calling Number: y
           Used for DCS? n                         Send EMU Visitor CPN? n
  Suppress # Outpulsing? n     Format: public
                                         UUI IE Treatment: service-provider

                                         Replace Restricted Numbers? n
                                        Replace Unavailable Numbers? n
                                           Send Connected Number: n
                                          Hold/Unhold Notifications? n
            Send UUI IE? y        Modify Tandem Calling Number? n
           Send UCID? n
 Send Codeset 6/7 LAI IE? y
```

4.6. Administer H.323 Signaling Group

Administer a H.323 signaling group for the new trunk group to use for signaling. Use the "add signaling-group n" command, where "n" is an available signaling group number. Enter the following values for the specified fields, and retain the default values for the remaining fields.

- **Group Type:** "h.323"
- **Trunk Group for Channel Selection:** The trunk group number from **Section 4.5**.
- **Near-end Node Name:** C-LAN node name from **Section 4.3**.
- **Far-end Node Name:** Biscom FAXCOM node name from **Section 4.3**.
- **Far-end Listen Port:** "1720"
- **Far-end Network Region:** The network region number from **Section 4.4**.

In the compliance testing, "CLAN2A" is a C-LAN located in port network 2 and pre-configured with network region 2.

```
add signaling-group 3                                        Page   1 of   5
                              SIGNALING GROUP

 Group Number: 3                  Group Type: h.323
                             Remote Office? n        Max number of NCA TSC: 0
                                     SBS? n          Max number of CA TSC: 0
    IP Video? n                                 Trunk Group for NCA TSC:
      Trunk Group for Channel Selection: 3
      TSC Supplementary Service Protocol: a
                      T303 Timer(sec): 10
  H.245 DTMF Signal Tone Duration(msec):
   Near-end Node Name: CLAN2A                  Far-end Node Name: BiscomFax
 Near-end Listen Port: 1720                  Far-end Listen Port: 1720
                                          Far-end Network Region: 2
        LRQ Required? n                Calls Share IP Signaling Connection? n
        RRQ Required? n

                                          Bypass If IP Threshold Exceeded? n
                                                H.235 Annex H Required? n
        DTMF over IP: out-of-band        Direct IP-IP Audio Connections? y
 Link Loss Delay Timer(sec): 90                    IP Audio Hairpinning? n
```

4.7. Administer H.323 Trunk Group Members

Administer H.323 trunk group members for the newly added H.323 trunk group. Use the "change trunk-group n" command, where "n" is the trunk group number added in **Section 4.5**. Enter the corresponding signaling group number from **Section 4.6** into the **Signaling Group** field. Enter the desired number of trunk group members into the **Number of Members** field.

```
change trunk-group 3                                          Page   1 of  21
                              TRUNK GROUP

Group Number: 3                    Group Type: isdn        CDR Reports: y
  Group Name: BiscomFax                  COR: 1       TN: 1       TAC: *003
   Direction: two-way      Outgoing Display? n      Carrier Medium: H.323
 Dial Access? n            Busy Threshold: 255  Night Service:
Queue Length: 0
Service Type: tie                   Auth Code? n
                                              Member Assignment Method: auto
                                                     Signaling Group: 3
                                                   Number of Members: 6
```

4.8. Administer Route Pattern

Create a route pattern to use for the newly created H.323 trunk group. Use the "change route-pattern n" command, where "n" is an available route pattern. Enter a descriptive **Pattern Name**. In the **Grp No** field, enter the trunk group number from **Section 4.5**. In the **FRL** field, enter a level that allows access to this trunk with "0" being least restrictive.

```
change route-pattern 3                                        Page   1 of   3
                    Pattern Number: 7   Pattern Name: ToFaxServer
                          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: 3    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            rest                                        none
```

4.9. Administer Public Unknown Numbering

Use the "change public-unknown-numbering 0" command, to define the calling party number to send to the local Biscom FAXCOM Server. Add an entry for the trunk group defined in **Section 4.5**. In the example shown below, all calls originating from a 5-digit extension beginning with 2 and routed over any trunk group will result in a 5-digit calling number.

```
change public-unknown-numbering 0                              Page   1 of   2
                      NUMBERING - PUBLIC/UNKNOWN FORMAT
                                                Total
Ext Ext              Trk        CPN            CPN
Len Code             Grp(s)     Prefix         Len
                                                        Total Administered: 2
 5  2                                           5          Maximum Entries: 9999
```

4.10.   Administer AAR Analysis

This section provides a sample AAR routing used for routing calls with dialed digits 7xxxx to the local Biscom FAXCOM Server. Note that other methods of routing may be used. Use the "change aar analysis 0" command, and add an entry to specify how to route calls to 7xxxx. In the example shown below, calls with digits 7xxxx will be routed as an AAR call using route pattern "7" from **Section 4.8**.

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

         Dialed           Total      Route    Call   Node  ANI
         String           Min  Max   Pattern  Type   Num   Reqd
     7                    5    5     3        aar          n
```

4.11.   Administer IP Network Map

Use the "change ip-network-map" command to assign the network region number from **Section 4.4** for incoming fax calls to the local Biscom FAXCOM Server, as shown below.

```
change ip-network-map                                        Page   1 of  63
                          IP ADDRESS MAPPING

                                          Subnet Network      Emergency
 IP Address                               Bits   Region VLAN Location Ext
 --------------------------------------------- ------ ------ ---- -------------
 FROM: 192.45.80.15                        /      2      n
   TO: 192.45.80.15
 FROM:                                     /             n
   TO:
```
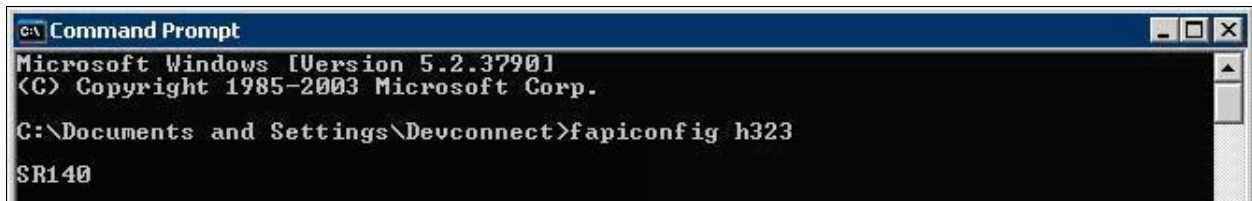
5. Configure Biscom FAXCOM Server

This section provides the procedures for configuring the Biscom FAXCOM Server. The procedures include the following areas:

- Execute configuration script
- Administer FAPI.ini
- Start fax service

5.1. Execute Configuration Script

From the Biscom FAXCOM Server, launch the **Command Prompt** window and enter "fapiconfig h323" as shown below to initialize for H.323. The initialization is complete when "SR140" is returned, as shown below.
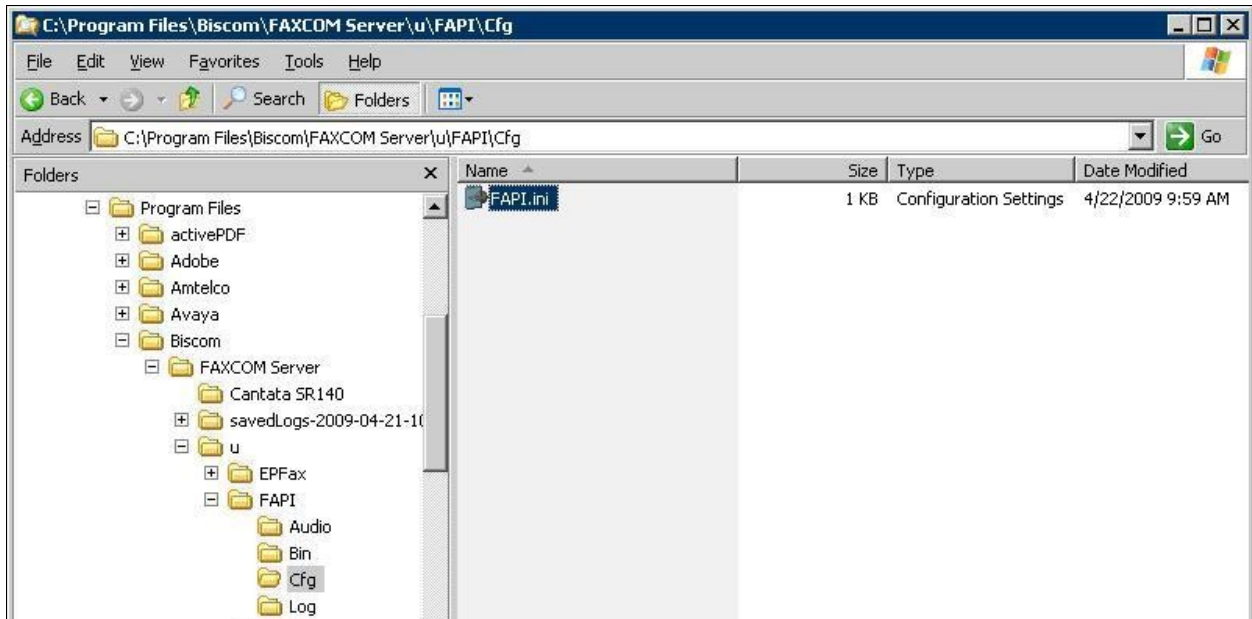

5.2. Administer FAPI.ini

Navigate to the **Cfg** directory to edit the **FAPI.ini** file, as shown below.

The **FAPI.ini** file contains a list of configurable parameters. Enter the following values for the specified fields, and retain the default values for the remaining fields.

- **T38_CALL_CONTROL:**   "H323"
- **T38_CALL_CONTROL_VARIANT:**   "AVAYA"
- **T38_GATEWAY_IP_ADDRESS:**   The C-LAN from **Section 4.3**, and port **1720**.
- **T38_LOCAL_SYSTEM_IP_ADDRESS:** The local FAXCOM Server.

In the event that the local Biscom FAXCOM Server has multiple Ethernet cards, then follow [3] to manually obtain the value for the **SR140_IP_INTERFACE** parameter shown below.

5.3. Start Fax Service

Launch the **Services** window, and right-click on **FAXCOM Server** and select "Start".
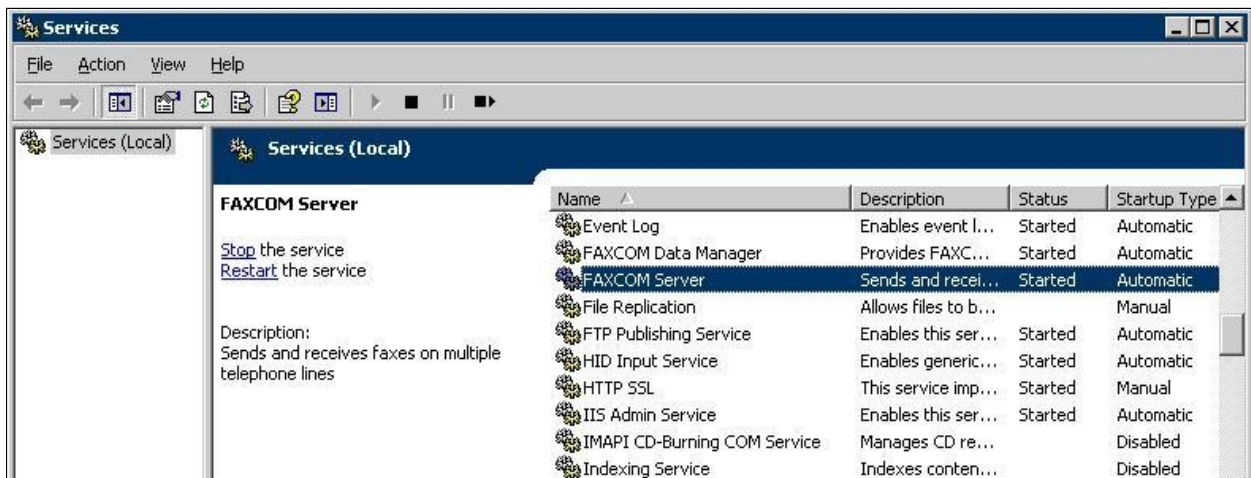
6. General Test Approach and Test Results

The feature test cases were performed manually. Intra-site and inter-site fax calls to and from the local Biscom FAXCOM Server were made. The fax calls were sent and received by using the Send A Test Fax utility at the local Biscom FAXCOM Server and the analog fax machine at the Remote site. The Biscom FAXCOM Server at the remote site was used for testing simultaneous send/receive of fax calls.

The serviceability test cases were performed manually by disconnecting/reconnecting the Ethernet cables and stop/start the fax service on the Biscom FAXCOM Server.

All test cases were executed. The one observation noted from the compliance test is that for inter-site fax calls over the H.323 trunks, the media shuffling for the H.323 trunks between the two sites have to be turned off.

7. Verification Steps

This section provides the tests that can be performed to verify proper configuration of Avaya Aura Communication Manager and the Biscom FAXCOM Server.

7.1. Verify Avaya Aura™ Communication Manager

On Avaya Aura Communication Manager, verify the status of the local SIP trunk group by using the "status trunk n" command, where "n" is the trunk group number administered in **Section 4.5**. Verify that all trunks are in the "in-service/idle" state as shown below.

```
status trunk 3                                                     Page    1

                            TRUNK GROUP STATUS

Member    Port      Service State         Mtce Connected Ports
                                          Busy

0003/001 T00101     in-service/idle       no
0003/002 T00102     in-service/idle       no
0003/003 T00103     in-service/idle       no
0003/004 T00104     in-service/idle       no
0003/005 T00105     in-service/idle       no
0003/006 T00106     in-service/idle       no
```

Verify the status of the SIP signaling group by using the "status signaling-group n" command, where "n" is the signaling group number administered in **Section 4.6**. Verify that the signaling group is "in-service" as indicated in the **Group State** field shown below.

```
status signaling-group 3
                    STATUS SIGNALING GROUP

      Group ID: 3                          Active NCA-TSC Count: 0
    Group Type: h.323                       Active CA-TSC Count: 0
 Signaling Type: facility associated signaling
    Group State: in-service
```
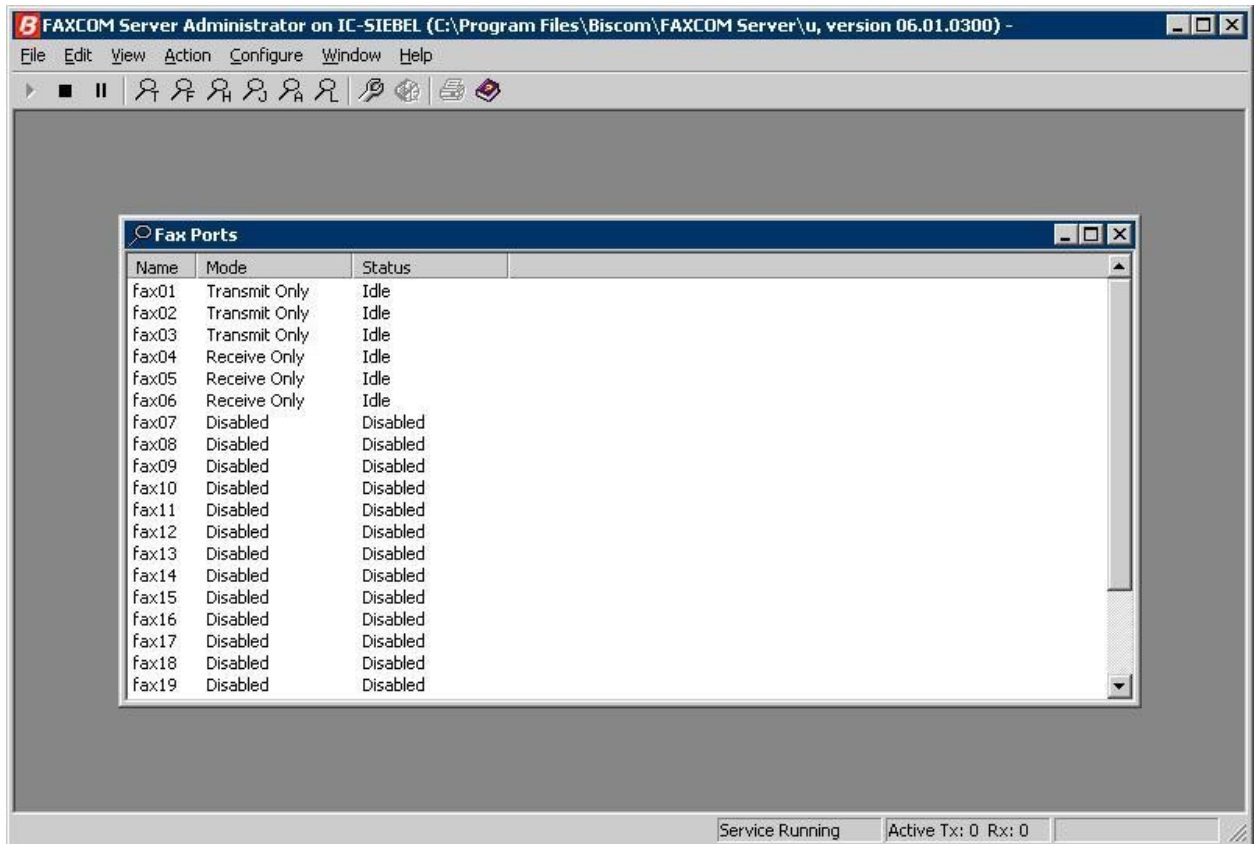
7.2. Verify Biscom FAXCOM Server

From the Biscom FAXCOM Server, select **Start > All Programs > FAXCOM > FAXCOM Server > Administrator**. The **FAXCOM Server Administrator** screen is displayed, as shown below. Select **View > Fax Ports** from the top menu.
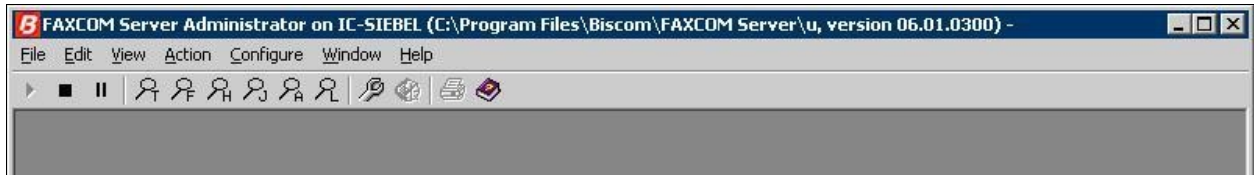
The **FAXCOM Server Administrator** screen is updated with a **Fax Ports** pane. Verify that the status of all configured ports is "Idle". In the compliance testing, six fax ports were pre-configured on the FAXCOM Server.

8. Conclusion

These Application Notes describe the configuration steps required for Biscom FAXCOM Server to successfully interoperate with Avaya Aura Communication Manager using H.323 trunks. All feature and serviceability test cases were completed.

9. Additional References

This section references the product documentation relevant to these Application Notes.

1. *Administering Avaya Aura*™ *Communication Manager*, Document 03-300509, Issue 5.0, Release 5.2, May 2009, available at http://support.avaya.com.

2. *FAXCOM Server Administrator's Guide*, February 2009 Revised Edition, available from Biscom Technical Support.

3. *KB Avaya 20090424*, Knowledge Base article under "SR140 Avaya", available from Biscom Technical Support.

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