Avaya Solution & Interoperability Test Lab

Application Notes for Configuring Multi-Tech FaxFinder® IP Fax Server with Avaya Aura® Communication Manager and Avaya Aura® Session Manager via SIP Trunk Interface - Issue 1.0

Abstract

These Application Notes describe the procedures for configuring the Multi-Tech FaxFinder® IP Fax Server with Avaya Aura® Communication Manager and Avaya Aura® Session Manager using a SIP trunk interface.

FaxFinder is an appliance-based fax server that sends and receives fax calls over an IP network. In the tested configuration, FaxFinder interoperated with Avaya Aura® Session Manager to send/receive faxes using SIP trunk facilities.

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 procedures for configuring Multi-Tech FaxFinder® IP Fax Server with Avaya Aura® Communication Manager and Avaya Aura® Session Manager.

FaxFinder is an appliance-based fax server solution that sends and receives faxes over an IP network. FaxFinder utilizes T.38 Fax over Internet Protocol (FoIP) for sending media. In the tested configuration, FaxFinder interoperated directly with Avaya Aura® Session Manager to send/receive faxes using SIP signaling.

2. General Test Approach and Test Results

This section describes the compliance test approach used to verify interoperability of Multi-Tech FaxFinder® IP Fax Server.

2.1. General Test Approach

The general test approach was to make intra-site and inter-site fax calls to and from FaxFinder. The inter-site calls were made using SIP or ISDN-PRI trunks between the sites. Faxes were sent with various page lengths, resolutions, and at various fax data speeds. For capacity, a large number of multi-page faxes were continuously sent between the two FaxFinder servers simultaneously. Serviceability testing included verifying proper operation/recovery from failed cables, unavailable resources, and Session Manager and FaxFinder restarts. Fax calls were also tested with different Avaya Media Gateway media resources used to process the fax data between sites. This included the TN2302 MedPro circuit pack, the TN2602 MedPro circuit pack in the Avaya G650 Media Gateway; the integrated VoIP engine of the Avaya G450 Media Gateway and the Avaya MM760 Media Module installed in the Avaya G450 Media Gateway.

2.2. Test Results

Multi-Tech FaxFinder® IP Fax Server successfully passed compliance testing.

2.3. General Observations

Fax calls consume DSP (Digital Signal Processing) resources for processing fax data on the TN2302AP IP Media Processor (MedPro) circuit pack and the TN2602AP IP Media Processor circuit pack in the Avaya G650 Media Gateway, and the integrated Voice over Internet Protocol (VoIP) engine of the Avaya G450 Media Gateway. To increase the capacity to support simultaneous fax calls, additional TN2302AP and/or TN2602AP MedPro circuit packs need to be installed in the Avaya G650 Gateway, and additional Avaya MM760 Media Module or Modules need to be installed in the Avaya G450 Media Gateway. The information contained in the table below indicates DSP capacities/usage in the Avaya media processors. Customers should work with their Avaya sales representatives to ensure that their fax solutions have adequate licenses and DSP resources to match the intended Fax capacity/usage.

Platform Device	DSP Resources per Platform Device	DSP Resources per FoIP Call
TN2302, G450, MM760	64	4
TN2602	64	1

Note that the SIP trunk group on Communication Manager for connecting to Session Manager at each site, as well as the SIP or ISDN-PRI trunk group for connecting the 2 sites must be configured with adequate number of trunk group members to support the number of simultaneous fax calls intended.

2.4. Support

Technical support for FaxFinder can be obtained by contacting Multi-Tech Systems at:

- Phone: (800) 972-2439 or (763) 717-5863
- Email: support@multitech.com
- Web: https://support.multitech.com

3. Configuration

The test configuration was designed to emulate two separate sites with multiple Port Networks at one site, and modular Gateway resources at the other site. Each site was configured with Multi-Tech FaxFinder® IP Fax Server, Avaya Aura® Communication Manager and Avaya Aura® Session Manager. **Figure 1** illustrates the configuration used in the tested configuration.

3.1. Configuration Details

In the tested configuration, Communication Manager Servers and Gateways at the two sites were connected via SIP and ISDN-PRI trunks. Faxes were alternately sent between the two sites using these two facilities. Connections to Session Manager were via SIP trunk facilities, and the FaxFinder servers communicated directly with Session Manager via SIP.

Two separate Session Manager Servers were used to connect to the FaxFinder Servers at each site.

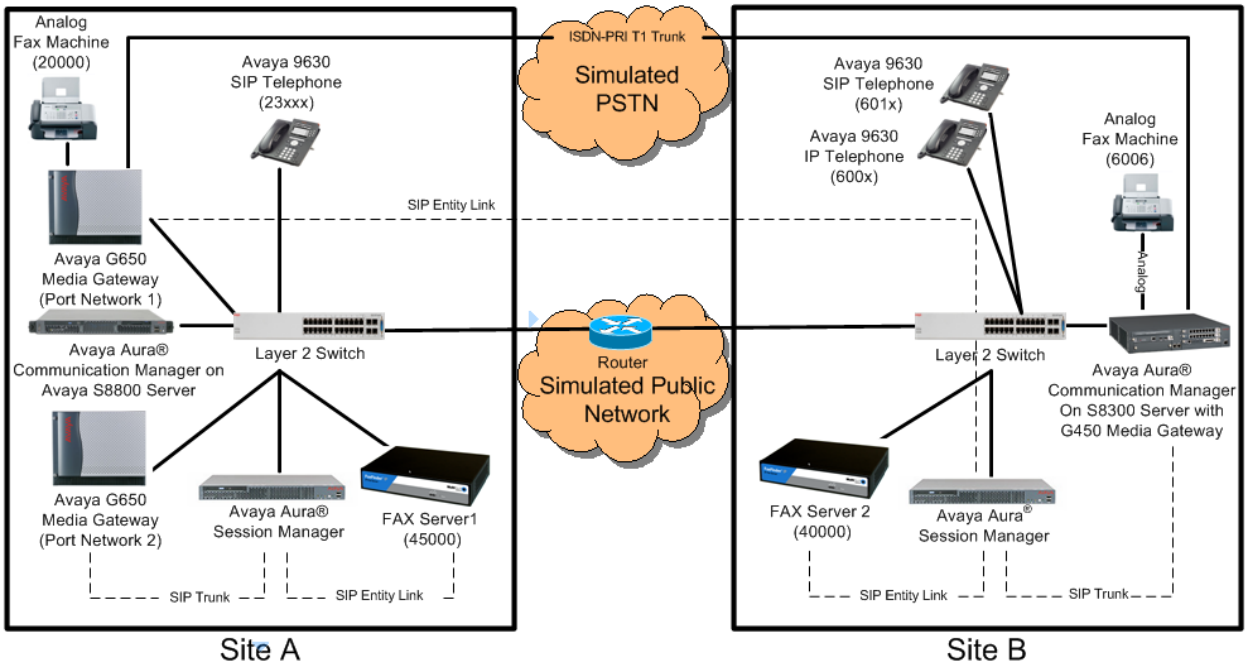


Figure 1: Multi-Tech FaxFinder® IP Fax Server sample configuration

Site A had an Avaya S8800 Communication Manager Server with two Avaya G650 Media Gateways. Each Media Gateway was configured in a separate port networks with separate IP network regions. The FaxFinder server at this site communicated with Session Manager via SIP. In turn, Communication Manager used a SIP Trunk which terminated on a CLAN circuit pack in port network 2 to communicate with Session Manager. IP media resources were provided by Media Processor (MedPro) circuit packs. Two versions of the MedPro circuit pack were tested in this configuration: TN2302AP and TN2602AP. Endpoints at this site included an Avaya 9600 Series IP Telephone (with H.323 firmware), and an analog fax machine.

Site B had an Avaya S8300 Communication Manager Server in an Avaya G450 Media Gateway. The FaxFinder server at this site communicated with Session Manager via SIP. On the Avaya G450 Media Gateway, the signaling and media resources supporting a SIP trunk connected to Session Manager were integrated directly on the media gateway processor. Endpoints at this site included Avaya 9600 Series IP Telephones (with H.323 and SIP firmware), and an analog fax machine.

The IP telephones were not involved in the faxing operations, they were present in the configuration to verify that VoIP telephone calls did not interfere with FoIP faxing operations.

Outbound fax calls originating from FaxFinder were sent to Session Manager first, then to Communication Manager, via the configured SIP trunks. Based on the dialed digits, Communication Manager directed the calls to the local fax machine, or the inter-site trunks (ISDN-PRI or SIP) to reach the remote site. Inbound fax calls to FaxFinder were first received by Communication Manager from the local fax machine or from across either ISDN-PRI or SIP trunks connected to the remote Site. Communication Manager then directed the calls to FaxFinder via the configured Session Manager SIP trunks.

4. Equipment and Software Validated

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

Equipment	Software/Firmware
Avaya S8800 Servers (at both sites)	Avaya Aura® Session Manager 6.0 (6.0.2.0.602004) 6.1 (6.1.2.0.612004) Avaya Aura® System Manager 6.0, 6.1
Avaya S8800 Server (at Site A)	Avaya Aura® Communication Manager 6.0 SP1 R016x.00.0.345.0 with patch 18567
Avaya G650 Media Gateway (at Site A) - 2 CLANs - 2 MedPros – TN2302 - 2 MedPros – TN2602	 TN799DP - HW01 FW38 & HW13 FW 38 TN2302AP - HW20 FW120 TN2602AP - HW02 FW057
Avaya S8300D Server (at Site B)	Avaya Aura® Communication Manager 6.0 SP2 R016x.00.1.510.1 with patch 18734
Avaya G450 Media Gateway (at Site B)	30.14.0/1
Avaya 9620 IP Telephone (SIP) Avaya 9630 IP Telephone (H.323)	Avaya one-X® Deskphone Edition SIP 2.5 H.323 3.11
Analog Fax Machines	-
Multi-Tech FaxFinder® IP Fax Server	1.0.14
Multi-Tech FaxFinder® Client software	2.2.2

The Multi-Tech FaxFinder® IP Fax Server is shipped as an all-in-one appliance. The physical dimensions are 9.1” W x 6.1” L x 1.7” H, roughly the size of a modem.

5. Configure Avaya Aura® Communication Manager

This section describes the Communication Manager configuration necessary to interoperate with Session Manager and Multi-Tech FaxFinder® IP Fax Server. Connectivity via SIP and PRI trunks between the two sites used existing configurations which follow standard practices. Therefore, it focuses on the configuration of the SIP trunks connecting Communication Manager to the Avaya SIP infrastructure with the following assumption:

- The examples shown in this section refer to Site A. Unless specified otherwise, these same steps also apply to Site B using values appropriate for that location.

The configuration of Communication Manager was performed using the System Access Terminal (SAT). After the completion of the configuration, the **save translation** command was used to make the changes permanent.

5.1. Steps to Configure Communication Manager

The configuration on Communication Manager include the following areas:

- Verify Communication Manager License (Step 1)
- Identify IP Interfaces (Step 2)
- Administer IP Network Regions (Steps 3 – 6)
- Administer IP Node Name (Step 7)
- Administer IP Network Map (Step 8)
- Administer IP Codec Set (Steps 9 – 10)
- Administer SIP Signaling Group (Step 11)
- Administer SIP Trunk Group (Steps 12 – 13)
- Administer Public Unknown Numbering (Step 14)
- Administer Route Pattern (Step 15)
- Administer AAR Analysis (Steps 16 – 17)

Step	Description
1.	**Verify Communication Manager License** Use the **display system-parameters customer-options** command to verify that the Communication Manager license has proper permissions for features illustrated in these Application Notes. Navigate to **Page 2**, and verify that there is sufficient remaining capacity for SIP trunks by comparing the **Maximum Administered SIP 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: 12000 96 Maximum Concurrently Registered IP Stations: 18000 1 Maximum Administered Remote Office Trunks: 12000 0 Maximum Concurrently Registered Remote Office Stations: 18000 0 Maximum Concurrently Registered IP eCons: 414 0 Max Concur Registered Unauthenticated H.323 Stations: 100 0 Maximum Video Capable Stations: 18000 0 Maximum Video Capable IP Softphones: 18000 0 **Maximum Administered SIP Trunks: 24000 298** Maximum Administered Ad-hoc Video Conferencing Ports: 24000 0 Maximum Number of DS1 Boards with Echo Cancellation: 522 0 Maximum TN2501 VAL Boards: 128 2 Maximum Media Gateway VAL Sources: 250 0 Maximum TN2602 Boards with 80 VoIP Channels: 128 0 Maximum TN2602 Boards with 320 VoIP Channels: 128 2 Maximum Number of Expanded Meet-me Conference Ports: 300 0

Step	Description
2.	**Identify IP Interfaces** Use the **list ip-interface clan** and **list ip-interface medpro** commands to identify IP interfaces in each network region. Interfaces in cabinet 01 (port network 1) as indicated in the **Slot** field are in IP network region 1 as indicated in the **Net Rgn** field. Testing with the TN2302 and TN2602 circuit packs were done separately. When testing with the TN2302, the TN2602 was disabled (turned off) and vice versa as indicated in the **ON** field.

```
list ip-interface clan

                                IP INTERFACES

                                                                  Skts  Net       Eth
ON  Slot   Code/Sfx Node Name/       Mask  Gateway Node          Warn  Rgn VLAN  Link
                    IP-Address
--  ----   -------- ---------------  ----  ---------------       ----  --- ----  ----
 y  01A03  TN799  D CLAN1A           /24   Gateway001            400   1   n     1
                    10.64.22.16
 y  02A03  TN799  D CLAN2A           /24   Gateway001            400   2   n     2
                    10.64.22.19
```

```
list ip-interface medpro

                                IP INTERFACES

                                                                  Net
ON Slot  Code/Sfx Node Name/      Mask Gateway Node               Rgn VLAN Virtual Node
                  IP-Address
-- ----- -------- --------------- ---- ---------------            --- ---- ---------------
 n 01A02 TN2302   MEDPRO1A        /24  Gateway001                 1   n
                  10.64.22.15
 n 02A02 TN2302   MEDPRO2A        /24  Gateway001                 2   n
                  10.64.22.18
 y 01A04 TN2602   MEDPRO1A-2      /24  Gateway001                 1   n
                  10.64.22.17
 y 02A04 TN2602   MEDPRO2A-2      /24  Gateway001                 2   n
                  10.64.22.20
```

Step	Description
3.	**Administer IP Network Region 1** The configuration of the IP network regions (**Steps 3 – 6**) was already in place and is included here for clarity. At Site A, the Avaya G650 Media Gateway comprising port network 1 and all IP endpoints were located in IP network region 1. Use the **display ip-network-region** command to view these settings. ▪ A descriptive name was entered for the **Name** field. ▪ **IP-IP Direct Audio** (Media Shuffling) was enabled to allow audio traffic to be sent directly between IP endpoints without using media resources in the Avaya Media Gateway. This was done for both intra-region and inter-region IP-IP Direct Audio. This is the default setting. Media Shuffling can be further restricted at the trunk level on the **Signaling Group** form. ▪ The **Codec Set** field was set to the IP codec set to be used for calls within this IP network region. In this case, IP codec set 1 was selected. ▪ The default values were used for all other fields. At Site B, all IP components were located in IP network region 1 and the IP network region was configured in the same manner as shown below. display ip-network-region 1 Page 1 of 20 IP NETWORK REGION Region: 1 Location: Authoritative Domain: avaya.com **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

Step	Description

4.	**Administer IP Network Region 1 – Continued**
	On **Page 4**, codec sets are defined for inter-region calls. In the case of the compliance test at Site A, calls from IP network Source Region 1 to IP network region 2 (**dst rgn 2**) used codec set 1. The default values were used for all other fields. At Site B, only one IP network region was used, so no inter-region settings were required.
	
	`display ip-network-region 1 Page 4 of 20`
	
	`Source Region: 1 Inter Network Region Connection Management I G A M 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 all`
	`2 1 y NoLimit n t`
	`3`

5.	**Administer IP Network Region 2**
	At Site A, IP network region 2 was created for Port Network 2 in a similar manner as IP network region 1 shown in **Step 3** but with a different name. This was the network region used for SIP Trunk connections to Session Manager.
	
	`display ip-network-region 2 Page 1 of 20`
	`IP NETWORK REGION`
	`Region: 2`
	`Location: Authoritative Domain: avaya.com`
	`Name: PN2`
	`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`

6.	**Administer IP Network Region 2 – Continued**
	The inter-region codec setting was created similarly to **Step 4**.
	
	`display ip-network-region 2 Page 3 of 19`
	
	`Source Region: 2 Inter Network Region Connection Management I G A M 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`
	`3 3 y NoLimit n all`

Step	Description
7.	**Administer IP Node Name** Use the **change node-names ip** command to create a node name that maps to the Session Manager IP address. This node name is used in the configuration of the SIP trunk signaling group in **Step 11**. `change node-names ip` Page 1 of 2 IP NODE NAMES Name IP Address CLAN1A 10.64.22.16 CLAN2A 10.64.22.19 CM-Remote 10.64.21.111 **DemoSM 10.64.20.31** Gateway001 10.64.22.1 MEDPRO1A 10.64.22.15 MEDPRO1A-2 10.64.22.17 MEDPRO2A 10.64.22.18 MEDPRO2A-2 10.64.22.20 TR18300 10.64.10.67
8.	**Administer IP Network Map** Session Manager and the FaxFinder server were configured to be located in an IP network region different than the default region 1. The region was assigned using the **change ip-network-map** command. In the case of the compliance test, the IP addresses for these resources at the Main Site were assigned to IP network region 2 as shown in the example below. At the Remote Site, Session Manager and the FaxFinder server were located in the default IP network region 1, so it did not require an IP address map entry. `change ip-network-map` Page 1 of 63 IP ADDRESS MAPPING IP Address / Subnet Bits / Network Region / VLAN / Emergency Location Ext **FROM: 10.64.20.31 / 2 n** **TO: 10.64.20.31** **FROM: 10.64.22.170 / 2 n** **TO: 10.64.22.170**
9.	**Administer IP Codec set** Use the **change ip-codec-set 1** command to verify that G.711MU or G.711A is contained in the codec list. The example below shows the value used in the compliance test. `display ip-codec-set 1` Page 1 of 2 IP Codec Set Codec Set: 1 **Audio Codec** / Silence Suppression / Frames Per Pkt / Packet Size(ms) 1: **G.711MU** n 2 20

Step	Description

10.	**Administer IP Codec set – Fax settings**
	On **Page 2**, set the **FAX Mode** field to ***t.38-standard*.** This is necessary to support the FaxFinder server assigned to IP network region 2. The **Modem Mode** field should be set to ***off***.
	
	Leave the **FAX Redundancy** setting at its default value of 0. A packet redundancy level can be assigned to improve packet delivery and robustness of FAX transport over the network (with increased bandwidth as trade-off). Avaya uses IETF RFC-2198 and ITU-T T.38 specifications as redundancy standard. With this standard, each Fax over IP packet is sent with additional (redundant) 0 to 3 previous fax packets based on the redundancy setting. A setting of 0 (no redundancy) is suited for networks where packet loss is not a problem.
	
	`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`

Step	Description
11.	**Administer SIP Signaling Group** For the compliance test, a signaling group with the associated SIP trunk group was used for routing fax calls to/from the FaxFinder server via Session Manager. For the compliance test at Site A, signaling group 12 was configured using the parameters highlighted below. All other fields were set as described in [3]. ▪ The **Group Type** was set to ***sip***. ▪ The **Transport Method** was set to the recommended default value of ***tls*** (Transport Layer Security). As a result, the **Near-end Listen Port** and **Far-end Listen Port** are automatically set to ***5061.*** ▪ The **Near-end Node Name** was set to ***CLAN2A***, the node name that maps to the IP address of the CLAN circuit pack used to connect to Session Manager. Node names are defined using the **change node-names ip** command (see **Step 7** above). ▪ The **Far-end Node Name** was set to ***demoSM***. This node name maps to the IP address of the Session Manager server as defined using the **change node-names ip** command. ▪ The **Far-end Network Region** was set to ***2***. This is the IP network region which contains Session Manager and FaxFinder. ▪ The **Far-end Domain** was set to ***avaya.com***. This domain is sent in the headers of SIP INVITE messages for calls originating from and terminating to Session Manager using this signaling group. ▪ **Direct IP-IP Audio Connections** was set to ***y***. This field must be set to ***y*** to enable Media Shuffling on the trunk level (see **Step 3** on **IP-IP Direct Audio**). ▪ The **DTMF over IP** field was set to the default value of ***in-band***. ▪ The default values were used for all other fields. change signaling-group 12 Page 1 of 1 SIGNALING GROUP Group Number: 12 **Group Type: sip** IMS Enabled? n **Transport Method: tls** Q-SIP? n SIP Enabled LSP? n IP Video? n Enforce SIPS URI for SRTP? y Peer Detection Enabled? y Peer Server: SM **Near-end Node Name: CLAN2A** **Far-end Node Name: demoSM** **Near-end Listen Port: 5061** **Far-end Listen Port: 5061** **Far-end Network Region: 2** **Far-end Domain: avaya.com** Bypass If IP Threshold Exceeded? n Incoming Dialog Loopbacks: eliminate RFC 3389 Comfort Noise? n **DTMF over IP: in-band** **Direct IP-IP Audio Connections? y** Session Establishment Timer(min): 3 IP Audio Hairpinning? n Enable Layer 3 Test? y Initial IP-IP Direct Media? n H.323 Station Outgoing Direct Media? n Alternate Route Timer(sec): 6

Step	Description
12.	**Administer SIP Trunk Group** For the compliance test, trunk group 12 with the associated signaling group was used for routing fax calls to/from Session Manager. Trunk group 12 was configured using the parameters highlighted below. All other fields were set as described in [3]. On **Page 1**: ▪ The **Group Type** field was set to ***sip***. ▪ A descriptive name was entered for the **Group Name**. ▪ An available trunk access code (TAC) that was consistent with the existing dial plan was entered in the **TAC** field. ▪ The **Service Type** field was set to ***tie***. ▪ The **Signaling Group** was set to the signaling group shown in the previous step. ▪ The **Number of Members** field contained the number of trunks in the SIP trunk group. It determines how many simultaneous SIP calls can be supported by the configuration. Each SIP call between two SIP endpoints (whether internal or external) requires two SIP trunks for the duration of the call. ▪ The default values were used for all other fields.

```
change trunk-group 12                                          Page   1 of  21
                                TRUNK GROUP

Group Number: 12                    Group Type: sip           CDR Reports: y
  Group Name: PN2 to demoSM                COR: 1        TN: 1        TAC: *012
   Direction: two-way        Outgoing Display? n
 Dial Access? n                                    Night Service:
Queue Length: 0
Service Type: tie                    Auth Code? n
                                              Member Assignment Method: auto
                                                        Signaling Group: 12
                                                      Number of Members: 50
```

Step	Description
13.	**Administer SIP Trunk Group – continued** On **Page 3**: ▪ Set the **Numbering Format** field to ***public***. This field specifies the format of the calling party number sent to the far-end. ▪ Default values may be used for all other fields.

```
change trunk-group 12                                          Page   3 of  21
TRUNK FEATURES
          ACA Assignment? n            Measured: none
                                                        Maintenance Tests? y



                      Numbering Format: public
                                              UUI Treatment: service-provider

                                               Replace Restricted Numbers? n
                                              Replace Unavailable Numbers? n


                                 Modify Tandem Calling Number: no




 Show ANSWERED BY on Display? y
```

Step	Description
14.	**Administer Public Unknown Numbering** Public unknown numbering defines the calling party number to be sent to the far-end. Use the **change public-unknown-numbering** command to create an entry that will be used by the trunk groups defined in **Steps 12-13**. In the example shown below, all calls originating from a 5-digit extension beginning with 2 or 4 and routed across any trunk group (**Trk Grp** column is blank) were sent as a 5-digit calling party 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: 6
 5  1                                       5       Maximum Entries: 9999
 5  2                                       5
 5  4                                       5     Note: If an entry applies to
 5  5                                       5     a SIP connection to Avaya
 4  6                                       4     Aura(tm) Session Manager,
 5  7                                       5     the resulting number must
                                                  be a complete E.164 number.
```

Step	Description
15.	**Administer Route Pattern** Use the **change route-pattern** command to create a route pattern that will route fax calls to the SIP trunk that connects to the FaxFinder server. The example below shows the route pattern used for the compliance test at the Main Site. A descriptive name was entered for the **Pattern Name** field. The **Grp No** field was set to the trunk group created in **Steps 12–13**. The Facility Restriction Level (**FRL**) field was set to a level that allows access to this trunk for all users that require it. The value of ***0*** is the least restrictive level. The default values were used for all other fields.

```
change route-pattern 12                                        Page   1 of   3
                   Pattern Number: 12  Pattern Name: To SM
                                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: 12   0                                                      n   user
```

Step	Description
16.	**Administer AAR Analysis** Automatic Alternate Routing (AAR) was used to route calls to FaxFinder via Session Manager. Use the **change aar analysis** command to create an entry in the AAR Digit Analysis Table for this purpose. The example below shows entries previously created for the Main Site using the **display aar analysis 0** command. The 3rd highlighted entry specifies that 5 digit dial string 40000 was to use route pattern 12 to route calls to the FaxFinder server at Site A via Session Manager. The dial string 45000 (the FaxFinder server at Site B) used Route Pattern 15 to route calls between Communication Managers.

```
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
    10                    4    4     4        aar          n
    3                     5    5     12       aar          n
    40000                 5    5     12       aar          n
    45000                 5    5     15       aar          n
```

6. Configure Avaya Aura® Session Manager - Overview

This section covers the configuration of Session Manager at Site A. Session Manager is configured via an Internet browser using the administration web interface. It is assumed that the setup screens of the administration web interface have been used for initial configurations. For additional information on these installation tasks, refer to [3].

Each SIP endpoint used in the compliance test that registered with Session Manager required that a user and endpoint profile be created and associated with Session Manager. This configuration is not directly related to the interoperability of the products being tested, so it is not included here. These procedures are covered in [3].

This section summarizes the configuration steps that are necessary for interoperating with Multi-Tech FaxFinder® IP Fax Server. The test environment was previously configured to enable Avaya Aura® Communication Manager and Session Manager at each site to communicate with each other. Details of this configuration are not described in this document, and additional information can be obtained in [3].

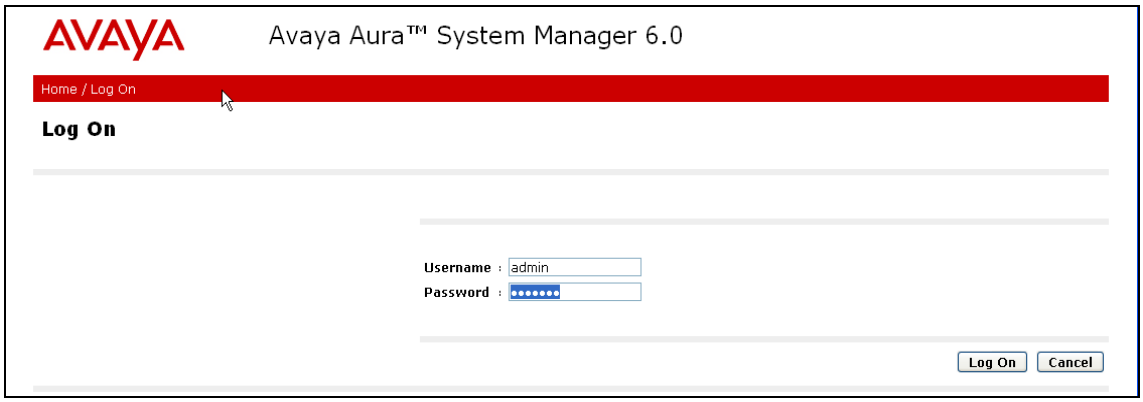
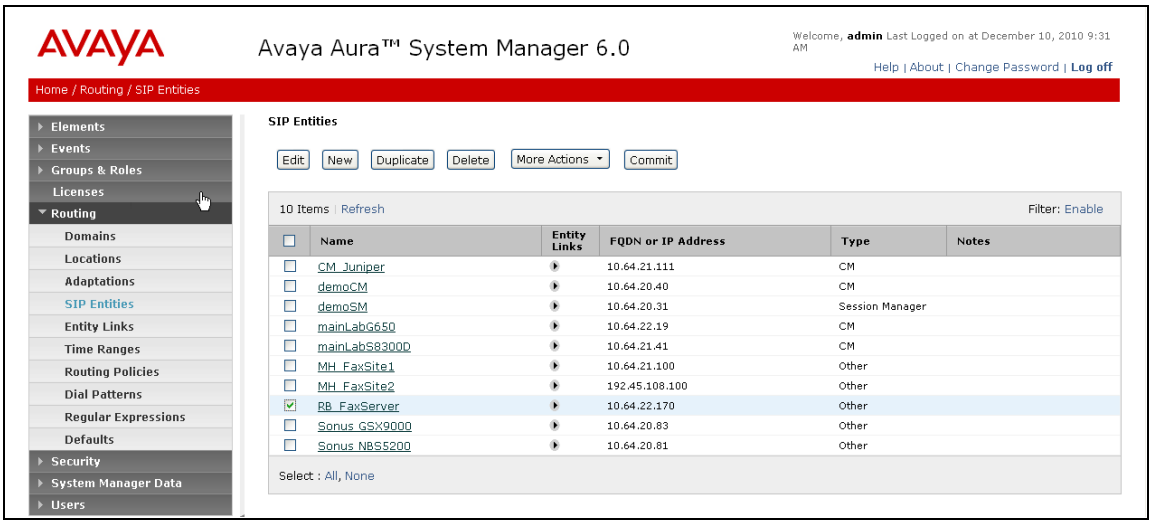
The documented configurations were repeated for the Session Manager at Site B using values appropriate for that site from **Figure 1**. This includes but is not limited to the IP addresses, SIP domain and user extensions.

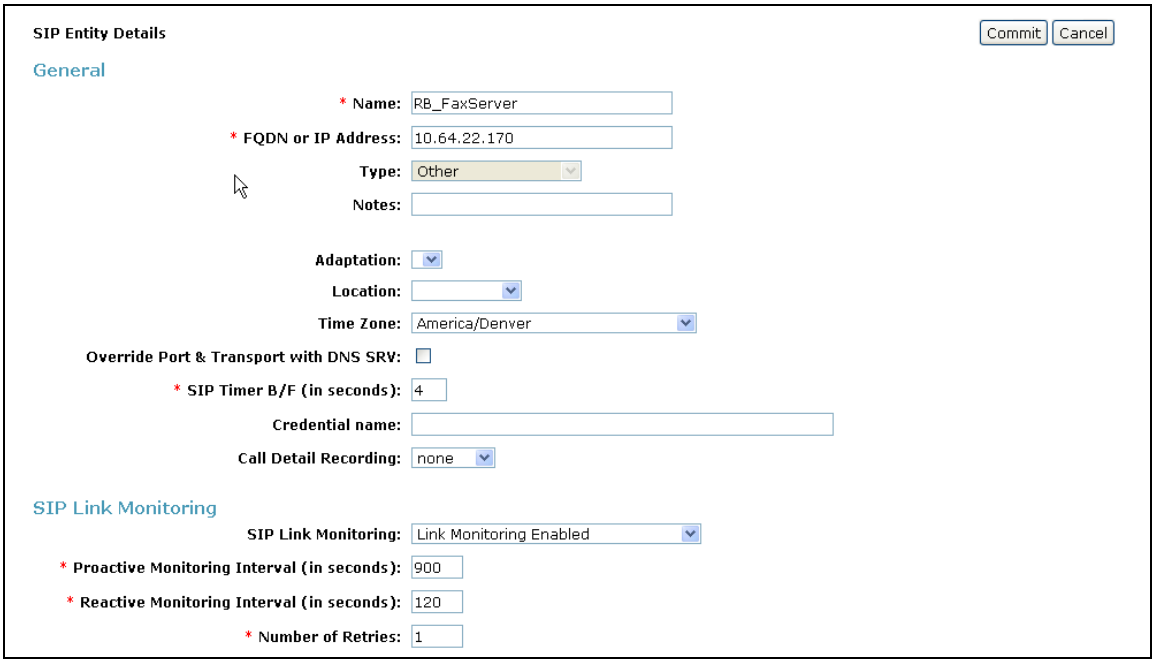
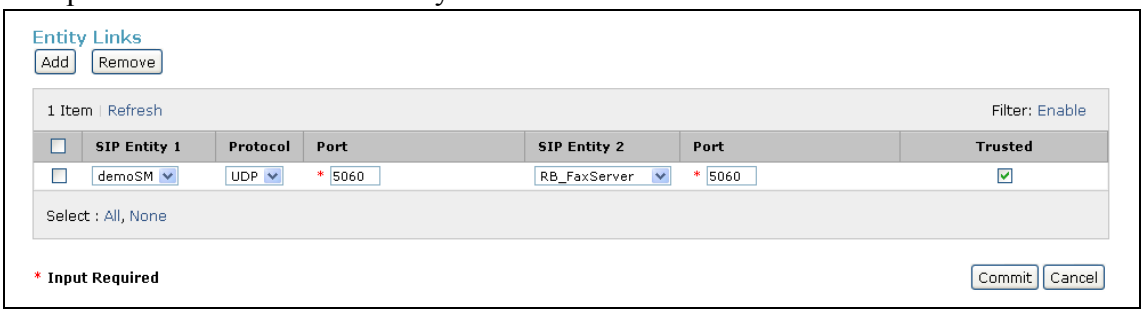
The steps used were:

- Create a SIP Entity for the FaxFinder Server
- Create a SIP Entity Link for the FaxFinder Server
- Create a Routing Policy
- Create or modify Dial Patterns

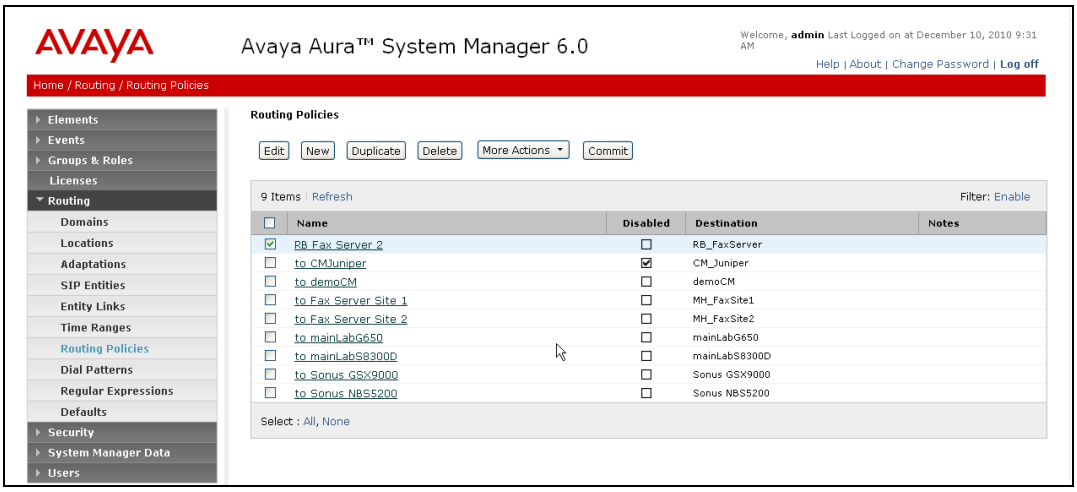
6.1. Configure Session Manager - Details

This section summarizes the applicable user-defined parameters used during the SIP installation procedures.

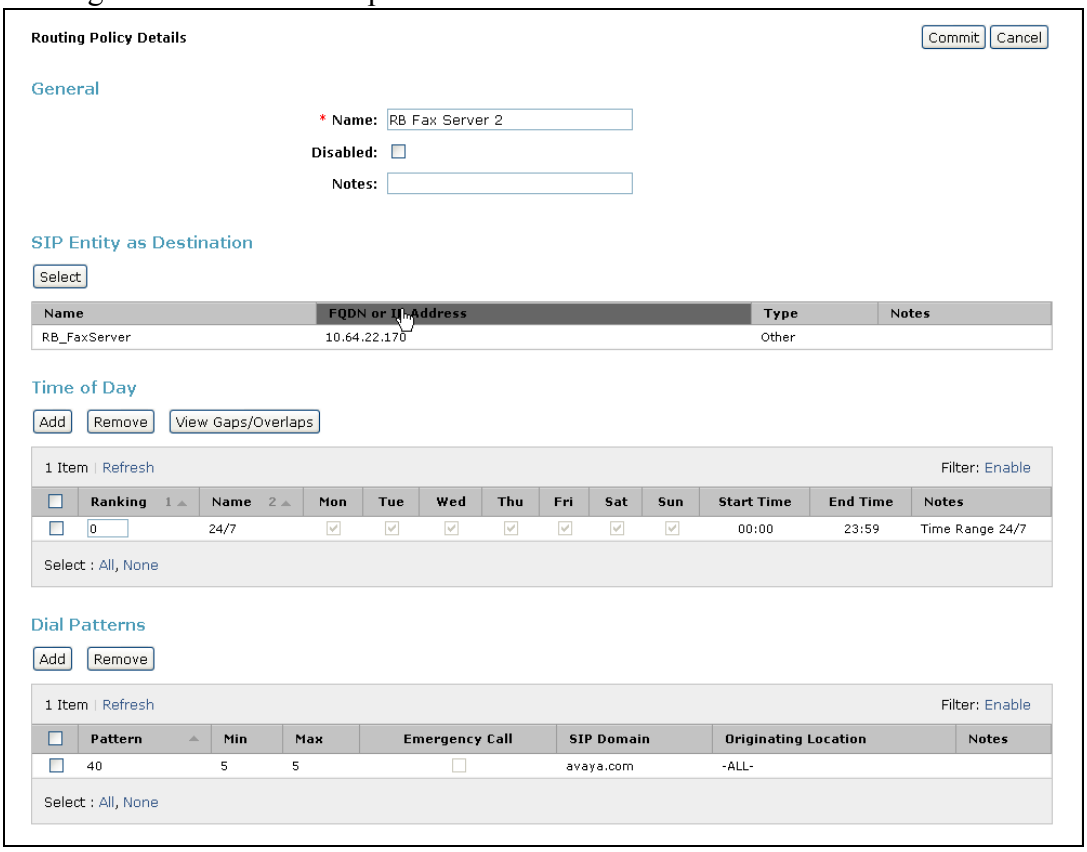
Step	Description
1.	**Login** Access the System Manager administration web interface by entering https://<*ip-addr*>/SMGR as the URL in an Internet browser, where <*ip-addr*> is the IP address (or FQDN) of the System Manager server. Log in with the appropriate credentials. 
2.	**Create a SIP Entity for the FaxFinder Server** Navigate to **Routing\SIP Entities** and click **New** to create an Entity definition. In the screenshot below, the Entity ***RB_FaxServer*** was previously created using the following settings. 

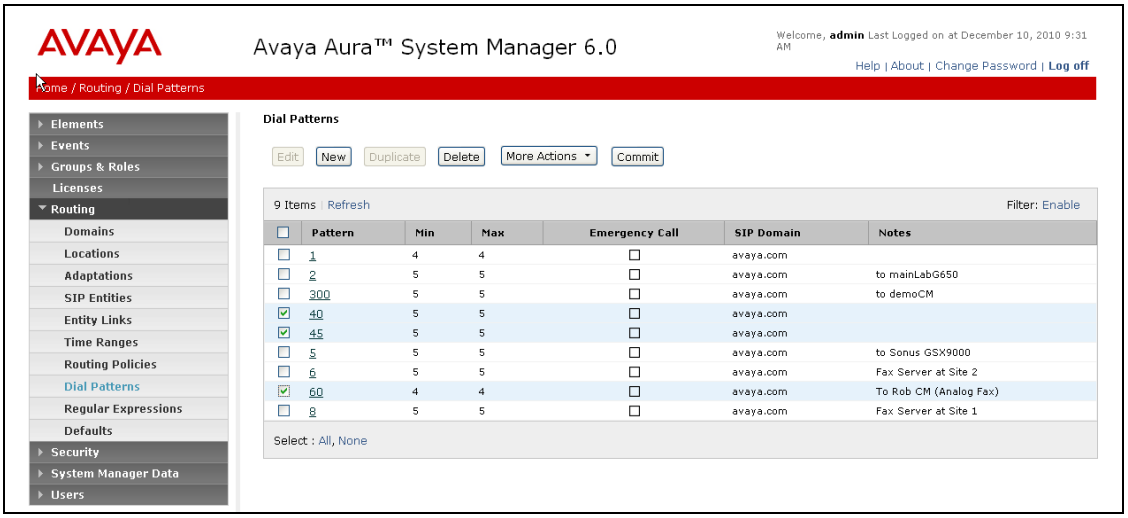
Step	Description
3.	**Create a SIP Entity for the FaxFinder Server - Continued** Enter a descriptive **Name** such as ***RB_FaxServer*** and enter the **FQDN or IP Address** for the FaxFinder server as shown below. Select **Other** for the Entity **Type**. All other settings were defaults. 
4.	**Create an Entity Link for the FaxFinder Server** An Entity Link establishes the details of how Entities will communicate with each other. Use the **Add** button to create a new link. In this case, Session Manager at the Main Site, ***demoSM,*** was configured to communicate with ***RB_FaxServer*** using ***UDP*** protocol over port ***5060*** as a **Trusted** Entity. 

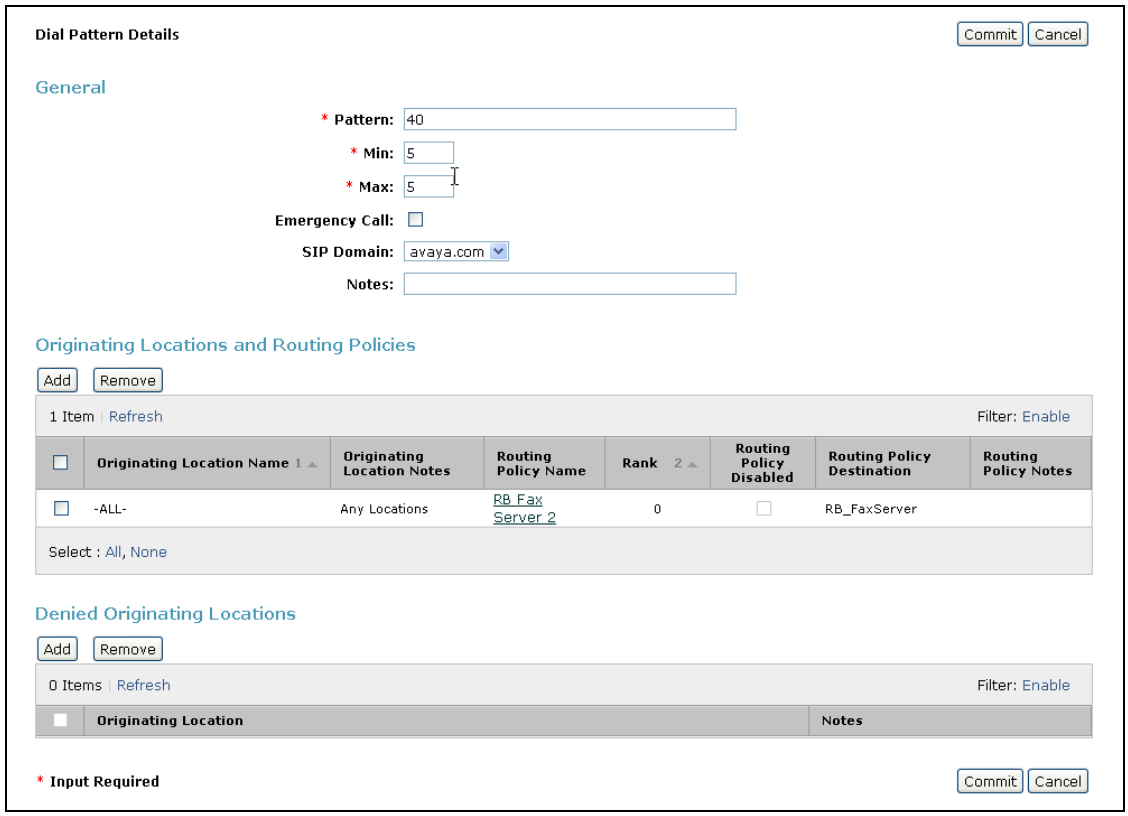
Step	Description
5.	**Create a Routing Policy** Navigate to **Routing\Routing Policies** and click **New** to create a routing policy for incoming calls to the FaxFinder server. The illustration below was captured after the Policy ***RB_Fax_Server_2*** had been created and the following steps will describe how this policy was created.



A Routing Policy consists of a definition of the **SIP Entity as Destination**, the **Time of Day** the policy applies, and the **Dial Patterns** that will trigger this particular policy. Below are the settings used for this test. Use the **Select** or **Add** buttons to create or use existing definitions for each parameter.



Step	Description
6.	**Create or Modify Dial Patterns** Associating a dial pattern with a SIP Routing Policy instructs Session Manager how to route calls matching the administered Dial Pattern(s). In the test, existing Routing Policies were modified for routing to endpoints or Entities at the Remote Site, and new Dial Patterns were created to route to the Main Site and Remote Site Fax Servers using the existing and new routing policies. In the snapshot below, the Dial Patterns were previously created. The applicable patterns were all 5 Digit extension patterns: dialed numbers beginning with 2 (the local analog fax machine at Site A), dialed numbers beginning with 40 (to route incoming Fax calls to the FaxFinder server at Site B), dialed numbers beginning with 45 (to route to Communication Manager at Site A in order to route via the public network interface between the sites). In addition, an existing 4 digit patterns beginning with 60 was used to route Fax calls to Communication Manager at the Main Site for routing via the public network interfaces to the analog machine at the Remote Site. The **'40' and '45'** dial patterns were created for this test, all others were in place in the test environment. 

Step	Description
7.	**Create or Modify Dial Patterns – Continued** The entries required to create the new Dial Pattern for routing calls to the FaxFinder server at the Main Site are illustrated below. The **Pattern, Min** and **Max** number of digits, and **SIP Domain** entries were used for this Dial Pattern definition. Click **Add** to associate the dial pattern with an existing Routing Policy, in this case the ***RB_Fax_Server_2*** policy created in **Step 5** above. **The Originating Location Name *All*** was used in this case to apply this pattern regardless of originating locations. In the same way, a new Dial Pattern was created (not shown) and associated with the existing policy to route calls to Communication Manager at the Main Site (for onward routing to remote site) using the Dial Pattern 45. This was used to route calls from the Main Site Fax Server to the Remote Site Fax Server. 

7. Configure Multi-Tech FaxFinder® IP Fax Server

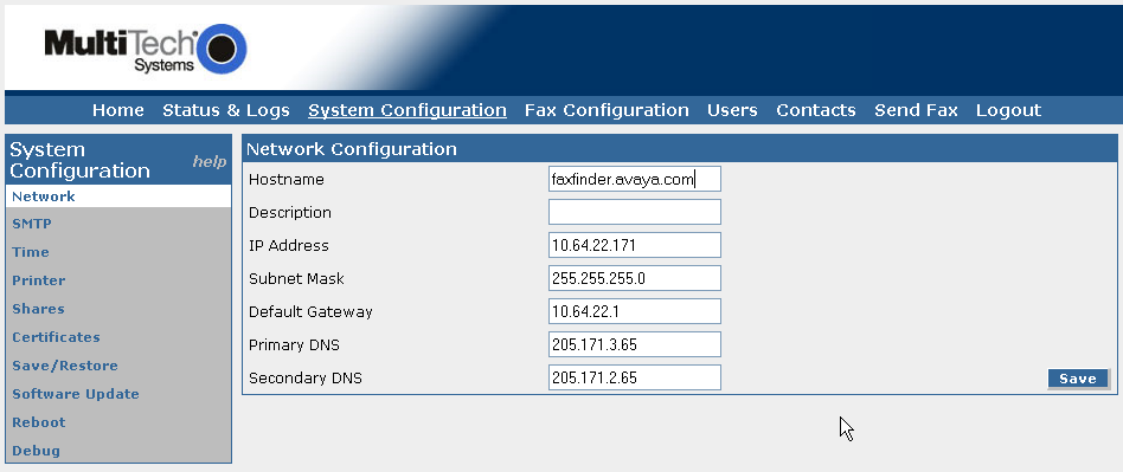
This section describes the configuration of Multi-Tech FaxFinder® IP Fax Server. For further instructions on configuring FaxFinder, consult the Administrator User Guide [4].

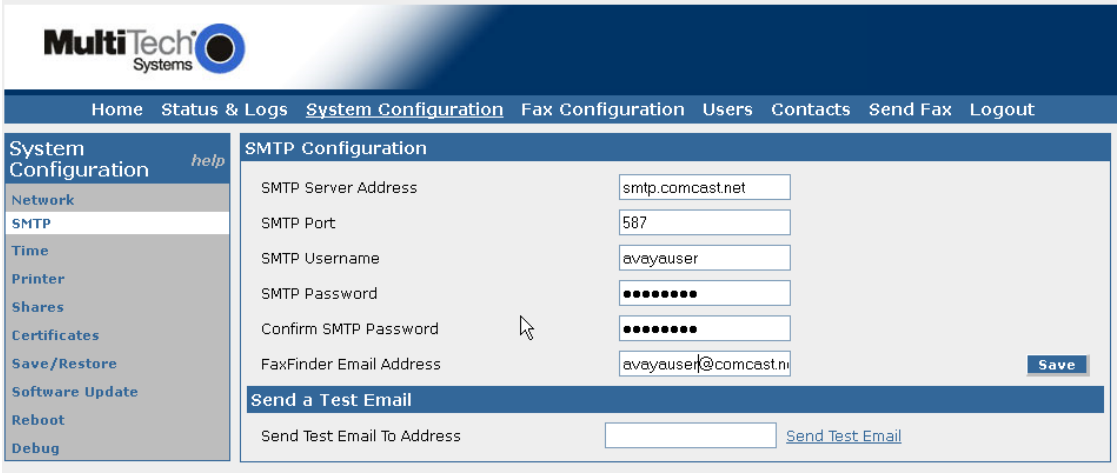
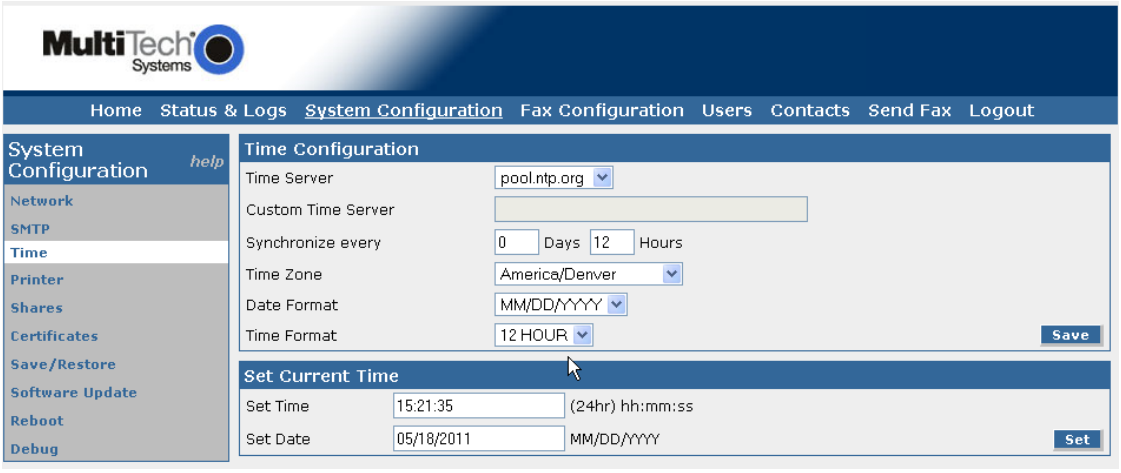
7.1. Configure FaxFinder Details

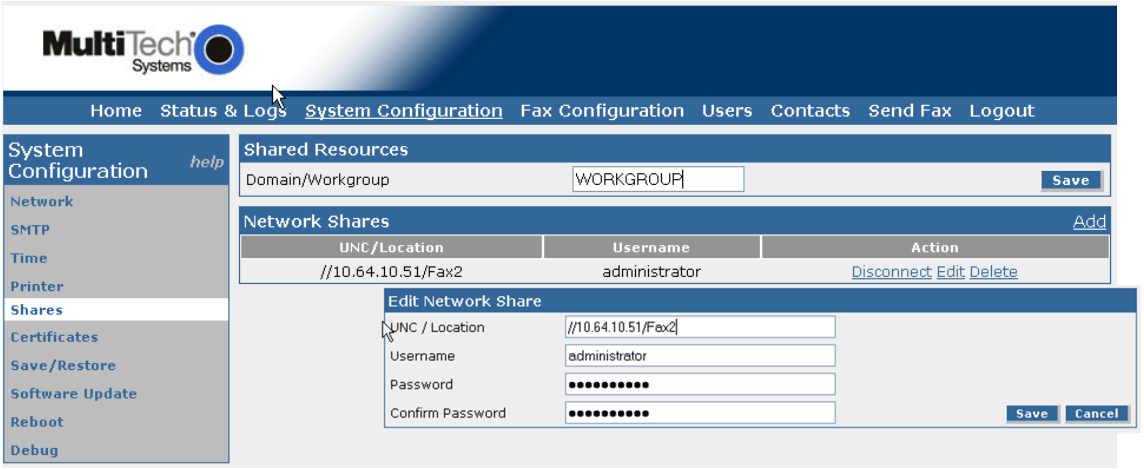
The configuration procedures covered in this section include tasks in the following sub categories:

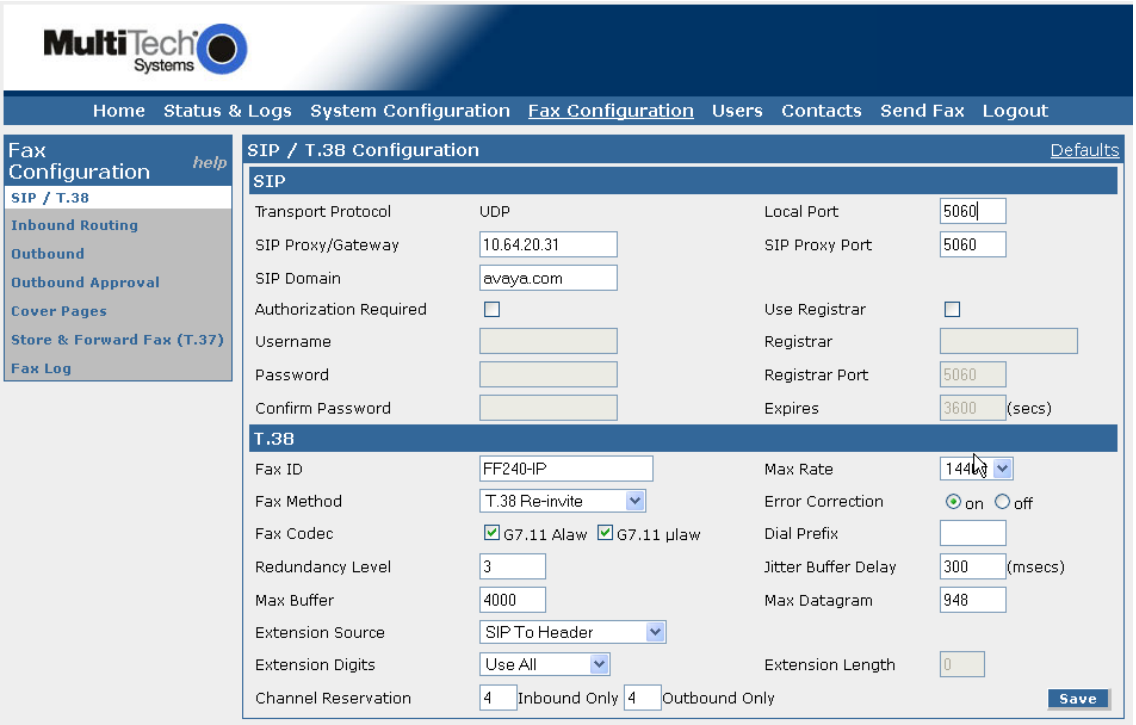
1. System Configuration
    - Launch FaxFinder web configuration tool
    - Configure Network Settings
    - Configure SMTP Settings
    - Configure Time Settings
    - Configure Printers and Network Shares
2. Fax Configuration
    - Configure SIP/T.38
    - Configure Inbound Routing
    - Configure Outbound rules
3. Configure Users and Contacts

The examples shown in this section refer to Site A. Unless specified otherwise, these same steps also apply to Site B using values appropriate from **Figure 1**.

Step	Description
1.	**System Configuration: Launch FaxFinder web configuration tool** The FaxFinder configuration is performed using a web browser. Access the tool by pointing your web browser to http://<ip_address>. The home page is displayed below: 
	System Configuration: Configure Network Settings FaxFinder ships with a default network address, so initial configuration needs to be performed from a browser on a host manually configured with an address on the same network segment. Once connected, navigate to **System Configuration > Network** to assign an appropriate **Hostname, IP Address**, and other relevant network settings as shown below. Click **Save** to commit the changes which will reboot the device. To complete the remaining settings, access the web configuration tool from a host that has access to the network segment of the newly configured address. 

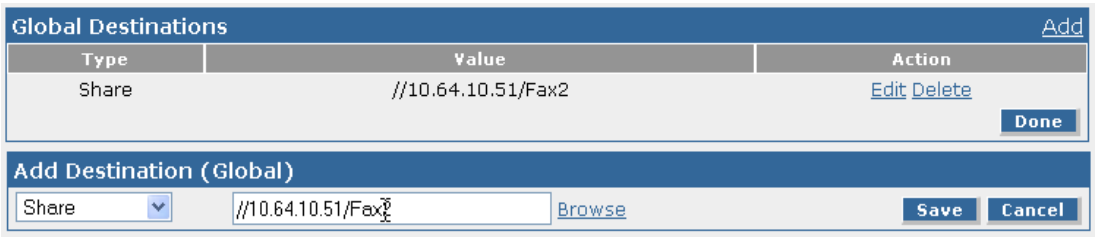
Step	Description
	System Configuration: Configure SMTP Settings FaxFinder can be configured to generate email alerts for a number of events. Navigate to **System Configuration > SMTP** to configure the outgoing mail gateway, click **Save** to commit the changes. Below is an example: 
	System Configuration: Configure Time Settings Set the current date and time, it is also recommended that an NTP server be configured to keep the system time in synch with other servers. Click **Set** and **Save** when entries are completed in each section. Below is an example of the settings used in the tested configuration: 

Step	Description
	System Configuration: Configure Printers and Network Shares FaxFinder can be configured to deliver inbound faxes to an email address, to a printer, or to a network share. In the tested configuration, all inbound faxes were saved to a network share. To add a share, click the **Add** link and provide the path and credentials for the share. The share was previously configured, however the **Edit** dialog shown below looks similar to the **Add** dialog: 

Step	Description
2.	**Fax Configuration: Configure SIP/T.38** Navigate to **Fax Configuration > SIP / T.38** and provide the appropriate information for the Session Manager in the SIP section. Note that at this time, UDP is the only option for communications with Session Manager. Default T.38 settings were used in the compliance tests. 

Step	Description
	Fax Configuration: Configure Inbound Routing Navigate to **Fax Configuration > Inbound Routing** to define Global, Default and specific Recipient routing rules. For each rule, a network share, email address or printer can be defined for fax delivery. Click on **Edit** in each section to define or modify the respective rules. Below is a view of the rules used in the tested configuration:

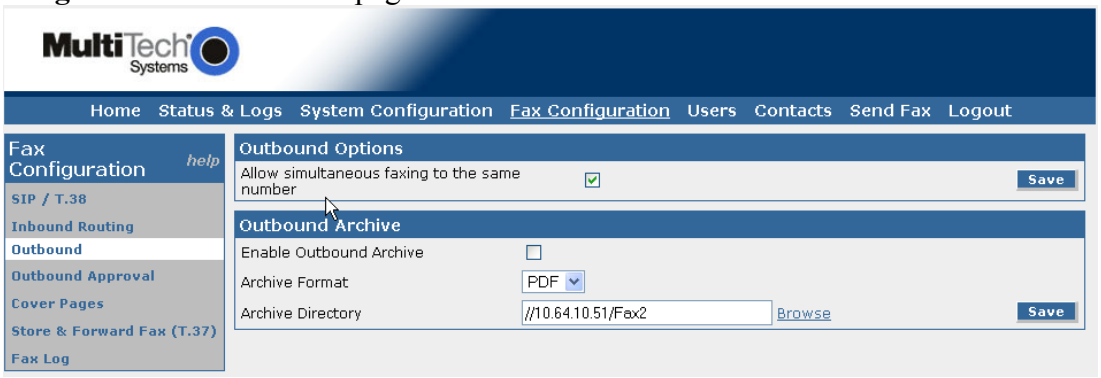
Global Routing was configured by clicking the **Add** link (from the dialog that appears when the **Edit** link is clicked in **Global Routing**), this rule applies to all Faxes received, in addition to any other routing rules:



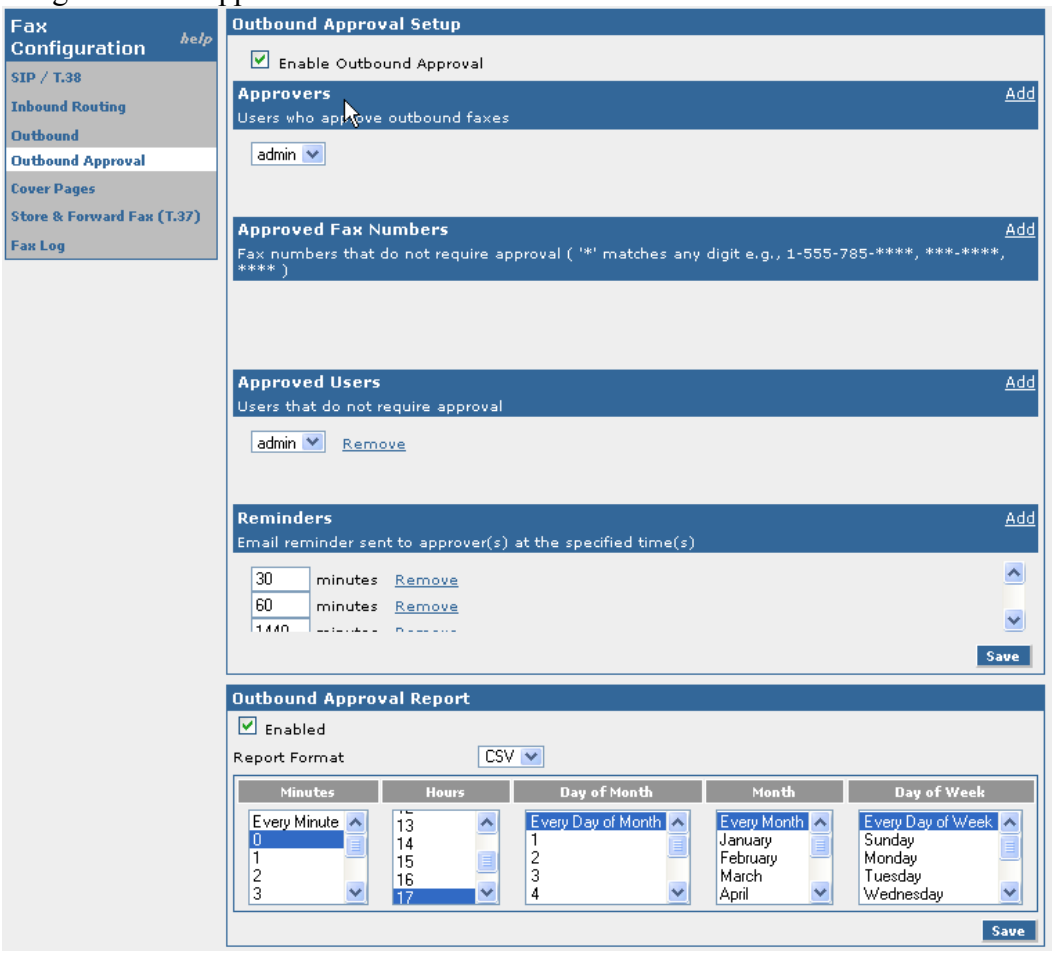
A default destination can be defined if no other routing policies apply:

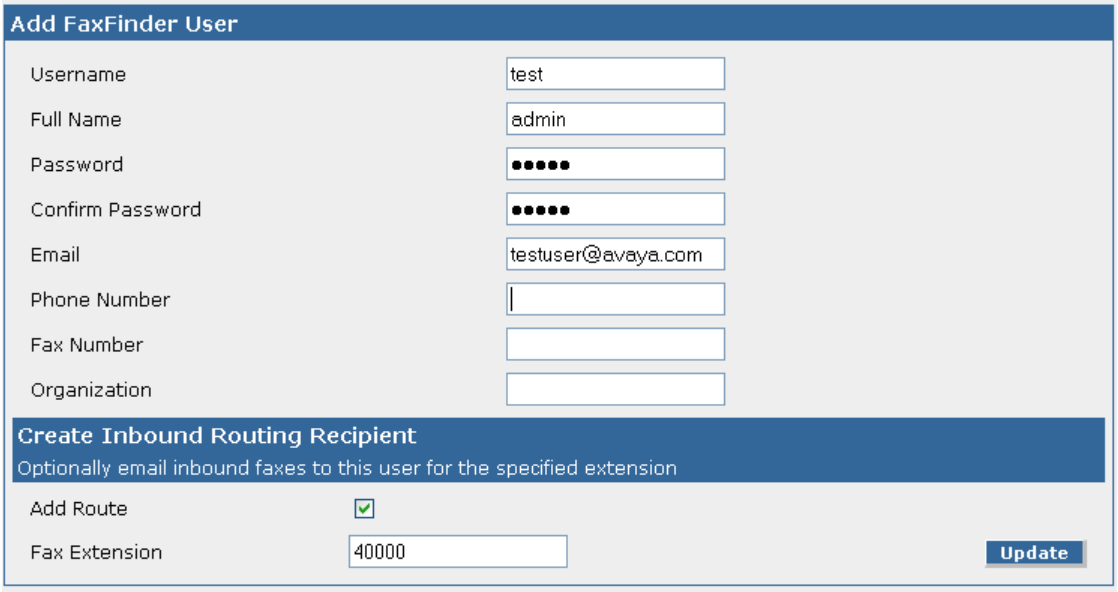
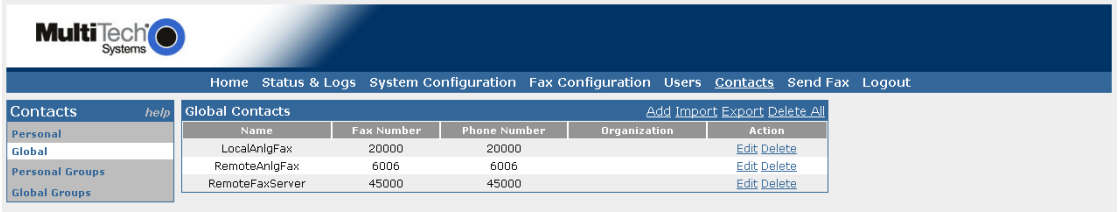
A Recipient Routing rule will automatically be created when users are configured (in the following Step 3).

Step	Description
	Fax Configuration: Configure Outbound Rules Configuration is needed only if an archive of outbound faxes is to be used. In the tested configuration, outbound archiving was configured to save in PDF format to the network share that was used in the previous step for inbound fax delivery. This was intermittently enabled and disabled by clicking on the **Enable Outbound Archive** selection on the **Fax Configuration > Outbound** page.



An Outbound approval rule was used to hold outbound faxes for a portion of the testing. This was not a requirement, but was a useful method for traffic test scenarios. The approval setup simply requires a check on the **Enable Outbound Approval** setting, and selecting a **User** to approve outbound faxes:

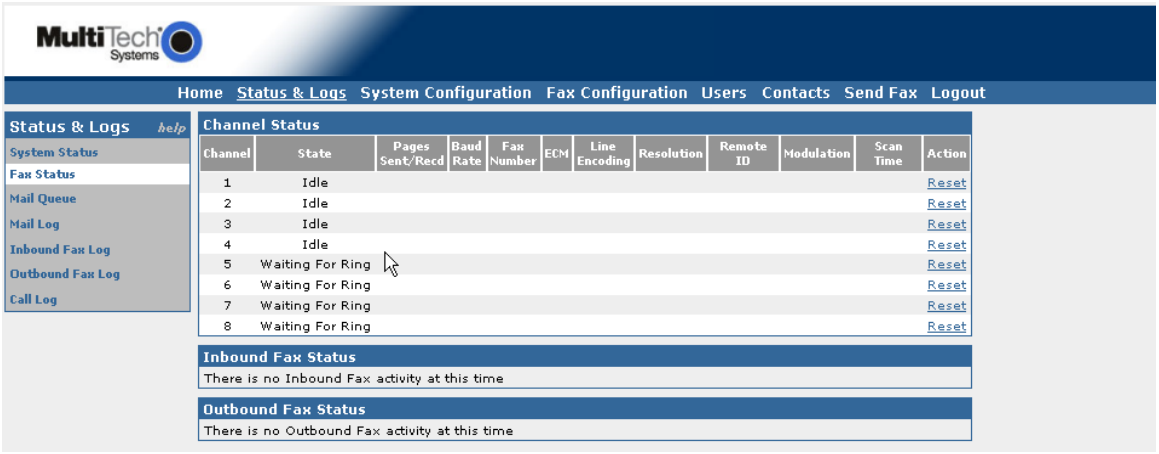


Step	Description
3.	**Configure Users and Contacts** Two users were configured, an administrator (**admin**) and a standard user (**test**).  To create a user, navigate to the **Users** tab, then click the **Add** link and enter a **Username**, Full Name, Password and Email address for each user. In addition, if a user has a unique inbound fax extension, a routing rule can be created by providing information in the lower section of the form.  Global and Personal contacts and Groups can be configured by clicking on the **Contacts** tab. In the tested configuration, these were used to simplify sending proceedures. See the Administration Guide [4] for complete instructions on managing contacts. 

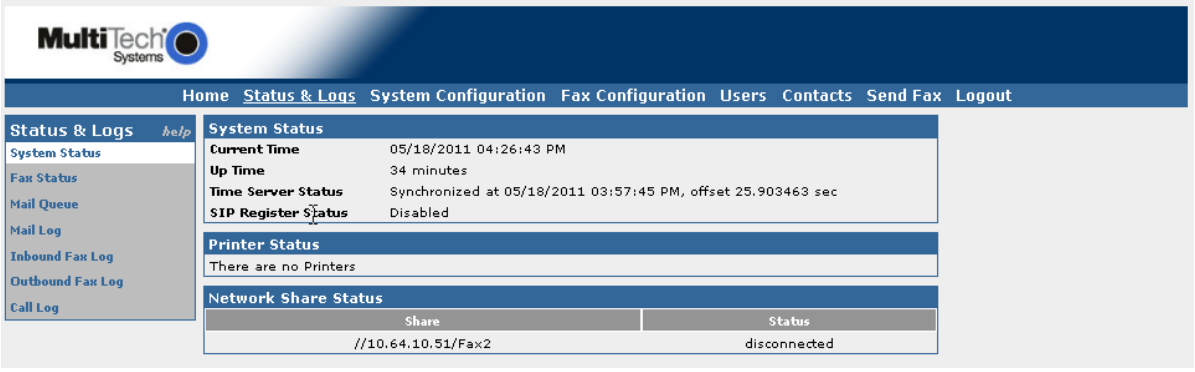
8. Verification Steps

The following steps may be used to verify the configuration:

- From Avaya Aura® Communication Manager SAT, use the **status signaling-group** command to verify that the signaling groups are in-service.
- From Communication Manager SAT, use the **status trunk-group** command to verify that the trunk groups are in-service.
- Verify that fax calls can be placed to/from Multi-Tech FaxFinder® IP Fax Server servers at each site.
- From Communication Manager SAT, use the **list trace tac** command to verify that fax calls are routed to the expected trunks.
- From Avaya Aura® System Manager, confirm that the Entity Link between Avaya Aura® Session Manager and the FaxFinder server is in service.
- From the FaxFinder web interface, navigate to **Status & Logs > Fax Status** to see the current status of each port and any inbound or outbound fax activity currently in progress:



Additional System Status information such as the status of connectivity to Session Manager and network shares can be found on the **Status & Logs > System Status** page:



Additional status screens showing mail queues and logs, inbound and outbound fax logs etc are also available (not pictured) from the Status and Logs web pages.

9. Conclusion

These Application Notes describe the procedures required to configure Multi-Tech FaxFinder® IP Fax Server interoperate with Avaya Aura® Communication Manager and Avaya Aura® Session Manager. Multi-Tech FaxFinder® IP Fax Server successfully passed compliance testing.

10. Additional References

[1] *Avaya Aura™ Communication Manager Feature Description and Implementation*, Doc # 555-245-205, Release 6.0, Issue 8.0, June, 2010.

[2] *Administering Avaya Aura™ Communication Manager*, Doc # 03-300509, Release 6.0, Issue 6.0, June, 2010.

[3] *Administering Avaya Aura™ Session Manager*, Doc # 03-603324, Release 6.0, Issue 3, August, 2010.

[4] *FaxFinder IP® Administrator User Guide,* S000493A, Version A Model: FF240-IP

Documentation for:

Avaya products may be found at http://support.avaya.com.
Multi-Tech products may be found at https://support.multitech.com

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya DevConnect Program at devconnect@avaya.com.