Avaya Solution & Interoperability Test Lab

Application Notes for Tandberg H.323 Videoconference Endpoints and Bridges with Avaya Communication Manager – Issue 1.0

Abstract

These Application Notes describe a compliance-tested solution comprised of Avaya Communication Manager, the Tandberg 150 MXP, the Tandberg 990 MXP, the Tandberg 1000 MXP, and the Tandberg MPS 200. The Tandberg 150 MXP, Tandberg 990 MXP, and Tandberg 1000 MXP are videoconference endpoints and the Tandberg MPS 200 is a videoconference bridge or Multipoint Control Unit (MCU). The Tandberg 990 MXP also provides an optional videoconference bridge capability, supporting up to three video endpoints and one audio endpoint with Avaya Communication Manager. The solution described in these Application Notes pertains only to H.323 interoperability between Avaya Communication Manager and the aforementioned Tandberg videoconference endpoints and MCU. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

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1. Introduction

These Application Notes describe a compliance-tested solution comprised of Avaya Communication Manager 3.1.2, the Tandberg 150 MXP, the Tandberg 990 MXP, the Tandberg 1000 MXP, and the Tandberg MPS 200. The Tandberg 150 MXP, Tandberg 990 MXP, and Tandberg 1000 MXP are videoconference endpoints and the Tandberg MPS 200 is a videoconference bridge or Multipoint Control Unit (MCU). The Tandberg 990 MXP also provides an optional videoconference bridge capability, supporting up to three video endpoints and one audio endpoint with Avaya Communication Manager. The solution described in these Application Notes pertains only to H.323 interoperability between Avaya Communication Manager and the aforementioned Tandberg videoconference endpoints and MCU.

Figure 1 illustrates a sample configuration consisting of an Avaya S8710 Media Server, an Avaya G650 Media Gateway, Avaya IP Softphone with Video, a Polycom VSX3000, Avaya 4600 Series IP Telephones, Avaya 2400 and 8400 Series Digital Telephones, analog telephones, a Tandberg 150 MXP, a Tandberg 990 MXP, a Tandberg 1000 MXP, a Tandberg MPS 200, and a Tandberg Gatekeeper. Avaya Communication Manager runs on the S8710 Media Server. The solution described herein is also extensible to other Avaya Media Servers and Media Gateways, as well as similar Tandberg videoconference endpoints and bridges that run the same software versions used during compliance testing (see Section 2). The Tandberg 150 MXP registers with Avaya Communication Manager as an unauthenticated H.323 endpoint, whereas the Tandberg 990MXP and Tandberg 1000 MXP register with Avaya Communication Manager as authenticated H.323 endpoints. The Tandberg MPS 200 registers with the Tandberg Gatekeeper. An H.323 IP trunk connects Avaya Communication Manager and the Tandberg Gatekeeper. Avaya Communication Manager routes calls intended for the Tandberg MPS 200 to the Tandberg Gatekeeper, which in turn routes the calls to the Tandberg MPS 200. Similarly, for calls originated by the Tandberg MPS 200, the Tandberg Gatekeeper routes the calls to Avaya Communication Manager.

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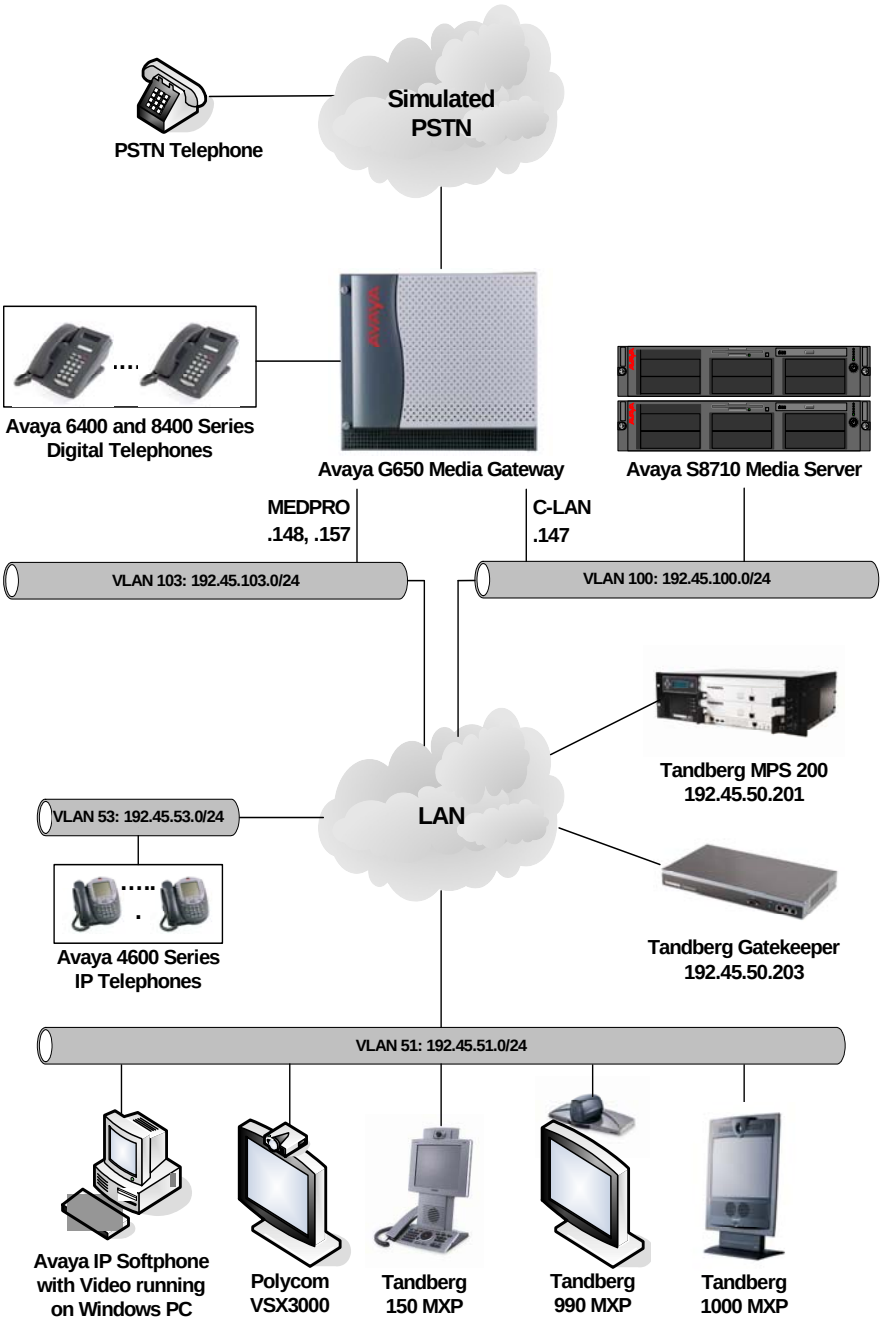

Figure 1: Sample configuration.

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2. Equipment and Software Validated

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

Equipment	Software/Firmware
Avaya S8710 Media Server	Avaya Communication Manager 3.1.2 (R013x.01.2.632.1)
Avaya G650 Media Gateway	-
TN2312BP IP Server Interface	HW12 FW 31
TN799DP C-LAN Interface	HW1 FW 17
TN2302AP IP Media Processor	HW20 FW 112
Avaya IP Softphone	5.2 Service Pack 1
Avaya IP Softphone Integrator for Polycom Video	2.0.103
Avaya 4600 Series IP Telephones	2.6 (4610SW H.323) 2.5 (4625SW H.323)
Avaya 2400 and 8400 Series Digital Telephones	-
Tandberg 150 MXP	L4.1.1
Tandberg 990 MXP	F5.0.2
Tandberg 1000 MXP	F5.0.2
Tandberg MPS200	J3.2
Tandberg Gatekeeper	N5.0
Polycom VSX3000	8.0.3
Analog Telephones	-

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3. Configure Avaya Communication Manager

This section describes the steps for configuring IP codec sets, IP network regions, video-enabled stations, and video-enabled IP trunks on Avaya Communication Manager. The steps are performed from the Avaya Communication Manager System Access Terminal (SAT) interface.

3.1. System Parameters

This section reviews the features that are required for the solution described in these Application Notes. For required licensed features that are not enabled in the **system-parameters special-applications** and **system-parameters customer-options** forms discussed below, contact an authorized Avaya account representative to obtain the licenses.

Step	Description
1.	Enter the **display system-parameters special-applications** command. On Page 5 of the **system-parameters special-applications** form, verify that **(SA8697) – 3rd Party H.323 Endpoint Support** is set to "**y**".

```
display system-parameters special-applications                  Page   5 of   6
                              SPECIAL APPLICATIONS

                   (SA8622) - Enhanced Call Pickup Alerting? n
                         (SA8623) - Chained Call Forwarding? n
                                  (SA8652) - No Hold Consult? n
     (SA8654) - Crisis Alert Call Monitoring and Recording? n
               (SA8661) - Increased Automatic Wakeup Calls? n
                     (SA8662) - Expanded PMS Name & Number? n
                              (SA8684) - PMS Wakeup Message? n
     (SA8693) - Connectivity Check for Direct IP Shuffling? n
              (SA8694) - Enhanced Redirection Notification? n
               (SA8697) - 3rd Party H.323 Endpoint Support? y
  (SA8701) - Net Region Support H.323 Endpoints Behind ALG? n
                    (SA8702) - CDR Enhancements for Network? n
            (SA8731) - Block Outgoing Bridged Call Display? n
                     (SA8734) - Enhanced Extension Display? n
            (SA8741) - CDR Identifier for IP Station Calls? n
              (SA8744) - Block Name for Room to Room Calls? n
          (SA8747) - Softphone Indication on DCP Terminals? n
```


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Step	Description
2.	Enter the **display system-parameters customer-options** command. On Page 2 of the **system-parameters customer-options** form, verify that there are sufficient licenses for the following: • **Maximum Administered H.323 Trunks** – must be large enough to accommodate the number of H.323 trunks (channels) to the Tandberg MPS 200. • **Max Concur Registered Unauthenticated H.323 Stations** – must be large enough to include the number of unauthenticated Tandberg videoconference endpoints. In this sample configuration, the Tandberg 150 is an unauthenticated H.323 station. • **Maximum Video Capable H.323 Stations** – must be equal to or greater than the number of H.323 video stations. In this sample configuration, the Polycom VSX3000, Tandberg 150 MXP, Tandberg 990 MXP, and Tandberg 1000 MXP are H.323 video stations. Each Polycom VSX3000 is administered as three H.323 video stations, and each Tandberg 990 MXP and Tandberg 1000 MXP is administered as four H.323 video stations. • **Maximum Video Capable IP Softphones** – must be equal to or greater than the number of Avaya IP Softphones enabled with video capabilities.

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

IP PORT CAPACITIES                                              USED
                     Maximum Administered H.323 Trunks: 200   148
           Maximum Concurrently Registered IP Stations: 1000  8
             Maximum Administered Remote Office Trunks: 0     0
Maximum Concurrently Registered Remote Office Stations: 0     0
              Maximum Concurrently Registered IP eCons: 10    0
  Max Concur Registered Unauthenticated H.323 Stations: 100   1
                  Maximum Video Capable H.323 Stations: 100   12
                   Maximum Video Capable IP Softphones: 100   6
                       Maximum Administered SIP Trunks: 200   153

   Maximum Number of DS1 Boards with Echo Cancellation: 0     0
                             Maximum TN2501 VAL Boards: 1     1
                     Maximum G250/G350/G700 VAL Sources: 0     0
           Maximum TN2602 Boards with 80 VoIP Channels: 2     0
          Maximum TN2602 Boards with 320 VoIP Channels: 2     1
   Maximum Number of Expanded Meet-me Conference Ports: 0     0

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


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Step	Description
3.	On Page 4 of the **system-parameters customer-options** form, verify that **IP Trunks**, **IP Stations**, and **ISDN-PRI** are set to "**y**".

```
display system-parameters customer-options                      Page   4 of  10
                                OPTIONAL FEATURES

   Emergency Access to Attendant? y                             IP Stations? y
           Enable 'dadmin' Login? y               Internet Protocol (IP) PNC? n
           Enhanced Conferencing? y                         ISDN Feature Plus? n
                     Enhanced EC500? y            ISDN Network Call Redirection? n
    Enterprise Survivable Server? n                          ISDN-BRI Trunks? n
       Enterprise Wide Licensing? n                                 ISDN-PRI? y
              ESS Administration? n               Local Survivable Processor? n
          Extended Cvg/Fwd Admin? n                     Malicious Call Trace? n
     External Device Alarm Admin? n                  Media Encryption Over IP? y
  Five Port Networks Max Per MCC? n     Mode Code for Centralized Voice Mail? n
                 Flexible Billing? n
   Forced Entry of Account Codes? n                  Multifrequency Signaling? y
      Global Call Classification? n Multimedia Appl. Server Interface (MASI)? n
             Hospitality (Basic)? y         Multimedia Call Handling (Basic)? n
 Hospitality (G3V3 Enhancements)? n      Multimedia Call Handling (Enhanced)? n
                       IP Trunks? y

           IP Attendant Consoles? y
```

3.2. IP Network Region and IP Codec Set

Step	Description
1.	Enter the **change ip-codec-set i** command where **i** is an available codec set number. On Page 1 of the **ip-codec-set** form, enter the audio codecs listed below, and set **Media Encryption** to "**none**". Of the codecs listed below, the Tandberg videoconference endpoints support G.722.1 and G.711, the Polycom VSX3000 supports SIREN14, G.722.1, G.729A and G.711, and Avaya IP Softphone supports G.729A and G.711.

```
change ip-codec-set 2                                           Page   1 of   2
                            IP Codec Set

    Codec Set: 2

    Audio        Silence      Frames   Packet
    Codec        Suppression  Per Pkt  Size(ms)
 1: SIREN14-S48K                 1        20
 2: G.722.1-32K                  1        20
 3: G.729A            n          2        20
 4: G.711MU           n          2        20
 5:
 6:
 7:

     Media Encryption
 1: none
 2:
 3:
```


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Step	Description
2.	On Page 2 of the **ip-codec-set** form, set **Allow Direct-IP Multimedia** to "**y**".

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

                           IP Codec Set

                              Allow Direct-IP Multimedia? y
              Maximum Call Rate for Direct-IP Multimedia:  384:Kbits

                     Mode                Redundancy
    FAX              relay                0
    Modem            off                  0
    TDD/TTY          US                   3
    Clear-channel    n                    0
```

3.	Enter the **change ip-network-region j** command where **j** is an unused network region number. Set **Intra-region IP-IP Direct Audio** and **Inter-region IP-IP Direct Audio** to "**yes**".

```
change ip-network-region 2                                     Page   1 of  19
                                IP NETWORK REGION
  Region: 2
Location:         Authoritative Domain: devconnect.com
    Name:
MEDIA PARAMETERS                Intra-region IP-IP Direct Audio: yes
      Codec Set: 2              Inter-region IP-IP Direct Audio: yes
   UDP Port Min: 2048                     IP Audio Hairpinning? y
   UDP Port Max: 3029
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
```


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Step	Description
4.	On Page 2 of the **ip-network-region** form, enter "**any-auth**" for the first **Security Procedures** entry.

```
change ip-network-region 2                                      Page   2 of  19
                                IP NETWORK REGION


INTER-GATEWAY ALTERNATE ROUTING
 Incoming LDN Extension:
 Conversion To Full Public Number - Delete:    Insert:
 Maximum Number of Trunks to Use:

 BACKUP SERVERS IN PRIORITY ORDER    SECURITY PROCEDURES
 1                                   1   any-auth
 2                                   2
 3                                   3
 4                                   4
 5
 6
```

5.	On Page 3 of the **ip-network-region** form, enter the number of the IP codec set configured in Steps 1 – 2 for each pair of IP network regions on which inter-region video and audio communications are expected. For simplicity during compliance testing, the Tandberg videoconference endpoints, Tandberg Gatekeeper, Avaya IP Softphone with Video, and Polycom VSX3000 were assigned to the same IP network region (2), and the Avaya H.323 telephones were assigned to IP network region 1.

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

                    Inter Network Region Connection Management

 src dst codec direct   Total           Video                            Dyn
 rgn rgn  set   WAN  WAN-BW-limits  WAN-BW-limits  Intervening-regions  CAC IGAR
 2   1    2     y        :NoLimit       :NoLimit                           n
 2   2    2
 2   3
 2   4
 2   5
 2   6
 2   7
 2   8
 2   9
 2   10
 2   11
 2   12
 2   13
 2   14
 2   15
```


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3.3. Station for Avaya IP Softphone with Video

Enter the **change station k** command, where **k** is the extension of an existing station. Set **IP SoftPhone** and **IP Video Softphone** to "**y**" to enable the station for Avaya IP Softphone with Video. Repeat this step for each station to be enabled with Avaya IP Softphone with Video.

```
change station 50005                                          Page   1 of   4
                                     STATION

Extension: 50005                           Lock Messages? n          BCC: 0
     Type: 4625                            Security Code: *           TN: 1
     Port: S00110                        Coverage Path 1:            COR: 1
     Name: STA-50005                     Coverage Path 2:            COS: 1
                                         Hunt-to Station:

STATION OPTIONS
              Loss Group: 19             Personalized Ringing Pattern: 1
                                                    Message Lamp Ext: 50005
            Speakerphone: 2-way                  Mute Button Enabled? y
        Display Language: english                   Expansion Module? n
 Survivable GK Node Name:
          Survivable COR: internal                 Media Complex Ext:
   Survivable Trunk Dest? y                              IP SoftPhone? y

                                                   IP Video Softphone? y

                                                  Customizable Labels? y
```

3.4. Station for Tandberg 150 MXP

Enter the **add station m** command, where **m** is an unused extension. Enter a descriptive **Name** and set **Type** to "**H.323**", **Authentication Required** to "**n**", and **IP Video** to "**y**". Repeat this step for each Tandberg 150 MXP.

```
add station 50501                                             Page   1 of   3
                                     STATION

Extension: 50501                           Lock Messages? n          BCC: 0
     Type: H.323                           Security Code:             TN: 1
     Port: IP                            Coverage Path 1:            COR: 1
     Name: Tandberg 150                  Coverage Path 2:            COS: 1
                                         Hunt-to Station:          Tests? y

STATION OPTIONS
              Loss Group: 19                Message Waiting Indicator: none

                                              Authentication Required? n


          Survivable COR: internal
   Survivable Trunk Dest? y
            DTMF over IP: in-band
                                                                IP Video? y
```


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3.5. Station for Tandberg 990 MXP / 1000 MXP

Each Tandberg 990 MXP and Tandberg 1000 MXP require the administration of four stations in Avaya Communication Manager. The procedures below are described in terms of the Tandberg 990 MXP, but are also applicable to the Tandberg 1000 MXP.

Step	Description
1.	Enter the **add station n** command, where **n** is an unused extension, to add the "first" station for the Tandberg 990 MXP. Enter a descriptive **Name** and a **Security Code**, and set **Type** to "**H.323**", **Authentication Required** to "**y**", and **IP Video** to "**y**".

	`add station 50017  Page 1 of 3`
	`STATION`
	`Extension: 50017  Lock Messages? n  BCC: 0`
	`**Type: H.323**  **Security Code: 12345**  TN: 1`
	`Port: IP  Coverage Path 1:  COR: 1`
	`**Name: Tandberg 990-1**  Coverage Path 2:  COS: 1`
	`Hunt-to Station:  Tests? y`
	`STATION OPTIONS`
	`Loss Group: 19  Message Waiting Indicator: none`
	`**Authentication Required? y**`
	`Survivable COR: internal`
	`Survivable Trunk Dest? y`
	`DTMF over IP: in-band`
	`**IP Video? y**

2.	Repeat Step 1 to add the "second" station for the Tandberg 990 MXP.
3.	Repeat Step 1 to add the "third" station for the Tandberg 990 MXP.
4.	Repeat Step 1 to add the "fourth" station for the Tandberg 990 MXP.
5.	Enter the **change station n** command, where **n** is the extension of the "first" station configured for the Tandberg 990 MXP. On Page 1 of the **station** form, set **Hunt-to Station** to the extension of the "second" station configured for the Tandberg 990 MXP.

	`change station 50017  Page 1 of 3`
	`STATION`
	`Extension: 50017  Lock Messages? n  BCC: 0`
	`Type: H.323  Security Code: 123456  TN: 1`
	`Port: S00192  Coverage Path 1:  COR: 1`
	`Name: VSX3000-1  Coverage Path 2:  COS: 1`
	`**Hunt-to Station: 50018**  Tests? y`
	`STATION OPTIONS`
	`Loss Group: 19  Message Waiting Indicator: none`
	`Authentication Required? y`
	`Survivable COR: internal`
	`Survivable Trunk Dest? y`
	`DTMF over IP: in-band`
	`IP Video? y`

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Step	Description
6.	Repeat Step 5 for the "second" station configured for the Tandberg 990 MXP, except set **Hunt-to Station** to the extension of the "third" station configured for the Tandberg 990 MXP.
7.	Repeat Step 5 for the "third" station configured for the Tandberg 990 MXP, except set **Hunt-to Station** to the extension of the "fourth" station configured for the Tandberg 990 MXP.
8.	Repeat Step 5 for the "fourth" station configured for the Tandberg 990 MXP, except set **Hunt-to Station** to the extension of the "first" station configured for the Tandberg 990 MXP.
9.	Repeat Steps 1 – 8 for each Tandberg 990 MXP.

3.6. Polycom VSX3000

Each Polycom VSX3000 requires the administration of three stations in Avaya Communication Manager.

Step	Description
1.	Enter the **add station p** command, where **p** is an unused extension, to add the "first" station for the Polycom VSX3000. Enter a descriptive **Name** and a **Security Code**, and set **Type** to "**H.323**", **Authentication Required** to "**y**", and **IP Video** to "**y**".
	add station 50017 Page 1 of 3 STATION Extension: 50017 Lock Messages? n BCC: 0 **Type: H.323** **Security Code: 123456** TN: 1 Port: IP Coverage Path 1: COR: 1 **Name: VSX3000-1** Coverage Path 2: COS: 1 Hunt-to Station: Tests? y STATION OPTIONS Loss Group: 19 Message Waiting Indicator: none **Authentication Required? y** Survivable COR: internal Survivable Trunk Dest? y DTMF over IP: in-band **IP Video? y**
2.	Repeat Step 1 to add the "second" station for the Polycom VSX3000.
3.	Repeat Step 1 to add the "third" station for the Polycom VSX3000.

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Step	Description
4.	Enter the **change station p** command, where **p** is the extension of the "first" station configured for the Polycom VSX3000. On Page 1 of the **station** form, set **Hunt-to Station** to the extension of the "second" station configured for the Polycom VSX3000.

```
change station 50017                                          Page   1 of   3
                                     STATION

Extension: 50017                           Lock Messages? n          BCC: 0
     Type: H.323                           Security Code: 123456      TN: 1
     Port: S00192                        Coverage Path 1:            COR: 1
     Name: VSX3000-1                     Coverage Path 2:            COS: 1
                                         Hunt-to Station: 50018    Tests? y

STATION OPTIONS
              Loss Group: 19                Message Waiting Indicator: none

                                              Authentication Required? y
          Survivable COR: internal
   Survivable Trunk Dest? y
            DTMF over IP: in-band
                                                                IP Video? y
```

5.	Repeat Step 4 for the "second" station configured for the Polycom VSX3000, except set **Hunt-to Station** to the extension of the "third" station configured for the Polycom VSX3000.
6.	Repeat Step 4 for the "third" station configured for the Polycom VSX3000, except set **Hunt-to Station** to the extension of the "first" station configured for the Polycom VSX3000.
7.	Repeat Steps 1 – 6 for each Polycom VSX3000.

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3.7. H.323 IP Trunk

This section describes the steps for configuring the Avaya Communication Manager side of the H.323 IP trunk to the Tandberg Gatekeeper.

Step	Description
1.	Enter the **list ip-interface all** command and verify that there is at least one C-LAN and MedPro board in the same IP network region as the one configured in Section 3.2 Steps 3 – 5. Note the **Node Names** of the C-LAN boards.

```
list ip-interface all                                                   Page   1

                                IP INTERFACES
                                                                         Net
ON Type   Slot   Code Sfx Node Name/      Subnet Mask     Gateway Address Rgn VLAN
                          IP-Address
-- ----   ----   ---- --- --------------- --------------- --------------- --- ----
y C-LAN   01A02  TN799  D CLAN-1A02       255.255.255.0   192.45.100.1    1   n
                          192.45.100.144
y MEDPRO  01A03  TN2302   MEDPRO-1A03     255.255.255.0   192.45.103.1    3   n
                          192.45.103.145
y C-LAN   01A06  TN799  D CLAN-1A06       255.255.255.0   192.45.100.1    2   n
                          192.45.100.147
y MEDPRO  01A13  TN2602   MEDPRO-1A13     255.255.255.0   192.45.103.1    2   n
                          192.45.103.148
y C-LAN   01B02  TN799  D CLAN-1B02       255.255.255.0   192.45.100.1    1   n
                          192.45.100.155
y MEDPRO  01B03  TN2302   MEDPRO-1B03     255.255.255.0   192.45.103.1    1   n
                          192.45.103.156
y MEDPRO  01B13  TN2302   MEDPRO-1B13     255.255.255.0   192.45.103.1    2   n
                          192.45.103.157
```

2.	Enter the **change node-names ip** command. Specify a node name for the Tandberg Gatekeeper and enter its IP address.

```
change node-names ip                                          Page   1 of   1
                                IP NODE NAMES
    Name              IP Address          Name              IP Address
CLAN-1A02           192.45 .100.144                          .   .   .
CLAN-1A06           192.45 .100.147                          .   .   .
CLAN-1B02           192.45 .100.155                          .   .   .
MEDPRO-1A03         192.45 .103.145                          .   .   .
MEDPRO-1A13         192.45 .103.148                          .   .   .
MEDPRO-1B03         192.45 .103.156                          .   .   .
MEDPRO-1B13         192.45 .103.157                          .   .   .
TandbergGK          192.45 .50 .203                          .   .   .
```


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Step	Description
3.	Enter the **add signaling-group q** command, where **q** is an unused signaling group number. Set **Near-end Node Name** to the Node Name of one of the C-LAN boards noted in Step 1, **Far-End Node Name** to the Node Name configured for the Tandberg Gatekeeper in Step 2, and **Far-End Network Region** to the IP network region configured in Section 3.2 Steps 3 - 5. Set the other bolded fields below to the values indicated.

```
add signaling-group 11                                          Page   1 of   5
                                SIGNALING GROUP

 Group Number: 11             Group Type: h.323
                            Remote Office? n          Max number of NCA TSC: 0
                                      SBS? n           Max number of CA TSC: 0
                                IP Video? y        Trunk Group for NCA TSC:
       Trunk Group for Channel Selection:
          Supplementary Service Protocol: a
                         T303 Timer(sec): 10

   Near-end Node Name: CLAN-1A06             Far-end Node Name: TandbergGK
 Near-end Listen Port: 1719                Far-end Listen Port: 1719
                                         Far-end Network Region: 2
         LRQ Required? y                  Calls Share IP Signaling Connection? n
         RRQ Required? n
     Media Encryption? 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
                                                        IP Audio Hairpinning? y
                                                Interworking Message: PROGress
                                            DCP/Analog Bearer Capability: 3.1kHz
```

4.	Enter the **add trunk-group r** command, where **r** is an unused trunk group number. On Page 1 of the **trunk-group** form, enter a descriptive **Group Name** and a Trunk Access Code (**TAC**) that is valid under the provisioned dial plan, and set **Signaling Group** to the signaling group configured in Step 3. Set the other bolded fields below to the values indicated. The **Number of Members** in the trunk group must be large enough to accommodate the expected number of in-use conference lines on the Tandberg MPS 200.

```
add trunk-group 11                                              Page   1 of  21
                                TRUNK GROUP

Group Number: 11                   Group Type: isdn          CDR Reports: y
  Group Name: Tandberg Gatekeeper          COR: 1        TN: 1        TAC: 111
   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: 11
                                                 Number of Members: 30
```


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Step	Description
5.	On Page 3 of the **trunk-group** form, set the bolded fields below to the values indicated.

```
add trunk-group 11                                              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: private
                                             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
```

6.	Enter the **change signaling-group q** command, where **q** is the number of the signaling group number configured in Step 3. Set **Trunk Group for Channel Selection** to the trunk group configured in Steps 4 - 5.

```
change signaling-group 11                                       Page   1 of   5
                                SIGNALING GROUP

 Group Number: 11             Group Type: h.323
                            Remote Office? n          Max number of NCA TSC: 0
                                       SBS? n           Max number of CA TSC: 0
                                  IP Video? y        Trunk Group for NCA TSC:
       Trunk Group for Channel Selection: 11
          Supplementary Service Protocol: a
                           T303 Timer(sec): 10

   Near-end Node Name: CLAN-1A06             Far-end Node Name: TandbergGK
 Near-end Listen Port: 1719                Far-end Listen Port: 1719
                                        Far-end Network Region: 2
         LRQ Required? y                 Calls Share IP Signaling Connection? n
         RRQ Required? n
     Media Encryption? 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
                                                        IP Audio Hairpinning? y
                                                Interworking Message: PROGress
                                          DCP/Analog Bearer Capability: 3.1kHz
```

7.	Enter the **change private numbering** command. Ensure that **Network Level** is set to "**0**" and the **Level 2 Code** and **Level 1 Code** field values are blank.

```
change private-numbering                                        Page   1 of   1

                            NUMBERING - PRIVATE FORMAT

               Network Level: 0                PBX Identifier:
                Level 2 Code:                  Deleted Digits: 0
                Level 1 Code:
```


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3.8. Routing to the Tandberg MPS 200 via the Tandberg Gatekeeper

This section describes the configuration steps for routing calls to the Tandberg MPS 200 via the Tandberg Gatekeeper.

Step	Description
1.	Enter the **change feature-access-codes** command. For **Auto Alternate Routing (AAR) Access Code**, enter a FAC that is valid under the provisioned dial plan. In the example below, "**8**" is used to invoke AAR.

```
change feature-access-codes                                          Page   1 of   6
                                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: 8
    Auto Route Selection (ARS) - Access Code 1: 9     Access Code 2:
                 Automatic Callback Activation:        Deactivation:
Call Forwarding Activation Busy/DA: #97    All:        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:
                    Contact Closure   Open Code:          Close Code:
                    Contact Closure  Pulse Code:
```

Step	Description
2.	Enter the **change aar analysis x** command, where **x** is any digit. Add one or more entries as necessary as follows: • **Dialed String**, **Total Min** and **Max** – enter a number string with minimum and maximum length specifications that matches a conference access number configured on the Tandberg MPS 200 (see Section 4.4 Step 2). The number string "**855600**" with seven-digit minimum and maximum length below matches numbers 8556001 through 8556002. • **Route Pattern** – enter the number of an unused route pattern. The route pattern will be defined in the next step. • **Call Type** – set to "**aar**".

```
change aar analysis 8                                                Page   1 of   2
                             AAR DIGIT ANALYSIS TABLE
                                                                  Percent Full:    2

          Dialed           Total     Route    Call   Node  ANI
          String          Min  Max  Pattern   Type   Num   Reqd
    855600                7    7     11       aar          n
```


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Step	Description
3.	Enter the **change route-pattern t** command, where **t** is the number of the route pattern specified in Step 2. Add a routing preference entry as follows: • **Grp No** – enter the number of the trunk group configured in Section 3.7 Steps 4 - 5. • **FRL** – assign a Facility Restriction Level to this routing preference. "0" is the least restrictive. Thus, in this example, when an internal caller dials 8 (to invoke AAR) followed by the number 8556000, the call is routed to the trunk group connected to the Tandberg Gatekeeper.

```
change route-pattern 11                                          Page   1 of   3
                    Pattern Number: 9   Pattern Name: To MPS 200
                              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: 11   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 3 4 W     Request                                  Dgts Format
                                                           Subaddress
 1: y y y y y n  n            rest                                        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
```

4.	To allow external/PSTN callers to access the Tandberg MPS 200, ensure that the proper digit treatment is applied to incoming trunk calls from the PSTN. For example, the incoming called number can be manipulated to match one of the conference numbers that internal callers dial to access the Tandberg MPS 200.

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4. Tandberg

This section describes the steps for configuring the Tandberg videoconference endpoints, Tandberg Gatekeeper, and Tandberg MPS 200. The Avaya-specific settings in Sections 4.1 and 4.2 below must be run from the command line; the other settings may be configured from the display and keypad of the Tandberg videoconference endpoint. Consult the Tandberg product documentation (see Section 9).

4.1. Tandberg 150 MXP

Log into the Tandberg 150 MXP and log in with the appropriate credentials. Enter the following commands:

- `xConfiguration H323Gatekeeper Discovery: Manual`
- `xConfiguration H323Gatekeeper Address: <IP address of C-LAN noted in Section 3.7 Step 1>`
- `xConfiguration H323CallSetup Mode: Gatekeeper`
- `xConfiguration Conference H323Alias E164: <extension administered in Section 3.4>`
- `xcom boot`

4.2. Tandberg 990 MXP / 1000 MXP

Log into the Tandberg 990 MXP and log in with the appropriate credentials. Enter the following commands:

- `xConfiguration H323Gatekeeper Discovery: Manual`
- `xConfiguration H323Gatekeeper Address: <IP address of C-LAN noted in Section 3.7 Step 1>`
- `xConfiguration H323CallSetup Mode: Gatekeeper`
- `xConfiguration Conference H323Alias E164: <extension administered in Section 3.5>`
- `xConfiguration H323Gatekeeper Avaya Mode: On`
- `xConfiguration H323Gatekeeper Avaya AnnexH: On`
- `xConfiguration H323Gatekeeper Avaya Password: 12345`
- `xcom boot`

The above is also applicable to the Tandberg 1000 MXP.

4.3. Tandberg Gatekeeper

Step	Description
1.	Open a web browser, enter http://a.b.c.d for the URL, where a.b.c.d is the IP address of the Tandberg Gatekeeper.

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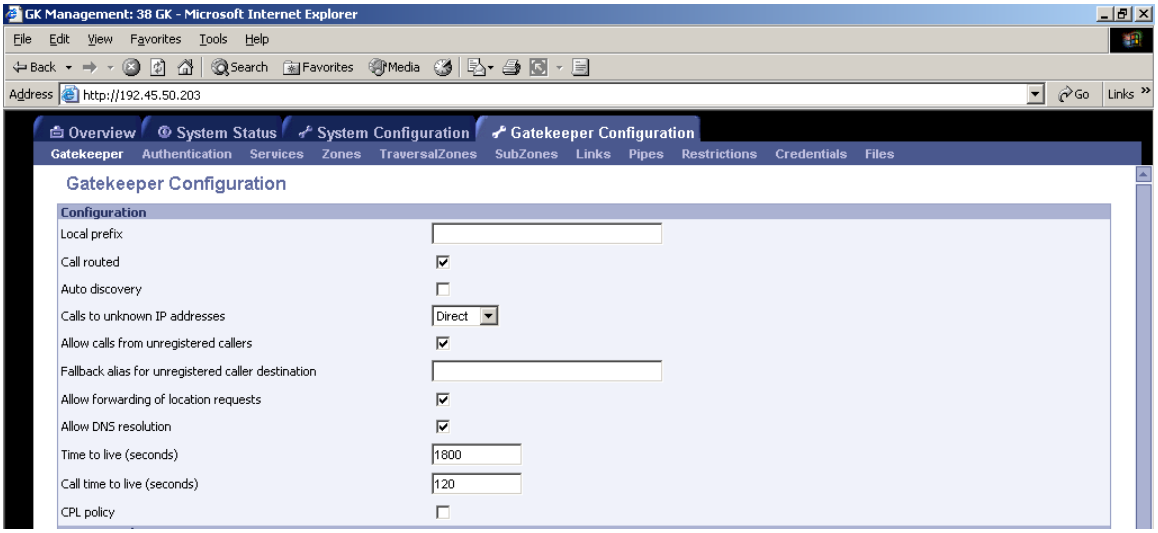
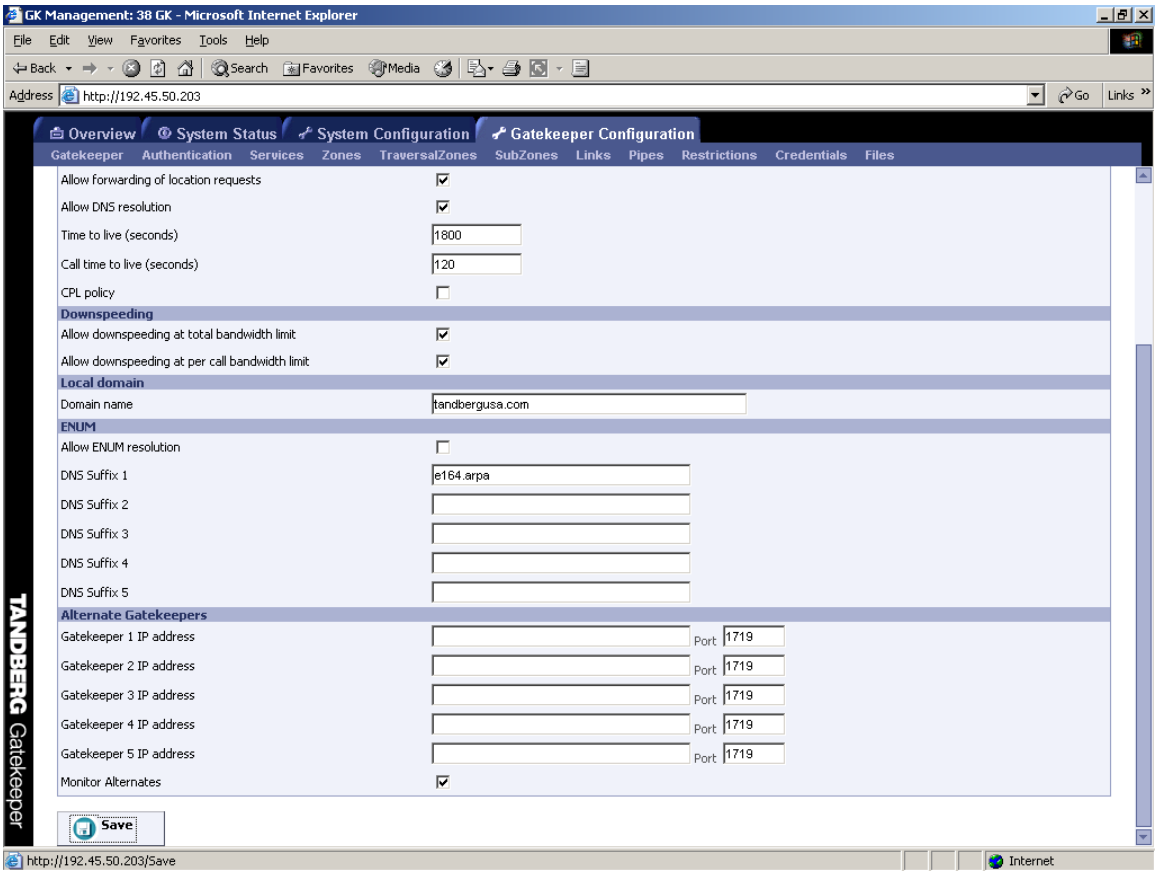
Step	Description
2.	Click on the **Gatekeeper Configuration** tab and then the **Gatekeeper** sub-tab. Check the **Call routed** checkbox, scroll down to the bottom of the page, and click on "**Save**".





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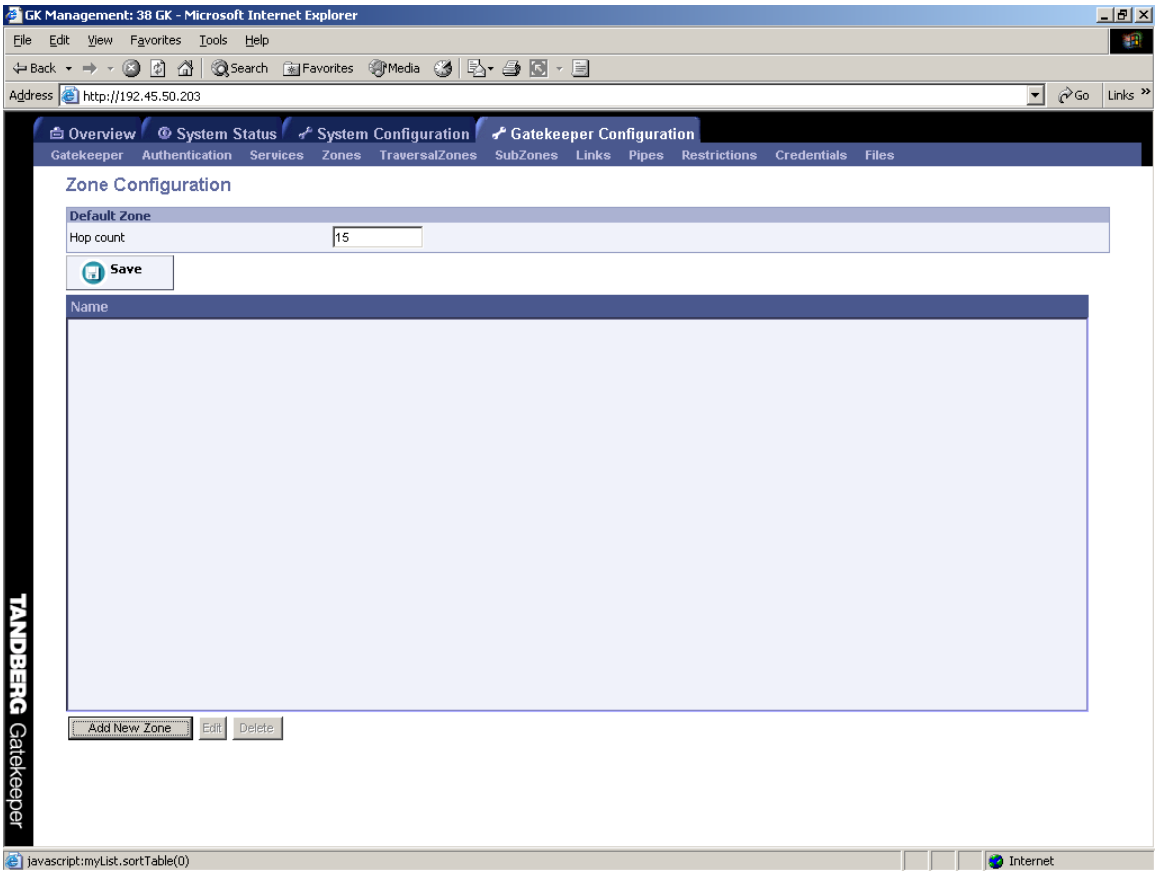
Step	Description
3.	Click on the **Zones** sub-tab and then on "**Add New Zone**". 

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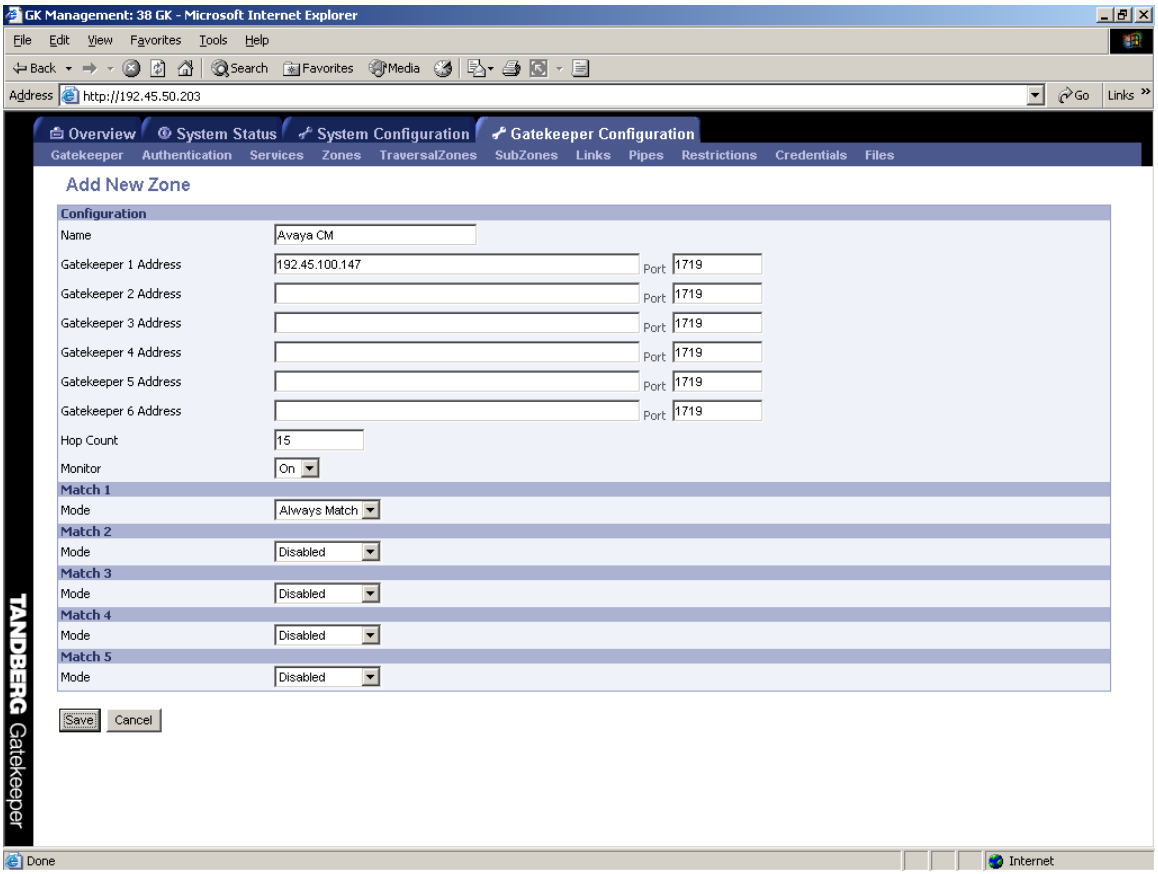
Step	Description
4.	Enter a descriptive **Name** and configure **Gatekeeper 1 Address** and **Port**. The **Gatekeeper 1 Address** and **Port** must match the Avaya Communication Manager side of the H.323 IP trunk configured in Section 3.7 Step 3. Click on "**Save**". 

4.4. Tandberg MPS 200

Step	Description
1.	Open a web browser, enter http://a.b.c.d for the URL, where a.b.c.d is the IP address of the Tandberg MPS 200, and log in with the appropriate credentials.

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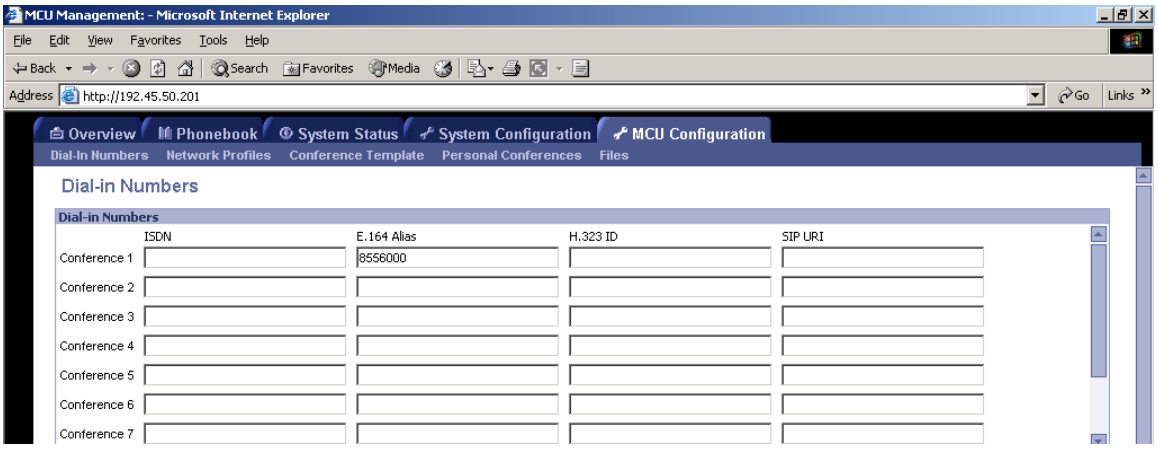
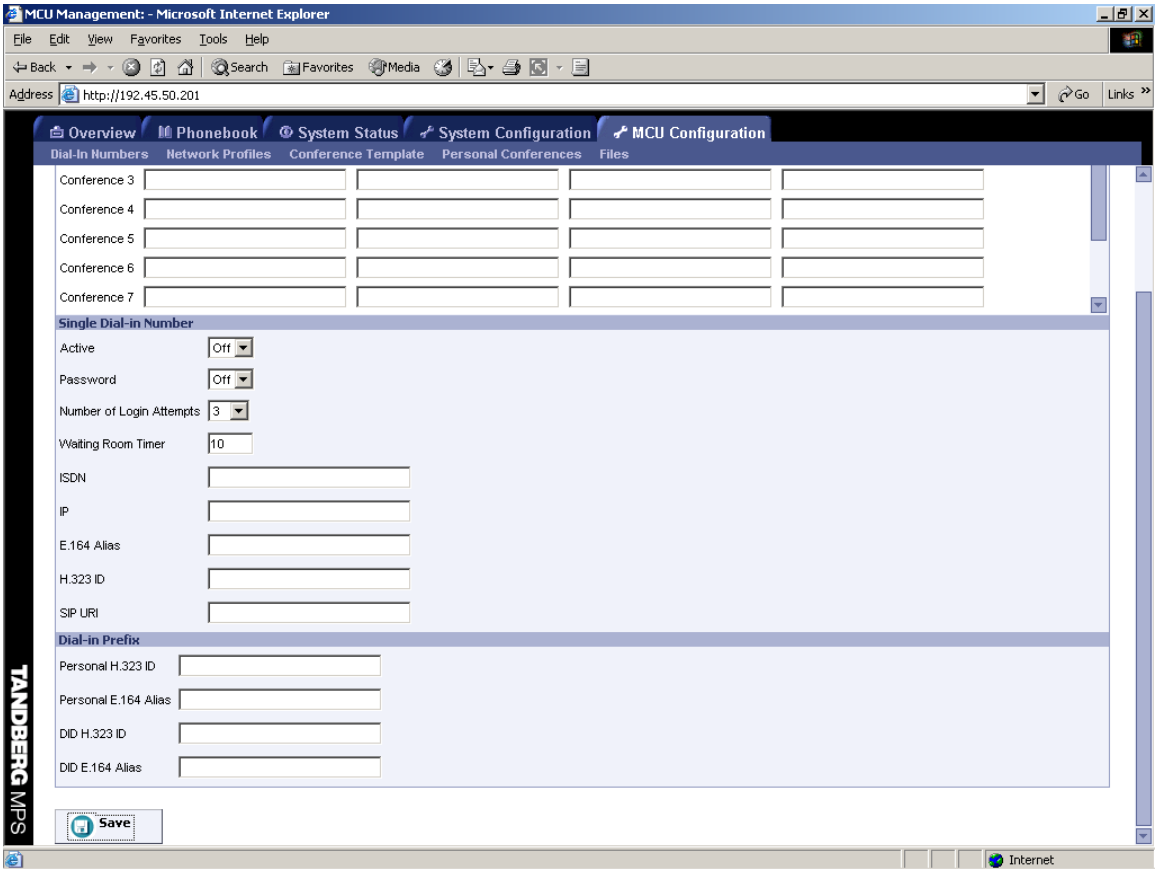
Step	Description
2.	Click on the **MCU Configuration** tab and then the **Dial-In Numbers** sub-tab. Enter one or more conference dial-in numbers in the **E.164 Alias** column, scroll down to the bottom of the page, and click on "**Save**".  
3.	Consult the Tandberg MPS User Manual [7] for instructions on creating and reserving conferences for the dial-in numbers configured in Step 2.

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5. Interoperability Compliance Testing

The interoperability compliance testing focused on verifying H.323 interoperability between Avaya Communication Manager and the aforementioned Tandberg videoconference products.

5.1. General Test Approach

The general test approach was to place H.323 video calls to and from Tandberg videoconference endpoints and MCU. The main objectives were to verify that:

- Tandberg videoconference endpoints successfully register with Avaya Communication Manager.
- Point-to-point video (with audio) calls and voice-only calls are successfully completed between pairs of Tandberg videoconference endpoints, between Tandberg videoconference endpoints and Avaya IP Softphone with Video, and between Tandberg videoconference endpoints and the Polycom VSX3000.
- Point-to-point voice-only calls are successfully completed between Tandberg videoconference endpoints and Avaya H.323 and Digital telephones.
- A multi-point video call is successfully established on the Tandberg 990 MPS with three other video endpoints (Tandberg videoconference endpoint, Avaya IP Softphone with Video, and the Polycom VSX3000) and one Avaya telephone.
- Videoconference calls with the Tandberg MPS 200 are successfully established, where the video endpoints include Tandberg videoconference endpoints, Avaya IP Softphone with Video, and the Polycom VSX3000, and the voice-only endpoints include Avaya H.323 and Digital telephones, and a PSTN telephone.
- The Tandberg 990 MXP and Tandberg MPS 200 successfully call and add video and voice-only endpoints to in-progress conferences.
- Video and voice-only endpoints successfully join and drop from in-progress conferences on the Tandberg 990 MXP and Tandberg MPS 200.
- Tandberg MPS 200 video mute, audio mute, listen mute, and request/release floor operations function correctly.
- Supervised transfers of video calls where a Tandberg videoconference endpoint is the transferred party or transfer target are successfully completed.

For serviceability testing, failures such as cable pulls and hardware and software resets were applied. For performance testing, two videoconference calls, one using the Tandberg 990 MXP and the other using the Tandberg MPS 200, were established.

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5.2. Test Results

The test objectives of Section 5.1 were verified. For serviceability testing, the Tandberg videoconference endpoints and MCU operated properly after recovering from failures such as cable disconnects, reboots, and Avaya Communication Manager reset. For performance testing, multi-endpoint videoconference calls were successfully maintained on the Tandberg 990 MPS and Tandberg MPS 200 for two and sixteen hours, respectively. The participants in the first videoconference call included the Tandberg 150 MXP, Tandberg 990 MXP, Avaya IP Softphone with Video, the Polycom VSX3000, and an Avaya telephone. The participants in the second videoconference included the same participants as the first videconference, plus the Tandberg 1000 MXP, two additional Avaya H.323/Digital telephones, and a PSTN telephone.

The following observations were made during testing:

- Avaya Communication Manager does not send Calling Party Number information to non-Avaya H.323 endpoints. A partial workaround for internal callers (i.e., stations configured in Avaya Communication Manager) is to configure the Tandberg videoconference endpoint with the command "`xConfiguration IdReport H323: H323Id`". This command enables the display of the internal caller's name, as configured in Avaya Communication Manager.
- If a videoconference Tandberg endpoint and an Avaya IP Softphone with Video are on a video call, and the Avaya IP Softphone with Video holds and retrieves the call, then after call retrieval, the Avaya IP Softphone with Video does not send video to the Tandberg videoconference endpoint. In comparison, if the held party is instead an Avaya IP Softphone with Video, then two-way video is successfully restored after call retrieval.
- For blind (non-supervised) transfers of video calls, if the transferred party is a Tandberg videoconference endpoint and the transfer target is another Tandberg videoconference endpoint or an Avaya IP Softphone with Video, then two-way video is lost after transfer completion. The workaround is to use supervised transfers.
- If a Tandberg videoconference endpoint is the transferred party or transfer target of a blind or supervised transfer of a voice-only call, then the resulting call after transfer completion does not transition to a video call and remains a voice-only call.
- Avaya Communication Manager does not support H.239 and Tandberg DuoVideo and Chair Control features.

6. Verification Steps

The following steps may be used to verify the configuration:

- To verify that the Tandberg videoconference endpoints are registered with Avaya Communication Manager, enter the **list registered-ip-stations** command.
- Place video calls to and from the Tandberg videoconference endpoints and verify two-way video and voice path.
- Establish multi-point video calls on the Tandberg videoconference bridge/MCU and verify two-way video and voice on each endpoint.

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7. Support

For technical support on Tandberg products, consult the support pages at http://www.tandberg.net/support/index.jsp or contact Tandberg Tech Support at:

- Americas: +1 866 826 3237
- Europe and Middle East: +47 67125125
- Australia/New Zealand: +61 2 8915 4100
- China: +86 10 8498 6467
- Hong Kong and East Asia: +852 2511 8040
- Japan: +81 3 5623 0396
- South East Asia: +65 6372 3650

8. Conclusion

These Application Notes described a compliance-tested solution comprised of Avaya Communication Manager 3.1.2, the Tandberg 150 MXP, the Tandberg 990 MXP, the Tandberg 1000 MXP, and the Tandberg MPS 200. The Tandberg 150 MXP, Tandberg 990 MXP, and Tandberg 1000 MXP are videoconference endpoints and the Tandberg MPS 200 is a videoconference bridge or Multipoint Control Unit (MCU). The Tandberg 990 MXP also provides an optional videoconference bridge capability, supporting up to three video endpoints and one audio endpoint with Avaya Communication Manager. The solution described in these Application Notes pertains only to H.323 interoperability between Avaya Communication Manager and the aforementioned Tandberg videoconference endpoints and MCU.

9. Additional References

Product documentation for Avaya products may be found at http://support.avaya.com.

[1] *Administrator Guide for Avaya Communication Manager*, Issue 2.1, May 2006, Document Number 03-300509
[2] *IP Softphone 5.2 and Video Integrator Getting Started*, Issue 1, February 2006, Document Number 16-600748
[3] *Video Telephony Solution R2.0 Quick Setup Guide*, Issue 1, February 2006, Document Number 16-300310

Product documentation for Tandberg products may be found at http://www.tandberg.net.

[4] *Tandberg 150 MXP USER GUIDE*, March 2006, Software version L4.x, D13640.04
[5] *Tandberg 770/880/990 MXP User Manual*, June 2006, Software version F5, D13356.07
[6] *Tandberg 1000 MXP User Manual*, June 2006, Software version F5, D13722.05
[7] *Tandberg MPS User Manual*, July 2006, Software version J3.2, D13373.06

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