



Avaya Solution & Interoperability Test Lab

Application Notes for CyberPath PowerPath PoE4424 Switch with Avaya Communication Manager - Issue 1.0

Abstract

These Application Notes describe the configuration steps required for a CyberPath PowerPath Switch (PoE4424) to successfully interoperate with Avaya Communication Manager using Avaya S8300 Media Server and Avaya G700 Media Gateway in a converged network infrastructure. Features and functionality were validated and performance testing was conducted to verify operation over the switched Ethernet Local Area Network (LAN). 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.

1. Introduction

These Application Notes describe a compliance-tested configuration utilizing an Avaya S8300 Media Server, Avaya G700 Media Gateway, Avaya IP Telephones and a CyberPath PowerPath PoE4424 switch.

The CyberPath PowerPath PoE4424 switch provides a cost effective Layer 2 switching solution for small and medium converged network deployments. It has Layer 2 switching features such as 802.1p prioritization and 802.3af Power over Ethernet (PoE), which are important for supporting VoIP implementations in LAN environments.

The PoE4424 switch is equipped with 2 priority queues, which can be used to differentiate IP telephony signaling and audio from traditional data traffic based on 802.1p priority values. In addition, the PoE4424 is capable of providing inline power to Avaya IP Telephones using the 802.3af standard. The sample LAN configuration (**Figure 1**) depicts a single location with an Extreme Alpine 3802 switch providing Layer 3 routing. An 802.1Q tagged trunk is used to uplink Layer 2 Virtual LAN (VLAN) traffic from the PoE4424 switch to the Alpine switch routing interfaces. See **Table 1** for detailed port configurations. The steps provided to build this configuration include QoS and DHCP scope provisioning. Separate Application Notes describing the PoE configuration are listed in **Section 12.1**.

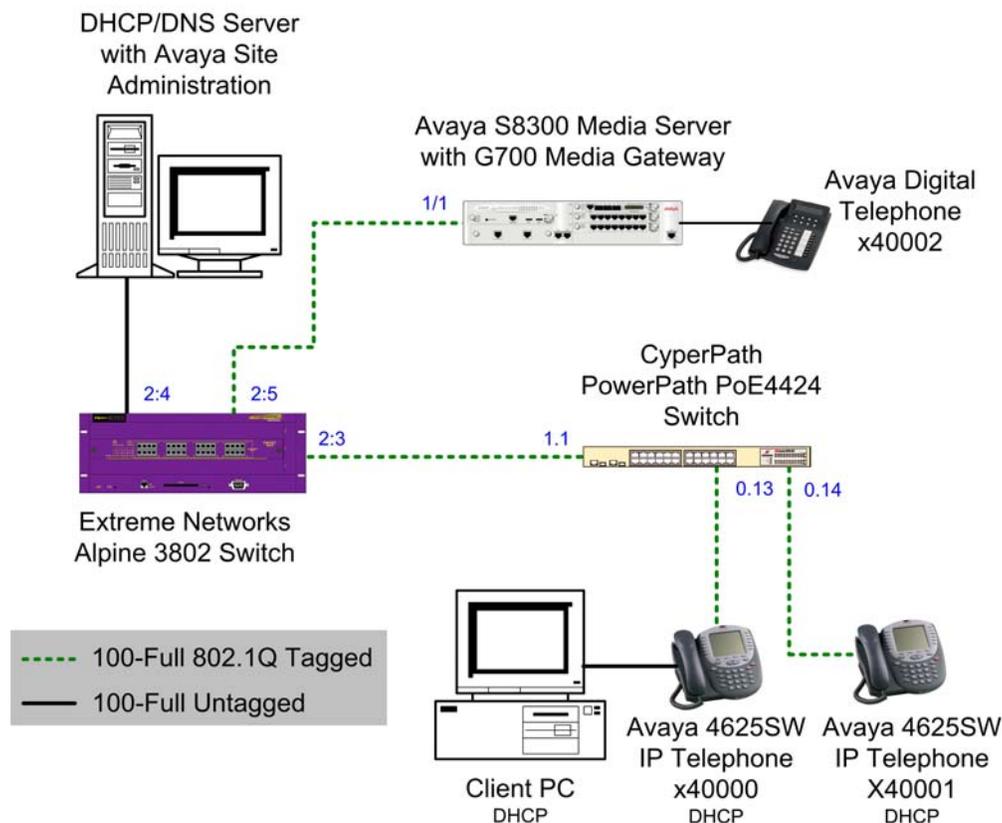


Figure 1: Sample LAN Configuration

Device	Port	PVID	Port Priority	Static VLANs	IP Interface
S8300 Media Server and G700 Media Gateway	1/1	60 untag	Low	50 tag	Procr. – 192.168.50.5 /24 Voip v0 – 192.168.50.4 /24 MGP – 192.168.50.3 /24 Stack – 192.168.50.2 /24
PoE4424	0.13	30 untag	Low	40 tag	Mgmt vlan30 – 192.168.30.2 /24
PoE4424	0.14	30 untag	Low	40 tag	Mgmt vlan30 – 192.168.30.2 /24
PoE4424	1.1	30 untag	Low	40 tag	Mgmt vlan30 – 192.168.30.2 /24
Alpine 3802	2:3	30 untag		40 tag	vlan30 – 192.168.30.1 /24 vlan40 – 192.168.40.1 /24
Alpine 3802	2:4	60 untag			vlan60 – 192.168.60.1 /24
Alpine 3802	2:5	60 untag		50 tag	vlan50 – 192.168.50.1 /24 vlan60 – 192.168.60.1 /24
DHCP/DNS Server	NIC				192.168.60.250 /24

Table 1: Connectivity Matrix

2. Equipment and Software Validated

The following equipment and software were used for the configurations provided in **Figure 1**.

Equipment	Software
Avaya Communication Manager with Avaya S8300 Media Server and G700 Media Gateway	R3.0 (R013x.00.0.340.3)
Avaya 4625SW IP Telephone	2.2
CyberPath PowerPath PoE4424 Switch	v2.03.0.11PoE
DHCP/DNS Server	Microsoft Windows 2003 Server with SP1
Extreme Networks Alpine 3802 Switch	v7.2.0 Build 27 (non-ssh)

3. Configure the PoE4424 Switch

The PoE4424 switch provides a web interface, console menu and Command Line Interface (CLI) for administration. These Application Notes present administration via the CLI, accessed using the console port and a terminal emulator running on an attached PC.

1. Configure VLAN dot1q tagging and strict priority queuing modes.

```
(L2SW) >config vlan mode dot1q
(L2SW) >config dot1p mode sp
```

2. Create applicable VLANs and associated names, vlan30 will be used for data and vlan40 will be used for voice.

```
(L2SW) >config vlan create 30 vlan30
(L2SW) >config vlan create 40 vlan40
```

3. Assign Port VLAN ID's (PVIDs).

```
(L2SW) >config vlan port pvid 30 0.13
(L2SW) >config vlan port pvid 30 0.14
(L2SW) >config vlan port pvid 30 1.1
```

4. Configure the inband management VLAN and interface information for the switch.

```
(L2SW) >config mgmtvlan 30
(L2SW) >config network params 192.168.30.2 255.255.255.0 192.168.30.1
```

5. Configure "low" port forwarding priority for all untagged frames on the data VLAN.

```
(L2SW) >config port priority all low
```

6. Enable RSTP and configure bridge priority to ensure proper root bridge election.

```
(L2SW) >config spanningtree switch forceversion 802.1w
(L2SW) >config spanningtree switch priority 61440
(L2SW) >config spanningtree switch adminmode enable
```

7. Statically assign the voice VLAN 40 to all ports connected to Avaya IP Telephones and neighboring switches, enable tagging for VLAN 40 and save the configuration.

```
(L2SW) >config vlan addport 40 0.13
(L2SW) >config vlan addport 40 0.14
(L2SW) >config vlan addport 40 1.1
(L2SW) >config vlan port tagging enable 40 0.13
(L2SW) >config vlan port tagging enable 40 0.14
(L2SW) >config vlan port tagging enable 40 1.1
(L2SW) >save config
```

4. Configure the Avaya S8300 Media Server

The following depicts configuration of the Avaya S8300 Media Server via the web interface.

1. Establish a web browser to the services port of the Avaya S8300 Media Server (e.g. <http://192.13.11.6>)
2. Enter a valid Logon ID with administrative privileges.
3. Select “Launch Maintenance Web Interface” to configure the server.

Installation	The Avaya Installation Wizard allows you to quickly install your system. The Avaya Network Region Wizard allows you to quickly administer network regions.	Launch Avaya Installation Wizard Launch Avaya Network Region Wizard
Administration	The Native Configuration Manager allows you to administer this system using a graphically enhanced SAT applet.	Launch Native Configuration Manager
Maintenance	The Maintenance Web Interface allows you to maintain, troubleshoot, and configure the media server.	Launch Maintenance Web Interface
Upgrade	The Upgrade Tool allows you to upgrade all servers, Survivable Processors, G700 Media Gateways, and G350 Media Gateways.	Launch Upgrade Tool

Figure 2: Web Interface Options Screen

4. Select “Configure Server” from the left navigation pane. The relevant portion is shown in **Figure 3** below.



Figure 3: Server Configuration Options

5. Observe the “Review Notices” and click **Continue** to proceed.

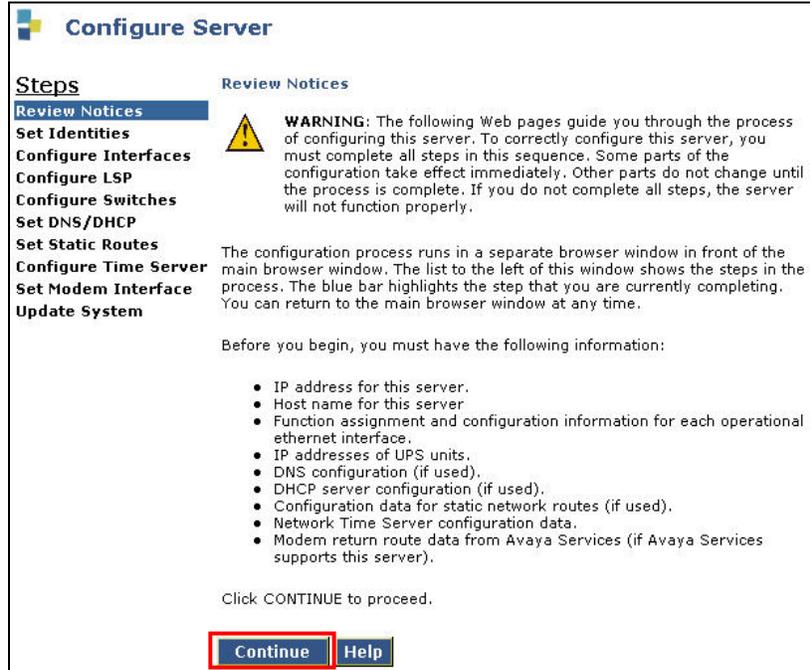


Figure 4: Review Notices Screen

6. Observe “Back Up Data” screen and click **Continue**.



Figure 5: Back Up Data Screen

7. Select **Configure all services using the wizard** and click **Continue**.



Figure 6: Specify Wizard Usage Screen

8. Enter a unique hostname for the server (e.g. **iccproc**) and click **Continue**.

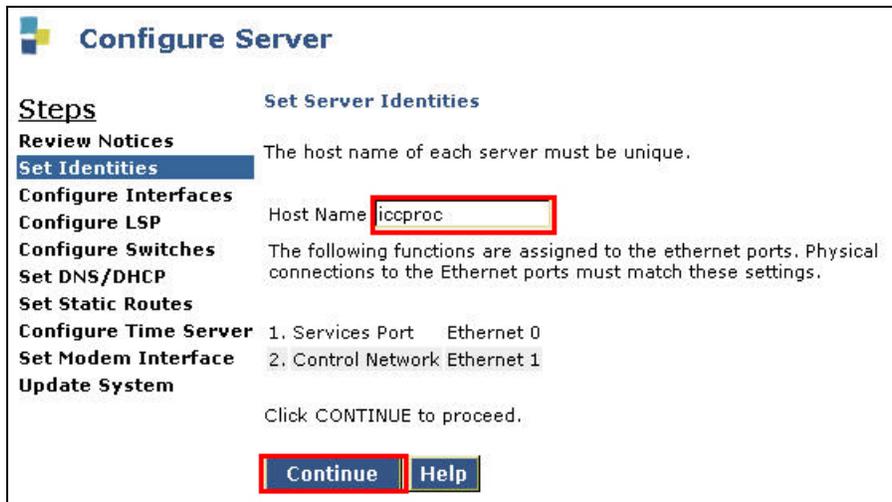


Figure 7: Set Server Identities Screen

9. Enter the IP address (e.g. **192.168.50.5**), Gateway (e.g. **192.168.50.1**) and Subnet mask (e.g. **255.255.255.0**) for the server and click **Continue**.

Configure Server

Steps

- Review Notices
- Set Identities
- Configure Interfaces**
- Configure LSP
- Configure Switches
- Set DNS/DHCP
- Set Static Routes
- Configure Time Server
- Set Modem Interface
- Update System

Configure Ethernet Interfaces

Ethernet 0: Laptop

IP address 192.11.13.6
Subnet mask 255.255.255.252

Ethernet 1: Control Network

IP address server1 (iccpoc)
Gateway
Subnet mask
Speed (Current speed : 100 Megabit full duplex) AUTO SENSE

Ethernet 1: Integrated Messaging

IP address server1 (iccpoc)
Subnet mask

Click CONTINUE to proceed.

Figure 8: Configure Ethernet Interfaces Screen

10. Select **This is NOT a local survivable processor** and click **Continue**.

Configure Server

Steps

- Review Notices
- Set Identities
- Configure Interfaces
- Configure LSP**
- Configure Switches
- Set DNS/DHCP
- Set Static Routes
- Configure Time Server
- Set Modem Interface
- Update System

Configure Local Survivable Processor

Changing the role of this server will **wipe out** any **translations** residing on this server and will cause a **CommunicMgr reset**.

This page alone is not enough to completely change the role of this server. The appropriate **license file** will still need to be downloaded and installed.

This is NOT a local survivable processor.

This is a local survivable processor with a S8700 Series media server as the primary controller.

Figure 9: Configure Local Survivable Processor Screen

11. Select system defaults for the remaining configuration options.

12. Observe the Update System screen and click **Continue** to complete server administration.

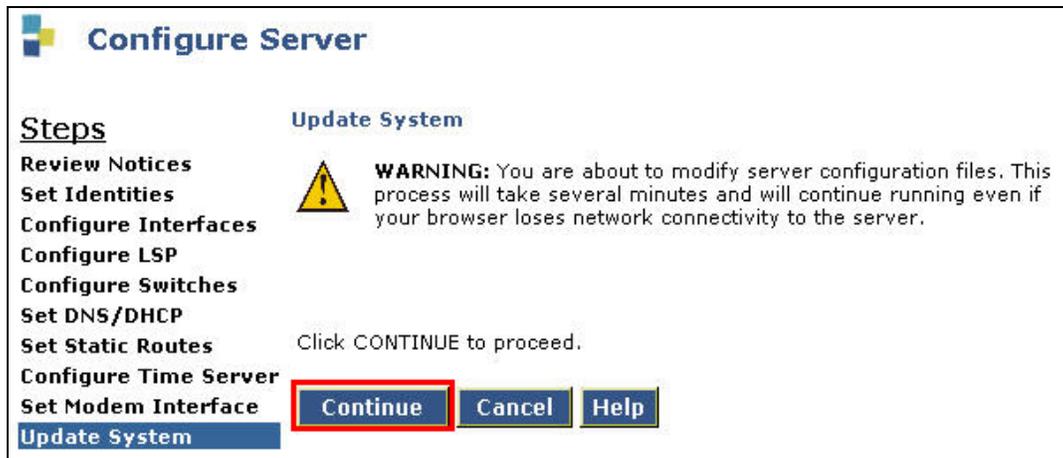


Figure 10: Update System Screen

5. Configure the G700 Media Gateway

The following commands were executed using the Command Line Interface of the Avaya G700 Media Gateway through the console port.

1. Rename the stack processor with a more meaningful name (optional).

```
p330-1(super)# hostname stkproc
```

2. Create and name the necessary Virtual LANs.

```
stkproc-1(super)# set vlan 50 name vlan50  
stkproc-1(super)# set vlan 60 name vlan60
```

3. Configure the stack processor inband management IP address and default route.

```
stkproc-1(super)# set interface inband 50 192.168.50.2 255.255.255.0  
stkproc-1(super)# set ip route 0.0.0.0 192.168.50.1
```

4. Configure the 802.1Q tagged uplink port.

```
stkproc-1(super)# set port vlan 60 1/1  
stkproc-1(super)# set trunk 1/1 dot1q  
stkproc-1(super)# set port static-vlan 1/1 50
```

5. Configure RSTP such that the Alpine is the root bridge.

```
stkproc-1(super)# set spantree version rapid-spanning-tree  
stkproc-1(super)# set spantree priority 61440  
stkproc-1(super)# set spantree enable
```

6. Use the “session mgp” command to log in to the Media Gateway Processor. Enter the “config” command to enter configuration mode. Optionally, enter a new Media Gateway Processor hostname as shown below.

```
mgp-001-1(configure)# hostname iccmgp
```

7. Use the “show system” command to observe the serial number, which will be provisioned in Avaya Communication Manager in a subsequent step.

```
iccmgp-001-1(super)# show system
```

```
Uptime(d,h:m:s): 0, 02:00:26
```

```
System Name      : -- Empty --  
System Location  : -- Empty --  
System Contact   : -- Empty --  
MAC Address      : 00-04-0D-51-7B-A6  
Serial No        : 04J210801944  
Model No         : G700  
HW Vintage       : 01  
HW Suffix        : C  
FW Vintage       : 24.17.0
```

```
Media Gateway Power Supplies
```

	VOLTAGE(V)	ACTUAL(V)	STATUS
DSP Complex	3.4	3.440	OK
MGP	5.1	5.070	OK
Media Modules	-48.0	-47.720	OK
VoIP DSP	1.6	1.590	OK
VoIP CPU	2.5	2.480	OK

8. Configure the MGP and VoIP v0 IP Interfaces.

```
iccmgp-001-1(configure)# set interface mgp 50 192.168.50.3 255.255.255.0  
iccmgp-001-1(configure)# set interface voip v0 192.168.50.4
```

9. Configure the MGP to use the Extreme Alpine switch as the default static route.

```
iccmgp-001-1(configure)# set ip route mgp 0.0.0.0 0.0.0.0 192.168.50.1
```

10. Configure the Media Gateway Controller (MGC) list with the Avaya S8300 Media Server IP address.

```
iccmgp-001-1(configure)# set mgc list 192.168.50.5
```

6. Configure Avaya Communication Manager

The following administration steps were performed using the System Access Terminal (SAT). It is assumed that all necessary licensed features have been enabled.

1. Add the Avaya G700 Media Gateway.

```

add media-gateway 1                                     Page 1 of 1
                MEDIA GATEWAY
    Number: 1                IP Address:
    Type: g700              FW Version/HW Vintage:
    Name: iccmgp            MAC Address:
    Serial No: 04J210801944  Encrypt Link? y
    Network Region: 1        Location: 1
    Registered? n           Controller IP Address:
    Recovery Rule: none     Site Data:
    Slot  Module Type      Name
    V1:
  
```

2. Map the IP Telephones located on subnet 192.168.40.0 /24 to IP Network Region 1.

```

change ip-network-map                                  Page 1 of 32
                IP ADDRESS MAPPING

From IP Address  (To IP Address  Subnet  Region  VLAN  Emergency
192.168.40 .0    . . .         or Mask) 1      y      Location
                . . .         24      1      n      Extension
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
                . . .         . . .         n
  
```

3. Configure IP Codec Set 1 to utilize the G.711MU codec.

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

                                IP Codec Set

Codec Set: 1

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

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

4. Configure IP Network Region 1 to use Codec Set 1 and allow all IP-IP Direct connections. The PoE4424 switch has two hardware queues. As shown, 802.1p priority value 6 is used for both Call Control and Audio. The PoE4424 will give VoIP traffic preferential forwarding treatment via the high priority queue.

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

                                IP NETWORK REGION

Region: 1
Location: voiceedge                                     Authoritative Domain:
Name:

Media Parameters
Codec Set: 1
UDP Port Min: 2048
UDP Port Max: 3028
RTCP Reporting Enabled? y
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
AUDIO RESOURCE RESERVATION PARAMETERS
RSVP Enabled? n
H.323 IP ENDPOINTS
H.323 Link Bounce Recovery? y
Idle Traffic Interval (sec): 20
Keep-Alive Interval (sec): 5
Keep-Alive Count: 5

Intra-region IP-IP Direct Audio: yes
Inter-region IP-IP Direct Audio: yes
IP Audio Hairpinning? y
RTCP MONITOR SERVER PARAMETERS
Use Default Server Parameters? y
```

5. Add the necessary 4625 IP Telephone stations for testing purposes. Add a security code, and select unique names to identify callers during verification. Station 40001 shown below is an example.

```

add station 40001                                     Page 1 of 4
                                                    STATION
Extension: 40001                                     Lock Messages? n          BCC: 0
  Type: 4625                                         Security Code: 1234      TN: 1
  Port: IP                                           Coverage Path 1:         COR: 1
  Name: Mike P                                       Coverage Path 2:         COS: 1
                                                    Hunt-to Station:

STATION OPTIONS
  Loss Group: 19                                     Personalized Ringing Pattern: 1
                                                    Message Lamp Ext: 40001
  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? n

```

6. Save Avaya Communication Manager translations.

```

save translation
                                                    SAVE TRANSLATION

Command Completion Status                               Error Code
Success                                                0

```

7. Configure the Alpine 3802 Switch

The Alpine switch provides both a web interface and a Command Line Interface (CLI) for administration. These Application Notes present administration via the CLI.

1. Create, name and assign tag values to applicable Virtual LANs.

```

# create vlan vlan30
# configure vlan vlan30 tag 30
# create vlan vlan40
# configure vlan vlan40 tag 40
# create vlan vlan50
# configure vlan vlan50 tag 50
# create vlan vlan60
# configure vlan vlan60 tag 60

```

2. Assign VLANs to physical ports and name the ports for easy reference.

```
# configure vlan Default delete port 2:3
# configure vlan Default delete port 2:4
# configure vlan Default delete port 2:5
# configure vlan vlan30 add port 2:3 untag
# configure vlan vlan40 add port 2:3 tag
# configure port 2:3 display-string cyberpath
# configure vlan vlan60 add port 2:4 untag
# configure port 2:4 display-string winaim
# configure vlan vlan60 add port 2:5 untag
# configure vlan vlan50 add port 2:5 tagged
# configure port 2:5 display-string avaya
```

3. Assign IP interfaces to VLANs and enable IP forwarding globally for all VLANs.

```
# configure vlan vlan30 ipaddress 192.168.30.1 255.255.255.0
# configure vlan vlan40 ipaddress 192.168.40.1 255.255.255.0
# configure vlan vlan50 ipaddress 192.168.50.1 255.255.255.0
# configure vlan vlan60 ipaddress 192.168.60.1 255.255.255.0
# enable ipforwarding
```

4. Globally enable DHCP Relay and administer the target DHCP server for the relayed requests.

```
# enable bootprelay
# configure bootprelay add 192.168.60.250
```

5. Enable single instance RSTP and include the appropriate VLANs.

```
# configure stpd s0 mode dot1w
# configure stpd s0 add vlan30
# configure stpd s0 add vlan40
# configure stpd s0 add vlan50
# configure stpd s0 add vlan60
# enable stpd s0
```

6. Save the configuration.

```
# save primary
```

8. DHCP Server Scopes

The DHCP Server 192.168.60.250 /24 requires two scopes to support voice and data hosts on different VLANs simultaneously.

The “DataEdge” scope includes the appropriate default gateway option 003 and custom option 176. Avaya IP Telephones initially booting on native PVID 30 learn the tagged voice VLAN 40 and rediscover an appropriate IP address on the newly assigned voice VLAN. The DNS options 006 and 015 were included in the DataEdge scope so that client PCs could receive appropriate DNS server information for domain resolution.

```
Scope [192.168.30.0] DataEdge
Address Pool
Start Address = 192.168.30.3
End Address = 192.168.30.200
Option 003 Router = 192.168.30.1
Option 006 DNS Servers = 192.168.60.250
Option 015 DNS Domain Name = test.com
Option 176 IP Telephone = L2Q=1,L2QVLAN=40
```

The “VoiceEdge” scope includes the default gateway option 003 and the custom 176 option, which informs Avaya IP Telephones of the appropriate Avaya S8300 Media Server, registration port and TFTP server IP address.

```
Scope [192.168.40.0] VoiceEdge
Address Pool`
Start Address = 192.168.40.3
End Address = 192.168.40.200
Option 003 Router = 192.168.40.1
Option 176 IP Telephone = MCIPADD=192.168.50.5,MCPORT=1719,TFTPSRVR=192.168.60.250
```

9. Interoperability Compliance Testing

This Interoperability Compliance Test included feature, functionality, and performance testing. Feature and functionality testing examined the PoE4424 switch and its ability to forward Voice over IP (VoIP) signaling, audio and data while maintaining voice quality. In addition, support for providing power to Avaya IP Telephones via Power over Ethernet (PoE) was validated. Performance tests verified that the configuration remained stable under load.

9.1. General Test Approach

Feature functionality testing was performed manually. Calls were made between stations registered with the Avaya S8300 Media Server. While calls were being made a protocol analyzer was used to monitor call signaling and audio flows to ensure that proper QoS markers at Layer 2 were being relayed. Performance testing was done using data traffic generator to stress the QoS functionality of the devices over a 1-hour period.

9.2. Test Results

All feature, functionality, and performance test cases passed successfully. A 1-hour test was conducted with 200 Mbps of 64-byte UDP traffic saturating the 100 Mbps LAN link between the PoE4424 and Alpine 3802. Calls were continuously placed between an Avaya Digital Telephone and an Avaya IP Telephone without any experienced call loss or voice quality degradation.

10. Verification Steps

10.1. Check the PoE4424 Switch Configuration

1. Verify connectivity from the PoE4424 switch to the Alpine 3802 switch.

```
(L2SW) >ping 192.168.30.1
Send count=3, Received count=3, from 192.168.30.1
```

2. Verify that the PoE4424 switch identified the Alpine 3802 switch as the root bridge.

```
(L2SW) show spanningtree switch detailed
```

```
Bridge Priority ..... 61440
Bridge Identifier ..... F0:00:00:50:A8:80:83:E1
Time Since Last Topology Change ..... 352
Topology Change Count ..... 0
Topology Change ..... False
Designated Root ..... 80:00:00:01:30:FC:ED:10
Root Path Cost ..... 200000
Root Port Identifier ..... 8019
Max Age ..... 20
Forward Delay ..... 15
Bridge Max Age ..... 20
Bridge Hello Time ..... 2
Bridge Forward Delay ..... 15
Bridge Hold Time ..... 3
```

10.2. Check Alpine 3802 Configuration

1. Verify that the Alpine identifies itself as the root bridge.

```
* Alpine3802:55 # show stpd s0
Stpd: s0                      Stp: ENABLED                Number of Ports: 28
Rapid Root Failover: Disabled
Operational Mode: 802.1W
802.1Q Tag: (none)
Ports: 1:1,1:2,1:3,1:4,2:1,2:3(cyberpath),2:11,2:12,2:13,2:14,2:15,2:16
      2:17,2:18,2:19,2:20,2:21,2:22,2:23,2:24,2:25,2:26,2:27,2:28
      2:29,2:30,2:31,2:32
Active Vlans:  vlan40 vlan30 Default
Bridge Priority: 32768
BridgeID:          80:00:00:01:30:fc:ed:10
Designated root:  80:00:00:01:30:fc:ed:10
RootPathCost: 0      Root Port: ----
MaxAge: 20s          HelloTime: 2s          ForwardDelay: 15s
CfgBrMaxAge: 20s    CfgBrHelloTime: 2s     CfgBrForwardDelay: 15s
Topology Change Time: 35s          Hold time: 1s
Topology Change Detected: FALSE     Topology Change: FALSE
Number of Topology Changes: 1
Time Since Last Topology Change: 25s
```

10.3. Confirm Avaya Communication Manager

1. Confirm Media Gateway registration.

```
display media-gateway 1
MEDIA GATEWAY
Number: 1          IP Address: 192.168.50 .3
Type: g700        FW Version/HW Vintage: 24 .17 .0 /1
Name: standalone  MAC Address: 00:04:0d:51:7b:a6
Serial No: 04J210801944  Encrypt Link? y
Network Region: 1    Location: 1
Registered? y       Controller IP Address: 192.168.50 .5
Recovery Rule: none Site Data:
Slot  Module Type   Name
V1:   S8300         ICC MM
V2:   MM712         DCP MM
V3:
V4:
V8:
V9:
```

10.4. Verify MGP Administration

1. From the MGP command prompt, verify that the MGP has registered with the MGC.

```
iccmgp-001-1(configure)# show mgc
```

```
CALL CONTROLLER STATUS
```

```
-----  
Registered           : YES  
Active Controller    : 192.168.50.5  
H248 Link Status     : UP  
H248 Link Error Code: 0x0
```

```
CONFIGURED MGC HOST
```

```
-----  
192.168.50.5  
-- Not Available --  
-- Not Available --  
-- Not Available --
```

2. Verify that the default MGP route is configured.

```
iccmgp-001-1(configure)# show ip route mgp
```

DESTINATION	MASK	GATEWAY	INTERFACE	(F/C/U)
0.0.0.0	0.0.0.0	192.168.50.1	motfec0	(3/0/0)
192.168.50.0	255.255.255.0	192.168.50.3	motfec0	(101/0/0)

3. Check that the VoIP static route is also configured properly.

```
iccmgp-001-1(configure)# show ip route voip v0
```

DESTINATION	MASK	GATEWAY
0.0.0.0	0.0.0.0	192.168.50.1
192.168.50.0	255.255.255.0	192.168.50.4

4. Confirm that the MGP and VoIP v0 interfaces are properly configured.

```
iccmgp-001-1(configure)# show interface
```

```
OPERATIONAL STATE: -- Currently in use --
```

INTERFACE	SRC	VLAN	IP ADDRESS	NETMASK	MAC ADDRESS
mgp	S	50	192.168.50.3	255.255.255.0	00-04-0D-51-7B-A6
voip-v0	S	50	192.168.50.4	255.255.255.0	00-04-0D-51-96-2A

10.5. Check G700 Media Gateway Stack Processor Settings

1. Verify inband management interface.

```
stkproc-1(super)# show interface inband
  Interface Name      VLAN      IP address      Netmask
-----
inband                50        192.168.50.2    255.255.255.0
```

2. Verify default gateway for management purposes.

```
stkproc-1(super)# show ip route
Destination      Gateway
-----
0.0.0.0          192.168.50.1
```

3. Confirm Spanning Tree Protocol (STP). Verify that the Extreme 3802 is the root bridge.

```
stkproc-1(super)# show spantree
```

Spanning tree state is enabled

Designated Root: 00-01-30-fc-ed-10

Designated Root Priority: 32768

Designated Root Cost: 19

Designated Root Port: 1/1

Root Max Age: 20 Hello Time: 2

Root Forward Delay: 15

Bridge ID MAC ADDR: 00-04-0d-92-9f-d6

Bridge ID priority: 61440

Bridge Max Age: 20 Bridge Hello Time: 2

Bridge Forward Delay: 15 Tx Hold Count 3

Spanning Tree Version is rapid spanning tree

Spanning Tree Default Path Costs is according to common spanning tree

```
Port  State      Cost      Priority
-----
1 /1  Forwarding  19        128
```

4. Confirm 802.1Q trunk configuration and VLAN bindings.

```
stkproc-1(super)# show trunk 1/1
Port  Mode  Binding mode      Native vlan  Vlans allowed on trunk
-----
1/1   dot1q  statically bound    60          50 60
```

5. Verify that port speed and duplex negotiated properly with the Alpine switch.

```
stkproc-1(super)# show port 1/1
Port  Name           Status  Vlan Level  Neg  Dup. Spd.  Type
-----
1/1   extremeuplink  connected 60  0    enable  full 100M 10/100Base-Tx
```

10.6. Test IP Telephony Connectivity

1. Verify that the IP Telephone powers up.
2. Verify that the IP Telephone initial DHCP address comes from the data VLAN.
3. Verify that the IP Telephone tags on the voice VLAN based on option 176 values.
4. Verify that the IP Telephone successfully reaches the TFTP server and downloads.
5. Verify that the IP Telephone completes the registration process.
6. Place IP-to-IP calls and verify audio quality. Verify that G.711MU was used for the call.
7. Place IP-to-Digital calls and verify audio quality as well.

11. Support

For technical support on the CyberPath PowerPath PoE4424 Switch, contact the CyberPath Tech Support Directory at 732 463 7700 ext. 221. Technical support email can be sent to support@cyberpathinc.com.

12. Conclusion

These Application Notes describe sample administrations steps, which allowed the CyberPath PowerPath PoE4424 switch to interoperate with the Avaya S8300 Media Server and Avaya G700 Media Gateway for the purposes of providing basic network connectivity and Layer 2 Quality of Service (QoS) via 802.1p prioritization. Features and functionality were successfully validated.

12.1. Additional References

The following documents are available from Avaya at www.avaya.com:

- [1] Application Notes for CyberPath Power Path PoE4424 Power over Ethernet (PoE) Switch with Avaya IP Telephones and Avaya Wireless Access Points - Issue 1.0 (8/25/2005)
- [2] Application Notes for CyberPath PowerPath PoE4424 Switch with Avaya IP Office - Issue 1.0 (8/24/2004)

The following documents are available from CyberPath:

- [3] CyberPath Application Notes, AN-1002: 802.1p priority value assignment for untagged frames entering through high priority ports, Version 2.0 (5/11/2004)
- [4] CyberPath PowerPath PoE4424 User Manual, CP-UM-0085, Version 1.6.5 (3/2005)

12.2. Glossary

- PoE** Power over Ethernet. The 802.3af standard allows endpoints to be powered over CAT5/6 cable.
- RSTP** Rapid Spanning Tree Protocol. The 802.1w protocol provides Layer 2 switches with fast loop detection and avoidance capabilities.
- QoS** Quality of Service. In the context of these Application Notes, QoS refers to a switches ability to classify different traffic types (e.g., Voice and Data) and provide preferential forwarding treatment to high priority traffic flows.

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