Avaya IP Phones
Avaya Ethernet Routing Switches
Engineering

> Avaya IP Telephony Deployment Technical Configuration Guide

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Abstract

The purpose of this TCG is to review the many options available on Avaya Ethernet and Ethernet Routing Switches for interoperability with Avaya's IP Phone sets.

Revision Control

No	Date	Version	Revised by	Remarks
1	07/12/2007	2.2	ESE	Modification to section 4.4.2 on page 45.
2	01/28/2008	3.0	ESE	Modifications
3	02/14/2008	4.0	ESE	Added updates related to ADAC and EAPOL. Added ERS2500 and ERS4500 switches.
4	8/4/2009	6.0	JVE	Updates related to auto provisioning and software updates on various switches
5	8/26/2010	7.0	JVE	Updated based on all Avaya IP Phones and added features on various Avaya switches. Added AES (Avaya Energy Savings)
6	1/07/2011	7.1	JVE	Update regarding LLDP-TLVs. LLDP tx-tlv sys-cap added to interface level in section 2.3.1.1. This is required to support some IP Phone models

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Conventions

This section describes the text, image, and command conventions used in this document.

Symbols

Tip – Highlights a configuration or technical tip.

Note – Highlights important information to the reader.

Warning – Highlights important information about an action that may result in equipment damage, configuration or data loss.

Text

Bold text indicates emphasis.

Italic text in a Courier New font indicates text the user must enter or select in a menu item, button or command:

ERS5520-48T# ***show running-config***

Output examples from Avayadevices are displayed in a Lucida Console font:

ERS5520-48T# ***show running-config***

```
! Embedded ASCII Configuration Generator Script
! Model = Ethernet Routing Switch ERS-Stackable
! Software version = v5.0.0.011
enable
configure terminal
```

1. Overview

This TCG covers standalone Avaya IP Phone sets and how they can be deployed on various Avaya switches. It will cover features on Avaya switches related to VoIP with configuration examples. Overall, topics that will be covered include the following:

Ethernet switch platforms that support PoE:

- Ethernet Routing Switch 5000: 5520-48T-PWR, 5650TD-PWR, 5698TFD-PWR
- Ethernet Routing Switch 4500: 4526T-PWR, 4550T-PWR, 4524GT-PWR, 4526GTX-PWR, 4548GT-PWR
- Ethernet Routing Switch 2500: 2526T-PWR, 2550T-PWR
- Ethernet Routing Switch 8300

VoIP technologies:

- Auto configuration via DHCP for VoIP Phone sets
- Auto provisioning using tftp or http
- Avaya Energy Saver (AES)
- Authentication using EAPoL (802.1x)
- Auto Detection Auto Configuration (ADAC)
- Link Layer Discovery Protocol (LLDP)
- Power over Ethernet (PoE)
- Quality over Service (QoS)

2. Automatic Provisioning Configuration Examples

This section will cover various configuration examples to allow for automatic or zero-touch provisioning of Avaya IP phones using Avaya data switches. The following chart summarizes each configuration example.

Section	Item	QoS	Description
2.2	Double DHCP	Manually configured[1]	Uses DHCP to get VLAN ID for voice VLAN from data DHCP scope
2.3	LLDP-MED	Manually configured[1]	Switch uses LLDP-MED Network Policy to provision voice VLAN
2.4	Double DHCP	None	Uses DHCP to get VLAN ID for voice VLAN from data DHCP scope using the ERS 8300
2.5	ADAC – MAC Detection	Automatically applied to Voice VLAN	Uses ADAC to automatically detect IP Phone using MAC address of IP Phone
2.6	ADAC – LLDP Detection	Automatically applied to Voice VLAN[2]	Switch uses ADAC to automically detect IP Phone using LLDP and uses LLDP-MED Network Policy to set VLAN ID and QoS settings for the IP Phone
2.7	EAP MHMA	N/A	Optional configuration to enable IP Phones as an EAP Supplicant using MD5
2.8	EAP NEAP	N/A	Optional configuration using the EAP NEAP feature on the switch allowing it to authenticate the IP Phone using its MAC address
2.9	EAP non-eap-phone	N/A	Optional configuration using the EAP non-eap-phone feature on the switch allowing it to authenticate the IP Phone using the IP phone DHCP signature without using RADIUS
2.10	DHCP and Provisioning files	N/A	DHCP server settings and provisioning files for the IP Phones used in this example
2.11	Avaya Energy Saver	N/A	Optional configuration adding AES to the switch
2.12	DHCP Server	N/A	Windows 2003 DHCP server settings

[1] QoS can be added in a number of methods such as simply trusting all traffic, applying filters, or enabling Auto QoS (applies to Avaya 1100, 1200, or 2000 series only)
[2] The LLDP-MED Network Policy can also set the QoS DSCP and p-bit priority values

2.1 Reference Diagrams

2.1.1 Diagram 1 : Stackable Ethernet Routing Switch

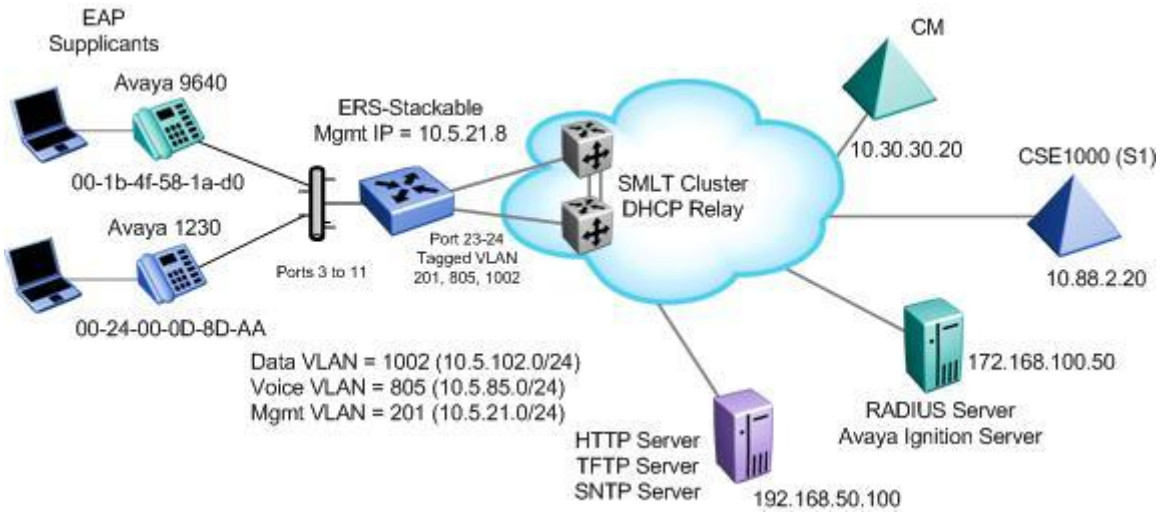


Figure 1: Base setup - Stackable Ethernet Routing Switch Setup

The following are the details for the base configuration:

- ERS-Stackable is a stackable Ethernet Routing Switches (ERS 2500, 4500, or 5000 series) setup as a Layer 2 switch connected to an SMLT Cluster
- The SMLT Cluster requires that DHCP Relay be enabled with a DHCP Relay agent for both the voice and data VLANs
- Overall, we will configure the following
    - Create Voice VLAN 805 with port members 3 to 11, 23, and 24
    - Create Data VLAN 1002 with port members 3 to 11, 23, and 24
    - Create Management VLAN 201 with port members 23 and 24
    - Configure access ports 3 to 11 to allow untagged Data VLAN 1002 and tagged Voice VLAN 805
    - Configure core ports 23 and 24 using MLT 1 using VLAN tagging and with Spanning disabled
    - Use all the recommended SMLT best practises
- Details regarding various Avaya IP Phone DHCP and provisioning file parameters are listed in Appendix A

2.1.2 Diagram 2 : Ethernet Routing Switch 8300

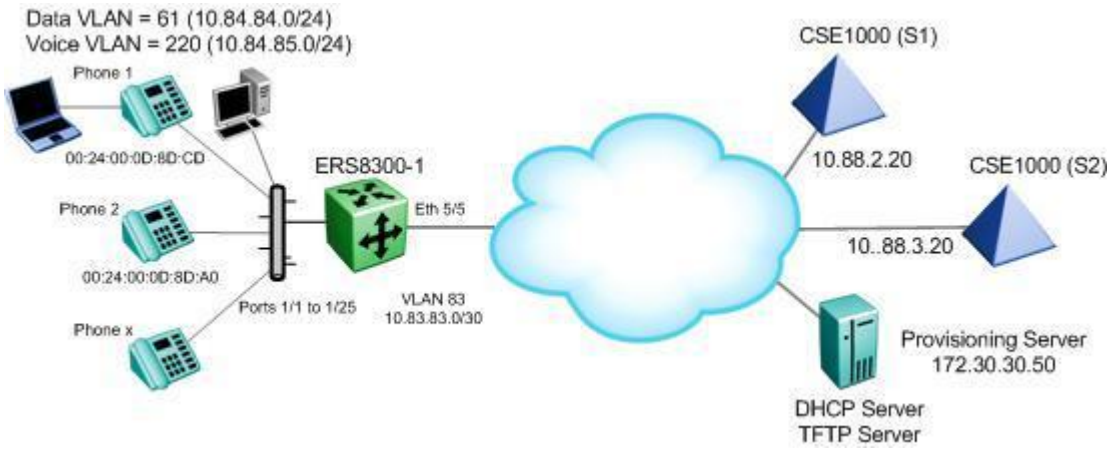


Figure 2: Base setup - Ethernet Routing Switch 8300 Setup

Overall, we will configure the following:

- Create Voice VLAN 220 with port members 1/1 to 1/25
- Create Data VLAN 61 with port members 1/1 to 1/25
- Create Trunk VLAN 83 with port member 5/5
- Enable DHCP relay for VLAN 220 and 61
- Enable Spanning Tree Fast-Start on ports 1/1 to 1/25 and disable STP on port 5/5
- Configure all voice ports, 1/1 to 1/25, with POE priority of high
- Enable RIP on all VLANs
- By default, the ERS 8300 passes both the DSCP and p-bit values as-is. The p-bit value determines the QoS level. For this example, we will not configure QoS as we are using VLAN tagging for the Voice VLAN
- Details regarding various Avaya IP Phone DHCP and provisioning file parameters are listed in Appendix A

2.2 Auto Configuration with a Stackable Ethernet Routing Switch using DHCP – Base Configuration

The following configuration example covers setting up a network to support both voice and data with Avaya's stackable Ethernet Routing switches and IP Phone sets using DHCP to configure the IP Phone sets. Please note, it is still advisable to use a provisioning server to allow for full configuration of the IP phone sets. We will cover how to setup the edge switch for Layer 2 operations using the best practises when connecting to an SMLT cluster.

This configuration example is in reference to diagram 1.

2.2.1 Stackable Switch Configuration

2.2.1.1 Go to configuration mode.

ERS-Stackable Step 1 - Enter configuration mode

```
ERS-Stackable>enable
ERS-Stackable#configure terminal
```

2.2.1.2 Create VLAN's

ERS-Stackable Step 1 – Create VLAN's 201, 805, and 1002

```
ERS-Stackable(config)#vlan create 201 name mgmt type port
ERS-Stackable(config)#vlan create 805 name voice type port
ERS-Stackable(config)#vlan create 1002 name data type port
```

ERS-Stackable Step 2 – Enable VLAN tagging on all appropriate ports

```
ERS-Stackable(config)#vlan port 23-24 tagging tagall
ERS-Stackable(config)#vlan port 3-11 tagging untagpvidOnly
```

ERS-Stackable Step 3 – Set VLAN configuration control to automatic and add VLAN port members

```
ERS-Stackable(config)# vlan configcontrol automatic
ERS-Stackable(config)#vlan members add 201 23-24
ERS-Stackable(config)#vlan members add 1002 3-11,23-24
ERS-Stackable(config)#vlan members add 805 3-11,23-24
ERS-Stackable(config)#vlan port 3-11 pvid 1002
```

ERS-Stackable Step 4 – Remove port members from the default VLAN

```
ERS-Stackable(config)#vlan members remove 1 3-11,23-24
```

2.2.1.3 Add MLT

ERS5698TFD-1 Step 1 – Add MLT with trunk members
ERS-Stackable(config)# ***mlt 1 enable member 23,24 learning disable***

2.2.1.4 Enable VLACP on trunk members using recommend values

ERS-Stackable Step 1 – Enable VLACP on uplink port member 23 and 24 using the recommended VLACP MAC and timeout values
ERS-Stackable(config)#***vlacp macaddress 01:80:c2:00:00:0f***
ERS-Stackable(config)#***vlacp enable***
ERS-Stackable(config)#***interface fastEthernet 23,24***
ERS-Stackable(config-if)#***vlacp timeout short***
ERS-Stackable(config-if)#***vlacp timeout-scale 5***
ERS-Stackable(config-if)#***vlacp enable***
ERS-Stackable(config-if)#***exit***

2.2.1.5 Discard Untagged Frames on uplink ports to SMLT Cluster

ERS-Stackable: Step 1 – Enable Discard Untagged Frames
ERS-Stackable(config)#***vlan ports 23-24 filter-untagged-frame enable***

2.2.1.6 Configure Management IP address on switch

An IP address can be added in one of two ways. If the switch is strictly used as a Layer 2 switch, then an IP address can be added via the Layer 2 method using the CLI command *ip address <switch|stack> <IP address> netmask <mask> default-gateway <default GW>*.

2.2.1.6.1 Adding Management IP - Layer 2

ERS-Stackable Step 1 – Set the IP address of the switch

```
ERS-Stackable(config)#vlan mgmt 201
ERS-Stackable(config)# ip address switch 10.5.21.8 netmask 255.255.255.0
default-gateway 10.5.21.1
```

2.2.1.6.2 Adding Management IP - Layer 3

ERS-Stackable Step 1 – Set the IP address of the switch

```
ERS-Stackable(config)#vlan mgmt 201
ERS-Stackable(config)#interface vlan 201
ERS-Stackable(config-if)#ip address 10.5.21.8 netmask 255.255.255.0
ERS-Stackable(config-if)#exit
```

ERS-Stackable Step 1 – Add the default route

```
ERS-Stackable(config)#ip routing
ERS-Stackable(config)#ip route 0.0.0.0 0.0.0.0 10.5.21.1 1
```

2.2.1.7 Configure PoE levels

If you wish, you can change the default PoE level of low to either high or critical.

ERS-Stackable Step 1 – Set PoE Power level high on all VoIP ports

```
ERS-Stackable(config)#interface fastEthernet 3-11
ERS-Stackable(config)# poe poe-priority high
ERS-Stackable(config)#exit
```

2.2.1.8 QoS

There are several options you can deploy to add QoS for the voice traffic.

- Assign QoS class of trusted to all ports – easiest to implement, but, trust's all traffic which may not be a good idea
- Assign QoS class of trusted to all ports and adding a filter to remark the data traffic
- Set all access ports as untrusted (default setting), set uplink ports as trusted, and add a filter to remark the voice traffic to CoS level of Premium
- Enable Auto QoS – only supported on limited Avaya products as listed below
    - CS1000, CS2100, BCM, and/or SRG call servers
- Enable ADAC – automatically provides QoS only to the voice VAN

For this example, we will simply trust all traffic by simply setting all ports as trusted ports. This is the easiest method for applying QoS.

If you are using an Avaya Ethernet Routing Switch 5000 or Ethernet Routing Switch 4500 (release 5.4 or higher), you will need to define a queue set other than the default queue set which only uses two queues. At mimimum, it is recommended to use queue set 4 which will provide three weighted queues and one strict queue using the CLI command *qos agent queue-set 4*. Use the CLI command *show qos queue-set* to view the make up for each queue set. The ERS 2500 only supports one queue set, queue set 4, which supports one strict queue and three weighted-round-robin (WWR) queues.

ERS-Stackable Step 1 – Change from default queue set (queue set 2) to at least queue set 4 and reset the switch. Note, this only applies to the ERS 5000 or ERS 4500

```
ERS-Stackable(config)#qos agent queue-set 4
QoS queue setting isn't effective until after reset.
```

ERS-Stackable Step 2 – Create a new interface group with a class of trusted

```
ERS-Stackable(config)#qos if-group name trusted class trusted
ERS-Stackable(config)#qos if-assign port 1-24 name trusted
```

ERS-Stackable Step 3 – Traffic Profile Option. Configure either a traffic profile or ACL to remark the data VLAN with a QoS level of Standard depending on switch model. Assuming ERS-Stackable is an ERS 4500 or ERS 5000, it is recommend to use traffic profiles

```
ERS-Stackable(config)#qos traffic-profile classifier name one vlan-min 1002
vlan-max 1002 ethertype 0x800 update-dscp 0 update-1p 0
ERS-Stackable(config)#qos traffic-profile set port 1-13 name one
```

ERS-Stackable Step 3 – ACL Option. Configure either a traffic profile or ACL to remark the data VLAN with a QoS level of Standard depending on switch model. ACL's can be used on a ERS 2500, ERS 4500, or ERS 5000 where it is recommended to use traffic profiles over ACL's if supported on the switch

```
ERS-Stackable(config)#qos l2-acl name one vlan-min 1002 vlan-max 1002 ethertype 0x800 update-dscp 0 update-1p 0
ERS-Stackable(config)#qos l2-acl name one ethertype 0x800 drop-action disable
ERS-Stackable(config)#qos acl-assign port 1-13 acl-type l2 name one
```

2.2.1.9 Spanning Tree Configuration

ERS-Stackable Step 1 – Enable STP Fast-Start and BPDU filtering on port 3 to 11

```
ERS-Stackable(config)#interface fastEthernet all
ERS-Stackable(config-if)#spanning-tree port 3-11 learning fast
ERS-Stackable(config-if)#spanning-tree port 3-11 bpdu-filtering timeout 0
ERS-Stackable(config-if)#spanning-tree port 3-11 bpdu-filtering enable
```

2.2.1.10 Enable IP Anti-Spoofing and IP Source Guard – Optional

To prevent IP spoofing attacks, it is recommened to enabled IP DHCP Snooing and IP Arp Inspecttion. In addition, it is recommended to enabled IP Source Guard which prevents a host from spoofing a source IP other than that assigned by DHCP.

ERS-Stackable Step 1 – Enable IP DHCP Snooping for voice VLAN 805 and data VLAN 1002

```
ERS-Stackable(config)#ip dhcp-snooping vlan 805
ERS-Stackable(config)#ip dhcp-snooping vlan 1002
ERS-Stackable(config)#ip dhcp-snooping enable
```

ERS-Stackable Step 2 – Enable IP Arp Inspection for voice VLAN 805 and data VLAN 1002

```
ERS-Stackable(config)#ip arp-inspection vlan 805
ERS-Stackable(config)#ip arp-inspection vlan 1002
```

ERS-Stackable Step 3 – Enable core ports 23 and 24 as a trusted port

```
ERS-Stackable(config)#interface fastEthernet 23-24
ERS-Stackable(config-if)#ip dhcp-snooping trusted
ERS-Stackable(config-if)#ip arp-inspection trusted
ERS-Stackable(config-if)#exit
```

ERS-Stackable Step 4 – Enable IP Source Guard on access ports 3 to 11
ERS-Stackable(config)#***interface fastEthernet 3-11***
ERS-Stackable(config-if)#***ip verify source***
ERS-Stackable(config-if)#***exit***

2.2.2 Verify Operations

Via the ERS-Stackable switch, verify the following information:

Step 1 – Verify VLAN Configuration as shown for ERS-Stackable where the default VLAN should be VLAN 1002 on ports 3 to 11

```
ERS-Stackable#show vlan interface info 3-11
```

Result:

```
          Filter     Filter
         Untagged Unregistered
Port      Frames     Frames    PVID PRI    Tagging    Name
---- -------- ------------ ---- --- ------------ --------------
3    No       Yes          1002 0   UntagPvidOnly Port 3
4    No       Yes          1002 0   UntagPvidOnly Port 4
5    No       Yes          1002 0   UntagPvidOnly Port 5
6    No       Yes          1002 0   UntagPvidOnly Port 6
7    No       Yes          1002 0   UntagPvidOnly Port 7
8    No       Yes          1002 0   UntagPvidOnly Port 8
9    No       Yes          1002 0   UntagPvidOnly Port 9
10   No       Yes          1002 0   UntagPvidOnly Port 10
11   No       Yes          1002 0   UntagPvidOnly Port 11
```

Step 2 – Verify VLAN Configuration as shown for ERS-Stackable where the ports 3 to 11 should be members of untagged VLAN 1002 and tagged VLAN 805

```
ERS-Stackable#show vlan interface vids 3-11
```

Result:

```
Port VLAN VLAN Name         VLAN VLAN Name         VLAN VLAN Name
---- ---- ---------------- ---- ---------------- ---- ----------------
3    805  voice            1002 data
---- ---- ---------------- ---- ---------------- ---- ----------------
4    805  voice            1002 data
---- ---- ---------------- ---- ---------------- ---- ----------------
5    805  voice            1002 data
---- ---- ---------------- ---- ---------------- ---- ----------------
6    805  voice            1002 data
---- ---- ---------------- ---- ---------------- ---- ----------------
7    805  voice            1002 data
---- ---- ---------------- ---- ---------------- ---- ----------------
8    805  voice            1002 data
---- ---- ---------------- ---- ---------------- ---- ----------------
9    805  voice            1002 data
---- ---- ---------------- ---- ---------------- ---- ----------------
10   805  voice            1002 data
---- ---- ---------------- ---- ---------------- ---- ----------------
11   805  voice            1002 data
---- ---- ---------------- ---- ---------------- ---- ----------------
```

Step 3 – Verify IP Phone detection by issuing PoE port status command

```
ERS-Stackable#show poe-port-status 3-11
```

Result:

```
        Admin      Current                              Limit
Port    Status     Status              Classification   (Watts)  Priority
----    -------    ------------------  --------------   -------  --------
3       Enable     Detecting                 0          16       Low
4       Enable     Detecting                 0          16       Low
5       Enable     Detecting                 0          16       Low
6       Enable     Detecting                 0          16       Low
7       Enable     Delivering Power          2          16       Low
8       Enable     Detecting                 0          16       Low
9       Enable     Delivering Power          2          16       Low
10      Enable     Delivering Power          2          16       Low
11      Enable     Detecting                 0          16       Low
```

Step 4 – Verify IP Phone power usage by issuing PoE power measured command

```
ERS-Stackable#show poe-power-measurement 3-11
```

Result:

```
Port    Volt(V)   Current(mA)   Power(Watt)
----    -------   -----------   ---------------
3       0.0       0             0.000
4       0.0       0             0.000
5       0.0       0             0.000
6       0.0       0             0.000
7       48.4      58            2.807
8       0.0       0             0.000
9       48.4      61            2.952
10      48.4      58            2.807
11      0.0       0             0.000
```

2.3 Auto Configuration with a Stackable Ethernet Routing Switch using DHCP and LLDP-MED

The following configuration example is similar to the previous configuration example except we will configure the stackable Ethernet Routing Switches using Layer 2 and enable LLDP-MED on the switches to use the network-policy to configure the voice VLAN on the IP phone.

Please note, release 5.4 is required on the ERS 4500 series and release 6.2 is required on the ERS 5000 to support LLDP-MED interoperation with the Avaya 1600, 4600, and 9600 series IP Phones. For the ERS 2500 series, ADAC is required and must be enabled for LLDP-MED operation to detect an Avaya model 1100 or 2000 series IP Phone. For the ERS 4500 and ERS 5000, LLDP-MED can be used with or without ADAC.

This configuration example is in reference to diagram 1 and uses the base configuration from example 2.2.

2.3.1 Stackable Ethernet Switch Configuration

2.3.1.1 Enable LLDP-MED

ERS-Stackable Step 1 – Enable LLDP-MED on port 3 to 11

```
ERS-Stackable(config)#interface fastEthernet 3-11
ERS-Stackable(config-if)#lldp config-notification
ERS-Stackable(config-if)#lldp status txAndRx config-notification
ERS-Stackable(config-if)#lldp tx-tlv local-mgmt-addr port-desc sys-cap sys-desc
sys-name
ERS-Stackable(config-if)#lldp tx-tlv med extendedPSE inventory location med-
capabilities network-policy
ERS-Stackable(config-if)# lldp med-network-policies voice dscp 46 priority 6
tagging tagged vlan-id 805
ERS-Stackable(config-if)#exit
```

The defalt MED policy values are: DSCP = 0, priority = 0, tagging = untagged, and vlan-id = 1. You can also set the voice signaling DSCP, priority, tagging, and vlan-id setting using the interface level *lldp med-network-policies port <port/ports> voice-signaling dscp <0-63> priority <0-7> tagging <tagged|untagged> vlan-id <0-4094>* CLI command.

2.3.2 Verify Operations

Via the ERS-Stackable switch, verify the following information:

Step 1 – Verify LLDP configuration. Note, using this command requires at mimumim software release 6.2 for the ERS 5000 and 5.4 for the ERS 4500

```
ERS-Stackable#show running-config module 802.1ab
```

Result:

```
        ! Displaying only parameters different to default
        !==================================================
        enable
        configure terminal
        !
        ! *** 802.1ab ***
        !

        interface FastEthernet ALL
        lldp port 3-11 config-notification
        lldp tx-tlv port 3-11 local-mgmt-addr port-desc sys-desc sys-name
        lldp tx-tlv port 3-11 med extendedPSE inventory location med-capabilities network-
        policy
        exit
        !
        ! *** 802.1AB MED Voice Network Policies ***
        !
        interface FastEthernet ALL
        lldp med-network-policies port 3-11 voice dscp 46 priority 6 tagging tagged vla
        n-id 99
        exit
```

Step 2 – Verify LLDP network policy configuration

```
ERS-Stackable#show lldp med-network-policies port 3-11

or, via some switches

ERS-Stackable#show lldp med-network-policies port 3-11 voice
```

Result:

```
        ------------------------------------------------------------------------------
                             LLDP-MED network-policies
        ------------------------------------------------------------------------------
        ------------------------------------------------------------------------------
           Unit/   Application Type   VlanID   Tagging   DSCP   Priority
           Port
        ------------------------------------------------------------------------------
           3       Voice              805      tagged     46    6
           4       Voice              805      tagged     46    6
           5       Voice              805      tagged     46    6
           6       Voice              805      tagged     46    6
           7       Voice              805      tagged     46    6
           8       Voice              805      tagged     46    6
           9       Voice              805      tagged     46    6
           10      Voice              805      tagged     46    6
           11      Voice              805      tagged     46    6
        ------------------------------------------------------------------------------
```

Step 3 – Verify LLDP MED configuration; for example, the following CLI command shows LLDP MED configuration for port 11

```
ERS-Stackable#show lldp port 13 local-sys-data med
```

Result:

```
--------------------------------------------------------------------------------
                      lldp local-sys-data chassis
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
        ChassisId: MAC address        00:13:0a:35:e8:00
        SysName:   ERS-Stackable
        SysCap:    rB / rB            (Supported/Enabled)
        SysDescr:
Ethernet Routing Switch ERS-Stackable  HW:05       FW:6.0.0.10  SW:v6.2.0.009

        MED-Device class:       Network Connectivity Device
        MED-POE Device Type:    PSE Device
        HWRev: 05               SerialNumber: SDNI2S00L9
        FWRev: 6.0.0.10         SWRev: v6.2.0.009
        ManufName: Avaya        ModelName: ERS-Stackable
--------------------------------------------------------------------------------
                      lldp local-sys-data port
--------------------------------------------------------------------------------
Port:  11

 MED-Capabilities:      CNLSI
 MED-PSE PDPort Priority: Low                   Power Value:   16.0 Watt
 MED-Application Type: Voice                    VLAN ID: 805
 L2 Priority: 6         DSCP Value: 46          Tagged Vlan, Policy defined

--------------------------------------------------------------------------------
Sys capability: O-Other; R-Repeater; B-Bridge; W-WLAN accesspoint; r-Router;
T-Telephone; D-DOCSIS cable device; S-Station only.
Med Capabilities-C: N-Network Policy; L-Location Identification; I-Inventory;
S-Extended Power via MDI - PSE; D-Extended Power via MDI - PD.
```

Step 4 – Verify LLDP neighbor details assuming an Avaya 9640G is connected to port 11

ERS-Stackable# ***show lldp port 11 neighbor detail***

Result:

```
--------------------------------------------------------------------------------
                            lldp neighbor
--------------------------------------------------------------------------------
Port: 11    Index: 89                Time: 11 days, 04:49:49
        ChassisId: Network address   IPv4  10.1.90.222
        PortId:    MAC address       00:1b:4f:58:1a:d0
        SysName:   AVB581AD0
        SysCap:    TB / TB           (Supported/Enabled)

 PVID:                               PPVID Supported: none
 VLAN Name List: none                PPVID Enabled: none

 Dot3-MAC/PHY Auto-neg: supported/enabled      OperMAUtype:  100BaseTXFD
 PMD auto-neg:          10Base(T, TFD), 100Base(TX, TXFD), 1000Base(TFD)

 MED-Capabilities: CNDI / CNDI       (Supported/Current)
 MED-Device type:  Endpoint Class 3
 MED-Application Type: Voice                   VLAN ID: 805
 L2 Priority: 6         DSCP Value: 46         Tagged Vlan, Policy defined
 Med-Power Type: PD Device           Power Source: FromPSE
 Power Priority: Low                 Power Value:    5.6 Watt
 HWRev: 9640GD01A                    FWRev: hb96xxua3_11.bin
 SWRev: ha96xxua3_11.bin             SerialNumber: 10N520301110
 ManufName: Avaya                    ModelName: 9640G
 AssetID:
--------------------------------------------------------------------------------
Sys capability: O-Other; R-Repeater; B-Bridge; W-WLAN accesspoint; r-Router;
T-Telephone; D-DOCSIS cable device; S-Station only.
Total neighbors: 3
Med Capabilities-C: N-Network Policy; L-Location Identification; I-Inventory;
S-Extended Power via MDI - PSE; D-Extended Power via MDI - PD.
```

2.4 Auto Configuration with an Ethernet Routing Switch 8300 using DHCP

The following configuration example covers setting up a network to support both voice and data to support automatic provisioning on Avaya's IP Phone sets. We will cover how to setup the edge switch, in this example an Ethernet Routing Switch 8300, for L3 operations using RIP.

By default, the ERS 8300 passes both the DSCP and p-bit values as-is. The p-bit value determines the QoS level. For this example, we will not configure QoS as we are using VLAN tagging for the Voice VLAN.

This configuration example is in reference to diagram 1.

2.4.1 ERS 8300 Configuration

2.4.1.1 Go to configuration mode.

ERS8300-1 Step 1 - Enter configuration mode – CLI only

```
CLI
ERS8300-1:5>enable
Password: ******
ERS8300-1:5#configure terminal
```

2.4.1.2 Enable VLAN tagging on access port members

ERS8300-1 Step 1 – Enable VLAN tagging on ports 1/1 to 1/25

```
PPCLI
ERS8300-1:5# config ether 1/1-1/25 perform-tagging enable
CLI
ERS8300-1:5(config)#interface fastEthernet 1/1-1/25
ERS8300-1:5(config-if)#encapsulation dot1q
ERS8300-1:5(config-if)#exit
```

2.4.1.3 Create Data VLAN 61

ERS8300-1 Step 1 – Remove port members from the default VLAN 1 and create VLAN 61, add port members, enable RIP, and enable DHCP relay

```
PPCLI
ERS8300-1:5# config vlan 1 port remove 1/1-1/25
ERS8300-1:5# config vlan 61 create byport 1
ERS8300-1:5# config vlan 61 name Data
ERS8300-1:5# config vlan 61 ports add 1/1-1/25
ERS8300-1:5# config vlan 61 ip create 10.84.84.1/24
ERS8300-1:5# config vlan 61 ip dhcp-relay mode dhcp
ERS8300-1:5# config vlan 61 ip dhcp-relay enable
ERS8300-1:5# config vlan 61 ip rip enable
CLI
ERS8300-1:5(config)#vlan members remove 1 1/1-1/25
ERS8300-1:5(config)#vlan create 61 type name Data port 1
ERS8300-1:5(config)#vlan members add 61 1/1-1/25
ERS8300-1:5(config)#interface vlan 61
ERS8300-1:5(config-if)#ip address 10.84.84.1 255.255.255.0
ERS8300-1:5(config-if)#ip dhcp-relay mode dhcp
ERS8300-1:5(config-if)#ip dhcp-relay
ERS8300-1:5(config-if)#no ip rip supply enable
ERS8300-1:5(config-if)#no ip rip listen enable
ERS8300-1:5(config-if)#exit
```

2.4.1.4 Enable Spanning Tree Faststart on access port

ERS8300-1 Step 1 – Enable STP Faststart on ports 1/1 to 1/25 and disable STP on port 5/5

```
PPCLI
ERS8300-1:5# config ethernet 1/1-1/25 stg 1 faststart enable
ERS8300-1:5# config ethernet 5/5 stg 1 stp disable
CLI
ERS8300-1:5(config)#interface fastEthernet 1/1-1/25
ERS8300-1:5(config-if)#spanning-tree stp 1 faststart
ERS8300-1:5(config-if)#exit
ERS8300-1:5(config)#interface gigabitEthernet 5/5
ERS8300-1:5(config-if)#no spanning-tree stp 1
ERS8300-1:5(config-if)#exit
```

2.4.1.5 Create Voice VLAN 220

ERS8300-1 Step 1 – Create VLAN 220, add port members, enable RIP, and enable DHCP relay

```
PPCLI
ERS8300-1:5# config vlan 220 create byport 1
ERS8300-1:5# config vlan 220 ports add 1/1-1/25
ERS8300-1:5# config vlan 220 name Voice
ERS8300-1:5# config vlan 220 ip create 10.84.85.1/24
ERS8300-1:5# config vlan 220 ip dhcp-relay mode dhcp
ERS8300-1:5# config vlan 220 ip dhcp-relay enable
ERS8300-1:5# config vlan 220 ip rip enable
CLI
ERS8300-1:5(config)# vlan create 220 name Voice type port 1
ERS8300-1:5(config)#vlan members add 220 1/1-1/25
ERS8300-1:5(config)#interface vlan 220
ERS8300-1:5(config-if)#ip address 10.84.85.1 255.255.255.0
ERS8300-1:5(config-if)#ip dhcp-relay mode dhcp
ERS8300-1:5(config-if)#ip dhcp-relay
ERS8300-1:5(config-if)#no ip rip supply enable
ERS8300-1:5(config-if)#no ip rip listen enable
ERS8300-1:5(config-if)#exit
```

2.4.1.6 Create Core VLAN 83

ERS8300-1 Step 1 – Create VLAN 83, add port member, and enable RIP

```
PPCLI
ERS8300-1:5# config vlan 1 port remove 5/5
ERS8300-1:5# config vlan 83 create byport 1
ERS8300-1:5# config vlan 83 name Trunk
ERS8300-1:5# config vlan 83 ports add 5/5
ERS8300-1:5# config vlan 83 ip create 10.83.83.2/30
ERS8300-1:5# config vlan 83 ip rip enable
CLI
ERS8300-1:5(config)#vlan members remove 1 1/1-1/25
ERS8300-1:5(config)#vlan create 83 type name Trunk port 1
ERS8300-1:5(config)#vlan members add 83 5/5
ERS8300-1:5(config)#interface vlan 83
ERS8300-1:5(config-if)#ip address 10.83.83.2 255.255.255.252
ERS8300-1:5(config-if)#exit
```

2.4.1.7 Configure access port members to untag the default VLAN

ERS8300-1 Step 1 – Configure port 1/1 to 1/25 for untag default VLAN and set the default VLAN to 61

```
PPCLI
ERS8300-1:5# config ethernet 1/1-1/25 untag-port-default-vlan enable
ERS8300-1:5# config ethernet 1/1-1/25 default-vlan-id 61
CLI
ERS8300-1:5(config)#vlan ports 1/1-1/25 tagging untagpvidonly
ERS8300-1:5(config)#interface fastEthernet 1/1-1/25
ERS8300-1:5(config-if)#default-vlan-id 61
ERS8300-1:5(config-if)#exit
```

2.4.1.8 Enable RIP Globally

ERS8300-1 Step 1 – Enable RIP

```
PPCLI
ERS8300-1:5# config ip rip enable
CLI
ERS8300-1:5(config)#ip routing
ERS8300-1:5(config)#router rip enable
ERS8300-1:5(config)#router rip
ERS8300-1:5(config-router)#networks 10.84.84.1
ERS8300-1:5(config-router)#networks 10.84.85.1
ERS8300-1:5(config-router)#networks 10.83.83.1
ERS8300-1:5(config-router)#exit
```

2.4.1.9 Enable DHCP relay agents

ERS8300-1 Step 1 – Enable relay agent for both data VLAN 61 and voice VLAN 220

```
PPCLI
ERS8300-1:5# config ip dhcp-relay create-fwd-path agent 10.84.84.1
server 10.10.10.20 mode dhcp state enable
ERS8300-1:5# config ip dhcp-relay create-fwd-path agent 10.84.85.1
server 10.10.10.20 mode dhcp state enable
CLI
ERS8300-1:5(config)#ip dhcp-relay fwd-path 10.84.84.1 10.10.10.20
ERS8300-1:5(config)#ip dhcp-relay fwd-path 10.84.85.1 10.10.10.20 l1
```

2.4.1.10 Enable IP Anti-Spoofing

ERS8300-1 Step 1 – Enable IP DHCP Snooping for voice VLAN 220 and data VLAN 61

```
PPCLI
ERS8300-1:5# config ip dhcp-snooping vlan 61 enable
ERS8300-1:5# config ip dhcp-snooping vlan 220 enable
ERS8300-1:5# config ip dhcp-snooping enable
CLI
ERS8300-1:5(config)#ip dhcp-snooping vlan 61 enable
ERS8300-1:5(config)#ip dhcp-snooping vlan 220 enable
ERS8300-1:5(config)#ip dhcp-snooping enable
```

ERS8300-1 Step 2 – Enable IP ARP Inspection for voice VLAN 220 and data VLAN 61

```
PPCLI
ERS8300-1:5# config ip arp-inspection vlan 61 enable
ERS8300-1:5# config ip arp-inspection vlan 220 enable
CLI
ERS8300-1:5(config)#ip arp-inspection vlan 61
ERS8300-1:5(config)#ip arp-inspection vlan 220
```

2.4.1.11 Configure access port member PoE setting to high

ERS8300-1 Step 1 – Enable relay agent for both data VLAN 61 and voice VLAN 220

```
PPCLI
ERS8300-1:5# config poe port 1/1-1/25 power-priority high
ERS8300-1:5# config poe port 1/1-1/25 type telephone
CLI
ERS8300-1:5(config)#interface fastEthernet 1/1-1/25
ERS8300-1:5(config-if)#poe priority high
ERS8300-1:5(config-if)#exit
```

By default, the power priority level is set to low. It is recommended to change this value to either high or critical depending on which ports you wish to come up first after a switch power cycle. Also, by default, the power limit is set to 16W per port. You can change this value from 3 to 16 watts using the command poe limit <3-16> under the interface level.

2.4.2 Verify Operations

Step 1 – Verify operations by using the following commands:

```
PPCLI
ERS8300-1:5# show ip interface
ERS8300-1:5# show ip route info
ERS8300-1:5# show vlan info basic
ERS8300-1:5# show vlan info port
ERS8300-1:5# show port info vlans
ERS8300-1:5# show port info interface
ERS8300-1:5# show ip dhcp-relay fwd-path
ERS8300-1:5# show ip rip info
ERS8300-1:5# show ip rip interface
ERS8300-1:5# show poe port <info|power-measurement|stats> <port #>
ERS8300-1:5# show poe card info
ERS8300-1:5# show poe sys info
CLI
ERS8300-1:5# show ip interface
ERS8300-1:5# show ip route
ERS8300-1:5# show vlan basic
ERS8300-1:5# show vlan members
ERS8300-1:5# show vlan
ERS8300-1:5# show ip dhcp-relay fwd-path
ERS8300-1:5# show ip dhcp-relay interface
ERS8300-1:5# show ip rip
ERS8300-1:5# show ip rip interface
ERS8300-1:5# show poe main-status
ERS8300-1:5# show poe port-status
ERS8300-1:5# show poe power-measurement
ERS8300-1:5# show poe sys-status
```

2.5 Auto Configuration Using ADAC – MAC Dectection using a Stackable Ethernet Routing Switch

The following configuration example covers setting up a network to support both voice and data to support Auto-Configuration with Avaya's stackable Ethernet Routing switches and IP Phone sets. ADAC MAC detection will be enabled detect the IP Phone and apply QoS.

This configuration example is in reference to diagram 1 and base configuration in section 2.2.

2.5.1 Stackable Ethernet Switch Configuration

Please note, the ADAC configuration is exactly the same as that used in section 2.2 with only exception that the Voice VLAN is created by ADAC.

2.5.1.1 Configure ADAC

ERS-Stackable Step 1 – Add ADAC voice VLAN with operation mode of tagged frame, enable ADAC traps, and add ADAC uplink port 23

```
ERS-Stackable(config)#adac voice-vlan 805
ERS-Stackable(config)#adac op-mode tagged-frames
ERS-Stackable(config)#adac uplink-port 23
ERS-Stackable(config)#adac traps enable
ERS-Stackable(config)#adac enable
```

Please note the following:

- VLAN 805 must not exist prior to configuring ADAC.
- The command *adac uplink-port 23* will automatically enable VLAN tagging on port 23 and 24 and add these ports as a member of VLAN 805 and MLT 1.

2.5.1.2 Enable ADAC at interface level

ERS-Stackable Step 1 – Enable ADAC on port members 3 to 11 and enable ADAC tagged frames with the option to untag the default PVID. By default, ADAC MAC detection is already enabled, hence it is not necessary to enable ADAC MAC detection.

```
ERS-Stackable(config)#interface fastEthernet all
ERS-Stackable(config-if)#adac port 3-11 tagged-frames-tagging untag-pvid-only
ERS-Stackable(config-if)#adac port 3-11 enable
ERS-Stackable(config-if)#exit
```

2.5.1.3 Add ADAC MAC address range

ERS-Stackable Step 1 – Add to ADAC the IP Phone set MAC address range for the Avaya 1230 and 9640 IP phone sets used in this example
ERS-Stackable(config)#***adac mac-range-table low-end 0024.000D.0000 high-end 0024.000D.ffff***
ERS-Stackable(config)#***adac mac-range-table low-end 001b.4f58.0000 high-end 001b.4f58.ffff***

2.5.1.4 Disable unregistered frames on ADAC port members

ERS-Stackable: Step 1 – Disable Filter unregistered Frames on MLT trunks members
ERS-Stackable(config)#***vlan ports 3-11 filter-unregistered-frames disable***

2.5.2 Verify configuration

2.5.2.1 VLAN Information

Step 1 – Verify the VLAN configuration for all access and trunk port members prior to connecting an IP phone to any port member

```
ERS-Stackable#show vlan interface info 3-11,23-24
```

Result:

```
             Filter     Filter
            Untagged Unregistered
Port  Frames     Frames     PVID PRI    Tagging     Name
---- -------- ---------- ---- --- ------------ ----------------
3    No       No         1002 0   UntagAll     Port 3
4    No       No         1002 0   UntagAll     Port 4
5    No       No         1002 0   UntagAll     Port 5
6    No       No         1002 0   UntagAll     Port 6
7    No       No         1002 0   UntagAll     Port 7
8    No       No         1002 0   UntagAll     Port 8
9    No       No         1002 0   UntagAll     Port 9
10   No       No         1002 0   UntagAll     Port 10
11   No       No         1002 0   UntagAll     Port 11
23   Yes      Yes        1    0   TagAll       Port 23
24   Yes      Yes        1    0   TagAll       Port 24
```

Step 2 – Verify the VLAN configuration for all access port members after connecting an IP phone to a port member. For example, assuming we have attached an Avaya IP phone connected to ports 3 and port 4

```
ERS-Stackable# show vlan interface info 3-4
```

Result:

```
             Filter     Filter
            Untagged Unregistered
Port  Frames     Frames     PVID PRI    Tagging     Name
---- -------- ---------- ---- --- ------------ ----------------
3    No       No         1002 0   UntagPvidOnly Port 10
4    No       No         1002 0   UntagPvidOnly Port 11
```

Step 3 – Verify the VLAN PVIDs for all access port members after connecting an IP phone to a port member. For example, assuming we have attached an Avaya IP phone to ports 3 and port 4
ERS-Stackable# ***show vlan interface vids 3-6***
Result:

```
       Port VLAN VLAN Name         VLAN VLAN Name         VLAN VLAN Name
       ---- ---- ----------------  ---- ----------------  ---- ----------------
       3    1002 data              805  Voice_VLAN
       ---- ---- ----------------  ---- ----------------  ---- ----------------
       4    1002 data              805  Voice_VLAN
       ---- ---- ----------------  ---- ----------------  ---- ----------------
       5    1002 data
       ---- ---- ----------------  ---- ----------------  ---- ----------------
       6    1002 data
       ---- ---- ----------------  ---- ----------------  ---- ----------------
```

Via the ERS-Stackable switch, verify the following information:

Option	**Verify**
PVID	Verify that the default PVID on port member 3 to 11 is ***1002***
Tagging	Verify that ports 3 to 11 are configured as ***UntagAll*** when no IP Phones have been detected by ADAC and set to ***UntagPvidOnly*** only when an IP Phone has successfully been detected by ADAC
Filter Untagged Frames	Verify that ports 3 to 11 are configured as ***No*** and port members 23 and 24 are configured as ***Yes***
Filter Unregistered Frames	Verify that ports 3 to 11 are configured as ***No*** and port members 23 and 24 are configured as ***Yes***
VLAN and VLAN Name	Verify that ports 3 to 11 are members of VLANs ***1002*** and only members of VLAN ***805*** when an IP Phone has been detected by ADAC.

2.5.2.2 Verify ADAC Global Information

Step 1 – Verify ADAC Global Settings
ERS-Stackable#***show adac***
Result:

```
            ADAC Global Configuration
        ---------------------------------------
        ADAC Admin State:  Enabled
        ADAC Oper State:  Enabled
        Operating Mode:  Tagged Frames
        Traps Control Status:  Enabled
        Voice-VLAN ID:  805
        Call Server Port:  None
        Uplink Port:  23
```

Via the ERS-Stackable switch, verify the following information:

Option	**Verify**
ADAC Admin State: ADAC Oper State:	Verify that the ADAC administrative and operation state is ***Enabled***
Operating Mode	Verify the ADAC operating mode is set for ***Tagged Frames***
Traps Control Status:	Verify the ADAC traps is set for ***Enabled***
Voice-VLAN ID:	Verify the ADAC voice VLAN is set for ***805***
Uplink Port:	Verify the ADAC uplink port is configured for port ***23***

2.5.2.3 Verify ADAC at interface level

Assuming ADAC has detected an Avaya IP phone on ports 3 and 4.

Step 2 – Verify ADAC at interface level
ERS-Stackable#***show adac interface 3-11***
Result:

```
                Auto        Oper       Auto
Port  Type  Detection   State      Configuration  T-F PVID   T-F Tagging
----  ----  ---------   --------   -------------  ---------  ---------------
3     T     Enabled     Enabled    Applied        No Change  Untag PVID Only
4     T     Enabled     Enabled    Applied        No Change  Untag PVID Only
5     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
6     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
7     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
8     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
9     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
10    T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
11    T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
```

The filter unregistered frames must be disabled for ADAC to work. If you connect an IP phone set to a port and the auto configuration state is *Not Applied*, either the MAC address is not part of the ADAC MAC table or filter unregistered frames is enabled.

Via the ERS-Stackable switch, verify the following information:

Option	**Verify**
Type	Verify that the ADAC type is set for ***T*** indicating the port is configured for ADAC type of tagged port
Auto Detection	Verify the ADAC detection is set to ***Enabled*** for port 3 to 11
Oper State:	Verify the ADAC operation state is set to ***Enabled*** for port 3 to 11
Auto Configuration	In our example, ports 3 and 4 should indicate ***Applied*** while ports 5 to 11 should indicate ***Not Applied*** as only ports 3 and 4 have IP Phone sets detected by ADAC
T-F PVID	Verify the tagged frames ***No Change*** which indicates do not change the default PVID
T-F Tagging	Verify the port members 3 to 11 are set to ***Untag PVID only***

2.5.2.4 Verify ADAC MAC Address table

Step 3 – Verify ADAC MAC address range
ERS-Stackable# ***show adac mac-range-table***
Result:

```
            Lowest MAC Address          Highest MAC Address
      ------------------------    ------------------------
         00-0A-E4-01-10-20           00-0A-E4-01-23-A7
         00-0A-E4-01-70-EC           00-0A-E4-01-84-73
         00-0A-E4-01-A1-C8           00-0A-E4-01-AD-7F
         00-0A-E4-01-DA-4E           00-0A-E4-01-ED-D5
         00-0A-E4-02-1E-D4           00-0A-E4-02-32-5B
         00-0A-E4-02-5D-22           00-0A-E4-02-70-A9
         00-0A-E4-02-D8-AE           00-0A-E4-02-FF-BD
         00-0A-E4-03-87-E4           00-0A-E4-03-89-0F
         00-0A-E4-03-90-E0           00-0A-E4-03-B7-EF
         00-0A-E4-04-1A-56           00-0A-E4-04-41-65
         00-0A-E4-04-80-E8           00-0A-E4-04-A7-F7
         00-0A-E4-04-D2-FC           00-0A-E4-05-48-2B
         00-0A-E4-05-B7-DF           00-0A-E4-06-05-FE
         00-0A-E4-06-55-EC           00-0A-E4-07-19-3B
         00-0A-E4-08-0A-02           00-0A-E4-08-7F-31
         00-0A-E4-08-B2-89           00-0A-E4-09-75-D8
         00-0A-E4-09-BB-9D           00-0A-E4-09-CF-24
         00-0A-E4-09-FC-2B           00-0A-E4-0A-71-5A
         00-0A-E4-0A-9D-DA           00-0A-E4-0B-61-29
         00-0A-E4-0B-BB-FC           00-0A-E4-0B-BC-0F
         00-0A-E4-0B-D9-BE           00-0A-E4-0C-9D-0D
         00-13-65-FE-F3-2C           00-13-65-FF-ED-2B
         00-15-9B-FE-A4-66           00-15-9B-FF-24-B5
         00-16-CA-00-00-00           00-16-CA-01-FF-FF
         00-16-CA-F2-74-20           00-16-CA-F4-BE-0F
         00-17-65-F6-94-C0           00-17-65-F7-38-CF
         00-17-65-FD-00-00           00-17-65-FF-FF-FF
         00-18-B0-33-90-00           00-18-B0-35-DF-FF
         00-19-69-83-25-40           00-19-69-85-5F-FF
         00-1B-4F-58-00-00           00-1B-4F-58-FF-FF
         00-24-00-0D-00-00           00-24-00-0D-FF-FF

      Total Ranges: 30
```

On ERS-Stackable, verify the following information:

Option	Verify
Lowest MAC Address Highest MAC Address	Verify the ADAC MAC address range you added for the Avaya 1230 and 9640 phone sets have been added from ***00-24-00-0D-00-00*** to ***00-24-00-0D-FF-FF*** and ***00-1B-4F-58-00-00*** to ***00-1B-4F-58-FF-FF.***

2.6 Auto Configuration Using ADAC – LLDP Dectection using a Stackable Ethernet Routing Switch

The following configuration example covers setting up a network to support both voice and data to support Auto-Configuration with Avaya's stackable Ethernet Routing switches and IP Phone sets. ADAC LLDP-MED detection will be enabled detect the IP Phone and apply QoS.

This configuration example is in reference to diagram 1 and base configuration in section 2.2.

2.6.1 Stackable Ethernet Switch Configuration

Please note, the ADAC configuration is exactly the same as that used in section 2.2 with the only difference that the Voice VLAN is created by ADAC.

2.6.1.1 Enable ADAC Globally

ERS-Stackable Step 1 – Enable ADAC using VLAN 805, set the operation mode to tagged-frames, and add the uplink port 23

```
ERS-Stackable(config)#adac voice-vlan 805
ERS-Stackable(config)#adac op-mode tagged-frames
ERS-Stackable(config)#adac uplink-port 23
ERS-Stackable(config)#adac traps enable
ERS-Stackable(config)#adac enable
```

2.6.1.2 Enable ADAC at interface level

ERS-Stackable Step 1 – Enable ADAC on port members 3 to 11, set the ADAC detection to LLDP only, and enable the ADAC tag mode to tagged frames and untag the default VLAN

```
ERS-Stackable(config)#interface fastEthernet 3-11
**ERS-Stackable(config-if)#adac detection lldp
ERS-Stackable(config-if)#no adac detection mac
ERS-Stackable(config-if)#adac tagged-frames-tagging untag-pvid-only
ERS-Stackable(config-if)#adac enable
ERS-Stackable(config-if)#exit
```

**Note that by default, ADAC detection for MAC and LLDP is enabled. Hence, the command *adac detection lldp* is not required and only used in this example to show that there is a command to enable or disable the detection type.

2.6.1.3 Enable LLDP-MED

ERS-Stackable Step 1 – Enable LLDP-MED on port 3 to 11

```
ERS-Stackable(config)#interface fastEthernet 3-11
ERS-Stackable(config-if)#lldp tx-tlv local-mgmt-addr port-desc sys-cap sys-desc sys-name
ERS-Stackable(config-if)#lldp status txAndRx config-notification
ERS-Stackable(config-if)#lldp tx-tlv med extendedPSE med-capabilities network-policy
ERS-Stackable(config-if)#exit
```

2.6.2 Verify operations

2.6.2.1 Verify LLDP-MED Operations

The following command is used to retrieve LLDP neighbor information from the IP Phone set assuming we have an Avaya 9640G connected to port 7 on ERS-Stackable.

Step 1 – Verify LLDP neighbor details by using the following command:

```
ERS-Stackable#show lldp port 7 neighbor detail
```

Result:

```
-------------------------------------------------------------------------------
                            lldp neighbor
-------------------------------------------------------------------------------
Port: 7     Index: 4                  Time: 0 days, 00:53:14
        ChassisId: Network address    IPv4  10.5.80.10
        PortId:    MAC address        00:1b:4f:58:1a:d0
        SysName:   AVB581AD0
        SysCap:    TB / TB            (Supported/Enabled)

 PVID:                                PPVID Supported: none
 VLAN Name List: none                 PPVID Enabled: none

 Dot3-MAC/PHY Auto-neg: supported/enabled       OperMAUtype:  100BaseTXFD
 PMD auto-neg:          10Base(T, TFD), 100Base(TX, TXFD), 1000Base(TFD)

 MED-Capabilities: CNDI / CNDI        (Supported/Current)
 MED-Device type:  Endpoint Class 3
 MED-Application Type: Voice                    VLAN ID: 805
 L2 Priority: 6         DSCP Value: 46          Tagged Vlan, Policy defined
 Med-Power Type: PD Device            Power Source: FromPSE
 Power Priority: Low                  Power Value:    5.6 Watt
 HWRev: 9640GD01A                     FWRev: hb96xxua3_11.bin
 SWRev: ha96xxua3_11.bin              SerialNumber: 10N520301110
 ManufName: Avaya                     ModelName: 9640G
 AssetID:
-------------------------------------------------------------------------------
Sys capability: O-Other; R-Repeater; B-Bridge; W-WLAN accesspoint; r-Router;
T-Telephone; D-DOCSIS cable device; S-Station only.
Total neighbors: 3
Med Capabilities-C: N-Network Policy; L-Location Identification; I-Inventory;
S-Extended Power via MDI - PSE; D-Extended Power via MDI - PD.
```

Step 2 – Verify LLDP-MED ERS-Stackable LLDP-MED network policy:

```
ERS-Stackable# show lldp med-network-policies port 7
```

Result:

```
-------------------------------------------------------------------------------
                    LLDP-MED network-policies
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
   Unit/   Application Type   VlanID   Tagging   DSCP   Priority
   Port
-------------------------------------------------------------------------------
   7       Voice              805      tagged     46    6
-------------------------------------------------------------------------------
```

Via the ERS-Stackable switch, verify the following information:

Option	Verify
ChassissId:	Displays the IP address of the PD device
PortId:	Displays the MAC address of the PD device
L2 Priority:	Displays as ***6*** indicating the 802.1p value for a CoS class of Premium.
DSCP Value:	Displays as decimal ***46*** indicating the DSCP value for a CoS class of Premium.
VLAN ID:	Displays as ***805***, the Voice VLAN ID.
Power Value:	Displays the PoE power consumed by the PD device.
ManufName:	Displays ***Avaya***
ModelName:	Displays as the Avaya IP phone model, for this example, ***9640G*** should be displayed.

2.6.2.2 Verify ADAC Operations

The following command is used to view ADAC detection. Assuming we have IP Phones connected to ports 7 and 9 the results should be as follows

Step 1 – Verify LLDP neighbor details by using the following command:
ERS-Stackable#***show adac interface 3-11***
Result:

```
                Auto        Oper       Auto
Port  Type  Detection   State      Configuration  T-F PVID   T-F Tagging
----  ----  ---------   --------   -------------  ---------  ---------------
3     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
4     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
5     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
6     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
7     T     Enabled     Enabled    Applied        No Change  Untag PVID Only
8     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
9     T     Enabled     Enabled    Applied        No Change  Untag PVID Only
10    T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
11    T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
```

Via the ERS-Stackable switch, verify the following information:

Option	**Verify**
Type	Verify that the ADAC type is set for ***T*** indicating the port is configured for ADAC type of tagged port
Auto Detection	Verify the ADAC detection is set to ***Enabled*** for ports 3 to 11
Oper State:	Verify the ADAC operation state is set to ***Enabled*** for port 3 to 11
Auto Configuration	In our example, ports 7 and 9 should indicate ***Applied*** while the other ports should indicate ***Not Applied*** as only ports 7 and 9 have IP Phone sets detected by ADAC
T-F PVID	Verify the tagged frames ***No Change*** which indicates do not change the default PVID
T-F Tagging	Verify the port members 3 to 11 are set to ***Untag PVID only***

2.6.2.3 Verify ADAC Detection

The following command is used to view ADAC detection configuration.

Step 1 – Verify LLDP neighbor details by using the following command:
ERS-Stackable#***show adac detection interface 3-11***
Result:

```
          MAC         LLDP
Port      Detection   Detection
----      ---------   ---------
3         Disabled    Enabled
4         Disabled    Enabled
5         Disabled    Enabled
6         Disabled    Enabled
7         Disabled    Enabled
8         Disabled    Enabled
9         Disabled    Enabled
10        Disabled    Enabled
11        Disabled    Enabled
```

Via the ERS-Stackable switch, verify the following information:

Option	Verify
MAC Detection	For this example, we disabled ADAC MAC detection, hence the value should be ***Disabled***
LLDP Detection	For this example, we enabled ADAC LLDP detection, hence the value should be ***Enabled***

2.7 Auto Configuration with a Stackable Ethernet Routing Switch with EAP MHMA

The following configuration example covers setting up a network to support both voice and data with Avaya's stackable Ethernet Routing switches and IP Phone sets where the Avaya IP Phones are configured as an EAP Supplicant. On the Stackable Ethernet Routing Switch, LLDP-MED will be used to set the Voice VLAN and QoS settings on the phone and EAP Multihost Multi Authentication will be enabled to authenticate all EAP Supplicants which includes the IP Phone and attached PC.

This configuration example is in reference to diagram 1 and uses the base configuration from example 2.2. If you wish, you can also enable LLDP-MED following the example in section 2.3.

Please not that if the IP phones are auto provisioned via a provision server, the IP Phone must be able to receive the configuration file prior to enabling EAP on the switch. After the initial IP Phone configuration, you can then enable EAP on the switch.

With the Avaya 1230 IP phone, the EAP user credentials can be added in the device configuration file, hence, the end user never has to enter anything.

In regards to the Avaya 9640 IP Phone, the end-user will be prompted to enter a password. By default, the IP phone will use its MAC address as the EAP-MD5 user-id. If you chose to use the default settings, the user-id configured on the RADIUS server for the Avaya 9640 must contain the MAC address of the IP phone entered in upper-case with no spaces; ie.for this example, the user-id will be *000B4F581AD0*.

2.7.1 Stackable Switch Configuration

In addition to the base configuration from section 2.2, we will add the following:

- Configure ports 3 to 11 with EAP Multiple-Host-Multiple-Authentication (MHMA)
- Configure the Avaya IP Phone 1230 and 9600 for auto provisioning and EAP using MD5
  - For this configuration example, we are going to use device files for Avaya 1230 phone to set the EAP MD5 user name and password
  - In regards to the Avaya 9640, the EAP user credentials must be manually entered on the IP phone itself
- Please refer to Section 9 for more details regarding EAP configuration on Avaya Switches

2.7.1.1 Configure RADIUS server

ERS-Stackable Step 1 – Add RADIUS server

```
ERS-Stackable(config)#radius-server host 192.168.50.100 key
Enter key: ******
Confirm key: ******
```

2.7.1.2 Enable EAP at interface level

ERS-Stackable Step 1 – Enable EAP MHMA on ports 3 to 11

```
ERS-Stackable(config)#interface fastEthernet all
ERS-Stackable(config-if)# eapol multihost enable
ERS-Stackable(config-if)#eapol port 3-11 status auto
ERS-Stackable(config-if)#exit
```

2.7.1.3 Enable EAP globally

ERS-Stackable Step 1 – Enable EAP

```
ERS-Stackable(config)#eapol enable
```

2.7.2 Verify Operations

2.7.2.1 Verify EAP Global and Port Configuration

Assuming we have an IP phone authenticated via port 6 and 8.

Step 1 – Verify that EAP has been enabled globally and the correct port members:

```
ERS-Stackable#show eapol port 6,8
```

Result:

```
        EAPOL Administrative State:  Enabled
        Port-mirroring on EAP ports: Disabled
        EAPOL User Based Policies:  Disabled
        EAPOL User Based Policies Filter On MAC Addresses:  Disabled
        Port:  6
            Admin Status:  Auto
            Auth:  Yes
            Admin Dir:  Both
            Oper Dir:  Both
            ReAuth Enable:  No
            ReAuth Period:  3600
            Quiet Period:  60
            Xmit Period:  30
            Supplic Timeout:  30
            Server Timeout:  30
            Max Req:  2
            RDS DSE:  No
        Port:  8
            Admin Status:  Auto
            Auth:  Yes
            Admin Dir:  Both
            Oper Dir:  Both
            ReAuth Enable:  No
            ReAuth Period:  3600
            Quiet Period:  60
            Xmit Period:  30
            Supplic Timeout:  30
            Server Timeout:  30
            Max Req:  2
            RDS DSE:  No
```

Step 2 – Verify that EAP multihost configuration
ERS-Stackable#***show eapol multihost interface 6,8,10***
Result:

```
        Port:  6
            MultiHost Status:  Enabled
            Max Eap Clients:  1
            Allow Non-EAP Clients:  Disabled
            Max Non-EAP Client MACs:  1
            Use RADIUS To Auth Non-EAP MACs:  Disabled
            Allow Auto Non-EAP MHSA:  Disabled
            Allow Non-EAP Phones:  Disabled
            RADIUS Req Pkt Send Mode:  Multicast
            Allow RADIUS VLANs:  Disabled
            Allow Non-EAP RADIUS VLANs:  Disabled
            Use most recent RADIUS VLAN:  Disabled
        Port:  8
            MultiHost Status:  Enabled
            Max Eap Clients:  1
            Allow Non-EAP Clients:  Disabled
            Max Non-EAP Client MACs:  1
            Use RADIUS To Auth Non-EAP MACs:  Disabled
            Allow Auto Non-EAP MHSA:  Disabled
            Allow Non-EAP Phones:  Disabled
            RADIUS Req Pkt Send Mode:  Multicast
            Allow RADIUS VLANs:  Disabled
            Allow Non-EAP RADIUS VLANs:  Disabled
            Use most recent RADIUS VLAN:  Disabled
```

Step 3 – Verify that EAP supplicants assuming IP Phones via port 6 and 8 have successfully authenticated:
ERS-Stackable#***show eapol multihost status***
Result:
Port Client MAC Address Pae State Backend Auth State ---- ------------------ -------------- ------------------ 6 00:24:00:0D:8D:AA Authenticated Idle 8 00:1B:4F:58:1A:D0 Authenticated Idle =========Neap Phones============

Via the ERS-Stackable switch, verify the following information:

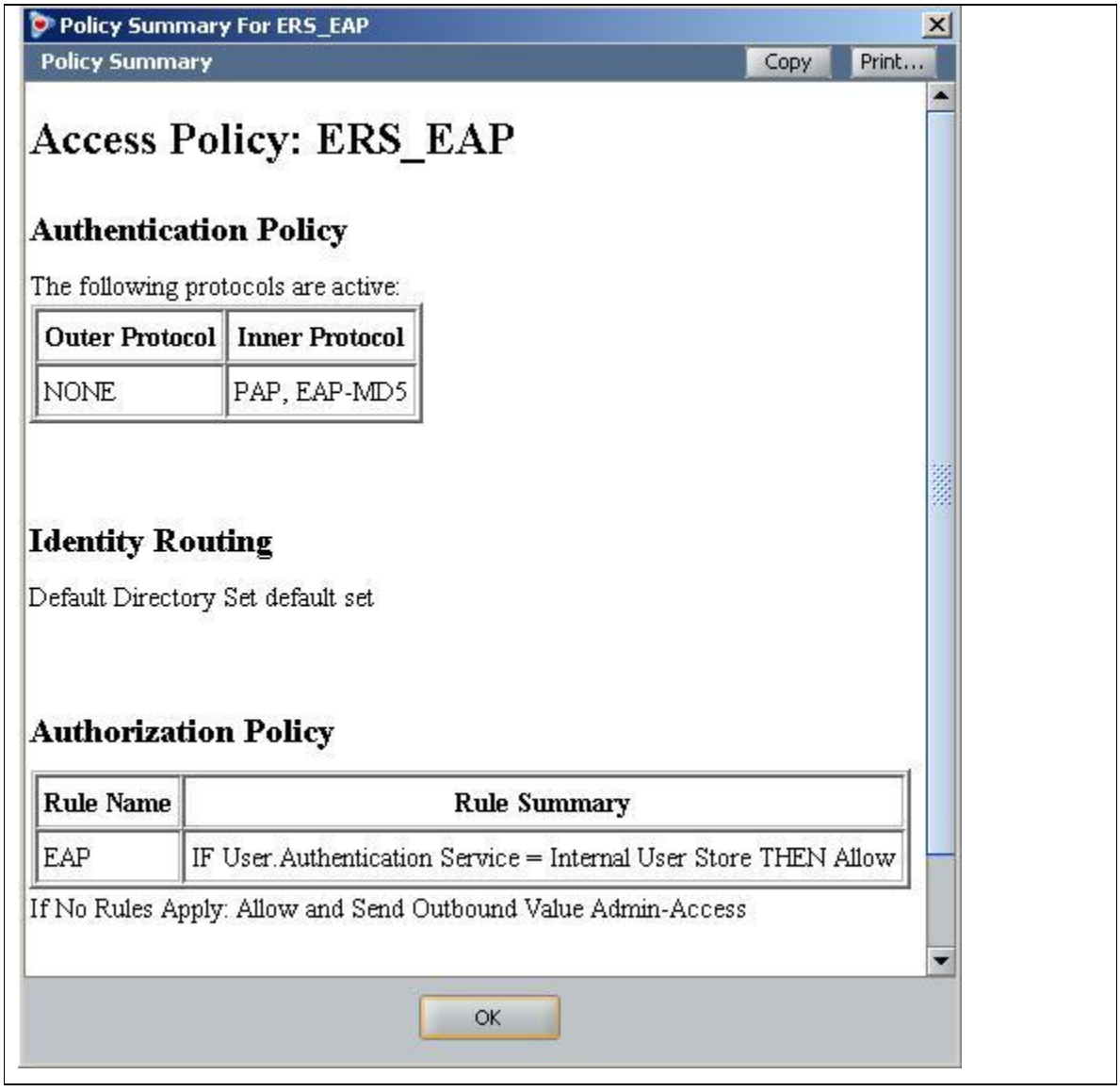
Option	**Verify**
EAPOL Administrative State	Verify that the EAPOL is ***Enabled*** globally.
Admin Status	Verify that the EAP is enabled on ports 3 to 11 by verifying that the Admin Status is set to ***Auto***; in this example, we only show ports 6, 8, and 10
Auth	The value will be ***Yes*** for port 6 and 8 assuming the IP phone attached to port 6 has successfully authenticated using EAP. Otherwise, the value should be ***No***.
MultiHost Status	Verify that EAP multihost status is set to ***Enabled***.
Pae State and Client MAC Address	Pae state should show ***Authenticated*** for each successfully authenticated EAP supplicant along with the corresponding MAC address

2.7.3 RADIUS Server Configuration

2.7.3.1 Avaya Identity Engines

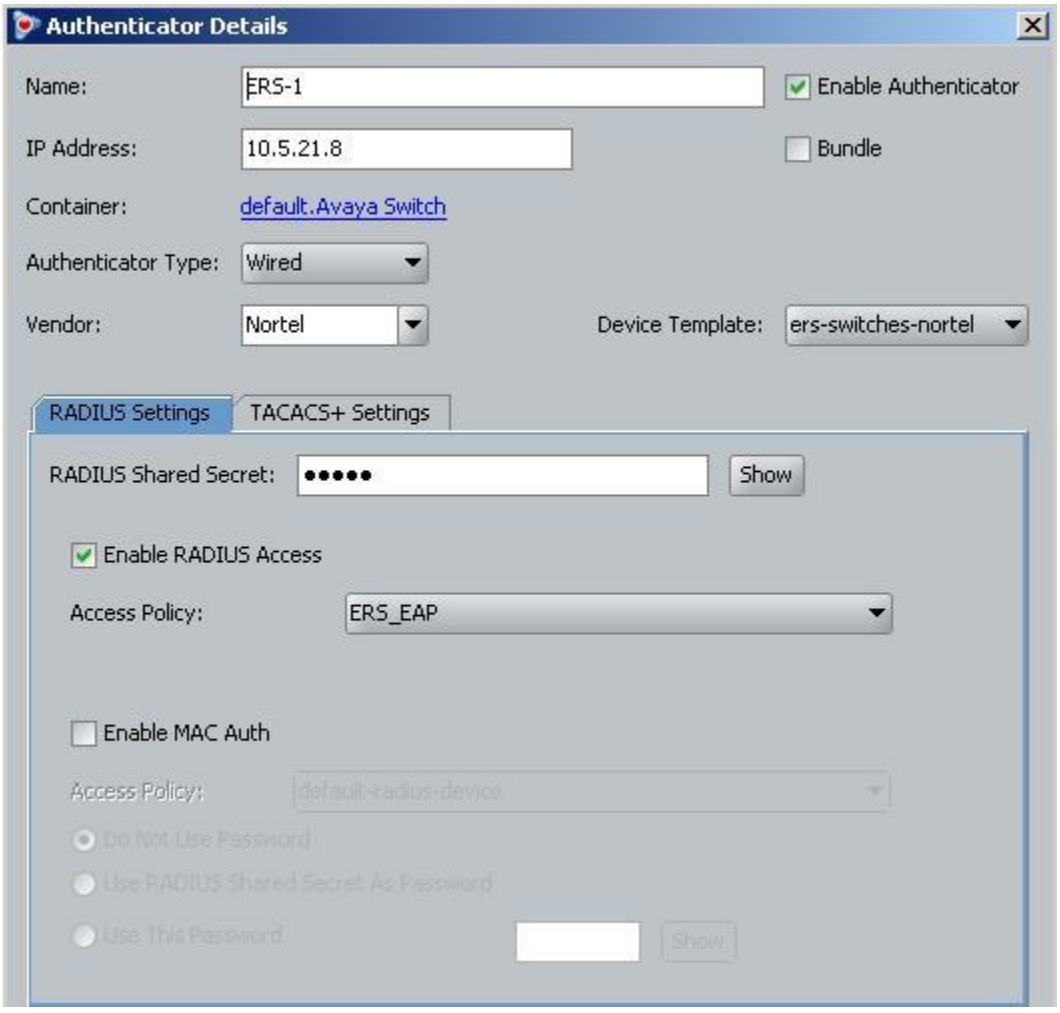
IDE Step 1 – Go to *Site Configuration -> Access Policies -> RADIUS*

• Right-click R*ADIUS* and select *New Access Policy*. Enter a policy name, i.e. *ERS-EAP* as used in this example and click on *OK* when done
• Click on the policy we just created, i.e. ERS-EAP, and click on *Edit* via the *Authentication Policy* tab. Under *Edit Authentication Policy* window, select *NONE -> EAP-MD5* and any additional authentication protocols you may require. Click on OK when done.
• Go to the *Identity Routing tab* and click on *Edit*. Check off the *Enable Default Directory Set* and click on *OK* when done.
• Go to the *Authorization Policy* tab and click on *Edit.*
  ○ Once the *Edit Authorization Policy* window pops up, click on *Add* under Rules and via the name pop-up box, enter a name, i.e. *EAP* as used in this example
  ○ Click on the rule named *EAP*, click on *New* to add a new constraint. From *Attribute Category*, select *User* and scroll down and select *Authentication Service*. Select *Equal To* with *Static Vlaue* of *Internernal User Store*. Click on *OK* when done and *OK* one more time to exit Edit Authentication Policy.
  ○ Clicking on the *Access Policy Summary* icon should display an Access Policy similar to that shown below


Policy Summary For ERS_EAP
Policy Summary
Copy
Print...
Access Policy: ERS_EAP
Authentication Policy
The following protocols are active:
Outer Protocol
Inner Protocol
NONE
PAP, EAP-MD5
Identity Routing
Default Directory Set default set
Authorization Policy
Rule Name
Rule Summary
EAP
IF User.Authentication Service = Internal User Store THEN Allow
If No Rules Apply: Allow and Send Outbound Value Admin-Access
OK

IDE Step 2 – Go to *Site Configuration -> Authenticators*

- For this configuration example, we will create a new container named *Avaya Switch*
  - Under *Authenticators*, right-click *default* and add a new container with a container, add a name of *Avaya Switch*, and click *OK* when done
- Select *Avaya Switch* and click on click on *New*
  - Enter the settings as shown below making sure you select the policy we created above named ERS_EAP via Access Policy. Leave *Enable Authenticator* and *Enable RADIUS Access* checked. Click on *OK* when done. Please note, the *RADIUS Shared Secret* must match the secret entered on the switch



IDE Step 3 – Add Users by going to *Site Configuration -> Directories -> Internal Store -> Internal Users* and click on *New*

- Add the EAP users by going to Directories>Internal Store>Internal Users. Next, enter the User Name and Password as shown below, i.e. User Name = phonea, Password = Phoneaeselab as per the Avaya IP Phone provisioning files used.
- Enter the user name for for the Avaya IP Phone EAP Supplicant via *User Name:* and enter the password for this user via *Password* and *Confirm Password*. Click on *OK* when done. If you wish, you can also change the expiry date via *Password Expires* if you do not wish to use the default setting of one year. Repeat again by clicking on *New* to add additional internal user names and passwords for each EAP Supplicant.
- Assuming we used the user credentials as per the provisioning file for the Avaya 1230 IP Phone and the MAC address of the Avaya 9640 IP Phone as the default user name, the internal store user-id's should like like the following
    - Avaya 1230 IP Phone
        - User Name = *phonea*, Password = *Phoneaeselab*
    - Avaya 9640 IP Phone
        - User Name = *001B4F581AD0*, Password = *123456*

2.8 Auto Configuration with a Stackable Ethernet Routing Switch using EAP with NEAP and User Based Policy

The Stackable Ethernet Routing Switch can be configured in one of two methods using NEAP (non-EAP) to allow an IP phone without an EAP Supplicant access to the network. One method is to enable *Non-EAPOL VoIP phone clients* – please see next configuration example.

If you do wish to authenticate the IP Phone via RADIUS using EAP on the switch, but, without enabling an EAP Supplicant on the phone itself, the *Allow Non-EAPOL client's (NEAP)* option can be enabled where the switch itself will authenticate the IP Phone on its behalf.

At this time, the *Non-EAPOL VoIP phone clients* feature is only supported on the Avaya 1100, 1200, and 2000 series IP Phones.

For this example, we will demonstrate how to configure the Stackable Ethernet Routing Switch to allow for NEAP authentication using RADIUS for the IP Phones. We will also demonstrate using user based policies to apply QoS for the IP Phones. Hence, instead of configuring filters on the switch to apply QoS for the voice traffic, we can use a policy triggered by EAP to apply QoS to the voice VLAN.

Any of the stackable Ethernet Routing switches support NEAP (ERS 2500, 4500 or 5000 series), however, only the ERS 5000 series supports user based policies.

The Stackable Ethernet Routing Switch can be configured to accept both EAP and non-EAP (NEAP) on the same port. In regards to non-EAP, the switch can be configured to accept a password format using any combination of IP address and MAC address with or without port number. By default, the password format is set for IP address, MAC address, and port number.

To apply QoS for the IP Phone sets, you can configure the QoS filters on the switch, use ADAC, or use user based policies (UBP) and trigger the policy via RADIUS authentication. As stated above, we will use UBP for this configuration example. Once the user based policies has been configured on a switch, the RADIUS server can reference the policy by using the name given to the UBP policy. User based policies (UBP) can be used with EAP and/or NEAP.

This configuration example is in reference to diagram 1 and uses the base configuration from example 2.2.

2.8.1 Stackable Switch Configuration

In addition to the base configuration from Section 2.2, we will add the following:

- Enable NEAP on ports 3 to 11 on ERS-Stackable using the non-EAP password format of MAC address only – this will allow the IP Phone to be connected elsewhere in the network on a different switch without having to worry about port numbers and IP addresses
- Configure a user based policy (UBP) for non-EAP IP Phones named *voice* that will remark both the DSCP and p-bit values to a CoS value of Premium only for tagged Voice VLAN 220
- Configure the RADIUS server NEAP policy using Nortel specific option 562 with vendor-assigned attribute number 110 and set the string value to *UROLvoice*.
- Please refer to Section 9 for more details regaring EAP configuration on Avaya Switches
- Please refer to Section 9 for more details regarding EAP configuration on Avaya Switches

Please note that when setting up the RADIUS server policy for the NEAP group, the string always starts with *UROL*. In our example, we configured the ERS5000 with a user based policy named *voice*, hence the string value configured on the RADIUS server must be set to *UROLvoice*.

2.8.1.1 Configure RADIUS server

ERS-Stackable Step 1 – Add RADIUS server assuming we used a shared key of avaya – this shared key must also be configured on the RADIUS server for this authenticator
ERS-Stackable(config)#***radius-server host 172.168.100.50 key avaya***

2.8.1.2 Enable EAP globally

ERS-Stackable Step 1 – Enable non-EAP (NEAP)
ERS-Stackable(config)#***eap multihost allow-non-eap-enable***
ERS-Stackable Step 2 – Remove the default NEAP password format of IpAddr.MACAddr.PortNumber
ERS-Stackable(config)#***no eapol multihost non-eap-pwd-fmt***
ERS-Stackable Step 3 – Enable NEAP password format of MAC address only
ERS-Stackable(config)#***eapol multihost non-eap-pwd-fmt mac-addr***
ERS-Stackable Step 4 – Enable EAP user-based Policies
ERS-Stackable(config)#***eapol user-based-policies enable***

ERS-Stackable Step 5 – Enable EAP multihost NEAP policies
ERS-Stackable(config)#***eapol multihost non-eap-user-based-policies enable***
ERS-Stackable Step 6 – Enable EAP globally
ERS-Stackable(config)#***eapol enable***

2.8.1.3 Enable EAP at interface level

ERS-Stackable Step 1 – Enable EAP on port 3-11 with NEAP, set the maximum allowable EAP and NEAP clients to 1, enable EAP multihost and enable RADIUS NEAP phone
ERS-Stackable(config)#***interface fastEthernet 3-11*** ERS-Stackable(config-if)#***eapol status auto*** ERS-Stackable(config-if)#***eapol multihost allow-non-eap-enable*** ERS-Stackable(config-if)#***eapol multihost eap-mac-max 1*** ERS-Stackable(config-if)#***eapol multihost non-eap-mac-max 1*** ERS-Stackable(config-if)#***eapol multihost radius-non-eap-enable*** ERS-Stackable(config-if)#***eapol multihost enable*** ERS-Stackable(config-if)#***exit***

2.8.1.4 Configure Policy

ERS-Stackable Step 1 – Configure a policy using the name *voice* to filter on tagged VLAN 805 and remark DSCP and p-bit to Premium CoS. We will set the eval-order to 5 in case you wish to add additional filters in the future with a higher preference
ERS-Stackable(config)#***qos ubp classifier name voice vlan-min 805 vlan-max 805 vlan-tag tagged ethertype 0x0800 update-dscp 46 update-1p 6 eval-order 4***
ERS-Stackable Step 2 – Enable the UBP set
ERS-Stackable(config)#***qos ubp set name voice***
ERS-Stackable Step 3 – Enable UBP
ERS-Stackable(config)#***qos agent ubp high-security-local***

The default ubp classifier action non-match action is for forward traffic. In older software releases for the ERS5500, this was not the case and you had to enter the command *qos ubp set name voice drop-nm-action disable*. You can quickly check to see if the software versions you are using require the drop non-match action by simply typing in *qos ubp set name voice ?* and checking if the command *drop-nm-action* is displayed or not.

2.8.2 Verify Operations

2.8.2.1 Verify EAP Global and Port Configuration

Step 1 – Verify that EAP has been enabled globally and the correct port members:

```
ERS-Stackable# show eapol port 3-11
```

Result:

```
        EAPOL Administrative State:  Enabled
        Port-mirroring on EAP ports: Disabled
        EAPOL User Based Policies:  Enabled
        EAPOL User Based Policies Filter On MAC Addresses:  Disabled
        Port:  3
            Admin Status:  Auto
            Auth:  No
            Admin Dir:  Both
            Oper Dir:  Both
            ReAuth Enable:  No
            ReAuth Period:  3600
            Quiet Period:  60
            Xmit Period:  30
            Supplic Timeout:  30
            Server Timeout:  30
            Max Req:  2
            RDS DSE:  No
        |
        |
        Port:  11
            Admin Status:  Auto
            Auth:  No
            Admin Dir:  Both
            Oper Dir:  Both
            ReAuth Enable:  No
            ReAuth Period:  3600
            Quiet Period:  60
            Xmit Period:  30
            Supplic Timeout:  30
            Server Timeout:  30
            Max Req:  2
            RDS DSE:  No
```

Via the ERS-Stackable switch, verify the following information:

Option	Verify
EAPOL Administrative State	Verify that the EAPOL is ***Enabled*** globally.
EAPOL User Based Policies	Verify that EAPOL policies are ***Enabled*** globally.
Admin Status	Verify that the EAP is enabled on ports 3 to 11 by verifying that the Admin Status is set to ***Auto***.
Auth	The value will be ***No*** even if the IP Phone has successfully authenticated. Only if there a Supplicant attached to the IP Phone and it

	has successfully authenticated will this value change to Yes.

2.8.2.2 Verify EAP Multihost Configuration

Step 1 – Verify that EAP multihost has been globally configured correctly:

```
ERS-Stackable#show eapol multihost
```

Result:

```
        Allow Non-EAPOL Clients:  Enabled
        Use RADIUS To Authenticate Non-EAPOL Clients:  Enabled
        Allow Non-EAPOL Clients After Single Auth (MHSA):  Disabled
        Allow Non-EAPOL VoIP Phone Clients:  Disabled
        EAPOL Request Packet Generation Mode:  Multicast
        Allow Use of RADIUS Assigned VLANs:  Disabled
        Allow Use of Non-Eapol RADIUS Assigned VLANs:  Disabled
        Non-EAPOL RADIUS Password Attribute Format:  MACAddr
        Non-EAPOL User Based Policies:  Enabled
        Non-EAPOL User Based Policies Filter On MAC Addresses:  Disabled
        Use most recent RADIUS VLAN:  Disabled
```

Step 2 – Verify that EAP multihost has been configured correctly at interface level:

```
ERS-Stackable#show eapol multihost interface 3-11
```

Result:

```
        Port:  3
            MultiHost Status:  Enabled
            Max Eap Clients:  1
            Allow Non-EAP Clients:  Enabled
            Max Non-EAP Client MACs:  1
            Use RADIUS To Auth Non-EAP MACs:  Enabled
            Allow Auto Non-EAP MHSA:  Disabled
            Allow Non-EAP Phones:  Disabled
            RADIUS Req Pkt Send Mode:  Multicast
            Allow RADIUS VLANs:  Disabled
            Allow Non-EAP RADIUS VLANs:  Disabled
            Use most recent RADIUS VLAN:  Disabled
        |
        |
        Port:  11
            MultiHost Status:  Enabled
            Max Eap Clients:  1
            Allow Non-EAP Clients:  Enabled
            Max Non-EAP Client MACs:  1
            Use RADIUS To Auth Non-EAP MACs:  Enabled
            Allow Auto Non-EAP MHSA:  Disabled
            Allow Non-EAP Phones:  Disabled
            RADIUS Req Pkt Send Mode:  Multicast
            Allow RADIUS VLANs:  Disabled
            Allow Non-EAP RADIUS VLANs:  Disabled
            Use most recent RADIUS VLAN:  Disabled
```

Via the ERS-Stackable switch, verify the following information:

Option	Verify
Allow Non-EAPOL Clients:	Verify that the non-EAPOL (NEAP) is ***Enabled*** globally.
Use RADIUS To Authenticate Non-EAPOL Clients:	Verify the use RADUIS to authenticate non-EAPOL option is ***Enabled*** globally.
Non-EAPOL RADIUS Password Attribute Format:	Verify that the non-EAP password format is set for ***MACAddr.*** Please note, some of the older software releases required a leading period "." before and after the MAC address.
Non-EAPOL User Based Policies:	Verity that the non-EAPOL user based policies is ***Enabled***

2.8.2.3 Verify EAP Multihost Status

Step 1 – Assuming the IP Phone via port 3 has successfully authenticated via EAP, use the following command to view the EAP status:

```
ERS-Stackable# show eapol multihost non-eap-mac status
```

Result:

```
        Port Client MAC Address State
        ---- ------------------ ------------------------------
        3    00:24:00:0D:8D:29 Authenticated By RADIUS
        4    00:24:00:0D:8D:AA Authenticated By RADIUS
```

On the ERS-Stackable switch, verify the following information:

Option	Verify
Port	Display the ports where the IP Phone has successfully been authenticated.
Client MAC Address	If the IP phone has successfully authenticated via NEAP, its MAC address should be shown.
State	Verity that ***Authenticated By RADIUS*** is displayed

2.8.2.4 Verify EAP Policy

Step 1 – Use the following command to view the UBP Policy:
ERS-Stackable# ***show qos ubp classifier***
Result:

```
        Id: 1
        Name: voice
        Block:
        Eval Order: 5
        Address Type: IPv4
        Destination Addr/Mask: Ignore
        Source Addr/Mask: Ignore
        DSCP: Ignore
        IPv4 Protocol / IPv6 Next Header: Ignore
        Destination L4 Port Min: Ignore
        Destination L4 Port Max: Ignore
        Source L4 Port Min: Ignore
        Source L4 Port Max: Ignore
        IPv6 Flow Id: Ignore
        IP Flags: Ignore
        TCP Control Flags: Ignore
        IPv4 Options: Ignore
        Destination MAC Addr: Ignore
        Destination MAC Mask: Ignore
        Source MAC Addr: Ignore
        Source MAC Mask: Ignore
        VLAN: 805
        VLAN Tag: Tagged
        EtherType: 0x0800
        802.1p Priority: All
        Packet Type: Ignore
        Inner VLAN: Ignore
        Action Drop: No
        Action Update DSCP: 0x2E
        Action Update 802.1p Priority: Priority 6
        Action Set Drop Precedence: Low Drop
        Storage Type: NonVolatile
```

Via the ERS-Stackable switch, verify the following information:

Option	**Verify**
Name:	Verify the port number is correct, should be ***voice*** for this example.
Eval Order:	Verify the port number is correct, should be ***5*** for this example.
Address Type:	Verify the Address Type is correct, should be ***IPv4*** for this example.
VLAN:	Verify VLAN is correct, should be ***805*** for this example.
EtherType:	Verify the EtherType is correct, should be ***0x0800*** representing the IP for this example.
Action Update DSCP:	Verify the DSCP value is correct, should be ***0x2e*** (decimal 46) for this

	example.
Action Update 802.1p Priority:	Verify the p-bit value is correct, should be ***6*** for this example.

2.8.2.5 Verify EAP Policy upon the NEAP client successfully authenticating

Step 1 – Assuming an IP Phone via port 3 and 4 has successfully authenticated via EAP, use the following command to view the UBP Policy:

```
ERS-Stackable# show qos ubp interface
```

Result:

```
          Id  Unit Port Filter Set Name
       _____ ____ ____ _______________
       55001 1    3    voice
       55002 1    4    voice
```

Via the ERS-Stackable switch, verify the following information:

Option	Verify
Port	Verify the port number is correct according the NEAP authenticated IP Phones
Filter Set Name	If the IP phone has successfully authenticated via NEAP, and if the RADIUS server has been configured correctly, the policy named ***voice*** will be displayed.

2.8.2.6 View EAP Policy Statistics

Step 1 – You can view the statistics by using the UBP reference and port number using the following command. Please note that the reference number for each port will be different.

```
ERS-Stackable# show qos statistics 55001 port 3
```

Result:

```
       Id: 55001
       Policy Name: UntrustedClfrs1

          Classifier     Unit/Port      In-Profile
             Name                         Packets

       _______________ _________ ____________________
                       1/3       203
```

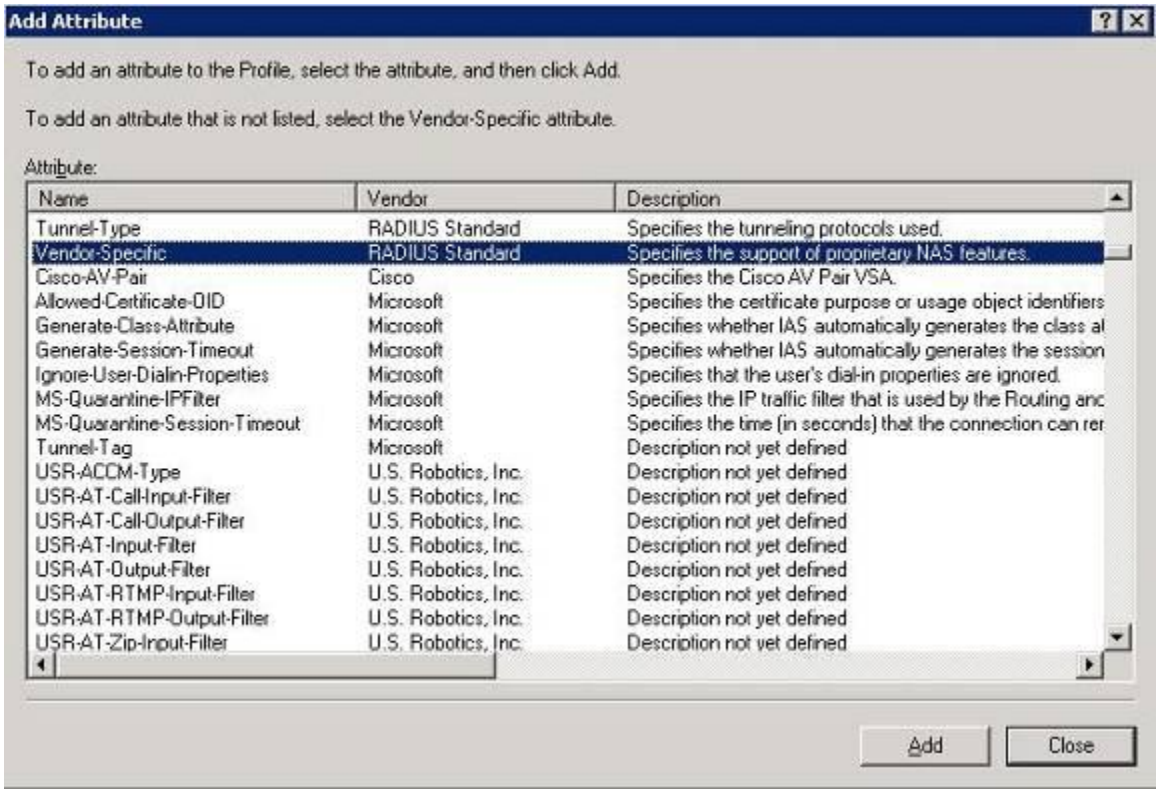
2.8.3 RADIUS Server – Policy Setup

2.8.3.1 Microsoft IAS

Assuming the RADIUS server is a Windows 2003 server, via the IAS Remote Access Policies, go to your NEAP policy Advanced settings. The Vendor-Specific attribute should be setup as follows.

- Vendor Code : Nortel ; Nortel Specific Option 562
- Vendor-assigned attribute
  - Attribute number : 110
  - Attribute format : String
  - Attribute value : UROLvoice

Step 1 – Via IAS, assuming you have already started a NEAP policy, go the *Advanced* tab and click on Add and scroll down to *Vendor-Specific* and click on *Add*

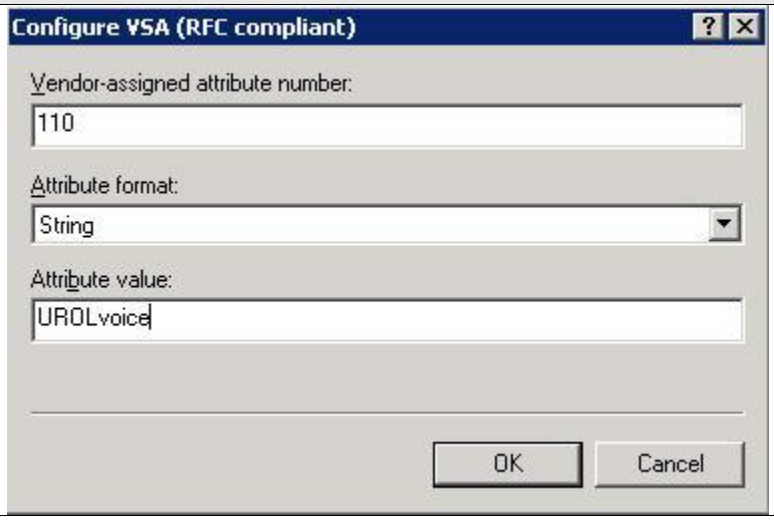


Step 2 - Via the *Multivalued Attribute Information* window, click on *Add.* In the next window titled *Vendor-Specific Attribute Information*, click no the *Select from list* radio button and select *Nortel Networks* and click on the *Yes, it conforms* radio button. When finished, click on *Configure Attributes*.

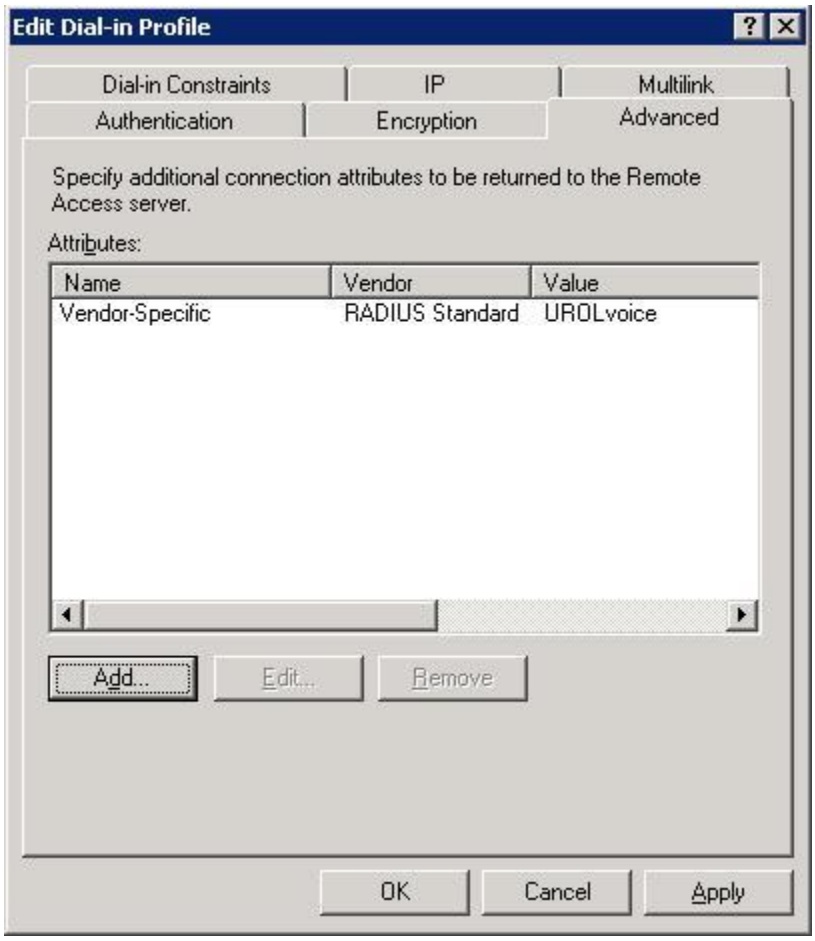
Step 3: Via the *Configure VSA (RFC compliant)* window, enter the following:

- **Vendor-assigned attribute number: 110**
- **Attribute formate: String**
- **Attribute value: UROLvoice**

Click on *OK* when done.



Step 4 – When completed, the profile should be as that displayed below.



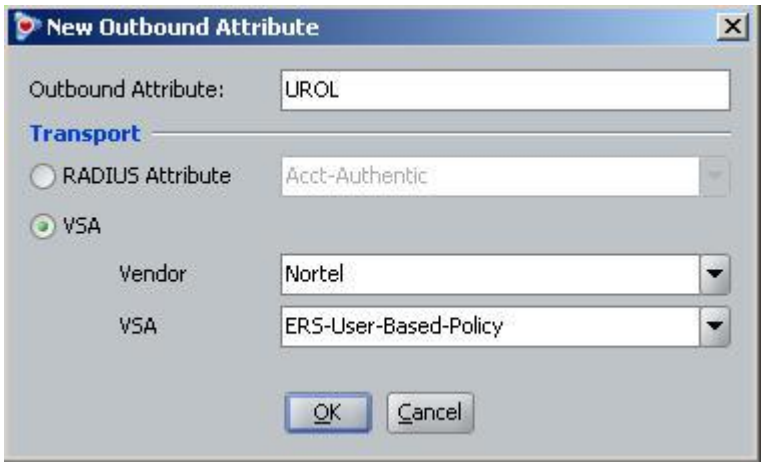
2.8.3.2 Avaya Identity Engines Ignition Server

Using the base IDE configuration in Section 2.7.3, we will simply add the appropriate outbound attribute to the Access Policy.

Please note, the Nortel vendor specific attributes are already added and can be viewed by going to *Site Configuration -> Provisioning -> Vendors/VSAs* and scrolling down and selecting *Nortel -> VSA Definitions*. For this example, we will use the VSA Definition *ERS-User-Based-Policy*.

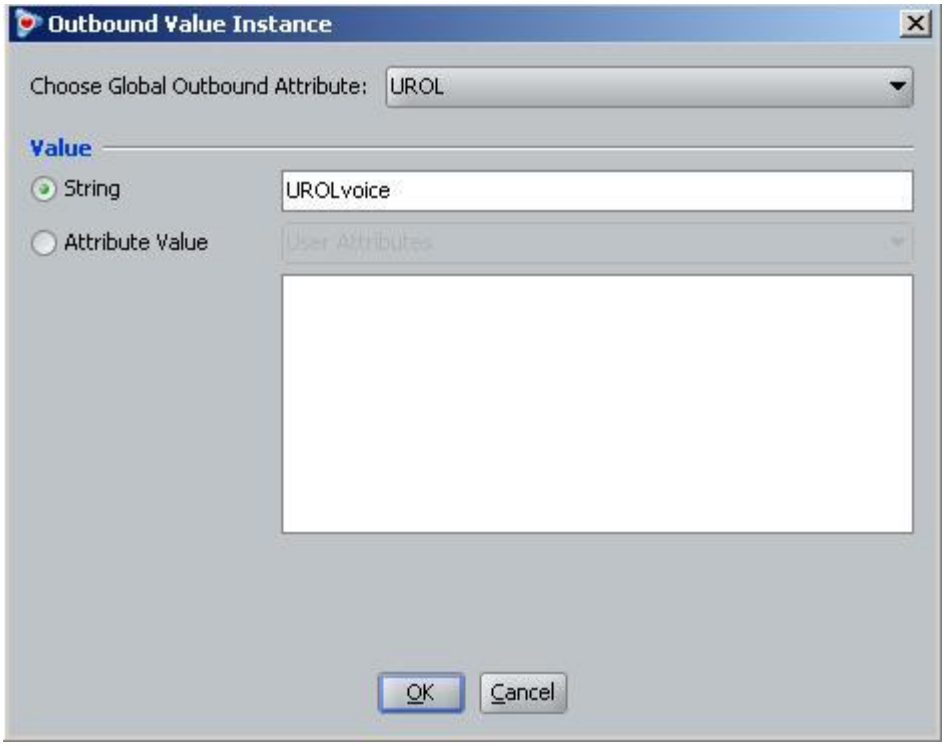
IDE Step 1 – Go to *Site Configuration -> Provisioning -> Outbound Attributes -> New*

- When the *New Outbound Attribute* window pops up, enter the following as shown below. As shown below, in this example, we simply named the outbound attribute *UROL*



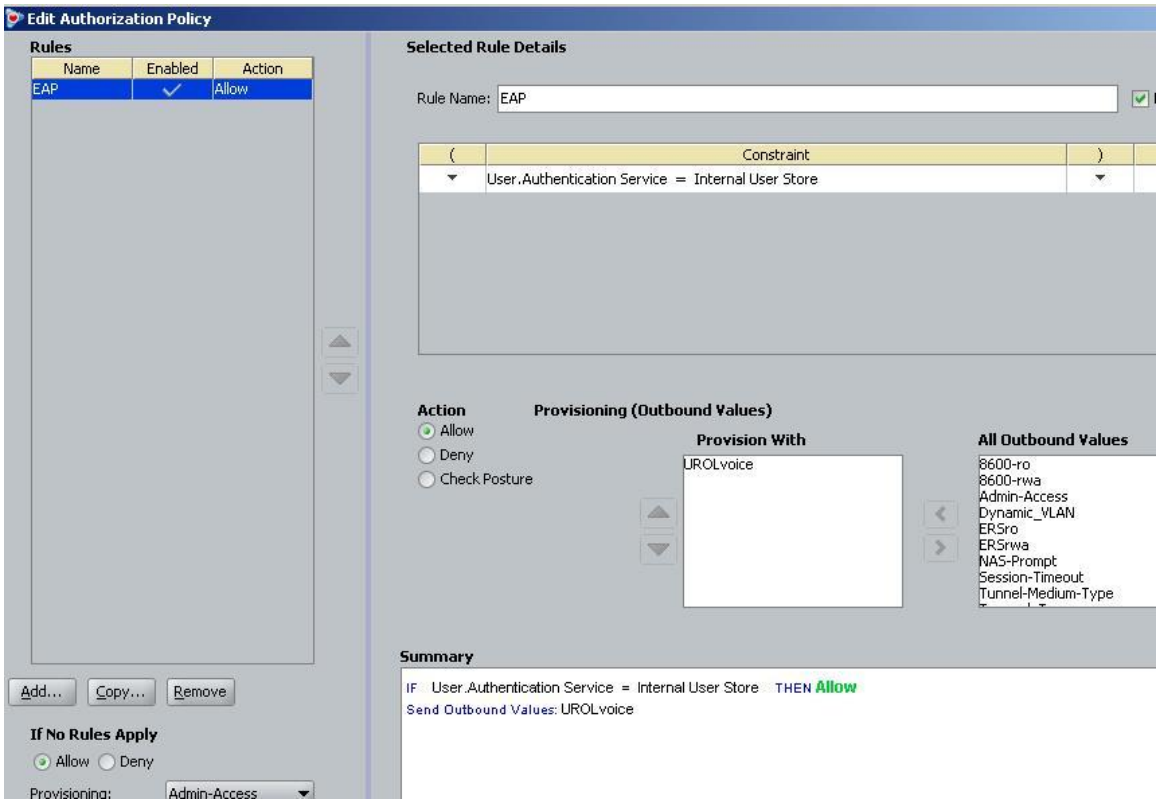
IDE Step 2 – Go to *Site Configuration -> Provisioning -> Outbound Values -> New*

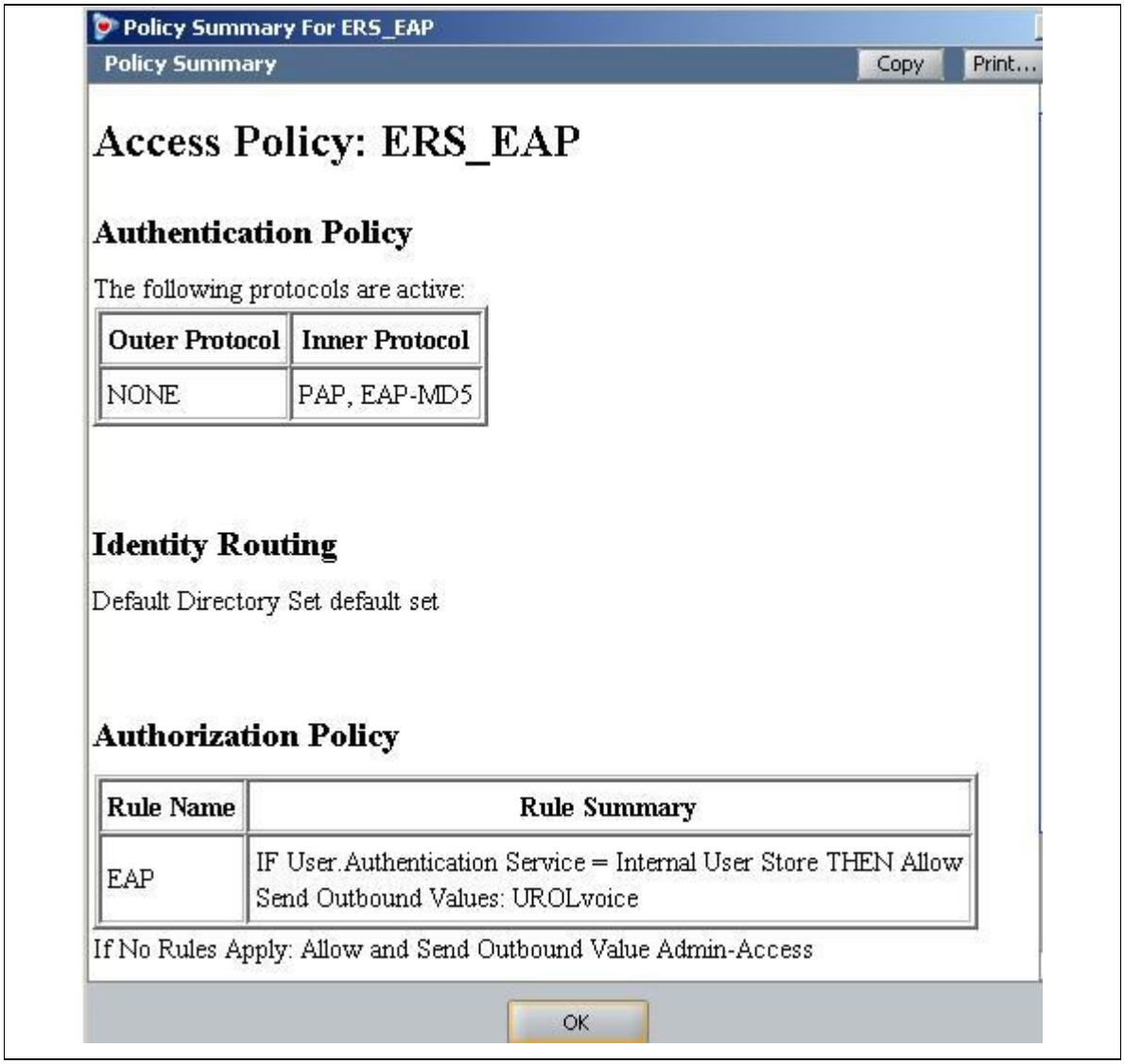
- When the *Outbound Value Details* window pops up, enter a name, i.e. *UROLvoice* as used in this example, and click on *New*
- When the Outbound Value Instance window pops up, enter the following as shown below. Please note, the *String* value must be *UROLvoice* as "*voice*" is the name of the policy defined on the switch in this configuration example. Click *OK* twice when done



IDE Step 3 – Go to *Site Configuration -> Access Policies-> RADIUS -> ERS_EAP -> Authorization Policy -> Edit (assuming we are using the policy we configured in Section 2.7.3 named "ERS_EAP")*

- From the *All Outbound Values* windows, select *UROLvoice* and then click on the "*less-than*" arrow key
- Click *OK* when done
- This should move the outbound attribute named UROLvoice to the Provision With window as shown below




Policy Summary For ERS_EAP
Policy Summary
Copy
Print...
Access Policy: ERS_EAP
Authentication Policy
The following protocols are active:
Outer Protocol
Inner Protocol
NONE
PAP, EAP-MD5
Identity Routing
Default Directory Set default set
Authorization Policy
Rule Name
Rule Summary
EAP
IF User.Authentication Service = Internal User Store THEN Allow
Send Outbound Values: UROLvoice
If No Rules Apply: Allow and Send Outbound Value Admin-Access
OK

2.9 Auto Configuration with a Stackable Ethernet Routing Switch using EAP with Non-EAP-Phone Support and ADAC (LLDP detection)

As explained in the configuration example in Section 2.8, the Stackable Ethernet Routing Switch can be configured in one of two methods using NEAP (non-EAP) to allow an IP phone without an EAP Supplicant access to the network. For this example, we will enable *Non-EAPOL VoIP phone clients*. This is by far the easiest method to authorize certain Avaya IP Phones on a switch as it does not require any RADIUS setup. The Avaya IP Phone is detected by examining the phone signature contained in the DHCP Discovery packet sent by the IP phone. If the signature is valid, the IP phone is allowed access to the network.

At this time, the *Non-EAPOL VoIP phone clients* feature is only supported on the Avaya 1100, 1200, and 2000 series IP Phones.

This configuration example is in reference to diagram 1 and uses the base configuration from example 2.2.

Please note that non-EAP support for IP phones is only supported on Avaya IP Phones and requires that DHCP be enabled. The IP phone is authenticated based on the DHCP signature. Do not enable EAP on the phone. Also, do not enable Guest-VLAN.

2.9.1 Stackable Switch Configuration

Please refer to Section 9 for more details regarding EAP configuration on Avaya Switches.

2.9.1.1 Enable ADAC at interface level

ERS-Stackable Step 1 – Enable ADAC on port members 3 to 11, set the ADAC detection to LLDP only, and enable the ADAC tag mode to tagged frames and untag the default VLAN

```
ERS-Stackable(config)#interface fastEthernet 3-11
ERS-Stackable(config-if)#adac detection lldp
ERS-Stackable(config-if)#no adac detection mac
ERS-Stackable(config-if)#adac tagged-frames-tagging untag-pvid-only
ERS-Stackable(config-if)#adac enable
ERS-Stackable(config-if)#exit
```

2.9.1.2 Enable LLDP-MED

ERS-Stackable Step 1 – Enable LLDP-MED on port 3 to 11

```
ERS-Stackable(config)#interface fastEthernet 3-11
ERS-Stackable(config-if)#lldp tx-tlv local-mgmt-addr port-desc sys-cap sys-desc
sys-name
ERS-Stackable(config-if)#lldp status txAndRx config-notification
ERS-Stackable(config-if)# lldp tx-tlv med extendedPSE location med-capabilities
network-policy
ERS-Stackable(config-if)#exit
```

2.9.1.3 Configure RADIUS server

ERS-Stackable Step 1 – Add RADIUS server

```
ERS-Stackable(config)#radius-server host 172.30.30.50 key
Enter key: ******
Confirm key: ******
```

2.9.1.4 Enable EAP globally

ERS-Stackable Step 1 – Enable EAP non-EAP phone

```
ERS-Stackable(config)#eapol multihost non-eap-phone-enable
```

ERS-Stackable Step 2 – Enable EAP

```
ERS-Stackable(config)#eapol enable
```

2.9.1.5 Enable EAP at interface level

ERS-Stackable Step 1 – Enable EAP on ports 3 to 11 with non-eap-phone and use-radius-assigned-vlan enabled

```
ERS-Stackable(config)#interface fastEthernet 3-11
ERS-Stackable(config-if)#eapol multihost non-eap-phone-enable
ERS-Stackable(config-if)#eapol multihost eap-mac-max 1
ERS-Stackable(config-if)#eapol multihost enable
ERS-Stackable(config-if)#eapol status auto
ERS-Stackable(config-if)#exit
```

2.9.2 Verify Operations

Assuming we have an Avaya IP phone with a Supplicant connected to port 7 and an Avaya IP Phone connected to port 8 with the following characteristics:

- Port 7:
  - Avaya IP Phone 1230 with MAC address 00-24-00-0d-8d-29
  - Supplicant with MAC address 00:02:A5:E9:00:28
- Port 8:
  - Avaya IP Phone 1230 with MAC address 00-24-00-0d-8d-aa

2.9.2.1 Verify EAP Global and Port Configuration

Step 1 – Verify that EAP has been enabled globally and the correct port members:

```
ERS-Stackable#show eapol port 3-11
```

Result:

```
        EAPOL Administrative State:  Enabled
        Port:  3
            Admin Status:  Auto
            Auth:  No
            Admin Dir:  Both
            Oper Dir:  Both
            ReAuth Enable:  No
            ReAuth Period:  3600
            Quiet Period:  60
            Xmit Period:  30
            Supplic Timeout:  30
            Server Timeout:  30
            Max Req:  2
            RDS DSE:  No
        |
        Port:  7
            Admin Status:  Auto
            Auth:  Yes
            Admin Dir:  Both
            Oper Dir:  Both
            ReAuth Enable:  No
            ReAuth Period:  3600
            Quiet Period:  60
            Xmit Period:  30
            Supplic Timeout:  30
            Server Timeout:  30
            Max Req:  2
            RDS DSE:  No
        Port:  8
            Admin Status:  Auto
            Auth:  Yes
```

Via the ERS-Stackable switch, verify the following information:

Option	Verify
EAPOL Administrative State	Verify that the EAPOL is ***Enabled*** globally.
Auth	For any port that has a Supplicant which has successfully been authenticated, the Auth state should be ***Yes***

2.9.2.2 Verify EAP Multihost Configuration

Step 1 – Verify that EAP multihost has been globally configured correctly:
ERS-Stackable#***show eapol multihost***
Result:
Allow Non-EAPOL Clients: Disabled Use RADIUS To Authenticate Non-EAPOL Clients: Disabled Allow Non-EAPOL Clients After Single Auth (MHSA): Disabled Allow Non-EAPOL VoIP Phone Clients: Enabled EAPOL Request Packet Generation Mode: Multicast Allow Use of RADIUS Assigned VLANs: Disabled Allow Use of Non-Eapol RADIUS Assigned VLANs: Disabled EAPOL Reauthentication Security Mode: Fail on RADIUS Timeout Non-EAPOL RADIUS Password Attribute Format: IpAddr.MACAddr.PortNumber Use most recent RADIUS VLAN: Disabled

Via the ERS-Stackable switch, verify the following information:

Option	Verify
Allow Non-EAPOL VoIP Phone Clients	Verify the allow non-EAPOL VoIP Phone Clients option is ***Enabled*** globally.

2.9.2.3 Verify EAP Multihost Port configuration

Step 1 – Verify that EAP mulltihost configuration:
ERS-Stackable#***show eapol multihost interface 3-11***
Result, i.e. for port 3:

```
        Port:  3
            MultiHost Status:  Enabled
            Max Eap Clients:  1
            Allow Non-EAP Clients:  Disabled
            Max Non-EAP Client MACs:  1
            Use RADIUS To Auth Non-EAP MACs:  Disabled
            Allow Auto Non-EAP MHSA:  Disabled
            Allow Non-EAP Phones:  Enabled
            RADIUS Req Pkt Send Mode:  Multicast
            Allow RADIUS VLANs:  Disabled
            Allow Non-EAP RADIUS VLANs:  Disabled
            RADIUS Timeout Mode:  Fail
            Use most recent RADIUS VLAN:  Disabled
        |
        |
        Port:  11
            MultiHost Status:  Enabled
            Max Eap Clients:  1
            Allow Non-EAP Clients:  Disabled
            Max Non-EAP Client MACs:  1
            Use RADIUS To Auth Non-EAP MACs:  Disabled
            Allow Auto Non-EAP MHSA:  Disabled
            Allow Non-EAP Phones:  Enabled
            RADIUS Req Pkt Send Mode:  Multicast
            Allow RADIUS VLANs:  Disabled
            Allow Non-EAP RADIUS VLANs:  Disabled
            RADIUS Timeout Mode:  Fail
            Use most recent RADIUS VLAN:  Disabled
```

Via the ERS-Stackable switch, verify the following information:

Option	**Verify**
MultiHost Status	Verify that the MultiHost status is ***Enabled*** on port ***3 to 11***.
Max Eap Client	Verify that the maximum EAP client is set to ***1***. If not, check your configuration
Max Non-EAP Client MACs	Verify that the maximum non-EAP client is set to ***1***. If not, check your configuration
Allow Non-EAP Phones	Verify that Allow Non-EAP Phone is set to ***Enabled***. If not, check your configuration

2.9.2.4 Verify EAP Multihost Status

Step 1 – Assuming the Supplicant via port 8 has successfully authenticated via EAP, use the following command to view the EAP status:
ERS-Stackable#***show eapol multihost status***
Result:

```
        Port Client MAC Address Pae State      Backend Auth State
        ---- ------------------ -------------- ------------------
        7    00:02:A5:E9:00:28  Authenticated  Idle

        =========Neap Phones============

         7 00-24-00-0d-8d-29
         8 00-24-00-0d-8d-aa
```

Via the ERS-Stackable switch, verify the following information:

Option	**Verify**
Client MAC Address	Verify the actual Supplicant MAC. For this example, this should be ***00:02:A5:E9:00:28*** on port 7.
Pae State	Verify the actual Supplicant Pae State. If the Supplicant has successfully authenticated, the Pae State should be displayed as ***Authenticated***
Neap Phones	Verify the actual MAC for the Avaya IP Phone sets. For this example, this should be ***00-24-00-0d-8d-29*** on port 7 and ***00-24-00-0d-8d-aa*** on port ***8***

2.10 Avaya IP Phone – DHCP and Provisioning Files

Details regarding various Avaya IP Phone DHCP and configuration file paramteters are listed in Appendix A. List below are the mimimum settings required for this configuration example.

2.10.1 DHCP Settings

The following assumptions apply:

- The voice VLAN id is 805
- We will use the HTTP provisioning server as illustrated in diagram 1 using an IP address of 192.168.50.100
    - The file path for the Avaya 9640 IP Phone is *9600/96xxH323_032910*
    - The file path for the Avaya 1230 IP Phone is *phone_prov_files*

DHCP Server Step 1 – Data VLAN DHCP Scope settings for the Avaya 1230 IP Phone
`Option 191 String Value` `VLAN-A:805.`
DHCP Server Step 1 – Data VLAN DHCP Scope settings for the Avaya 9640 IP Phone

`Option 242 String Value`
`L2Q=1`
`L2QVLAN=805`
`VLANTEST=60`

DHCP Server Step 2 – Voice VLAN DHCP Scope settings for the Avaya 1230 IP Phone
`Option 224 String Value` `Nortel-i2004-B,prov=http://192.168.50.100/phone_prov_files;`
DHCP Server Step 2 – Voice VLAN DHCP Scope settings for the Avaya 9640 IP Phone

`Option 242 String Value`
`HTTPSRVR=192.168.50.100`
`HTTPDIR= 9600/96xxH323_032910`

2.10.2 Provisioning Files

The following shows the configuration files used for this example.

Avaya 1230 IP Phone provisioning Files – Files include system.prv, 1230.prv, and 0024000D8DAA.prv (includes EAP MD5 configuration)

system.prv

```
file=td;
s1ip=10.88.2.20;
p1=4100;
a1=1;
r1=2;
s2ip=10.88.2.20;
p2=4100;
a2=1;
r2=2;
```

1230.prv

```
lldp=y;
igarp=y;
vq=y;
vlanf=y;
pc=y;
dq=n;
pcuntag=y;
reg=00:24:00:0D:8D:AA,CS1K,S1S2,600,096-00-00-20;
```

0024000D8DAA.prv

```
eap=md5;
eapid1=phoneb;
eappwd=Phonebeselab;
```

Avaya 9640 IP phone provisioning File – File used is 46xxxsettings.txt (includes EAP MD5 configuration)

46xxsettings.txt

```
SET HTTPSRVR 192.168.50.100
SET HTTPDIR 9600\96xxH323_032910
SET VLANTEST 60
SET PROCSTAT 0
SET PROCPSWD 27238
SET PHY1STAT 1
SET PHY2STAT 1
SET MCIPADD 47.165.168.240
SET DOT1XSTAT 2
SET DOT1X 0
SET DOT1XEAPS "MD5"
```

2.11 Avaya Energy Saver (AES)

In reference to Diagram 1, assume we wish to enable AES to ERS-Stackable with the following schedule:

- Activate AES during the week from Monday to Friday nighttime from 7:00 pm to 6:30 am
- Deactivate AES on Saturday from 7:00 am to 5:00 pm

2.11.1 Go to configuration mode.

ERS-Stackable: Step 1 - Enter configuration mode
ERS-Stackable>***enable***
ERS-Stackable#***config terminal***

2.11.2 Add SNTP Server

ERS-Stackable: Step 1 – Add an SNTP server
ERS-Stackable(config)#***sntp server primary address 192.168.50.100***
ERS-Stackable(config)#***sntp enable***

2.11.3 Add Avaya Energy Saver configuration

ERS-Stackable: Step 1 – Enable AES at interface level
ERS-Stackable(config)#***interface fastEthernet all***
ERS-Stackable(config-if)#***energy-saver enable***
ERS-Stackable(config-if)#***exit***
ERS-Stackable: Step 2 – Enable AES schedule
ERS-Stackable(config)#***energy-saver schedule weekday 06:30 deactivate***
ERS-Stackable(config)#***energy-saver schedule weekday 19:00 activate***
ERS-Stackable(config)#***energy-saver schedule saturday 07:00 deactivate***
ERS-Stackable(config)#***energy-saver schedule saturday 17:00 activate***
ERS-Stackable(config)#***energy-saver enable***

For test purposes, you can activate/deactivate AES by issuing the following commands from the CLI Privileged level:

ERS-Stackable#***energy-saver activate***

ERS-Stackable#***energy-saver deactivate***

2.11.4 Verify operations

2.11.4.1 Verify SNTP

SNTP must be configured and running for AES to operate. The switch must have SNTP enabled to correctly obtain the time for operation of AES if the scheduler is configured.

Step 1 – Verify SNTP is configured

```
ERS-Stackable#show sntp
```

Result:

```
        SNTP Status:                    Enabled
        Primary server address:         192.168.50.100
        Secondary server address:       0.0.0.0
        Sync interval:                  24 hours
        Last sync source:               192.168.50.100
        Primary server sync failures:   0
        Secondary server sync failures: 0
        Last sync time:                 2010-06-22 09:43:31 GMT-01:00
        Next sync time:                 2010-06-23 09:43:31 GMT-01:00
        Current time:                   2010-06-22 14:52:16 GMT-01:00
```

Step 2 – Verify clock

```
ERS-Stackable#show clock
```

Result:

```
            Current SNTP time  :    2010-06-22 14:51:11 GMT-01:00
            Summer time recurring is set to:
        start: on Sunday in the 4th week of March at 02:00
        end: on Sunday in the 4th week of October at 02:00
            Offset: 60 minutes.
            Summer time is set to:
        start: 29 March 2010 at 02:00
        end: 30 October 2010 at 03:00
            Offset: -60 minutes. Time zone will be 'EDT'
            Time zone is set to 'EST', offset from UTC is -02:00
```

2.11.4.2 Verify AES

Use the following commands to verify AES is operational. In this example, we will show the effect of AES with a model 1120E IP phone connected to port 1/9. Prior to AES activation, the 1120E should be operating at 1000Mbps full duplex. After AES activation, the 1120E should be operating at 10Mbps full duplex.

Step 1 – Verify AES is configured at interface level

```
ERS-Stackable#show energy-saver interface
```

Result:

```
        Unit/Port AES State PoE Savings PoE Priority
        --------- --------- ----------- ------------
        1/1       Enabled   Disabled    Low
        1/2       Enabled   Disabled    Low
        |
        |
```

Step 2 – Verify Port is delivering PoE power; the following shows the power measured prior to and after AES activation

```
ERS-Stackable#show poe-power-measurement 1/9
```

Result:

```
        The following shows the PoE power delivered prior to AES activation:

        Unit/Port  Volt(V)  Current(mA)   Power(Watt)
        ---------  -------  -----------   ---------------
        1/9        47.5     125           6.000

        The following show the PoE power delivered after AES activation:

        Unit/Port  Volt(V)  Current(mA)   Power(Watt)
        ---------  -------  -----------   ---------------
        1/9        47.5     95            4.500
```

Step 3 – Verify Ethernet interface speed; the following shows the port speed prior to and after AES activation

```
ERS-Stackable#show poe-port-status 1/9
```

Result:

```
The following displays the interface speed prior to AES activation:

                    Status                    Auto                          Flow
Unit/Port Trunk Admin   Oper Link LinkTrap Negotiation Speed    Duplex Control
--------- ----- ------- ---- ---- -------- ----------- -------- ------ -------
1/9             Enable  Up   Up   Enabled  Enabled     1000Mbps Full   Symm

The following displays the interface speed after AES is activated:

                    Status                    Auto                          Flow
Unit/Port Trunk Admin   Oper Link LinkTrap Negotiation Speed    Duplex Control
--------- ----- ------- ---- ---- -------- ----------- -------- ------ -------
1/9             Enable  Up   Up   Enabled  Enabled     10Mbps   Full   Disable
```

Step 4 – Verify AES globally settings

```
ERS-Stackable#show energy-saver
```

Result:

```
Avaya Energy Saver (AES):  Enabled
AES PoE Power Saving Mode: Disabled
AES Efficiency-Mode Mode:  Disabled
Day/Time:                  Tuesday 20:58:58
Current AES state:         AES is Active
```

Step 5 – Verify AES schedule

```
ERS-Stackable#show energy-saver schedule
```

Result:

```
Day       Time  Action
--------- ----- -----------
Monday    06:30 Deactivate
Monday    19:00 Activate
Tuesday   06:30 Deactivate
Tuesday   19:00 Activate
Wednesday 06:30 Deactivate
Wednesday 19:00 Activate
Thursday  06:30 Deactivate
Thursday  19:00 Activate
Friday    06:30 Deactivate
Friday    19:00 Activate
Saturday  07:00 Deactivate
Saturday  17:00 Activate
```

Step 6 – Verify AES power savings; the following shows the power savings after AES activation

```
ERS-Stackable# show energy-saver savings
```

Result:

```
       Prior to AES activation:

       Unit# Model        Switch Capacity Saving PoE Saving
       ----- ------------ ---------------------- -------------------
       1     5698TFD-PWR  0.0 watts              0.0 watts
       ------------------------------------------------------------
       TOTAL              0.0 watts              0.0 watts
       ============================================================

       After AES activation:

       Unit# Model        Switch Capacity Saving PoE Saving
       ----- ------------ ---------------------- -------------------
       1     5698TFD-PWR  2.7 watts              0.0 watts
       ------------------------------------------------------------
       TOTAL              3.6 watts              0.0 watts
       ============================================================
```

2.12 DHCP Server Setup

The following setup applies to configuring a DHCP server for auto configuration. Depending on the Avaya IP phone series used, the DHCP options can vary.

VLAN Setting using DHCP

Double DHCP is a term used where the IP Phone learns the voice VLAN Id using DHCP. From a default setting, all IP Phones send out traffic untagged and use DHCP to get an IP address. Providing you configure the data VLAN scope with the correct DHCP options, the IP Phone will learn the voice VLAN ID from the data VLAN and then proceed to request for a new IP address now via the tagged voice VLAN. This method provides separation for voice and data traffic allowing for a PC or any other data device to be directly connected to the IP Phone set. The IP Phone can be also be setup to either leave the data traffic untagged or tag the data VLAN using a different VLAN Id other than that of the voice VLAN.

Depending on the Avaya IP Phone model, the VLAN and IP address may be cached so this double DHCP process actually only occurs once. The Avaya 1600, 4600, and 9600 series cache both the IP address and VLAN Id. Hence, upon a power cycle, the Avaya IP Phone will request an IP address directly via the tagged voice VLAN without having to perform double DHCP. The Avaya 1100, 1200, and 2000 series have an option to cache the IP address, but, this only comes into effect if a DHCP server is unreachable – in other words, the IP phone will continue to perform double DHCP unless the DHCP server is unreachable.

Depending on the Avaya IP phone model, the following DHCP option should be configured. Details on each on these items are described in detail latter in this document and in the appendixes.

- Avaya 1100, 1200, and 2000 Series
  - Option 191
- Avaya 4600 Series
  - Option 176
- Avaya 1600 and 9600 Series
  - Option 242

IP Phone Settings using DHCP

A limited set of IP phone settings can be set by DHCP. Details are covered in detail later in this document and in the appendixes. More detailed IP phone configuration should be done using a provisioning server which can be set via the voice VLAN. Depending on the Avaya IP phone model, the following DHCP option should be configured.

- Avaya 1100, 1200, and 2000 Series
  - Option 128- prior to UNIStim firmware release 2.2
    - Call Server settings only
  - Option 128, 131, 144, 157, 188, 191, 205, 219, 223, 224, 227, 230, 232, 235, 238, 241, 244, 247, 251 or 254 - UNIStim firmware release 2.2 and greater
    - Extended IP phone settings

- Avaya 4600 Series
    - Option 176
- Avaya 1600 and 9600 Series
    - Option 242

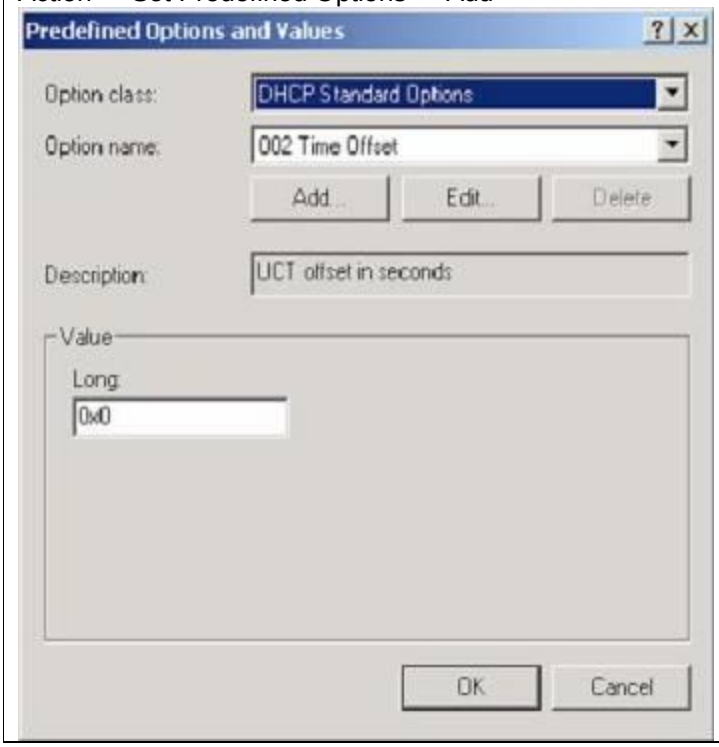
The following configuration example shows how to setup a DHCP server for Avaya IP phone. In our example, a Windows 2003 server will be used.

2.12.1 Windows 2003 DHCP Configuration

For this configuration example, we will create the following

- Option 224 and 191 to be used for the Avaya 1100, 1200, and 2000 Series Series IP phones
- Option 242 to be used for the Avaya 1600 and 9600 Series IP Phones

2.12.1.1 Default DHCP Options

Windows 2003 Server Step 1 – Go to the following
Start->Administrative Tools->DHCP
Windows 2003 Server Step 2 – Create DHCP Options by high-lighting the name on of your DHCP server from the top menu and select the following
Action -> Set Predefined Options -> Add 

Windows 2003 Server Step 3 – Add a new DHCP option, create DHCP option 191

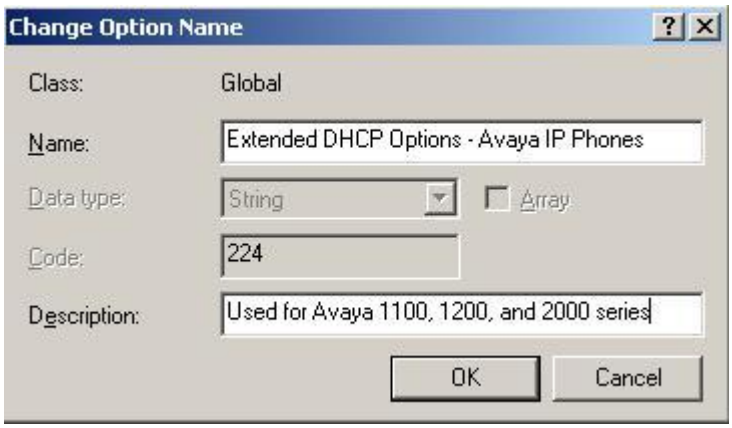
After clicking on *Add*, fill in the information as shown below for the DHCP option with the identifier set to *191*.

- Name: Any name you like
- Set Date type: String
- Code: 191
- Description: Add any comments if you like

Windows 2003 Server Step 4 – Create DHCP option 224

Select *Add* again and fill in the information as shown below for the DHCP option with the identifier set to *224*.

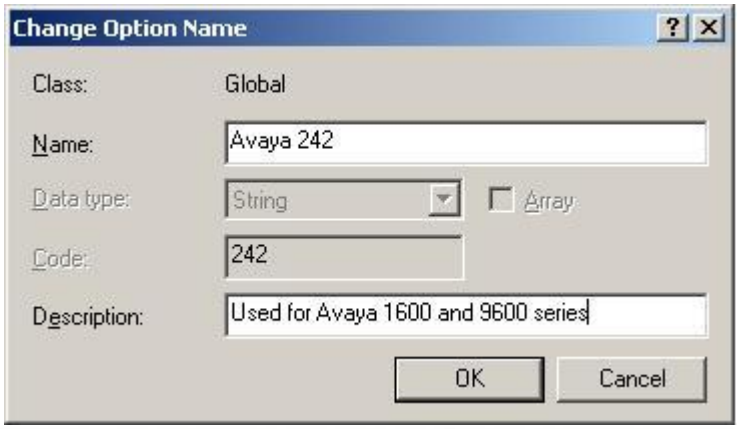
- Name: Any name you like
- Set Date type: String
- Code: 224
- Description: Add any comments if you like



Windows 2003 Server Step 5 – Create DHCP option 242

Select *Add* again and fill in the information as shown below for the DHCP option with the identifier set to *242*.

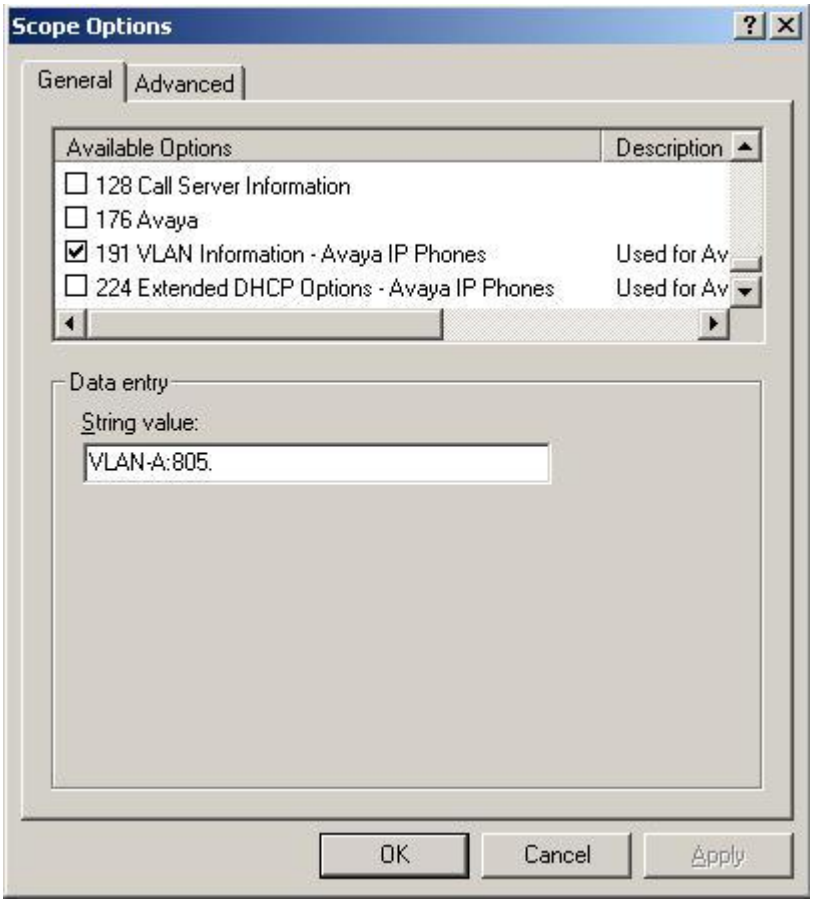
- Name: Any name you like
- Set Date type: String
- Code: 242
- Description: Add any comments if you like



Windows 2003 Server Step 6 – Right-click *Scope Option* from the data VLAN DHCP scope and select *Configure Options*. Scroll down to the DHCP Options you just created and check off the box to enable the 191 Option

Add the appropriate IP address scope, default router, and other various DHCP options for the data VLAN. Once you complete this step, you can then add the required DHCP options for the Avaya IP Phone VLAN information. The example below shows the DHCP scope for the Data VLAN using DHCP Option 191 for the Avaya 1100, 1200, or 2000 series IP Phones. The example below shows the string value pertaining for the Data VLAN where the following string is added to set the Avaya IP phone to tag the voice VLAN using VLAN ID 805:

- VLAN-A:805.

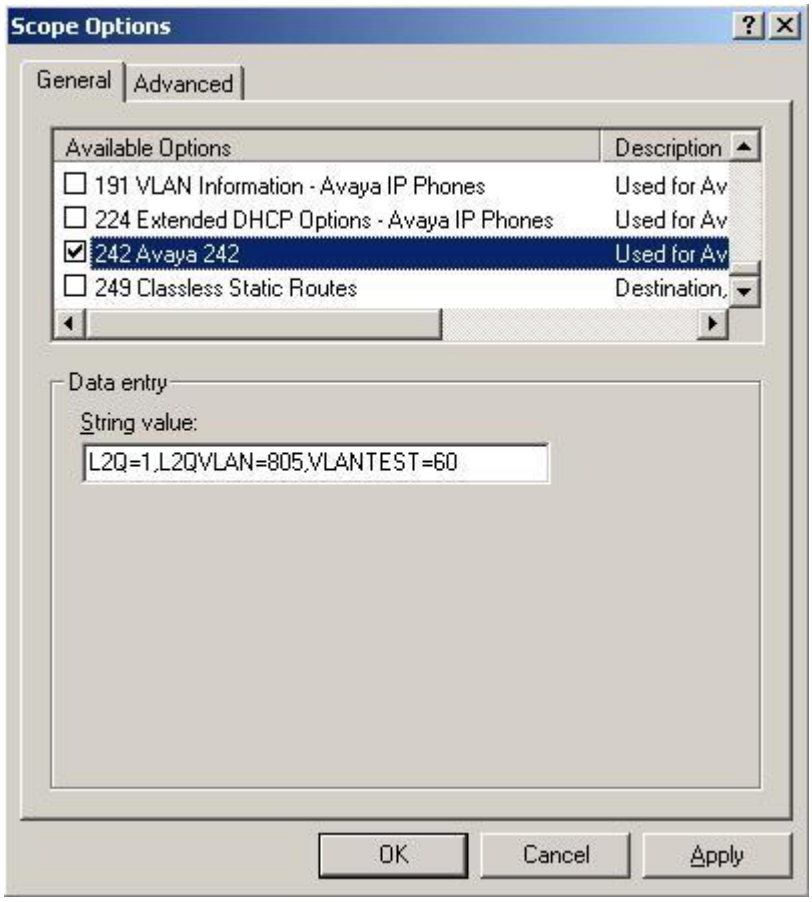


There must be a colon (:) separating the Hardware Revision from the VLAN ID. The string must also end in a period (.)

Windows 2003 Server Step 7 – Right-click *Scope Option* from the data VLAN DHCP scope then select *Configure Options*. Scroll down to the DHCP Options you just created and check off the box to enable the 242 Option

Add the appropriate IP address scope, default router, and other various DHCP options for the data VLAN. Once you complete this step, you can then add the required DHCP options for the Avaya IP Phone VLAN information. The example below shows the DHCP scope for the Data VLAN using DHCP Option 242 for the Avaya 1600 or 9600 series IP Phones. The example below shows the string value pertaining for the Data VLAN where the following string is added to set the Avaya IP phone to tag the voice VLAN using VLAN ID 60:

- L2Q=1,L2QVLAN=805,VLANTEST=60

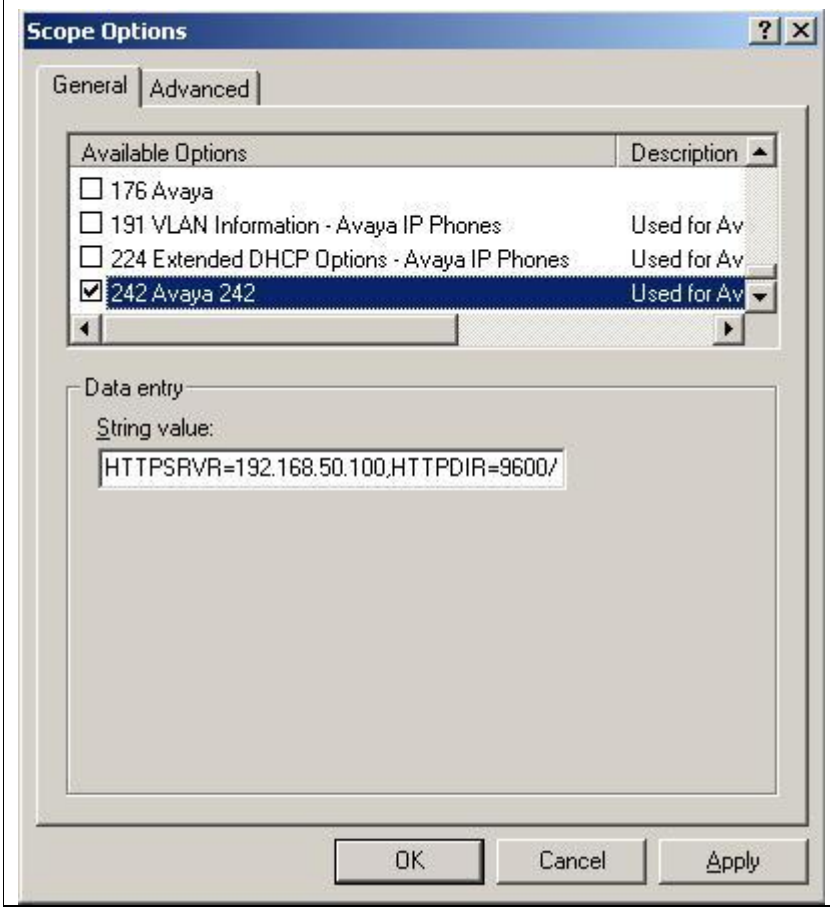


The string must have a comma (,) between each parameter with no spaces.

Windows 2003 Server Step 8 – Right-click *Scope Option* from the voice VLAN DHCP scope and select *Configure Options*. Scroll down to the DHCP Options you just created and check off the box to enable the 242 Option

Add the appropriate IP address scope, default router, and other various DHCP options for the voice VLAN. Once you complete this step, you can then add the required DHCP options for the Avaya IP Phone VLAN information. The example below shows the DHCP scope for the Voice VLAN using DHCP Option 242 for the Avaya 9600 series IP Phones as used in this example. The example below shows the string value pertaining for the Voice VLAN assuming the Avaya 9600 IP Phones are using H.323 and retrieving the configuration file using HTTP from the directory 9600/96xxH323_032910. In this directory, it should contain the appropriate files, assuming the Avaya 9600 series is used, it should contain the 96xxupgrade.txt and 46xxsettings.txt files

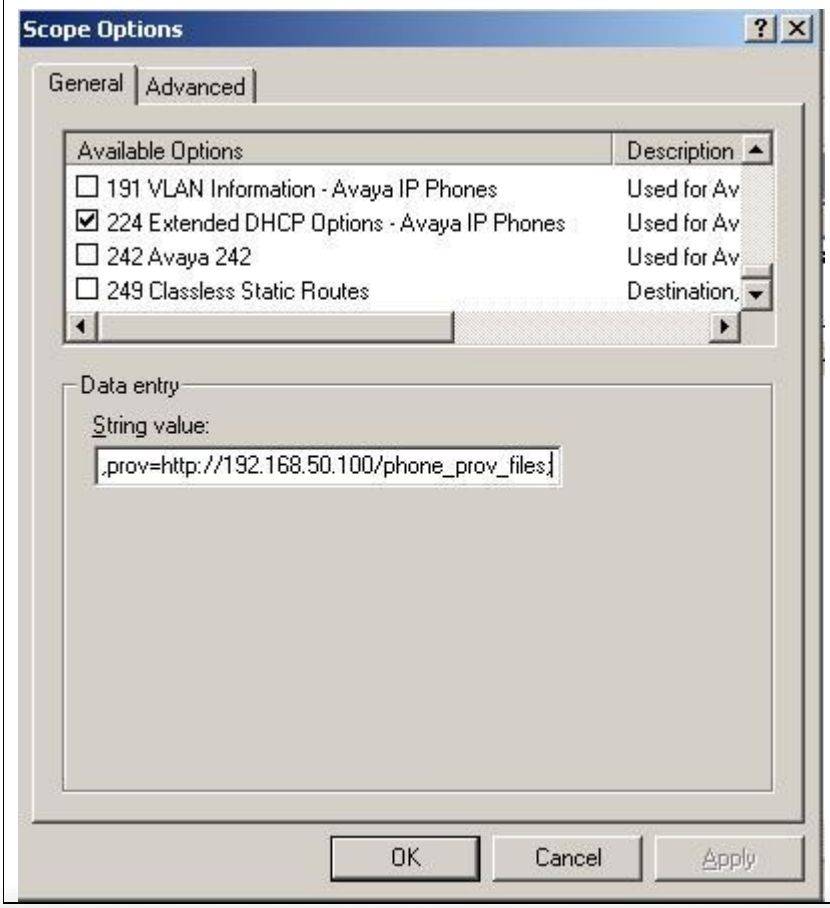
- With a provision server using HTTP
  - HTTPSRVR=192.168.50.100,HTTPDIR= 9600/96xxH323_032910
- Without a provision server:
  - *MCIPADD=10.30.30.20,VLANTEST=60*



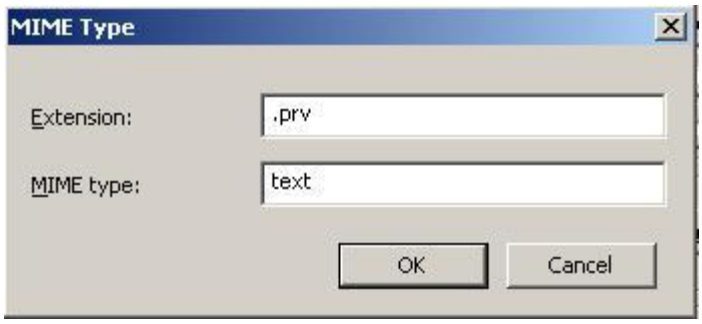
Windows 2003 Server Step 9 – Right-click *Scope Option* from the voice VLAN DHCP scope and select *Configure Options*. Scroll down to the DHCP Options you just created and check off the box to enable the 224 Option

Add the appropriate IP address scope, default router, and other various DHCP options for the voice VLAN. Once you complete this step, you can then add the required DHCP options for the Avaya IP Phone VLAN information. The example below shows the DHCP scope for the Voice VLAN using DHCP Option 224 for the Avaya 1100 or 1200 series IP Phones. The example below shows the string value pertaining for the Voice VLAN assuming the Avaya 1100 or 1200 IP Phones use HTTP to get it's provisioning files via the directory named *phone_prov_files*

- With a provision server using HTTP
  - Nortel-i2004-B,prov=http://192.168.50.100/phone_prov_files;
- With a provision server using TFTP
  - Nortel-i2004-B,prov=192.168.50.100/phone_prov_files;
- Without a provision server:
  - Nortel-i2004-B,s1=10.88.2.20;p1=4100;a1=1;r1=5;s2=10.88.2.20;p1=4100; a1=1;r1=5;



Please note that if using a Windows 2003 server, it may not associate the Avaya 1100/1200 series provision file extention of *.prv* with text files. To change this, open Windows 2003 Internet Information Services (IIS) Manager and under the name of your IIS server, go to *Web Sites -> Default Web Site -> phone_prov_files -> Properties* (in our example, phone_prov_files is the name of the directory storing the Avaya 1100/1200 series provision files). Next, go to *HTTP Headers -> MIME Types -> New* and under Extention, enter *.prv* and under MIME Type, enter *text*.



3. Avaya IP Deskphones

Avaya offers a variety of IP Deskphones. The following sections highlight the major features of each of these series of phones along with information on how to access the configuration menus.

3.1 2000 Series IP Deskphones

3.1.1 Feature Comparison

Feature	Avaya 2000 Series IP Deskphones			
	IP Phone 2001[1]	***IP Phone 2002***[1]	***IP Phone 2004***[1]	**2007 IP Deskphone**
Display Size / Type	3x24 Character LCD	4x24 Character LCD	8x24 Character LCD	320x240 Pixels Color Touch screen LCD
# of Lines	1	4	6+ Varies w/config	6+ Varies w/config
Headset Jack	0	1	1	1
Handsfree	Listen only	Yes	Yes	Yes
802.3af PoE Class	Class 2	Class 2	Class 2	Class 3
Two Port Switch	No	Yes	Yes	Yes
Gigabit Ethernet	No	No	No	No
USB Ports	0	0	0	1
Support for Expansion Module Attachment	No	Yes (Current 200x KEM)	Yes (Current 200x KEM)	No
Bluetooth Headset	No	No	No	No
XAS (Application Gateway) Support	Yes	Yes	Yes	Yes
EAP (802.1x)	Yes	Yes	Yes (Phase II only)	Yes
802.1AB	Yes	Yes (Phase II only)	Yes (Phase II only)	Yes

Table 1: Avaya IP Deskphones – 2000 Series

[1] The IP Phone 2001, IP Phone 2002 and IP Phone 2002 are no longer manufactured.

3.1.2 Accessing the Configuration Menu (2001/2002/2004)

To access the configuration menu power cycle the IP Phone 2001/2002/2004 and then wait until Nortel appears on the LCD panel. At this point, press the following keys in order from 1 to 4: Function key 1, Function key 2, Function key 3, and finally Function key 4.

Figure 3: IP Phone 2004 Access Configuration Menu

Function Keys

Figure 4: IP Phone 2002 Access Configuration Menu

To power cycle the IP Phone 2004 via the front panel, press the following keys in order from 1 to 9: Mute key, up Navigation key, down Navigation key, up Navigation key, down Navigation key, up Navigation key, Mute, 9, and finally the Goodbye key.

To power cycle the IP Phone 2001 via the front panel, press the following keys in order from 1 to 9: # key, up Navigation key, down Navigation key, up Navigation key, down Navigation key, up Navigation key, #, 9, and finally the Goodbye key.

Figure 5: IP Phone 2004 Power Cycle Phone Set

Figure 6: IP Phone 2002 Power Cycle Phone Set

3.1.3 Configuration Menu on Phase II IP Phone 2001, Phase II IP Phone 2002 and Phase II IP Phone 2004

The single-line based configuration menu structure below presents the complete configuration menu now available on the Phase II IP Phone 2001, Phase II IP Phone 2002 and Phase II IP Phone 2004:

EAP Enable?[0-N,1-Y]:0
if "1"
DeviceID:[ ]
Password:
LLDP Enable?[0-N,1-Y]:0
DHCP? [0-N, 1-Y]:1
if "0"
SET IP: xxx.xxx.xxx.xxx
NETMSK: xxx.xxx.xxx.xxx
DEF GW: xxx.xxx.xxx.xxx
S1 IP: xxx.xxx.xxx.xxx
S1 PORT:
S1 ACTION:
S1 RETRY COUNT:
S2 IP: xxx.xxx.xxx.xxx
S2 PORT:
S2 ACTION:
S2 RETRY COUNT:
else if "1"
DHCP:0-Full,1-Partial:1
if "1"
S1 IP: xxx.xxx.xxx.xxx
S1 PORT:
S1 ACTION:
S1 RETRY COUNT:
S2 IP: xxx.xxx.xxx.xxx
S2 PORT:
S2 ACTION:
S2 RETRY COUNT:
Speed[0-A,1-10,2-100]:0
if "1" or "2"
Duplex[0-A,1-F,2-H]:0
Cfg XAS?[0-N, 1-Y]:1
if "1"
XAS IP: xxx.xxx.xxx.xxx
Voice 802.1Q[0-N,1-Y]:1
if "1"
VOICE VLAN?[0-N,1-Y]:0
if "1"
VLAN Cfg?0-Auto,1-Man :1
The VLAN Cfg menu is only presented if DHCP is provisioned to "Partial" or "Full" above or if LLDP is enabled above.
if "0"
LLDP MED? [0-N, 1-Y] :0

The LLDP MED menu is only presented if LLDP is enabled above.

if "0"

LLDP VLAN? [0-N,1-Y] :0

The LLDP VLAN menu is only presented if LLDP is enabled above.

if "0"

DHCP? [0-N, 1-Y] :0

The DHCP menu is only presented if DHCP is provisioned to "Partial" or "Full" above.

else if "1"

VOICE VLAN ID :

VLANFILTER?[0-N, 1-Y] :0

Ctrl pBits[0-7,8-Au] :8

Media pBits[0-7,8-Au] :8

PC Port? [0-OFF,1-ON] :1 *This menu item, and submenus, are not available on the IP Phone 2001.*

if "1"

Speed[0-A,1-10,2-100]:0

if "1" or "2"

Duplex[0-A,1-F,2-H]:0

Data 802.1Q[0-N,1-Y]:1

if "1"

DATA VLAN? [0-N, 1-Y]:0

if "1"

DATA VLAN Cfg?0-A,1-M:0

This DATA VLAN Cfg menu item is only presented if LLDP is enabled above.

if "1"

DATA VLAN ID:

Data pBits[0-7,8-Au] :8

PCUntagAll?[0-N,1-Y]:0

Cached IP? [0-N, 1-Y]:0

This Cached IP menu item is only presented if DHCP is provisioned to "Yes" above and Voice VLAN is not provisioned as "Auto".

GARP Ignore?[0-N,1-Y]:0

PSK SRTP?[0-N, 1-Y]:0

3.1.4 Accessing the Configuration Menu (2007 IP Deskphone)

To access the configuration menu, power cycle the 2007 IP Deskphone and when the Avaya logo appears in the middle of the display, immediately press the following key in sequence: 0, 0, 7, and star (*). If prompted for “Enter Administration Password:”, then press the following keys in sequence: 2, 6, 5, 6, 7, *, 7, 3, 8, OK. Using Navigation Keys scroll down/up to select the configuration options. As an alternative, use the USB port on the back of the IP Phone to use a mouse to scroll and select configuration options.

Figure 7: IP Phone 2007 Phone Set

3.1.5 Configuration Menu on the 2007 IP Deskphone

The full-screen based configuration menu structure below presents the complete configuration menu available on the 2007 IP Deskphone as of UNIStim 4.2 (0621C7G). For other releases of software, please refer to the associated Product Bulletin or ReadMe File.

EAP Mode: [Disable, MD5, PEAP, TLS]
- **ID 1:**
- **ID 2:**
- **Password:**

Enable 802.1ab (LLDP): []
DHCP: [No, Yes]
- **Set IP: xxx.xxx.xxx.xxx**

Net Mask: xxx.xxx.xxx.xxx
Gateway: xxx.xxx.xxx.xxx
DNS1 IP: xxx.xxx.xxx.xxx
DNS2 IP: xxx.xxx.xxx.xxx
CA Server:
Domain Name:
Hostname:
S1 IP: xxx.xxx.xxx.xxx
Port:
S1 Action:
Retry:
S1 PK: FFFFFFFFFFFFFFFF
S2 IP: xxx.xxx.xxx.xxx
Port:
S2 Action:
Retry:
S2 PK: FFFFFFFFFFFFFFFF
Ntwk Port Speed: [Auto, 10BT, 100BT]
Ntwk Port Duplex: [Auto, Force Full, Force Half]
Phone Mode [Hidden, Full, Reduced]
XAS Mode [Text Mode, Graphical, Full Screen, Secure Graphical, Secure Full Screen]
XAS IP: xxx.xxx.xxx.xxx
Port:
Enable Voice 802.1Q: []
VoiceVLAN: [No VLAN, Auto, Enter VLAN ID]
The Auto option in the VoiceVLAN menu is only available if DHCP is provisioned to "Yes" above or if LLDP is enabled above, respectively.
VLAN Filter : []
Ctrl Priority Bits: [Auto, 0, 1, 2, 3, 4, 5, 6, 7]
Media Priority Bits: [Auto, 0, 1, 2, 3, 4, 5, 6, 7]
Enable Avaya Auto QoS: []
DSCP Override: [] *This DSCP Override menu item is only presented if "Enable 802.1ab (LLDP)" is enabled above and "Control DSCP" or "Media DSCP" are not manually set below*
Control DSCP: xx
Media DSCP: xx
Enable PC Port: []
PC Port Speed: [Auto, 10BT, 100BT]
PC Port Duplex: [Auto, Force Full, Force Half]
Enable Data 802.1Q: []
DataVLAN: [No VLAN, Enter VLAN ID]
Data Priority Bits: [Auto, 0, 1, 2, 3, 4, 5, 6, 7]
PC-Port Untag All: []
Enable Stickiness []
Cached IP: [] *This Cached IP menu item is only presented if DHCP is provisioned to "Yes" above.*
Ignore GARP: []

Enable SRTP PSK: []

SRTP PSK Payload ID: [96, 115, 120]

Provision: xxx.xxx.xxx.xxx

Provision Zone ID:

The 2007 IP Deskphone contains a password protection mechanism to lock out access to the Local Tools menu including the Network Configuration menu. If enabled, access to the Local Tools menu is password protected and the password is prompted by a pop up window. One must type the password from the dial pad and press the center of the navigation cluster (enter key) to enter the Network Configuration menu. The default password is 26567*738 (color*set), but this password can be changed by the system administrator.

When an incorrect password is entered, the Local Tools menu is not opened.

To thwart password guessing, only 3 incorrect password entries in a row are allowed. After the 3rd incorrect entry, the password entry is ignored for 5 minutes. During this period of time, the password prompt is displayed and the entered digits accepted; however, the phone will not process the incoming digits. The password prompt window simply closes and the behavior is identical to that of an incorrect password entry. The user will assume the incorrect password has been entered and try again. Thus even if the correct password is guessed during the 5 minute period, it will be ignored. This effectively reduces the guess entry rate to 3 guesses every 5 minutes.

Once the password has been entered, access to the Local Tools menu remains active for 5 minutes. During the 5 minutes, the menu can be freely navigated, exited and entered without being prompted again for the password. When the 5 minutes expires, the menu is closed. The password must be reentered to access the Local Tools menu.

3.2 1100 Series IP Deskphones

3.2.1 Feature Comparison

Feature	Avaya 1100 Series IP Deskphone				
	1110 IP Deskphone	**1120E IP Deskphone**	**1140E IP Deskphone**	**1150E IP Deskphone**	**1165E IP Deskphone**
Display Size / Type	144x32 Pixels Graphical LCD	240x80 Pixels Grayscale LCD	240x160 Pixels Grayscale LCD	240x160 Pixels Grayscale LCD	320x240 Pixels 24-bit Color LCD
Feature Keys (Excluding Enter + NAV)	12	22	24	30	30
# of Lines	1	4	6+ Varies w/config	6+ Varies w/config	8+ Varies w/config
Headset Jack	0	1	1	1	1
Handsfree	Listen only	Yes	Yes	Yes	Yes
802.3af PoE Class	Class 2	Class 2	Class 2	Class 3	Class 2
Two Port Switch	Yes	Yes	Yes	Yes	Yes
Gigabit Ethernet	No	Yes	Yes	Yes	Yes
USB Ports	0	1	1	1	1
Support for Expansion Module Attachment	No	Yes	Yes	Yes	Yes
Bluetooth Headset	No	No	Yes	Yes (Agent only)	Yes
XAS (Application Gateway) Support	Yes	Yes	Yes	Yes	Yes
EAP (802.1x)	Yes	Yes	Yes	Yes	Yes
802.1AB	No	Yes	Yes	Yes	Yes

Table 2: Avaya IP Deskphones – 1100 Series

3.2.2 Accessing the Configuration Menu

To access the configuration menu, power cycle the 11xx IP Deskphone and when the Avaya logo appears in the middle of the display, immediately press the four feature keys at the bottom of the display in sequence from left to right. If prompted for “Enter Administration Password:”, then press the following keys in sequence: 2, 6, 5, 6, 7, *, 7, 3, 8, Down. Use the Navigation Keys scroll down/up to select configuration options. As an alternative, use the USB port on the back of the IP Deskphone to use a mouse to scroll and select configuration options.

Figure 8: 1100 Series IP Deskphone Setup

You can also configure the 1100 Series IP Deskphone by pressing the *Services* key twice and select option 3 *Network Configuration*.

3.2.3 Configuration Menu on the 1120E/1140E/1150E/1165E IP Deskphone

The full-screen based configuration menu structure below presents the complete configuration menu available on the 1120E, 1140E, 1150E and 1165E IP Deskphones running UNIStim 4.2 software (062xC7M). For other versions of software, please refer to the associated Product Bulletin or ReadMe File.

EAP Mode: [Disable, MD5, PEAP, TLS]
ID 1:
ID 2:
Password:
Enable VPN: []
Protocol:
Mode:
Authentication:
PSK User ID:
PSK Password:
XAUTH Method:
XAUTH User ID:
XAUTH Password:
VPN Server 1: xxx.xxx.xxx.xxx
VPN Server 2: xxx.xxx.xxx.xxx
VPN DSCP:
VPN MOTD Timer:
Enable 802.1ab (LLDP): []
DHCP: [No, Yes]
Set IP: xxx.xxx.xxx.xxx
Net Mask: xxx.xxx.xxx.xxx
Gateway: xxx.xxx.xxx.xxx
DNS1 IP: xxx.xxx.xxx.xxx
DNS2 IP: xxx.xxx.xxx.xxx
Local DNS IP: xxx.xxx.xxx.xxx
CA Server:
Domain Name:
Hostname:
S1 IP: xxx.xxx.xxx.xxx
Port:
S1 Action:
Retry:
S1 PK: FFFFFFFFFFFFFFFF
S2 IP: xxx.xxx.xxx.xxx
Port:
S2 Action:
Retry:
S2 PK: FFFFFFFFFFFFFFFF
Ntwk Port Speed: [Auto, 10BT, 100BT]

Ntwk Port Duplex: [Auto, Force Full, Force Half]

XAS Mode: [Text Mode, Graphical, Secure Graphical] *This parameter is called "Graphical XAS" on the 1165E IP Deskphone.*

XAS IP: xxx.xxx.xxx.xxx

XAS Port:

Enable Voice 802.1Q: []

VoiceVLAN: [No VLAN, Auto, Enter VLAN ID]

The Auto option in the VoiceVLAN menu is only available if DHCP is provisioned to "Yes" above or if LLDP is enabled above

VLAN Filter : []

Ctrl Priority Bits: [Auto, 0, 1, 2, 3, 4, 5, 6, 7]

Media Priority Bits: [Auto, 0, 1, 2, 3, 4, 5, 6, 7]

Enable Avaya Auto Qos: []

DSCP Override: [] *This DSCP Override menu item is only presented if "Enable 802.1ab (LLDP)" is enabled above and "Control DSCP" or "Media DSCP" are not manually set below*

Control DSCP: xx

Media DSCP: xx

Enable PC Port: []

PC Port Speed: [Auto, 10BT, 100BT]

PC Port Duplex: [Auto, Force Full, Force Half]

Enable Data 802.1Q: []

DataVLAN: [No VLAN, Enter VLAN ID]

Data Priority Bits: [Auto, 0, 1, 2, 3, 4, 5, 6, 7]

PC-Port Untag All: []

Enable Stickiness []

Cached IP: [] *This Cached IP menu item is only presented if DHCP is provisioned to "Yes".*

Ignore GARP: []

Enable SRTP PSK: []

SRTP PSK Payload ID: [96, 115, 120]

Provision: xxx.xxx.xxx.xxx

Provision Zone ID:

Enable Bluetooth: [Yes, No] *This Bluetooth menu item is on the 1140E, 1150E, and 1165E only.*

The 1120E, 1140E, 1150E and 1165E IP Deskphones contain a password protection mechanism to lock out access to the Local Tools menu including the Network Configuration menu. If enabled, access to the Local Tools menu is password protected and the password is prompted by a pop up window. One must type the password from the dial pad and press the center of the navigation cluster (enter key) to enter the Network Configuration menu. The default password is 26567*738 (color*set), but this password can be changed by the system administrator.

When an incorrect password is entered, the Local Tools menu is not opened.

To thwart password guessing, only 3 incorrect password entries in a row are allowed. After the 3rd incorrect entry, the password entry is ignored for 5 minutes. During this period of time, the password prompt is displayed and the entered digits accepted; however, the phone will not process the incoming digits. The password prompt window simply closes and the behavior is

identical to that of an incorrect password entry. The user will assume the incorrect password has been entered and try again. Thus even if the correct password is guessed during the 5 minute period, it will be ignored. This effectively reduces the guess entry rate to 3 guesses every 5 minutes.

Once the password has been entered, access to the Local Tools menu remains active for 5 minutes. During the 5 minutes, the menu can be freely navigated, exited and entered without being prompted again for the password. When the 5 minutes expires, the menu is closed. The password must be reentered to access the Local Tools menu.

3.3 1200 Series IP Deskphone

3.3.1 Feature Comparison

Feature	Avaya 1200 Series IP Deskphone		
	IP Phone 1210	**IP Phone 1220**	**IP Phone 1230**
Display Size / Type	3x24 characters LCD	5x25 characters LCD	9x25 characters LCD
Feature Keys (Excluding Enter + NAV)	14	22	28
# of Lines	1	4+ Varies w/config	6+ Varies w/config
Headset Jack	1	1	1
Handsfree	Yes	Yes	Yes
802.3af PoE Class	Class 2	Class 2	Class 2
Two Port Switch	Yes	Yes	Yes
Gigabit Ethernet	No	No	No
USB Ports	0	0	0
Support for Expansion Module Attachment	No	Yes (LED & LCD)	Yes (LED & LCD)
Bluetooth Headset	No	No	No
XAS (Application Gateway) Support	No	No	No
EAP (802.1x)	Yes	Yes	Yes
802.1AB	Yes	Yes	Yes

Table 3: Avaya IP Phone Sets – 1200 series

3.3.2 Access the Configuration Menu

To access the configuration menu, power cycle the IP Phone 12x0 and when the Avaya logo appears in the middle of the display, immediately press the four feature keys at the bottom of the display in sequence from left to right. If prompted for “Enter Administration Password:”, then press the following keys in sequence: 2, 6, 5, 6, 7, *, 7, 3, 8, Down. Use the Navigation Keys scroll down/up to select configuration options.

Figure 9: 1200 Series IP Deskphone Setup

You can also configure the 1200 Series IP Deskphone by pressing the *Services* key twice and select option 3 *Network Configuration*.

3.3.3 Configuration Menu on IP Phone 12xx Series and IP Phone 1110

The single-line based configuration menu structure below presents the complete configuration menu available with UNIStim 4.2 software (062xC7M) on the 1110 and 1200 Series IP Deskphones. For other releases of software, please refer to the associated Product Bulletin or ReadMe File.

EAP[0-N,1-M, 2-P, 3-T]:0
if "1" or "2" or "3"
ID 1: [ ]
also if "1" or "2"
ID 2: [ ]
Password: [*******]
LLDP Enable?[0-N,1-Y]:0
DHCP? [0-N,1-Y]:1
if "0"
Set IP: xxx.xxx.xxx.xxx
Netmsk: xxx.xxx.xxx.xxx
Def GW: xxx.xxx.xxx.xxx
DNS1 IP: xxx.xxx.xxx.xxx
DNS2 IP: xxx.xxx.xxx.xxx
CA Server:
Domain Name:
Hostname:
S1 IP: xxx.xxx.xxx.xxx
S1 Port:
S1 Action:
S1 Retry Count:
S2 IP: xxx.xxx.xxx.xxx
S2 Port:
S2 Action:
S2 Retry Count:
Speed[0-A,1-10,2-100]:0
if "1" or "2"
Duplex[0-A,1-F,2-H]:0
Cfg XAS? [0-N, 1-Y]:1
if "1"
XAS IP: xxx.xxx.xxx.xxx
Voice 802.1Q[0-N,1-Y]:1
if "1"
Voice VLAN?[0-N,1-Y]:0
if "1"
VLAN Cfg ?0-Auto,1-Man :1
This VLAN Cfg menu is only presented if DHCP is provisioned to "Y" above or if LLDP Enabled is provisioned to "Y" above.
if "1"
VLAN ID :
VLAN Filter?[0-N,1-Y] :0
Ctrl pBits[0-7,8-Au] :8
Media pBits[0-7,8-Au] :8
Avaya QOS? [0-N,1-Y]:0
DSCP Ovride [0-N,1-Y]:0 *This DSCP Override menu item is only presented if "LLDP Enable?" is enabled above and neither the "Control DSCP" or "Media DSCP" are not manually set below*
CTRL DSCP [0-63]: xx

Media DSCP [0-63]: xx
PC Port ? [0-Off,1-On] :1
if "1"
Speed[0-A,1-10,2-100]:0
if "1" or "2"
Duplex[0-A,1-F,2-H]:0
Data 802.1Q[0-N,1-Y]:1
if "1"
VLAN ID :
Data pBits[0-7,8-Au] :8
PCUntagAll? [0-N,1-Y]:1
Stickiness? [0-N,1-Y]:1
Cached IP? [0-N, 1-Y]:0 *This Cached IP menu item is only presented if DHCP is provisioned to "Y" above*
GARP Ignore?[0-N,1-Y]:0
SRTP PSK? [0-N, 1-Y]:0
PayID[0-96,1-115,2-120]0
Prov: xxx.xxx.xxx.xxx
Prov Zone ID:
End of Menu

The 1110, 1210, 1220 and 1230 IP Deskphones contain a password protection mechanism to lock out access to the Local Tools menu including the Network Configuration menu. If enabled, access to the Local Tools menu is password protected and the password is prompted by a pop up window. One must type the password from the dial pad and press the center of the navigation cluster (enter key) to enter the Network Configuration menu. The default password is 26567*738 (color*set), but this password can be changed by the system administrator.

When an incorrect password is entered, the Local Tools menu is not opened.

To thwart password guessing, only 3 incorrect password entries in a row are allowed. After the 3rd incorrect entry, the password entry is ignored for 5 minutes. During this period of time, the password prompt is displayed and the entered digits accepted; however, the phone will not process the incoming digits. The password prompt window simply closes and the behavior is identical to that of an incorrect password entry. The user will assume the incorrect password has been entered and try again. Thus even if the correct password is guessed during the 5 minute period, it will be ignored. This effectively reduces the guess entry rate to 3 guesses every 5 minutes.

Once the password has been entered, access to the Local Tools menu remains active for 5 minutes. During the 5 minutes, the menu can be freely navigated, exited and entered without being prompted again for the password. When the 5 minutes expires, the menu is closed. The password must be reentered to access the Local Tools menu.

3.4 Restore to Factory Defaults (applies to 1100-Series, 1200-Series, and 2007 IP Deskphones)

The UNIStim software release 3.0 for IP Deskphones introduced the ability to restore an IP Deskphone to a “factory default” configuration. This can be useful when redeploying an IP Deskphone from one location to another, when starting to use an IP Deskphone with unknown history, or to reset to a known baseline configuration.

With UNIStim software release 3.0, and greater, the following keypad sequence is used to reset all provisioning parameters to a “factory default”:

[*][*][7][3][6][3][9][MAC][#][#]

Where MAC corresponds to the MAC address of the IP Deskphone which can be found on a label on the back of the IP Deskphone.

Since a MAC address can contain the letters A through F, the letters A, B and C can be entered via the [2] key on the dialpad, and letters D, E and F can be entered via the [3] key.

For example, an IP Deskphone with MAC address 00:19:E1:E2:17:12 would be reset to “factory default” when the sequence **736390019313217 12## is entered on the keypad.

Please note that the keypad sequence will only be accepted by the phone after the IP Deskphone has finished its boot-up procedure.

3.5 1600 Series IP Deskphones

3.5.1 Feature Comparison

Feature	Avaya 1600 Series IP Deskphone			
	1603-I IP Deskphone	**1603SW-I IP Deskphone**	**1608-I IP Deskphone**	**1616-I IP Deskphone**
Display Size / Type	128x25 Pixel Mono LCD	128x25 Pixel Mono LCD	181x40 Pixel Mono LCD	181x56 Pixel Mono LCD
# of Lines	3	3	8	16
Headset Jack	0	0	1	1
Handsfree	Listen only	Listen only	Yes	Yes
802.3af PoE Class	Class 2	Class 2	Class 2	Class 2
Two Port Switch	No	Yes	Yes	Yes
Gigabit Ethernet	No	No	No	No
USB Ports	0	0	0	0
Support for Expansion Module Attachment	No	No	No	Yes
Bluetooth Headset	No	No	No	No
WML Support	No	No	No	No
EAP (802.1x)	Yes	Yes	Yes	Yes
802.1AB	No	No	No	No

Table 4: Avaya IP Phone Sets – 1600 series

3.6 9600 Series IP Deskphones

3.6.1 Feature Comparison

Feature	Avaya 9600 Series IP Deskphone (1 of 2)					
	9608 IP Deskphone	**9611G IP Deskphone**	**9620L IP Deskphone**	**9620C IP Deskphone**	**9621G IP Deskphone**	**9630G IP Deskphone**
Display Size / Type	181x120 Pixels Color LCD	320x240 Pixels Color LCD	320x160 Pixels Grayscale LCD	320x160 Pixels Color LCD	480x272 Pixels Color Touchscreen LCD	320x240 Pixels Grayscale LCD
# of Lines	8	8	1	1	11	6
Headset Jack	1	1	1	1	1	1
Handsfree	Yes	Yes	Yes	Yes	Yes	Yes
802.3af PoE Class	Class 1	Class 1	Class 1	Class 2	Class 2	Class 2
Two Port Switch	Yes	Yes	Yes	Yes	Yes	Yes
Gigabit Ethernet	No	Yes	No	No	Yes	Yes
USB Ports	0	1	0	1	0	1
Support for Expansion Module Attachment	No	Yes	No	No	Yes	Yes
Bluetooth Headset	No	No	No	No	No	No
WML Support	Yes	Yes	Yes	Yes	Yes	Yes
EAP (802.1x)	Yes	Yes	Yes	Yes	Yes	Yes
LLDP (802.1AB)	Yes	Yes	Yes	Yes	Yes	Yes

Feature	Avaya 9600 Series IP Deskphone (2 of 2)					
	9640 IP Deskphone	**9640G IP Deskphone**	**9641G IP Deskphone**	**9650 IP Deskphone**	**9650C IP Deskphone**	**9670G IP Deskphone**
Display Size / Type	320x240 Pixels Color LCD	320x240 Pixels Color LCD	480x272 Pixels Color Touchscreen LCD	320x240 Pixels Grayscale LCD	320x240 Pixels Color LCD	640x480 Pixels Color Touchscreen LCD
# of Lines	6	6	11	11	11	11
Headset Jack	1	1	1	1	1	1
Handsfree	Yes	Yes	Yes	Yes	Yes	Yes
802.3af PoE Class	Class 2	Class 2	Class 2	Class 2	Class 2	Class 2
Two Port Switch	Yes	Yes	Yes	Yes	Yes	Yes
Gigabit Ethernet	No	Yes	Yes	No	No	Yes
USB Ports	1	1	1	1	1	1
Support for Expansion Module Attachment	Yes	Yes	Yes	Yes	Yes	Yes
Bluetooth Headset	No	No	No	No	No	Yes
WML Support	Yes	Yes	Yes	Yes	Yes	Yes
EAP (802.1x)	Yes	Yes	Yes	Yes	Yes	Yes
LLDP (802.1AB)	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Avaya IP Phone Sets – 9600 series

4. Automatic Provisioning: Plug and Play IP Telephony

IP Phone provisioning has evolved over the years and Avaya now offers several methods that can be used independently or together to automatically provision an Avaya IP Phone. Although the manual provision of an IP Phone is still available and overrides any automatic provision mechanism, IP client provisioning provides an alternative mechanism to easily set the various IP Phone settings. The end result is IP Phone provisioning removes the need for a trained technician to walk desk-to-desk configuring IP Phones.

The following is a summary of the various IP Phone provisioning mechanisms:

- *DHCP & TFTP/HTTP/HTTPS*
    - Provides configuration information to IP phone
    - Configuration options for call server, VLAN, etc.
    - VLAN auto discovery via DHCP site specific option
    - DHCP options
    - Auto Provisioning via tftp/http/https
- *802.1AB - Station and Media Access Control Connectivity Discovery*
    - Uses Link Layer Discovery Protocol (LLDP)
    - Exchanges capabilities/information of connected devices
    - Builds topology of connected devices
    - Can be used for configuration of network devices
- *Auto Detect Auto Config (ADAC)*
    - Avaya Ethernet Switch feature
    - Discovers IP phones connected to it
    - Automatically configures Voice VLAN and QoS
    - Auto detection of IP phone can be accomplished in one of two methods
        - MAC address of IP phone
        - 802.1ab LLDP-MED
    - Can be used with 802.1x EAP
- *QoS*
    - can be provided automatically using Avaya Automatic QoS, ADAC, or using LLDP

4.1 Auto Provisioning on Avaya IP Deskphones (1100-Series, 1200-Series, 2000-Series)

Multiple modes of configuration exist for provisioning an Avaya IP Deskphone (1100-Series, 1200-Series, 2000-Series). A hierarchy must be employed for configuration information. The hierarchy, as shown below, will aid in resolution in the case of any conflict due to parameter settings from multiple sources.

- Manual Configuration
- Provision Server - device specific
- Provision Server – zone specific
- Provision Server – model/type specific
- Provision Server – system specific
- LLDP
- DHCP (Nortel-i2004-B)
- DHCP (Nortel-i2004-A)
- UNIStim(for some specific device / network parameters only)
- Last value received
- Factory default

More details on each of these mechanisms is provided in the following sections.

4.1.1 Provisioning Server – Using TFTP/HTTP/HTTPS

If a provision server is deployed, the IP phone receives the provision server address via DHCP Option 66, the *prov* parameter via DHCP (Nortel-i2004-B) extended option, or via manual configuration on the phone itself. An IP phone can be configured via a combination of different files from a provisioning server. For example, you may only have a *system.prv* file which includes a generic configuration and then have an *1140E.prv* to enable Bluetooth. When the phone sees the server address or URL prefixed with "http://", it knows to connect to an HTTP server and retrieve the files using HTTP as apposed to TFTP. Auto provisioning is supported on the IP Phone 2007, the IP Phone 1100 series, and the IP Phone 1200 series.

A summary of each type of provision file is as follows:

- System level file SYSTEM.PRV
    - System specific provisioning information
    - "file" parameter indicates which other files (if any) are to be downloaded via TFTP – line below indicates phone type (t), device (d) and zone (z) files should all be pulled via TFTP file=tdz;
- Model level file TTTT.PRV
    - Phone type specific provisioning information
    - For example – to turn on/off Bluetooth on all 1140E sets

- TTTT replaced by phone model, e.g. 1140e.prv
- 1110,1120E,1140E,1150E,2007,1210,1220,1230 as valid options

- Zone level file ZZZZZ.PRV
  - Zone specific provisioning information, where ZZZZZ is the one to eight character Zone ID
  - Zone ID can be set manually, via DHCP or via “zone” parameter in SYSTEM.PRV
- Device level file XXXXXXXXXXXXXXXX.PRV
  - Device specific provisioning information, where XX… is the MAC address of the device, i.e. 001365FEF$D4.prv

Please refer to Appendix A for a list of all the various parameters that can be provisioned.

With the delivery of UNIStim firmware release 3.0 or higher, the IP Phones will now accept a list of Node and TN values associated to a particular MAC address. The Node and TN value is assigned to an appropriate phone by the phone recognizing its own MAC address within the list of Node and TN values. If the phone’s MAC address is found in more than one valid association across the different .PRV files, the association that the phone ultimately accepts will be the one in the highest priority file. The precedence order of the .PRV files from highest priority to lowest is device, zone, type then system. The Node and TN provisioning string has the following format:

- reg=MACaddr, CallServerType, ConnectServer, NodeID, TN
  - *MACaddr*: delimiters in the MAC address can be dashes, colons, spaces, or any combination thereof.
  - *CallServerType*: Currently the implementation only support the CS 1000, thus the only supported CallServerType is CS1K
  - *ConnectServer*: Only values S1 and S1S2 are supported at this time
  - *NodeID*: The Node ID can be any number from 0 -9999.
  - *TN*: The same format is used for the Terminal Number as would be entered via the TN prompt on the phone’s display during registration. Two formats exist:

    Large system TN: “LLL-SS-CC-UU” or LLL SS CC UU”
    Small system TN: “CC-UU” or “CC UU”

    The following is an example of a valid Node and TN provision string that could be included in any .PRV file:

    reg=00:24:00:0D:8D:CD,CS1K,S1S2,600,096-0-0-01

An example of using hierarchal provision files using system, zone, and type provisioning files is as per the following:

system.prv

```
# System level provisioning file
# Applies to all phones
file=zt;                    # read <zone>.prv and <type>.prv
zone=headqrtr;              # Zone id
unid=Main-tower;            # Unique network identification
```

```
menulock=p;                 # Menu lock mode
vq=y;                       # Enable 802.1Q for voice
vcp=3;                      # 802.1Q control p bit for voice
vmp=4;                      # 802.1Q media p bit for voice
vlanf=y;                    # Enable VLAN filter
pc=y;                       # Enable PC port
pcs=a;                      # PC port speed
pcd=a;                      # PC port duplex
dq=y;                       # Enable 802.1Q for PC port
lldp=y;                     # Enable 802.1ab (LLDP)
pk1= ffffffffffffffff;      # force pk1 to ff SMC will update
pk2= ffffffffffffffff;      # force pk1 to ff SMC will update
stickiness=y;               # Enable stickiness
cachedip=n;                 # Enable cached IP
igarp=n;                    # Ignore GARP
srtp=n;                     # Enable PSK SRTP
eap=peap;                   # Enable 802.1x (EAP)
eapid1=DEV1024;             # 802.1x (EAP) device ID 1
eapid2=TOW2234;             # 802.1X (EAP) device ID 2
eappwd=D3c6v5;              # 802.1x (EAP) password
cdiff=13;                   # DiffServ code point for control
mdiff=12;                   # DiffServ code point for media
prov=47.11.232.115;         # Provisioning server IP address
dns=47.11.20.20;            # Primary DNS server IP address
dns2=47.11.20.21;           # Secondary DNS server IP address
ct=20;                      # Contrast value
br=18;                      # Brightness value
blt=1;                      # Backlight timer
dim=y;                      # Enable dim
hd=w;                       # Headset type
bold=y                      # Enable font display in bold
```

headqrtr.prv

```
# Zone level provisioning file
# Applies to all phones within the headquarters zone
s1ip=47.11.62.20;           # Primary server IP address
p1=4100;                    # Primary server port number
a1=1;                       # Primary server action code
r1=10;                      # Primary server retry count
s2ip=47.11.62.21;           # Secondary server IP address
p2=4100;                    # Secondary server port number
a2=1;                       # Secondary server action code
r2=10;                      # Secondary server retry count
xip=47.11.62.147;           # XAS server IP address
xp=5000;                    # XAS server port number
xa=g;                       # XAS server action code
```

1140E.prv

```
# Type level provisioning file specific to IP Phone 1140E
# Applies to all IP Phone 1140E within the network
bt=y;                       # Enable Bluetooth
```

4.1.2 LLDP

Avaya 1100/1200/2000 Series IP Deskphones support IEEE 802.1AB Link Layer Discovery Protocol (LLDP). For more information on LLDP, please refer to section 4.4. An 1100/1200/2000 Series IP Deskphone initiates LLDP after receiving an LLDPDU message from an appropriate system.

Once initiated, the 1100/1200/2000 Series IP Deskphones send an LLDPDU every 30 seconds with the following content.

Category	TLV Name (Type)	TLV Info String (Value)
Basic Mandatory	Chassis ID	IPv4 Address of IP Deskphone
Basic Mandatory	Port ID	MAC address of the IP Deskphone
Basic Mandatory	Time-To-Live	180 seconds.
Basic Optional	Port Description	“Avaya IP Phone”
Basic Optional	System Description	“Avaya IP Telephone” plus model number plus firmware version
Basic Optional	System Capabilities	Bit 2 (Bridge) is set and Bit 5 (Telephone) is set.
Basic Optional	VLAN Name	If the voice or data VLAN is configured, the Deskphone will transmit respectively one or two VLAN Name TLVs. The VLAN name field will be set to “data” and “voice” accordingly.
Basic Optional	Protocol Identity	Three TLVs are transmitted: • One for STP: Protocol identity = the first 8 bytes of an STP PDU starting with the Ethertype field. • One for 802.1x: Protocol identity= 0x888E – the 802.1x Ethertype • One for LLDP: Protocol identity= 0x88CC – the LLDP Ethertype
Basic Optional	Maximum Frame Size	1552
IEEE 802.3 Organization Specific	MAC / PHY Configuration/Status	Reports autonegotiation status and speed of the uplink port.
TIA LLDP MED	LLDP-MED Capabilities	Media Endpoint Discovery – Class III – IP Telephone
TIA LLDP MED	Extended Power-via-MDI	Maximum power usage of the IP Deskphone plus all modules and adjuncts powered by the IP Deskphone in tenths of a watt.
TIA LLDP MED	Network Policy	Tagging Yes/No, VLAN ID for voice, L2 Priority, DSCP Value
TIA LLDP MED	Inventory – Firmware Revision	Software version being used

Category	TLV Name (Type)	TLV Info String (Value)
TIA LLDP MED	Inventory – Manufacturer Name	Avaya-xy were xy is a 2-digit manufacturer code
TIA LLDP MED	Inventory – Model Name	String containing the IP Deskphone model name.
Basic Mandatory	End-of-LLDPDU	Not applicable

On receipt of a LLDPDU message, the Avaya IP Deskphone 1600/9600 Series IP Deskphone will act on the TLV elements as described below.

TLV Name	Impact
IEEE 802.1 VLAN Name	Use the received VLAN ID, L2 Priority and DSCP values to program the phone
MED Network Policy	Use the received VLAN ID, L2 Priority and DSCP values to program the phone. Has priority over any VLAN Name TLV.
MAC / PHY Configuration/Status	In case of a discrepancy in the settings of duplex mode, the Telephone does the following: • If duplex mode is in auto, force duplex mode to the received one, • If duplex mode is in full, i.e., manually configured, send the "Duplex mismatch" alarm to the call server,
Location Identification	Stored in the IP Deskphone for subsequent forwarding.

4.1.3 DHCP

The IP Phones can use DHCP to receive VLAN, network configuration parameters, and specific Connect Server parameters allowing for automatic configuration. All Avaya IP Phones use the text string *Nortel-i2004-A* or *Nortel-i2004-B* for provisioning Avaya network and Connect Server information and the string *VLAN-A* for provisioning 802.1Q VLAN information. The ASCII string is send inside the Class Identifier option of the IP Phone DHCP messages. The following table list the various IP Phone network configuration parameters requested by the IP Phone in the Parameter Request List option (Option Code 55) in the DHCPDISCOVERY and DHCPREQUEST messages

Parameters requested by IP Phone (Option Code 55)	**DHCP server response: Option Code**
Subnet mask – the client IP subnet mask	1
Router/gateway(s) — the client default gateway IP address (not required in DHCPOFFER in IP Phone Firmware 1.25 and later for compatibility with Novell DHCP server)	3
DNS Server IP	6
DNS domain	15
Lease time — implementation varies according to DHCP server	51
Renewal time — implementation varies according to DHCP server	58
Rebinding interval — implementation varies according to DHCP server	59
TFTP Server Name	66
IP Line site-specific or vendor-specific encapsulated or site options.	43, 128, 131, 144, 157, 188, 191, 205, 219, 223, 224, 227, 230, 232, 235, 238, 241, 244, 247, 249, 251, and 254
RFC 3942 states that DHCP site-specific options 128 to 223 are hereby reclassified as publicly defined options. The IP Phone supports 9 vender specific options in this range and continues to do so for backward compatibility. However, as suggested in RFC 3942, the use of these options is discouraged to avoid potential future collisions.	

Table 6: DHCP Response Codes

If auto provisioning for the Voice VLAN is enabled, the Voice VLAN ID is received from the DHCP *VLAN-A* option string typically from a DHCP response received from the DHCP server in the Data VLAN. Whereas, the *Nortel-i2004-A* and *Nortel-i2004-B* sections would typically contain DHCP response received from the DHCP server in Voice VLAN. If the *VLAN-A* option is also provided by the DHCP server in the Voice VLAN, the *VLAN-A* section in “DHCP Information” will not be updated. The Site Specific Option #191 pertains to the VLAN ID information that the IP Phone set will require for the voice VLAN. Note that the string always begins with VLAN-A where ‘A’ refers to the revision of the Avaya DHCP/VLAN specification

VLAN-A:vvvv.

Where: “VLAN-A” = Option #191 begins with this string for all Nortel IP phone sets
“vvvv” = The VLAN ID in Decimal

For example, enter the following in DHCP option 191 typically in the Data VLAN DHCP scope to inform an IP Phone to use VLAN 99 as the voice VLAN. There must be a colon (:) separating the Hardware Revision from the VLAN ID. The string must also end in a period (.)

- **VLAN-A:99.**

In firmware loads prior to UNIStim firmware release 2.2 for the IP Phone 2007, IP Phone 1110, IP Phone 1120E, IP Phone 1140E and IP Phone 1150E and prior to UNIStim firmware release 2.3 for the Phase II IP Phone 2001, 2002 and 2004 the IP Phones could obtain only limited provisioning parameters via Nortel specific DHCP text string *Nortel-i2004-A* via DHCP option 128. The format of the String for Option #128 is as shown below. Note that the string always begins with *Nortel-i2004-A* where 'A' refers to the revision of the Nortel DHCP/VLAN specification. The IP Address must be separated from the port number by a colon (:). The parameters for the Primary (S1) and the Secondary (S2) Call Servers are separated by a semicolon (;). The string must end a period (.).

Nortel-i2004-A,iii.iii.iii.iii:ppppp,aaa,rrr;iii.iii.iii.iii:ppppp,aaa,rrr.

Where

"Nortel-i2004-A"	= Option #128 begins with this string for all Nortel IP phone sets
"iii.iii.iii.iii"	= the IP Address of the Call Server (S1 or S2)
"ppppp"	= port number for the Call Server
"aaa"	= the Action for the Server
"rrr"	= the Retry Count for the Server

For example, enter the following via DHCP Option 128 to configure a Nortel IP Phone to use Call Server S1 IP address of *10.30.30.20*, Call Server S2 IP address of *10.30.31.20*, S1 and S2 port number of *4100*, S1 and S2 action of *1*, and S1 and S2 retry of *5*:

Nortel-i2004-A,10.30.30.20:4100,1,5:10.30.31.20:4100,1,5.

With the introduction of the UNIStim firmware release 2.2 and greater for the IP Phone 2007, IP Phone 1110, IP Phone 1120E, IP Phone 1140E and IP Phone 1150E, and UNIStim firmware release 2.3 and greater for the Phase II IP Phone 2001, 2002 and 2004, a new Nortel specific option type was introduced ("Nortel-i2004-B"). The Nortel-i2004-B specific option type expands the number of parameters that can be provisioned to include all those previously provisioned in the existing option type of Nortel-i2004-A, plus more. The existing option type of Nortel-i2004-A will continue to be supported for backward compatibility. In fact, the new firmware will accept both option types, although it is recommended to either remain with the existing option type or move to the new option type, but not both. In the event that the IP Phone receives both option types, values provisioned with the new option type of Nortel-i2004-B will have a higher priority than values provisioned with the old option type Nortel-i2004-A. Please refer to Appendix A for a list of all the various parameters that can be provisioned.

In the case of Expanded DHCP Options the DHCP private options 128, 131, 144, 157, 188, 191, 205, 219, 223, 224, 227, 230, 232, 235, 238, 241, 244, 247, 251 or 254 can be used – so there is wider choice than in the case of Default DHCP Options. Another change with Expanded DHCP Options is that multiple options can be used to pass information – this is necessary as the theoretical maximum size otherwise exceeds what is allowed for any one DHCP option.

In the case of Expanded DHCP Options and multiple options being used, if information is repeated in a later option then it will take precedence over what came in an earlier option.

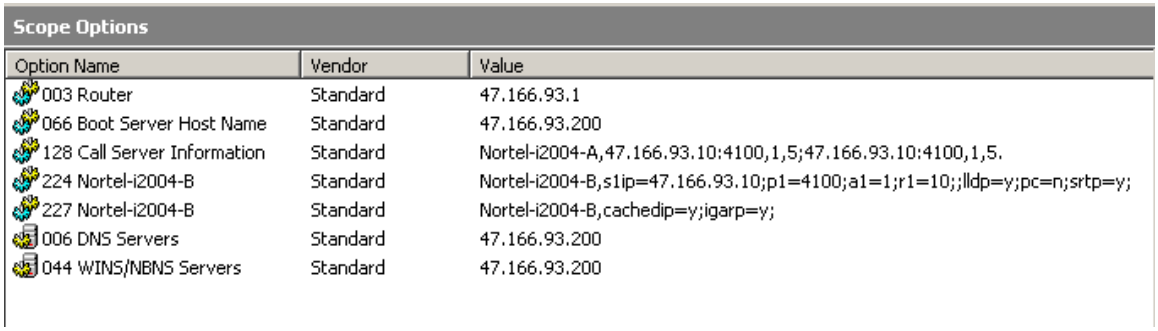
The priority rules are:

- "Nortel-i2004-B" option's priority is higher than the "Nortel-i2004-A" option's.

- Vendor specific DHCP options' priorities are higher than the site specific DHCP options'.
- The option with lower DHCP option number has higher priority than the option with higher DHCP option number.
- In the same DHCP option, the rear sub-string has higher priority than the front sub-string.

Setup of the DHCP server is very similar to what is done for the Default DHCP Options. The Predefined Options still need to be defined initially and then enabled for the scope, using the choice of private options as noted above.

The main change comes in defining the string for the Call Server information in the case of Expanded DHCP Options, as the format is different. The Default DHCP Options uses the string Nortel-i2004-A at the start of the DHCP option string; the Expanded DHCP Options uses the string Nortel-i2004-B instead. The screenshot below shows the DHCP server with two private options (#224 and #227) configured for the Expanded DHCP Options, in addition to the private earlier option (#128) for the Default DHCP Options.



The format of the Expanded DHCP option is obviously different to the earlier mode of operation; it is easier to understand as it consists of a series of "parameter=value" combinations, each followed by a semi colon.

Note that the string always begins with 'Nortel-i2004-B' where 'B' refers to the revision of the Nortel DHCP/VLAN specification.

Nortel-i2004-B,param=value;param=value;param=value; …

Where

"Nortel-i2004-B"	= the selected private option(s) for Expanded DHCP Options begins with this string for 1100 series (C4I upwards) or 1200 series IP sets
"param"	= a defined string representing one of the values that can be set via Expanded DHCP Options
"value"	= a valid value for the corresponding parameter

All parameters are separated by a semicolon (;). The string must end a semi colon (;).

As noted earlier, there can be multiple Nortel-i2004-B strings in order to pass the full range of parameters possible, which in theory could exceed (at 310 bytes) the maximum length allowed for any one DHCP option (255 bytes).

An example of the new Nortel-i2004-B Expanded DHCP Options is as follows.

Option 224

Nortel-i2004-B,s1=10.10.10.5;p1=4100;a1=1;r1=10;s2=10.10.10.10;p2=4100;a2=1;r2=10; menulock=p;pc=n;

Option 227

Nortel-i2004-B,cachedip=n;igarp=y;srtp=n;

There is no change in the operation of the Voice VLAN Auto Discovery process as part of Extended DHCP Options. That continues to use the same "VLAN-A" option type as with Default DHCP Options.

4.2 Auto Provisioning on Avaya IP Deskphones (1600-Series, 9600-Series)

Multiple modes of configuration now exist for provisioning an Avaya IP Deskphone (1600-Series, 9600 Series). A hierarchy must be employed for configuration information. The hierarchy, as shown below, will aid in resolution in the case of any conflict due to parameter settings from multiple sources.

- LLDP
- Manual Configuration
- DHCP
- HTTP/HTTPS script file
- Avaya Media Server
- Backup files

Settings the IP telephone receives from backup files or the media server overwrite any previous settings, including manual settings. The only exception to this sequence is in the case of VLAN IDs. In the case of VLAN IDs, LLDP settings of VLAN IDs are the absolute authority. Then the usual sequence applies through HTTP/HTTPS.

4.2.1 LLDP

Release 1.2 9600 Series IP Deskphones and Release 1.1 1600 Series IP Deskphones support IEEE 802.1AB Link Layer Discovery Protocol (LLDP). For more information on LLDP, please refer to section 4.4. A 1600/9600 Series IP Deskphone initiates LLDP after receiving an LLDPDU message from an appropriate system.

Once initiated, the 1600/9600 Series IP Deskphones send an LLDPDU every 30 seconds with the following content.

Category	TLV Name (Type)	TLV Info String (Value)
Basic Mandatory	Chassis ID	IPv4 Address of IP Deskphone
Basic Mandatory	Port ID	MAC address of the IP Deskphone
Basic Mandatory	Time-To-Live	120 seconds.

Category	TLV Name (Type)	TLV Info String (Value)
Basic Optional	System Name	The Host Name sent to the DHCP server in DHCP Option 12
Basic Optional	System Capabilities	Bit 2 (Bridge) is set if the IP Deskphone has an internal Ethernet switch. Bit 5 (Telephone) will be set in the System Capabilities. If Bit 5 is set in the Enabled Capabilities than the IP Deskphone is registered.
Basic Optional	Management Address	Mgmt IPv4 Address of IP Deskphone. Interface number subtype = 3 (system port). Interface number = 1. OID = SNMP MIB-II sysObjectID of the IP Deskphone.
IEEE 802.3 Organization Specific	MAC / PHY Configuration/Status	Reports autonegotiation status and speed of the uplink port.
TIA LLDP MED	LLDP-MED Capabilities	Media Endpoint Discovery – Class III – IP Telephone
TIA LLDP MED	Extended Power-via-MDI	Power Value = 0 if the IP Deskphone is not currently powered via PoE, elese the maximum power usage of the IP Deskphone plus all modules and adjuncts powered by the IP Deskphone in tenths of a watt.
TIA LLDP MED	Network Policy	Tagging Yes/No, VLAN ID for voice, L2 Priority, DSCP Value
TIA LLDP MED	Inventory – Hardware Revision	MODEL – Full Model Name
TIA LLDP MED	Inventory – Firmware Revision	BOOTNAME
TIA LLDP MED	Inventory – Software Revision	APPNAME
TIA LLDP MED	Inventory – Serial Number	IP Deskphone serial number
TIA LLDP MED	Inventory – Manufacturer Name	Avaya
TIA LLDP MED	Inventory – Model Name	MODEL with the final D***xxx*** characters removed.
Avaya Proprietary	PoE Conservation Level Support	Provides Power Conservation abilities/settings, Typical and Maximum Power values OUI = 00-40-0D (hex), Subtype = 1
Avaya Proprietary	Call Server IP Address	Call Server IP Address Subtype = 3
Avaya Proprietary	IP Phone Addresses	Phone IP Address, Phone Address Mask, Gateway IP Address Subtype = 4
Avaya Proprietary	CNA Server IP Address	CNA Server IP Address = in-use value from CNASRVR Subtype = 5
Avaya Proprietary	File Server	File Server IP Address Subtype = 6
Avaya Proprietary	802.1Q Framing	802.1Q Framing = 1 if tagging or 2 if not Subtype = 7
Basic Mandatory	End-of-LLDPDU	Not applicable

On receipt of a LLDPDU message, the Avaya IP Deskphone 1600/9600 Series IP Deskphone will act on the TLV elements as described below.

System Paramater Name	TLV Name	Impact
PHY2VLAN	IEEE 802.1 Port VLAN ID	System value changed to the Port VLAN identifier in the TLV
L2QVLAN and L2Q	IEEE 802.1 VLAN Name	The system value is changed to the TLV VLAN Identifier. L2Q will be set to 1 (ON). VLAN Name TLV is only effective if: • The telephone is not registered with the Call Server. • Name begins with VOICE (case does not matter). • The VLAN is not zero. • DHCP Client is activated. • The telephone is registered but is not tagginglayer 2 frames with a non-zero VLAN ID. If VLAN Name causes the telephone to change VLAN and the telephone already has an IP Address the telephone will release the IP Address and reset. If the TLV VLAN ID matches the VLAN ID the telephone is using, the VLAN ID is marked as set by LLDP. Otherwise, if already registered, the telephone waits until there are no active calls, releases its IP Address, turns on tagging with the TLV VLAN ID, sets L2Q to "on," changes the default L2Q to "on," and resets. If there is no valid IP Address, the telephone immediately starts tagging with the new VLAN ID without resetting.
L2Q, L2QVLAN, L2QAUD, L2QSIG, DSCPAUD, DSCPSIG	MED Network Policy TLV	L2Q - set to “2” (off) If T (the Tagged Flag) is set to 0; set to “1” (on) if T is set to 1. L2QVLAN - set to the VLAN ID in the TLV. L2QAUD and L2QSIG - set to the Layer 2 Priority value in the TLV. DSCPAUD and DSCPSIG - set to the DSCP value in the TLV. A check is made as to whether a reset is necessary to obtain a new IP address due to a change in the values of the parameters L2Q or L2QVLAN. This TLV is ignored if: • the value of USE_DHCP is “0” and the value • of IPADD is not “0.0.0.0”, or • the Application Type is not 1 (Voice), or • the Unknown Policy Flag (U) is set to 1.

System Paramater Name	TLV Name	Impact
MCIPADD	Proprietary Call Server TLV	MCIPADD will be set to this value if it has not already been set. *NOT USED WITH SIP IP DESKPHONE.*
TLSSRVR and HTTPSRVR	Proprietary File Server TLV	TLSSRVR and HTTPSRVR will be set to this value if neither of them have already been set.
L2Q	Proprietary 802.1 Q Framing	The default L2Q is set to the value of this TLV. No change is made to the current L2 tagging, but the new default value is used on the next reboot. If TLV = 1, L2Q set to "1" (On). If TLV = 2, L2Q set to "2" (Off). If TLV = 3, L2Q set to "0" (Auto).
	Proprietary – PoE Conservation TLV	This proprietary TLV can initiate a power conservation mode. The telephones that support this will turn on/off the telephone backlight and the backlight of an attached Button Module in response to this TLV. Exception: the 9670G display backlight is put into low-power mode rather than being turned off.
	Extended Power-via-MDI	Power conservation mode will be enabled if the received binary Power Source value is 10, and power conservation mode will be disabled if the received binary Power Source value is not 10. Power conservation mode is enabled even if the telephone is not powered over Ethernet because the telephone sends information about the power source that it is using in a TIA LLDP MED Extended Power-Via-MDI TLV; it is assumed that the power management system intends to conserve local power as well.

4.2.2 DHCP

Dynamic Host Configuration Protocol (DHCP) minimizes maintenance for a 1600/9600 Series IP Deskphone network by removing the need to individually assign and maintain IP addresses and other parameters for each IP Deskphone on the network.

The DHCP server provides the following information to the 1600/9600 Series IP Deskphones:

- IP address of the 1600/9600 Series IP Telephone(s)
- IP address of the Gatekeeper board on the Avaya Media Server
- IP address of the HTTP or HTTPS server
- The subnet mask
- IP address of the router

- DNS Server IP address

Administer the LAN so each IP Deskphone can access a DHCP server that contains the IPaddresses and subnet mask.

Parameters requested by IP Phone (Option Code 55)	**DHCP server response: Option Code**
Subnet mak	1
Gateway (router) IP Address(es) If using more than one address, the total list can contain up to 255 total ASCII characters. You must separate IP addresses with commas with no intervening spaces.	3
DNS Server(s) address list If using more than one address, the total list can contain up to 127 total ASCII characters. You must separate IP addresses with with no intervening spaces. At least one address in Option 6 must be a valid, non-zero, dotted decimal address.	6
Host name Value is ***AVohhhhhh***, where: **o** is “A” if the OID (first three octets) of the MAC addressfor the telephone is 00-04-0D. “E” if the OID is 00-09-6E, “L” if the OID is 00-60-1D,and “X” if the OID is anything else and where *hhhhhh* are ASCII characters for the hexadecimal representation of the last three octets of the MAC address for the IP Deskphone.	12
DNS domain name	15
Lease time — implementation varies according to DHCP server	51
Overload option (if desired). If this option is received in a message, the IP Deskphone interprets the sname and file fields in accordance with IETF RFC 2132.	52
Renewal time — implementation varies according to DHCP server If not received or this value is greater than that for Option 51, the default value of T1 (renewal timer) is used.	58
Rebinding interval — implementation varies according to DHCP server If not received or this value is greater than that for Option 51, the default value of T2 (rebinding timer) is used.	59
Vendor Class identifier The default value is “ccp.avaya.com”.	60
Vendor-specific encapsulated or site options. Refer to Appendix B-E for DHCP Configurable Paramaters.	242

4.2.3 Provisioning Server – Using HTTP or HTTPS

Avaya 1600/9600 IP Deskphones can retrieve application software, script file, and settings file from an HTTP/HTTPS server. The addresses of the HTTP/HTTPS server must be provided to the IP Deskphone in DHCP Option 242 or via LLDP or manually configured. Avaya 1600/9600 IP Deskphones will request a “46xxsettings.txt” file and parse that file. Avaya maintains a current version of this file on http://www.avaya.com/support with all available paramaters. An example file is shown in Appendix E.

4.2.4 SNMP

The 1600/9600 Series IP Deskphones are fully compatible with SNMPv2c and with Structure of Management Information Version 2 (SMIv2). The Avaya custom MIB for the 1600/9600 Series IP Deskphones is available in *.txt format on the Avay support web site at http://www.avaya.com/support.

4.3 Auto Detection and Auto Configuration (ADAC) of Avaya IP Phones

ADAC can be used to automatically discover an IP Phone set either via MAC addresses or LLDP. In addition, ADAC can be used with 802.1AB LLDP-MED to inform an IP Phone with the Voice VLAN ID and QoS values

ADAC detection by MAC address works by checking the MAC address of the IP phone against a MAC address range pre-configured on the switch. With the availability of ADAC detection by LLDP, Avaya no longer recommends the use of ADAC detection by MAC.

4.3.1 ADAC Operating Modes

ADAC can also be configured to automatically assign a port to a voice VLAN. The voice VLAN is an independent VLAN leaning (IVL) port-based VLAN that can be applied to either tagged or untagged ports with the following modes of operation:

- Untagged Basic Mode
  - No VLAN auto configuration will be applied
  - ADAC Call Server or Uplink Port is not used
  - The customer can create and configure the VLAN independently
  - The IP Phone must be configured to send untagged frames
  - QoS configuration is applied
  - Auto-Configuration is applied only when a Avaya IP Phone is detected on a port
- Untagged Advanced Mode
  - Voice VLAN is created
  - Call server port (if any)
    - Membership = add to Voice-VLAN
    - Tagging = UntaggedAll
    - PVID = Voice-VLAN
    - Up to 8 call server ports are now supported starting with release 5.4 for the ERS 4500 and 6.2 for the ERS 5000
  - Uplink port (if any):
    - Membership = add to Voice-VLAN
    - Tagging = UntaggedAll
    - PVID = no change
    - Up to 8 uplink ports are now supported starting with release 5.4 for the ERS 4500 and 6.2 for the ERS 5000
  - Telephony port
    - Membership = remove from all other VLANs and add to Voice VLAN

        - Tagging = UntaggedAll
        - PVID = Voice-VLAN
    - Port and PVID are assigned to Voice VLAN when phone is detected.
    - The IP Phone must be configured to send untagged frames
    - QoS configuration is applied
    - Auto-Configuration is applied only when a Avaya IP Phone is detected on a port
    - When ADAC is disabled, the port is placed back into the previously configured VLAN
- Tagged Frames
    - IP Phone are pre-configured to send *tagged* traffic
    - Voice VLAN is configured
    - Telephony port:
        - Membership = add to Voice-VLAN
        - Tagging = UntaggedPVIDOnly
        - PVID = unchanged or changed to DefaultVLAN (1) if equals Voice-VLAN
    - Call Server port (if any):
        - Membership = add to Voice-VLAN
        - Tagging = UntaggedAll
        - PVID = Voice-VLAN
    - Uplink port (if any):
        - Membership = add to Voice-VLAN
        - Tagging = TaggedAll
        - PVID = no change
- Tagged mode
    - Voice traffic is tagged from the IP phone must be configured with the VLAN ID of the Voice VLAN
    - QoS configuration is applied
    - Auto-Configuration is applied only when a Avaya IP Phone is detected on a port

- Initial User Settings

When configuring ADAC, you must set the ADAC operation mode using one of the three operation modes mentioned above according to if the IP Phones are configured to send tagged or untagged frames. If you select either Untagged Advanced or Tagged mode, you must also supply the voice VLAN ID and at least one of the following:

- Call Server port, if it is connected directly to the switch
- Uplink port, if used
  - If you select Uplink port, this will enable tagging on the specified uplink port with a VLAN ID of the voice VLAN.

4.3.2 QoS Settings

Overall, ADAC QoS configuration will be applied to:

- traffic coming from the IP Phones
- traffic coming from the Call Server port
- traffic coming from the Uplink port

Auto QoS and 802.1AB MED Interopability

- Starting with release 5.4 for the ERS 4500 and 6.2 for the ERS 5000, the LLDP-MED network policy will be automatically be altered to match the Automatic QoS value if Automatic QoS is enabled
- Previously, when you enabled Automatic QoS, the LLDP-MED values where defined by the network policy

ADAC Port Restrictions

The following applies to the Call Server, Uplink, and Telephony ports:

The Call Server port must not be:

- part of a trunk (MLT, LAG)
- a Monitor Port in port mirroring
- a Telephony port
- the Uplink port

The Uplink port must not be:

- a Monitor Port in port mirroring
- a Telephony port
- the Call Server port

The Telephony port must not be:

- part of a trunk (MLT, LAG)
- a Monitor Port in port mirroring
- an IGMP static router port

- the Call Server port
- the Uplink port

To support Auto Configuration on an Avaya IP Phone, an ADAC port must be configured as *untagPvidOnly* with a default PVID belonging to the data VLAN even though ADAC is configured with operation mode of Tagged. This will allow support for an IP Phone with Auto Configuration and a data device on the same port. The data device will be put in an untagged data VLAN and the IP Phone will be put into a different tagged voice VLAN.

For ADAC MAC Detection to work, you must disable unregistered frames on the ERS2500, ERS4500, and ERS5000 series.

4.3.3 ADAC Configuration

ADAC can be configured by either using CLI (CLI or PPCLI on ERS8300), using EDM (Enterprise Device Manager), or by using Java Device Manager (JDM).

4.3.3.1 ADAC Global Settings

CLI

Via the privileged configuration terminal mode, the following command is used to enable ADAC:

Use the following command to view the various ADAC options:

```
ERS-Stackable(config)#adac ?

       Parameters:
         call-server-port  Set call server port
         enable            Enable ADAC
         op-mode           Set ADAC operation mode
         traps             Enable ADAC notifications
         uplink-port       Set uplink port
         voice-vlan        Set Voice-VLAN
       Sub-Commands/Groups:

         mac-range-table  Add new supported MAC address range
```

Use the following command to disable ADAC:

```
ERS-Stackable(config)#no adac enable
```

EDM

Go to ***Configuration -> Edit -> ADAC***

Where:

Item	Description
call-server-port	Sets Call Server port. Depending on the switch and software version used, up to 8 call-server ports are supported.
enable	Enables ADAC on the switch.
op-mode	Sets the ADAC operation mode to one of the following: • untagged-frames-basic: IP Phones send untagged frames and the Voice VLAN is not created • untagged-frames-advanced: IP Phones send untagged frames and the Voice VLAN is created • tagged-frames: IP Phones send tagged frames
traps	Enables ADAC trap notifications.
uplink-port	Sets the Uplink port(s). Depending on the switch and software version used, up to 8 uplinks are supported.
voice-vlan	Sets the Voice VLAN ID. The assigned VLAN ID must not previously exist.
mac-range-table	Sets a new MAC addresses range used by ADAC to auto detect IP Phone sets. NOTE: this option is only available for the ERS5500 series.

4.3.3.2 ADAC Interface settings

CLI

ERS-Stackable: Use the following command to view the various ADAC options:

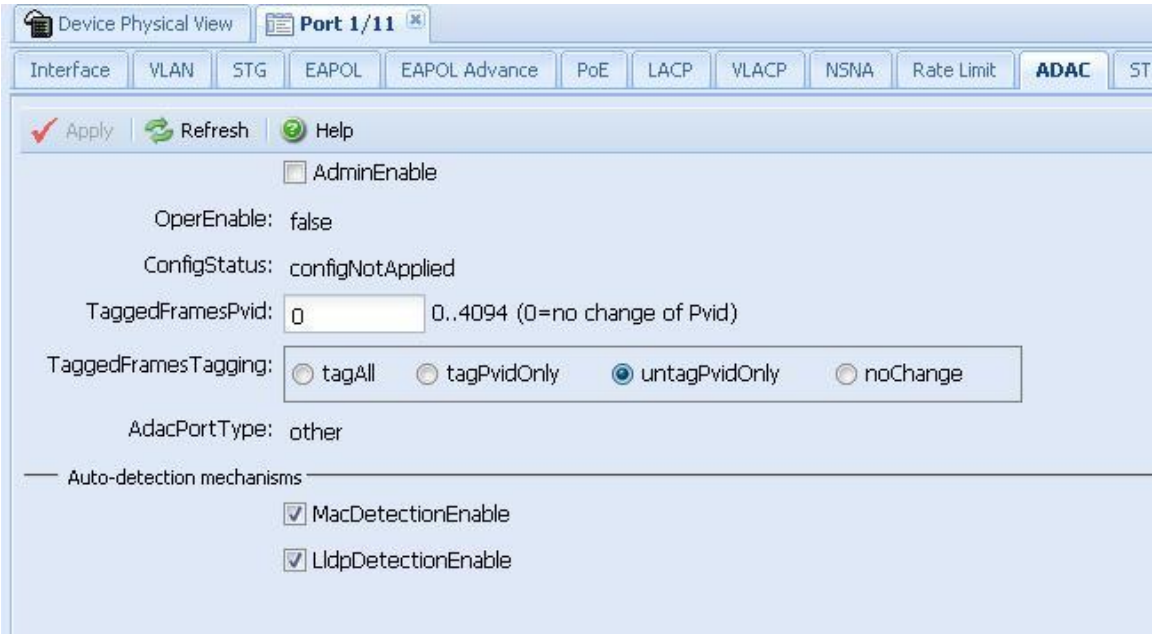
```
ERS-Stackable(config)#interface fastEthernet all

(config-if)#adac ?

 Parameters:
    enable                 Enable auto-detection on ports
    port                   Port number(s) for which to change settings
    tagged-frames-pvid     Set the PVID to be configured for telephony ports in
                           Tagged Frames operating mode
    tagged-frames-tagging  Set the tagging to be configured for telephony ports
                           in Tagged Frames operating mode
  Sub-Commands/Groups:
    detection  Enable detection mechanisms on ports
```

ERS-Stackable: Use the following command to view the various ADAC detection options:

```
ERS-Stackable(config)#interface fastEthernet all

ERS-Stackable(config-if)#adac detection ?

 Parameters:
    lldp  Enable 802.1ab-based detection on ports
    mac   Enable MAC-based detection on ports
    port  Port number(s) for which to change settings
```

EDM

Go to *Device Physical View* -> right-click port(s) and select *Edit -> ADAC*



Where:

Item	Description
enable	Enables ADAC on the port or ports listed.
port <*portlist*>	Ports to which to apply the ADAC configuration.
tagged-frames-pvid <1-4094> | no-change	Sets Tagged-Frames PVID on the port or ports listed. Use no-change to keep the current setting.
tagged-frames-tagging tagAll | tagPvidOnly | untagPvidOnly | no-change	Sets Tagged-Frames Tagging to • tagAll • tagPvidOnly • untagPvidOnly Use no-change to keep the current setting.
ADAC Dectection variable	Specifies the ADAC detection method for either MAC or LLDP. The default setting is MAC.

4.3.3.3 ADAC Support on Avaya Products

Model	Software Release	ADAC					
		Detection		LLDP-MED	Voice VLAN Tagging		
		MAC	LLDP		Untag only	Tag only	Untag default VLAN and tag Voice VLAN
ERS2500	4.1	√[1]	√[2]		√	√	√
	4.2	√[1]	√	√	√	√	√
ERS4500	5.1	√[1]	√[2]		√	√	√
	5.2	√[1]	√	√	√	√	√
ERS5500	5.0	√[1]			√	√	√
	5.1	√[1]	√	√	√	√	√
ERS 5600	6.0	√[1]	√	√	√	√	√

[1]Requires filter unregistered frames to be disabled

Table 7: ADAC Support on Avaya Switches

4.4 Link Layer Discovery Protocol (IEEE 802.1AB)

IEEE 802.1AB LLDP is a Layer 2 neighbor discovery protocol. It defines a standard method for Ethernet network devices such as switches, routers and IP Phones to advertise information about themselves to other nodes on the network and store the information they discover.

LLDP was formally ratified as IEEE standard 802.1AB-2005 in May 2005.

LLDP defines

- a set of common advertisement messages,
- a protocol for transmitting the advertisements and
- a method for storing the information contained in received advertisements.

The LLDP lets network management systems accurately discover and model physical network topologies. As LLDP devices transmit and receive advertisements, the devices will store information they discover about their neighbors. Details such as device configuration, device capabilities and device identification can be advertised using this protocol.

LLDP can be used as a useful management tool – particularly for heterogeneous networks – by providing accurate network mapping, inventory data and network troubleshooting information. LLDP enables Ethernet network devices to inform each other about their configurations. A miss-configuration can be easily detected and with suitable configuration management can be rectified.

Presently today, IP Phones do not have any SNMP or SONMP agent. Providing LLDP support in the phone, allows the phones to exchange information between the phone and the L2/L3 data switch to which it is attached. This allows the phone and the switch to exchange capabilities and for a network administrator to have a more complete view of the network infrastructure. LLDP exchange between the IP Phone and the data switch allows for the following:

- VLAN assignment
- QoS assignment
- Duplex mismatch errors
- Topology Recognition
- Inventory Management
- Basis for e911 location services – Nortel working group
- Proprietary TLV – 802.1AB is flexible enough to define additional TLVs

4.4.1 Protocol Behavior

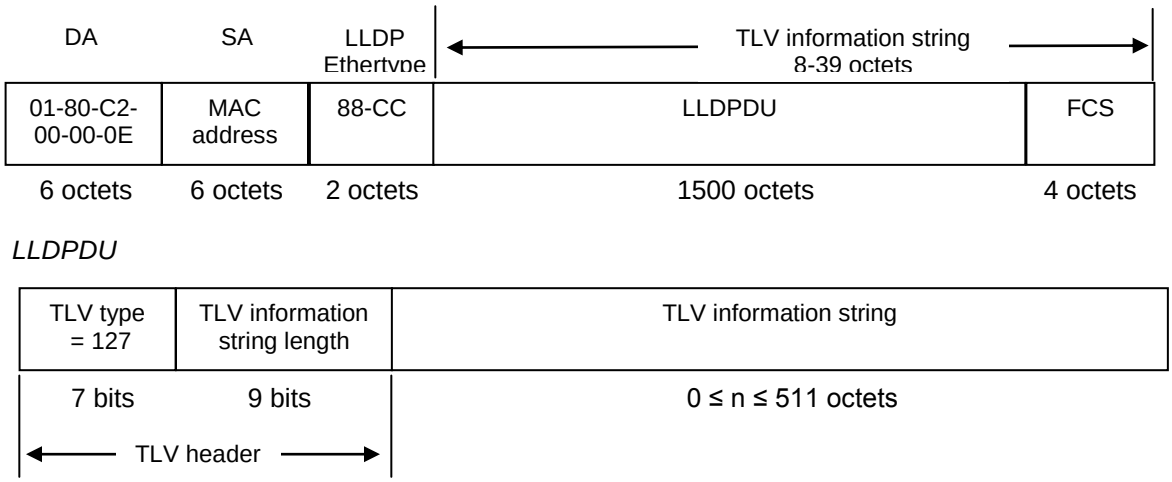


Figure 10: IEEE 802.3 LLDP frame format

LLDPPDUs are transmitted with a multicast destination address specially identified for LLDPDU. The LLDP-Multicast address is 01-80-C2-00-00-0E. An LLDPDU is identified based on the Ethertype (Hexadecimal 88-CC) value carried in the MAC header. The neighboring devices do not acknowledge LLDP information received from a device.

LLDP information is transmitted periodically and stored for a finite period. IEEE has defined a recommended transmission rate of 30 seconds, but the transmission rate is adjustable. LLDP devices, after receiving an LLDP message from a neighboring network device, will store the LLDP information in a Management Information Base (MIB). LLDP information is stored in the MIB and is valid for a period of time defined by the LLDP Time to Live (TTL).

An LLDP agent can operate in any of the following three modes:

1. Transmit-only mode: The agent can only transmit the information about the capabilities and the current status of the local system.
2. Receive-only mode: The agent can only receive information about the capabilities and the current status of the remote systems.
3. Transmit and receive mode: The agent can transmit the local system capabilities and status information and receive remote system's capabilities and status information.

The TIA extensions require a device claiming conformity with this protocol to implement both transmits and receive mode.

TLV Type	TLV Sub Type	TLV Name	Usage in LLPDU
0		End of LLDPDU	Mandatory
1		Chassis ID	Mandatory
2		Port ID	Mandatory
3		Time to Live	Mandatory
4		Port Description	Mandatory
5		System Name	Optional
6		System Description	Optional
7		System Capabilities	Optional
8		Management Address	Optional
9-126		Reserved for future utilization	NA
127		Organizational specific TLVx	Optional

Table 8: TLV Type Values

4.4.2 Mandatory TLVs

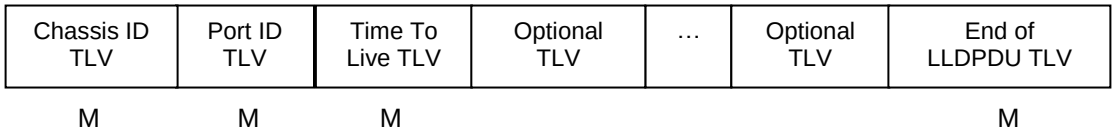


Figure 11: LLDPDU Frame Format

The following mandatory TLVs shall be included at the beginning of each LLDPDU and shall be in the following order

1. Chassis ID TLV - Identifies the 802 LAN device's chassis,
2. Port ID TLV - Identifies the port from which the LLDPDU is transmitted,
3. Time-to-Live TLV - Indicates how long the received data is valid,
4. End-of-LLDPDU TLV - Indicates the end of TLVs in the LLDPDU and shall be the last TLV in the LLDPDU

Optional TLVs as selected by network management may be inserted in any order.

4.4.3 Optional TLVs

The optional TLVs provide various details about the LLDP agent advertising them. The LLDP agent can advertise one or more of these TLVs in addition to the mandatory TLVs. The optional TLVs defined as part of LLDP are grouped into two sets: Basic Management and Organizationally Specific extensions. Currently the latter set includes three subsets: IEEE 802.1 extensions, IEEE 802.3 extensions, and TIA Media Endpoint Discovery extensions.

4.4.4 Basic Management TLVs

This set includes the following five TLVs:

1. **Port description TLV**:
   Provides a description of the port in an alpha-numeric format.
2. **System name TLV**:
   Provides the system's assigned name in an alpha-numeric format.
3. **System description TLV**:
   Provides a description of the network entity in an alpha-numeric format.
4. **System capabilities TLV**:
   Indicates the primary function(s) of the device such as Repeater, Bridge, WLAN AP, Router, or Telephone.
5. **Management address TLV**:
   Indicates the addresses of the local LLDP agent. Other remote managers can use this address to obtain information related to the local device.

4.4.5 IEEE Organization Specific TLV

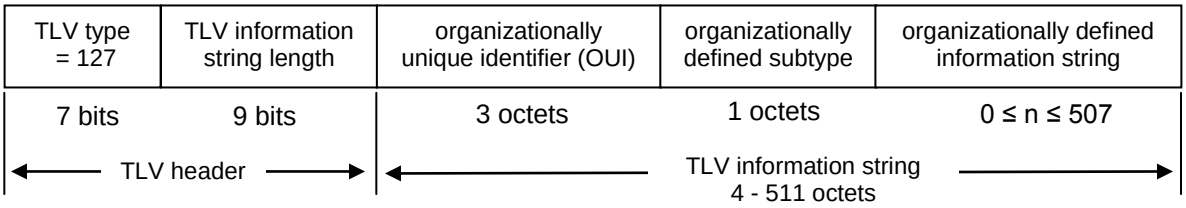


Figure 12: Organizationally Specific TLV Format

This TLV category is provided to allow different organizations, such as IEEE 802.1, IEEE 802.3, IETF, as well as individual software and equipment vendors, to define TLVs that advertise information to remote entities attached to the same media.

	OUI	TLV SubType	TLV Name	Usage in LLDPDU
802.1	00-80-C2	1	Port VLAN ID	Mandatory
	00-80-C2	2	Port & Protocol VLAN ID	Mandatory
	00-80-C2	3	VLAN Name	Mandatory
	00-80-C2	4	Protocol Identity	Mandatory
	00-80-C2	0, 5-255	Reserved	-
802.3	00-12-0F	1	MAC/PHY configuration/status	Mandatory
	00-12-0F	2	Power via MDI	Mandatory
	00-12-0F	3	Link Aggregation	Mandatory
	00-12-0F	4	Maximum Frame Size	Mandatory
	00-12-0F	0, 5-255	Reserved	-

Table 9: Organizational TLV

IEEE 802.1 Organizational Specific TLV Set

This group includes the following four TLVs:

1. **Port VLANID TLV**:
   The PVID that will be associated with an untagged or priority tagged data frame received on the VLAN port.
2. **PPVLAN ID TLV**:
   The PPVID that will be associated with an untagged or priority tagged data frame received on the VLAN port.
3. **VLAN name TLV**:
   The assigned name of any VLAN at the device. The number of VLAN name TLVs in an LLDPDU corresponds to the number of VLANs enabled at the port.
4. **Protocol identity TLV**:
   The set of protocols that is accessible at the device's port.

IEEE 802.3 Organizational Specific TLV Set

This set includes the following four TLVs:

1. **MAC/PHY configuration/status TLV**:
   Duplex and bit rate capability and the current duplex and bit rate settings of the sending device. It also indicates whether the current settings are due to auto-negotiation or due to manual configuration.
2. **Power via media dependent interface (MDI) TLV**:
   The power support capabilities of the LAN device.
3. **Link aggregation TLV**:
   Indicates whether the link (associated with the port on which the LLDPDU is transmitted) can be aggregated
4. **Maximum frame size TLV**: The maximum frame size capability of the devices MAC and PHY implementation.

4.4.6 TIA LLDP-MED Extensions

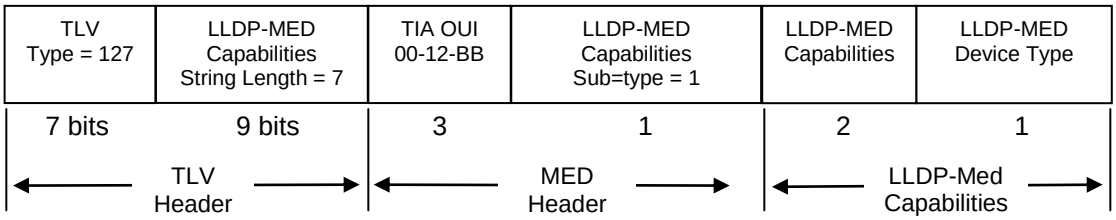


Figure 13: LLDP-MED TLV Format

OUI	TLV SubType	TLV Name	NCD	ED I	ED II	ED III
00-12-BB	1	LLDP-MED Capabilities	M	M	M	M
	2	Network Policy	C	O	M	M
	3	Location Identification	C			O
	4	Extended Power-via-MDI	C	C	C	C
	5	Inventory – Hardware Revision	Optional TLV Set Recommended when device does not support SNMP			
	6	Inventory – Firmware Revision				
	7	Inventory – Software Revision				
	8	Inventory – Serial Number				
	9	Inventory – Manufacturer Name				
	10	Inventory – Model Name				
	11	Inventory – Asset ID				
	12-255	Reserved				

Table 10: LLDP MED TLV

The Telecommunications Industry Association (TIA) has developed an extension to LLDP for VoIP networks. VoIP-related extensions to LLDP, known as LLDP - Media Endpoint Discovery (LLDP-MED) enable media devices to transmit and receive media related information.

In addition to expanding the LLDP TLVs, LLDP-MED requires certain optional LLDP TLVs to be transmitted as mandatory information by media endpoints. Currently the TIA has defined the following TLVs:

1. **Capabilities Discovery TLV**:
   Indicates which MED capabilities are supported,
2. **Network Policy Discovery TLV**:
   Advertises the VLAN configuration and QoS attributes,
3. **Location Identification Discovery TLV**:
   Advertises location information,
4. **Extended Power-via MDI Discovery TLV**:
   Advertises power requirements,
5. **Inventory Management Discovery TLVs**:
   Provide HW/firmware/SW revision, serial number, manufacturer/model name, and asset ID.

4.4.7 LLDP Support on Avaya Switches

Switch	802.1AB core (mandatory TLVs)	ORGANIZATIONAL TLVs (802.1 and 802.3)	LLDP-MED TLVs
ES 325/425	V 3.6	-	-
ES 470	V 3.7	-	-
ERS 2500	V4.1	V4.2	V 4.2
ERS 4500	V 5.1	V 5.1	V 5.2
ERS 5500	V 5.0[1]	V 5.0[12]	V 5.0[1]
ERS 5600	V 6.0	V 6.0	V 6.0
ERS 8300	v 2.3.1	v 3.0[1,3]	V 3.0[4]

[1] Supported on a port configured with both a untagged data VLAN and tagged voice VLAN

[2] The ERS55xx can send two LLDP VLAN Name packets, one for a Data VLAN and another for a Voice VLAN. To do so, you must name the Data VLAN as “data” and the Voice VLAN as “voice”. The VLAN name is not case-sensitive. The LLDP VLAN Name packet will contain the VLAN name and VLAN ID.

[3] The ERS8300 only sends one LLDP VLAN Name packet. If a Voice VLAN is either not configured or not named “voice”, the ERS8300 will send one LLDP VLAN Name packet providing you name a VLAN as “data”. The LLDP VLAN Name packet will contain the name “data” and the VLAN ID. Otherwise, if you name a VLAN as “voice”, the ERS8300 will only send one LLDP VLAN Name packet which will contain the name “voice” and the VLAN ID.

[4] The ERS8300 supports LLDP-MED network policy as of release 4.2.3.0. For more details, please refer to the 4.2.3.0 release notes.

Table 11: LLDP Support on Avaya Switches

4.4.8 LLDP Configuration on Avaya IP Phone Sets and Switches

The IP Phone sets can be set up for LLDP Vlan Name or LLDP-MED Network Policy but not both.

4.4.9 LLDP VLAN Name

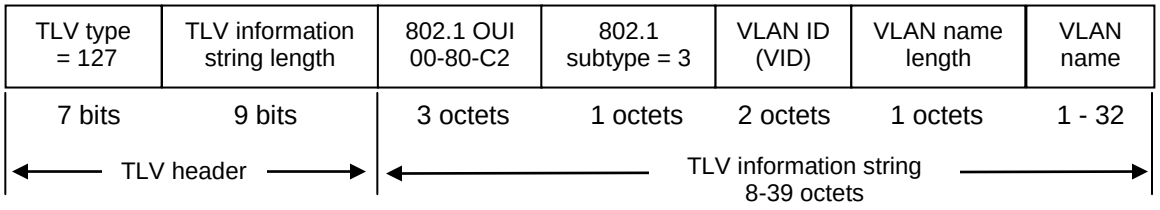


Figure 14: Organizational TLV SubType 3 TLV Frame Format

4.4.9.1 LLDP VLAN configuration on a Avaya Ethernet Switch

4.4.9.1.1 LLDP Interface level configuration

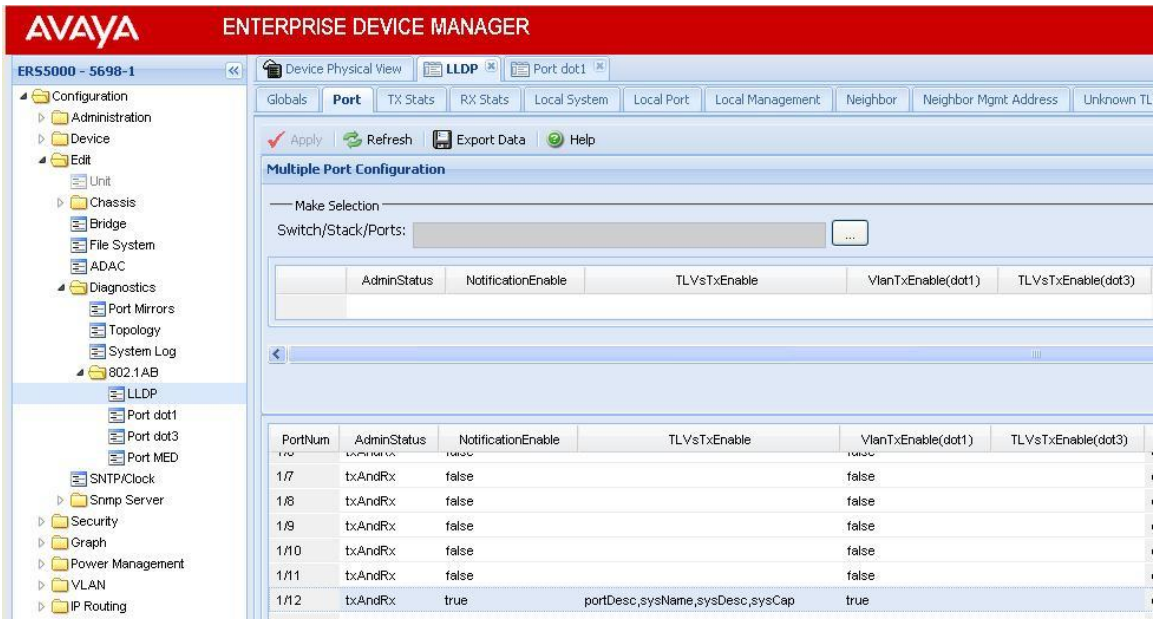
The following is an example of configuring LLDP on an Avaya Stackable Ethernet switch.

ERS-Stackable Step 1 – To enable LLDP on an Avaya Stackable Ethernet switch, please enter the following commands assuming that ports 3 to 11 are used for both voice and data using data VLAN 1000 and voice VLAN 800

```
ERS-Stackable(config)#interface fastEthernet 3-11

ERS-Stackable(config-if)#lldp tx-tlv local-mgmt-addr port-desc sys-cap sys-desc
sys-name

ERS-Stackable(config-if)#lldp status txAndRx config-notification

ERS-Stackable(config-if)#lldp tx-tlv port 12 dot1 port-vlan-id vlan-name
800,1000
```

EDM

Go to *Configuration -> Edit -> Diagnostics -> 802.1AB -> LLDP -> Port*



By default, the Avaya IP Phone set only uses the LLDP VLAN dot1 tx-tlv VLAN Name where the LLDP VLAN Name packet contains the VLAN name and VLAN ID. The Avaya IP Phone set requires the Voice VLAN to be named “voice” and the data VLAN to be named “data”. The name is not case-sensitive. To set the LLDP tx-tlv dot1 VLAN name, the Avaya switch by default will send the VLAN name assigned to the actual VLAN. Hence, we rename both VLAN’s.

```
ERS-Stackable(config)#vlan name 1000 data

ERS-Stackable(config)#vlan name 800 voice
```

4.4.9.2 Verifying Operations

The following commands are used to verify the organizational TLV for both the local (switch) and remote (IP Phone) devices assuming we have an IP Phone 2004 phone set connected to port 4.

4.4.9.2.1 Verify local TLV

Step 1 – Verify the local (switch) TLV by using the following command:

```
ERS-Stackable#show lldp port 4 local-sys-data dot1 dot3
```

Result:

```
--------------------------------------------------------------------------------
                      lldp local-sys-data chassis
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
        ChassisId: MAC address        80:17:7d:26:68:00
        SysName:   ERS-Stackable
        SysCap:    rB / rB            (Supported/Enabled)
        SysDescr:
Ethernet Routing Switch ERS-Stackable  HW:02       FW: 6.0.0.10  SW:v6.2.0.003

        Dot1 protocols: STP,EAP,LLDP
--------------------------------------------------------------------------------
                      lldp local-sys-data port
--------------------------------------------------------------------------------
Port:  4
 PVID: 1000  PPVID List: 800,1000
             VLAN Name List: 800,1000           ProtocolId List: ALL

 Dot3-MAC/PHY Auto-neg: supported/enabled       OperMAUtype:  100BaseTXFD
 PSE MDI power:         supported/enabled       Port class:   PSE
 PSE power pair:        signal/not controllable Power class:  0
 LinkAggr: not aggregatable/not aggregated      AggrPortID:   0
                                                MaxFrameSize: 9216
 PMD auto-neg:          10Base(T, TFD), 100Base(TX, TXFD), (FdxS)Pause,
                        1000Base(TFD)
--------------------------------------------------------------------------------
Sys capability: O-Other; R-Repeater; B-Bridge; W-WLAN accesspoint; r-Router;
T-Telephone; D-DOCSIS cable device; S-Station only.
```

Core TLV

802.1

802.3

4.4.9.2.2 Verify Remote TLV

Step 1 – Verify the remote (IP phone) TLV by using the following command:

```
ERS-Stackable(config)#show lldp port 4 neighbor dot1 dot3
```

Result:

```
-------------------------------------------------------------------------------
                              lldp neighbor
-------------------------------------------------------------------------------
Port: 4     Index: 157                Time: 4 days, 22:56:16
        ChassisId: Network address    ipV4  47.133.58.224
        PortId:    MAC address        00:0a:e4:09:72:e7
        SysCap:    TB / TB            (Supported/Enabled)
        PortDesc:  Nortel IP Phone
        SysDescr:  Nortel IP Telephone 2004, Firmware:C604DB1


 PVID: 0                              PPVID Supported: not supported(0)
 VLAN Name List: 800                  PPVID Enabled: none

 Dot3-MAC/PHY Auto-neg: supported/enabled       OperMAUtype:  100BaseTXFD
 PSE MDI power:         not supported/disabled  Port class:   PD
 PSE power pair:        signal/not controllable Power class:  1
 LinkAggr: not aggregatable/not aggregated      AggrPortID:   0
                                                MaxFrameSize: 1522
 PMD auto-neg:          (FdxS, FdxB)Pause, 1000Base(XFD, T)
-------------------------------------------------------------------------------
Sys capability: O-Other; R-Repeater; B-Bridge; W-WLAN accesspoint; r-Router;
T-Telephone; D-DOCSIS cable device; S-Station only.
```

Core TLC

802.1

802.3

4.4.9.3 LLDP VLAN configuration on the ERS8300

ERS8300 Step 1 – To enable LLDP on an ERS8300 switch, please enter the following commands assuming that ports 31 is used for both voice and data using data VLAN 61 and voice VLAN 220

```
ERS8300:5# config ethernet 1/33 default-vlan-id 61
ERS8300:5# config ethernet 1/33 lldp tx-tlv local-mgmt-addr-tx enable
ERS8300:5# config ethernet 1/33 lldp tx-tlv sys-name enable
ERS8300:5# config ethernet 1/33 lldp tx-tlv sys-desc enable
ERS8300:5# config ethernet 1/33 lldp tx-tlv sys-cap enable
ERS8300:5# config ethernet 1/33 lldp tx-tlv port-desc enable
ERS8300:5# config ethernet 1/33 lldp tx-tlv dot1 vlan-name enable
```

By default, the Avaya IP Phone set only uses the LLDP VLAN dot1 tx-tlv VLAN Name where the LLDP VLAN Name packet contains the VLAN name and VLAN ID. The Avaya IP Phone set requires the Voice VLAN to be named “voice” and the data VLAN to be named “data”. The name is not case-sensitive; however, on the ERS8300 you must either use the name “voice” or “VOICE”. Also, the ERS8300 only sends one LLDP VLAN Name packet. To set the LLDP tx-tlv dot1 VLAN name, the ERS8300 by default will send the VLAN name assigned to the actual VLAN. Hence, we rename both VLAN’s.

- `ERS8300:5# config vlan 61 name data`
- `ERS8300:5# config vlan 220 name voice`

4.4.9.4 Verifying Operations

The following commands are used to verify the organizational TLV for both the local (switch) and remote (IP Phone) devices assuming we have an IP Phone 2004 phone set connected to port 4.

4.4.9.4.1 Verify neighbor TLV

Step 1 – Verify the local (switch) core TLV by using the following command:

```
ERS8300B:5# show lldp neighbor 1/33
```

Result:

```
================================================================================
                                    LLDP NEIGHBOR
================================================================================

PORT  INDEX CHASSIS  CHASSIS           PORT       PORT
NUM         SUBTYPE  ID                SUBTYPE    ID

PORT DESC                 SYS NAME                  SYS DESC
--------------------------------------------------------------------------------

1/33  22    NetworkAddr  10.103.59.201 MAC        00:13:65:fe:f1:cb

Nortel IP Phone                                     Nortel IP Telephone 1120E, F
irmware:0624C22

================================================================================
                                    lldp Remote-sys-data Sys Capabilitities
================================================================================
Repeater Bridge   WLAN       Router   Telephone  DOCICS   Station  Other
                  Access Pt                      Cable    Only
                           (Supported/Enabled)

--------------------------------------------------------------------------------
No/No     Yes/Yes      No/No      No/No     Yes/Yes      No/No      No/No      No/No
```

Core TLV

Step 2 – Verify the neighbor 802.1 TLV by using the following command:

```
ERS8300B:5# show lldp neighbor-dot1
```

Result:

```
        ================================================================================
                                          LLDP NEIGHBOR (Dot1)
        ================================================================================
        PORT  INDEX CHASSIS  CHASSIS           PORT       PORT
        NUM         SUBTYPE  ID                SUBTYPE    ID
        --------------------------------------------------------------------------------
        PVID  PPVID           PPVID           VlanName
              Supported List  Enabled List    List
        --------------------------------------------------------------------------------


        1/33  11    NetworkAddr  10.103.59.200 MAC        00:0a:e4:09:72:e7
        0     0               0               220
```

Step 3– Verify the neighor 802.3 TLV by using the following command:

```
ERS8300B:5# show lldp neighbor-dot3
```

Result:

```
================================================================================

                                      LLDP NEIGHBOR (Dot3)
================================================================================
--------------------------------------------------------------------------------
PORT  INDEX CHASSIS  CHASSIS           PORT       PORT
NUM         SUBTYPE  ID                SUBTYPE    ID
--------------------------------------------------------------------------------

1/33  11    NetworkAddr  10.103.59.200 MAC        00:0a:e4:09:72:e7

Dot3-MAC/PHY Autoneg           : Supported/Enabled
OperMAUtype                    : 100BaseTXFD
PMD auto-neg                   : 1000-half
PSE MDI power                  :
Port Class                     :
PSE pair control               : Signal
Power Class                    : Class 1

Link Aggregation               : Supported
Link Aggregation Port ID       : 0
MaxFrameSize                   : 1522
```

4.4.10 LLDP-MED (Media Endpoint Devices) Network Policy

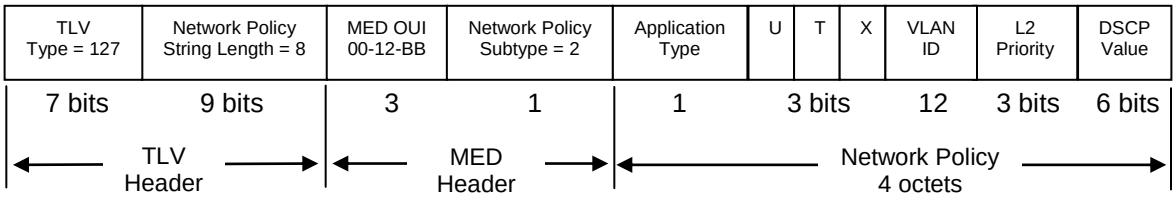


Figure 15: LLDP-MED Network Policy TLV SubType 2 Frame Format

4.4.10.1 LLDP-MED configuration on an Avaya Stackable Ethernet Routing Switch

Depending on the switch model and software version used, ADAC may have to be enabled on the switch to allow LLDP-MED. As of software release 5.1.4 for the ERS5500, software 6.1 for the ERS5500 or ERS5600, or software release 5.4 for the ERS 4500, ADAC is no longer required in order to enable LLDP-MED network policy.

For the ERS 2500 or older releases for the ERS 4500 or ERS 5000, in order to support LLDP-MED Network Policy TLV, ADAC must be used in addition to enabling, at minimum, LLDP-MED Capabilities TLV and LLDP-MED Network Policy TLV.

4.4.10.1.1 ADAC Configuration for LLDP-MED

Assuming the Ethernet Routing Switch is configured as a Layer 2 switch with a trunked uplink port 1 and access ports 3 to 11 for IP phones where we wish to tag the ADAC voice VLAN and untag the data VLAN, enter the following.

Please note that by default, ADAC detection by MAC and LLDP is enabled. The configuration below allows only for ADAC detection by LLDP by disabling ADAC detection by MAC using interface command *no adac detection port <port list> mac*.

Step 1 – Enable ADAC

```
ERS-Stackable(config)#adac voice-vlan 280
ERS-Stackable(config)#adac uplink-port 1
ERS-Stackable(config)#adac op-mode tagged-frames
ERS-Stackable(config)#adac enable
ERS-Stackable(config)#interface FastEthernet ALL
ERS-Stackable(config-if)#no adac detection port 3-11 mac
ERS-Stackable(config-if)#adac tagged-frames-tagging untag-pvid-only
ERS-Stackable(config-if)#adac port 3-11 enable
ERS-Stackable(config-if)#exit
```

4.4.10.1.2 LLDP-MED Configuration

After ADAC has been configured, enable LLDP-MED by entering the following commands.

Step 1 – Enable ADAC and also set PoE priority level to high

```
ERS-Stackable(config)#interface fastEthernet 3-11
ERS-Stackable(config-if)#poe poe-priority high
ERS-Stackable(config-if)#lldp status txAndRx
ERS-Stackable(config-if)#lldp tx-tlv local-mgmt-addr port-desc sys-cap sys-desc sys-name
ERS-Stackable(config-if)#lldp tx-tlv med extendedPSE med-capabilities network-policy
ERS-Stackable(config-if)#exit
EDM
Go to Configuration -> Edit -> Diagnostics -> 802.1AB -> Port
```

We will also add LLDP-MED extendedPSE so that we can compare PoE settings between the IP Phone set and the switch.

4.4.10.2 Verifying Operations

Assuming an IP Phone 2004 IP Phone set is connected to port 4.

4.4.10.2.1 Verify LLDP-MED

Step 1 – Verify LLDP-MED operation by using the following command:

```
ERS-Stackable# show lldp port 4 neighbor med
```

Result:

```
-------------------------------------------------------------------------------
                            lldp neighbor
-------------------------------------------------------------------------------
Port: 4     Index: 4                  Time: 0 days, 00:01:43
        ChassisId: Network address    ipV4  47.133.58.220
        PortId:    MAC address        00:0a:e4:09:72:e7
        SysCap:    TB / TB            (Supported/Enabled)
        PortDesc:  Nortel IP Phone
        SysDescr:  Nortel IP Telephone 2004, Firmware:C604DB1


 MED-Capabilities: CNSD / CNDI        (Supported/Current)
 MED-Device type:  Endpoint Class 3
 MED-Application Type: Voice                    VLAN ID: 280
 L2 Priority: 6         DSCP Value: 46          Tagged Vlan, Policy defined
 Med-Power Type: PD Device            Power Source: Unknown
 Power Priority: High                 Power Value:    5.4 Watt
-------------------------------------------------------------------------------
Sys capability: O-Other; R-Repeater; B-Bridge; W-WLAN accesspoint; r-Router;
T-Telephone; D-DOCSIS cable device; S-Station only.
Med Capabilities-C: N-Network Policy; L-Location Identification; I-Inventory;
S-Extended Power via MDI - PSE; D-Extended Power via MDI - PD.
```

Core TLC

MED

4.4.10.2.2 Verify ADAC Detection

Step 1 – Verify ADAC detection by using the following command assuming IP Phones are connected to ports 4 and 5:

```
ERS-Stackable#show adac interface 3-11
```

Result:

```
                Auto        Oper       Auto
Port  Type  Detection   State      Configuration  T-F PVID   T-F Tagging
----  ----  ---------   --------   -------------  ---------  ---------------
3     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
4     T     Enabled     Enabled    Applied        No Change  Untag PVID Only
5     T     Enabled     Enabled    Applied        No Change  Untag PVID Only
6     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
7     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
8     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
9     T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
10    T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
11    T     Enabled     Enabled    Not Applied    No Change  Untag PVID Only
```

Step 2 – Verify ADAC detection mechanism enabled by issuing the following command:

```
ERS-Stackable#show adac detection interface 3-11
```

Result:

```
        MAC         LLDP
Port    Detection   Detection
----    ---------   ---------
3       Disabled    Enabled
4       Disabled    Enabled
5       Disabled    Enabled
6       Disabled    Enabled
7       Disabled    Enabled
8       Disabled    Enabled
9       Disabled    Enabled
10      Disabled    Enabled
11      Disabled    Enabled
```

4.4.10.3 LLDP-MED configuration on Stackable Ethernet Routing Switch without ADAC

In software release 5.1.4 or higher for the ERS5500, software release 6.1 for the ERS5500 or ERS5600, or software release 5.4 for the ERS 4500, you can use LLDP-MED network policy to configure the voice VLAN, Layer 3 QoS level (DSCP value) and the Layer 2 QoS level (802.1p value). The DSCP value is entered in decimal with a value from 0 to 63 while the p-bit value is also entered in decimal with a value from 0 to 7.

The command syntax to enable the MED network policy is as follows at an interface level:

- ERS-Stackable(config-if)#***lldp med-network-policies voice dscp <0-63> priority <0-7> tagging <tagged|untagged> vlan-id <1-4094>***

The default MED policy values are: DSCP = 0, Priority = 0, Tagging Mode = untagged, VLAN-ID = 1.

As of software release 5.4 for the ERS 4500 and 6.2 for the ERS 5000, Auto QoS and LLDP-MED interoperates with each other. Auo QoS, when enabled, will now alter the LLDP-MED Network Policy to match the Auto QoS values. Previously, the LLDP MED values where determined by the Network Policy - there was no interaction between Auto QoS and LLDP-MED.

Assuming the Stackable Ethernet Routing switch switch is configured as a Layer 2 switch with access ports 3 to 11 for IP phones, enter the following assuming you are using VLAN 805 for the voice VLAN and you wish to use a DSCP value of 46 and a p-bit value of 6.

Step 1 – Enable LLDP MED name on ports 3 to 11, set the voice VLAN to VLAN 805, set the DSCP value to decimal 46 and the p-bit value to 6.

```
ERS-Stackable(config)#interface fastEthernet 3-11
ERS-Stackable(config-if)#lldp tx-tlv local-mgmt-addr port-desc sys-cap sys-desc sys-name
ERS-Stackable(config-if)#lldp status txandRx config-notification
ERS-Stackable(config-if)#lldp tx-tlv med extendedPSE med-capabilities network-policy
ERS-Stackable(config-if)#lldp med-network-policies voice tagging tagged vlan-id 805
ERS-Stackable(config-if)#lldp med-network-policies voice dscp 46
ERS-Stackable(config-if)#lldp med-network-policies voice priority 6
ERS-Stackable(config-if)#exit
EDM
Go to Configuration -> Edit -> Diagnostics -> 802.1AB -> LLDP -> Port
and then
Go to Configuration -> Edit -> Diagnostics -> 802.1AB -> Port MED -> Insert
```


AVAYA
ENTERPRISE DEVICE MANAGER
ER55000 - 5698-1
Configuration
Administration
Device
Edit
Unit
Chassis
Bridge
File System
ADAC
Diagnostics
Port Mirrors
Topology
System Log
802.1AB
LLDP
Port dot1
Port dot3
Port MED
Device Physical View
Switch Summary
Port MED
Local Policy
Local Location
Local PoE PSE
Neighbor Capabilities
Neighbor Policy
Insert
Delete
Apply
Refresh
Export Data
Help
PortNum
PolicyAppType
PolicyVlanID
PolicyPriority
PolicyDscp
PolicyTagged
1/11
voice
805
6
46
true

4.4.10.4 Verify Operations

Assuming an IP Phone 1230 IP Phone set is connected to port 5.

4.4.10.4.1 Verify LLDP-MED

Step 1 – Verify LLDP neighbor details by using the following command:

```
ERS-Stackable#show lldp port 5 neighbor detail
```

Result:

```
--------------------------------------------------------------------------------
                              lldp neighbor
--------------------------------------------------------------------------------
Port: 5     Index: 4                  Time: 3 days, 19:18:15
        ChassisId: Network address    IPv4  10.5.85.10
        PortId:    MAC address        00:24:00:0d:8d:aa
        SysCap:    TB / TB            (Supported/Enabled)
        PortDesc:  Nortel IP Phone
        SysDescr:  Nortel IP Telephone 1230, Firmware:062AC6R


 PVID: 0                              PPVID Supported: not supported(0)
 VLAN Name List: 805                  PPVID Enabled: none

 Dot3-MAC/PHY Auto-neg: supported/enabled       OperMAUtype:  100BaseTXFD
 PSE MDI power:         not supported/disabled  Port class:   PD
 PSE power pair:        signal/not controllable Power class:  2
 LinkAggr: not aggregatable/not aggregated      AggrPortID:   0
                                                MaxFrameSize: 1522
 PMD auto-neg:          10Base(T, TFD), 100Base(TX, TXFD)

 MED-Capabilities: CNLDI / CNDI       (Supported/Current)
 MED-Device type:  Endpoint Class 3
 MED-Application Type: Voice                    VLAN ID: 805
 L2 Priority: 6         DSCP Value: 46          Tagged Vlan, Policy defined
 Med-Power Type: PD Device            Power Source: Unknown
 Power Priority: High                 Power Value:    6.0 Watt
 HWRev:                               FWRev: 062AC6R
 SWRev:                               SerialNumber:
 ManufName: Nortel-05                 ModelName: IP Phone 1230
 AssetID:
--------------------------------------------------------------------------------
Sys capability: O-Other; R-Repeater; B-Bridge; W-WLAN accesspoint; r-Router;
T-Telephone; D-DOCSIS cable device; S-Station only.
Total neighbors: 1
Med Capabilities-C: N-Network Policy; L-Location Identification;
I-Inventory;
S-Extended Power via MDI - PSE; D-Extended Power via MDI - PD.
```

Step 2 – Verify LLDP-MED operations by using the following command:

```
ERS-Stackable#show lldp port 5 neighbor med network-policy
```

Result:

```
-------------------------------------------------------------------------------
                            lldp neighbor
-------------------------------------------------------------------------------
Port: 5     Index: 4                  Time: 3 days, 19:18:15
        ChassisId: Network address    IPv4  10.5.85.10
        PortId:    MAC address        00:24:00:0d:8d:aa
        SysCap:    TB / TB            (Supported/Enabled)
        PortDesc:  Nortel IP Phone
        SysDescr:  Nortel IP Telephone 1230, Firmware:062AC6R


 MED-Application Type: Voice                    VLAN ID: 805
 L2 Priority: 6         DSCP Value: 46          Tagged Vlan, Policy defined
-------------------------------------------------------------------------------
Sys capability: O-Other; R-Repeater; B-Bridge; W-WLAN accesspoint; r-Router;
T-Telephone; D-DOCSIS cable device; S-Station only.
Total neighbors: 1
```

4.4.10.4.2 Verify LLDP-MED Policy Configuration

Step 1 – Verify LLDP neighbor details by using the following command:

```
ERS-Stackable# show lldp med-network-policies voice
```

Result:

```
-----------------------------------------------------------------
                    lldp voice network-policies
-----------------------------------------------------------------
-----------------------------------------------------------------
   Port  Voice    Tagging    DSCP  Priority
         VlanID
-----------------------------------------------------------------
   3      805     tagged     46    6
   4      805     tagged     46    6
   5      805     tagged     46    6
   6      805     tagged     46    6
   7      805     tagged     46    6
   8      805     tagged     46    6
   9      805     tagged     46    6
   10     805     tagged     46    6
   11     805     tagged     46    6
-----------------------------------------------------------------
```

4.4.10.5 LLDP-MED configuration on the ERS8300

In order to support LLDP-MED Network Policy TLV, ADAC must be enabled on an interface level in addition to enabling at minimum LLDP-MED Capabilities TLV and LLDP-MED Network Policy TLV.

Assuming the ERS8300 is configured as a Layer 2 switch with access ports 1/1 to 1/5 for IP phones, enter the following:

4.4.10.5.1 Enable ADAC at interface level

ERS8300-1 Step 1 – Enable ADAC on port members 1/1 to 1/5

```
PPCLI
ERS8300-2:5# config ethernet 1/1-1/5 adac enable
CLI
ERS8310-1:5(config)#interface fastEthernet 1/1-1/5
ERS8310-1:5(config-if)#adac port enable
ERS8310-1:5(config-if)#exit
```

4.4.10.5.2 Enable LLDP-MED

ERS8300-1 Step 1 – Enable LLDP VLAN name on port 1/1 to 1/5

```
PPCLI
ERS8300-2:5# config ethernet 1/1-1/5 lldp tx-tlv local-mgmt-addr-tx enable
ERS8300-2:5# config ethernet 1/1-1/5 lldp tx-tlv sys-name enable
ERS8300-2:5# config ethernet 1/1-1/5 lldp tx-tlv sys-desc enable
ERS8300-2:5# config ethernet 1/1-1/5 lldp tx-tlv sys-cap enable
ERS8300-2:5# config ethernet 1/1-1/5 lldp tx-tlv port-desc enable
ERS8300-2:5# config ethernet 1/1-1/5 lldp tx-tlv med network-policy enable
ERS8300-2:5# config ethernet 1/1-1/5 lldp tx-tlv med extendedPSE enable
ERS8300-2:5# config ethernet 1/1-1/5 lldp tx-tlv med capabilities enable
CLI
ERS8310-1:5(config)#interface fastEthernet 1/1-1/5
ERS8310-1:5(config-if)#lldp tx-tlv local-mgmt-addr
ERS8310-1:5(config-if)#lldp tx-tlv sys-name sys-desc sys-cap
ERS8310-1:5(config-if)#lldp tx-tlv port-desc
ERS8310-1:5(config-if)#lldp status txAndRx
ERS8310-1:5(config-if)#lldp tx-tlv med capabilities extendedPSE
ERS8310-1:5(config-if)#lldp tx-tlv med network-policy
ERS8310-1:5(config-if)#exit
```

5. 802.3af Power over Ethernet

The intention of the 802.3af standard is to provide a 10BaseT, 100BaseT, or1000BaseT device with a single interface for the data it requires and the power to process the data. Power is supplied by a Power Sourcing Device (PSE) for one or more Powered Devices (PD). The PSE main function is to only supply power for a PD after it has successfully detected a PD on a link by probing. The PSE can also successfully detect a PD, but then opt to not supply power to the detected PD. The PSE shall only supply power on the same pair as those used for detection.

The cable requirements are defined in ISO/IEC 11801-2000 and EIA/TIA 568A/B (T-568A or B, with most using the A standard) which allows for up to 100 meters of cable.

Power Sourcing Devices (PSE) can deliver power on the data pairs (1+2, 3+6), spare pairs (4+5, 7+8), or either, but only on the pair that the Powered Device (PD) is detected on. Power is not to be supplied to non-powered devices and other PSE's.

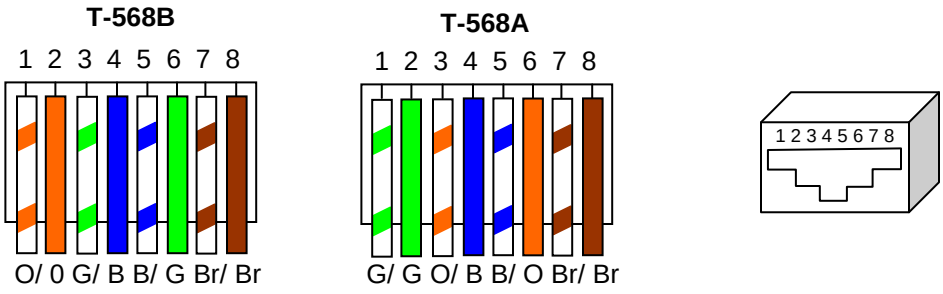


Figure 16: PD and PSE 8-pin Modular Jack Pin's

Conductor	Alternative A (MDI-X)	Alternative A (MDI)	Alternative B (All)
1	Negative V_{Port}	Positive V_{Port}	
2	Negative V_{Port}	Positive V_{Port}	
3	Positive V_{Port}	Negative V_{Port}	
4			Positive V_{Port}
5			Positive V_{Port}
6	Positive V_{Port}	Negative V_{Port}	
7			Negative V_{Port}
8			Negative V_{Port}

Table 12: PSE Pinout Alternative

In regards to the PD, it must fall into the following characteristics:

- 19k to 26.5k ohm DC resistance
- <100nF of capacitance and
- a voltage offset of at least 2VDC in the signature characteristics
- a current of less than 12uA in the signature characteristics

Anything outside of the characteristics listed above will be considered a non-PD device and the PSE will not supply power. Each port from a PSE should be capable of delivering up to 15.4W of power. 802.3af also adds a class feature that allows the PSE to limit the power based on the class of the PD detected. Table 13 shown below lists the 802.3af power classes.

Class	Usage	Range of MAXIMUM power used by the PD
0	Default	0.44 to 12.95 Watts
1	Optional	0.44 to 3.84 Watts
2	Optional	3.84 to 6.49 Watts
3	Optional	6.49 to 12.95 Watts
4	Not Allowed	Reserved for Future Use

Table 13: 802.3af PD Power Classification

5.1 IP Deskphone Power Requirements

Table 14 displays the average power consumed for each Avaya IP Phone set.

Model	Product Code	PoE Class	Typical use Power (Watts)	Minimum Software
2007	All	3	9.6	
1110	All	2	2.8	
1120E	NTYS03xA – NTYS03xCE6	3	7.0	
1120E	NTYS03xDE6	3	4.6	UNISTIm 3.1 / SIP 2.1
1120E	NTYS03xEE6, NTYS03xFE6	2	4.2	UNISTim 3.4 / SIP 2.2
1140E	NTYS05xA – NTYS05xCE6	3	7.3	
1140E	NTYS05xCE6 Rel 50 & higher	3	4.8	UNISTIm 3.1 / SIP 2.1
1140E	NTYS05xEE6, NTYS05xFE6	2	4.3	UNISTim 3.4 / SIP 2.2
1150E	NTYS06xxE6	3	7.0	
1165E	NTYS07xxE6	2	3.8	
1210	All	2	3.2	
1220	All	2	3.2	
1230	All	2	3.2	
1603-I	All	2	4.32	
1603SW-I	All	2	4.32	
1608-I	All	2	4.66	
1616-I	All	2	3.17	
1616 w/BM32	All	2	4.37	
9608	All	1	2.0	
9611G	All	1	3.1	
9620L	All	1	2.2	
9620C	All	2	4.6	
9621G	All	2	3.5	
9630G	All	2	4.8	
9640	All	2	4.5	
9640G	All	2	4.8	
9641G	All	2	3.4	
9650	All	2	4.6	
9650C	All	2	4.5	
9670G	All	2	6.2	

Table 14: IP Deskphone Power Requirements

5.2 Avaya PoE Switches

Ethernet Routing Switch 8300

This chassis system provides both 10/100 and 10/100/1000 48 port I/O modules capable of PoE. When utilizing PoE, make sure to engineer the power requirements of the chassis properly. The amount of PoE per module is configurable up to 800 watts per module, along with the ability to specify port priority for PoE. The total PoE power required will dictate the type of input power for the chassis. The ERS 8300 provides different power options as indicated in Table 15.

ERS 8300 Six Slot Chassis

ERS 8300 Ten Slot Chassis

Power Supply	Power Supply Rating	# of Power Supplies	Redundancy	PoE Available
8301AC	110-120 VAC 20 Amp 1140 watts	1	No	400 watts
		2	Yes 1+1	400 watts
		3	Yes 2+1	800 watts
	200-240 VAC 20 Amp 1770 watts	1	No	800 watts
		2	Yes 1+1	800 watts
		3	Yes 2+1	1600 watts
8302AC	100-120 VAC 15 Amp 850 watts	1	No	200 watts
		2	Yes 1+1	200 watts
		3	Yes 2+1	400 watts
	200-240 VAC 15 Amp 1400 watts	1	No	400 watts
		2	Yes 1+1	400 watts
		3	Yes 2+1	800 watts

Table 15: ERS 8300 Power over Ethernet Options

Ethernet Routing Switch 5600

The PoE capable ERS 5600 series stackable switches are available in a 48-port and a 96-port version. The ERS 5600 offers built-in, hot swappable redundant power supply options in both AC and DC varieties. It is also capable of providing full 15.4watts per port on every port in the switch along with full N+1 redundant power simultaneously. The available configurations for power options are specified in Table 16.

ERS 5650TD-PWR

ERS 5698TFD-PWR

Switch Model	PoE with one power supply	PoE with two power supplies	PoE with three power supplies
ERS 5650TD-PWR (600W)	370 watts total 7.7 watts/port	740 watts total 15.4 watts/port	N/A
ERS 5650TD-PWR (1000W)	740 watts total 15.4 watts/port	740 watts total * 15.4 watts/port	N/A
ERS 5698TFD-PWR (1000W)	740 watts total 7.7 watts/port	1480 watts total 15.4 watts/port	1480 watts total * 15.4 watts/port
* Full 15.4 watts on every port with N+1 power redundancy			

Table 16: ERS 5600 Power over Ethernet Options

Ethernet Routing Switch 5500

The PoE capable ERS 5520 stackable switch is available in both a 24-port and a 48-port version. The ERS 5520 provides up to 320 watts per switch on standard 110/240 VAC power. To provide more power and/or redundant power, use the ERS Redundant Power Supply 15 (RPS 15) to augment the ERS 5520. The RPS 15 can support up to three ERS 5520 switches. The available configurations for power options are specified in Table 17.

ERS 5520-48T-PWR

ERS-24T-PWR

Switch Model	PoE on Standard AC	RPS 15 Power Sharing	RPS 15 RPSU
ERS ERS-24T-PWR	320 watts total 13.3 watts/port	740 watts total 15.4 watts/port	320 watts total 13.3 watts/port
ERS 5520-48T-PWR	320 watts total 6.7 watts/port	740 watts total 15.4 watts/port	320 watts total 6.7 watts/port

Table 17: ERS 5500 Power over Ethernet Options

Ethernet Routing Switch 4500

The PoE capable ERS 4500 stackable switches are available in 10/100 and 10/100/1000 48-port versions. The ERS 4500 provides up to 370 watts per switch on standard 110/240 VAC power. To provide more power and/or redundant power, use the ERS Redundant Power Supply 15 (RPS 15) to augment the ERS 4500. The RPS 15 can support up to three ERS 4500 switches. The available configurations for power options are specified in Table 18.

ERS 4526T-PWR

ERS 4550T-PWR

ERS 4524GT-PWR

ERS 4548GT-PWR

ERS 4526GTX-PWR

Switch Model	PoE on Standard AC	RPS 15 Power Sharing	RPS 15 RPSU
ERS 4526T-PWR	370 watts total 15.4 watts/port	740 watts total 15.4 watts/port	370 watts total 15.4 watts/port
ERS 4550T-PWR	370 watts total 7.7 watts/port	740 watts total 15.4 watts/port	370 watts total 7.7 watts/port
ERS 4524GT-PWR	360 watts total 15.0 watts/port	740 watts total 15.4 watts/port	360 watts total 15.0 watts/port
ERS 4548GT-PWR	320 watts total 6.7 watts/port	740 watts total 15.4 watts/port	320 watts total 6.7 watts/port
ERS 4526GTX-PWR	360 watts total 15.0 watts/port	740 watts total 15.4 watts/port	360 watts total 15.0 watts/port

Table 18: ERS 4500 Power over Ethernet Options

Ethernet Routing Switch 2500

The PoE capable ERS 2500 switches are available in both a 24-port and a 48-port version. With both of these ERS 2500 switches, PoE is provided on half the ports (ports 1-12 of the 24 port switch and ports 1-24 on the 48 port switch). The ERS 2500 provides up to 165 watts per switch on standard 110/240 VAC power. The ERS 2500 does not support a redundant power option. The available configurations for power options are specified in Table 19.

ERS 2526T-PWR

ERS 2550T-PWR

Switch Model	PoE on Standard AC	RPS 15 Power Sharing	RPS 15 RPSU
ERS 2526T-PWR	165 watts	N/A	N/A
ERS 2550T-PWR	165 watts	N/A	N/A

Table 19: ERS 2500 Power over Ethernet Options

Redundant Power Supply 15 (RPS 15)

The RPS 15 provides redundant power to the Avaya stackable Ethernet switches (both PoE and non-Poe). The RPS 15 is comprised of the following components:

- RPS 15 Chassis (supports up to three 600 watt power supplies)
- 600 Watt Power Supply
- DC-DC Converter (only required for some switches – see table below)
- DC cable to connect power supply to Ethernet switch

The RPS 15 supports two different DC cable types. The first (AA0005018) is used with all Ethernet switches that have a built-in DC-DC converter and can provide a single power connection to one Ethernet switch. The second type of cable, which comes in two models (AA0005020 – 25' and AA0005021 – 10') is used with all Ethernet switches that require the addition of the DC-DC converter module. This second cable type can provide a single power connection for up to four Ethernet switches.

The RPS 15 can be added to an Ethernet switch or stack of Ethernet switches while the switches are powered up and running. There is no need to power off the switch to connect the RPS 15 cable.

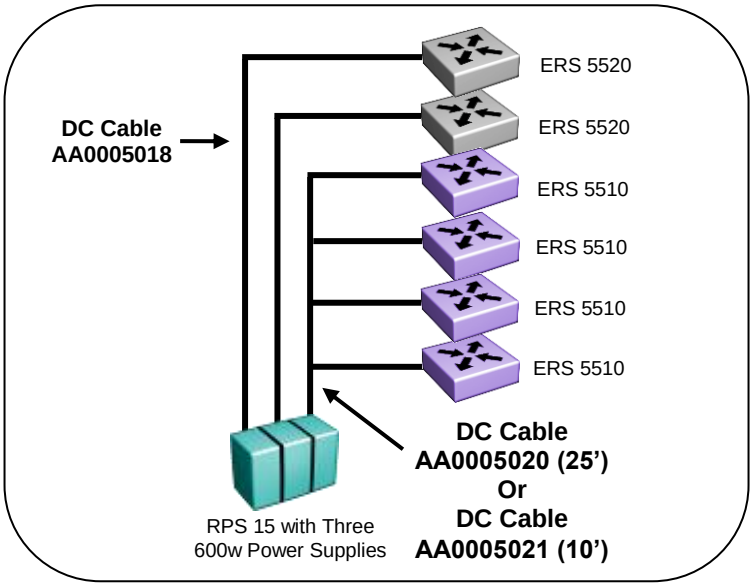


Figure 17: Redundant Power Supply 15 (RPS15)

Table 20 provides information on the required components when using the RPS 15 with the various Ethernet switching options.

Switch Model	PoE Capable Switch	RPS 15 Chassis	RPS 15 600w Power Supply	DC-DC Converter	DC Cable for Built-In Converter	10' or 25' DC Cable
ERS 5510	No	1	1 per 4 switches	Required	N/A	Required
ERS 5520	Yes	1	1	Built-In	Required	N/A
ERS 5530	No	1	1	Built-In	Required	N/A
ERS 4526FX	No	1	1 per 4 switches	Required	N/A	Required
ERS 4526T	No	1	1 per 4 switches	Required	N/A	Required
ERS 4526T-PWR	Yes	1	1	Built-In	Required	N/A
ERS 4550T	No	1	1 per 4 switches	Required	N/A	Required
ERS 4550T-PWR	Yes	1	1	Built-In	Required	N/A
ERS 4524GT	No	1	1 per 4 switches	Required	N/A	Required
ERS 4524GT-PWR	Yes	1	1	Built-In	Required	N/A
ERS 4548GT	No	1	1 per 4 switches	Required	N/A	Required
ERS 4548GT-PWR	Yes	1	1	Built-In	Required	N/A
ERS 4526GTX	No	1	1 per 4 switches	Required	N/A	Required
ERS 4526GTX-PWR	Yes	1	1	Built-In	Required	N/A
ES 470-24T-PWR	Yes	1	1	Built-In	Required	N/A
ES 470-48T-PWR	Yes	1	1	Built-In	Required	N/A
ES 470-24T	No	1	1 per 4 switches	Required	N/A	Required
ES 470-48T	No	1	1 per 4 switches	Required	N/A	Required

Table 20: RPS 15 Configuration Options

5.3 Configuring PoE

5.3.1 Stackable Ethernet Routing Switch

By default, PoE Power Management is enabled by default with all PoE ports power enabled at power up. The following commands apply to the switches listed in the previous section.

5.3.1.1 Displaying PoE Status and Statistics and setting global settings

To display the PoE status and statistics, you can use the following commands:

To view the Global PoE status, enter the following command:
ERS-Stackable(config)#***show poe-main-status***
ERS-Stackable(config)#***show poe-main-status unit <1-8>***
To view the PoE port status, enter the following command:
ERS-Stackable(config)#***show poe-port-status***
ERS-Stackable(config)#***show poe-port-status <port|unit/port>***
To view power used on a PoE port, enter the following command:
ERS-Stackable(config)#***show poe-power-measurement***
ERS-Stackable(config)#***show poe-power-measurement <port|unit/port>***
To change the trap threshold, enter the following commands:
ERS-Stackable(config)#poe poe-power-usage-threshold <1-99>
ERS-Stackable(config)#poe poe-power-usage-threshold unit <1-8> <1-99>
To set the PD detection type, enter the following command:
ERS-Stackable(config)# ***poe poe-pd-detect-type <802dot3af|802dot3ad_and_legacy>***
ERS-Stackable(config)# ***poe poe-pd-detect-type unit <1-8> <802dot3af| 802dot3ad_and_legacy>***

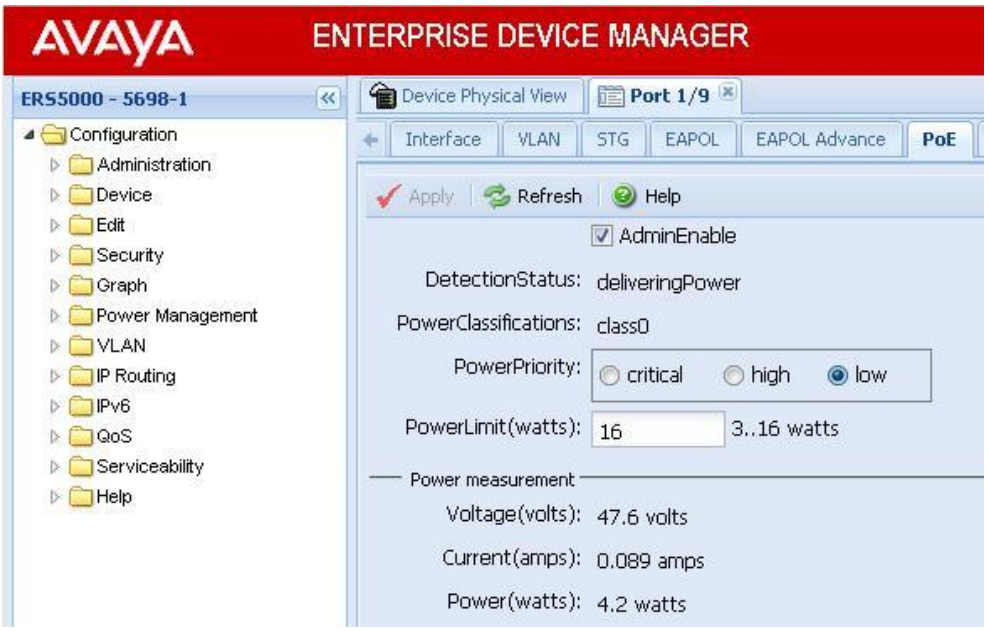
EDM:

To view or configure the PoE global status, enter the following:

- Using EDM, go to the *Device Physical View*, right-click the switch and select *Edit*
- Go to the PoE tab

To view or configure the PoE port status, enter the following:

- Using EDM, go to the *Device Physical View*, right-click the port or ports and select *Edit*
- Go to the *PoE* tab



5.3.1.2 PoE Settings

CLI

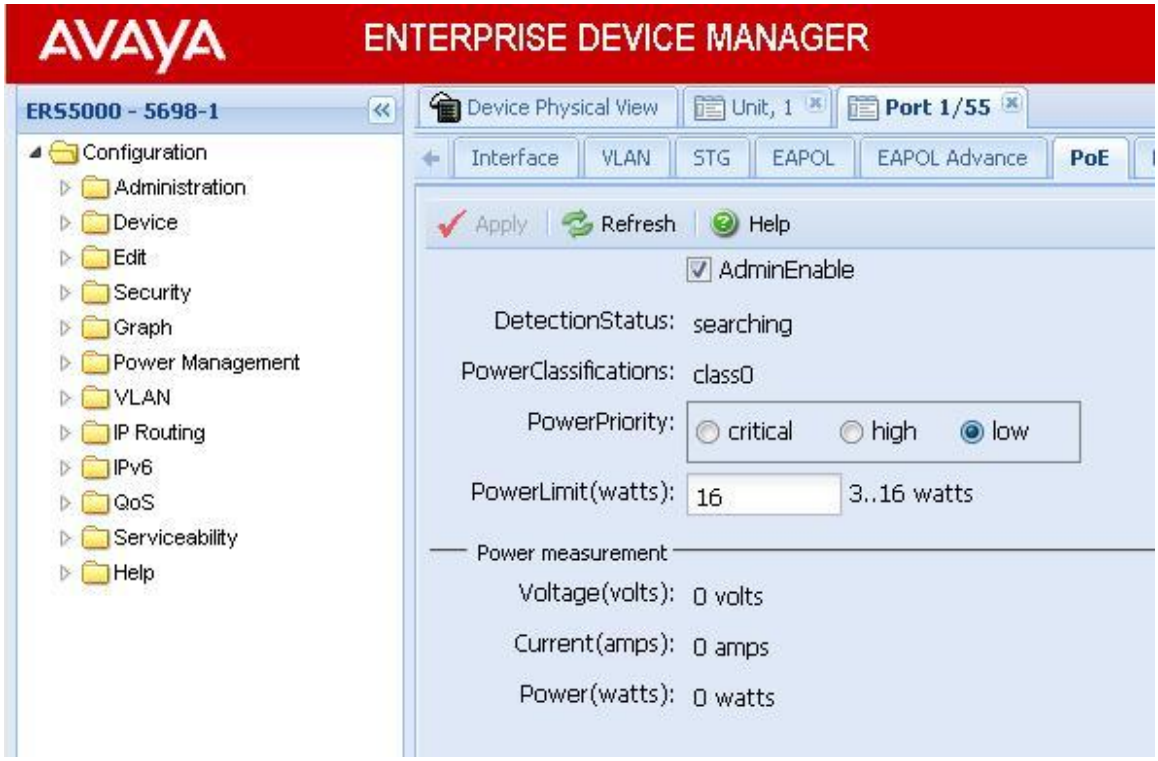
By default, all ports support 802.3af Power Class of 0 providing up to 15.4W per port.

To disable PoE at a port level, enter the following commands:
ERS-Stackable(config)#***interface fastEthernet all*** ERS-Stackable(config-if)#***poe poe-shutdown port <port #>*** ERS-Stackable(config-if)#***exit***
To configure the PoE power level, enter the following commands where the value <3-16> is the power limit in watts:
ERS-Stackable(config)#***interface fastEthernet all*** ERS-Stackable(config-if)#***poe poe-limit port <port #> <3-16>*** ERS-Stackable(config-if)#***exit***
To set the PoE port priority, enter the following commands:
ERS-Stackable(config)#***interface fastEthernet all*** ERS-Stackable(config-if)#***poe poe-priority port <port #> <low|high|critical>*** ERS-Stackable(config-if)#***exit***

EDM:

To disable PoE on a port via EDM, perform the following:

- Go to the Device Phyical View
- Right-click on the port and select *Edit*
  - If you wish to configure multiple port, press the Ctrl key and left click each port you wish to configure
- Go to the PoE tab



5.3.2 Ethernet Routing Switch 8300

By default, PoE Power Management is enabled with all PoE ports power enabled at power up.

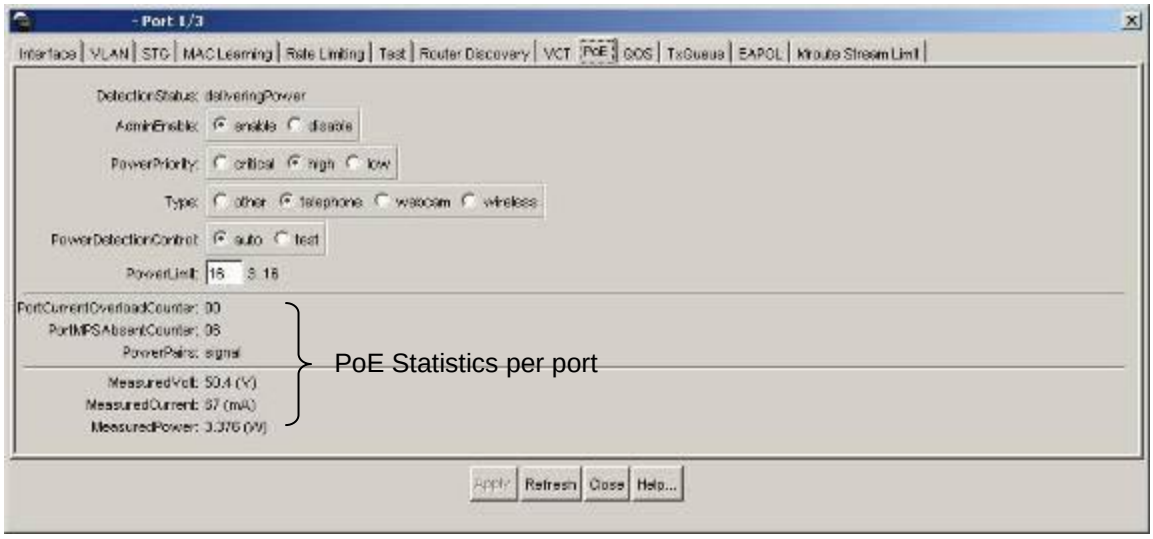
5.3.2.1 Displaying PoE Status and Statistics

To display the PoE status and statistics, you can use the following commands:

To view the Global PoE status per module, enter the following command:
PPCLI ERS-8310:5# ***show poe card info*** CLI ERS-8310:5#***show poe main-status***
To view the PoE port status, enter the following command:
PPCLI ERS-8310:5# ***show poe port info*** CLI ERS-8310:5#***show***
To view the PoE port stats, enter the following command:
PPCLI ERS-8310:5# ***show poe port stats*** CLI ERS-8310:5#***show poe port-status***
To view power used on a PoE port, enter the following command:
PPCLI ERS-8310:5# ***show poe port power-measurement <slot/port>*** CLI ERS-8310:5#***show poe port-stats***
To view the PoE system status, enter the following command:
PPCLI ERS-8310:5# ***show poe sys info*** CLI ERS-8310:5#***show poe sys-status***

JDM - Port Level

- Right-click on the port> *Edit>PoE*
  - If you wish to configure multiple ports, press the Ctrl key and left click each port you wish to configure



5.3.2.2 PoE Settings

To disable PoE on a port, enter the following command:
PPCLI ERS-8310:5# ***config poe port <slot/port> admin disable*** CLI ERS-8310:5(config)#***interface fastEthernet <slot/port>*** ERS-8310:5(config-if)#***poe shutdown*** ERS-8310:5(config-if)#***exit***
To disable PoE on a slot basis, enter the following command:
PPCLI ERS-8310:5# ***config poe card <slot #> admin disable*** CLI ERS-8310:5(config)# ***poe shutdown slot <slot #>***
To limit PoE power at a port level, enter the following command:
PPCLI ERS-8310:5# ***config poe port <slot/port> power-limit <3-16>*** CLI ERS-8310:5(config)#***interface fastEthernet <slot/port>*** ERS-8310:5(config-if)# ***poe limit <3-16>*** ERS-8310:5(config-if)#***exit***
To limit PoE power at a module level from 37 to 800W, enter the following command:
PPCLI ERS-8310:5# ***config poe card 1 power-limit <slot #> <37-800>*** CLI ERS-8310:5(config)#***poe limit slot <slot #> <37-800>***
To set the PoE slot priority, enter the following command:
PPCLI ERS-8310:5# ***config poe card <card #> power-priority <low|high|critical>*** CLI ERS-8310:5(config)#***poe priority slot <slot #> <low|high|critical>***
To set the PoE priority at a port level, enter the following command:

```
PPCLI
ERS-8310:5# config poe port <slot/port> power-priority <low|high|critical>
CLI
ERS-8310:5(config)#interface fastEthernet <slot/port>
ERS-8310:5(config-if)#poe priority <low|high|critical>
ERS-8310:5(config-if)#exit
```

To set the PoE detection control, enter the following command. The PSE Power Management Admin Status is enabled by default with power detection set on all ports to auto mode. Power detection can be set for either auto or test where test mode implies the port is in continuous discovery without supplying power. Under normal operation, the Ethernet Routing Switch 8300 will not supply power unless a PD (Powered Device) is requesting power. To change the detection control, enter the following commands.

```
PPCLI
ERS-8310:5# config poe port <slot/port> power-detection-control  <auto|test>
CLI
ERS-8310:5(config)#interface fastEthernet <slot/port>
ERS-8310:5(config-if)#poe detect-control <auto|test>
ERS-8310:5(config-if)#exit
```

To set the Power Device (PD) Type, enter the following command:

```
PPCLI
ERS-8310:5# config poe port 1/1 type <other|telephone|webcam|wireless>
CLI
ERS-8310:5(config)#interface fastEthernet <slot/port>
ERS-8310:5(config-if)# poe type <other|telephone|webcam|wireless>
ERS-8310:5(config-if)#exit
```

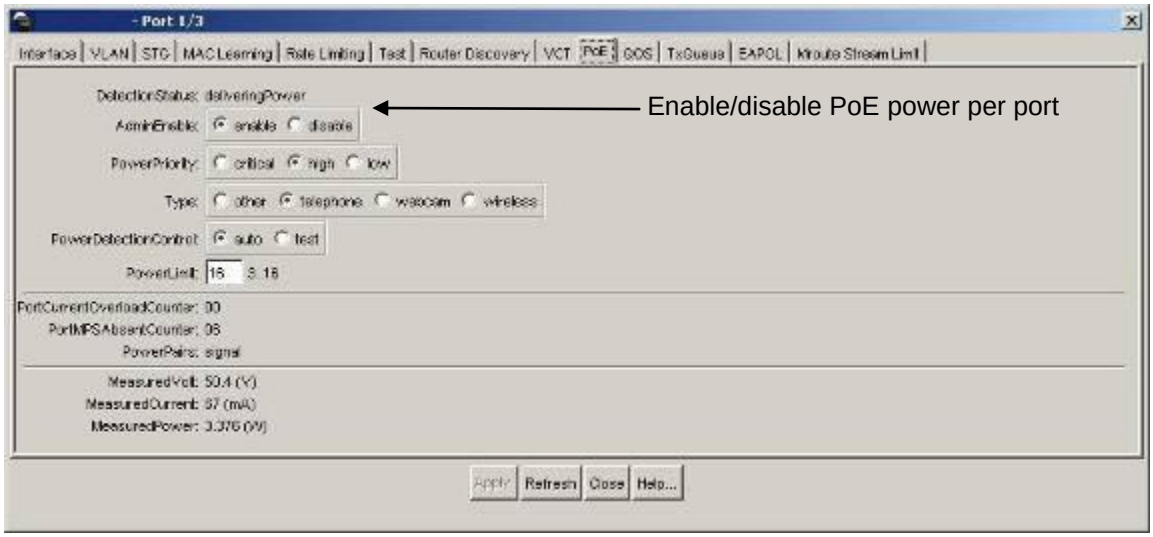
To set the PoE Trap Threshold , enter the following command:

```
PPCLI
ERS-8310:5# config poe card <slot #> power-usage-threshold <0-99>
CLI
ERS-8310:5(config)# poe usage-threshold slot <slot #> <0-99>
```

To disable PoE threshold notification , enter the following command:
PPCLI ERS-8310:5# ***config poe card notification-control <enable|disable>*** CLI ERS-8310:5(config)# ***no poe notification slot <slot#>***

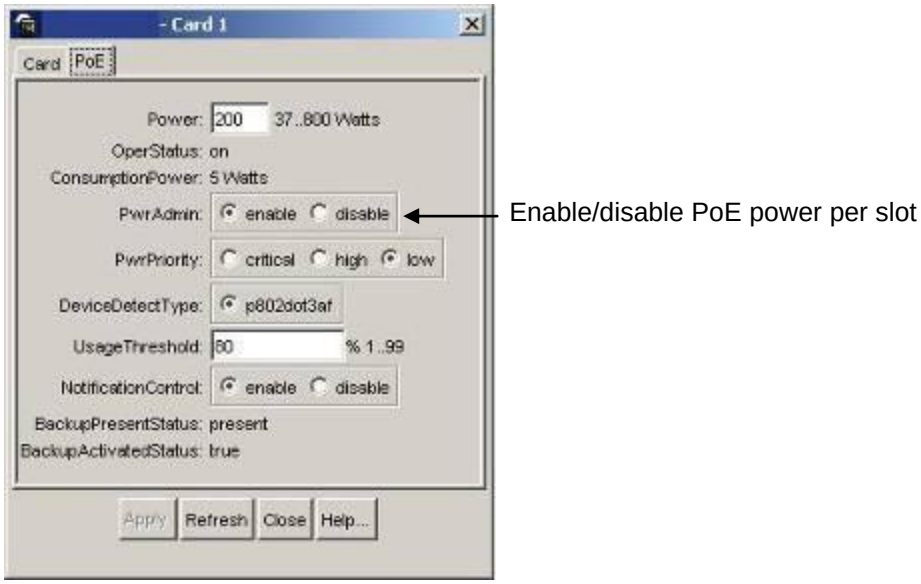
JDM – Port Level:

- Right-click on the port> *Edit>PoE*
- If you wish to configure multiple ports, press the Ctrl key and left click each port you wish to configure



JDM – Card Level:

- Select slot that you wish to configure, it should be high-lighted in a yellow box
- Right-click the card and select *Edit>PoE*



6. Avaya Enery Saver

You can use Avaya Energy Saver (AES) to reduce network infrastructure power consumption without impacting network connectivity. AES uses intelligent switching capacity reduction in off-peak mode to reduce direct power consumption by up to 40%. AES can also use Power over Ethernet (PoE) port power priority levels to shut down low priority PoE ports and provide more power savings.

The power consumption savings of each switch is determined by the number of ports with AES enabled and by the power consumption of PoE ports that are powered off. If AES for a port is set to disabled, the port is not powered off, irrespective of the PoE configuration. AES turns off the power to a port only when PoE is enabled globally, the port has AES is enabled, and the PoE priority for the port is configured to low.

You can schedule AES to enter lower power states during specified periods of time. These time periods can be a complete week, complete weekend, or individual days.

Because AES reduces the port speed to 10 Mbps full duplex when AES is activated, the IP phone will experience a short loss of traffic. Depending on the Avaya IP Phone model, this loss can be anywhere from 3 to 15 seconds as shown in the following chart.

Avaya IP Phone	Duration of loss of traffic	Setup
1600, 4600, 9600 Series	3-5 seconds	Using double DHCP
	3-5 seconds	LLDP-MED with Network Policy
	25 seconds	ADAC with LLDP-MED
1100, 1200, 2000 Series	5-15 seconds	Using double DHCP
	8-13 seconds	LLDP-MED with Network Policy
	70 seconds	ADAC with LLDP-MED

The Avaya 1600, 4600, and 9600 series are faster to recover when AES is activiated as they cache the VLAN and IP address. The 1100, 1200, and 2000 series will always perform a DHCP request when AES is activated even if the cached IP setting is enabled – this setting is only used when the IP Phone cannot reach the DHCP server.

7. QoS

7.1 Interface Roles – Stackable Ethernet Routing Switch

The Ethernet Routing Switch ports are classified into one of three categories which are trusted, untrusted, or unrestricted. The classifications of trusted, untrusted, and unrestricted actually apply to groups of ports (interface groups). These three categories are also referred to as interface classes. In your network, trusted ports are usually connected to the core of the DiffServ network, and untrusted ports are typically access links that are connected to end stations. Unrestricted ports can be either access links or connected to the core network.

At factory default, all ports are considered untrusted. However, for those interface groups created, the default is unrestricted.

Because a port can belong to only one interface group, a port is classified as trusted, untrusted, or unrestricted. These types are also referred to as interface classes.

The default processing of trusted and untrusted interfaces is as follows:

- **Trusted interfaces** — IPv4 traffic received on trusted interfaces is re-marked at the layer 2 level, that is, the 802.1p user priority value is updated based on the DSCP value in the packet at ingress and the installed DSCP-to-CoS mapping data. The DSCP value is not updated. On the 5500 Series switch, remapping occurs, by default, only for standardized DSCP values (for example, EF, AFXX) and any proprietary Avaya values. On the 5600 Series switch, remapping occurs for all DSCP values. The DSCP values that are remapped are associated with a zero 802.1p user priority value in the DSCP-to-COS Mapping Table. The 5600 Series switch uses a hardware based DSCP table to support Trusted processing. No policies or filters are consumed by the 5600 Series.
- **Untrusted interfaces** — IPv4 traffic received on untrusted interfaces is re-marked at the layer 3 level—that is, the DSCP value is updated. The new DSCP value is determined differently depending on whether the packet is untagged or tagged:
    - Untagged frames

      The DSCP value is derived using the default port priority of the interface receiving the ingressing packet. This default port priority is used to perform a lookup in the installed CoS-to-DSCP mapping table.

      The 802.1p user priority value is unchanged—that is, the default port priority determines this value.

      (Thus, the DSCP value on untagged frames on untrusted interfaces is updated using the default port priority of the ingress interface; the user sets the default port priority).
    - Tagged frames

      The DSCP value is re-marked to indicate best-effort treatment is all that is required for this traffic.

      The 802.1p user priority value is updated based on the DSCP-to-CoS mapping data associated with the best effort DSCP, which is 0.

Table 21 "Default QoS fields by class of interface—IPv4 only" shows the default guidelines the switch uses to re-mark various fields of IPv4 traffic (and layer 2 traffic matching IPv4) based on the class of the interface. These actions occur if the user does not intervene at all; they are the default actions of the switch.

Action	Trusted	Untrusted	Unrestricted
DSCP	Does not change	• Tagged--Updates to 0 (Standard) • Untagged--Updates using mapping table and port's default QoS level value	Does not change
IEEE 802.1p	Updates based on DSCP mapping table value	Updates based on DSCP mapping table value • Tagged—Updates to 0 • Untagged--Updates to port's default value	Does not change

Table 21: Default QoS fields by class of interface—IPv4 only

By default, all ports are untrusted using the default role combination named *allQoSPolicyIfcs*. This can be viewed by using the following command:

ERS-Stackable#***show qos if-group***

```
          Role                    Interface      Capabilities        Storage
      Combination                   Class                            Type
_____________________________ _____________ ____________________ ___________
allQoSPolicyIfcs              Untrusted     Input 802, Input IP ReadOnly
$remediationIfcs              Unrestricted  Input 802, Input IP Other
$NsnaIfcs                     Unrestricted  Input 802, Input IP Other
```

The following demonstrates several methods used to configure a simple layer 2 filter depending on if the ports are configured as untrusted or trusted. In our example VLAN 220 will be used for the Voice VLAN and VLAN 1000 as the data VLAN.

7.2 Default QoS Operations - ERS 8300

In regards to the ERS 8300, by default, both the DSCP and p-bit values are passed as-is. The p-bit value determines the QoS level. If you wish to use the DSCP value instead of the p-bit value to determine the QoS level, the port parameter *trust-dscp* should be enabled (in software versions prior to 4.1.3.1 and 4.2.0.1 on I/O modules other than the 8348GTX or 8348GTX-PWR, an ACL must be configured to trust DSCP instead).

7.3 QoS Mapping

Table 22 display's the default QoS Avaya service class mapping. This is the default mapping used with all the Avaya switches mentioned in the TCG.

DSCP	TOS	Binary	Decimal DSCP/ToS	NNSC	PHB
0x0	0x0	000000 **00**	0	Standard	CS0
0x0	0x0	000000 **00**	0		DE
0x8	0x20	001000 **00**	8/32	Bronze	CS1
0xA	0x28	001010 **00**	10/40		AF11
0x10	0x40	010000 **00**	16/64	Silver	CS2
0x12	0x48	010010 **00**	18/72		AF21
0x18	0x60	011000 **00**	24/96	Gold	CS3
0x1A	0x68	011010 **00**	26/104		AF31
0x20	0x80	100000 **00**	32/128	Platinum	CS4
0x22	0x88	100010 **00**	34/136		AF41
0x28	0xA0	101000 **00**	40/160	Premium	CS5
0x2E	0xB8	101110 **00**	46/184		EF
0x30	0xC0	110000 **00**	48/192	Network	CS6
0x38	0xE0	111000 **00**	56/224	Critical	CS7

Table 22: Avaya QoS Class Mappings

7.4 Queue Sets

7.4.1 Ethernet Routing Switch 2500

The ERS 2500 has four hardware queues which can be viewed by using the following CLI command. The first queue, strict priority, is always serviced first. The remaining three queues are serviced using a weighted-round-robin (WRR) scheduler.

- 2526T-PWR#***show qos queue-set***

```
Set Queue        General         Bandwidth Absolute  Bandwidth  Service  Size
ID   ID        Discipline          (%)    Bandwidth Allocation  Order  (Bytes)
                                  (Kbps)
___ _____ _____________________ _________ _________ __________ _______ _______
4   1     Priority Queuing      100       0         Relative   1       184320
4   2     Weighted Round Robin  65        0         Relative   2       151552
4   3     Weighted Round Robin  26        0         Relative   2       135168
4   4     Weighted Round Robin  9         0         Relative   2       118784
```

The default priority mapping can be used by the issuing the following CLI command.

- 2526T-PWR#***show qos queue-set-assignment***

```
Queue Set 4
802.1p Priority Queue
_______________ _____
0               4
1               4
2               4
3               4
4               4
5               3
6               1
7               2
```

The default DSCP to priority mapping can be viewed by issuing the following command.

- 2526T-PWR#***show qos egressmap status***

```
DSCP 802.1p Priority Drop Precedence       Name
____ _______________ _______________ _________________
0    0              High Drop       Standard Service
1    0              High Drop       Standard Service
2    0              High Drop       Standard Service
3    0              High Drop       Standard Service
8    2              High Drop       Bronze Service
[…]
16   3              High Drop       Silver Service
[…]
24   4              High Drop       Gold Service
[…]
32   5              High Drop       Platinum Service
[…]
40   6              Low Drop        Premium Service
[…]
48   7              Low Drop        Network Service
[…]
56   7              Low Drop        Critical Service
[…]
63   0              High Drop       Standard Service
```

7.4.2 Ethernet Routing Switch 4500

Beginning with release 5.4, the ERS 4500 now supports up to 8 different queue sets with a buffering sharing setting, and support for egress traffic shaping. Depending on the queue set, up to eight queues are supported. The default settings include queue-set 2 supporting two strict queues with and a buffer sharing setting of Large.

Egress CoS Queuing CLI Commands

- 4500-PWR(config)#***qos agent queue set <1-8>***
- 4500-PWR#***show qos queue-set***
- 4500-PWR#***show qos queue-set <1-8>***
- 4500-PWR(config)#***default qos agent queue-set***

  The *qos agent queue set <1-8>* command sets the egress CoS and QoS queue mode (1-8) in which the switch will operate. This parameter is global and requires a reset to activate a change. Please note, although up to 32 queue sets shown using the *show qos queue-set*, you can only select one of the first eight queue sets.

  The *show qos queue-set* command displays the queue set configuration. The display includes the general discipline of the queue, the percent bandwidth (Kbps), and the queues size in bytes.

  The *default qos agent queue-set* command will default the egress CoS and QoS queue set back to queue mode is 2.

- 4500-PWR(config)# ***qos agent buffer <large | maximum | regular>***
- 4500-PWR(config)#***show qos agent***
- 4500-PWR(config)#***qos agent reset-default***

  The *qos agent buffer <regular | large | maximum >* command allows the user to specify the level of resource sharing on the switch. This parameter is global and requires a reset to activate a change.

  The *show qos agent command* displays the current attributes for egress CoS and QoS queue mode, resource sharing mode, and QoS NVRAM commit delay.

  The *qos agent reset-default* command resets QoS to its configuration default.

- 4500-PWR(config)#***qos queue-set-assignment queue-set <1-32> 1p <0-7> queue <1-8>***
- 4500-PWR#***show qos queue-set-assignment***
- 4500-PWR#***show qos queue-set-assignment queue-set <1-32>***

  The *qos queue-set-assignment queue-set <1-32> 1p <0-7> queue <1-8>* command gives the user the ability to specify the queue to associate an 802.1p priority.

  The *show qos queue-set-assignment* command displays in the CLI the 802.1p priority to egress CoS and QoS queue mapping for CoS setting.

- 4500-PWR(config)#***qos egressmap [name <policy-name>] ds <DSCP-value 0-63> 1p <802.1P-value 0-7> dp <drop-precedence low-drop | high-drop> newds <mutated-DSCP-value 0-63>***

  QoS DSCP mutation is a QoS feature (release 5.4 or higher) which extends the trusted interface support to allow recolouring of the DSCP values on egress utilising the mapping tables rather than filters. This feature enables the switch to not only set the Class of Service, but to also recolour the DSCP value on egress without using any filter resouces.

In software releases prior to v5.4 the ERS4500 supported one queue set, queue set 4, made up of four queues with maximum allocation.

QoS Egress Queue Traffic Shaping

- 4500-PWR(config)# ***qos if-queue-shaper port <port> queue <1-8> shape-rate <64-10230000> shape-min-rate <64-10230000>***
- 4500-PWR(config)#***show qos if-queue-shaper port <port> {queue <1-8>}***

  Egress Queue Shaping allows the ability to configure egress shaping on either a per port basis or on a per Class-of-Service basis on the ERS 4500.

  - Can be applied to any of the 8 egress queues per port
  - Provides shaping granularity of 1Mbps or 64kbps

QoS Guidelines

QoS resources are shared on the Ethernet Routing Switch 4500 across groups of ports. Each hardware device (ASIC) contains 24 to 26 ports as per table 23 below and supports the following scaling:

- Up to 128 classifiers for each mask precedence for each ASIC.
- Up to 64 meters for each mask precedence for each ASIC.
- Up to 64 counters for each mask precedence for each ASIC.
- Up to 8 precedence masks for each port.
- Up to 16 range checkers for each ASIC.

Model	ASIC Device 1	ASIC Device 2
4526FX, 4526T, 4526T-PWR, 4526GTX, 4526GTX-PWR	Port 1 -24 or 26	Not Applicable
4550T, 4550T-PWR, 4548GT, 4548GT-PWR	Port 1 -24	Port 25 – 48 or 50

Table 23: Ethernet Routing Switch 4500 ASIC

The QoS resources used can be viewed by using the following command:

- 4500-PWR#***show qos diag unit <1-8>***

A maximum of 16 port ranges are supported for each hardware device (ASIC).

7.4.3 Ethernet Routing Switch 5000

The ERS 5000 supports up to 8 different queue sets, a buffering sharing setting, and support for egress traffic shaping. Depending on the queue set, up to eight queues are supported. The default settings include queue-set 2 supporting two strict queues with and a buffer sharing setting of Large.

Egress CoS Queuing CLI Commands

- 5000-PWR(config)#***qos agent queue set <1-8>***
- 5000-PWR#***show qos queue-set***
- 5000-PWR#***show qos queue-set <1-8>***
- 5000-PWR(config)#***default qos agent queue-set***

  The *qos agent queue set <1-8>* command sets the egress CoS and QoS queue mode (1-8) in which the switch will operate. This parameter is global and requires a reset to activate a change. Please note, although up to 56 queue sets shown using the *show qos queue-set*, you can only select one of the first eight queue sets.

  The *show qos queue-set* command displays the queue set configuration. The display includes the general discipline of the queue, the percent bandwidth (Kbps), and the queues size in bytes.

  The *default qos agent queue-set* command will default the egress CoS and QoS queue set back to queue mode is 2.

- 5600-PWR(config)# ***qos agent buffer <large | lossless | maximum | regular>***
- 5520-PWR(config)# ***qos agent buffer <large | maximum | regular>***
- 5000-PWR(config)#***show qos agent***
- 5000-PWR(config)#***qos agent reset-default***

  The *qos agent buffer <large | lossless | maximum | regular>* command allows the user to specify the level of resource sharing on the switch. The *lossless* value, added in release 6.2, shapes traffic to be lossless at the expense of throughput using 802.3x flow control. In order for lossless to work, the end stations must be capable of sending and responding to 802.3x pause frames. Please note the value of *lossless* applies only to the ERS 5600 series, hence, it should be used in hybrid stack of ERS 5600 and ERS 5500 switches. This parameter is global and requires a reset to activate a change.

  The *show qos agent* command displays the current attributes for egress CoS and QoS queue mode, resource sharing mode, and QoS NVRAM commit delay.

  The *qos agent reset-default* command resets QoS to its configuration default.

- 4500-PWR(config)#***qos queue-set-assignment queue-set <1-56> 1p <0-7> queue <1-8>***
- 4500-PWR#***show qos queue-set-assignment***
- 4500-PWR#***show qos queue-set-assignment queue-set <1-56>***

  The *qos queue-set-assignment queue-set <1-56> 1p <0-7> queue <1-8>* command gives the user the ability to specify the queue to associate an 802.1p priority.

The *show qos queue-set-assignment* command displays the 802.1p priority to egress CoS and QoS queue mapping for CoS setting.

- 5000-PWR(config)#***qos egressmap [name <policy-name>] ds <DSCP-value 0-63> 1p <802.1P-value 0-7> dp <drop-precedence low-drop | high-drop> newds <mutated-DSCP-value 0-63>***

  QoS DSCP mutation is a QoS feature (release 6.2 or higher) which extends the trusted interface support to allow recoloring of the DSCP values on egress utilising the mapping tables rather than filters. This feature enables the switch to not only set the Class of Service, but to also recolour the DSCP value on egress without using any filter resouces.

QoS Egress Queue Traffic Shaping

- 5000-PWR(config)# ***qos if-queue-shaper port <port> queue <1-8> shape-rate <64-10230000> shape-min-rate <64-10230000>***
- 5000-PWR(config)#***show qos if-queue-shaper port <port> {queue <1-8>}***

  Egress Queue Shaping allows the ability to configure egress shaping on either a per port basis or on a per Class-of-Service basis on the ERS 5000.

  - Can be applied to any of the 8 egress queues per port
  - Provides shaping granularity of 1Mbps or 64kbps

7.4.4 Ethernet Routing Switch 8300

Each Ethernet port on the Ethernet Routing Switch 8300 supports eight hardware queues as shown in the Table below. Each of the eight queues is mapped to one of the eight QoS levels while each queue can be configured using one of three scheduling arbitration groups, i.e. strict priority, DWRR0, and DWRR1 where strict always have the highest precedence followed by DWRR1 and then DWRR0. This allows you to have the flexibility, if you wish to change all eight queues to Strict Priority. In addition, each per queue shaping can be enabled for shaping with a minimum shaping rate of 1 Mbps

Queue	Traffic Class Queue	Drop Precedence	Scheduling Group	DWRR Weight	Size (8348TX)	Size (8324GTX)	Size (8348GTX)	Size (8393SF)
1	7 (highest)	Low	Strict Priority	N/A	16	32	64	48
2	6	Low	DWRR1	36	16	32	64	48
3	5	Low	DWRR1	12	16	32	64	48
4	4	Low	DWRR1	10	16	32	64	48
5	3	Low	DWRR1	8	32	32	64	48
6	2	Low	DWRR1	6	32	32	64	48
7	1	Low	DWRR1	3	32	48	64	48
8	0 (lowest)	Low	DWRR1	3	32	48	64	48
Queue	**Traffic Class Queue**	**Drop Precedence**	**Scheduling Group**	**DWRR Weight**	**Size (8394SF)**	**Size (8308XPF)**		
1	7 (highest)	Low	Strict Priority	N/A	192			
2	6	Low	DWRR1	36	192			
3	5	Low	DWRR1	12	192			
4	4	Low	DWRR1	10	192			
5	3	Low	DWRR1	8	192			
6	2	Low	DWRR1	6	192			
7	1	Low	DWRR1	3	192			
8	0 (lowest)	Low	DWRR1	3	192			

Table 24: Ethernet Routing Switch 8300 Egress Queue

Egress TX Queue CLI Commands

Use the following command to change the Tx Queue settings:
PPCLI ERS-8310:5# ***config ethernet <slot/port> tx-queue <0-7> [transmit <value>] [size <value>] [scheduler <value>] [weight <value>] [shaper <value>] [rate <value>] [burst-size <value>]*** To disable a queue ERS-8310:5# ***config ethernet <slot/port> tx-queue <0-7> transmit disable*** CLI ERS-8310:5(config)#***interface <fastEthernet| gigabitEthernet> <slot|port>*** ERS-8310:5(config-if)#***tx-queue <0-7> transmit [size <value>] [scheduler <value>] [weight <value>] shaper [rate <value>] [burst-size <value>]*** ERS-8310:5(config-if)#***exit*** To disable a queue ERS-8310:5(config-if)# ***no tx-queue <0-7> transmit*** ERS-8310:5(config-if)#***exit***

Where :

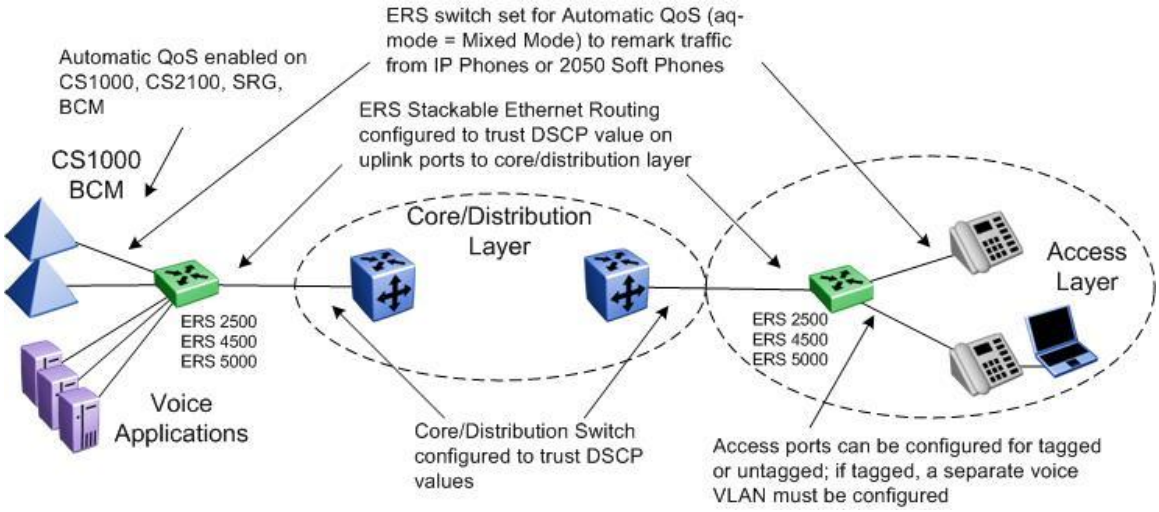
config ethernet <ports> tx-queue <queue-id> (PPCLI) **tx-queue (CLI)** followed by:	
[burst-size <value>]	Sets the shaper burst size in Kilobytes (KB). The default value is 4 KB. The range is an integer value in the range 4 and 16000 KB. • burst-size <*value*> allows you to set the shaper burst size in KB. The available range is 1 and 16000 KB.
[rate <value>]	Sets the shaping rate in Mb/s. The default value is 10 Mb/s. The range is an integer value in the range 1 and 10000 Mb/s. • rate <*value*> allows you to set the shaper maximum rate in Mb/s. The available range is 1 and 10000 Mb/s. Note: the actual shaping rate can be different from the configured rate due to the rate granularity of the shaper.

[scheduler <value>]	Sets the scheduling Arbitration group. *value* allows you to set one of the three following scheduling arbitration groups: • Strict priority - This Arbitration Group is served first, where the priority goes from the highest queue index to the lowest. • DWRR1 - This Arbitration Group may transmit packets when there is no traffic from the SP Arbitration Group. • DWRR0 - This Arbitration Group may transmit packets when there is no traffic from the DWRR Group 1. Note: Within each DWRR Arbitration Group, each queue is guaranteed its proportional minimal bandwidth according to its configured weight.
shaper <value>] (PPCLI only)	Enables or disables transmission of shaper on the port. • shaper <*value*> allows you to enable or disable the feature.
[size <value>]	Specifies the number of packet descriptors allocated for the queue. • size <*value*> sets the number of descriptors in resolution of 16 {16..384}
[transmit <value>] (PPCLI only)	Enables or disables transmission on the queue. • transmit <*value*> enables or disables the feature
[weight <*value*>]	Specifies the proportion (in units of 256 bytes) of bandwidth assigned to this queue relative to the other queues in the arbitration group. • *value* is an integer value in the range 1 and 256, which represents units of bandwidth in the DWRR. The default value is 8 units, which is 8 * 256 (2048). Note: Avaya recommends that the minimum weight (N * 256) be greater than the port MTU.

7.5 Automatic QoS

Automatic QoS provides application traffic prioritization allowing for the ability to identify and prioritize Avaya application traffic. This applies to both an Avaya only or Avaya edge and third party core data infrastructure to provide application aware networking. Avaya application traffic is defined as IP Telephony and Multimedia applications. By identifying Avaya application traffic, Automatic QoS transparently provides appropriate traffic prioritization handling and in turn improves application performance particularly in times of network congestion. Automatic QoS is applied end-to-end from the application traffic to the Avaya or third party data infrastructure without the need to configure individual application filters and QoS components across a variety of platforms. Simply enable/disable the appropriate Automatic QoS mode and all underlying QoS configurations to identify Avaya application traffic are automatically configured. Well known Avaya application traffic that is automatically identified via DSCP values will be given preferential treatment and will be handled by the appropriate egress queue on the Ethernet switching infrastructure.

As shown in the diagram below, dynamic prioritization is provided by enabling Automatic QoS on the Stackable Ethernet Routing Switch edge access switch and on the CS1000, CS2100, BCM, and/or SRG call servers. In regards to the edge switch, the Stackable Ethernet Routing Switch supports dynamic prioritization for either tagged or untagged IP telephony traffic. The only other configuration required on the edge switch is setting the uplink port members attached to the core/distribution layer as trusted port members. In the core, all that is required is enabling the port members as QoS trusted.



Please note that Automatic QoS configuration is only available using the CS1000, CS2100, BCM, and/or SRG call servers.

7.5.1 Automatic QoS Edge Mode: Stackable Ethernet Routing Switch

On the Stackable Ethernet Routing Switch, when enabling dynamic prioritization via Automatic QoS Edge, there are two modes to choose from, mixed mode and pure mode.

In mixed mode, the Stackable Ethernet Routing Switch will recognize and remark the traffic from the attached IP phone, IP Softphone 2050 client or BCM/SRG/CS1000/CS2100 according to values shown in Table 25. As long as the switches used in the core/distribution layer are configured as QoS trusted, these remarked DSCP values will be given preferential treatment and will be handled by the appropriate egress queue.

NT DSCP from IP Phone	Traffic Type	Standard DSCP	Standard p-bit
0x2F (47)	VoIP Data (Premium)	0x2E (46) (EF)	6
0x29 (41)	VoIP Signaling (Platinum)	0x28 (40) (CS5)	5
0x23 (35)	Video (Platinum)	0x22 (34) (AF41)	5
0x1B (27)	Streaming (Gold)	0x1A (26) (AF31)	4

Table 25: NT DSCP Mapping Values (Mixed)

Please note that all other traffic types not identified will be handled as normal unidentified traffic and will be remarked as “Standard/Best Effort” with DSCP value of 0x00 and treated as untrusted traffic.

In pure mode, the Stackable Ethernet Routing Switch will recognize and not remark the traffic from the attached IP phone, IP Softphone 2050 client or BCM/SRG/CS1000/CS2100. Avaya DSCP values will be given preferential treatment and will be handled by the appropriate egress queue and the packet will retain these DSCP values as shown in Table 26.

NT DSCP	NT p-bit	Traffic Type
0x2F (47)	6	VoIP Data (Premium)
0x29 (41)	5	VoIP Signaling (Platinum)
0x23 (35)	5	Video (Platinum)
0x1B (27)	4	Streaming (Gold)

Table 26: NT DSCP Values (Pure)

Please note that all other traffic types not identified will be handled as normal unidentified traffic and will be remarked as “Standard/Best Effort” with DSCP value of 0x00 and treated as untrusted traffic.

Automatic QoS support is envisioned as a multi-phase project. In phase 1 of Automatic QoS, ADAC, NSNA, Automatic QoS pure mode, or 802.1AB is not supported simultaneously. This will be added in subsequent phases of Automatic QoS.

7.5.2 Automatic QoS Configuration – Stackable Ethernet Routing Switch

Automatic QoS is configured by using the following command:

- ERS-Stackable(config)#***qos agent aq-mode ?***

```
disable  Auto QOS application traffic processing disabled on all ports
mixed    Auto QOS application traffic processing enabled on all ports with
         egress DSCP remapping
pure     Auto QOS application traffic processing enabled on all ports without
         egress DSCP remapping
```

where:

Parameter	Description
disable	Disables Automatic QoS functionality for the system
mixed	Enables Automatic QoS functionality with DSCP remarking at egress enabled. Private Avaya DSCP values will be remarked to corresponding standard DSCP values.
pure	Enables Automatic QoS functionality with DSCP remarking at egress disabled. Private DSCP values will be honored while all other traffic is remarked to QoS level of Standard. Please note that this mode is not supported at this time.

Please note that phase 1 of Automatic QoS does not support ADAC, NSNA, or 802.1AB simultaneously. Depending on the software release, the CLI Automatic QOS command may either be qos *agent aq-mode* or *qos agent nt-mode*.

7.5.2.1 Core Ports

Although not necessary, the core or uplink port members could be configured as QoS trusted ports if you wish to trust all QoS levels besides just the Automatic QoS levels. This can be accomplished by first adding a new QoS interface group and then adding the port members to this interface group.

- ERS-Stackable(config)#***qos if-group name <if-group_name> class trusted***
- ERS-Stackable(config)#***qos if-assign port <port members> name <if-group_name>***

7.6 Configuring QoS on a Avaya Switch for Voice Traffic

7.6.1 Stackable Ethernet Routing Switch - Creating a new Interface Group of Trusted

The following will show how to use a Policy, ACL, or Traffic profile to only trust the voice traffic assuming we will use VLAN 220 for the voice VLAN and 1000 for the data VLAN

- Section 7.6.1: Creating a new Interface Group with a class of trusted
  - Remark the data VLAN to CoS level of Standard or best effort by adding either a QoS policy, an ACL, or Traffic Profile
- Section 7.6.2: Using the default Interface Group with a class of untrusted
  - Remarking the voice VLAN to CoS level of Premium by adding either a QoS policy, an ACL, or Traffic Profile

7.6.1.1 Stackable Ethernet Routing Switch - Using a Policy

ERS Stackable: Step 1 – Add a new interface group with a class of trusted and add port members. For this example, we will name the if-group "trusted".
ERS-Stackable(config)#***qos if-group name trusted class trusted*** ERS-Stackable(config)#***qos if-assign port 1-24 name trusted***
ERS Stackable: Step 2 – Create two elements, one matching the voice VLAN and another matching the data VLAN and set the EtherType to 0x0800. An EtherType value of 0x0800 signifies IP traffic
ERS-Stackable(config)#***qos l2-element 1 vlan-min 220 vlan-max 220 ethertype 0x800*** ERS-Stackable(config)#***qos l2-element 2 vlan-min 1000 vlan-max 1000 ethertype 0x800***
ERS Stackable: Step 3 – Add each layer 2 element to a classifier by starting with classifier id 1 and adding the layer 2 element id's from step above
ERS-Stackable(config)#***qos classifier 1 set-id 1 name voice element-type l2 element-id 1*** ERS-Stackable(config)#***qos classifier 2 set-id 2 name data element-type l2 element-id 2***

ERS Stackable: Step 3 – Create a classifier-block and add both classifiers from the previous step to it. For the voice classifier, we will add an in-profile action of *null* to pass all voice traffic as-is. For the data classifier, we will add an in-profile action of *standard* to remark all the traffic to a QoS level of standard. Please note that a classifier block can be used in this example because both of the classifier elements are of the same type, i.e. both are a layer 2 element matching a VLAN with the same EtherType.

```
ERS-Stackable(config)#qos classifier-block 1 block-number 1 name data_remark
set-id 1 in-profile-action 9
ERS-Stackable(config)#qos classifier-block 2 block-number 1 name data_remark
set-id 2 in-profile-action 2
```

ERS Stackable: Step 4 – Add a policy, for this example named VoIP_Policy, add classifier-block id 1 configured above, and set the precedence to a value from 1 to 7 for the ERS 4500, 2 to 11 for the ERS 2500, and 1 to 15 for the ERS 5000.

```
ERS-Stackable(config)#qos policy 1 name "VoIP_Policy" if-group trusted clfr-
type block clfr-name data_remark precedence 3
```

Note that you can use either ID's or names for the classifiers and policy actions.

To understand what the in-profile-action and non-match-action refer to, enter the following command:

ERS-Stackable #***show qos action 2***

ERS-Stackable #***show qos action 9***

```
Id: 2
Name: Standard_Service
Drop: No
Update DSCP: 0x0
802.1p Priority: Priority 0
Set Drop Precedence: High Drop
Extension:
Session Id: 0
Storage Type: ReadOnly

Id: 9
Name: Null_Action
Drop: No
Update DSCP: Ignore
802.1p Priority: Ignore
Set Drop Precedence: Low Drop
Extension:
Session Id: 0
Storage Type: ReadOnly
```

7.6.1.2 Stackable Ethernet Routing Switch – using an ACL

ERS Stackable: Step 1 – Add a new interface group with a class of trusted and add port members. For this example, we will name the if-group "trusted".
ERS-Stackable(config)#***qos if-group name trusted class trusted*** ERS-Stackable(config)#***qos if-assign port 1-24 name trusted***
ERS Stackable: Step 1 – Create the ACL to match the data VLAN and remark DSCP and p-bit values to 0. Please note the default action of an ACL is drop for all other traffic not matched by an ACL, hence, we also need to add a drop-action of disable to our ACL:
ERS-Stackable(config)#***qos l2-acl name one vlan-min 1000 vlan-max 1000 ethertype 0x800 drop-action disable update-dscp 0 update-1p 0*** ERS-Stackable(config)#***qos l2-acl name one ethertype 0x800 drop-action disable***
ERS Stackable: Step 2 – Assign the ACL vlan_fil to the appropriate port members
ERS-Stackable(config)#***qos acl-assign port 1-24 acl-type l2 name one***

To view the configuration, enter the following commands"

- ERS-Stackable#***show qos l2-acl***
- ERS-Stackable#***show qos acl-assign***

To remove the configuration, enter the following commands:

- ERS-Stackable#***no qos acl-assign x*** (where x = id assigned to port; in our case, this command has to be repeated 24 times where x = 1 to 24 as we assigned the ACL to 24 port members)
- ERS-Stackable#***no qos l2-acl 1***
- ERS-Stackable#***no qos l2-acl 2***
- ERS-Stackable#***no qos l2-acl all (remove all L2-ACL's)***

7.6.1.3 Stackable Ethernet Routing Switch – using an Traffic Profile

Please note Traffic Profiles can only be applied to the ERS 4500 and ERS 5000.

ERS Stackable: Step 1 – Add a new interface group with a class of trusted and add port members. For this example, we will name the if-group "trusted".
ERS-Stackable(config)#***qos if-group name trusted class trusted*** ERS-Stackable(config)#***qos if-assign port 1-24 name trusted***
ERS Stackable: Step 2 – Create the traffic profile to match the data VLAN and remark DSCP and p-bit values to 0
ERS-Stackable(config)#***qos traffic-profile classifier name one vlan-min 1000 vlan-max 1000 ethertype 0x800 update-dscp 0 update-1p 0***
ERS Stackable: Step 2 – Assign the traffic profile *one* to the appropriate port members
ERS-Stackable(config)#***qos traffic-profile set port 1-24 name one***

At mimimum, software release 6.1 for the ERS 5000 and 5.4 for the ERS 4500 must be used in order to create traffic profiles.

7.6.2 Stackable Ethernet Routing Switch - Assuming default role combination with class of untrusted

By default, all ports belong to the default interface group named *allQoSPolicyIfcs* with an interface class of untrusted. Hence, it is not nessessary to create a new interface group.

7.6.2.1 Stackable Ethernet Routing Switch – using an Policy

ERS Stackable: Step 1 – Create a new layer 2 element, assign Voice VLAN and set the EtherType to 0x0800
ERS-Stackable(config)#***qos l2-element 1 vlan-min 220 vlan-max 220 ethertype 0x800***
ERS Stackable: Step 2 – Add layer 2 element to a classifier by starting with classifier id 1 and adding layer 2 element id 1 from step above
ERS-Stackable(config)#***qos classifier 1 set-id 1 name VoIP_Class element-type 12 element-id 1***
ERS Stackable: Step 3 – Add a policy, for this example named VoIP_Policy, add classifier id 1 configured above, set in-profile-action to remark to Premium CoS, and set the non-match action to remark to Standard CoS.
ERS-Stackable(config)#***qos policy 1 name VoIP_Policy if-group allQoSPolicyIfcs clfr-type classifier clfr-id 1 in-profile-action 7 non-match-action 2***
ERS Stackable: Step 3 – Add a policy, for this example named VoIP_Policy, add classifier id 1 configured above, set in-profile-action to remark to Premium CoS, and set the non-match action to remark to Standard CoS.
ERS-Stackable(config)#***qos policy 1 name "VoIP_Policy" if-group allQoSPolicyIfcs clfr-type classifier clfr-id 1 in-profile-action 7 precedence 3***

You can also apply the policy to an individual port member instead of an interface role with multiple port members. For example, assuming only wish to apply the policy to port 12, enter the following command:

- ERS-Stackable(config)#***qos policy 1 name VoIP_Policy port 12 clfr-type classifier clfr-id 1 in-profile-action 7 non-match-action 2***

7.6.2.2 Stackable Ethernet Routing Switch – using an ACL

ERS Stackable: Step 1 – Create an ACL to match the voice VLAN. Please note that default action of an ACL is drop for all other traffic not matched by an ACL, hence, we also need to add a drop-action of disable to our ACL:
ERS-Stackable(config)#***qos l2-acl name one vlan-min 220 vlan-max 220 ethertype 0x800 update-dscp 46 update-1p 6*** ERS-Stackable(config)#***qos l2-acl name one ethertype 0x800 drop-action disable***
ERS Stackable: Step 2 – Assign the ACL to the appropriate port members; for example, port member 1-24:
ERS-Stackable(config)#***qos acl-assign port 1-24 acl-type l2 name one***

7.6.2.3 Stackable Ethernet Routing Switch – using a Traffic Profile

Please note Traffic Profiles can only be applied to the ERS 4500 and ERS 5000.

ERS Stackable: Step 1 – Create the traffic profile to match the voice VLAN and remark DSCP and p-bit values
ERS-Stackable(config)#***qos traffic-profile classifier name one vlan-min 220 vlan-max 220 ethertype 0x800 update-dscp 46 update-1p 6***
ERS Stackable: Step 2 – Assign the traffic profile *one* to the appropriate port members
ERS-Stackable(config)#***qos traffic-profile set port 1-24 name one***

At mimimum, software release 6.1 for the ERS 5000 and 5.4 for the ERS 4500 must be used in order to create traffic profiles.

7.6.3 Configure L2 QoS on a Ethernet Routing Switch 8300

By default, the Ethernet Routing Switch 8300 trusts the 802.1p value with a default behavior as shown in table 27 below. Providing the VoIP VLAN is tagged, no additional configuration steps are required.

Traffic Type	802.1p		DSCP	
	Behavior	Queue	Behavior	Queue
Bridged, i.e. VLAN without IP address				
Tagged	Passed as-is	As per traffic class and queue mapping	Passed as-is	As per p-bit
Untagged	N/A	N/A	Passed as-is	Queue 1
Routed, i.e. VLAN with IP address assigned				
Tagged	Passed as-is	As per traffic class and queue mapping	Passed as-is	As per p-bit
Untagged	N/A	N/A	Passed as-is	Queue 1

Table 27: Default QOS Behavior for the Ethernet Routing Switch 8300

If the IP Phone set voice VLAN is not tagged or if the voice VLAN is tagged and you wish to trust the DSCP value instead of the p-bit, you could set up a filter to trust the DSCP value. You can also classify traffic based on VLAN value or filters.

7.6.3.1 Trust DSCP Value Configuration

To setup a filter to trust the DSCP value, please enter the following commands.

ERS8300: Step 1 – Create a new ACL with an action to trust the DSCP value. Assuming no ACLs have been configured, start with ACL 1

```
PPCLI
ERS8300:5# config filter acl 1 create ip
ERS8300:5# config filter acl 1 ace 1 action permit trust-dscp enable
CLI
ERS8300:5(config)#filter acl 1 ip
ERS8300:5(config)#filter acl 1 action 1 permit trust-dscp enable
```

ERS8300: Step 2 – Create an ACG group and add ACL configured in step 1 above. Assuming no ACG have been configured, start with ACG 1

```
PPCLI
ERS8300:5# config filter acg 1 create 1
CLI
ERS8300:5(config)#filter acg 1 1
```

ERS8300: Step 3 – Add the ACG created in step 2 to all appropriate port members

```
PPCLI
ERS8300:5# config ethernet <port #> filter create 1
CLI
ERS8300:5(config)#interface fastEthernet <slot/port>
ERS8300:5(config-if)#filter 1
ERS8300:5(config-if)#exit
```

You can enable or disable trusted DSCP at an interface level as per the configuration steps shown below.

ERS8300: Step 1 – Enable *trust-dscp* via interface level

```
PPCLI
ERS8300:5# config ethernet <slot/port> qos trust-dscp enable
CLI
ERS8300:5(config)# interface gigabitEthernet <slot/port>
ERS8300:5(config-if)#qos trust-dscp enable
ERS8300:5(config-if)#exit
```

7.6.3.2 Classify traffic based on VLAN basis

For IP subnet and Protocol-based VLANs you can set up a default traffic class level based on the VLAN id. The VLAN QoS level can be assigned a value from 0 (lowest) to 7 (highest) with a default setting of 1. Note that you cannot apply a VLAN QoS level to port-based VLANs. For example, assuming the VoIP VLAN is 220 with port members 1/3 to 1/11, enter the following commands:

ERS8300: Step 1 – Create VLAN 220 and add port members

```
PPCLI
ERS8300:5# config vlan 220 create byprotocol 1 ip
ERS8300:5# config vlan 1 ports remove 1/1-1/11
ERS8300:5# config vlan 220 ports add 1/1-1/11
CLI
ERS8300:5(config)#vlan create 220 type protocol-ipether2 1
ERS8300:5(config)#vlan members remove 1 1/1-1/11
ERS8300:5(config)#vlan members add 220 1/1-1/11
```

ERS8300: Step 2 – Assign QoS level

```
PPCLI
ERS8300:5# config vlan 220 qos-level 6
CLI
ERS8300:5(config)#vlan qos-level 220 6
```

ERS8300: Step 3 – Enable Dynamic MAC QoS Update

```
PPCLI
ERS8300:5# config vlan 220 update-dynamic-mac-qos-level enable
CLI
ERS8300:5(config)#vlan update-dynamic-mac-qos-level 220
```

The dynamic update parameter is used to enable to disable the update of the MAC traffic class assignment when the VLAN traffic class changes.

7.6.3.3 Classify traffic based on a filter

Assuming we wish to filter on the VoIP VLAN with the MAC address range belonging to the IP Phone sets and set the DiffServ value to EF (0x2e). This can be accomplished by using the commands shown below.

For our example, we will assume the voice VLAN is 220 while the MAC address range is from 00:0a:e4:00:00:00 to 00:0a:e4:ff:ff:ff.

PPCLI:

ERS8300: Step 1 – Create a new ACT to allow ACL filtering on MAC addresses

```
PPCLI
ERS8300:5# filter act 2 ethernet ip src-mac ff:ff:ff:ff:ff:ff dst-mac
ff:ff:ff:ff:ff:ff vlan-mask 0x0fff name "act_2_ip-mac"
CLI
ERS8300:5(config)#filter act 2 ethernet ip src-mask ff:ff:ff:ff:ff:ff dst-mask
ff:ff:ff:ff:ff:ff vlan-mask 0x0fff name act-2-ip-mac
```

ERS8300: Step 2 – Enable the ACT to also allow ACL filtering on the DSCP value

```
PPCLI
ERS8300:5# config filter act 2 ip 0.0.0.0 tos 0xff
CLI
ERS8300:5(config)#filter act 2 ip tos 0xff
```

ERS8300: Step 3 – Add ACL 1 using the name ACL-1_VoIP, add ACT 2 created above, and enable the ACL to filter on the specified MAC address in VLAN 220 to remark traffic using Premium CoS and remark all other traffic as Standard CoS

```
PPCLI
ERS8300:5# config filter acl 1 create ip acl-name ACL-1_VoIP act-id 2
ERS8300:5# config filter acl 1 ace 1 action permit remark-dscp phbef "ACE-
1_remark" precedence 1
ERS8300:5# config filter acl 1 ace 1 ethernet src-mac 00:0a:e4:00:00:00 range
00:0a:e4:ff:ff:ff vlan-id 220
ERS8300:5# config filter acl 1 ace default action permit remark-dscp phbcs0
CLI
ERS8300:5(config)#filter acl 1 ip acl-name ACL-1_VoIP act-id 2
ERS8300:5(config)# filter acl 1 action 1 permit remark-dscp phbef ACE-1_remark
precedence 1
ERS8300:5(config)#filter acl 1 ethernet 1 src-mac 00:0a:e4:00:00:00 range
00:0a:e4:ff:ff:ff vlan-id 220
ERS8300:5(config)#filter acl 1 action default permit remark-dscp phbcs0
```

ERS8300: Step 4 – Create a new ACT to allow ACL filtering on MAC addresses. For this example, we will name the ACG *ACG-1_Voip*.

```
PPCLI
ERS8300:5# config filter acg 1 create 1 acg-name ACG-1_Voip
CLI
ERS8300:5(config)#filter acg 1 1 acg-name ACG-1_Voip
```

ERS8300: Step 5 – Add ACG 'ACG-1_Voip' to interface level and disable p-bit override.

```
PPCLI
ERS8300:5# config ethernet <slot/port> filter create 1
ERS8300:5# config ethernet <slot/port> qos 8021p-override enable
CLI
ERS8300:5(config)#interface fastEthernet <slot/port>
ERS8300:5(config-if)#filter 1
ERS8300:5(config-if)#qos 8021p-override
ERS8300:5(config-if)#exit
```

7.6.3.4 Verify QoS Operation using IPFIX

IPFIX can be used to verify the DSCP settings. For example, assuming if we are using an ERS 8000 in the core where the edge switch is connected to port 3/29, entering the following commands on the ERS 8000 allows to verify the DSCP on values send from the traffic ingressing this port.

ERS8000: Step 1 – Enable IPFIX globally

```
ERS8000:5# config ip ipfix state enable
```

ERS80-00: Step 2 – Enable IPFIX at interface level, assuming port 3/29 for this example

```
ERS8000:5# config ip ipfix port 3/29 all-traffic enable
```

ERS8000: Step 3 – Verify DSCP values via slot 3, assuming we have VoIP traffic via VLAN 805

```
ERS8000:5# show ip ipfix flows 3
```

Results:

```
================================================================================
                                  IPFIX Flows
================================================================================
Slot Number : 3                              Total Number Of Flows : 3

Port/  SrcIP/DstIP     Src/   Protcol/  DSCP/    Egrss  Start/Last
Vlan   Addr            Dst    Obsv      TcpFlag  Port/  Time
                       Port   Point              Mgid
--------------------------------------------------------------------------------
3/29   10.5.85.10      5201   udp       184      3/27   AUG 1  11:38:35
805    10.5.83.10      51009  Port      none             AUG 1  11:38:35

3/29   10.5.85.10      5200   udp       184      3/27   AUG 1  11:38:32
805    10.5.83.10      51008  Port      none             AUG 13 11:38:36

3/29   10.5.85.10      5000   udp       184      3/3    AUG 1  11:38:21
805    10.88.2.10      5100   Port      none             AUG 1  11:38:36

Total number of Displayed Flows on Slot 3 : 3

--------------------------------------------------------------------------------
Port/  SrcMac/DstMac      Byte/Pkt
Vlan                      Count
--------------------------------------------------------------------------------
3/29   00:24:00:0d:8d:aa         114
805    00:00:5e:00:01:55           1

3/29   00:24:00:0d:8d:aa      918636
805    00:00:5e:00:01:55        4138

3/29   00:24:00:0d:8d:aa       92670
805    00:00:5e:00:01:55        1440
```

Please note the DSCP value shown is actually the ToS value. To calculate the DSCP value, drop the two least significant binary bits. For this example, 184 in binary is “10111000” where the two least significant bits become binary “101110” or decimal 46.

8. Anti-Spoofing Best Practices

Overview – ARP Poison

ARP spoofing simply involves spoofing an IP address of a victim thereby allowing frames destined for the remote host to be forwarded to the attacker. For example, by sending Gratuitous ARP (GARP) frames between an attacker to a victim and a default gateway router within a VLAN of a Layer 2 switch, a man-in-the-middle (MITM) attack can occur.

Overview – IP Spoofing

IP spoofing refers to the creation of IP packets with a spoofed source IP address other than the local network address. By forging the source IP address, an attacker can make the packet appear as it was sent by a different machine. The victim that receives the spoofed packets will send responses back to the forged source address.

IP Source Guard

IP Source Guard provides security to the network by filtering clients with invalid IP addresses. IPSource Guard works closely with information in the Dynamic Host Control Protocol (DHCP) snooping binding table. When IP Source Guard is enabled on an untrusted port with DHCP snooping enabled, an IP filter entry is created or deleted for that port automatically, based on IP information stored in the corresponding DHCP snooping binding table entry. When a connecting client receives a valid IP address from the DHCP server, a filter is installed on the port to allow traffic only from the assigned IP address. A maximum of 10 IP addresses are allowed on each IP Source Guard-enabled port. When this number is reached, no more filters are set up and traffic is dropped. When IP Source Guard is enabled without DHCP snooping enabled, a default filter is installed and IP traffic for the port is dropped.

Defense against Spoofing

Avaya IP Phone sets supports GARP feature – please see section 3. However, this feature only prevents ARP spoofing one way from the IP Phone set to the default gateway address. Therefore, if the voice call is to another phone set that is off-net (to a phone on a different subnet or switch) an attacker can only poison the phone one-way. The attacker can only record the voice traffic from a remote phone sent to the local phone set and not from the local phone to the remote phone. The IP Phone GARP also does prevent an on-net attack. On-net refers to the same VLAN on a switch where both IP phone are connected.

To prevent ARP Spoofing, it is recommended to enabled DHCP Snooping and ARP Spoofing when available on the local switch where the IP Phone sets are connected. Both of these mechanisms will prevent Man-in-the-middle (MITM) attacks and spoofing a victims IP address. In addition, it is also recommended to enable IP Spoofing either on the local switch where the IP Phone sets are attached or in the core.

Summary Chart

The following chart provides a summary of Off-Net and On-Net MITM attacks.

- An 'X" indicated MITM attack (ARP Spoofing can occur) in both directions, i.e. the ability to capture traffic from a local phone set to the remote phone set and vise-versa.
- An "✓" indicates a MITM attack does not occur
- An "⇨" indicates a one-way MITM attack from an remote phone set to the local phone set only
- Off-Net indicates traffic off the local subnet
- On-Net indicated traffic between two devices within the same VLAN, i.e. same subnet, on a local switch

Switch	Traffic Type	Off-Net	On-Net
Generic L2 switch	Data	X	X
	Voice	X	X
	Voice with GARP disabled on IP Phone	X	X
	Voice with GARP enabled on IP Phone	⇨	✓
ERS switch with ARP Spoofing Prevention enabled	Data	✓	✓
	Voice	✓	✓
	Voice with GARP enabled on IP Phone	✓	✓

Table 28: MITM Attacks

Support on Avaya Switches

Switch	Feature		
	DHCP Snooping	ARP Inspection	IP Source Guard
ERS2500	✓ (4.2)	✓ (4.2)	✓ (4.2)
ERS5500	✓ (5.0)	✓ (5.0)	✓ (5.1)
ERS5600	✓ (6.0)	✓ (6.0)	✓ (6.0)
ERS4500	✓ (5.1)	✓ (5.1)	✓ (5.2)
ERS8300	✓ (4.2)	✓ (4.2)	✓ (4.2)
Core			
ERS8600	✓ (7.0)	✓ (7.0)	✓ (4.1)*

*Requires software release 4.1 with R-modules (does not require R-mode)

Table 29: Anti-Spoofing support on Avaya Switches

9. EAPoL Support

9.1 EAP Overview

Extensible Authentication Protocol over LAN is a port-based network access control protocol. EAPoL provides a method for performing authentication at the edge of the network in order to obtain network access based on the IEEE 802.1X standard.

802.1X specifies a protocol used between devices (EAP Supplicants) that desire access to the network and devices providing access to the network (EAP Authenticator). It also specifies the requirements for the protocol used between the EAP Authenticator and the Authentication server, i.e. RADIUS. The following are some of the 802.1X definitions:

- Authenticator: The entity that requires the entity on the other end of the link to be authenticated. Authenticator passes authentication exchanges between supplicant and authentication server.
- Supplicant: The entity being authenticated by the Authenticator and desiring access to the services of the Authenticator.
- Port Access Entity (PAE): The protocol entity associated with a port. May support functionality of Authenticator, Supplicant or both.
- Authentication Server: An entity providing authentication service to the Authenticator. May be co-located with Authenticator, but most likely an external server.

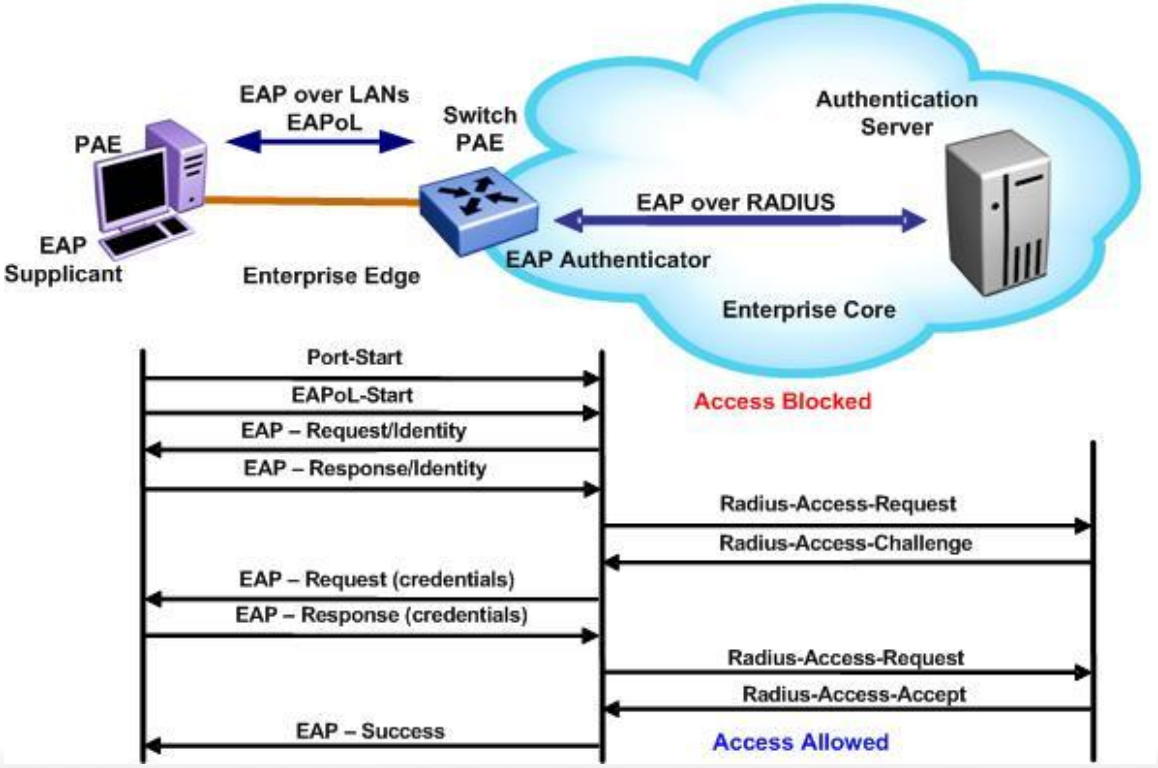


Figure 18: EAP Overview

802.1x Ethernet Frame

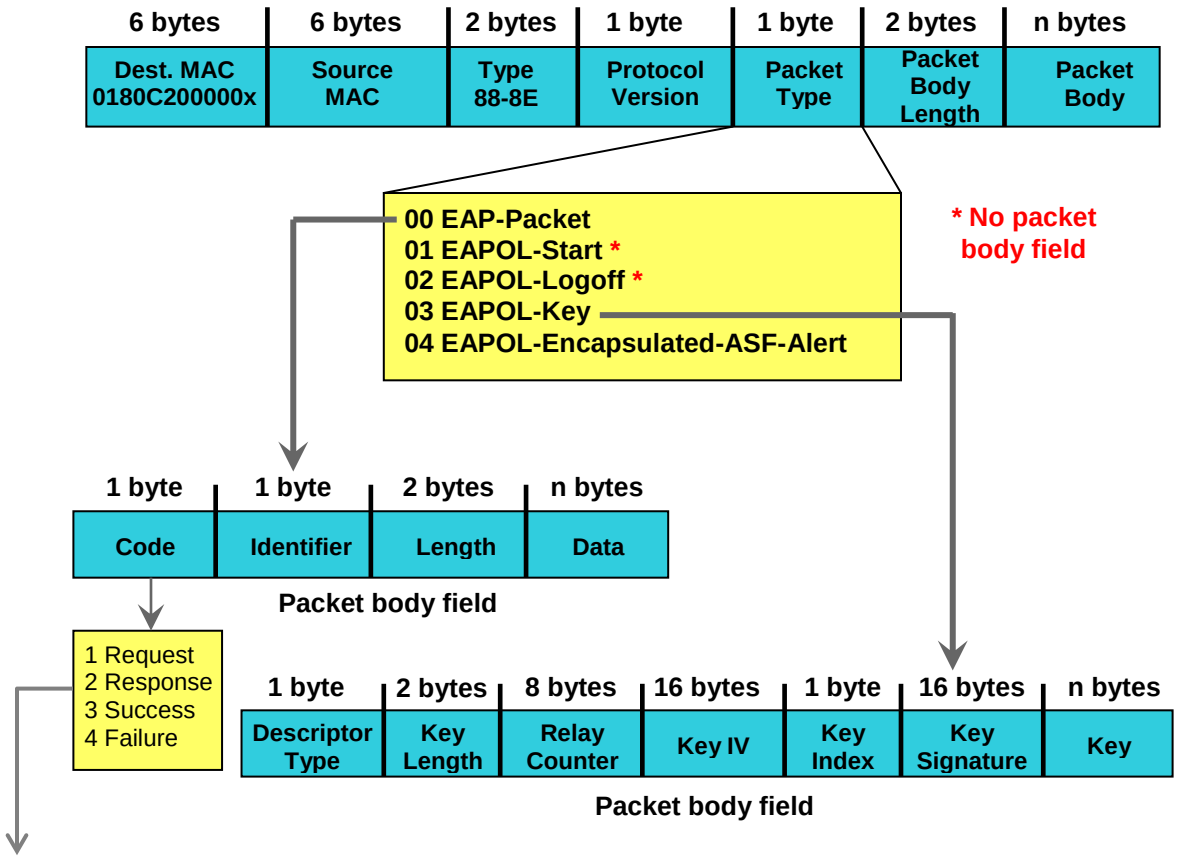


Figure 19: EAP Frame

EAP Request and Response Code Types

- Type code 1: Identity
- Type code 2: Notification
- Type code 3: NAK
- Type code 4: MD-5 Challenge
- Type code 5: One-time password (OTP)
- Type code 6: Generic Token Card
- Type code 13: TLS

EAP and RADIUS related RFCs

- RFC2284 – PPP Extensible Authentication Protocol
- RFC2716 – PPP EAP Transport Level Security (TLS) Authentication Protocol
- RFC2865 (Obsoletes RFC2138) – RADIUS
- RFC2548 – Microsoft Vendor specific RADIUS Attributes

9.2 EAP Support on Avaya IP Phone Sets

The following table shows the authentication methods supported on each type of Avaya IP phone.

Authentication method	IP Phone
EAP MD5	IP Phone 2001, IP Phone 2002, IP Phone 2004, IP Audio Conference Phone 2033, IP Phone 1210, IP Phone 1220, IP Phone 1230, IP Phone 2007, IP Phone 1110, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E. Beginning with 46xx H.323 Release 2.6, 96xx H.323 Release 1.0, 96xx SIP Release 2.0, and 16xx H.323 Release 1.0.
EAP PEAP, EAP TLS	IP Phone 1210, IP Phone 1220, IP Phone 1230, IP Phone 2007, IP Phone 1110, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E The 96xx SIP Supplicant supports EAP-TLS authentication

Table 30: EAP Support on Avaya IP Phones

9.3 EAP and ADAC

ADAC and EAP are mutually exclusive on

- The Call Server port
- The Uplink port

ADAC and EAP can both be enabled on telephony ports as follows:

- The ports must be configured to allow non-EAP MAC addresses
- Guest VLAN must not be configured on the ports

To enable ADAC on an EAP port, you must perform the following:

- On the switch, globally enable support for non-EAP MAC addresses
- On each telephony port, enable support for non-EAP MAC addresses
- On each telephony port, enable EAP Multihost
- On the telephony ports, ensure that Guest VLAN is disabled
- On the switch, enable EAP globally
- Configure and enable ADAC on the ports

When you configure ADAC and EAP, the following restrictions apply:

- If ADAC is enabled, you cannot enable or disable EAP or EAP Multihost on the port

You can enable ADAC on the port only if:

- EAP is disabled on the port OR EAP and Multihost are enabled on the port
- EAP does not change the VLAN configuration for ADAC-enabled ports. ADAC changes to the VLAN configuration take priority over EAP configurations

9.4 EAP Support on Avaya Switches

Table 31 shown below display's the various EAP features supported on the Avaya switches used for this TCG.

Authentication Feature	**Switch**				
	Ethernet Routing Switch 2500	**Ethernet Routing Switch 4500**	**Ethernet Routing Switch 5500**	**Ethernet Routing Switch 5600**	**Ethernet Routing Switch 8300**
Single Host Single Authentication (SHSA)	Yes	Yes	Yes	Yes	Yes
Multiple Host Single Authentication (MHSA)	Yes	Yes	Yes	Yes	Yes
Multiple Host Multiple Authentication (MHMA)	Yes	Yes	Yes	Yes	Yes
MHMA MultiVLAN – EAP and non-EAP	No	Yes (5.4)	Yes (6.2)	Yes (6.2)	No
*Guest VLAN with EAP (GVLAN-SHSA)	Yes (4.1.0)	Yes	Yes (5.0.0)	Yes	Yes
SHSA with Guest VLAN	Yes	Yes	Yes	Yes	Yes
*MHSA with Guest VLAN	Yes (4.1.0)	Yes (5.1.0)	Yes (5.0.0)	Yes	Yes
MHMA wit Guest VLAN	Yes	Yes	Yes	Yes	Yes
MAC Based EAP Authentication	Yes (4.1.0)	Yes (5.1.0)	Yes (5.0.0)	Yes	Yes
EAP and non-EAP on same port	Yes	Yes	Yes	Yes	Yes
RADIUS Assigned VLAN in MHMA	Yes (4.2.0)	Yes (5.1.0)	Yes (5.1.0)	Yes	Yes
Non-EAP IP Phone Support	Yes (4.2.0)	Yes (5.1.0)	Yes (5.1.0)	Yes	No
EAP or non-EAP with Guest VLAN	No	Yes (5.3.0)	Yes (6.2)	Yes (6.2)	No
EAP or non-EAP with Fail Open VLAN	No	Yes (5.3.0)	Yes (6.2)	Yes (6.2)	No
EAP or non-EAP with VLAN Name	Yes (4.3)	Yes (5.3.0)	Yes (6.2)	Yes (6.2)	No
EAP or non-EAP Last Assigned VLAN	No	Yes (5.3.0)	Yes (6.2)	Yes (6.2)	No
Non-EAP use with Wake on LAN	No	Yes (5.3.0)	Yes (6.2)	Yes (6.2)	No
User Based Policy Support	No	No	Yes	Yes	No
Tagged/Untagged					
Per VLAN Egress Tagging	Yes	Yes	Yes	Yes	Yes
Tagged and untagged per port	Yes	Yes	Yes	Yes	Yes
Tagging with EAP	Yes	Yes	Yes	Yes	**Yes

* Please note that a device is only put into the Guest VLAN providing another user has not already passed EAP authentication. For example, on a switch port configured for MHMA with Guest VLAN, once an EAP supplicant has passed EAP authentication, any existing client or any new client that either fails EAP or does not support EAP will be removed from the Guest VLAN. You cannot enable Guest VLAN and non-EAP on the same port.

[1]Requires software release 5.1. Not supported for NEAP (centralized MAC authentication)

**The Ethernet Routing Switch 8300 supports tagging with 802.1x in software release 2.2.2.0. Please see software release notes. Tagging with EAP is not supported in release 2.3, but is reintroduced in release 2.3.1.

Table 31: EAP Support on Avaya Switches

9.5 EAP Feature Overview and Configuration on Avaya Stackable Switches

9.5.1 Single Host Single Authentication: SHSA

SHSA is the default mode of operation which supports a single EAP Supplicant on a per port basis. Hence, only one MAC address is allowed per port. If multiple MAC addresses are detected, the port will be disabled - set to an EAP Force Unauthorized state.

In SHSA mode, the switch supports dynamic VLAN assignment and setting of the port priority via the RADIUS server.

Once you have setup a RADIUS server, SHSA can be enabled by issuing the following commands.

Global Setting

- ERS-Stackable(config)#***eapol enable***

Interface Level

- ERS-Stackable(config)#***interface fastEthernet all***
- ERS-Stackable(config-if)#***eapol port <port list> status <authorized | auto | unauthorized>***
- ERS-Stackable(config-if)#***exit***

9.5.2 Guest VLAN

By default, if EAP is enabled on a port, an EAP Supplicant is required on the end station and requires authentication against an Authentication Server. If the end station does not have an EAP Supplicant or if the EAP authentication fails, the end station can be put into a guest VLAN. Any VLAN can be assigned as the guest VLAN. The guest VLAN, for example, could allow internet access, but deny access to the corporate network. A port configured with EAP and Guest VLAN feature only allows one MAC address to be learned per port. Any traffic from a new host will be discarded.

Global Setting

- ERS-Stackable(config)#***eapol guest-vlan enable vid <1-4094>***
- ERS-Stackable(config)#***eapol enable***

Interface Level

- ERS-Stackable(config)#***interface fastEthernet all***
- ERS-Stackable(config-if)#***eapol port <port list> status auto***
- ERS-Stackable(config-if)#***eapol guest-vlan port <port list> enable vid <global | <1-4094>***
- ERS-Stackable(config-if)#***exit***

9.5.3 Multiple Host Multiple Authentication: MHMA

MHMA allows multiple EAP Supplicants to be authenticated on the same port. Up to eight (8) MACs are allowed per port for the Ethernet Routing Switch 8300 which can be either EAP Supplicants or non-eap-mac end stations. Up to 32 MACs are allowed for the ERS 2500, ERS 4500, or ERS 5000. For non-eap-mac end stations, the MAC address must either be statically configured on the switch or Non-EAP MAC (NEAP) must be used. If the switch senses more than the configured MHMA limit, traffic from the new host will be discarded and a trap message is sent.

NOTES: Please be aware of the following when using MHMA:

- VLAN Tagging is now supported on a port configuring with MHMA on the Ethernet Routing Switch 8300 in software release 2.2.2.0 and 3.0
- As of release 5.4 for the ERS 4500 and 6.2 for the ERS 5000, the maximum number clients supported is 384 NEAP clients per stack, or 768 EAP clients per stack, or 768 EAP & NEAP clients per stack. In older repleases, the maximum number of EAP and NEAP clients supported is 384

Global Setting

- ERS-Stackable(config)#***eapol enable***

Interface Level

- ERS-Stackable(config)#***interface fastEthernet all***
- ERS-Stackable(config-if)#***eapol port <port list> status auto***
- ERS-Stackable(config-if)# ***eapol multihost port <port list> enable***
- ERS-Stackable(config-if)# ***eapol multihost port <port list> eap-mac-max <1-32>***
- ERS-Stackable(config-if)#***exit***

9.5.4 MHMA Radius Assigned VLANs

This feature allows the RADIUS server to dynamically assign VLANs to a port. In MHMA, the switch will move the port to the VLAN of the first authenticated client and subsequent VLAN assigments are ignored. MHMA Radius Assigned VLANs can be used with an IP Phone on the port which can be authenticated via NEAP, IP Phone signature or EAP. Please note if Guest VLAN is enabled, once the IP Phone is authenticatd, the port is moved out of the Guest VLAN. Please see the *MHMA MultiVLAN* section below if you wish to allow multiple VLANs . Please see the *MHMA Last Assigned RADIUS VLAN* section below if you wish to allow subsequent VLAN assigments.

Global Setting

- ERS-Stackable(config)#***eapol multihost use-radius-assigned-vlan***
- ERS-Stackable(config)#***eapol enable***

Interface Level

- ERS-Stackable(config)#***interface fastEthernet all***
- ERS-Stackable(config-if)#***eapol port <port list> status auto***
- ERS-Stackable(config-if)# ***eapol multihost port <port list> enable***
- ERS-Stackable(config-if)#***eapol multihost port <port list> use-radius-assigned-vlan***
- ERS-Stackable(config-if)#***exit***

9.5.5 MHMA MultiVLAN

EAP MHMA MultiVLAN capability enables a port to support multiple RADIUS assigned VLANs (RAV) per port. It uses dynamic MAC based VLANs to bind each MAC address dynamically to the appropriate VLAN. With the EAP MHMA MultiVLAN feature enabled, this will allow EAP to be more widely deployed in scenarios where end devices are daisy chained from IP Phones. All RAV must be previously defined on the switch and assigned to uplink ports (as per current configuration requirements).

The IP Phone can be assigned to an appropriate Voice VLAN or RAV and client devices can also be assigned to RAV based upon their login credentials. An IP Phone on the port can be authenticated via NEAP, IP Phone signature or EAP and at the same time the port will also maintain Guest VLAN access. This then allows guest to continue to be able to access the Guest VLAN once the IP Phone is authenticated. Previously if Guest VLAN were enabled once the IP Phone was authenticated the port was moved out of the Guest VLAN, meaning you can not have Guest VLAN access once an IP Phone is authenticated on a port.

Please be aware of the following considerations when using MultiVLAN:

- EAP must be globally disabled to enable or disable multiVLAN feature.
- RAV must be configured on the switch and uplink ports.
- Manually moving a port from a VLAN with authenticated clients is not recommended, EAP should first be globally disabled.
- Deleting a RAV with authenticated clients is not recommended. EAP should first be globally disabled, so that clients are removed from the VLAN before it is deleted.
- Note that each EAP/NEAP client can have only one entry in VLAN_MAC table.
- EAP MultiVLAN is mutually exclusive with “RADIUS Last Assigned VLAN” functionality as it supersedes that functionality as each host will be assigned individual VLANs.
- EAP MultiVLAN is mutually exclusive with “Fail Open VLAN”.
- If the Guest VLAN is enabled, the port PVID is set to the Guest VLAN, so that all unauthenticated clients will have access to the Guest VLAN.
- If NEAP IP Phone is enabled “non-eap-phone-enable”, then the port will dynamically be a member of all VoIP VLANs.
- Untagged traffic that comes from the authenticated client (identified by its MAC address) will be placed into the RADIUS Assigned VLAN (RAV) or the initial port VLAN if the RADIUS VLAN attribute for the client is missing.
- If the client sends tagged traffic once authenticated, then if the VLAN is defined for that port, the traffic will be forwarded for that VLAN.
- When a client is physically disconnected, logs-off or is sent an RFC 3576 disconnect message, if no other clients are assigned to the same RADIUS Assigned VLAN (RAV) on that port, the port will then be removed from the dynamic VLAN.

Global Setting

- ERS-Stackable(config)#***eapol multihost use-radius-assigned-vlan***
- ERS-Stackable(config)#***eapol multihost multivlan enable***
- ERS-Stackable(config)#***eapol multihost multivlan voip-vlan <1-5> vid <1-4095>***
- ERS-Stackable(config)#***eapol enable***

Interface Level

- ERS-Stackable(config)#***interface fastEthernet all***
- ERS-Stackable(config-if)#***eapol port <port list> status auto***
- ERS-Stackable(config-if)#***eapol multihost port <port list> use-radius-assigned-vlan***
- ERS-Stackable(config-if)# ***eapol multihost port <port list> enable***
- ERS-Stackable(config-if)#***exit***

9.5.6 MHMA Last Assigned RADIUS VLAN

This features introduces a mode where the latest RADIUS assigned VLAN will be configured for the port. Without this feature, the first RADIUS assigned VLAN from the RADIUS server will be used and subsequent VLAN assignments will be ignored.

Global Setting

- ERS-Stackable(config)#***eapol multihost use-most-recent-radius-vlan***
- ERS-Stackable(config)#***eapol enable***

9.5.7 MHMA with Fail Open VLAN

This feature allows the switch to deal with a situation when the RADIUS servers become unreachable. Rather than denying clients access to the network, the switch can assign clients into a specialized fail open VLAN. This will allow clients to continue to work during certain failures, but through the VLAN configuration, could support additional restrictions and restrictions.

Global Setting

- ERS-Stackable(config)#***eapol multihost fail-open-vlan enable vid <1-4094>***
- ERS-Stackable(config)#***eapol enable***

9.5.8 Enhanced MHMA Feature: Non-EAP-MAC (NEAP)

If a port is configured for MHMA, by default only multiple EAP Supplicants are allowed on this port. All traffic from non-EAP MAC addresses will be discarded. To allow non-EAP MAC (NEAP) addresses on a port, the Switch non-eap-mac (NEAP) feature must be enabled. The NEAP MAC address or addresses can be statically configured on the switch. If a NEAP MAC connects to the switch, its MAC address will be checked against the NEAP table and if present, the port will forward traffic for this particular MAC address.

As an alternative to configuring the NEAP MAC statically on the switch, the NEAP MAC can be authenticated via RADIUS. Upon detecting a NEAP MAC, the switch will first check to see if the NEAP MAC is located in the NEAP table. If not, and if the Radius authentication of non-eap clients is enabled, the switch will forward an Access-Request to the Radius server. The Access-Request will contain the non-EAP MAC address as the user name and one or any combination of IP address, MAC address, and/or port number for the password. Hence, if the password is made up of MAC address or IP address or MAC and IP address, this will allow NEAP MAC to be used on any port. For example, assuming the non-eap MAC is 00:50:8b:e1:58:e8, the non-eap source-IP is 11.1.46.5 and the port number for the client is 1/21 (stack 1, port 21), this will result in any of the following passwords:

RADIUS Password	Details
00508be158e8	Just MAC included
011001046005..	Just IP included
011001046005..0121	IP, unit & port are used
011001046005.00508be158e8.	IP and MAC included
011001046005.00508be158e8.0121	IP, MAC, and unit & port included.

If only MAC address is used, in older releases, a period must be inserted before and after the MAC address. This is no longer the case. Use the CLI command *show eapol multihost* to view the RADIUS password attribute format.
If only the switch IP address is used, 2 periods must be inserted after the IP address
If you plan to use unit/port number, on a standalone switch the unit number is always 00.

Table 32: NEAP Passwords

The number of EAP and non-EAP addresses is configurable.

Global Setting

- ERS-Stackable(config)#***eapol multihost allow-non-eap-enable***
- ERS-Stackable(config)#***eapol multihost non-eap-pwd-fmt <ip-addr|mac-addr|port-number***
- ERS-Stackable(config)#***eapol enable***

By default, the NEAP password format is set for IP address, MAC address, and port number. To remove all password format settings, simply enter the CLI command *no eapol multihost non-eap-pwd-fmt*.

Interface Level

- ERS-Stackable(config)#***interface fastEthernet all***
- ERS-Stackable(config-if)#***eapol port <port list> status auto***
- ERS-Stackable(config-if)# ***eapol multihost port <port list> allow-non-eap-enable***
- ERS-Stackable(config-if)# ***eapol multihost port <port list> eap-mac-max <1-32>***
- ERS-Stackable(config-if)# ***eapol multihost port <port list> non-eap-mac-max <1-32>***
- ERS-Stackable(config-if)# ***eapol multihost port <port list> radius-non-eap-enable***
- ERS-Stackable(config-if)# ***eapol multihost port <port list> enable***
- ERS-Stackable(config-if)#***exit***

9.5.9 Enhanced MHMA Feature: Non-EAP IP Phone client

This feature allows an Avaya IP Phone and an EAP Supplicant to co-exist on an EAP enabled port. The IP Phone is not required to use EAP and instead is authenticated by the switch using a DHCP Signature from the Avaya IP Phone while the PC, if connected on the same interface, is authenticated by EAP. At this time, support for only Avaya IP Phones sets is supported with this feature.

Do not enable EAP on the IP Phone. If EAP authentication is required on the phone, do not enable this feature. Do not enable any other non-eap feature on the same port. DHCP has to be enabled on the phone, because the switch will examine the phone signature contained in the DHCP Discover packet sent by the phone. This feature is also only supported on the Avaya IP phone 1100, 1200, and 2000 series.

Global Setting

- ERS-Stackable(config)# ***eapol multihost non-eap-phone-enable***
- ERS-Stackable(config)#***eapol enable***

Interface Level

- ERS-Stackable(config)#***interface fastEthernet all***
- ERS-Stackable(config-if)#***eapol port <port list> status auto***
- ERS-Stackable(config-if)# ***eapol multihost port <port list> non-eap-phone-enable***
- ERS-Stackable(config-if)# ***eapol multihost port <port list> enable***
- ERS-Stackable(config-if)#***exit***

9.5.10 EAP/NEAP with VLAN Names

This feature allows the switch to match the RADIUS VLAN attribute by either VLAN-ID (current operational mode) or VLAN-name to improve the interoperability where some other devices many use or require VLAN-name. If the first character is non-numerical, then a match for VLAN will occur based on name, if it is numerical; then match will proceed based on VLAN number. If no match occurs for VLANs defined on the switch, then the client will not be assigned to the RADIUS VLAN, but will instead stay in the default port based VLAN. No CLI/WebUI/JDM configuration is required

9.5.11 Unicast EAP Request in MHMA

By default, the switch periodically queries the connected MAC addresses connected to a port with EAP MHMA enabled with EAP Request Identity packets. The EAP Supplicant must reply in order to remain an authorized MAC address. This does not occur when the switch is configured for SHSA unless EAP re-authentication is enabled.

With the switch setup for unicast EAP in MHMA, the switch no longer queries the connected MAC addresses with EAP Request Identity packets. This helps in preventing repeated authentications. The EAP Supplicants must be able to initiate the EAP authentication session. In other words, the Supplicant must send EAP Start and End packets to the switch. Please note that not all EAP Supplication support this operating mode.

By default, multicast mode is selected both globally and at an interface level on all switch ports. To select unicast mode, you must enable EAP unicast mode globally and at an interface level. Any other combination, i.e. multicast in global and unicast in interface mode, will select multicast operating mode.

Global Setting

- ERS-Stackable(config)#***eapol multihost eap-packet-mode unicast***

Interface Level

- ERS-Stackable(config)#***interface fastEthernet all***
- ERS-Stackable(config-if)#***eapol multihost port <port #> eap-packet-mode unicast***
- ERS-Stackable(config-if)#***exit***

9.5.12 User Based Policies (UBP)

The Ethernet Routing Switch 5000 Series can be configured to manage access with user based policies. User based policies revolve around the User Policy Table supporting multiple users per interface. User data is provided through interaction with EAP and is maintained in the User Policy Table. A user is associated with a specific interface, user role combination, user name string, and, optionally, user group string. Each user is also associated with session information. Session data is used to maintain state information for each user and includes a session identifier and a session start time. Users are also associated with a session group identifier. The same group identifier is shared by users with the same role combination and is referenced during new user installation and the subsequent EPM policy installation to identify the policy criteria to be applied. This session data is controlled by the QoS Agent.

Once the user based policies has been configured on a switch, the RADIUS server can reference the policy by using the name given to the UBP policy. User based policies (UBP) can be used with EAP and/or NEAP.

Global Setting - EAP

- ERS-Stackable(config)# ***eapol user-based-policies enable***
- ERS-Stackable(config)#***eapol enable***

UBP

- ERS-Stackable(config)# ***qos ubp classifier name <word> ?***

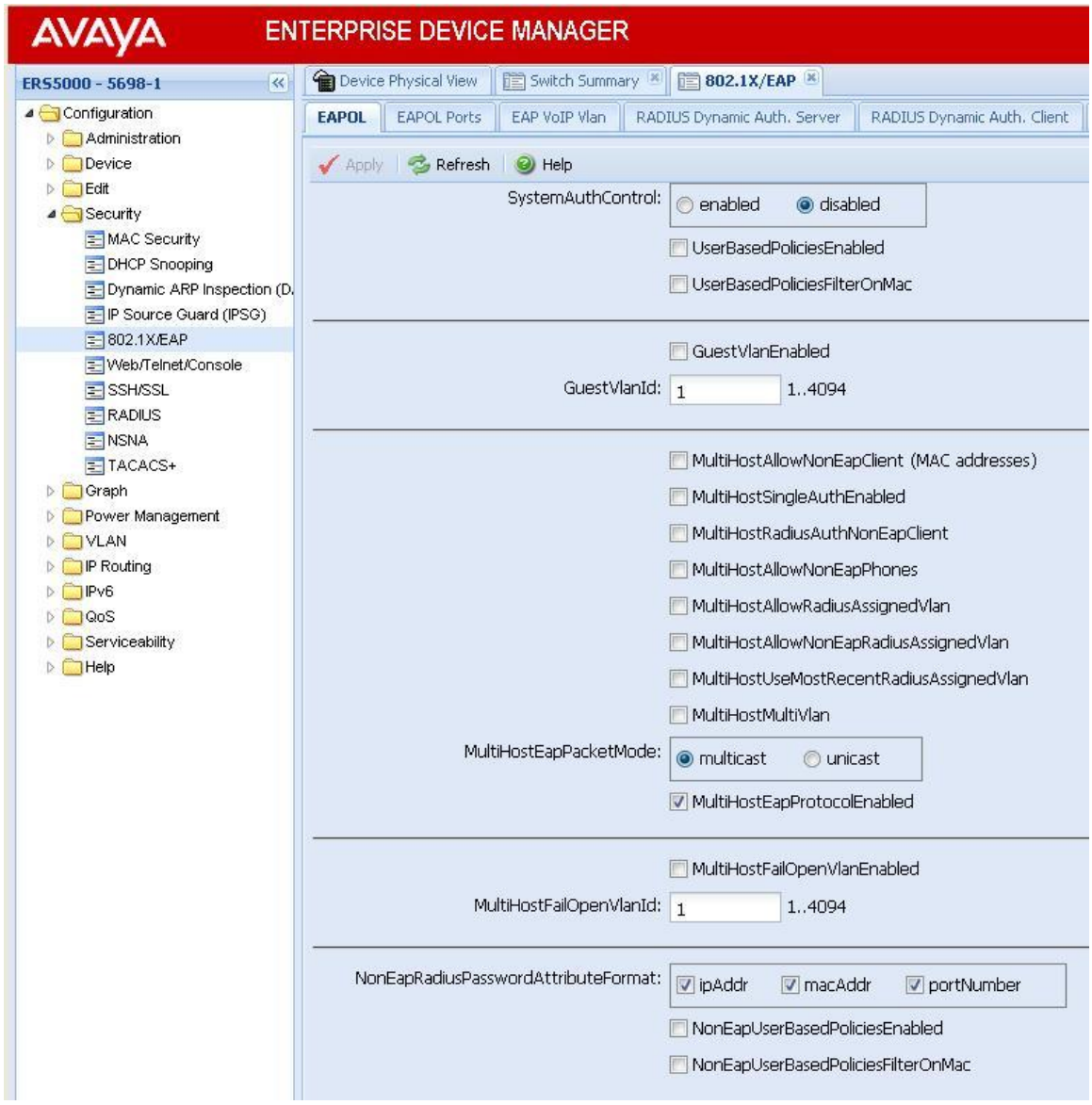
```
  addr-type       Specify the address type (IPv4, IPv6) classifier criteria
  block           Specify the label to identify access-list elements that are of
                  the same block
  drop-action     Specify the drop action
  ds-field        Specify the DSCP classifier criteria
  dst-ip          Specify the destination IP classifier criteria
  dst-mac         Specify the destination MAC classifier criteria
  dst-port-min    Specify the L4 destination port minimum value classifier
                  criteria
  ethertype       Specify the ethertype classifier criteria
  eval-order      Specify the evaluation order
  flow-id         Specify the IPv6 flow identifier classifier criteria
  ip-flag         Specify the IP fragment flag criteria
  ipv4-option     Specify the IPv4 option criteria
  master          Specify as the master member of the block
  next-header     Specify the IPv6 next header classifier criteria
  pkt-type        Specify the filter packet format ethertype encoding criteria
  priority        Specify the user priority classifier criteria
  protocol        Specify the IPv4 protocol classifier criteria
  set-drop-prec   Specify the set drop precedence
  src-ip          Specify the source IP classifier criteria
  src-mac         Specify the source MAC classifier criteria
  src-port-min    Specify the L4 source port minimum value classifier criteria
  tcp-control     Specify the TCP control criteria
  update-1p       Specify the update user priority
  update-dscp     Specify the update DSCP
  vlan-min        Specify the Vlan ID minimum value classifier criteria
  vlan-tag        Specify the vlan tag classifier criteria
  <cr>
```

- ERS-Stackable(config)#***qos ubp set name <word>***
- ERS-Stackable(config)#***qos agent ubp high-security-local***

9.6 EAP Configuration using EDM

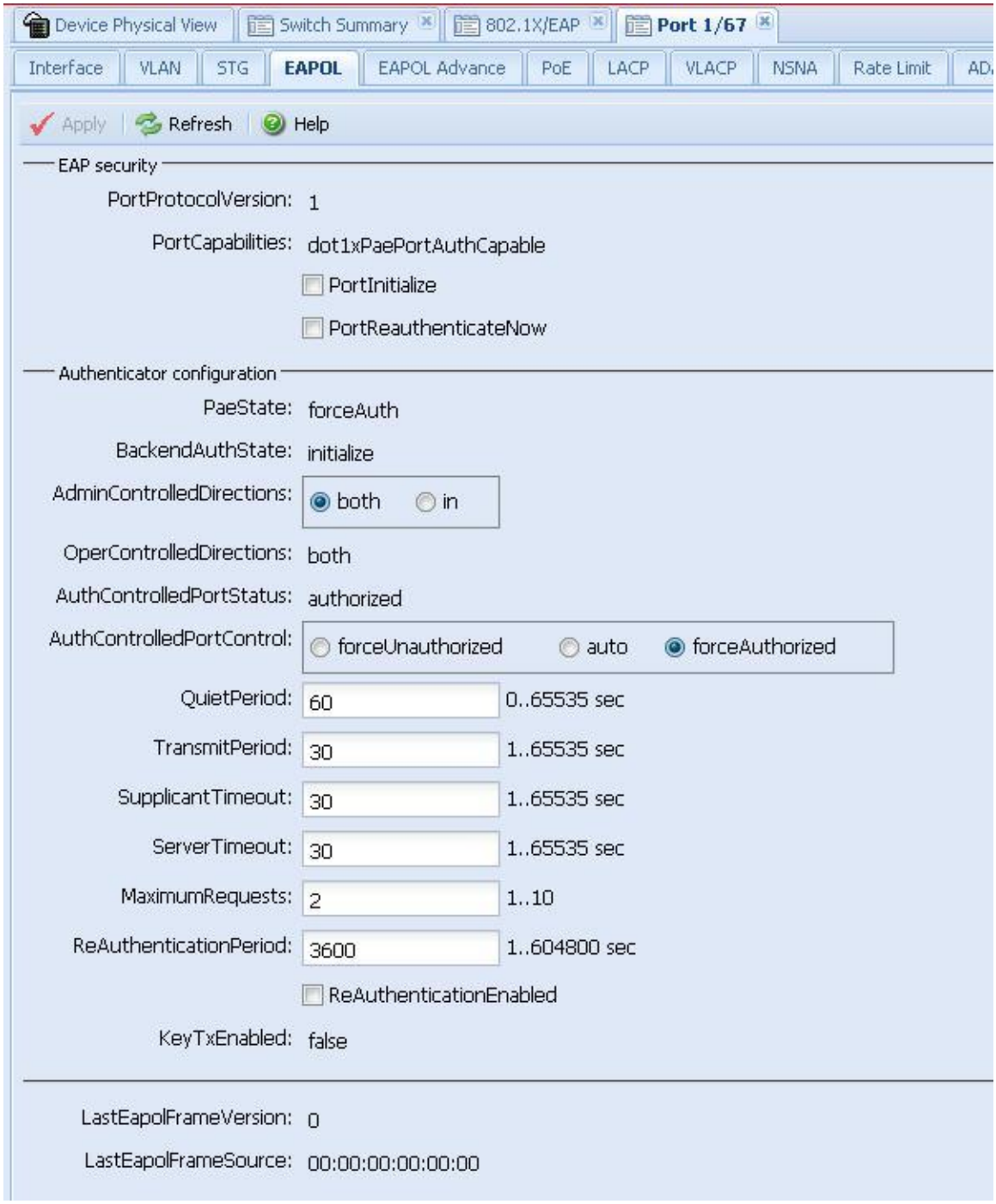
Global Settings

Go to *Configuration -> Security -> 802.1X/EAP*



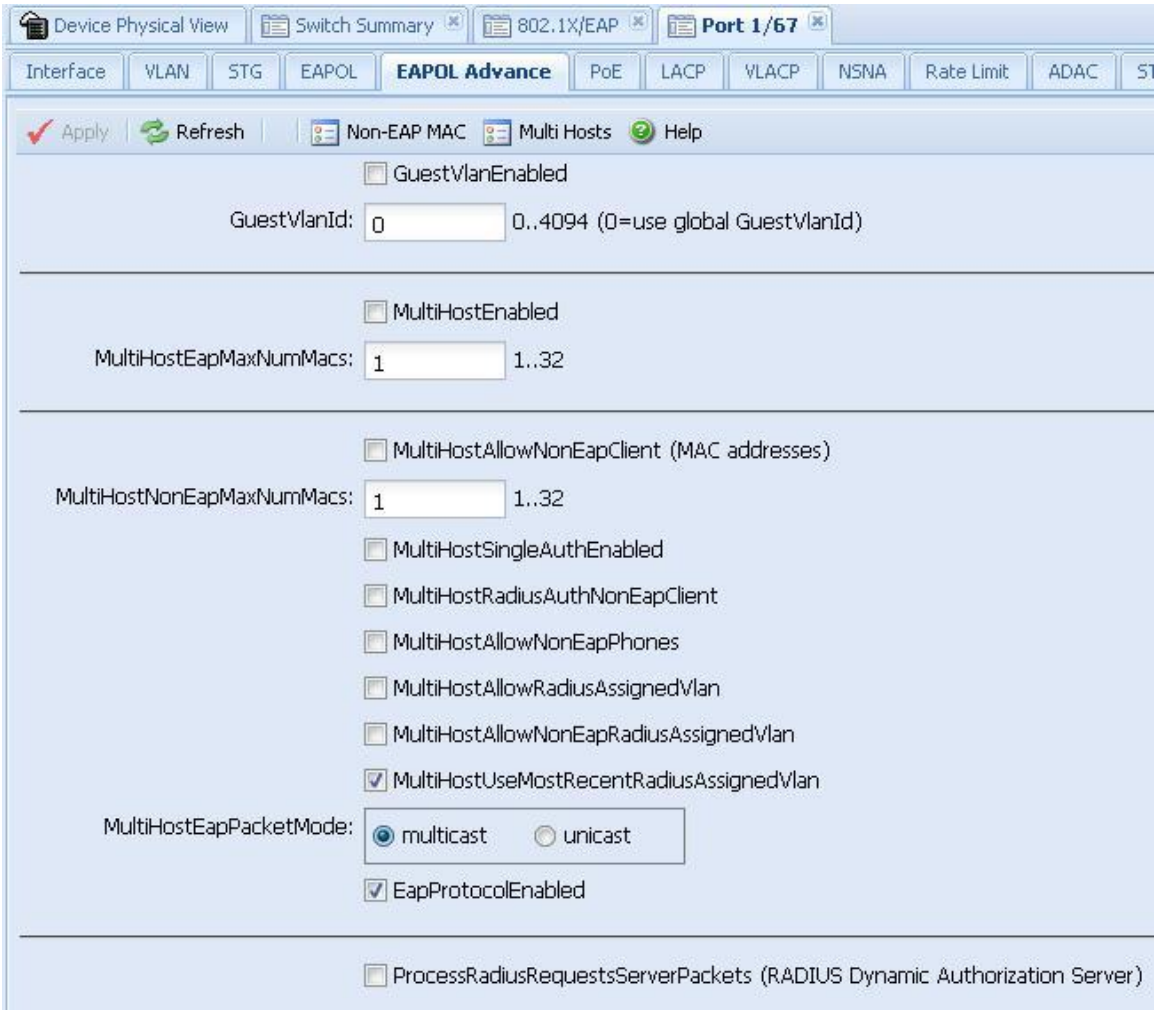
Interface Settings – Base Settings

Go to *Device Physical View -> (*select port(s), right-click and select *Edit -> EAPOL*



Interface Settings – Advance Settings

Go to *Device Physical View -> (*select port(s), right-click and select *Edit -> EAPOL Advance*



9.7 RADIUS Setup

9.7.1 RADIUS Setup for NEAP

9.7.1.1 Microsoft IAS Server

When setting up the RADIUS server, the user name is the non-eap MAC address. The password is one of or a combination of the non-eap MAC address, source-IP address and the physical port of the non-eap MAC as a string separated by dots. For example, assuming the non-eap MAC is 00:50:8b:e1:58:e8, the non-eap source-IP is 11.1.46.5 and the port number for the client is 1/21, this will result in a user name of 00508be158e8 and password of 011001046005.00508be158e8.0121 assuming use the non-eap password format of MAC, IP and port number.

For a Microsoft IAS, the non-eap user is entered as follows:

1) Go to *Active Directory for Users and Computers*, right-click on *Users* and select *New>User*

2) Add new user using the MAC address of the PC as the *User logon name*.

3) Next, enter the Password shown above (011001046005.00508be158e8.0121) and click on *Finish* when done.

4) Next, right-click on the user you just created and select *Properties*

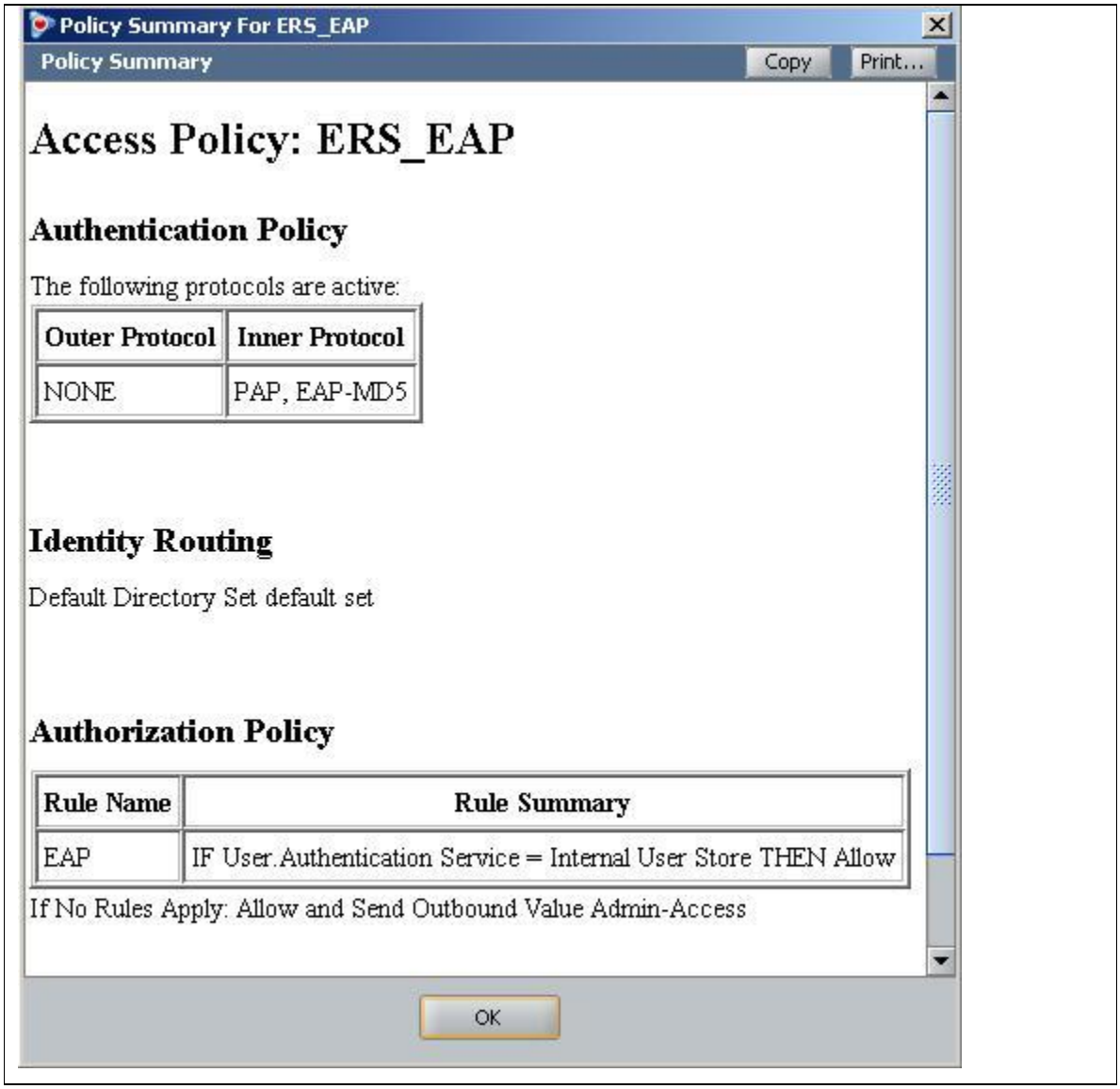
- In the *Dial-in* dialog box, select *Allow Access*
- In the *Member Of* dialog box, click on *Add* and add *RAS and IAS Servers*
- Finally, in the *Account* dialog box, under *Account options*, click on *Store Password using reverse encryption*

5) Enable the IAS Authentication profile for MD5-Challenge with PAP/SPAP selected.

9.7.1.2 Avaya Identity Engines

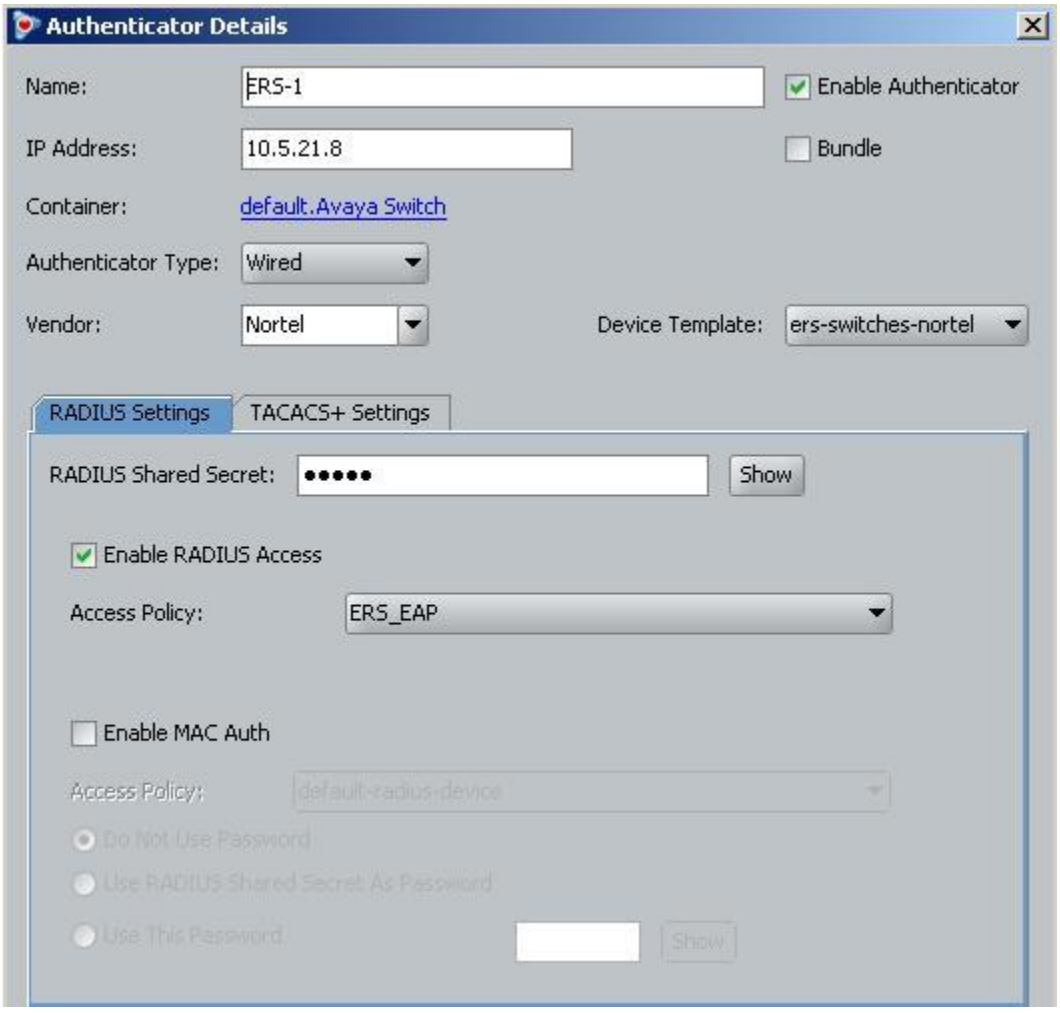
IDE Step 1 – Go to *Site Configuration -> Access Policies -> RADIUS*

- Right-click R*ADIUS* and select *New Access Policy*. Enter a policy name, i.e. *ERS-EAP* as used in this example and click on *OK* when done
- Click on the policy we just created, i.e. ERS-EAP, and click on *Edit* via the *Authentication Policy* tab. Under *Edit Authentication Policy* window, select *NONE -> PAP* and any additional authentication protocols you may require. Click on *OK* when done.
- Go to the *Identity Routing tab* and click on *Edit*. Check off the *Enable Default Directory Set* and click on *OK* when done.
- Go to the *Authorization Policy* tab and click on *Edit.*
    - Once the *Edit Authorization Policy* window pops up, click on *Add* under Rules and via the name pop-up box, enter a name, i.e. *EAP* as used in this example
    - Click on the rule named *EAP*, click on *New* to add a new constraint. From *Attribute Category*, select *User* and scroll down and select *Authentication Service*. Select *Equal To* with *Static Vlaue* of *Internernal User Store*. Click on *OK* when done and *OK* one more time to exit Edit Authentication Policy.
    - Clicking on the *Access Policy Summary* icon should display an Access Policy similar to that shown below


Policy Summary For ERS_EAP
Policy Summary
Copy
Print...
Access Policy: ERS_EAP
Authentication Policy
The following protocols are active:
Outer Protocol
Inner Protocol
NONE
PAP, EAP-MD5
Identity Routing
Default Directory Set default set
Authorization Policy
Rule Name
Rule Summary
EAP
IF User.Authentication Service = Internal User Store THEN Allow
If No Rules Apply: Allow and Send Outbound Value Admin-Access
OK

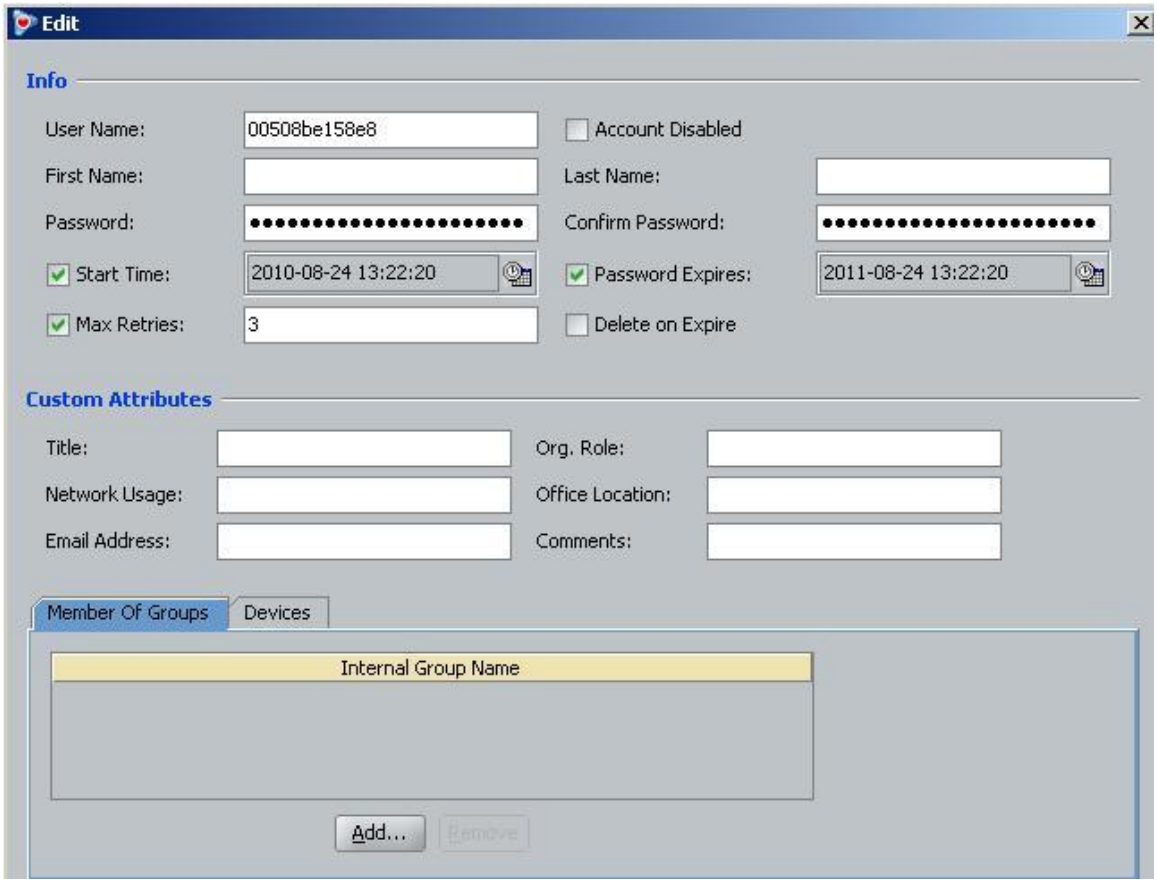
IDE Step 2 – Go to *Site Configuration -> Authenticators*

- For this configuration example, we will create a new container named *Avaya Switch*
  - Under *Authenticators*, right-click *default* and add a new container with a container, add a name of *Avaya Switch*, and click *OK* when done
- Select *Avaya Switch* and click on click on *New*
  - Enter the settings as shown below making sure you select the policy we created above named ERS_EAP via Access Policy. Leave *Enable Authenticator* and *Enable RADIUS Access* checked. Click on *OK* when done. Please note, the *RADIUS Shared Secret* must match the secret entered on the switch



IDE Step 3 – Add Users by going to *Site Configuration -> Directories -> Internal Store -> Internal Users* and click on *New*

- Add the NEAP users by going to Directories>Internal Store>Internal Users. Next, enter the User Name and Password as shown below:
  - NEAP user with MAC address of 0050.8be1.58e8 and using a password of MAC plus IP (11.1.46.5), and port number (1/21)
    - User Name = 00508be158e8
    - Password = 011001046005.00508be158e8.0121



DE Step 4 – At the point you are completed. After clicking on the IP address of your IDE server, go to the *Monitor* tab and then to *Log Viewer -> Access* to verify if the non-EAP client can successfully login.

9.7.1.3 FreeRADIUS Setup

In the radius server's user configuration file,

1. Add the MAC address of the Non-EAP host as the user name. (ex: "00a0c9a4d0e0")
2. Set the Auth-Type to 'local'.
3. Set the User-Password to "Net Mgmt IP of the switch" + "." + "Mac address of the Non-EAP host" + "." + "slot port through which the non-eap client will be connected". For example, assuming the management IP address of the switch is 192.168.151.165, the MAC address of the non-EAP host is 00:a0:c9:a4:d0:e0 and the slot/port is 8/5, enter "192168151165.00a0c9a4d0e0.0805"
4. Set the desired QoS value for the Non-EAP host in the 'Nortel-Dot1x-Mac-Qos' attribute. Where, "Nortel-Dot1x-Mac-Qos" is declared as a vendor-specific-attribute in "dictionary.passport" file as follows:

   ATTRIBUTE Nortel-Dot1x-Mac-Qos 2 integer Nortel

The above declaration describes that "Nortel-Dot1x-Mac-Qos" attribute is a vendor-specific attribute (Nortel keyword does that). The identifier for this vendor-specific attribute is 2 and the type of the attribute is integer.

Example:

"192.168.151.165" specifies the net management IP of the switch. User configuration for Non-Eap host with mac address 00:a0:c9:a4:d0:e0 connected to port 8/5 is given as:

00a0c9a4d0e0 Auth-Type := local, User-Password == "192168151165.00a0c9a4d0e0.0805"

Termination-Action = RADIUS-Request,

Tunnel-Type = VLAN,

Tunnel-Medium-Type = IEEE802,

Tunnel-Private-Group-Id = "0002",

Nortel-Dot1x-Port-Priority = 5,

Nortel-Dot1x-Mac-Qos = 3

9.7.1.4 Steel-Belted Radius Server

To get a non-eap client authenticated using radius server,

1. Ensure that *pprt8300* is included in *dictiona.dcm* file.
2. In the *pprt8300* file, add the following return list attribute for returning MAC QoS in the access-accept packet. The Mac-QoS attribute identifier, i.e. type1 is set to 2 and data is set to integer.

   ATTRIBUTE Mac-QoS 26 [vid=1584 type1=2 len1=+2 data=integer]R

   VALUE Mac-QoS Level0 0

   VALUE Mac-QoS Level1 1

   VALUE Mac-QoS Level2 2

   VALUE Mac-QoS Level3 3

   VALUE Mac-QoS Level4 4

   VALUE Mac-QoS Level5 5

   VALUE Mac-QoS Level6 6

   VALUE Mac-QoS Level7 7

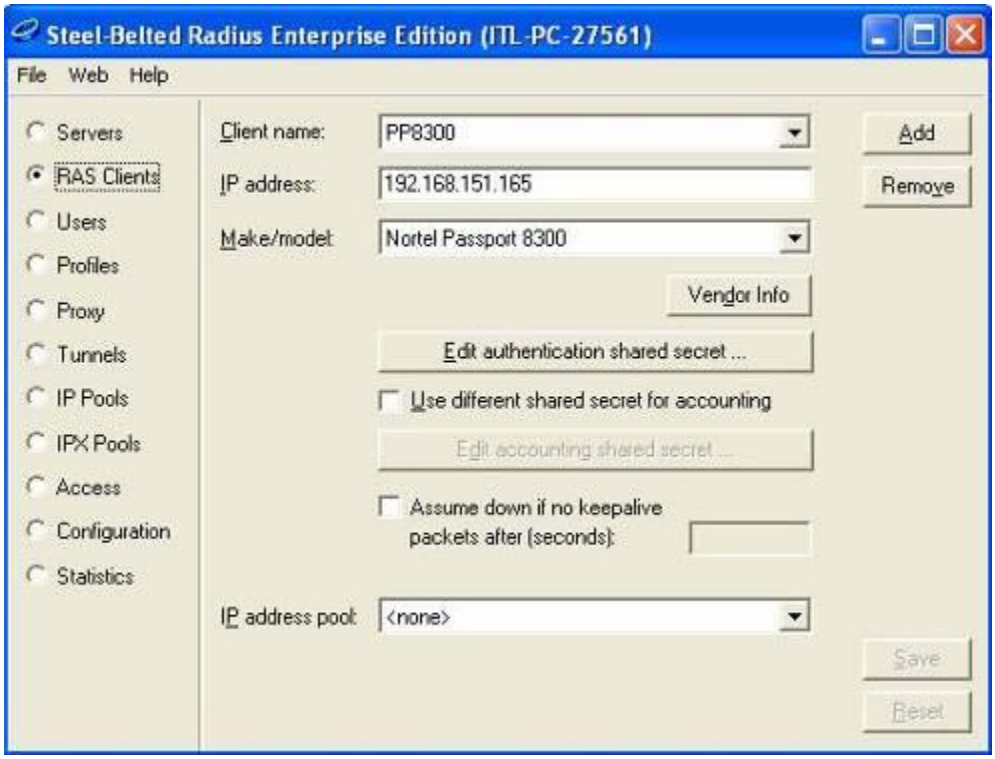
3. In *eap.ini* file, add the following lines for the Non-EAP client to get authenticated [radiusmac]

   EAP-Only = 0

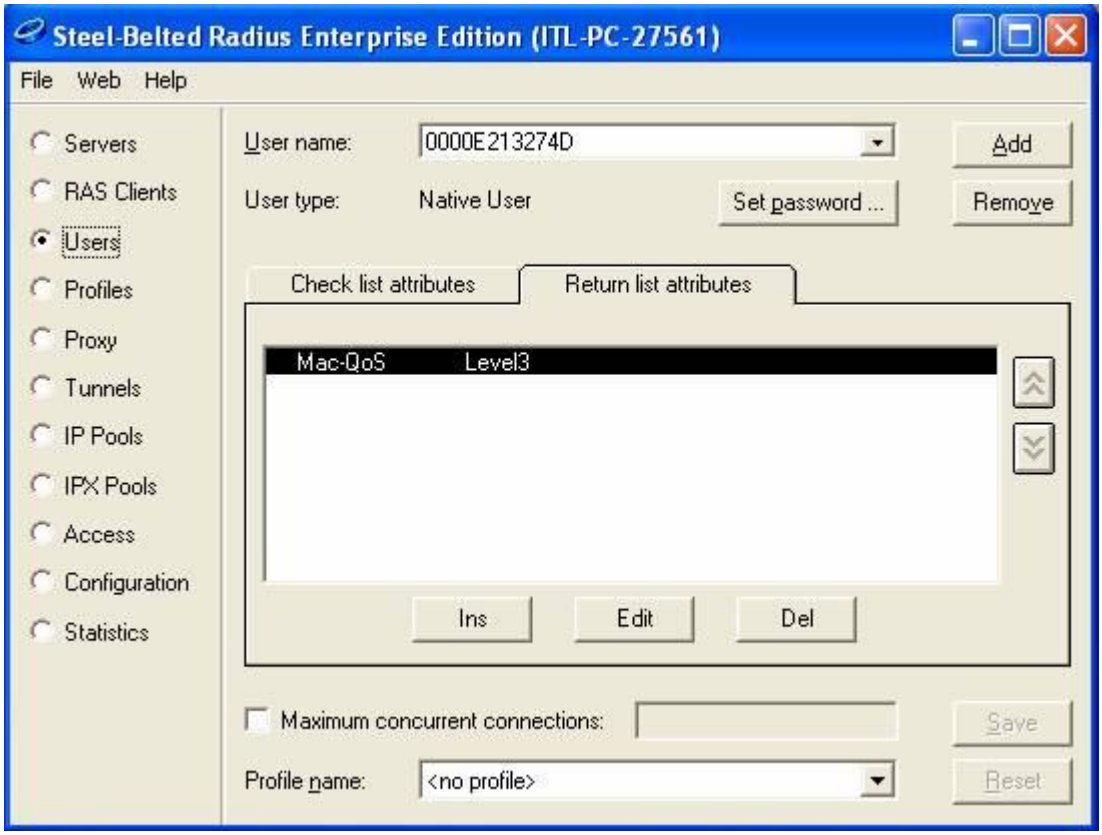
   EAP-Type =

   First-Handle-Via-Auto-EAP = 0

4. Set the RAS-Clients as follows:



5. Configure the Non-EAP user with user-name, password (as specified in FreeRADIUS section) and the return list attribute, MAC-QoS.



9.7.2 RADIUS Setup for Dynamic VLAN Assignment

In EAP SHSA or MHMA mode, the RADIUS server can be configured with a Return-Attribute to dynamically set the VLAN and if required, the port priority.

The following applies to dynamic VLAN assignment:

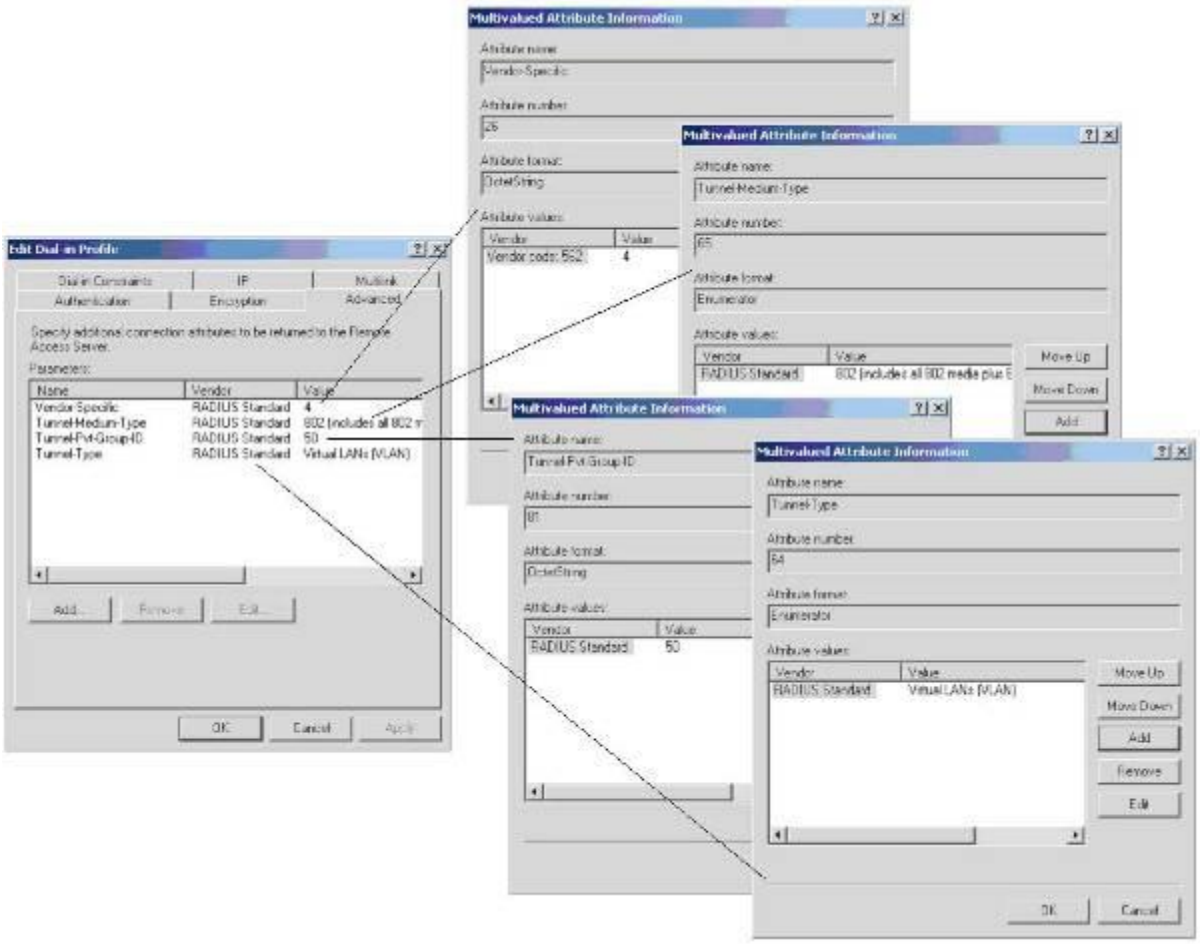
- The dynamic VLAN configuration values assigned by EAPoL are not stored in the switch's NVRAM or running configuration file.
- You can override the dynamic VLAN configuration values assigned by EAPoL; however, be aware that the values you configure are not stored in NVRAM.
- When EAPoL is enabled on a port, and you configure values other than VLAN configuration values, those values are applied and stored in NVRAM.
- You cannot enable EAPoL on tagged ports or MLT ports.
- You cannot change the VLAN/STG membership of EAPoL authorized ports.

To set up the Authentication server, the following RADIUS 'Return-List' attributes needs to be set:

- VLAN membership attributes:
    - Tunnel-Type: value 13, Tunnel-Type-VLAN
    - Tunnel-Medium-Type: value 6, Tunnel-Medium-Type-802
    - Tunnel-Private-Group-Id: ASCII value 1 to 4094 (this value is used to identify the specified VLAN) or VLAN name
- Port priority (vendor-specific) attributes:
    - Vendor Id: value 562, Nortel vendor Id

9.7.2.1 IAS Server

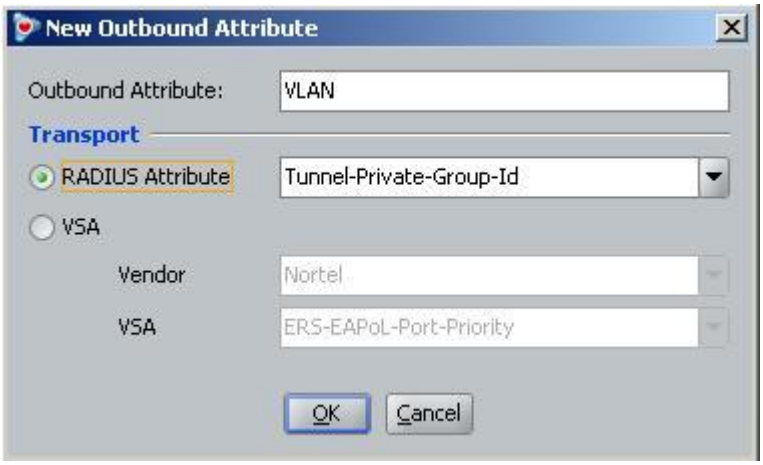
If the Authentication server is a Microsoft IAS server, the configuration would look something like the following assuming the dynamic VLAN is 50 and the port priority is 4.



9.7.2.2 Avaya Identity Engines

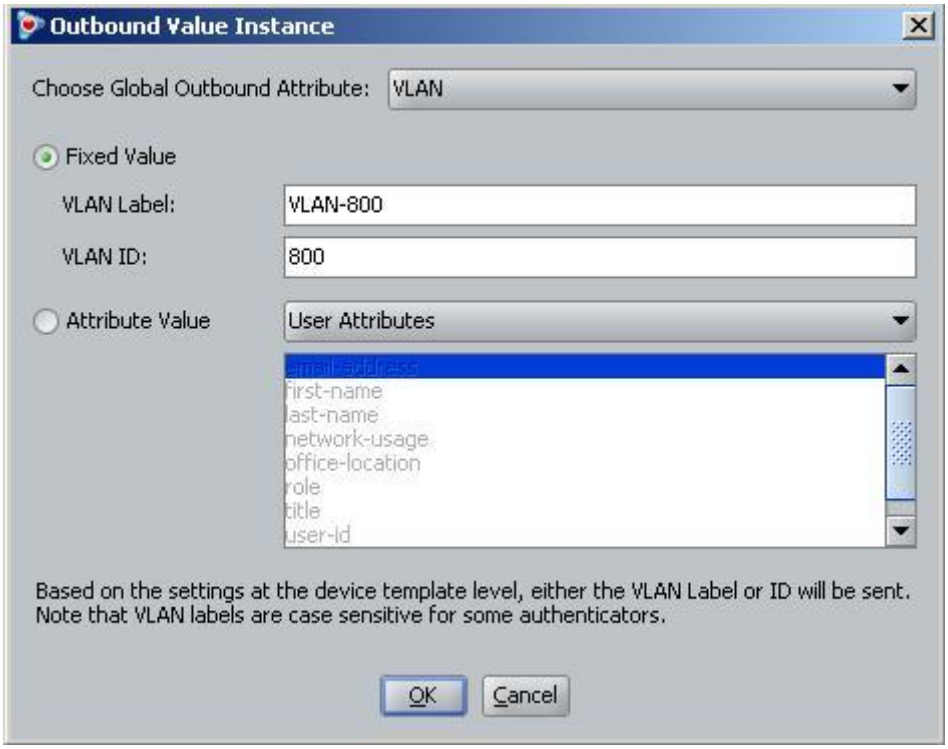
IDE Step 1 – Configure an Outbound Attribute on Ignition Server for VLAN. Go to *Site Configuration -> Provisioning -> Outbound Attributes -> New*

- Via the *New Outbound Attribute* window, enter a name for the attribute (i.e. *VLAN* as used in this example), and select *Tunnel-Private-Group-Id* via the *RADIUS Attribute* radio button. Click on *OK* when done



IDE Step 2 – Go to *Site Configuration -> Provisioning -> Outbound Values -> New*

- Using the Outbound Attribute created in Step 1, we will add the VLAN-ID or VLAN-name value.
  - Start by entering a name via the *Outbound Value Name:* window (i.e. vlan-800 assuming VLAN 800 will be used) and click on *New*
  - Via the *Choose Global Outbound Attribute:* pull down menu, select the outbound attribute we created in step 1 (*VLAN*). Make sure the *Fixed Value* radio button is selected. Enter a name (i.e. VLAN-800 as used in this example) in the *VLAN Label:* window and enter the correct VLAN number or name (i.e. *800* as used in this example) in the *VLAN ID:* window. Click on *OK* twice when done.



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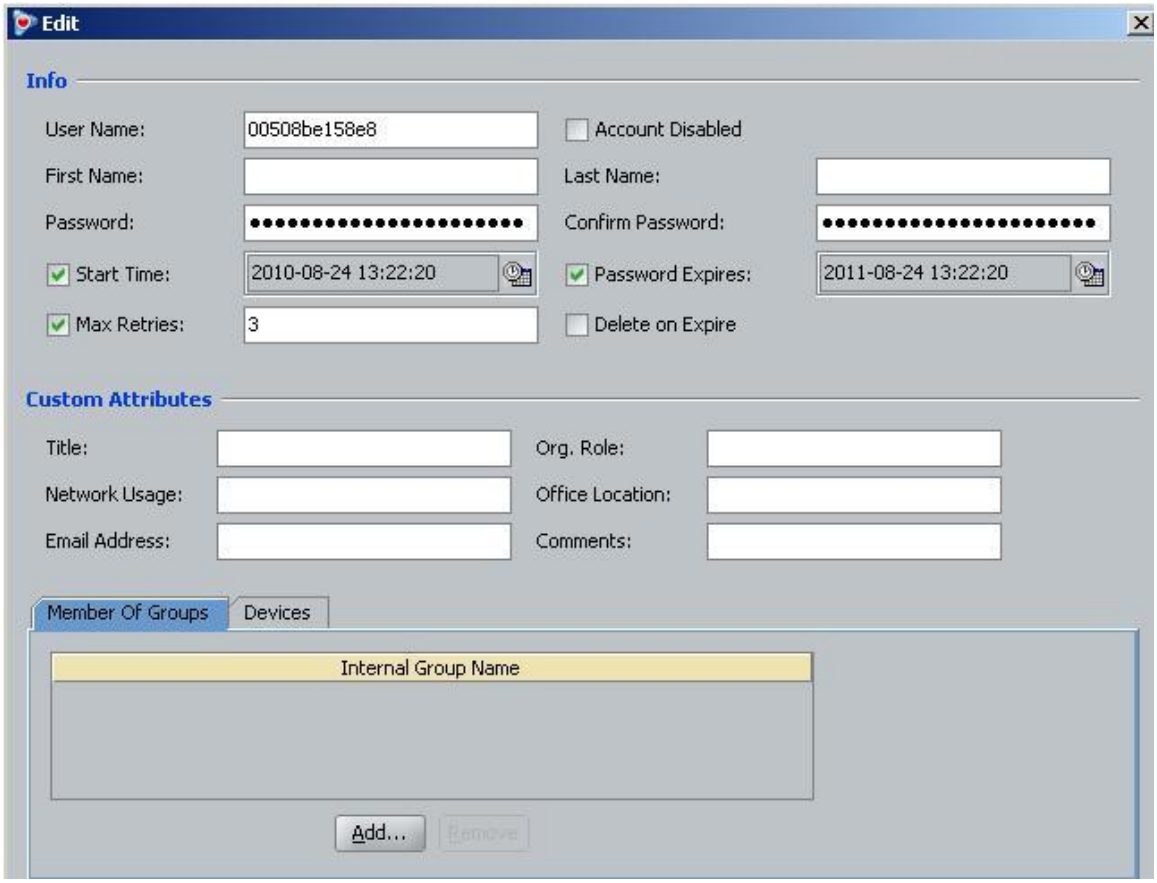
IDE Step 3 – Add Users by going to *Site Configuration -> Directories -> Internal Store -> Internal Users* and click on *New*

- Add the NEAP users by going to Directories>Internal Store>Internal Users. Next, enter the User Name and Password as shown below:
  - NEAP user with MAC address of 0050.8be1.58e8 and using a password of MAC plus IP (11.1.46.5), and port number (1/21)
    - User Name = 00508be158e8
    - Password = 011001046005.00508be158e8.0121



10. Appendixes

10.1 Appendix A: IP Deskphone info Block (applies to the 2001, 2002, 2004, 2007, 1110, 1120E, 1140E, 1150E, 165E, 1210, 1220, and 1230 IP Deskphones)

The list of all the parameters that can be provisioned via the Info-Block is provided in the table below. Note that not all parameters need be specified in the Info-Block. If the option is included, the parameter will be provisioned with the value specified. If the option is not included, the phone will retain its default value for the particular parameter, or the phone will retain the value that was previously provisioned for the parameter if the "stickiness" parameter is set.

Info Block Parameters		
Parameter	**Value**	**Description**
a1	Value from 0 to 255	Primary server action code
a2	Value from 0 to 255	Secondary server action code
ar	'y' yes 'n' no	Enable Auto-recovery
arl	'cr' critical 'ma' major 'mi' minor	Auto-recovery level
blt	'0' 5 seconds '1' 1 minute '2' 5 minutes '3' 10 minutes '4' 15 minutes '5' 30 minutes '6' 1 hour '7' 2 hours '8' always on	Backlight timer
bold	'y' yes 'n' no	Enable bold on font display
br	Value from 0 to 15	Brightness value
bt	'y' yes 'n' no	Enable Bluetooth (1140E IP Deskphone and 1150E only)
ca	Character string up to 80 characters	Certificate Authority (CA) server
cachedip	'y' yes 'n' no	Enable cached IP
cadomain	Character string up to 50 characters	Certificate Authority (CA) domain name
cahost	Character string up to 32 characters	Certificate Authority (CA) host name

Info Block Parameters		
cdiff	Value from 0 to 255	Diffserv code points for control messages
ct	Value from 0 to 15 for 1100 Series IP Deskphones Value from 7 to 39 for 2007 IP Deskphone	Contrast value
dcpactive1	‘n’ Inactive ‘y’ Active	Profile is active or not
dcpattrcn1	Character string of 128 characters	If “Auto CN” is disabled, this value is used instead of combining cadomain and cahost
dcpattrextkeyusage1	Character string made up of one of the following characters ‘a’ anyExtendedKeyUsage ‘c’ clientAuth ‘i’ ipsecIKE (RFC 4945) ‘m’ iKEIntermediate ’ ’ no Extended Key Usage	Define the Extended Key Usage attributes to be requested for the device certificate. The default is clientAuth.
dcpcaname1	Character string of 128 characters	CA name included in the SCEP request to identify requested CA (note that not all CA require the CA name)
dcphostnameoverride1	Character string of 128 characters	Override hostname (cahost) for this DCP only
dcpsource1	‘scep’ ‘pkcs12’	Method used to install device certificates
dhcp	‘y’ yes ‘n’ no	Enable DHCP
dim	‘y’ yes ‘n’ no	*As of UNIStim software release 3.4, the previously supported “dim” parameter is no longer supported since its functionality is superseded by the dimt parameter. The phone will still accept the dim parameter to prevent errors when reading existing provisioning files but the parameter will be ignored in favor of the new dimt parameter.*
dimt	‘0’ Off ‘1’ 5 seconds ‘2’ 1 minute ‘3’ 5 minutes ‘4’ 10 minutes ‘5’ 15 minutes ‘6’ 30 minutes ‘7’ 1 hour ‘8’ 2 hours	Phone inactivity timer to dim the screen (2007 IP Deskphone only)
dns	Character string up to 50 characters	Primary DNS server URL
dns2	Character string up to 50 characters	Secondary DNS server URL

Info Block Parameters		
dp	Value from 0 to 8	802.1Q p bit for data stream. Provisioning this value to 8 tells the phone to use the value it receives from the LLDP Network Policy TLV or from the call server
dq	‘y’ yes ‘n’ no	Enable 802.1Q for PC port
dscpovr	‘y’ yes ‘n’ no	DSCP Precedence Override
dv	‘y’ yes ‘n’ no	Enable VLAN for data
dvid	Value from 1 to 4094	VLAN ID for data VLAN
eap	‘dis’ disable ‘md5’ EAP-MD5 ‘peap’ PEAP/MD5 ‘tls’ EAP-TLS	Disable or choose an EAP authentication method [1] [2]
eapid1	Character string up to 32 characters	802.1x (EAP) device ID1 [1] [2]
eapid2	Character string up to 32 characters	802.1x (EAP) device ID2 [1] [2]
eappwd	Character string up to 32 characters	802.1x (EAP) password [1] [2]
file	Character string up of the following character ‘z’ read zone file ‘t’ read type file ‘d’ read device file	For system specific provisioning file specifies what other provisioning files to read
fs	‘y’ enabled ‘n’ disabled	Font smoothing enabled [3]
hd	Character string up of the following character ‘w’ wired ‘b’ Bluetooth ‘n’ none	Headset type
igarp	‘y’ yes ‘n’ no	Ignore GARP
ll	‘cr’ critical ‘ma’ major ‘mi’ minor	Log level
lldp	‘y’ yes ‘n’ no	Enable 802.1ab LLDP [1]
mdiff	Value from 0 to 255	Diffserv code points for media messages
menulock	‘f’ full lock ‘p’ partial lock ‘u’ unlock	Menu lock mode

Info Block Parameters		
menupwd	String between and 21 characters containing only numeric digits, asterisk (*) and hash (#) – i.e. only the dialpad symbols	Administrator password [2]
nid	‘a’ auto negotiation ‘f’ full duplex ‘h’ half duplex	Network port duplex [1]
nis	‘a’ auto negotiation ‘10’ 10 Mbps ‘100’ 100 Mbps	Network port speed [1]
ntqos	‘y’ yes ‘n’ no	Enable Avaya Automatic QoS
of	‘y’ enabled ‘n’ disabled	Outlined font enabled [3]
p1	Value from 1 to 65535	Primary server port number
p2	Value from 1 to 65535	Secondary server port number
pc	‘y’ yes ‘n’ no	Enable PC port
pcd	‘a’ auto negotiation ‘f’ full duplex ‘h’ half duplex	PC port duplex
pcs	‘a’ auto negotiation ‘10’ 10 Mbps ‘100’ 100 Mbps	PC port speed
pcuntag	‘y’ yes ‘n’ no	Enable stripping of tags on packets forwarded to PC port
pk1	Character string of16 character representing 16 hexadecimal digits	S1 PK [2]
pk2	Character string of 16 character representing 16 hexadecimal digits	S2 PK [2]
prov	Character string up to 50 characters	Provisioning server address or URL (if the string is prefixed with “http://” the phone will connect to a HTTP server, otherwise the phone will connect to a TFTP server)
r1	Value from 0 to 255	Primary server retry count
r2	Value from 0 to 255	Secondary server retry count
s1ip	Value from 0.0.0.0 to 255.255.255.255	Primary server IP address
s2ip	Value from 0.0.0.0 to 255.255.255.255	Secondary server IP address
si	‘y’ enabled ‘n’ disabled	Simple icons enabled [3]
srtp	‘y’ yes ‘n’ no	Enable SRTP-PSK

Info Block Parameters		
srtpid	96 115 120	Payload type ID
ssh	‘y’ yes ‘n’ no	Enable SSH
sshid	Character string between 4 and 12 characters	SSH user ID [2]
sshpwd	Character string between 4 and 12 characters	SSH password [2]
sst	‘0’ Off ‘1’ 1 minute ‘2’ 5 minutes ‘3’ 10 minutes ‘4’ 15 minutes ‘5’ 30 minutes ‘6’ 1 hour ‘7’ 2 hours	Phone inactivity timer to initiate the slide show (2007 IP Deskphone only)
st	‘y’ yes ‘n’ no	Enable stickiness (provisioning is persistent in the event a new info block is not received)
th	‘0’ black theme ‘1’ metallic blue them ‘2’ blue theme ‘3’ orange theme ‘4’ green theme ‘5’ red theme ‘6’ purple theme	Theme [3]
unid	Character string up to 32 characters	Unique network identification
usb	‘y’ enabled ‘n’ disabled	UBS port enabled [3]
usbh	‘y’ enabled ‘n’ disabled	UBS headset device enabled [3]
usbk	‘y’ enabled ‘n’ disabled	UBS keyboard device enabled [3]
usbm	‘y’ enabled ‘n’ disabled	UBS mouse device enabled [3]
usbms	‘y’ enabled ‘n’ disabled	UBS memory stick (flash drive) device enabled [3]
utb	‘y’ use the selected theme background ‘n’ use the user selected image – if present	Use a user selected background picture [3]
vcp	Value from 0 to 8	802.1Q control p bit for voice stream. Provisioning this value to 8 tells the phone to use the value it receives from the LLDP Network Policy TLV or from the call server

Info Block Parameters		
vlanf	'y' yes 'n' no	Enable VLAN filter on voice stream
vmp	Value from 0 to 8	802.1Q media p bit for voice stream. Provisioning this value to 8 tells the phone to use the value it receives from the LLDP Network Policy TLV or from the call server
vpn	'y' enable 'n' disable	Enable the UNIStim VPN Client (UVC) within the phone
vpnauth	'psk' preshared key 'certificate' X.509 certificate	Authentication credential[2]
vpndiff	0-255	If vpndiffcpy=n, then this value is used for the DSCP value for the tunnel traffic
vpndiffcpy	'y' copy DSCP from inner packet 'n' use vpndiff value	Source of DSCP value for the tunnel traffic. Determines if DSCP value is copied from inner packet to outer packet or if vpndiff is used.
vpnmode	'aggressive' 'main'	Authentication mode
vpnmotd	0-999	Message of the Day (MOTD) timer
vpnpskpwd	Character string up to 64 characters	PreShared Key (PSK) password
vpnpskuser	Character string up to 64 characters	PreShared Key (PSK) User ID
vpns1	Character string up to 64 characters	IP address or FQDN[3] of the primary VPN server
vpns2	Character string up to 64 characters	IP address or FQDN of the secondary VPN server
vpntype	'1' Avaya VPN	Only Avaya (heritage Nortel) VPN devices are supported at this time
vpnxauth	'0' none '1' password	X Authentication type
vpnxauthpwd	Character string up to 64 characters	X Authentication password
vpnxauthuser	Character string up to 64 characters	X Authentication User ID
vq	'y' yes 'n' no	Enable 802.1Q for voice [1]

[2] When 'certificate' is provisioned, both a CA root certificate and a device certificates must be installed in the phone. Please refer to *Appendix A: Certificate Installation* for details on installing a CA root certificate and a device certificate into the phone.
[3] If a FQDN is entered, the remote user's local network must have access to DNS to resolve the entered name. Typically in a home environment, this would be the service provider's DNS.

Info Block Parameters		
vvsource	'n' no VLAN 'a' auto VLAN via DHCP 'lv' auto VLAN via VLAN Name TLV 'lm' auto VLAN via Network Policy TLV	Source of VLAN information
xa	Character string made up of the following character 'g' graphical XAS mode 'f' full screen XAS mode 's' secure XAS mode 'h' hidden Phone mode 'r' reduced Phone mode	XAS server action code (XAS Mode and Phone Mode) Note that there is no explicit character to select text-mode. Instead, the lack of specifying graphical 'g' implies the XAS mode is text. Also note that there is no explicit character to select Full phone mode. Instead, the lack of specifying either hidden 'h' or reduced 'r" implies the phone is to be provisioned for Full phone mode. Please be careful not to confuse Full Screen XAS mode 'f' with Full phone mode. Note that hidden Phone mode and reduced Phone mode are supported on the 2007 IP Deskphone only.
xatv	'0' no tone '1' -36dB '2' -26dB '3' -20dB '4' -16dB '5' -13dB '6' -9dB '7' -6dB '8' 0dB	Alternate tone volume
xip	Value from 0.0.0.0 to 255.255.255.255	XAS server IP address
xp	Value from 0 to 65535	XAS server port number
zone	Character string up to 8 characters	Zone ID

[1]: Warning - changing this parameter could impact the network connectivity and may require manual correction

[2]: Warning – provisioning this parameter via TFTP, HTTP, or DHCP means that secure information is transferred in clear text

[3]: Applies to the 1165E IP Deskphone only

10.2 Appendix B: DHCP Configurable Parameters – Avaya 9600 Series H323 IP Phones

Parameter	Description
DOT1X	Controls the operational mode for 802.1X. The default is 0 (pass-through of multicast EAPOL messages to an attached PC, and enable Supplicant operation for unicast EAPOL messages).
DOT1XSTAT	Controls 802.1X Supplicant operation.
HTTPDIR	Specifies the path name to prepend to all file names used in HTTP and HTTPS GET operations during startup. (0 to 127 ASCII characters, no spaces.) The command is "**`SET HTTPDIR myhttpdir`**". The path (relative to the root of the TLS or HTTP file server) where 96xx telephone files are stored. If an Avaya file server is used to download configuration files over TLS, but a different server is used to download software files via HTTP, set the path of the Avaya server in the DHCP site-specific option, and set HTTPDIR again in the 46xxsettings.txt file with the appropriate path for the second server. HTTPDIR is the path for all HTTP operations **except** for BRURI.
HTTPPORT	Specifies the TCP port number to be used for HTTP file downloading.
HTTPSRVR	IP Address(es) or DNS name(s) of HTTP file server(s) used for file download (settings file, language files, code) during startup. The files are digitally signed, so TLS is not required for security.
ICMPDU	Controls the extent to which ICMP Destination Unreachable messages are sent in response to messages sent to closed ports so as not to reveal information to potential hackers. The default is 1 (sends Destination Unreachable messages for closed ports used by traceroute).
ICMPRED	Controls whether ICMP Redirect messages are processed. The default is 0 (redirect messages are not processed).
L2Q	802.1Q tagging mode. The default is 0 (automatic).
L2QVLAN	VLAN ID of the voice VLAN. The default is 0.
LOGLOCAL	Controls the severity level of events logged in the SNMP MIB. The default is 7.
MCIPADD	CM server(s) IP Address(es) or DNS name(s). If there are too many addresses or names to include all of them in the DHCP site-specific option, include at least one from each major system. Then set MCIPADD again in the 46xxsettings.txt file with the complete list of addresses. Providing a subset of the addresses via DHCP improves reliability if the file server is not available due to server or network problems.
PHY1STAT	Controls the Ethernet line interface speed. The default is 1 (auto-negotiate).
PHY2STAT	Controls the secondary Ethernet interface speed. The default is 1 (auto-negotiate).
PROCPSWD	Security string used to access local procedures. The default is 27238.
PROCSTAT	Controls whether local procedures are enabled. The default is 0 (enabled).
SNMPADD	Allowable source IP Address(es) for SNMP queries. The default is " " (Null).
SNMPSTRING	SNMP community name string. The default is " " (Null).
STATIC	Controls whether to use a manually-programmed file server or CM IP Address instead of those received via DHCP or a settings file. If a manually-programmed file server IP Address is to be used, STATIC **must** be set via DHCP.
TLSDIR	Specifies the path name prepended to all file names used in HTTPS GET

Parameter	Description
	operations during startup.
TLSPORT	Specifies the TCP port number used for HTTPS file downloading.
TLSSRVR	IP Address(es) or DNS name(s) of Avaya file server(s) used to download configuration files. **Note:** Transport Layer Security is used to authenticate the server.
VLANTEST	Controls the length of time the telephone tries DHCP with a non-zero VLAN ID. When the interval is exceeded, the telephone records the VLAN ID so that it is not used again, and DHCP continues on the default VLAN. The default is 60 seconds.

10.3 Appendix C: DHCP Configurable Parameters – Avaya 9600 Series SIP IP Phones

Parameter	Description
HTTPDIR	Specifies the path to prepend to all configurations and data files the phone might request when starting up, i.e., the path, relative to the root of the HTTP file server, to the directory in which the telephone configuration and date files are stored. The path may contain no more than 127 characters and may contain no spaces. If an Avaya file server is used to download configuration files over HTTPS, but a different server is used to download software files via HTTP, set the path of the Avaya server in the DHCP site-specific option, and set HTTPDIR again in the 46xxsettings.txt file with the appropriate path for the second server. HTTPDIR is the path for all HTTP operations. The command is "SET HTTPDIR=<path>". In configurations where the upgrade(96xxupgrade.txt) and binary files are in the default directory on the HTTP server, do not use the HTTPDIR=<path>.
HTTPPORT	Destination port for HTTP requests (default is 80).
HTTPSRVR	IP Address(es) or DNS name(s) of HTTP file server(s) used for file download (settings file, language files, code) during startup. The files are digitally signed, so TLS is not required for security.
ICMPDU	Controls the extent to which ICMP Destination Unreachable messages are sent in response to messages sent to closed ports so as not to reveal information to potential hackers. The default is 1 (sends Destination Unreachable messages for closed ports used by traceroute).
ICMPRED	Controls whether ICMP Redirect messages are processed. The default is 0 (redirect messages are not processed).
L2Q	802.1Q tagging mode. The default is 0 (automatic).
L2QVLAN	VLAN ID of the voice VLAN. The default is 0.
LOGSRVR	Syslog server IP or DNS address.
MTU_SIZE	Maximum transmission unit size. Used to accommodate older Ethernet switches that cannot support the longer maximum frame length of tagged frames (since 802.1Q adds 4 octets to the frame).
PHY1STAT	Controls the Ethernet line interface speed. The default is 1 (auto-negotiate).
PHY2STAT	Controls the secondary Ethernet interface speed. The default is 1 (auto-negotiate).
PROCPSWD	Security string used to access local procedures. The default is 27238.
PROCSTAT	Controls whether local procedures are enabled. The default is 0 (enabled).
SIP_CONTROLLER_LIST	SIP proxy/registrar server IP or DNS address(es). (0 to 255 characters; zero or one IP Address in dotted decimal or DNS name format, separated by commas without any intervening spaces.) The default is null.
SNTPSRVR	List of SNTP server IP or DNS address(es) used to retrieve date and time via SNTP

Parameter	Description
TLSDIR	Used as path name that is prepended to all file names used in HTTPS
TLSPORT	Destination TCP port used for requests to https server (0-65535). Thedefault is 443.
TLSSRVR	IP Address(es) or DNS name(s) of Avaya file server(s) used todownload configuration files. **Note:** Transport Layer Security is used to authenticate the server.
VLANTEST	Number of seconds to wait for a DHCPOFFER on a non-zero VLAN. The default is 60 seconds.

10.4 Appendix D: DHCP Configurable Parameters – Avaya 1600 Series H.323 IP Deskphones

Parameter	Description
AGCHAND	Automatic Gain Control status for handset
AGCHEAD	Automatic Gain Control status for headset
AGCSPKR	Automatic Gain Control status for speaker
APPNAME	Primary application image file name
APPSTAT	Controls whether specific applications are enabled, restricted, or disabled.
AUTH	Script file authentication value (0=HTTP is accepted, 1=HTTPS is accepted)
BAKLIGHTOFF	Number of minutes without display activity to wait before turning off the backlight.
BRURI	URL used for backup and retrieval of user data.
DHCPSTD	DHCP Standard leave violation flag.
DNSSRVR	Text string containing the IP address of zero or more DNS servers.
DOMAIN	Text string containing the domain name to be used when DNS names in system values are resolved into IP addresses.
DOT1X	Controls the operational mode for 802.1X. The default is 0 (pass-through of multicast EAPOL messages to an attached PC, and enable Supplicant operation for unicast EAPOL messages).
DOT1XSTAT	Controls 802.1X Supplicant operation.
ENHDIALSTAT	Enhanced Dialing Status.
FONTFILE	Name of the font file for a language for a 1600 Series International Deskphone
HTTPDIR	Specifies the path name to prepend to all file names used in HTTP and HTTPS GET operations during startup. (0 to 127 ASCII characters, no spaces.) The command is "**`SET HTTPDIR myhttpdir`**". The path (relative to the root of the TLS or HTTP file server) where 96xx telephone files are stored. If an Avaya file server is used to download configuration files over TLS, but a different server is used to download software files via HTTP, set the path of the Avaya server in the DHCP site-specific option, and set HTTPDIR again in the 46xxsettings.txt file with the appropriate path for the second server. HTTPDIR is the path for all HTTP operations **except** for BRURI.
HTTPSRVR	IP Address(es) or DNS name(s) of HTTP file server(s) used for file download (settings file, language files, code) during startup. The files are digitally signed, so TLS is not required for security.
ICMPDU	Controls the extent to which ICMP Destination Unreachable messages are sent in response to messages sent to closed ports so as not to reveal information to potential hackers. The default is 1 (sends Destination Unreachable messages for closed ports used by traceroute).
ICMPRED	Controls whether ICMP Redirect messages are processed. The default is 0 (redirect messages are not processed).
L2Q	802.1Q tagging mode. The default is 0 (automatic).
L2QVLAN	VLAN ID of the voice VLAN. The default is 0.
LANG0STAT	Controls whether the built-in English language text strings can be selected by the user.

Parameter	Description
LANGxFILE	Name of the language file in use.
LANGSYS	The file name of the system default language file, if any.
LOGLOCAL	Controls the severity level of events logged in the SNMP MIB.
LOGSRVR	Voice Monitoring Manager (VMM) Server Address
MCIPADD	CM server(s) IP Address(es) or DNS name(s). If there are too many addresses or names to include all of them in the DHCP site-specific option, include at least one from each major system. Then set MCIPADD again in the 46xxsettings.txt file with the complete list of addresses. Providing a subset of the addresses via DHCP improves reliability if the file server is not available due to server or network problems.
MSGNUM	Voice Mail telephone number.
OPSTAT	Options status flag(s) indicate which options are user-selectable.
PHNCC	Telephone country code.
PHNDPLENGTH	Internal extension telephone number length.
PHNIC	Telephone international access code
PHNLD	Telephone long distance access code
PHNLDLENTGH	Length of national telephone number.
PHNOL	Outside line access code.
PHY1STAT	Controls the Ethernet line interface speed. The default is 1 (auto-negotiate).
PHY2PRIO	Layer 2 priority value for frames received on or forwarded to the secondary Ethernet interface. Set this parameter only when VLAN separation is “1” (enabled).
PHY2STAT	Controls the secondary Ethernet interface speed. The default is 1 (auto-negotiate).
PHY2VLAN	VLAN identifier used by frames received on or forwarded to the secondary Ethernet interface. Set this parameter only when VLAN separation is “1” (enabled). If this value is set by LLDP using the Port VLAN ID TLV value, it will not change regardless of the settings from other sources.
PROCPSWD	Security string used to access local procedures. The default is 27238.
PROCSTAT	Controls whether local procedures are enabled. The default is 0 (enabled).
REREGISTER	Registration time in minutes.
RTCPMON	Text string containing the 4-octet IP address of the RTCP monitor currently in use.
SNMPADD	Allowable source IP Address(es) for SNMP queries. The default is " " (Null).
SNMPSTRING	SNMP community name string. The default is " " (Null).
STATIC	Controls whether to use a manually-programmed file server or CM IP Address instead of those received via DHCP or a settings file. If a manually-programmed file server IP Address is to be used, STATIC **must** be set via DHCP.
SUBSCRIBELIST	One or more Push application server subscription URLs.
TPSLIST	One or more trusted domain/path strings.
UNNAMEDSTAT	Unnamed Registration Status
VLANSEP	VLAN Separation. Controls whether frames to/from the secondary Ethernet interface receive IEEE 802.1Q tagging treatment. This parameter is used with several related paramaters.
VLANTEST	Controls the length of time the telephone tries DHCP with a non-zero VLAN ID. When the interval is exceeded, the telephone records the VLAN ID so that

Parameter	Description
	it is not used again, and DHCP continues on the default VLAN. The default is 60 seconds.

10.5 Appendix E: DHCP Configurable Parameters – Avaya 1600 Series SIP IP Deskphones

Parameter	Description
HTTPDIR	Specifies the path name to prepend to all file names used in HTTP and HTTPS GET operations during startup. (0 to 127 ASCII characters, no spaces.) The command is "**`SET HTTPDIR myhttpdir`**". The path (relative to the root of the TLS or HTTP file server) where 96xx telephone files are stored. If an Avaya file server is used to download configuration files over TLS, but a different server is used to download software files via HTTP, set the path of the Avaya server in the DHCP site-specific option, and set HTTPDIR again in the 46xxsettings.txt file with the appropriate path for the second server. HTTPDIR is the path for all HTTP operations **except** for BRURI.
HTTPPORT	Destination port for HTTP requests.
HTTPSRVR	IP Address(es) or DNS name(s) of HTTP file server(s) used for file download (settings file, language files, code) during startup. The files are digitally signed, so TLS is not required for security.
ICMPDU	Controls the extent to which ICMP Destination Unreachable messages are sent in response to messages sent to closed ports so as not to reveal information to potential hackers. The default is 1 (sends Destination Unreachable messages for closed ports used by traceroute).
ICMPRED	Controls whether ICMP Redirect messages are processed. The default is 0 (redirect messages are not processed).
L2Q	802.1Q tagging mode. The default is 0 (automatic).
L2QVLAN	VLAN ID of the voice VLAN. The default is 0.
LOGSRVR	Voice Monitoring Manager (VMM) Server Address
MTU_SIZE	Maximum transmission unit size.
PHY1STAT	Controls the Ethernet line interface speed. The default is 1 (auto-negotiate).
PHY2STAT	Controls the secondary Ethernet interface speed. The default is 1 (auto-negotiate).
PROCPSWD	Security string used to access local procedures. The default is 27238.
PROCSTAT	Controls whether local procedures are enabled. The default is 0 (enabled).
REREGISTER	Registration time in minutes.
SIP_CONTROLLER_LIST	SIP proxy/registrar server IP or DNS address(es).
TLSDIR	Used as path name that is prepended to all fine names used in HTTPS GET operations during initialization.
TLSSRVR	IP Address(es) or DNS name(s) of Avaya file server(s) used to download configuration files.
VLANTEST	Controls the length of time the telephone tries DHCP with a non-zero VLAN ID. When the interval is exceeded, the telephone records the VLAN ID so that it is not used again, and DHCP continues on the default VLAN. The default is 60 seconds.

10.6 Appendix F: 46xxsettings.txt Configuration File

```
##############################################################
##                                                          ##
##     AVAYA IP TELEPHONE CONFIGURATION FILE TEMPLATE       ##
##                ***   Aug 31, 2010  ***                   ##
##                                                          ##
##                                                          ##
## This file is to be used as a template for configuring    ##
## Avaya IP telephones.  This file lists parameters         ##
## supported through the following software releases:       ##
##                                                          ##
## 16xx telephone H.323 software release 1.3                ##
## 1603 telephone SIP software release 1.0                    ##
## 96xx telephone SIP software release 2.6                  ##
## 96xx telephone SIP software release 2.5                  ##
## 96xx telephone SIP software release 2.4.2                ##
## 96xx telephone SIP software release 2.4.1                ##
## 96xx telephone SIP software release 2.2                  ##
## 96x1 telephone SIP software release 6.0                  ##
## 96x1 telephone H.323 software release 6.0                ##
## 96xx telephone H.323 software release 3.1                ##
## 9670 telephone H.323 software release 2.0                ##
## 96xx telephone H.323 software release 2.0 SP1            ##
## 96xx telephone H.323 software release 1.5                ##
## 46xx telephone H.323 software release 2.9                ##
## 3631 telephone H.323 software release 1.3.0              ##
## 16cc telephone SIP software release 1.0                  ##
## 1692 telephone H.323 software release R1.00                ##
## 96xx telephone SIP software release 2.0                  ##
## 46xx telephone SIP software release 2.2.2                ##
## SIP Softphone release 2.1                                ##
##                                                          ##
## Not all parameters are supported on all telephones or    ##
## on all software releases.  See the appropriate issue     ##
## of your telephone's Administrators Guide for more        ##
## details. The guides are available on support.avaya.com   ##
##                                                          ##
##############################################################
##
## Use "## " without quotes to comment out a line.
## To activate a setting, set the parameter to the
## appropriate value for your environment and remove the
## "## " from the beginning of the line.
##
## To include white spaces in a value, the entire value
## must be enclosed in double quotes.
## example:
## SET PARAM "value1 value2"
##
## To set different set types to different values, use
## the "IF" keyword statement.
## See the LAN Administrators Guide for more details.
##
## Some of the parameters listed below have default settings
## which are used by the IP Telephones even if they are
## commented out in this file.  For a list of those
## settings and their default values, see the LAN
## Administrators Guide.
##
##############################################################

##############################################################
```

```
##                                                              ##
##                     COMMON SETTINGS                          ##
##                Applies to all telephones                     ##
##                                                              ##
##################################################################
##
##################  HTTP SERVER SETTINGS  ##################
##
## HTTP Server Addresses
##   [If you set your HTTP Server Addresses via DHCP, do not
##   set them here as they will override your DHCP settings.
##   Also, use TLSSRVR instead if you require an
##   authenticated server]
##   Server used to download configuration script files.
##   Zero or more HTTP server IP addresses in dotted-decimal, colon-hex (H.323 R6.0
onwards),
##   or DNS name format, separated by commas without any
##   intervening spaces. (0 to 255 ASCII characters,
##   including commas).
##   This parameter may also be changed via LLDP.
## SET HTTPSRVR 192.168.0.5
##
## HTTP Server Directory Path
##   Specifies the path name to prepend to all file names
##   used in HTTP and HTTPS GET operations during startup.
##   (0 to 127 ASCII characters, no spaces.)
## SET HTTPDIR myhttpdir
##
## HTTP port
##   Sets the TCP port used for HTTP file downloads from
##   non-Avaya servers. (0-65535) The default is 80.
##   Applies only to 46xx H.323 phones, 96xx phones and 96x1 phones.
## SET HTTPPORT 80
##
## Server Authentication
##   Sets whether script files are downloaded from an
##   authenticated server over an HTTPS link.
##   0 for optional, 1 for mandatory
## SET AUTH 0
##
################  DOMAIN NAME SYSTEM (DNS)  ################
##
## If you set your DNS parameters via DHCP, do not set them
## here as they will over ride your DHCP settings.
##
##   Your Domain Name Server
## SET DNSSRVR 198.152.15.15
##
##   Your DNS domain
## SET DOMAIN mycompany.com
##
##
#############  CALL SERVER ADDRESS OVERRIDE  ###############
##
##
## STATIC parameter is not supported by SIP phones.
##
## STATIC specifies whether a call server IP address that
## has been manually programmed into the phone may override
## any value received via DHCP or this settings file.
##   0 for disabled. File server and call server IP addresses received via DHCP or
##      via a configuration file are used instead of manually programmed values
##   1 for allowing manually programmed file server IP address.
##   2 for allowing manually programmed call server IP address.
##   3 for allowing manually programmed file server and call server IP addresses.
```

```
##
## SET STATIC 0
##
#################  DHCP ADDRESS SETTINGS  #################
##
## DHCPSTD controls whether the phone continues to use an
## expired IP address if the phone received no response to
## its address renewal request.  0 for yes, 1 for no.
##
## SET DHCPSTD 0
##
## VLANTEST specifies the number of seconds to wait for a
## DHCPOFFER when the phone is using a non-zero VLAN ID.
## (0-999)
##
## SET VLANTEST 60
##
######################  LOGIN SETTINGS  ######################
##
## QKLOGINSTAT specifies whether a password must always be
## entered manually at the login screen.For 96XX  SIP Phones ,
## default value is 0 and  'Press Continue softkey to accept
## the current password'
##
##   0 : makes manual password entry mandatory.
##   1 : enables a "quick login' by pressing the
##   # key to accept the current password value.
##
## SET QKLOGINSTAT 0
##
######################  SIG SETTINGS  ######################
## Variable Name : SIG
## Valid Values
##    0    Default
##    1    H.323
##    2    SIP
##
## Description
##       Signaling protocol download flag
##
## SET SIG 1
## Note: This setting is applicable for 96x1 phone models
##
#############  ENHANCED LOCAL DIALING RULES  ###############
##
## These settings affect certain dialing behaviors, such as
## dialing numbers from the incoming Call Log or from web
## pages
##
##   Dialing Algorithm Status
##   Controls whether algorithm defined by parameters in
##   this section is used during certain dialing behaviors.
##     0 disables algorithm.
##     1 enables algorithm, but not for Contacts
##     2 enables algorithm, including Contacts (96xx SIP only)
## SET ENHDIALSTAT 1
##
##   Country Code
##   For United States the value is '1'
## SET PHNCC 1
##
##   Internal extension number length
##   If your extension is 12345, your dial plan length is 5.
##   On 46xx phones, the maximum extension length is 10.
##   On 96xx phones, the maximum extension length is 13.
```

```
##   This value must match the extension length set on your
##   call server.
## SET PHNDPLENGTH 5
##
##   International access code
##   For the United States, the value is 011.
## SET PHNIC 011
##
##   Long distance access code
## SET PHNLD 1
##
##   National telephone number Length
##   For example, 800-555-1111 has a length of 10.
## SET PHNLDLENGTH 10
##
##   Outside line access code
##   The number you press to make an outside call.
## SET PHNOL 9
##
##
############### Emergency Contact Number ##############
##
## If set, this number will be the top-leftmost speed dial
## button in Group 1 of the 46xx speed dial screen and
## labeled "EMERGENCY".  The default is null ("") but any
## valid phone number is acceptable.
## If set in the case of 96xx phones, this is the number
## dialed when the softkey labeled "Emerg." is pressed.
## The default is null ("") but any valid phone number is acceptable.
##
## Note 1: This parameter is not supported on phone model 3631.
## Note 2: This setting is applicable for 1603 phone models also.
## SET PHNEMERGNUM 911
##
##############  APPLICATION ACCESS SETTINGS  ###############
##
## These settings restrict access to certain applications.
## APPSTAT is not supported on 96xx or 16cc SIP phones.
##
##   When APPSTAT is set to 0, Call Log and Redial are
##   suppressed and changes to Speed Dial/Contacts are not allowed.
##
##   When APPSTAT is set to 1, Call Log, Redial and,
##   Speed Dial/Contacts work without restrictions.
##
##   When APPSTAT is set to 2, Call Log is suppressed.
##   For Redial the Last-6-numbers option is suppressed
##   and changes to Speed Dial/Contacts are not allowed.
##
##   When APPSTAT is set to 3, changes to Speed Dial/Contacts
##   are not allowed.
##
## SET APPSTAT 1
##
##
#################  OPTION ACCESS SETTINGS  #################
##
## This setting restricts access to certain user options.
## OPSTAT is not supported on 96xx or 16cc SIP phones.
##
##   When OPSTAT is set to 000, the user options
##   are not accessible.
##
##   When OPSTAT is set to 001, the user can only access
##   the Log-Off Option.
```

```
##
##   When OPSTAT is set to 010, the user can only access
##   view-only options. The user cannot change any setting.
##
##   When OPSTAT is set to 011, the user can only access
##   view-only options and the Log-Off Option.
##
##   When OPSTAT is set to 100, the user can access
##   all options except the view-only options and
##   the Log-Off option.
##
##   When OPSTAT is set to 101, the user can access
##   all options except the view-only options.
##
##   When OPSTAT is set to 110, the user can access
##   all the options except the Log-Off option.
##
##   When OPSTAT is set to 111, the user can invoke
##   any or all of the user options.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET OPSTAT 111
##
##
#############  LOCAL PROCEDURE ACCESS SETTINGS  ############
##
## Restrict Local Procedure Access
##   Controls whether local (dial pad) procedures can be
##   used to administer the telephone.
##   0 means local procedures can be accessed from the
##   telephone.
##   1 means local procedures can not be accessed from the
##   telephone.
##   CAUTION:Be absolutely sure before setting PROCSTAT to 1
##   Note : This setting is applicable for 1603 SIP phones also.
## SET PROCSTAT 0
##
## Local Procedure Password
##   Sets password for local (dial pad) procedure access.
##   (0 to 7 ASCII numeric digits).  See your telephone's
##   Administrator's guide for the default password
##   supported by your release.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET PROCPSWD 27238
##
####################  AUDIO SETTINGS  ######################
##
## Automatic Gain Control (AGC).
##   These settings enable or disable AGC.
##
##   A value of 1 (default) enables AGC. A value of 0 disables AGC.
##   AGCHAND controls handset AGC. Not supported on 16cc phones.
##   AGCHEAD controls headset AGC
##   AGCSPKR controls speaker AGC. Not supported on 16cc phones.
##   Note: AGCHAND and AGCSPKR are applicable for 1603 SIP phone.
## SET AGCHAND 0
## SET AGCHEAD 0
## SET AGCSPKR 0
##
## Headset Operational Mode
##   Controls whether the headset ignores a disconnect
##   message.
##
##   A value of 0 or 2 makes the headset go on-hook when it
##   receives a disconnect message.
##   A value of 1 or 3 makes the headset ignore a disconnect
```

```
##   message.
##
## SET HEADSYS 1
##
## Audio Environment Index
##   Enables you to customize the telephone's audio
##   performance.  (0-299)  This parameter affects settings
##   for AGC dynamic range, handset and headset noise
##   reduction thresholds, and headset transmit gain. It is
##   highly recommended you consult Avaya before changing
##   this parameter.
##
## SET AUDIOENV 0
##
#################  WML BROWSER SETTINGS  ###################
##
##   This section contains the common settings used to
##   enable and administer the 'Web' application.  These
##   parameters are not supported on 16cc and 96x1 SIP phones.
##
##   The settings 'WMLHOME', which sets the URL of the
##   telephone home page, and 'WMLIDLEURI', which sets the
##   idle phone home page, may be different for each set
##   type to take advantage of the capabilities of the
##   individual sets. WMLHOME and WMLIDLEURI should be set
##   in the sections for the individual set types.
##   Note: The 9610 does not use WMLHOME or WMLIDLEURI.
##   Use WMLSMALL in their place.
##
##   Your HTTP proxy server address (name or IP address)
## SET WMLPROXY my.proxy.company.com
##
##   The TCP port number of your HTTP proxy server
## SET WMLPORT 8080
##
##   A list of one or more HTTP proxy server exception
##   domains separated by commas without any spaces.
##   Accesses to these addresses will not go through the
##   proxy server.
## SET WMLEXCEPT mycompany.com,135.20.21.20
##
##   The idle period in minutes before the WMLIDLEURI
##   web page is displayed.  Valid values are 1 to 999.
##   Default (if WMLIDLEURI is set) is 10 minutes.
## SET WMLIDLETIME 100
##
##
################  PUSH INTERFACE SETTINGS  #################
##
## These settings are used to administer the Push interface.
## These parameters are not supported on 16cc and 96x1 SIP phones.
##
##   The list of all the Trusted Push Servers.
##   If set to "/", all servers are allowed.
##   If set to null or blank, Push is disabled.
## Note: This parameter is supported on H.323 and R2.2 release
##       of SIP 96xx telephones.
## SET TPSLIST 135.20.21.20
##
##   The list of all the Subscription Servers.
## Note: This parameter is supported on H.323 and R2.2 release
##       of SIP 96xx telephones.
## SET SUBSCRIBELIST http://135.20.21.21/subscribe
##
################## USB POWER SETTINGS #########################
```

```
##
## USBPOWER parameter is not supported by SIP phones.
##
##   USB Power Control
##   This defines a Control parameter to Power the USB interface.
##   The values are as follows and default is 2.
##     0:  Turn off USB power regardless of power source.
##     1:  Turn on USB power only if Aux powered.
##     2:  Turn on USB power regardless of power source.
##     3:  Turn on USB power if Aux powered or PoE Class 3 power.
##
## SET USBPOWER 2
##
####################  RTCP MONITORING  ######################
##
## The RTCP monitor
##   One RTCP monitor (VMM server) IP address in
##   dotted-decimal format or DNS name format (0 to 15
##   characters). Note that for H.323 telephones only this
##   parameter may be changed via signaling from Avaya
##   Communication Manager. For 96xx SIP models in Avaya
##   environments, this parameter is set via the PPM server.
##   This parameter is not supported on 16cc model phones.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET RTCPMON 192.168.0.10
##
## RTCPMONPORT sets the port used to send RTCP information
## to the IP address specified in the RTCPMON parameter.
## RTCPMONPORT is only supported on 46xx SIP telephones and
## 96xx telephones in non-Avaya environments.  For 96xx SIP
## models in Avaya environments, this parameter is set via
## the PPM server. The default is 5005.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET RTCPMONPORT  "5005"
##
## RTCP Monitor Report Period
##   Specifies the interval for sending out RTCP monitoring
##   reports (5-30 seconds).  Default is 5 seconds. This
##   parameter applies only to 96xx SIP telephones.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET RTCPMONPERIOD 5
##
############  CONVERGED NETWORK ANALYZER SETTINGS  ##########
##
## The CNA server
##   One or more CNA server IP addresses in
##   dotted-decimal format or DNS name format (0 to 255
##   characters). This parameter is not supported on 16cc
##   and 1603 SIP model phones.
## SET CNASRVR 192.168.0.10
##
## CNA port
##   Sets the port used for CNA registration. (0-65535)
##   The default is 50002.  This parameter is not supported
##   on 16cc and 1603 SIP model phones.
## SET CNAPORT 50002
##
##
###################  ETHERNET INTERFACES  ###################
##
## Primary Interface Status
##   Controls the speed and duplex settings for the primary
##   Ethernet interface.
##     1 for auto-negotiate
##     2 for 10Mbps half-duplex
```

```
##     3 for 10Mbps full-duplex
##     4 for 100Mbps half-duplex
##     5 for 100Mbps full-duplex
##     6 for 1Gbps full-duplex (96xx phones only)
##   Note : This setting is applicable for 1603 SIP phones also.
## SET PHY1STAT 1
##
## PC Interface Status
##   Controls the speed and duplex settings for the PC
##   Ethernet interface.
##     0 for disabled
##     1 for auto-negotiate
##     2 for 10Mbps half-duplex
##     3 for 10Mbps full-duplex
##     4 for 100Mbps half-duplex
##     5 for 100Mbps full-duplex
##     6 for 1Gbps full-duplex (96xx phones only)
##   Note : This setting is applicable for 1603 SIP phones also.
## SET PHY2STAT 1
##
##################  802.1P/Q SETTINGS  ###################
##
## Telephone Frame Tagging
##   Controls whether layer 2 frames generated by the
##   telephone have IEEE 802.1Q tags.
##   0 for Auto, 1 for On, and 2 for Off
##   This parameter may also be changed via LLDP.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET L2Q 0
##
## Voice VLAN Identifier
##   VLAN identifier to be used by IP telephones. This
##   parameter should only be set when IP telephones are to
##   use a VLAN that is separate from the default data VLAN.
##   If the VLAN identifier is to be configured via H.323
##   signaling based on Avaya Communication Manager
##   administration forms, it should not be set here.
##   This parameter may also be changed via LLDP.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET L2QVLAN 0
##
## Audio Priority Value
##   Sets the layer 2 priority value for audio packets
##   from the phone. (0-7)
##   For H.323 phones, this parameter may also be
##   changed from Communication Manager. For 96xx SIP
##   phones, this parameter may also be changed via LLDP.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET L2QAUD 6
##
## Signaling Priority Value
##   Sets the layer 2 priority value for signaling
##   protocol messages from the phone. (0-7)
##   For H.323 phones, this parameter may also be
##   changed from Communication Manager. For 96xx SIP
##   phones, this parameter may also be changed via LLDP.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET L2QSIG 6
##
## VLAN Separation
##   Controls access to the voice VLAN from the secondary
##   Ethernet interface and whether broadcast traffic from
##   the data VLAN is forwarded to the phone.
##   1 for enabled, 0 for disabled.
##   Note : This setting is applicable for 1603 SIP phones also.
```

```
## SET VLANSEP 0
##
## Secondary Ethernet Interface VLAN Identifier
##   VLAN Identifier used for the data VLAN (0-4094).
##   This parameter is only used if VLANSEP is 1.
##   This parameter may also be changed via LLDP.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET PHY2VLAN 0
##
## Secondary Ethernet Interface Priority Value
##   Sets the priority value (0-7) for layer 2 frames
##   forwarded to the network from the telephone's secondary
##   Ethernet interface.
##   This parameter is only used if VLANSEP is 1.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET PHY2PRIO 0
##
#####################  SNMP SETTINGS  ######################
##
## SNMP addresses
##   If this parameter is set, an SNMP query will only be
##   accepted if the source IP address of the query matches
##   one of these values. This parameter may contain one or
##   more IP addresses in dotted-decimal,colon-hex (H.323 R6.0 onwards) or DNS name
format,
##   separated by commas without any intervening spaces
##   (0 to 255 ASCII characters, including commas).
##   Note : This setting is applicable for 1603 SIP phones also.
## SET SNMPADD 192.168.0.22,192.168.0.23
##
## SNMP community name string
##   This value must be set to enable viewing of the phone's
##   MIB. This value must match the community string name
##   used in the SNMP query (up to 32 ASCII characters, no
##   spaces).
##   Note : This setting is applicable for 1603 SIP phones also.
## SET SNMPSTRING mystring
##
##
#################  EVENT LOGGING SETTINGS  ##################
##
## Event Logging control
##   Controls the level of events logged in the
##   endptRecentLog and endptResetLog objects in the SNMP
##   MIB. Events with the selected severity level and higher
##   will be logged.
## LOGLOCAL is not supported on 96xx or 16cc SIP phones.
##     0 for disabled
##     1 for emergencies
##     2 for alerts
##     3 for critical
##     4 for errors
##     5 for warnings
##     6 for notices
##     7 for information
##     8 for debug
## SET LOGLOCAL 5
##
## Syslog Server address
##   One syslog server IP address in dotted-decimal,colon-hex (H.323 R6.0 onwards), or
DNS
##   name format (0 to 255 ASCII characters).
##   Note : This setting is applicable for 1603 phones also.
## SET LOGSRVR 192.168.0.15
##
```

```
##
###############  DISPLAY BACKLIGHT CONTROL  ################
##
##   Idle Time Before Turning Off Backlight (minutes)
##   Number of minutes without phone activity to wait
##   before turning off backlight. A value of 0 means the
##   backlight is never turned off.  This parameter is
##   supported only by phones which have a backlight.
##   The default is 120 minutes.
##   Gray-scale phones do not completely turn backlight off;
##   it is set to the lowest non-off level
##   Valid values are in the range 0-999.
## SET BAKLIGHTOFF 120
##
##
####################  802.1X SETTINGS  ####################
##
## 802.1X Supplicant Status
## This setting determines the 802.1X supplicant operating
## mode for 96xx telephones only.
##
##   0: Supplicant operation disabled.
##   1: Supplicant operation enabled, but responds only to
##      received unicast EAPOL messages (default)
##   2: Supplicant operation enabled; responds to received
##      unicast and multicast EAPOL messages
## Note 1: The default value of "0" is only for R2.4.1 and later
## releases of 96xx SIP telephones. For releases prior to R2.4.1,
## the default value is "1".
## Note 2: This setting is applicable to 1603 SIP phone models also.
## the default value for 1603 SIP is "0".
## SET DOT1XSTAT 0
##
## 802.1X Pass-Through Mode
## This setting determines the 802.1X pass-through operating
## mode.
##   0: PAE multicast pass-through enabled. No proxy Logoff.
##      (For H.323 phones, also enables Unicast Supplicant
##      operation.) DEFAULT OPERATION.
##   1: Same operation as for "0" but with proxy Logoff.
##   2: No PAE multicast pass-through or proxy Logoff.
##      (For H.323 phones prior to S2.0, also enables Unicast or multicast
##      Supplicant operation.)
##   Note : This setting is applicable for 1603 SIP phones also.
## SET DOT1X 0
##
#####################  ICMP SETTINGS  #####################
##
## Destination Unreachable Message Control
##   Controls whether ICMP Destination Unreachable messages
##   are generated.
##     0 for No
##     1 for limited Port Unreachable messages
##     2 for Protocol and Port Unreachable messages
##   Note : This setting is applicable for 1603 SIP phones also.
## SET ICMPDU 1
##
## Redirect Message control
##   Controls whether received ICMP Redirect messages will
##   be processed
##     0 for No
##     1 for Yes
##   Note : This setting is applicable for 1603 SIP phones also.
## SET ICMPRED 0
##
```

```
#################  BACKUP/RESTORE SETTINGS  ################
##
## Backup and Restore URI
##   URI used for HTTP backup and retrieval of user data.
##   Specify HTTP server and directory path to backup file.
##   Do not specify backup file name.
##   BRURI is not supported on 96xx, 16cc and 1603 SIP phones.
## SET BRURI http://192.168.0.28
##
## Backup/Restore Authentication
##       Specifies whether authentication is used for backup/restore file download.
##      Call server IP address and telephone's registration can be used as credentials.
##    0: Call server IP address and telephone's registration password
##          are not included as credentials.
##    1: The call server IP address and the telephone’s registration
##      password are included as the credentials in an Authorization request-header
## SET BRAUTH 0
##
#################### AUDIBLE ALERTING ######################
##
##   Specifies the audible alerting setting for the telephone
##   and whether users may change this setting.
##
##   A value of 0 turns off audible alerting; user cannot
##     adjust ringer volume at all.
##   A value of 1 turns on audible alerting; user can adjust
##     ringer volume but cannot turn off audible alerting.
##   A value of 2 turns off audible alerting; user can adjust
##     ringer volume and can turn off audible alerting.
##   A value of 3 turns on audible alerting; user can adjust
##     ringer volume and can turn off audible alerting.
##
##   For 46xx phones:
##   A value of 0 or 2 lets the user reduce audible alerting to
##     the lowest audible setting, but not zero.
##   A value of 1 or 3 lets the user reduce audible alerting to zero.
##
##   The default value is 3.
##
##   SET AUDASYS 3
##
##   NOTE : This AUDASYS value is applicable for 16xx phones starting
##          with R1.3.
##
############################################################
##                                                        ##
##                      46xx SETTINGS                     ##
##      Settings applicable to 46xx telephone models      ##
##                                                        ##
############################################################
##
## IP Filter List Addresses
##   Specifies additional IP addresses whose packets are
##   allowed through the IP source address filter to be
##   processed by the telephone.  This parameter should be
##   set only if it is suspected that an address is being
##   blocked unnecessarily. This parameter may contain one
##   or more IP addresses in dotted-decimal or DNS name
##   format, separated by commas without any intervening
##   spaces (0 to 255 ASCII characters, including commas).
## SET FILTERLIST 192.168.0.45
##
######  46XX IP Phone Multi-Language Administration  #######
##
## This setting is used to set the local display
```

```
## language of your 46XX telephone.
##
##   For all 4620 sets, and either 4610SW or 4620SW sets
##   that have been loaded with single-byte software (the
##   default), use one of the following settings:
##   For English use keyword    "English"
##   For French use keyword     "Francais"
##   For Italian use keyword    "Italiano"
##   For Japanese use keyword   "Katakana"
##   For Dutch use keyword      "Nederlands"
##   For German use keyword     "Deutsch"
##   For Portuguese use keyword "Portugues"
##   For Spanish use keyword    "Espanol"
##
##   For 4620SW/4625SW sets that have been loaded with
##   multi-byte software to support Chinese/Russian/Hebrew/
##   English fonts, use one of the following settings:
##   For English use keyword    "English"
##   For Chinese use keyword    "Chinese"
##   For Russian use keyword    "Russian"
##   For Hebrew use keyword     "Hebrew"
##
##   For 4620SW/4625SW sets that have been loaded with
##   multi-byte software to support Japanese/Russian/
##   Hebrew/English fonts, use one of the following
##   settings:
##   For English use keyword    "English"
##   For Japanese use keyword   "Japanese"
##   For Russian use keyword    "Russian"
##   For Hebrew use keyword     "Hebrew"
##
##   For 4620SW/4625SW sets that have been loaded with
##   multi-byte software to support Korean/Russian/Hebrew/
##   English fonts, use one of the following settings:
##   For English use keyword    "English"
##   For Korean use keyword   "Korean"
##   For Russian use keyword    "Russian"
##   For Hebrew use keyword     "Hebrew"
##
## SET SYSLANG English
##
##
######  46xx Automatic Backup/Restore Settings  ########
##
## RESTORESTAT enables/disables the automatic backup and
## restore of user data. Applies to both FTP and HTTP
## backup/restore.  This setting does not apply to the
## 4602 sets.
##
##   A value of 1 enables  Backup/Restore.
##   A value of 0 disables Backup/Restore.
##
## FTPUSERSTAT sets user permissions on modifications to
## server names and directory paths used for FTP
## backup/restore.  Does not apply to HTTP backup/restore.
##
##   When FTPUSERSTAT is set to 0, the user can only use the
##   server and path data administered via DHCP or settings
##   file.
##
##   When FTPUSERSTAT is set to 1, the user can specify
##   alternative FTP servers or directory paths. The default
##   is 1.
##
##   When FTPUSERSTAT is set to 2, the user can specify
```

```
##   alternative FTP directory paths but is not allowed to
##   specify alternative FTP servers.
##
## FTPSRVR specifies the IP Address of the default FTP
## Server. May be a dotted-decimal address or DNS string.
## Depending on FTPUSERSTAT setting, may be overridden by
## the user.
##
## FTPDIR specifies the default directory path used for
## storage and retrieval of phone user information.
## Depending on FTPUSERSTAT setting, may be overridden by
## the user.
##
## SET RESTORESTAT 1
## SET FTPUSERSTAT 1
## SET FTPSRVR 135.18.18.18
## SET FTPDIR myftpdir
##
################################################################
##                                                            ##
##                    PUSH INTERFACE SETTINGS                 ##
##           Settings applicable to 46xx,96xx,96x1 H.323      ##
##                     telephone models only                  ##
##                                                            ##
################################################################
##
## These settings are used to administer the Push interface
##
##   The TCP port number for the telephone's HTTP server.
##   (80-65535).  The default is 80.
## Note: This parameter is supported on H.323 and R2.2 release of
##        96xx SIP telephones.
## SET PUSHPORT 80
##
##   Push capabilities settings.
##     PUSHCAP consists of 4 digits (each 0, 1, or 2).
##     The rightmost digit controls the Top Line push mode,
##     the next digit to the left controls the display (web) pushes,
##     the next digit to the leftmost controls Audio receive pushes,
##     and the leftmost digit controls Audio transmit pushes.
##
##   0000: all push modes are disabled
##
##   1111: barge in only is allowed in
##         all push modes.
##
##   2222: both barge in and normalpushes are allowed in
##         all push modes.
## SET PUSHCAP 1111
##
################################################################
##                                                            ##
##                   PUSH INTERFACE SETTINGS                  ##
##        Settings applicable for 96xx SIP Telephone          ##
##                 release 2.2, 2.5 and above.                ##
##                                                            ##
################################################################
#########  PUSH SETTINGS  ######################
##
## These settings are used to administer the push interface.
##
##   Push capabilities. Valid values are any one to five digit
##   combination using only the digits "0", "1", or "2". The
##   PUSHCAP is interpreted as a five digit number so any
##   PUSHCAP fewer than 5 digits in length will be prepended
```

```
##   with zeros.
##
##   Each of the digits control the following push functionality as
##   specified below:
##   - First digit - PhoneXML push
##   - Second digit - Audio transmit push
##   - Third digit - Audio receive push
##   - Fourth digit - Display push
##   - Fifth digit - Top Line push
##
##   Each of the digit values is described below:
##   - 0 - Push mode is disabled.
##   - 1 - Only barge-in push is allowed for this push type.
##   - 2 - Normal and barge-in pushes are allowed for this push type.
##
##   An example of a PUSHCAP is that of 21100. For this PUSHCAP the phone
##   will be able to receive both barge-in and normal PhoneXML push
##   messages, it will only be able to receive barge-in audio receive and
##   transmit pushes, and it will not be able to receive barge-in or
##   normal priority display or topline pushes.
## SET PUSHCAP 22222
##
##   The TCP port number for the telephone's HTTP server.
##   (80-65535).  The default is 80.
## SET PUSHPORT 80
##
##   The list of all the Trusted Push Servers.
##   If set to "/", all servers are allowed.
##   If set to null or blank, Push is disabled.
## SET TPSLIST xxx.xxx.xxx.xxx:port
##  Where the TPSPORT i.e the port of the push server from which
##  phone will receive the push request. This was not present in R2.2.
##
##   The list of all the Subscription Servers.
## SET SUBSCRIBELIST xxx.xxx.xxx.xxx
##
##   If this is set to 1, then the RTP receive port must be the
##   same as the RTP transmit port. The default is 1.
## SET SYMMETRIC_RTP 0
##
############################################################
##                                                        ##
##            96xx,16xx and 16cc SETTINGS                 ##
## Settings applicable to 96xx,16xx and 16cc models       ##
##                                                        ##
############################################################
##
## Voice Mail Telephone Number
##   Specifies the telephone number to be dialed
##   automatically when the telephone user presses the
##   Messaging button.  The specified number is used to
##   connect to the user's Voice Mail system.
##
## Note:
## This parameter setting is ignored for extensions
## configured as 96xx station types on the call server.
##
## SET MSGNUM 1234
##
## English Language Selection Status
##   Specifies whether built-in English language text strings
##   are selectable by the user. 0 for off, 1 for on.
##   Note : This setting is applicable for 16xx H323 and 1603 SIP phones also.
## SET LANGOSTAT 1
##
```

```
################  AVAYA SCREEN SAVER SETTINGS  ###################
##
##   Idle time before the Avaya Screen Saver is activated (minutes).
##   Number of minutes without phone activity to wait
##   before the screen saver is activated. A value of 0 means
##   the screen saver is never activated. The default is 240 minutes.
##   This parameter does not apply to 16cc SIP phones.
##
##   Note:
##   This setting activates the Avaya Screen Saver which is
##   different than the "idle screen" accessed by WMLIDLEURI.
##   While it is possible to use WMLIDLEURI as an "idle
##   screen", it is recommended that the SCREENSAVERON
##   timer and the Avaya Screen Saver display be used for
##   screen saver purposes.
##   The available range is 0-999.
##
## SET SCREENSAVERON 240
##
##  The filename of a valid JPEG customized screen saver image.
##  0-32 ASCII characters.
## Note: This parameter is supported on H.323 and Its not been
## supported for SIP 96XX Releases of telephones
##
## SET SCREENSAVER filename
##
################  A(Avaya) Menu Settings   #################
##
##   WML-Application URI
##   URI used for WML-applications under A (AVAYA) Menu.
##   Specify HTTP server and directory path to administration
##   file (AvayaMenuAdmin.txt). Do not specify the
##   administration file name. This parameter applies to 96xx H323
##   model phones and also supported in 96xx SIP releases from R2.5 onwards.
##   This parameter is not supported in 96x1 SIP phones.
##
## SET AMADMIN  http://192.168.0.28
##
##
#####################################################################
##                                                                 ##
##                    H.323 SETTINGS for 96xx                      ##
##  Settings specific to 96xx telephones with H.323 software       ##
##                                                                 ##
#####################################################################
##
## VOICE LANGUAGE FILES
##
## Specifies the list of files presented to the user for selecting a
## voice language file for the phone.  The files are separated by
## commas, and the filenames are fixed and should not be changed.
## By default, the first file in the list is installed in the phone at
## registration.  The first three characters in the filename
## indicate the language supported as follows:
##
## Brazilian Portuguese      PTB
## European SpanishSPE
## Dutch           DUN
## German          GED
## Italian                   ITI
## Parisian French FRF
## U.K. English              ENG
## U.S. English              ENU
##
## SET VOXFILES ENU_S20_v3.tar,SPE_S20_v3.tar,GED_S20_v3.tar
```

```
##################################################################
##                                                              ##
##       H.323 SETTINGS for 96xx & 96x1                         ##
##       Settings specific to 96xx & 96x1 telephones            ##
##       with H.323 software                                    ##
##                                                              ##
##################################################################
##
## Guest Login State
##   Specifies whether Guest Login feature is available to the user
##   A binary value, with a default of 0.
##
##   0 : Guest Login feature is not available to the user.
##   1 : The telephone will offer the Guest Login feature
##
## SET GUESTLOGINSTAT 0
##
## Guest Duration
##   Specifies the minimum duration (in hours) the
##   Guest Login is effective, before the telephone may
##   automatically log the guest off.
##   An integer value from 1 to 12, with a default of 2.
##
## SET GUESTDURATION 2
##
## Guest warning
##   Specifies the number of minutes before the
##   GUESTDURATION expires that a warning is initially
##   presented to the user, warning of the impending expiration.
##   An integer value from 1 to 15, with a default of 5.
##
## SET GUESTWARNING 5
##
########################## Features on Softkeys ######################
##
## Idle Feature Settings
##   A list of feature identifiers for softkey features
##   available in the Idle call state
##   0 to 255 ASCII characters: zero to six whole numbers
##   separated by commas without any intervening spaces
##
## SET IDLEFEATURES ""
##
## Dial Feature Settings
##   A list of feature identifiers for softkey features
##   available in the Dialing call state
##   0 to 255 ASCII characters :zero to five whole numbers separated
##   by commas without any intervening spaces
##
## SET DIALFEATURES ""
##
## Ring Back Feature Settings
##
##   A list of feature identifiers for softkey features
##   available in the Active with far end ringback call state
##   0 to 255 ASCII characters :zero to three whole numbers
##   separated by commas without any intervening spaces
##
## SET RINGBKFEATURES ""
##
## Talk Feature Settings
##
##   A list of feature identifiers for softkey features
##   available in the Active with talk path call state
```

```
##   0 to 255 ASCII characters :zero to three whole numbers
##   separated by commas without any intervening spaces
##
## SET TALKFEATURES ""
##
#################### USB Login/Logout feature ###################
## USB Login/Logout State
##   Specifies whether USB Login/Logout feature is available to the user
##   0 : USB Login/Logout feature is not available to the user.
##   1 : USB Login/Logout feature is available to the user
##  Note: This feature is available on H.323 release 3.0 for 96xx & release 6.0 for 96x1
phones.
## SET USBLOGINSTAT 1
##
##
## Admin Option for locking down access to features
##
##   When OPSTAT2 is set to 1, the user can upload
##   customized labels from backup file irrespective
##   of value of first digit of OPSTAT
##   When OPSTAT2 is set 0, the user can not upload
##   customized labels from backup file
##  Note: This feature is available on H.323 release 3.0 for 96xx & release 6.0 for 96x1
phones.
## SET OPSTAT2 0
##
##   Backup of Call Log Entries
##   When LOGBACKUP set to "1" Call Log entries are backed up
##   to & restored from standard backup file.
##  Note: This feature is available on H.323 release 3.0 for 96xx & release 6.0 for 96x1
phones.
## SET LOGBACKUP 1
##
##
## Enable/disable logging of Call Log entries
##   Call Log entries for calls that have reached the phone
##   (E.g. calls that have not been alerted because the phone was busy, or forwarded
calls)
##   are logged in Call Log if LOGUNSEEN is set to 1.
##   If LOGUNSEEN is set to 0 then those calls will not be logged.
##   Default = 0.
##  Note: This feature is available on H.323 release 3.0 for 96xx & release 6.0 for 96x1
phones.
## SET LOGUNSEEN 1
##
##
## Enable/disable removing of Call Log entries
##  When CLDELCALLBK is set to 1, and when user presses Call, if the call
##  is established then the entry is deleted from the Call Log.
##  When CLDELCALLBK is set to 0, then the enrty will not be deleted from
##  Call log.
##   Default = 0.
##  Note: This feature is available on H.323 release 3.0 for 96xx & release 6.0 for 96x1
phones.
##  SET CLDELCALLBK 0
##
##
## Entries in missed call log from the same caller
##   When LOGMISSEDONCE is set to 1, then Calls are logged only once
##   for the same number.Any other Missed Call Log entry with the same
##   Number is deleted.
##   Default = 0.
##  Note: This feature is available on H.323 release 3.0 for 96xx & release 6.0 for 96x1
phones.
##  SET LOGMISSEDONCE 1
```

```
##
## Enable/disable Feature Button on Phone
##   When FBONCASCREEN is set to 1 Feature Button are also
##   displayed on Call Appearance filtered screen.
##   Default = 0.
##  Note: This feature is available on H.323 release 3.0 only for 9630 or 9640 phones &
release 6.0 for 96x1 phones..
## SET FBONCASCREEN 0
##
## Team Button Display
## When TEAMBTNDISPLAY is set to 1, use LED to mark the Busy state of their team member's
phone
## When TEAMBTNDISPLAY is set to 0, use the LED to mark the Forwarding state of the team
member's phone.
## Default = 0.
## Note: This feature is available on H.323 release 3.0 for 96xx & release 6.0 for 96x1
phones.
## SET TEAMBTNDISPLAY 0
##
################### Home Idle Timer ########################
## HOMEIDLETIME is the idle period in minutes before the
##  Home screen will be displayed
##  Valid values are 0 to 30.
##   Default is 10 minutes.
##  Note: This feature is available on H.323 release 2.0 for 9670 & release 6.0 for 9641
& 9621.
## SET HOMEIDLETIME 10
##
## World Clock Application
## WORLDCLOCKAPP is the  application to display World Clock information.
## Note: This feature is available on H.323 release 2.0 for 9670 & release 6.0 for 9641 &
9621.
##     "" :        World Clock application is disabled
##     "default" : World Clock application is enabled (default)
## SET WORLDCLOCKAPP "default"
##
## Weather application
## WEATHERAPP is the application to display the weather information.
##  Note: This feature is available on H.323 release 2.0 for 9670 & release 6.0 for 9641
& 9621.
##     ""        : Weather application is disabled
##     "default" : Weather application is enabled (default)
## SET WEATHERAPP "default"
##
## Calcualtor Application
##
## Description
##     Specifies whether the Calculator application should be displayed.
##
## Variable Name :  CALCSTAT
## Valid Values
##    0    Don't display Calculator
##    1    Display Calculator
##
## SET CALCSTAT 1
##  Note: This feature is available on release 6.0 for 9641 & 9621.
##
## Ring Tone Style
##  This feature is related to personalised ringing operation.
##  RINGTONESTYLE determines name of the list for the current setting
##  i.e. "Rich", "Classic" or "Alternate"
##  Note: This feature is available on H.323 release 2.0 for 9670 & 96x1 H.323 6.0
release.
## SET RINGTONESTYLE 0
##
```

```
## Variable Name :  WMLHELPSTAT
## Valid Values
##    1    WML Applications Help screen that explains that the telephone supports
##         WML applications, but that no such applications are currently administered.
##    0    no WML items are displayed.
##
## Description
##     Specifies whether a Web Application Help item is displayed on the Home screen
##     if no WML apps are administered and WMLHOME is null
##
## SET WMLHELPSTAT 1
## Note: This feature is available on H.323 release 6.0 for 9641 & 9621.
##
##################  REUSE TIME SETTINGS  ##################
##
## REUSE TIME:
##  Phone can reuse its previous IP address, and parameter values after configured REUSE
TIME elapsed, if
##  the DHCP server and/or file server is not available after a power outage or reset.
##
##  Value 20 to 999 - This value specifies the number of seconds that an IP telephone
will attempt to
##                    contact a DHCP server on the default VLAN before proceeding to
reuse its previous
##                    IP address and parameter values.
##
##  The Default value of REUSETIME is 60.
##
##  When set to "0", reuse of an IP address and parameter values will be disabled.
##
##  For other values - Waits for the DHCP offer for an infinite time.
##
##  SET REUSETIME 60
##
##  NOTE: This feature is available on H.323 release 2.0SP1, 3.0SP1 and
##        SIP release R2.5 for 96xx phones.
##
##################  GRATUITOUS ARP SETTINGS  ##################
##
## This parameter specifies the phones behavior for handling Gratuitous ARP.
##        In the PE Dup Environment, if the PE DUP server and the phone reside
##        in the same subnet, the user should set this to 1.
##
##  0 - (Default) ignore all received gratuitous ARP messages.
##
##
##  1 - Phones will update an existing ARP cache entry with the MAC address received in a
gratuitous ARP message
##      for that entry's destination IP address.
##
##  SET GRATARP 0
##
##  NOTE: This feature is available on H.323 release 3.0SP1 for 96xx phones.
##
############################################################
## Avaya VPN IP Telephone Settings Script
## File Modified on: 07/16/2010
## See the LAN Administrators Guide for
## more details on using this file.
##
## Variable Name : NVVPNMODE
## Valid Values
##    0  DISABLE
##    1  ENABLE
## Default Value
```

```
##    0  DISABLE
## Description
##    This variable dictates when the VPN Client is started. If it's value is
##    1, VPN Client is started immediately after TCP/IP stack is initialized,
##    If it's value is 0, VPN Client is disabled
## Example : Setting VPN startup mode to ENABLE.
## SET NVVPNMODE 1
## SET NVVPNMODE 0
##
##
## DHCP Server Addresses
##
##   Specifies enterprise DHCP server IP address(es) from which configuration
##   parameters may be requested through a VPN tunnel via a DHCPINFORM message
##
## SET    DHCPSRVR 192.168.16.2
##
##
##
## Variable Name : NVVPNCFGPROF
## Valid Values
##    0  Profile ID 0
##    2  Checkpoint
##    3  Cisco Xauth with Preshared Key
##    5  Juniper/Netscreen Xauth with Preshared Key
##    6  Generic Preshared key
##    8  Cisco xauth with certificates
##    9  Juniper Xauth with certificates.
##    11 Nortel contivity
## Default Value
##    NONE
## Description
##    Set this to 3 if Security Gateway Vendor is Cisco and Xauth is used for
##       authenticating phone user.
##    Set this to 5 if Security Gateway Vendor is Juniper, Xauth is used for
##       authenticating phone user.
##    Set this to 6 if Security Gateway Vendor does not support Xauth.
##    Following Variables are set to specified value when NVVPNCFGPROF = 3
##       NVIKECONFIGMODE   1
##       NVIKEIDTYPE       11
##       NVIKEXCHGMODE     1
##    Following Variables are set to specified value when NVVPNCFGPROF = 5
##       NVIKECONFIGMODE   1
##       NVIKEIDTYPE       3
##       NVIKEXCHGMODE     1
##    Following Variables are set to specified value when NVVPNCFGPROF = 6
##       NVIKECONFIGMODE   2
##       NVIKEIDTYPE       3
##       NVIKEXCHGMODE     1
##    Following variables are set to specified value when NVVPNCFGPROF = 2
##       NVIKECONFIGMODE  1
##       NVIKEIDTYPE      11
##       NVIKEOVERTCP     1
##       NVIKEXCHGMODE         2
##    Following variables are set to specified value when NVVPNCFGPROF = 11
##       NVIKECONFIGMODE  1
##       NVIKEIDTYPE      11
##       NVIKEXCHGMODE         1
##    Following variables are set to specified value when NVVPNCFGPROF = 8
##       NVIKECONFIGMODE  1
##       NVIKEIDTYPE      11
##       NVIKEXCHGMODE         1
##    Following variables are set to specified value when NVVPNCFGPROF = 9
##       NVIKECONFIGMODE  1
##       NVIKEIDTYPE      3
```

```
##       NVIKEXCHGMODE        1
## NOTE : SET commands for all the dependent variables mentioned above must
##       appear after SET command for NVVPNCFGPROF.
## Example : Setting VPN Configuration profile to "0"
## SET NVVPNCFGPROF 0
## SET NVIKECONFIGMODE 1
## SET NVIKEXCHGMODE 1
##
## Variable Name : NVIKEXCHGMODE
## Description: The exchange method used for IKE Phase 1
## Valid Values
##    1    Aggressive Mode
##    2    Main Mode
## Default Value
##   1
## SET NVIKEXCHGMODE 2
##
## Variable Name : NVIKECONFIGMODE
## Description: Enables IKE configuration mode
## Valid Values:
##                 1: Enabled,
##                 2: Disabled.
##
## Default Value
##   1
## SET NVIKECONFIGMODE 1
##
## Variable Name : NVVPNAUTHTYPE
## Valid Values
##    3    PSK
##    4    PSK with XAUTH
##    5    RSA Signature with XAUTH
##    6    HYBRID XAUTH
##    7    RSA Signature
## Default Value
##   3
## Example : Setting authentication method to PSK with XAUTH
## SET NVVPNAUTHTYPE 4
## SET NVVPNAUTHTYPE 3
##
##
## Variable Name : NVSGIP
## Valid Values
##    String. Length of the string cannot exceed 255 characters.
## Description
##   This variable contains the ip address or fully qualified domain name of
##   the primary security gateway.
## Example : Setting primarysg.mycompany.com as the primary security gateway's
##          FQDN.
## SET NVSGIP primarysg.mycompany.com
##
## Example : Setting 10.1.1.1 as the primary security gateway's IP address.
## SET NVSGIP "10.1.1.1"
## SET NVSGIP ""
##
##
## Variable Name : NVVPNUSER
## Valid Values
##    String, Length of the string cannot exceed 16 characters.
## Description
##    This variable contains the VPN User Name. In most cases this value will
##    be unique to each phone hence should not be specified here. However it
##    is possible to force the VPN client in the phone to use phone's mac
##    address or serial number as user name thus eliminating the need to enter
##    user name by the phone user via phone keypad. In such cases you need to
```

```
##    add each phone's serial number or mac address in your authentication
##    database.
## Example : Setting phone's mac address as VPN user name.
## SET NVVPNUSER %MACADDR%
## SET NVVPNUSER ""
##
##
## Variable Name : NVVPNPSWDTYPE
## Valid Values
##    1  Save in Flash.
##    2  Erase on reset.
##    3  Numeric One Time Password.
##    4  Alpha-Numeric One Time Password.
##    5  Erase on VPN Termination
## Description
##    This variables determines how password should be treated. By default
##    password type is set to 1. You must set this variable to 3 or 4 if
##    using One Time Password such as SecureID from RSA.
## Note
##    Setting password type to 3 will not let the user select "Alpahbets"
##    while entering password. This might look like an obvious choice when
##    using RSA secure ID tokens. However under some conditions user may
##    need to respond back by entering 'y' or 'n' in the password field.
##    This could happen if RSA ACE server is configured to generate PIN
##    instead of letting the user select a PIN.
## Example : Setting password type to 2 (Erase on reset)
## SET NVVPNPSWDTYPE 1
##
##
## Variable Name : NVVPNCOPYTOS
## Valid Values
##    1  YES
##    2  NO
## Description
##    Value of this variable decides whether TOS bits should be copied from
##    inner header to outer header or not. If it's value is 1, TOS bits are
##    copied otherwise not. By default TOS bits are not copied from inner
##    header to outer header. Some Internet Service Provider don't route the
##    IP packets properly if TOS bits are set to anything other than 0.
##
## Example
##    SET NVVPNCOPYTOS 1
## Note
##    It is highly recommended that this value should not be changed if phone
##    is downloading the script over the VPN tunnel in order to avoid
##    overriding end user setting due to ISP specific issues. For example you
##    can set this value to 1 while provisioning phone with VPN firmware so
##    that phone can take advantage of QOS service provided by home router but
##    if the phone's ISP (Few percent cases) does not handle properly the
##    packets with non-zero TOS bits in IP header, phone user will have to
##    revert back this value to 2. Under such circumstances it is desirable
##    the user's choice don't get overriden every time script is downloaded.
##
## Example : Setting NVVPNCOPYTOS to 1 if script is not downloaded over VPN
##    tunnel.
##
##    IF $VPNACTIVE SEQ 1 goto skipcopytos
##    SET NVVPNCOPYTOS 1
##    # skipcopytos
## SET NVVPNCOPYTOS 2
##
##
## Variable Name : NVVPNENCAPS
## Valid Values
##    0  4500-4500
```

```
##    1  Disable
##    2  2070-500
##    4  RFC (As per RFC 3947 and 3948)
## Description
##    Type of UDP encapsulation method to use if there is a NAT device between
##    phone and the security gateway. By default UDP Encapsulation 4500-4500
##    is used.
##    If NVVPNENCAPS is 0, ike negotiation starts with source port of 2070
##       and destination port 500. Negotiation switches to port source port
##       4500 and destination port 4500 if peer supports port floating (Ref
##       RFC 3947,3948). Finally IPsec traffic is send inside UDP packets
##       from/to port 4500 if supported by peer or port 2070<->500 if port
##       floating is not supported but UDP encapsulation is supported as
##       published in the initial draft versions of RFC 3947 and 3948.
##     If NVVPNENCAPS is 1, ike nat traversal is completly disabled.
##     If NVVPNENCAPS is 2, Port floating is disabled during IKE nat traversal.
##     If NVVPNENCAPS is 4, ike negotiation starts with source port of 500 and
##       destination port 500. Negotiation switches to port source port 4500
##       and destination port 4500 if peer supports port floating (Ref RFC 3947
##       and 3948). Finally IPsec traffic is send inside UDP packets from/to
##       port 4500 if supported by peer or port 500<->500 if port floating is
##       not supported but UDP encapsulation is supported as published in the
##       initial draft versions of RFC 3947 and 3948.
## Note
##    UDP Encapsulation causes overhead hence it might be desirable to disable
##    udp encapsulation if NAT device supports IPsec pass through and there is
##    only one IPsec client behind the NAT connecting to the same security
##    gateway. However not all devices support IPsec pass through hence this
##    value must not be pushed if phone is downloading the script over the VPN
##    tunnel.
##
## Example : Setting NVVPNENCAPS to 1 if script is not downloaded over VPN tunnel.
##
##          IF $VPNACTIVE SEQ 1 goto skipencaps
##          SET NVVPNENCAPS 1
##          # skipencaps
##
## The example above will set NVVPNENCAPS to 1 if script is not downloaded over the
## tunnel.
## SET NVVPNENCAPS 0
##
##
## Variable Name : NVIKEPSK
## Valid Values
##    String. Length of the string cannot exceed 30 characters.
## Description
##    Preshared Key to use during phase 1 negotiation.
## Note
##    It is recommened that user enter his/her Preshared Key using phone's
##    dialpad. However if you don't want to share PSK with the end user
##    because it's common for multiple users you can use this variable to
##    push PSK (Group password) to each phone and the end user will never
##    know what the PSK is. But if you are doing this, make sure that the file
##    server is on an isolated network and is used only for provisioning
##    VPN parameters to the phones.
## Example : Setting abc1234 as Preshared Key
## SET NVIKEPSK "abc1234"
## SET NVIKEPSK ""
##
##
## Variable Name : NVIKEID
## Valid Values
##     String. Length of the string cannot exceed 30 characters.
## Description
##     Phone uses this string as IKE Identifier during phase 1 negotiation.
```

```
##     Some XAuth documentation refer to this variable as group name because
##     same    IKE Id is shared among a group of user and indvidual user
##     authentication is done using XAuth after establishing IKE phase 1
##     security association.
## Note
##     If this variable is left uninitialized, phone uses "VPNPHONE" as the IKE
##     Identifier.
##
## Example : Setting IKE Id as phones@sales.com
##     SET NVIKEID phones@sales.com
## SET NVIKEID "phones@sales.com"
## SET NVIKEID "VPNPHONE"
##
## Variable Name
##            NVIKEIDTYPE
## Valid Values
##    1    IP Address
##    2    FQDN
##    3    User-FQDN (E-Mail)
##    9    Directory-Name
##    11   KEY-ID (Opaque)
## Description
##    Phone uses this variable as the IKE Identifier type for the
##    IKE-ID specified via NVIKEID variable.
## Note
##    This variable default value depends on the value of variable
##    NVVPNCFGPROF.
##
## Example : Setting IKE ID type to FQDN
##    SET NVIKEIDTYPE   2
## SET NVIKEIDTYPE 3
##
##
## Variable Name : NVIPSECSUBNET
## Valid Values
##     Comma separated list of strings containing subnet and masks. Number of
##     strings cannot exceed 5.
## Description
##     This variable contains IP subnets protected by the security gateway.
##     By default phone assumes that all the network resources are behind
##     the security gateway hence it negotiates for a security association
##     between it's IP address (or Virtual IP if delevired via IKE Config
##     mode) and 0.0.0.0 with the security gateway. If your security gateway
##     is configured to allow building security association for only selected
##     subnets, you can specify them here.
##
## Example :
##     Configuring 10.1.12.0/24 and 172.16.0.0/16 as the subnets protected by
##     the Security Gateway
##     SET NVIPSECSUBNET 10.1.12.0/24,172.16.0.0/16
## SET NVIPSECSUBNET "0.0.0.0/0"
##
##
## Variable Name : NVIKEDHGRP
## Valid Values
##    1    Diffie-Hellman Group 1
##    2    Diffie-Hellman Group 2
##    5    Diffie-Hellman Group 5
##    14   Diffie-Hellman Group 14
##    15   Diffie-Hellman Group 15
## Description
##    This variable contains the value of DH group to use during phase 1
##    negotiation. By default phone uses Group 2.
##
## Example : Setting DH Group 1 for phase 1.
```

```
##    SET NVIKEDHGRP 1
## SET NVIKEDHGRP 2
##
##
## Variable Name : NVPFSDHGRP
## Valid Values
##    0    No-PFS
##    1    Diffie-Hellman Group 1
##    2    Diffie-Hellman Group 2
##    5    Diffie-Hellman Group 5
##    14   Diffie-Hellman Group 14
##    15   Diffie-Hellman Group 15
## Description
##    This variable contains the value of DH group to use during phase 2
##    negotiation for establishing IPsec security associations also known
##    as perfect forward secrecy (PFS).
##    By default PFS is disabled.
##
## Example : Setting DH Group 2 for phase PFS.
##    SET NVPFSDHGRP
## SET NVPFSDHGRP 0
##
##
## Variable Name : NVIKEP1ENCALG
## Valid Values
##    0    ANY
##    1    AES-128
##    2    3DES
##    3    DES
##    4    AES-192
##    5    AES-256
## Description
##    Encryption Algorithms to propose for IKE Phase 1 Security Association.
## Note
##    Phone by default proposes all encryption algorithm. Security Gateway
##    picks the algorthm mandated by administrator. Prioirity order of
##    algorithms proposed by phone is AES-128,3DES,DES,AES-192.AES-256.
##    In very rare circumstances security gateway may not handle multiple
##    proposals. In such cases only you should try overriding the default
##    behaviour.
##
## Example : Setting Encryption Alg to AES-128
##           SET NVIKEP1ENCALG 1
## SET NVIKEP1ENCALG 0
##
##
## Variable Name : NVIKEP2ENCALG
## Valid Values
##     0    ANY
##     1    AES-128
##     2    3DES
##     3    DES
##     4    AES-192
##     5    AES-256
## Description
##     Encryption Algorithm(s) to propose for IKE Phase 2 Security
##     Association.
## Note
##    Phone by default proposes all encryption algorithm. Security Gateway
##    picks the algorithm mandated by administrator. Priority order of
##    algorithms proposed by phone is AES-128,3DES,DES,AES-192.AES-256.
##    In very rare circumstances security gateway may not handle multiple
##    proposals. In such cases only you should try overriding the default
##    behaviour.
##
```

```
## Example : Setting Encryption Alg to AES-128
##    SET NVIKEP2ENCALG 1
## SET NVIKEP2ENCALG 0
##
##
## Variable Name : NVIKEP1AUTHALG
## Valid Values
##    0    ANY
##    1    MD5
##    2    SHA1
## Description
##    Authentication Algorithm(s) to propose for IKE phase 1 Security
##    Association.
## Note
##    Phone by default proposes all Authentication algorithms. Security
##    Gateway picks the algorithm mandated by administrator. Prioirity order
##    of algorithims proposed by phone is MD5,SHA1. In very rare circumstances
##    security gateway may not handle multiple proposals. In such cases
##    only you should try overriding the default behaviour.
##
## Example : Setting Authentication Alg to SHA1
##    SET NVIKEP1AUTHALG 1
## SET NVIKEP1AUTHALG 0
##
##
## Variable Name : NVIKEP2AUTHALG
## Valid Values
##    0    ANY
##    1    MD5
##    2    SHA1
## Description
##    Authentication Algorithim(s) to propose for IKE phase 2 Security
##    Association
## Note
##    Phone by default proposes all Authentication algorithms. Security
##    Gateway picks the algorithm mandated by administrator. Priority order
##    of algorithms proposed by phone is MD5,SHA1. In very rare circumstances
##    security gateway may not handle multiple proposals. In such cases
##    only you should try overriding the default behaviour.
##
## Example : Setting Authentication Alg to SHA1
##    SET NVIKEP2AUTHALG 1
## SET NVIKEP2AUTHALG 0
##
##
## Variable Name : NORTELAUTH
## Valid Values
##     1  Local username and password
##     2  RADIUS username and password
##     3  Radius SecureId
##     4  RADIUS Axent
## Description
##     Use this variable to configure Authentication method for Nortel
##     Contivity.
##
## Example (User is configured locally on Nortel Switch)
##     SET NORTELAUTH 1
## Example (User is configured externally on a RADIUS sever)
##     SET NORTELAUTH 2
## Example (User is configured externally on a RSA Ace server)
##     SET NORTELAUTH 3
## SET NORTELAUTH 1
##
##
## Variable Name : NVXAUTH
```

```
## Valid Values
##     1  "Enable"
##     2  "Disable"
## Description
##     Use this variable to disable XAuth based user authentication
##     for profiles which enable XAuth by default.
##
## Example (XAuth based user authentication required)
##     SET NVXAUTH 1
## Example (XAuth based user authentication not required)
##     SET NVXAUTH 2
## SET NVXAUTH 1
##
##
## Variable Name : QTESTRESPONDER
## Valid Values:
## IP Address or domain name of the host acting as QTESTRESPONDER
## Description
##     If this information is supplied, phone performs QTEST using
##     UDP Echo port 7 with the host indicated by this variable.
## Example (Setting 10.1.1.1 as the QTEST responder)
##     SET QTESTRESPONDER 10.1.1.1
## SET QTESTRESPONDER ""
##
## Variable Name : RINGPRIORITY
## Valid Values
##    1    Inside Call rate
##    2    Outside Call rate
##    3    Priority Ring rate
## Description
##    Informs the phone which distinctive ring rate is really for a Priority Call
## SET RINGPRIORITY 3
##
##
## Variable Name : MYCERTURL
## Valid Values
##     URL for enrolling with a SCEP fronted Certificate Authority.
##
## Description
##     If this information is supplied, phone generates a RSA key pair
##     and sends the enrollment request using SCEP protocol to the
##     server pointed by this URL. Consult your CA administrator guide
##     for further information regarding SCEP support.
## Example
##     SET MYCERTURL "http://10.1.1.1/mscep/mscep.dll"
## SET MYCERTURL""
##
## Variable Name : MYCERTCN
## Valid values
##     $MACADDR
##     $SERIALNO
##
## Description
##     If value of this variable is set to $MACADDR, phone uses it's
##        MAC Address as the CN component of the certificate request
##     If value of this variable is set to $SERIALNO, phone uses it's
##        Serial Number as the CN component of the certificate request.
## Example
##     SET MYCERTCN $MACADDR
## SET MYCERTCN "$SERIALNO"
##
##
## Variable Name : SCEPPASSWORD
## Valid values
##      String
```

```
##
## Description
##      The string specified here is used by phone as the SCEP challenge pass
##      phrase for SCEP certificate enrollment. If left unspecified and
##      SCEPPASSWORDREQ is SET to 0, phone uses it's SERIAL number as the challenge
##      pass phrase.
## Note
##      Consult your Certificate Authrority administrator guide for HOWTO
##      configure pass phrase for SCEP certificate enrollment.
##
## Example (Instructing phone to use string "abcd" as the SCEP challenge pass phrase)
##      SET SCEPPASSWORD "abcd"
## SET SCEPPASSWORD "$SERIALNO"
##
##
## Variable Name : MYCERTRENEW
## Valid values
##       1 to 98
##
## Description
##       Percentage life used after which phone should attempt to renew identity
##       certificate. By default phone attempts to renew certificate after 90% of
##       identity certificate life is finished.
##       For example, if Identity certificate was issued for 2 years and MYCERTRENEW
##       set to 95. Phone will attempt to renew certificate approximately 694 days after
##       Identity certificate was issued.
##
## Example
##       SET MYCERTRENEW 95
## SET MYCERTRENEW 90
##
## Variable Name : MYCERTCAID
## Valid Values: 0 to 255 ASCII characters
##
## Descriptiom
## Specifies the Certificate Authority Identifier to be used in a certificate request.
## SET MYCERTCAID "CAIdentifier"
##
## Variable Name : MYCERTDN
## Valid Values: 0 to 255 ASCII characters
## Descriptiom
## Specifies additional information for the Subject of a certificate request
## SET MYCERTDN ""
##
## Variable Name : MYCERTKEYLEN
## Valid Values: 4 ASCII numeric digits,"1024" through "2048"
## Descriptiom
## Specifies the bit length of the public and private keys generated for a certificate
request
## SET MYCERTKEYLEN 1024
##
## Variable Name : MYCERTWAIT
## Valid Values: 1 ASCII numeric digit,"0" or "1"
## Descriptiom
## Specifies whether the telephone will wait until a pending certificate request is
complete, or
## whether it will periodically check in the background
## SET MYCERTWAIT 1
##
## Variable Name : VPNCODE
## Valid Values: 0 to 7 ASCII numeric digits,null ("") and "0" through "9999999"
## Description:    Specifies the VPN procedure access code
## SET VPNCODE "876"
##
##
```

```
## Variable Name : VPNPROC
## Valid Values: 1 ASCII numeric digit,"0","1" or "2"
##                 0: disabled,
##                 1: view only
##                 2: View and edit.
## Description: Specifies whether VPNCODE can be used to access the VPN procedure at all,
in
## view-only mode, or in view/modify mode
## SET VPNPROC  1
##
##
## Variable Name : ALWCLRNOTIFY
## Valid Values: 1 ASCII numeric digit,"0" or "1"
## Description: Specifies whether unencrypted ISAKMP Notification Payloads will be
accepted
## SET ALWCLRNOTIFY 0
##
##
## Variable Name : DROPCLEAR
## Valid Values: 1 ASCII numeric digit,"0" or "1"
## Description:    Specifies the treatment of received unencrypted (clear) IPsec packets
## SET DROPCLEAR 1
##
##
## Variable Name : NVMCIPADD
## Valid Values: 0 to 255 ASCII characters zero or more IP addresses in dotted decimal,
colon-hex (H.323 R6.0 onwards) or DNS
## name format,separated by
## commas without any intervening spaces
## Description:    Call server IP addresses
## SET NVMCIPADD "0.0.0.0"
##
## Variable Name : NVHTTPSRVR
## Valid Values: 0 to 255 ASCII characters zero or more IP addresses in dotted decimal,
colon-hex (H.323 R6.0 onwards)or DNS
## name format,separated by
## commas without any intervening spaces
## Description:    HTTP file server IP addresses used to initialize HTTPSRVR the next
time the phone starts up,
## SET NVHTTPSRVR "0.0.0.0"
##
## Variable Name : NVTLSSRVR
## Valid Values: 0 to 255 ASCII characters zero or more IP addresses in dotted decimal,
colon-hex (H.323 R6.0 onwards) or DNS
## name format,separated by
## commas without any intervening spaces
## Description:    HTTPS file server IP addresses used to initialize TLSSRVR the next
time the phone starts up.
## SET NVTLSSRVR "0.0.0.0"
##
##
## Variable Name : NVIKEOVERTCP
## Valid Values: 1 ASCII numeric digit,"0", "1" or "2"
##                 0: Never,
##                 1: Auto
##                 2: Always
## Description:    Specifies whether and when to use TCP as a transport protocol for IKE
## SET NVIKEOVERTCP 0
##
##
## Variable Name : NVIKEP1LIFESEC
## Valid Values: 3 to 8 ASCII numeric digits"600" through "15552000"
## Description:    Specifies the proposed IKE SA lifetime in seconds
## SET NVIKEP1LIFESEC 432000
##
```

```
##
## Variable Name : NVIKEP2LIFESEC
## Valid Values: 3 to 8 ASCII numeric digits"600" through "15552000"
## Description:    Specifies the proposed IPsec SA lifetime in seconds
## SET NVIKEP2LIFESEC 432000
##
##
## Variable Name : NVVPNPSWD
## Valid Values: 0 to 30 ASCII characters
## Description:    If the user password can be stored in NV memory, it is stored as the
value of
## NVVPNPSWD
## SET NVVPNPSWD ""
##
##
## Variable Name : NVVPNSVENDOR
## Valid Values:
## 1: Juniper/Netscreen, 2: Cisco
## 3: Checkpoint/ Nokia, 4: Other
## 5: Nortel.
## Description:    Specifies the security gateway Vendor to be used.
## SET NVVPNSVENDOR 4
##
##
## Variable Name : NVVPNUSERTYPE
## Valid Values: 1 ASCII numeric digit,"1" or "2"
##                 1: Any,
##                 2: User
##
## Description: Specifies whether the user can change the VPN username
## SET NVVPNUSERTYPE 1
##
## Variable Name : VPNTTS
## Valid Values: 1 ASCII numeric digit,"0" or "1"
## Description: this parameter specifies TTS mode is enabled or disabled in VPN mode
## 0 - Disable
## 1 - Enable
## SET VPNTTS 0
##
############################################################
## Avaya IP Telephone IPv6 related Settings for H.323 release 6.0 for 96x1 phones
## Script File modified on: 07/08/2010
##
## Variable Name : NDREDV6
## Valid Values
##    0    disable
##    1    enable
## Description
##    Controls whether IPv6 Neighbor Discovery Redirect messages will be processed
## Note
##       Received Redirect messages will be processed if and only if the value of
##      the parameter NDREDV6 is "1" otherwise they will be ignored.
##
## Example : Setting IPv6 Neighbor Discovery Redirect messages
##            SET NDREDV6 1
## SET NDREDV6 0
##
##
## Variable Name : DHCPPREF
## Valid Values
##    4    DHCPv4
##    6    DHCPv6
##
## Description
##     Specifies whether new values received via DHCPv4 orDHCPv6 will be preferred
```

```
##     when both are used,
##
## Example : Setting prefernace to recived DHCPPv4 values
##            SET DHCPPREF 4
## SET DHCPPREF 6
##
##
## Variable Name : DHCPSTAT
## Valid Values
##    1    run DHCPv4 only                (IPv4only-mode, if no own IPv6 address is
programmed statically)
##    2    run DHCPv6 only                (IPv6only-mode, if no own IPv4 address is
programmed statically)
##    3    run both DHCPv4 & DHCPv6       (dual-stack mode)
## Description
##    Specifies whether DHCPv4, DHCPv6, or both will be used in case IPV6STAT has enabled
IPv6 support generally
##
## Example : Setting dual stack mode
##            SET DHCPSTAT 3
##
## SET DHCPSTAT 1
##
## Variable Name : IPPREF
## Valid Values
##    4    IPv4
##    6    IPv6
##
## Description
##     Control whether an IPv4 or an IPv6 address returned by DNS would be
##     tried first during dual-mode operation.
## Note
##       In general, if dual-stack operation is enabled, whether IPv4 or IPv6
##      is to be used to contact a server is determined by the value of the
##      parameter that contains the server address(es). However, if the value
##      is a DNS name and if DNS returns both an IPv4 and an IPv6 address,
##      the order in which they will be tried will be based on the order in
##      which they are returned to the application by the DNS resolver, which
##      is controlled by the parameter
##
## Example : Setting preference to IPv4
##            SET IPPREF 4
## SET IPPREF 6
##
## Variable Name : IPV6STAT
## Valid Values
##    0    IPv6 will not be supported.
##    1    IPv6 will be supported.
##
## Description
##       Specifies whether IPv6 will be supported
##
## SET IPV6STAT 0
##
## Variable Name : PINGREPLYV6
## Valid Values
##    0    ICMPv6 Echo Reply messages will not be sent
##    1    ICMPv6 Echo Reply messages will be sent only in reply to received Echo
##         Request messages with a Destination Address equal to one of the telephone's
##         unicast IPv6 addresses.
##    2    ICMPv6 Echo Reply messages will be sent in reply to received Echo Request
##          messages with a Destination Address equal to one of the telephone's unicast,
##          multicast or anycast IPv6 addresses.
##
## Description
```

```
##        Specifies whether ICMPv6 Echo Reply messages will be sent.
##
## SET PINGREPLYV6 1
##
##
## Variable Name :  GRATNAV6
## Valid Values
##    0    Received unsolicited Neighbor Advertisement messages will not be processed
##    1    Received unsolicited Neighbor Advertisement messages will be processed
##
## Description
##      Specifies whether gratuitous (unsolicited) IPv6 Neighbor Advertisement messages
will be processed
## Note:
##        An IPv6 unsolicited Neighbor Advertisement message is similar to a gratuitous
ARP message in IPv4.
##
## SET GRATNAV6 0
##
#############################################################################################
#############################################################
##                                                         ##
##                    H.323 SETTINGS                       ##
##  Settings specific to telephones with H.323 software    ##
##                                                         ##
#############################################################
##
## The Call Server Addresses
##   [If you set your Call Server Addresses via DHCP, do not
##   set them here as they will over ride your DHCP settings.]
##   One or more Avaya Communication Manager server IP
##   addresses in dotted-decimal,colon-hex (H.323 R6.0 onwards) or DNS name format,
##   separated by commas without any intervening spaces
##   (0 to 255 ASCII characters, including commas).
## SET MCIPADD 192.168.0.5
##
## Unnamed Registration Status
##   Specifies whether unnamed registration is initiated if
##   a user fails to enter a value at the Extension prompt.
##   Unnamed registration provides the telephone with
##   TTI-level service, enabling a user, for example, to
##   dial emergency services such as 911.
## SET UNNAMEDSTAT 1
##
## Reregistration Timer
##   Controls an H.323 protocol timer.  It is highly
##   recommended you consult Avaya before changing this
##   parameter.
## SET REREGISTER 20
##
## CTI Status
##   Controls the status of the Computer-Telephony Interface.
##   0 for disabled, 1 for enabled
## SET CTISTAT 0
##
## CTI Port
##   Sets the UDP port number for reception of broadcast
##   CTI discovery messages. (49714-49721).
## SET CTIUDPPORT 49721
##
##
#############################################################
##                                                         ##
##                     SIP SETTINGS                        ##
##   Settings specific to telephones with SIP software     ##
```

```
##                                                            ##
##############################################################
##
##  REGISTERWAIT sets the time, in seconds, between
##  re-registrations with the current server.
##
##  The default is 3600 for the 46xx SIP telephones,
##  96xx SIP Releases 1.0, 2.0, R2.2 telephones and 16CC telephones.
##
##  The default is 900 seconds for R2.4.1 and later  telephones.
##
##  Valid values are 0 to 65535 for the 46xx SIP telephones,
##  10 to 1,000,000,000 for the 96xx SIP Releases 1.0, 2.0, 2.2 and 16CC telephones and
##  30 to 86400 for the 96xx SIP R2.4.1 and later  telephones
##   Note : This setting is applicable for 1603 SIP phones also.
## SET REGISTERWAIT "900"
##
##  SIPDOMAIN sets the domain name to be used during
##  registration.  The default is null ("") but valid values
##  are 0 to 255 ASCII characters with no spaces.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET SIPDOMAIN    "example.com"
##
##  SIPPROXYSRVR sets the IP address or Fully-Qualified
##  Domain Name (FQDN) of the SIP Proxy server(s). The
##  default is null (""), but valid values are zero or more
##  IP addresses in dotted-decimal or DNS format, separated
##  by commas without intervening spaces, to a maximum of
##  255 ASCII characters. (For 96xx SIP models, this
##  parameter also may be set either via LLDP or PPM.)
## Note: This parameter is supported on 96xx SIP Releases
##       1.0, 2.0, 2.2, 16CC and 1603 SIP telephones only. For SIP
##       releases 2.4.1 and later this parameter is ignored and
##       equivalent functionality is supported using SIP_CONTROLLER_LIST.
##       Please see SIP_CONTROLLER_LIST parameter for details.
## SET SIPPROXYSRVR "192.168.0.8"
##
##  SIPPORT sets the port that the telephone set will listen
##  for UDP/TCP SIP signaling messages.  The default is 5060, but
##  valid values are 1 to 5 ASCII digits from 0 to 65535,
##  inclusive.
##
## Note: For 96xx SIP Releases 1.0, 2.0, 2.2 and 16CC telephones
##  the parameter also controls the proxy server port for the telephone's
##  outbound connections.For SIP releases 2.4.1 and later , this parameter is ignored
##  and equivalent functionality for the proxy server port
##  is supported using SIP_CONTROLLER_LIST.
##  Please see SIP_CONTROLLER_LIST parameter for details.
##
## SET SIPPORT      "5060"
##
##  SPEAKERSTAT controls operation of Speakerphone as
##  follows:
##      0   no speakerphone allowed
##      1   one-way speaker (also called "monitor") allowed
##      2   two-way speaker allowed
##  The default is 2.  This parameter is not supported on
##  16cc phones.
## SET SPEAKERSTAT  "2"
##
##  DSCPAUD Sets the DiffServ value for audio streams from
##  the phone. The default is 46 and valid values are 0-63.
##  For 96xx SIP phones, this parameter may also be changed
##  via LLDP.
##   Note : This setting is applicable for 1603 SIP phones also.
```

```
## SET DSCPAUD 46
##
##  DSCPSIG Sets the DiffServ value for signaling protocol
##  messages from the phone. The default is 34 and valid
##  values are 0-63.  For 96xx SIP phones, this parameter
##  may also be changed via LLDP.
##   Note : This setting is applicable for 1603 phones also.
## SET DSCPSIG 34
##
## SNTP settings are used to configure SNTP related
##  parameters. SNTP is only supported on SIP telephones.
##
##  SNTPSRVR sets the IP address or Fully-Qualified
##  Domain Name (FQDN) of the SNTP server(s) to be used.
##  The default is null ("") but valid values are zero or
##  more IP addresses in dotted-decimal or DNS format,
##  separated by commas without intervening spaces, to a
##  maximum of 255 ASCII characters.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET SNTPSRVR  "192.168.0.5"
##
##  DSTOFFSET sets the daylight savings time adjustment
##  value. The default is 1 but valid values are 0, 1, or 2.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET DSTOFFSET "1"
##
##  DSTSTART sets the beginning day for daylight savings
##  time. The default for 16cc phones is 2SunMar2L.  The
##  default for 46xx phone sis 1SunApr2L; see the 4600 Series
##  IP Telephone LAN Admin Guide for format and setting
##  alternatives.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET DSTSTART  "2SunMar2L"
##
##  NOTE:
##  Starting in March 2007, the default values for DSTSTART
##  and DSTSTOP on 46xx SIP phones are obsolete for the
##  United States and Canada and must be changed via
##  revised values in this file as indicated in the examples
##  below.
##
##  DSTSTOP sets the ending day for daylight savings time.
##  The default for 16cc phones is 1SunNov2L.  The default
##  for 46xx phones is LSunOct2L; see the 4600 Series IP
##  Telephone LAN Admin Guide for format and setting
##  alternatives.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET DSTSTOP   "1SunNov2L"
##
##  GMTOFFSET sets the time zone the phone should use. The
##  default is 0:00; see the 4600 Series IP Telephone LAN
##  Admin Guide for format and setting alternatives.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET GMTOFFSET "0:00"
##
## CONFIG_SERVER_SECURE_MODE
##   Specifies the communication mode used to access the
##   configuration server. This parameter applies only to
##   96xx model phones.
##     0 for use HTTP (default)
##     1 for use HTTPS
##     2 for use HTTPS if SIP transport mode is TLS;
##       otherwise, use HTTP
## Note 1: Default value is 0 for 2.5 and 1 for 2.6 and above.
## Note 2: This setting is applicable for 1603 SIP phones also.
```

```
## SET CONFIG_SERVER_SECURE_MODE 1
##
## SDPCAPNEG
##    Controls the SDP capability negotiation. The range is
##    from 0-1. The default value for this SDP CAP NEG is 1
##    for 2.6 and 0 for 2.5 releases respectively.
## SET SDPCAPNEG 1
##
## ENFORCE_SIPS_URI
##   Controls the enforcement of SIPS URI with SRTP. The range
##   is from 0-1. The default value for ENFORCE SIPS URI is 1
##   for 2.6 and above releases.
## SET ENFORCE_SIPS_URI 1
##
## ASTCONFIRMATION
##   Sets the time that the phone waits to validate an active
##   subscription when it SUBSCRIBEs to the "avaya-cm-feature-status"
##   package. The range is from 16-3600 seconds. The default
##   value for ASTCONFIRMATION is 32 seconds for 2.6 and above.
## SET ASTCONFIRMATION 32
##
## SIMULTANEOUS_REGISTRATIONS
##   The number of Session Managers in the configuration that
##   the phone will simultaneously register with. The range is
##   from 1-3. The default value for SIMULTANEOUS_REGISTRATIONS
##   3 for 2.6 and above.
## SET SIMULTANEOUS_REGISTRATIONS 3
##
############################################################
##                                                        ##
##                    46xx SIP SETTINGS                   ##
##    Settings applicable only to 46xx telephone models   ##
##                 running the SIP protocol               ##
##                                                        ##
############################################################
##
##  DATESEPARATOR sets the character to be used to delineate
##  the date values.  The default is a backslash.
## SET DATESEPARATOR   "/"
##
##  DATETIMEFORMAT sets the formatting of the date display.
##  The default is 0, which means the SIP phone will display
##  12-hour time and displays dates in mm/dd/yy format.
##  Setting DATETIMEFORMAT to 1 means the SIP phone will
##  display 12-hour time and displays dates in dd/mm/yy
##  format.  Setting DATETIMEFORMAT to 2 means the SIP phone
##  will display 24-hour time and displays dates in
##  mm/dd/yy format.  Setting DATETIMEFORMAT to 3 means the
##  SIP phone will display 24-hour time and displays dates
##  in dd/mm/yy format.
##  Note : This setting is applicable for 1603 SIP phones also.
## SET DATETIMEFORMAT  "0"
##
##  DIALWAIT sets the time (in seconds) the phone waits
##  after the user enters the most recent dialable character
##  before it automatically begins dialing.  A value of 0
##  disables the wait timer.  The default is 5, and valid
##  values are 0-10 seconds.
## SET DIALWAIT     "5"
##
############################################################
##                                                        ##
##                      SIP SETTINGS                      ##
##    Settings applicable only to 46xx telephone models   ##
##    or 96xx telephone models in non-Avaya environments  ##
```

```
##                                                            ##
##############################################################
##
## SIP Signaling Transport Type
##   Specifies the type of transport to use for SIP signaling.
##     0 for UDP
##     1 for TCP
##     2 for TLS (default)
## Note: This parameter is supported on 96xx SIP Releases
##       1.0, 2.0, 2.2 and 16CC telephones only. For SIP
##       releases 2.4.1 and later, this parameter is ignored and
##       equivalent functionality is supported using SIP_CONTROLLER_LIST.
##       Please see SIP_CONTROLLER_LIST parameter for details.
## SET SIPSIGNAL 2
##
## Secure SIP port
##   For 96xx SIP Releases 1.0, 2.0, 2.2 and 16CC telephones,
##   Destination TCP port used for secure SIP registration
##   and signaling messages sent over TLS link.
##   The default is 5061. Valid range is 1024 to 65535.
## SET SIP_PORT_SECURE 5061
##
##  PHNNUMOFSA sets the number of Session Appearances the
##  telephone should support while operating in the non-Avaya
##  environment.  The default is 3 and valid values are 1-10.
## SET PHNNUMOFSA   "3"
##
## Avaya Environment Enabled
##   Determines whether phone is configured for use in Avaya
##   SES environment or third-party proxy environment. If
##   set to 0, standard SIPPING 19 features are available.
##   If set to 1, SIP/AST features and use of PPM are
##   available. This parameter is not supported on 46xx
##   phones.
##     0 for 3rd party proxy
##     1 for Avaya SES (default)
## Note: This parameter is not supported on R2.4.1 and later
##       release of 96xx SIP telephones.
## SET ENABLE_AVAYA_ENVIRONMENT 1
##
##  SIPREGISTRAR sets the IP address or Fully-Qualified
##  Domain Name (FQDN) of the SIP registration server(s).
##  The default is null ("") but valid values are zero or
##  more IP addresses in dotted-decimal or DNS format,
##  separated by commas without intervening spaces, to a
##  maximum of 255 ASCII characters.
## SET SIPREGISTRAR "192.168.0.9"
##
##  MWISRVR sets the IP address or Fully-Qualified Domain
##  Name (FQDN) of the Message Waiting server.  The default
##  is null ("") but valid values are zero or more IP
##  addresses in dotted-decimal or DNS format, separated by
##  commas without intervening spaces, to a maximum of 255
##  ASCII characters.
## SET MWISRVR      "192.168.0.7"
##
## Music-On-Hold Server
##  MUSICSRVR sets the IP address or Fully-Qualified Domain
##  Name (FQDN) of the Music-On-Hold server.  The default
##  is null ("") but valid values are zero or more IP
##  addresses in dotted-decimal or DNS format, separated by
##  commas without intervening spaces, to a maximum of 255
##  ASCII characters.
## SET MUSICSRVR    ""
##
```

```
##  Note: This parameter is set only in non-Avaya environments.
##
##  DIALPLAN accelerates dialing by defining the dial plan
##  used in the phone.  The default is null ("").
##      See the telephone Admin Guide for format and setting
##      alternatives.
## SET DIALPLAN     "[23]xxxx|91xxxxxxxxxx|9[2-9]xxxxxxxxx"
##
##  CALLFWDSTAT sets the call forwarding mode of the set by
##  summing the values below:
##      1   Permits unconditional call forwarding
##      2   Permits call forward on busy
##      4   Permits call forward/no answer
##      A value of 0 disables call forwarding.
##      The default is 0.
##      Example: a value of 6 allows Call Forwarding on
##               busy and on no answer.
## SET CALLFWDSTAT  "3"
##
##  CALLFWDDELAY sets the number of ring cycles before the
##  call is forwarded to the forward or coverage address.
##  The default delay is one ring cycle.
## SET CALLFWDDELAY "5"
##
##  CALLFWDADDR sets the address to which calls are
##  forwarded for the call forwarding feature.  The default
##  is null ("").
##      Note the user can change or replace this
##      administered value if CALLFWDSTAT is not 0.
## SET CALLFWDADDR  "cover@avaya.com"
##
##  COVERAGEADDR sets the address to which calls will be
##  forwarded for the call coverage feature.  The default
##  is null ("").
##      Note the user can change or replace this
##      administered value if CALLFWDSTAT is not 0.
## SET COVERAGEADDR "cover@avaya.com"
##
##  SIPCONFERENCECONTINUE specifies whether a conference
##  call continues after the host hangs up.  This parameter
##  is not supported on 46xx telephones.
##     0 for drop all parties (default)
##     1 for continue conference
## SET SIPCONFERENCECONTINUE 0
##
##
##
## PROVIDE_TRANSFER_TYPE provides the call transfer type in 3rd party environments.
##   No meaning for Avaya environment
##   Value 0 or 1 (default 0),
##
## PROVIDE_TRANSFER_TYPE  0
##
##
##
## CALL_TRANSFER_MODE determines the call transfer mode in 3rd party environments.
##   Value 0 or 1 (default is 0)
## CALL_TRANSFER_MODE 0
##
##
############################################################
##                                                        ##
##               96xx and 16cc SIP SETTINGS               ##
##  Settings applicable only to 96xx and 16cc telephone   ##
##             models running the SIP protocol            ##
```

```
##                                                            ##
##############################################################
##
##
## TLS Server Identification
##  TLSSRVRID parameter is used for TLS servers identification.
##  If it is set to 1 then TLS/SSL connection will only be established
##  if the server's identity matches the server's certificate.
##  If it is set to 0 then connection will be established anyway.
## SET TLSSRVRID 1
##
## Usage of Quad Zeros for hold
##  When call hold request is received,the telephone will look for
##  'c=0.0.0.0', to determine whether an incoming re-INVITE is to
##  initiate call hold.
## This is provisioned using USE_QUAD_ZEROS_FOR_HOLD parameter.
##  When USE_QUAD_ZEROS_FOR_HOLD is set to 0 then a=directional
##  attributes will be used in SDP to signal hold operation.
##  When USE_QUAD_ZEROS_FOR_HOLD is set to 1 then c=0.0.0.0 IP
##  address is used in SDP to signal hold operation.
## USE_QUAD_ZEROS_FOR_HOLD
##
## SIP and SIPS subscriptions
##  SUBSCRIBE_SECURITY controls use of SIP or SIPS for subscriptions.
##  If SUBSCRIBE_SECURITY is 0, the phone uses SIP for both the
##  Request URI and the Contact Header regardless of whether SRTP is
##  enabled. If SUBSCRIBE_SECURITY is 1,the phone uses SIPS for both
##  the Request URI and the Contact Header if SRTP is enabled
##  (TLS is on and MEDIAENCRYPTION has at least one valid crypto suite).
##  If SUBSCRIBE_SECURITY is 2, and the SES/PPM does not show a
##  FS-DeviceData FeatureName with a FeatureVersion of 2 in the
##  response to the getHomeCapabilities request (indicative
## SET SUBSCRIBE_SECURITY 2
##
## SIP Operational Mode
##  SIP_MODE parameter is used to define SIP operational mode. If set to 0 then SIP
##  Proxy/Registrar is used. If set to 1 then SIP Proxy/Registrar will not be used
##  and phone will operate in peer-to-peer mode.
## SIP_MODE 0
##
## EAP methods for IEEE 802.1x authentication
##  DOT1XEAPS defines EAP authentication methods for authentication.
##  This parameter is a comma seperated string.
##  Currently it allows only one method. The allowable methods are
##  MD5 or TLS.
## SET DOT1XEAPS "MD5"
##
## Power over Ethernet conservation mode
##  If POE_CONS_SUPPORT is set to 1 then Power conservation mode is supported.
##  If this parameter is set to 0 then Power conservation mode is not supported.
## SET POE_CONS_SUPPORT 1
##
## Personalize button labels ability
##  CNGLABEL determines ability to personalize button labels to be displayed to
##  the user. If it is set to 0 then ability will not be displayed to user.
##  If it is set to 1 then personalize button labels ability will be exposed to user.
##  Default value is 1.
## SET CNGLABEL 1.
##
## Selection of Conference Method
##  If CONFERENCE_TYPE is set to 0 then local conferencing is supported based on
##  sipping services. If set to 1 then server based conferencing is supported.
##  If it is set to 2 then click-to conference server based conferencing is supported.
##  If it is set to outside range then default value is selected.
##  Default value is 1.
```

```
## SET CONFERENCE_TYPE 1
##
## Call Coverage Tone
##   Specifies the tone to play when a call goes to
##   coverage.  The default is 1 and valid values are 1-4.
##   This parameter applies only to 16cc model phones.
## SET REDIRECT_TONE 1
##
## LLDP Mode
##   Specifies whether LLDP is enabled on the telephone.
##   This parameter applies only to 96xx model phones.
##     0 for Off
##     1 for On
##     2 for On but only begin transmitting once an
##       LLDP frame is received (default)
## SET LLDP_ENABLED 2
##
## Early Media Enabled
##   Specifies whether the phone sets up a voice channel
##   to the called party before the call is answered.
##   Setting this parameter to 1 can speed up call setup.
##     0 for No
##     1 for Yes
##   Note : This setting is applicable for 1603 SIP phones also.
## SET ENABLE_EARLY_MEDIA 1
##
## Hold Indication Method
##   Specifies method to use to indicate phone is on hold.
##   A setting of 1 is useful for compatibility with 3rd
##   party SIP endpoints.
##     0 for "a= directional attributes"
##     1 for 0.0.0.0 IP address
## SET USE_QUAD_ZEROES_FOR_HOLD 0
##
## RTCP Enabled
##   Enables the phone to send RTCP data during calls.
##     0 for No
##     1 for Yes
##   Note : This setting is applicable for 1603 SIP phones also.
## SET RTCPCONT 1
##
## Maximum Transmission Unit Size
##   Specifies the maximum frame length (MTU size)
##   transmitted by the phone. Use 1496 for older Ethernet
##   switches. (1496 or 1500)
## SET MTU_SIZE 1500
##
## Media Encryption Support
##   Specifies media encryption (SRTP) options supported by
##   phone. Up to 2 options may be selected. Values are in
##   comma-separated list. Options should match those
##   specified in CM IP-codec-set form.
##     1 = aescm128-hmac80
##     2 = aescm128-hmac32
##     3 = aescm128-hmac80-unauth
##     4 = aescm128-hmac32-unauth
##     5 = aescm128-hmac80-unenc
##     6 = aescm128-hmac32-unenc
##     7 = aescm128-hmac80-unenc-unauth
##     8 = aescm128-hmac32-unenc-unauth
##     9 = none (default)
## SET MEDIAENCRYPTION "9"
##
####################  DISPLAY SETTINGS  ####################
##
```

```
## Display Colors and Layout
##   Specifies a list of tuples describing color scheme and
##   layout used in phone display. See Administrator's guide
##   for additional detail. (0 to 1023 ASCII characters)
## SET SKINS Yankees=http://mycompany.com/skins/yankees_color/pinstripes.xml
##
## Selected skin for display layout
##  If CURRENT_SKIN is selected(not empty string), then that particular skin is selected
##  for display. This parameter should be one of the label as defined in 'SKINS'
##  configuration parameter. If it is empty or not set then default skin is used.
## SET CURRENT_SKIN ""
##
## Display Logo
##   Specifies a list of tuples describing logo used as phone
##   display background. See Administrator's guide for
##   additional detail.  This parameter is not supported on
##   16cc phones.
## SET LOGOS FIFAWorldCup=../fifa_logo.jpg
##
## Selected background logo on display
##  CURRENT_LOGO defines if custom logo is selected for display.
##  This is used to display custom logo or built in default logo is to be used.
##  If CURRENT_LOGO is selected (not empty string), then the resource should be
##  available using "LOGOS" configuration parameter.
## SET CURRENT_LOGO ""
##
## Options Menu Display
##   Determines whether Options & Settings menu is displayed
##   on phone.
##     0 for No
##     1 for Yes
## SET PROVIDE_OPTIONS_SCREEN 1
##
## Network Info Menu Display
##   Determines whether Network Information menu is displayed
##   on phone.
##     0 for No
##     1 for Yes
## SET PROVIDE_NETWORKINFO_SCREEN 1
##
## Logout Enabled
##   Determines whether user can log out from phone.
##     0 for No
##     1 for Yes
## SET PROVIDE_LOGOUT 1
##   Determines whether  log out  option is available or not in Avaya Menu options.
####################  CALL LOG SETTINGS  ####################
##
## Call Log Enabled
##   Determines whether call logging and associated menus
##   are available on the phone.
##     0 for No
##     1 for Yes
## SET ENABLE_CALL_LOG 1
##
## Redial Enabled
##   Determines whether redial softkey is available.
##     0 for No
##     1 for Yes
## SET ENABLE_REDIAL 1
##
## Redial List Enabled
##   Determines whether phone redials last number or
##   displays list of recently dialed numbers.
##     0 for last number redial
```

```
##     1 user can select between last number redial and
##        redial list
## SET ENABLE_REDIAL_LIST 1
##
####################  CONTACTS SETTINGS  ###################
##
## Contacts Enabled
##   Determines whether the contacts application and
##   associated menus are available on the phone.
##     0 for No
##     1 for Yes
## SET ENABLE_CONTACTS 1
##
## Contacts Modification Enabled
##   Determines whether the list of contacts and
##   the function of the contacts application can
##   be modified on the phone.
##     0 for No
##     1 for Yes
## SET ENABLE_MODIFY_CONTACTS 1
##
## Multiple Contacts Warning Display
##   Determines whether a warning message is displayed if
##   there are multiple devices registered on a user's
##   behalf.  Multiple registered devices may lead to
##   service disruption.
##     0 for No
##     1 for Yes
## SET ENABLE_MULTIPLE_CONTACT_WARNING 1
##
####################  EXCHANGE SETTINGS  ###################
##
## Exchange Calendar Enabled
##   Determines whether phone will retrieve calendar data
##   from Microsoft Exchange
##     0 for Disabled
##     1 for Enabled
## SET USE_EXCHANGE_CALENDAR 0
##
## Exchange Calendar Display
##   Determines whether menu item(s) for Exchange® Calendar
##   integration are displayed on the phone.  This parameter
##   is not supported on 16cc phones.
##     0 for No
##     1 for Yes
## SET PROVIDE_EXCHANGE_CALENDAR 1
##
## Exchange Domain
##   Specifies domain information for URL used to obtain
##   Exchange contacts and calendar data. Appended to
##   Exchange User ID specified in phone menus.(0 to 255
##   ASCII characters).  This parameter is not supported
##   on 16cc phones.
## SET EXCHANGE_USER_DOMAIN exchange.mycompany.com
##
## Exchange Server List
##   A list of one or more Exchange servers to be accessed
##   for contacts and calendar data. The default is null
##   (""), but valid values are zero or more IP addresses
##   in dotted-decimal or DNS format, separated by commas
##   without intervening spaces, to a maximum of 255 ASCII
##   characters.  This parameter is not supported on 16cc
##   phones.
## SET EXCHANGE_SERVER_LIST example
##
```

```
## For additional Exchange-related settings, see the
## CONTACTS SETTINGS section.
##
## Enable Exchange Reminder
##   Enables popup reminder notifications to turn Exchange Reminder
##   Message Box Interrupt screen on or off.
##   If it is 0 = Off
##            1 = On
## SET ENABLE_EXCHANGE_REMINDER 0
##
## Exchange Reminder Time
##   To administer how far in advance the user wants to get the
##   reminder for the appointment. Setting the value to 5 min for example,
##   will cause the reminder/popup to appear 5 min before the start time
##   of appointment. Setting the value to 0 minute will cause the reminder
##   to be displayed at the start time of the appointment.
##   The maximum reminder time can be set for 60 minutes.
## SET EXCHANGE_REMINDER_TIME 5
##
## Exchange Snooze Time
##   To administer how long in minutes for the Reminder to reappear
##   after it has been snoozed (temporally dismissed) by the user.
##   Setting the value to 5 min for example, will cause the Reminder
##   popup to reappear after 5 min once it has been snoozed by the user.
##   The maximum snooze time can be set for 60 minutes.
## SET EXCHANGE_SNOOZE_TIME 5
##
## Exchange Reminder Tone
##   To enable/disable generation of reminder tone (error beep)
##   that will be played when the Reminder popup appears. If the user
##   chooses "Yes", the reminder tone will be played with the popup.
##   If user chooses "No", the reminder tone will not be played with
##   the popup. This is only played when a popup pops for the 1st time.
##       0 = Disabled
##       1 = Enabled
## SET EXCHANGE_REMINDER_TONE 0
##
## Exchange Notify Subscription Period
##   To administer how long the phone re-syncs with the Exchange
##   Server in seconds.
##       0 = Minumum value for the re-sync
##       3600 = Maximum value  for the re-sync
## SET EXCHANGE_NOTIFY_SUBSCRIPTION_PERIOD 180
##
##
####################  PRESENCE SETTINGS  ###################
##
## On 96x1 SIP phones, presence is not supported for SM 5.x / 6.x
##
## Enable Presence
##   To enable/disable complete Presence function
##       0 = Disabled
##       1 = Enabled
## SET ENABLE_PRESENCE 0
##
## Presence Server
##   A list of one or more presence server IP addresses or DNS addresses
##   used to access server for presence indication (in case of several
##   entries first address always first, etc.). The default is null
##   (""), but valid values are zero or more IP addresses in dotted decimal
##   or DNS format, separated by commas without intervening spaces, to a
##   maximum of 255 ASCII characters.
## SET PRESENCE_SERVER "192.168.0.5"
##
## Enable Automatic On The Phone Presence
```

```
##   To enable/disable automatic On The Phone Presence status update when
##   user goes on/off hook.
##       0 = Disabled
##       1 = Enabled
## SET ENABLE_AUTOMATIC_ON_THE_PHONE_PRESENCE 1
##
##
#####################  CODEC SETTINGS  #####################
##
## G.711a Codec Enabled
##   Determines whether G.711 a-law codec is available on
##   the phone.
##     0 for No
##     1 for Yes
## SET ENABLE_G711A 1
##
## G.711u Codec Enabled
##   Determines whether G.711 mu-law codec is available on
##   the phone.
##     0 for No
##     1 for Yes
## SET ENABLE_G711U 1
##
## G.729 Codec Enabled
##   Determines whether G.729 codec is available on the
##   phone.
##     0 for G.729(A) disabled
##     1 for G.729(A) enabled without Annex B support
##     2 for G.729(A) enabled with Annex B support
##  Note : This setting is applicable for 1603 SIP phones also.
## SET ENABLE_G729 1
##
## G.726 Codec Enabled
##   Determines whether G.726 codec is available on the
##   phone.  This parameter is not supported on 16cc phones.
##     0 for No
##     1 for Yes
## SET ENABLE_G726 1
##
## G.726 Payload Type
##   Specifies the RTP payload type to be used with the
##   G.726 codec. (96-127).  This parameter is not supported
##   on 16cc phones.
## SET G726_PAYLOAD_TYPE 110
##
## G.722 Codec Enabled
##   Determines whether G.722 codec is available on the
##   phone.  This parameter is not supported on 16cc phones.
##     0 for No
##     1 for Yes
## SET ENABLE_G722 0
##
## DTMF Payload Type
##   Specifies the RTP payload type to be used for RFC
##   2833 signaling. (96-127).
##   Note : This setting is applicable for 1603 SIP phones also.
## SET DTMF_PAYLOAD_TYPE 120
##
## DTMF Transmission Method
##   Specifies whether DTMF tones are sent in-band, as
##   regular audio, or out-of-band, using RFC 2833
##   procedures.
##     1 for in-band
##     2 for out-of-band using RFC 2833
## SET SEND_DTMF_TYPE 2
```

```
##
####################  LANGUAGE SETTINGS  ####################
##
## System-Wide Language
##   Contains the name of the default system language file
##   used in the phone. The filename should be one of the
##   files listed in the LANGUAGES parameter.  If no
##   filename is specified, or if the filename does not
##   match one of the LANGUAGES values, the phone shall use
##   its built-in English text strings. 0 to 32 ASCII
##   characters.  Filename must end in .xml
##
## NOTE:
##   For 96xx SIP Release 1.0 phones only, all language
##   filenames begin with Mls_Spark_.  For example,
##   Mls_Spark_English.xml
##
##   For 96xx SIP Release 2.0 and later and for 16CC phones,
##   all language filenames begin with Mlf_
##
## SET SYSTEM_LANGUAGE Mlf_English.xml
##
## Installed Languages
##   Specifies the language files to be installed/downloaded
##   to the phone.  Filenames may be full URL, relative
##   pathname, or filename. (0 to 1096 ASCII characters,
##   including commas). Filenames must end in .xml.
##
## NOTE:
##   For 96xx SIP Release 1.0 phones only, all language
##   filenames begin with Mls_Spark_  For example,
##   Mls_Spark_English.xml
##
##   For 96xx SIP Release 2.0 and later and for 16CC phones,
##   all language filenames begin with Mlf_
##
## SET LANGUAGES Mlf_German.xml,Mlf_ParisianFrench.xml,Mlf_LatinAmericanSpanish.xml
##
####################  COUNTRY AND DATE SETTINGS  ####################
##
## Call Progress Tone Country
##   Country used for network call progress tones.
##   For Argentina use keyword            "Argentina"
##   For Australia use keyword            "Australia"
##   For Brazil use keyword      "Brazil"
##   For Canada use keyword      "USA"
##   For France use keyword      "France"
##   For Germany use keyword     "Germany"
##   For Italy use keyword       "Italy"
##   For Ireland use keyword     "Ireland"
##   For Mexico use keyword      "Mexico"
##   For Spain use keyword       "Spain"
##   For United Kingdom use keyword "UK"
##   For United States use keyword  "USA"
##
## NOTE 1:For a complete list of supported countries, see your
##        telephone's Administrators Guide.
## NOTE 2:This setting is applicable for 1603 SIP phone models also.
##
## SET COUNTRY "USA"
##
## Date Format
##   Specifies the format for dates displayed in the phone.
##     Use %d for day of month
##     Use %m for month in decimal format
```

```
##     Use %y for year without century (e.g., 07)
##     Use %Y for year with century (e.g., 2007)
##     Any character not preceded by % is reproduced exactly.
## SET DATEFORMAT %m/%d/%y
##
## Time Format
##   Specifies the format for time displayed in the phone.
##     0 for am/pm format
##     1 for 24h format
## SET TIMEFORMAT 0
##
## Daylight Savings Time Mode
##   Specifies daylight savings time setting for phone.
##     0 for no daylight saving time
##     1 for daylight savings activated (time set to DSTOFFSET)
##     2 for automatic daylight savings adjustment (as
##       specified by DSTSTART and DSTSTOP)
## SET DAYLIGHT_SAVING_SETTING_MODE 2
##
#################   TIMER PARAMETER SETTINGS  ##############
##
## Registration Response Timer.
##   Specifies number of seconds to wait for a SIP register response message.
##   If no response message is received within this time, registration is retried.
##   The possible values are in the range of 4 seconds to 3600 seconds.
##   The default value is 32 seconds.
##
##   NOTE: For Avaya Distributed Office configurations prior to release 2.0,
##   this parameter must be set to 60.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET WAIT_FOR_REGISTRATION_TIMER 32
##
##
## Un-Registration complete Timer
##   Specifies number of seconds to wait before declaring the SIP
##   un-registration request to be complete. Un-registration includes
##   termination of all active SIP dialogs, and SIP registration.
##   The min-max values for this parameter are 4-3600 secs and default
##   value is 32.
##  SET WAIT_FOR_UNREGISTRATION_TIMER 32
##
## Subscription Request Duration
##   Specifies the duration of initial SUBSCRIBE messages
##   sent from the phone. May be lowered by the server.
##   (60-31536000 seconds). Maximum is one year; default is
##   one day.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET OUTBOUND_SUBSCRIPTION_REQUEST_DURATION 86400
##
## No Digits Timeout
##   Specifies the number of seconds after going off-hook
##   that the phone waits to receive its first dialed digit.
##   If no digits are entered within the specified time
##   period, the phone plays a warning tone. (1-60)
## SET NO_DIGITS_TIMEOUT 20
##
## Inter-Digit Timeout
##   Specifies the number of seconds after the user dials
##   a digit and before the phone sends out a SIP INVITE.
##   The expiration of this timer signifies the completion
##   of the digit collection period. (1-10)
##   Note : This setting is applicable for 1603 SIP phones also.
## SET INTER_DIGIT_TIMEOUT 5
##
## Failed Session Removal Timer
```

```
##   Specifies the number of seconds the phone will play
##   re-order tone after an invalid extension has been
##   dialed. If this timer expires, or if the user
##   presses the End Call softkey, the re-order tone is
##   stopped and the session line appearance is removed.
##   (5-999)
## SET FAILED_SESSION_REMOVAL_TIMER 30
##
## TCP Keep Alive Enabled
##   Determines whether or not the phone sends TCP keep
##   alive (TCP ACK) messages.
##     0 for No
##     1 for Yes
##   Note : This setting is applicable for 1603 SIP phones also.
## SET TCP_KEEP_ALIVE_STATUS 1
##
## TCP Keep Alive Time
##   Specifies number of seconds an idle phone will wait
##   before sending out a TCP keep alive (TCP ACK) message.
##   (10-3600).
##   Note : This setting is applicable for 1603 SIP phones also.
## SET TCP_KEEP_ALIVE_TIME 60
##
## TCP Keep Alive Interval
##   Specifies number of seconds a phone will wait before
##   re-transmitting a TCP keep alive (TCP ACK) message.
##   (5-60).
##   Note : This setting is applicable for 1603 SIP phones also.
## SET TCP_KEEP_ALIVE_INTERVAL 10
##
################  EVENT LOGGING SETTINGS  ##################
##
## Local Event Logging control
##   Controls the level of events recorded in the phone's local
##   log. Events with the selected severity level and higher
##   will be logged.
##     0 for emergencies
##     1 for alerts
##     2 for critical
##     3 for errors
##     4 for warnings
##     5 for notices
##     6 for information
##     7 for debug
## SET LOCAL_LOG_LEVEL 3
##
## Logging Categories
##   Specifies categories to be logged in syslog and local
##   log file.  This parameter must be specified to log
##   events below Errors level.  Comma-separated list of
##   keywords.  See Administrator's guide for additional
##   detail.
## SET LOG_CATEGORY DHCP
##
## Enable syslog logging
##   Value 0 (disable) and 1 (enable) and default is 0.
##   Meaning for Activate/deactivate sending of syslog messages
##
## SYSLOG_ENABLED 0
##
###################  CERTIFICATE SETTINGS  #################
##
## Certificate Server URI
##   URI used to access SCEP server.
## SET MYCERTURL http://192.168.0.25/certsrv/mscep/mscep.dll
```

```
##
## HTTP Proxy
##   Specifies proxy server used to set up HTTP connection
##   for SCEP protocol.  zero or one IP address in dotted
##   decimal or DNS name format followed by optional colon
##   and port number.
## SET HTTPPROXY proxy.mycompany.com
##
## HTTP Exception Domains
##   A list of one or more HTTP proxy server exception
##   domains separated by commas without any spaces.
##   SCEP accesses to these addresses will not go through
##   the proxy server.
## SET HTTPEXCEPTIONDOMAINS mycompany.com,135.20.21.20
##
## Certificate Common Name
##   Common Name (CN) specified for SUBJECT of SCEP
##   certificate request.
##     Use $SERIALNO for phone's serial number
##     Use $MACADDR for phone's MAC address
## SET MYCERTCN $SERIALNO
##
## Certificate Distinguished Name
##   Specifies the part of SUBJECT in a certificate
##   request which is common for requests from different
##   phones. May include Organizational Unit, Organization,
##   Location, State, Country,  (0 to xx ASCII characters
##   beginning with /).
## SET MYCERTDN /C=US/ST=NJ/L=MyTown/O=MyCompany
##
## Certificate Authority Identifier
##   specifies the certificate with which the certificate
##   request will be signed.  Used especially by CAs that
##   host multiple CAs (for example, EJBCA).  Some CAs
##   will ignore this parameter if they act as only one
##   CA (for example, Microsoft CA).
## SET MYCERTCAID EjbSubCA
##
## Certificate Key Length
##   specifies length of certificate private key for phone.
##   (1024-2048).
## SET MYCERTKEYLEN 1024
##
## Certificate Renewal Threshold
##   Specifies period of time after which to begin
##   certificate renewal request.  Specified as percentage
##   of certificate's Validity Object.(1-99)
## SET MYCERTRENEW 90
##
## Certificate Wait Behavior
##   Specifies phone's behavior while performing
##   certificate enrollment.
##     0 for periodic background check
##     1 for wait until phone receives certificate,
##       denial, or pending notification before continuing
##       startup operation
## SET MYCERTWAIT 1
##
#####################  PORT SETTINGS  #####################
##
## UDP Minimum Port Value
##   Specifies the lower limit of the UDP port range
##   to be used by RTP/RTCP or SRTP/SRTCP connections.
##   (1024 -65503).
##   Note : This setting is applicable for 1603 SIP phones also.
```

```
## SET RTP_PORT_LOW 5004
##
## UDP Port Range
##   Specifies the range or number of UDP ports
##   available for RTP/RTCP or SRTP/SRTCP connections.
##   This value is added to RTP_PORT_LOW to determine
##   the upper limit of the UDP port range (32-64511).
##   Note : This setting is applicable for 1603 SIP phones also.
## SET RTP_PORT_RANGE 40
##
## Signaling Port Minimum Value
##   Specifies the minimum port value for SIP
##   signaling.
##   (1024 -65503).
##   Note : This setting is applicable for 1603 SIP phones also.
## SET SIG_PORT_LOW 1024
##
## Signaling Port Range
##   Specifies the range or number of SIP signaling
##   ports.  This value is added to SIG_PORT_LOW to
##   determine the upper limit of the SIP signaling
##   port range (32-64511).
##   Note : This setting is applicable for 1603 SIP phones also.
## SET SIG_PORT_RANGE 64511
##
############################################################
##                                                        ##
##                96xx SIP TELEPHONE SETTINGS             ##
##                                                        ##
############################################################
##
## PROVIDE_EDITED_DIALING specifies control for editied dialing for user.
## 0 = Dialing Options is not displayed. The user cannot change edit dialing
##     and the phone defaults to on-hook dialing.  Edit dialing is disabled.
## 1 = Dialing Options is not displayed. The user cannot change edit dialing
##     and the phone defaults to edit dialing.  On hook dialing is disabled.
## 2 = Dialing Options is displayed. The user can change edit dialing
##     and the phone defaults to on-hook dialing.
## 3 = Dialing Options is displayed. The user can change edit dialing and
##     the phone defaults to edit dialing.
## PROVIDE_EDITED_DIALING 2
##
## DTMF Volume Level
##  This parameter specifies the power level of tone, expressed
##  in dBm0.
##  The possible values are in the range of -20dBm to -7dBm.
##  The default value is -12dBm. This parameter is supported on
##  96xx telephones.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET INGRESS_DTMF_VOL_LEVEL -12
##
## UDP Source port check for Audio regeneration
##  Audio received via RTP or SRTP will be regenerated through
##  the appropriate audio transducer if and only if the telephone
##  is off-hook, and if the datagrams containing the RTP or SRTP
##  have a UDP Source Port equal to the corresponding value of
##  FEPORT if the value of the parameter SYMMETRIC_RTP is 1.
##  If the value of SYMMETRIC_RTP is 0, he UDP Source Port is not checked.
## SET SYMMETRIC_RTP 1
##
##   Push capabilities settings.
##     PUSHCAP consists of 4 digits (each 0, 1, or 2).
##     The rightmost digit controls the Top Line push mode,
##     the next digit to the left controls the display (web) pushes,
```

```
##     the next digit to the leftmost controls Audio receive pushes,and Multicast Audio
pushes,
##     the next digit controls Audio transmit pushes.
##     and the leftmost digit controls phonexml pushes
##     and it only supports barge priority.
## Note: These settings are supported on R2.2 release of 96xx SIP telephones.
##   00000: all push modes are disabled
##
##   11111: barge in only is allowed in all push modes.
##
##   12222: both barge in and normal pushes are allowed in
##         all push modes except phonexml, which supports only barge in pushes.
##
## SET PUSHCAP 00000
##
## Customization file for Home Screen
##  CURRENT_CONTENT parameter is used to customize home screen. This parameter defines
##  URL of the customization file in xml format. The default value of the parameter is
null.
## Note: This parameter is supported on R2.2 and above releases of 96xx SIP telephones.
## SET CURRENT_CONTENT "http://135.27.67.137/screen.xml"
##
############################################
##
## Conference transfer on primary appearence
##  When CONF_TRANS_ON_PRIMARY_APPR is set to 1,
##  conference and transfer setup will first attempt
##  to use an idle primary call appearance even if
##  initiated from a bridged call appearance.
##  If an idle primary call appearance is not available,
##  then an idle bridged call appearance will be used.
##  Conference and transfer setup initiated from a bridged call
##  appearance when no idle primary call appearance is available
##  will next attempt to use an idle bridged call appearance of
##  the same extension and if not available, an idle bridged call
##  appearance of a different extension.
## Note:  When CONF_TRANS_ON_PRIMARY_APPR is set to 1, AUTO_SELECT_ANY_IDLE_APPR is
ignored.
##
##  When CONF_TRANS_ON_PRIMARY_APPR is set to 0,
##  conference and transfer setup initiated from a primary call
##  appearance will first attempt to use an idle primary call appearance.
##  If an idle primary call appearance is not available, it will use an idle
##  bridged call appearance regardless of the setting of AUTO_SELECT_ANY_IDLE_APPR.
##  Conference and transfer setup initiated from a bridged call appearance will attempt
##  to use an idle bridged call appearance of the same extension.
##  If an idle bridged call appearance of the same extension is not available
##  and AUTO_SELECT_ANY_IDLE_APPR is set to 1, then conference and transfer
##  setup will use any idle call appearance (primary or bridged).
##  It will first attempt to find an idle primary call appearance and if not
##  available will then attempt to find an idle bridged call appearance of a different
extension.
##  However, if AUTO_SELECT_ANY_IDLE_APPR is set to 0, transfer and conference setup
##  initiated on a bridged call appearance will be denied if an idle bridged call
appearance
##  of the same extension is not available.
##
##  The Default value of CONF_TRANS_ON_PRIMARY_APPR is 0.
## Note:  These parameters are supported on SIP release R2.4.1 and later release of 96xx
SIP telephones.
##
## Visiting User Mode
## VU_MODE defines visiting user mode capabilities.
##  If set to 0, the phone operates normally.
```

```
##  If set to 1, phone prompts the user, at registration time, if they are Visiting or
Not.
##  If set to 2, phone only allows Visiting User registrations.
## SET VU_MODE 0
##
## Auto Select any idle appearance
##  When AUTO_SELECT_ANY_IDLE_APPR is active then any idle appearance is selected.
##  When AUTO_SELECT_ANY_IDLE_APPR is set to 0 and CONF_TRANS_ON_PRIMARY_APPR is 0,
##  then if no associated call appearance is selected, the conference or transfer
##   operation will be denied.
##  When AUTO_SELECT_ANY_IDLE_APPR is set to 1 and CONF_TRANS_ON_PRIMARY_APPR is 0,
##  then if no associated call appearance is selected, the conference or transfer
##  operation will be tried on any available call appearance (primary or bridged).
## Note: This parameter is supported on R2.4.1 and later release of 96xx SIP telephones.
## SET AUTO_SELECT_ANY_IDLE_APPR 0
##
## Ring Tone files
##  EXTEND_RINGTONE provides to customize ring tone files.
##  This is a comma seperated list of file names in xml format.
##  The default value of this parameter is null.
## Note: This parameter is supported on R2.4.1 and later release of 96xx SIP telephones.
## SET EXTEND_RINGTONE ""
##
## Display Name and Number of incoming call
##  DISPLAY_NAME_NUMBER provides display of name and number of incoming call.
##  If it is set to 0 then phone will display only number of incoming call.
##  If it is set to 1 then phone will display name and number os incoming call.
## SET DISPLAY_NAME_NUMBER 0
##
##
## SIP controller list
##  SIP_CONTROLLER_LIST provides the ability to configure a list of SIP
proxies/registrars.
##  The list may contain one or more comma separated controllers where a controller
##  has the following format:
##  host[:port][;transport=xxx]
##  host is an IP addresses in dotted-decimal format or DNS name.
##  [:port] is the optional port number.
##  [;tansport=xxx] is the optional transport type where xxx can be tls, tcp, or udp.
##  If a port number is not specified the default value of 5060 for TCP and UDP or 5061
for TLS is used.
##  If a transport type is not specified the default value of tls is used.
## Note 1: This parameter is supported on R2.4.1 and later release of 96xx SIP
telephones.
## Note 2: This setting is applicable for 1603 SIP phone models also.
## SET SIP_CONTROLLER_LIST proxy1:5060;transport=tcp,proxy2:5060;transport=tcp
##
## PPM as a source of SIP proxy server
##  ENABLE_PPM_SOURCED_SIPPROXYSRVR parameter enables PPM as a source of SIP
##  Proxy server information.
##  When this is set to 1 then proxy server information discovered via PPM will be used.
##  The default value of this parameter is 1.
## Note: This parameter is supported on R2.4.1 and later release of 96xx SIP telephones.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET ENABLE_PPM_SOURCED_SIPPROXYSRVR 1.
##
## Fast Response Timer
##  FAST_RESPONSE_TIMEOUT provides ability to configure fast response timer.
##  When it is set to 0 then this timer is disabled.
##  When it is set to any value in between 1 to 32 then the timer will be
##  started for the set value. The timer terminates INVITE transactions if no
##  SIP response is received within a specified number seconds of sending the request
## Note: This parameter is supported on R2.4.1 and later release of 96xx SIP telephones.
## SET FAST_RESPONSE_TIMEOUT 4
##
```

```
## Reactive Monitoring Interval
##  When RECOVERYREGISTERWAIT is set with value then phone will retry the
##  monitoring attempt after a randomly selected  delay of 50% - 90% of
##  the reactive monitoring interval specified in the RECOVERYREGISTERWAIT parameter.
##  The range for this timer is 10-36000 seconds
## Note 1: This parameter is supported on R2.4.1 and later release of 96xx SIP
telephones.
## Note 2: This setting is applicable for 1603 SIP phone models also.
## SET RECOVERYREGISTERWAIT 60
##
##  For small network loads, but back off under non-responsive or error conditions, to
avoid network congestion or server overload.
## Impose a delay before each retry where the delay interval grows exponentially for each
subsequent retry.
## The parameters are configurable via settings file.
##
## RDS_INITIAL_RETRY_TIME
##  The initial delay time is RDS_INITIAL_RETRY_TIME seconds. Each subsequent retry
##  is delayed by double the previous delay.The minimum value is 2 seconds and Maximum
value is 60 seconds .
##   Note : This setting is applicable for 1603 SIP phones also.
## SET RDS_INITIAL_RETRY_TIME 2
##
## RDS_MAX_RETRY_TIME
##  The max delay interval is limited to RDS_MAX_RETRY_TIME seconds. The minimum value is
2 seconds
##  and Maximum value is 3600 seconds
## SET RDS_MAX_RETRY_TIME 600
##
## RDS_INITIAL_RETRY_ATTEMPTS
##  The number of retries is limited to RDS_INITIAL_RETRY_ATTEMPTS.The minimum value is 1
attempt  and Maximum value is 30 attempts.
##   Note : This setting is applicable for 1603 SIP phones also.
## SET RDS_INITIAL_RETRY_ATTEMPTS 15
##
##
## Selection of Active Controller
##  When FAILBACK_POLICY parameter is set to "auto", the phone's active controller will
##  always be the highest priority available controller.
##  If FAILBACK_POLICY parameter is set to "admin", then a controller
##  lower down the priority list may be active.
## Note: This parameter is supported on R2.4.1 and later release of 96xx SIP telephones.
## SET FAILBACK_POLICY auto
##
## SIP Registration Proxy Policy
##  If SIPREGPROXYPOLICY parameter is "alternate" and a user is logged-in,
##  the phone will attempt and maintain a single active SIP registration with the highest
priority
##  If SIPREGPROXYPOLICY parameter is "simultaneous" and a user is logged-in,
##  the phone will attempt and maintain active SIP registrations with all Available
Controller(s).
## Note: This parameter is supported on R2.4.1 and later release of 96xx SIP telephones.
## SET SIPREGPROXYPOLICY alternate
##
## Dynamic Feature Set Discovery
##  If the DICSOVER_AVAYA_ENVIRONMENT parameter value is 1, the phone discovers
(determines)
##  if that controller supports the AST feature set or not. The phone will send a
SUBSCRIBE
##  request to the active controller for the Feature Status Event Package (avaya-cm-
feature-status).
##  If the request succeeds, then the phone proceeds with PPM Synchronization.
##  If the request is rejected, is proxied back to the phone or does not receive a
response,
##  the phone will assume that AST features are not available.
```

```
##  If the parameter value is 0, the phone operates in a mode where AST features are not
available.
## Note: This parameter is supported on R2.4.1 and later release of 96xx SIP telephones.
## SET DISCOVER_AVAYA_ENVIRONMENT 1
##
##
## Telephone number to call into the messaging system
##  PSTN_VM_NUM is the "dialable" string is used to call into the messaging system
##  (e.g. when pressing the Message Waiting button).
## Note: This parameter is supported on R2.4.1 and later release of 96xx SIP telephones
##       when the phone is failed over.
## SET PSTN_VM_NUM ""
##
## PSTN Access Prefix
##  ENABLE_REMOVE_PSTN_ACCESS_PREFIX parameter allows telephone to
##  perform digit manipulation during failure scenarios. This parameter
##  allows removal of PSTN access prefix from the outgoing number.
##  0 - PSTN access prefix is retained in the outgoing number
##  1 - PSTN access prefix is stripped from the outgoing number.
## Note: This parameter is supported on R2.4.1 and later release of 96xx SIP telephones
##       when the phone is failed over.
## SET ENABLE_REMOVE_PSTN_ACCESS_PREFIX 0
##
## Local Dial Area Code
##  LOCAL_DIAL_AREA_CODE indicates whether user must dial area code for calls within same
##  area code regions. when LOCAL_DIAL_AREA_CODE is enabled (1), the area code parameter
(PHNLAC)
##  should also be configured (ie. not the empty string).
##  0 - User don't need to dial area code.
##  1 - User need to dial area code.
## Note: This parameter is supported on R2.4.1 and later release of 96xx SIP telephones
##       when the phone is failed over.
## SET LOCAL_DIAL_AREA_CODE 0
##
## Phone's Local Area Code
##  When PHNLAC is set,it indicates the telephone's local area code, which along with
##  the parameter LOCAL_DIAL_AREA_CODE, allows users to dial local numbers with more
flexibility.
##  PHNLAC is a string representing the local area code the telephone.
## Note: This parameter is supported on R2.4.1 and later release of 96xx SIP telephones
##       when the phone is failed over.
## SET PHNLAC ""
##
## Monitored Controller Search Interval settings
##  CONTROLLER_SEARCH_INTERVAL which is the time that the phone waits
##  to complete the maintenance check for monitored controllers.
##  This value is the wait period in seconds. Range is 4secs to 3600secs.
## Note: This parameter is supported on R2.4.1 and later  release of 96xx SIP telephones
## SET CONTROLLER_SEARCH_INTERVAL 4
##
## Phone Lock
##  Phone Lock provides users with the capability to manually lock their
##  stations using either a softkey on the idle Phone Screen or a button
##  on the Feature Screen.
##    0 - Lock Softkey and Feature Button are not displayed
##    1 - Lock Softkey and Feature Button are displayed
## SET ENABLE_PHONE_LOCK 0
##
## Phone Lock Idle Time
##  Phone can be automatically locked after a period of idle time.
##  The Default Phone Lock idle time is not to lock the phone.
##  If Phone Lock is enabled via settings, but Phone Lock idle time
##  is not set; the phone will not lock. If Phone Lock is enabled via
##  settings, and Phone Lock idle time is set; the phone will lock
##  after whatever value of minutes of inactivity is set.
```

```
##    0 - Phone does not lock
##    1-999 - Phone locks after the value in minutes
## SET PHONE_LOCK_IDLETIME 0
##
##
############################################################
##                                                        ##
##                 SIP SOFTPHONE SETTINGS                 ##
##                                                        ##
############################################################
##
##  WEBLMSRVR  sets the IP address or Fully-Qualified Domain
##  Name (FQDN) of the Licensing Server Name or Address. The
##  default is null ("") but valid values are zero or more
##  IP addresses in dotted-decimal or DNS format, separated
##  by commas without intervening spaces, to a maximum of
##  255 ASCII characters.
##
##  SP_DIRSRVR sets the IP address or Fully-Qualified Domain
##  Name (FQDN) of the LDAP Directory Server Name or
##  Address. The default is null ("") but valid values are
##  zero or more IP addresses in dotted-decimal or DNS
##  format, separated by commas without intervening spaces,
##  to a maximum of 255 ASCII characters.
##
##  SP_DIRSRVRPORT sets the TCP port number of your LDAP
##  Directory Server.  The default port number is 389. If
##  you wish to change the  port number, you must set this
##  value.
##
##  SP_DIRTOPDN sets the Directory Topmost Distinguished
##  Name.  You must set this value to a non-null value to
##  enable the LDAP application.  The default is null (""),
##  but you should set DIRTOPDN to the LDAP root entry.
##
##  SP_AC sets the Area Code
##
##  LOCAL_CALL_PREFIX sets the prefix for local calls.
##  Permissible values are the Area Code denoted by AC, a
##  string of digits, or the default, DIAL_AS_IS. The
##  example shows the Area Code.
##
## Examples:
## SET WEBLMSRVR 192.168.0.11
## SET SP_DIRSRVR ldap-east.post.avaya.com
## SET SP_DIRSRVRPORT 389
## SET SP_DIRTOPDN ou=People,o=avaya.com
## SET SP_AC 212
## SET LOCAL_CALL_PREFIX AC
##
##
############################################################
#
# SETTINGS16XX
#
############################################################
## This section contains the phone model specific settings
## for the 16XX telephone.
## NOTE:
##   For releases previous to R1.1, only language files (LANGxFILE) needed to be
specified.
##   For release R1.1 and beyond, where 5 additional languages received support, a
FONTFILE for
##   each of these languages was also needed, in addition to its LANGxFILE.
##
```

```
## The 5 additional languages supported in phones (R1.1 and beyond) are:
##
## Arabic
## Simplified Chinese
## Traditional Chinese
## Hebrew
## Korean
##
## There are ten predefined language files for phone display that don't require any font
file.
## By convention, when specifying any 3 of these 10 languages, use LANG1FILE, LANG2FILE,
LANG3FILE:
##       mlf_Sage_v54_dutch.txt
##       mlf_Sage_v54_french_can.txt
##       mlf_Sage_v54_french_paris.txt
##       mlf_Sage_v54_german.txt
##       mlf_Sage_v54_italian.txt
##       mlf_Sage_v54_japanese_kat.txt
##       mlf_Sage_v54_portuguese.txt
##       mlf_Sage_v54_russian.txt
##       mlf_Sage_v54_spanish.txt
##       mlf_Sage_v54_spanish_latin.txt
##
## There are five predefined language files for the phone display that require a font
file.
## Normally, only specify one of these languages because the font files are large and
require more memory
## By convention, when specifying any 1 of these 5 languages, use LANG4FILE:
##       mlf_Sage_v54_arabic.txt
##       mlf_Sage_v54_chinese.txt
##       mlf_Sage_v54_trad_chinese.txt
##       mlf_Sage_v54_hebrew.txt
##       mlf_Sage_v54_korean.txt
##
## Five predefined font files for the 5 languages above, respectively:
##       Arabic_S11_V34.rbm.lzma
##       GB_S11_V34.rbm.lzma
##       Big5_S11_V34.rbm.lzma
##       Hebrew_S11_V34.rbm.lzma
##       KSC_S11_V34.rbm.lzma
##
## These next language file configurations are examples of what a customer might
## use whan specifying 4 languages.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
## SET LANG1FILE "mlf_Sage_v54_german.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_Sage_v54_russian.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG3FILE "mlf_Sage_v54_spanish_latin.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET FONTFILE KSC_S11_V34.rbm.lzma
## SET LANG4FILE "mlf_Sage_v54_korean.txt"
##
```

```
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_Sage_V54_german.txt"
##
############## END OF 16XX IP Phone Language Settings #############
##############################################################
##                                                          ##
##                    PER MODEL SETTINGS                    ##
##           Applies to specific telephone models           ##
##                                                          ##
##############################################################
##
IF $MODEL4 SEQ 1692 GOTO SETTINGS1692
IF $MODEL4 SEQ 1603 GOTO SETTINGS1603
IF $MODEL4 SEQ 1608 GOTO SETTINGS1608
IF $MODEL4 SEQ 1616 GOTO SETTINGS1616
IF $MODEL4 SEQ 16cc GOTO SETTINGS16cc
IF $MODEL4 SEQ 3631 GOTO SETTINGS3631
IF $MODEL4 SEQ 4601 GOTO SETTINGS4601
IF $MODEL4 SEQ 4602 GOTO SETTINGS4602
IF $MODEL4 SEQ 4610 GOTO SETTINGS4610
IF $MODEL4 SEQ 4620 GOTO SETTINGS4620
IF $MODEL4 SEQ 4621 GOTO SETTINGS4621
IF $MODEL4 SEQ 4622 GOTO SETTINGS4622
IF $MODEL4 SEQ 4625 GOTO SETTINGS4625
IF $MODEL4 SEQ 4630 GOTO SETTINGS4630
IF $MODEL4 SEQ 9610 GOTO SETTINGS9610
IF $MODEL4 SEQ 9620 GOTO SETTINGS9620
IF $MODEL4 SEQ 9630 GOTO SETTINGS9630
IF $MODEL4 SEQ 9640 GOTO SETTINGS9640
IF $MODEL4 SEQ 9650 GOTO SETTINGS9650
IF $MODEL4 SEQ 9670 GOTO SETTINGS9670
IF $MODEL4 SEQ 9608 GOTO SETTINGS9608
IF $MODEL4 SEQ 9641 GOTO SETTINGS9641
IF $MODEL4 SEQ 9611 GOTO SETTINGS9611
IF $MODEL4 SEQ 9621 GOTO SETTINGS9621
GOTO END
##
##############################################################

##############################################################
#
# SETTINGS1692
#
##############################################################
##
GOTO END
############## END OF 1692 IP Phone Settings ###############

##############################################################
#
# SETTINGS1603
#
##############################################################
##
## These settings are used to set the local display
## language of your 1603 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
## SET LANG1FILE "mlf_Sage_v54_russian.txt"
##
```

```
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_Sage_v54_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG3FILE "mlf_Sage_v54_french_paris.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET FONTFILE KSC_S11_V34.rbm.lzma
## SET LANG4FILE "mlf_Sage_v54_korean.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_Sage_v54_german.txt"
##
goto END
############## END OF 1603 IP Phone Settings ###############

############################################################
#
# SETTINGS1608
#
############################################################
##
## These settings are used to set the local display
## language of your 1608 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
## SET LANG1FILE "mlf_Sage_v54_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_Sage_v54_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG3FILE "mlf_Sage_v54_french_paris.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET FONTFILE KSC_S11_V34.rbm.lzma
## SET LANG4FILE "mlf_Sage_v54_korean.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_Sage_v54_german.txt"
##
goto END
############## END OF 1608 IP Phone Settings ###############

############################################################
#
# SETTINGS1616
```

```
#
############################################################
##
## These settings are used to set the local display
## language of your 1616 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
## SET LANG1FILE "mlf_Sage_v54_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_Sage_v54_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG3FILE "mlf_Sage_v54_french_paris.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET FONTFILE KSC_S11_V34.rbm.lzma
## SET LANG4FILE "mlf_Sage_v54_korean.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_Sage_v54_german.txt"
##
goto END
############## END OF 1616 IP Phone Settings ###############

############################################################
#
# SETTINGS16cc
#
############################################################
##
## This section contains the phone model specific settings
## for the 16cc telephone.
##
## Agent Login Tone
##   Specifies the confirmation tone to play when the agent
##   successfully logs in.  The default is 1 and valid
##   values are 1-32.  This parameter applies only to 16cc
##   model phones.
## SET AGENTTONE 1
###################  CERTIFICATE SETTINGS  #################
##
## Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
##   Files may contain only PEM-formatted certificates.
## SET TRUSTCERTS avayaprca.crt,sip_product_root.crt,avayacallserver.crt
##
####################  AUDIO SETTINGS  ####################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
```

```
##     0        NORMAL level for most users (default)
##     1        one level softer than NORMAL
##     2        two levels softer than NORMAL
##     3        three levels softer than NORMAL
##     4        OFF (inaudible)
##     5        one level louder than NORMAL
##
## SET AUDIOSTHD 0
##
goto END
############## END OF 16cc IP Phone Settings ###############
#                                                          ##
# SETTINGS3631                                             ##
#                                                          ##
############################################################
##                                                        ##
##      Settings applicable to 3631 telephone model       ##
##                                                        ##
############################################################
##
##   WMM mode for 3631 telephone. May be overridden by WMM
##   mode specified in Access Profile.
##     0 for off
##     1 for on
## SET WTWMM 0
##
##   Power save mode for 3631 telephone. May be overridden
##   by power save mode specified in Access Profile.
##     0 for off
##     1 for on
## SET WTPWRSAV 1
##
##  Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
##   Files may contain only PEM-formatted certificates.
##     cacert1.pem for 3631 Access Profile 1
##     cacert2.pem for 3631 Access Profile 2
##     cacert3.pem for 3631 Access Profile 3
## SET TRUSTCERTS cacert1.pem,cacert2.pem,cacert3.pem
##
##   Regulatory domain (country) for 3631 telephone. (0 to
##   2 ASCII characters, no spaces.)
## SET WTREGDOM US
##
##   Data rate for 3631 telephone
##      -1 for Auto
##       2 for 1 Mbps
##       4 for 2 Mbps
##      11 for 5.5 Mbps
##      12 for 6 Mbps
##      18 for 9 Mbps
##      22 for 11 Mbps
##      24 for 12 Mbps
##      36 for 18 Mbps
##      48 for 24 Mbps
##      72 for 36 Mbps
##      96 for 48 Mbps
##     108 for 54 Mbps
## SET WTRATE -1
##
##   Fragmentation threshold for 3631 telephone (256-3000).
## SET WTFRAG 3000
##
```

```
##   Request to send (RTS) threshold for 3631 telephone
##   (0-3000).
## SET WTRTS 3000
##
################  ACCESS PROFILE 1 SETTINGS  ###############
##
##   Name for Access Profile 1. (0 to 31 ASCII characters,
##   no spaces.)
## SET WTPROF1 North
##
##   SSID for Access Profile 1. (0 to 31 ASCII characters,
##   no spaces.)
## SET WTSSIDP1 north@mycompany
##
##   WMM mode for Access Profile 1.
##     0 for off
##     1 for on
## SET WTWMMP1 0
##
##   Power save mode for Access Profile 1.
##     0 for off
##     1 for on
## SET WTPWRSAVP1 1
##
##   Security mode for Access Profile 1.
##     0 for none
##     1 for WEP
##     2 for WPA-PSK
##     3 for WPA2-PSK
##     4 for WPA-802.1X
##     5 for WPA2-802.1X
## SET WTSECP1 0
##
##   Encryption type for Access Profile 1.
##     0 for none
##     1 for WEP-64
##     2 for WEP-128
##     3 for TKIP
##     4 for AES
## SET ENCRYPTP1 0
##
##   Encryption key for Access Profile 1.  (0 to 63 ASCII
##   characters, no spaces.)
## SET WTKEYP1 northkey
##
##   EAP type for Access Profile 1.
##     0 for disable
##     1 for TLS
##     2 for LEAP
##     3 for PEAP-GTC
##     4 for PEAP-MSCHAPV2
##     5 for TTLS-CHAP
##     6 for TTLS-MD5
##     7 for TTLS-MSCHAP
##     8 for TTLS-MSCHAPV2
## SET EAPTYPEP1 0
##
################  ACCESS PROFILE 2 SETTINGS  ###############
##
##   Name for Access Profile 2. (0 to 31 ASCII characters,
##   no spaces.)
## SET WTPROF2 South
##
##   SSID for Access Profile 2. (0 to 31 ASCII characters,
##   no spaces.)
```

```
## SET WTSSIDP2 south@mycompany
##
##   WMM mode for Access Profile 2.
##     0 for off
##     1 for on
## SET WTWMMP2 0
##
##   Power save mode for Access Profile 2.
##     0 for off
##     1 for on
## SET WTPWRSAVP2 1
##
##   Security mode for Access Profile 2.
##     0 for none
##     1 for WEP
##     2 for WPA-PSK
##     3 for WPA2-PSK
##     4 for WPA-802.1X
##     5 for WPA2-802.1X
## SET WTSECP2 0
##
##   Encryption type for Access Profile 2.
##     0 for none
##     1 for WEP-64
##     2 for WEP-128
##     3 for TKIP
##     4 for AES
## SET ENCRYPTP2 0
##
##   Encryption key for Access Profile 2.  (0 to 63 ASCII
##   characters, no spaces.)
## SET WTKEYP2 southkey
##
##   EAP type for Access Profile 2.
##     0 for disable
##     1 for TLS
##     2 for LEAP
##     3 for PEAP-GTC
##     4 for PEAP-MSCHAPV2
##     5 for TTLS-CHAP
##     6 for TTLS-MD5
##     7 for TTLS-MSCHAP
##     8 for TTLS-MSCHAPV2
## SET EAPTYPEP2 0
##
##   Domain Name Server for Access Profile 2
## SET DNSSRVRP2 198.152.20.15
##
##   DNS domain for Access Profile 2
## SET DOMAINP2 south.mycompany.com
##
################  ACCESS PROFILE 3 SETTINGS  ###############
##
##   Name for Access Profile 3. (0 to 31 ASCII characters,
##   no spaces.)
## SET WTPROF3 West
##
##   SSID for Access Profile 3. (0 to 31 ASCII characters,
##   no spaces.)
## SET WTSSIDP3 west@mycompany
##
##   WMM mode for Access Profile 3.
##     0 for off
##     1 for on
## SET WTWMMP3 0
```

```
##
##   Power save mode for Access Profile 3.
##     0 for off
##     1 for on
## SET WTPWRSAVP3 1
##
##   Security mode for Access Profile 3.
##     0 for none
##     1 for WEP
##     2 for WPA-PSK
##     3 for WPA2-PSK
##     4 for WPA-802.1X
##     5 for WPA2-802.1X
## SET WTSECP3 0
##
##   Encryption type for Access Profile 3.
##     0 for none
##     1 for WEP-64
##     2 for WEP-128
##     3 for TKIP
##     4 for AES
## SET ENCRYPTP3 0
##
##   Encryption key for Access Profile 3.  (0 to 63 ASCII
##   characters, no spaces.)
## SET WTKEYP3 westkey
##
##   EAP type for Access Profile 3.
##     0 for disable
##     1 for TLS
##     2 for LEAP
##     3 for PEAP-GTC
##     4 for PEAP-MSCHAPV2
##     5 for TTLS-CHAP
##     6 for TTLS-MD5
##     7 for TTLS-MSCHAP
##     8 for TTLS-MSCHAPV2
## SET EAPTYPEP3 0
##
##   Domain Name Server for Access Profile 3
## SET DNSSRVRP3 198.152.25.15
##
##   DNS domain for Access Profile 3
## SET DOMAINP3 west.mycompany.com
##
##
##
GOTO END
################## END OF 3631 phone settings ################

############################################################
#
# SETTINGS4601
#
############################################################
##
## This section contains the phone model specific settings
## for the 4601 telephone.
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting               level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
```

```
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
##
GOTO END
############## END OF 4601 IP Phone Settings ###############

############################################################
#
# SETTINGS4602
#
############################################################
##
## This section contains the phone model specific settings
## for the 4602 telephone.
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
##
GOTO END
############## END OF 4602 IP Phone Settings ###############

############################################################
#
# SETTINGS4610
#
############################################################
##
## This section contains the phone model specific settings
## for the 4610 telephone.
##
####################  AUDIO SETTINGS  ######################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
```

```
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## The WMLIDLEURI setting acts as an idle screen when the
## phone has been idle (see WMLIDLETIME value). By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTE:
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDLEURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/4620/home.wml
## SET WMLIDLEURI http://support.avaya.com/elmodocs2/avayaip/4620/idle.wml
##
GOTO END
############## END OF 4610 IP Phone Settings ###############

############################################################
#
# SETTINGS4620
#
############################################################
##
## This section contains the phone model specific settings
## for the 4620 telephone.
##
####################  AUDIO SETTINGS  ####################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
```

```
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## The WMLIDLEURI setting acts as an idle screen when the
## phone has been idle (see WMLIDLETIME value). By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTE:
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDLEURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/4620/home.wml
## SET WMLIDLEURI http://support.avaya.com/elmodocs2/avayaip/4620/idle.wml
##
GOTO END
############### END OF 4620 IP Phone Settings ###############


############################################################
#
# SETTINGS4621
#
############################################################
##
## This section contains the phone model specific settings
## for the 4621 telephone.
##
```

```
####################  AUDIO SETTINGS  ####################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## The WMLIDLEURI setting acts as an idle screen when the
## phone has been idle (see WMLIDLETIME value). By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTE:
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDLEURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/4620/home.wml
## SET WMLIDLEURI http://support.avaya.com/elmodocs2/avayaip/4620/idle.wml
##
GOTO END
############## END OF 4621 IP Phone Settings ###############

############################################################
#
# SETTINGS4622
#
```

```
############################################################
##
## This section contains the phone model specific settings
## for the 4622 telephone.
##
####################  AUDIO SETTINGS  ######################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## The WMLIDLEURI setting acts as an idle screen when the
## phone has been idle (see WMLIDLETIME value). By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTE:
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDLEURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/4620/home.wml
## SET WMLIDLEURI http://support.avaya.com/elmodocs2/avayaip/4620/idle.wml
##
GOTO END
############## END OF 4622 IP Phone Settings ###############

############################################################
#
# SETTINGS4625
#
############################################################
##
## This section contains the phone model specific settings
## for the 4625 telephone.
##
####################  AUDIO SETTINGS  ######################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
##     0        NORMAL level for most users (default)
```

```
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## The WMLIDLEURI setting acts as an idle screen when the
## phone has been idle (see WMLIDLETIME value). By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTE:
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDLEURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/4625/home.wml
## SET WMLIDLEURI http://support.avaya.com/elmodocs2/avayaip/4625/idle.wml
##
GOTO END
############## END OF 4625 IP Phone Settings ###############

############################################################
#
# SETTINGS4630
#
############################################################
##
###### Settings for the 4630 IP Phone LDAP Application #####
##
## These settings are used to enable and administer the LDAP
## application on the 4630.
##
```

```
##   Your LDAP Directory server Address
##   You must set this value to a non-null value to enable
##   the LDAP application.
##   The default is null ("") but valid values are zero or
##   more IP addresses in dotted-decimal or DNS format,
##   separated by commas without intervening spaces, to a
##   maximum of 255 ASCII characters.##
## SET DIRSRVR ldap.mycompany.com
##
##   The TCP port number of your LDAP Directory Server
##   The default port number is 389. If you wish to change
##   the port number, you must set this value.##
## SET DIRLDAPPORT 389
##
##   The Directory Topmost Distinguished Name
##   You must set this value to a non-null value to enable
##   the LDAP application.  The default is null ("") but
##   you should set DIRTOPDN to the LDAP root entry.
## SET DIRTOPDN "People"
##
##   The default LDAP search value.
##   The 4630 only supports searches on names.  The default
##   is "cn" which stands for "complete name" in LDAP.
##   CHANGING ## THIS VALUE IS NOT RECOMMENDED unless your
##   LDAP directory uses a different term for this data
##   field.
## SET DIRFULLNAME cn
##
##   The Directory Telephone Number field.
##   The default is "telephonenumber".  CHANGING THIS VALUE
##   IS NOT RECOMMENDED unless your LDAP directory uses a
##   different term for this data field.
## SET DIRTELNUM telephonenumber
##
##
######## Settings for 4630 IP Phone Web Application ########
##
## These settings are used to enable and administer the Web
## application on the 4630.
##
## NOTE: Avaya hosts a web site for the 4630 IP Phone.
## The WEBHOME and WEBCODING parameters are set up
## to point your 4630 IP telephones to this hosted site.
## To enable this operation, remove "##" from the front
## of the lines SET WEBHOME ... (and you may need to
## administer WEBPROXY as well).
## To change the web site that your phones point to,
## remove "##" from the front of the lines SET WEBHOME ...
## and replace the provided URL with the URL of your site.
##
## NOTE: Your network must be using Domain Name Services
## (DNS) for the Avaya hosted site settings to operate
## properly.
##
##   The URL of your 4630 Home page
##   The default is null ("") but you can specify any other
##   valid URL up to 255 characters in length.
## SET WEBHOME http://support.avaya.com/elmodocs2/avayaip/4630/index.htm
##
##   Your HTTP proxy server address (name or IP address)
##   This text string contains zero or one IP address in
##   dotted-decimal or DNS format, identifying an HTTP Proxy
##   Server.  The default is null ("") and you may not need
##   to set this parameter if all Web pages to be viewed by
##   the phone user are on your organization's intranet.
```

```
## SET WEBPROXY my.proxy.company.com
##
##   The TCP port number of your HTTP proxy server
##   The default is 80, but WEBPORT is ignored if WEBPROXY
##   is null.
## SET WEBPORT 80
##
##   A list of one or more HTTP proxy server exception
##   domains. Accesses to these addresses will not go
##   through the proxy server.  The default is null ("")
##   but valid values are zero or more IP addresses in
##   dotted-decimal or DNS format, separated by commas
##   without intervening spaces, to a maximum of 255 ASCII
##   characters.
## SET WEBEXCEPT mycompany.com,135.20.21.20
##
#################### 4630 Stock Ticker ####################
## Use this setting to activate the stock ticker on your
## 4630. Go to Options on your 4630 to complete setup of
## this feature.
## Use 0 to Disable or 1 to Enable (the default)
## SET STKSTAT 1
##
GOTO END
############### END OF 4630 IP Phone Settings ###############

############################################################
#
# SETTINGS9610
#
############################################################
##
## This section contains the phone model specific settings
## for the 9610 telephone.
##
####################  AUDIO SETTINGS  ####################
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
#################  WML BROWSER SETTINGS  #################
##
## The WMLSMALL setting is used to enable and
## administer the 'Web' Application.
##
## NOTES:
##
##   The model 9610 is different from other 96xx phone
##   models and does not use either WMLHOME or
##   WMLIDLEURI. Use WMLSMALL in their place together
##   with WMLIDLETIME. The 9610 requires the 9610 backup
```

```
##   restore file to populate the home page on the phone.
##   When the 9610 has been idle for WMLIDLETIME minutes,
##   there are several possible displays which may appear
##   depending on the values of IDLEAPP (in the 9610
##   backup restore file) and WMLSMALL itself. While it is
##   possible to use one of these screens as an "idle
##   screen", it is recommended that the SCREENSAVERON timer
##   and the Avaya Screen Saver display be used for
##   screen saver purposes. See your telephone's
##   Administrators guide for more information.
##
##   To change the web site that your 9610 points to, remove
##   the "## " from the SET WMLSMALL line and replace the
##   provided URL in the line with the URL of your site.
##   If WMLSMALL is null, 9610 backup-restore Main Menu WML
##   links will not display
##
## SET WMLSMALL http://www.mycompany.com/my_screen.wml
##
############### Authentication section ######################
##
##  CERTIFICATE SETTINGS
##
## Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
##   Files may contain only PEM-formatted certificates.
##
## SET TRUSTCERTS avayaprca.crt,sip_product_root.crt,avayacallserver.crt
##
######  9610 H.323 Phone Multi-Language Administration  #######
##
## These settings are used to set the local display
## language of your 9610 H.323 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
##
## Note:
## It is recommended you install the latest version of the
## language files in all 96xx H.323 telephones, even if some
## phones are running an earlier release of software.
##
## SET LANG1FILE "mlf_s31_v49_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_s31_v49_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG3FILE "mlf_s31_v49_french_paris.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG4FILE "mlf_s31_v49_german.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
```

```
## SET LANGSYS "mlf_s31_v49_german.txt"
GOTO END
############## END OF 9610 IP Phone Settings ###############

############################################################
#
# SETTINGS9620
#
############################################################
##
## This section contains the phone model specific settings
## for the 9620 telephone.
##
####################  AUDIO SETTINGS  ######################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   CAUTION:
##   Setting 2 turns OFF sidetone in H.323 release 1.1 and
##   earlier
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   CAUTION:
##   Setting 2 turns OFF sidetone in H.323 release 1.1 and
##   earlier
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMALL
##
## SET AUDIOSTHS 0
##
############### Authentication section ######################
##
##  CERTIFICATE SETTINGS
##
## Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
```

```
##   Files may contain only PEM-formatted certificates.
## SET TRUSTCERTS avayaprca.crt,sip_product_root.crt,avayacallserver.crt
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## WMLIDLEURI may be used as an "idle screen" when the
## phone has been idle for WMLIDLETIME minutes. By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTES:
##
##   The WMLIDLEURI idle screen is different than the
##   Avaya screen saver activated by the SCREENSAVERON
##   timer. While it is possible to use WMLIDLEURI as an
##   "idle screen", it is recommended that the SCREENSAVERON
##   timer and the Avaya Screen Saver display be used for
##   screen saver purposes.
##
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDLEURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/9600/home.wml
## SET WMLIDLEURI http://www.mycompany.com/my_screen.wml
##
#######  9620 H.323 Phone Multi-Language Administration  #######
##
## These settings are used to set the local display
## language of your 9620 H.323 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
##
## Note:
## It is recommended you install the latest version of the
## language files in all 96xx H.323 telephones, even if some
## phones are running an earlier release of software.
##
## SET LANG1FILE "mlf_s31_v49_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_s31_v49_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG3FILE "mlf_s31_v49_french_paris.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG4FILE "mlf_s31_v49_german.txt"
##
## System-Wide Language
```

```
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_s31_v49_german.txt"
##
## Larger Text Font File name
##   Specifies the loadable language file on the HTTP server
##   for the Large Text Font. 0 to 32 ASCII characters.
##
## SET LANGLARGEFONT "mlf_s31_v49_english_large.txt"
GOTO END
############## END OF 9620 IP Phone Settings ###############

############################################################
#
# SETTINGS9630
#
############################################################
##
## This section contains the phone model specific settings
## for the 9630 telephone.
##
######################  AUDIO SETTINGS  ####################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   CAUTION:
##   Setting 2 turns OFF sidetone in H.323 release 1.1 and
##   earlier
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   CAUTION:
##   Setting 2 turns OFF sidetone in H.323 release 1.1 and
##   earlier
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
```

```
############### Authentication section ######################
##
##  CERTIFICATE SETTINGS
##
## Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
##   Files may contain only PEM-formatted certificates.
## SET TRUSTCERTS avayaprca.crt,sip_product_root.crt,avayacallserver.crt
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## WMLIDLEURI may be used as an "idle screen" when the
## phone has been idle for WMLIDLETIME minutes. By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTES:
##
##   The WMLIDLEURI idle screen is different than the
##   Avaya screen saver activated by the SCREENSAVERON
##   timer. While it is possible to use WMLIDLEURI as an
##   "idle screen", it is recommended that the SCREENSAVERON
##   timer and the Avaya Screen Saver display be used for
##   screen saver purposes.
##
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDLEURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/9600/home.wml
## SET WMLIDLEURI http://www.mycompany.com/my_screen.wml
##
######  9630 H.323 Phone Multi-Language Administration  #######
##
## These settings are used to set the local display
## language of your 9630 H.323 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
##
## Note:
## It is recommended you install the latest version of the
## language files in all 96xx H.323 telephones, even if some
## phones are running an earlier release of software.
##
## SET LANG1FILE "mlf_s31_v49_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_s31_v49_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
```

```
## SET LANG3FILE "mlf_s31_v49_french_paris.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG4FILE "mlf_s31_v49_german.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_s31_v49_german.txt"
##
## Larger Text Font File name
##   Specifies the loadable language file on the HTTP server
##   for the Large Text Font. 0 to 32 ASCII characters.
##
## SET LANGLARGEFONT "mlf_s31_v49_english_large.txt"
GOTO END
############## END OF 9630 IP Phone Settings ###############
##
#############################################################
#
# SETTINGS9640
#
#############################################################
##
## This section contains the phone model specific settings
## for the 9640 telephone.
##
####################  AUDIO SETTINGS  ######################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
```

```
############### Authentication section ######################
##
##  CERTIFICATE SETTINGS
##
## Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
##   Files may contain only PEM-formatted certificates.
## SET TRUSTCERTS avayaprca.crt,sip_product_root.crt,avayacallserver.crt
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## WMLIDLEURI may be used as an "idle screen" when the
## phone has been idle for WMLIDLETIME minutes. By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTES:
##
##   The WMLIDLEURI idle screen is different than the
##   Avaya screen saver activated by the SCREENSAVERON
##   timer. While it is possible to use WMLIDLEURI as an
##   "idle screen", it is recommended that the SCREENSAVERON
##   timer and the Avaya Screen Saver display be used for
##   screen saver purposes.
##
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDLEURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/9600/home.wml
## SET WMLIDLEURI http://www.mycompany.com/my_screen.wml
##
######  9640 H.323 Phone Multi-Language Administration  #######
##
## These settings are used to set the local display
## language of your 9640 H.323 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
##
## Note:
## It is recommended you install the latest version of the
## language files in all 96xx H.323 telephones, even if some
## phones are running an earlier release of software.
##
## SET LANG1FILE "mlf_s31_v49_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_s31_v49_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
```

```
## SET LANG3FILE "mlf_s31_v49_french_paris.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG4FILE "mlf_s31_v49_german.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_s31_v49_german.txt"
##
## Larger Text Font File name
##   Specifies the loadable language file on the HTTP server
##   for the Large Text Font. 0 to 32 ASCII characters.
##
## SET LANGLARGEFONT "mlf_s31_v49_english_large.txt"
GOTO END
############## END OF 9640 IP Phone Settings ###############
##
############################################################
#
# SETTINGS9650
#
############################################################
##
## This section contains the phone model specific settings
## for the 9650 telephone.
##
####################  AUDIO SETTINGS  ######################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
```

```
############### Authentication section ######################
##
##  CERTIFICATE SETTINGS
##
## Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
##   Files may contain only PEM-formatted certificates.
## SET TRUSTCERTS avayaprca.crt,sip_product_root.crt,avayacallserver.crt
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## WMLIDLEURI may be used as an "idle screen" when the
## phone has been idle for WMLIDLETIME minutes. By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTES:
##
##   The WMLIDLEURI idle screen is different than the
##   Avaya screen saver activated by the SCREENSAVERON
##   timer. While it is possible to use WMLIDLEURI as an
##   "idle screen", it is recommended that the SCREENSAVERON
##   timer and the Avaya Screen Saver display be used for
##   screen saver purposes.
##
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDLEURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/9600/home.wml
## SET WMLIDLEURI http://www.mycompany.com/my_screen.wml
##
######  9650 H.323 Phone Multi-Language Administration  #######
##
## These settings are used to set the local display
## language of your 9650 H.323 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
##
## Note:
## It is recommended you install the latest version of the
## language files in all 96xx H.323 telephones, even if some
## phones are running an earlier release of software.
##
## SET LANG1FILE "mlf_s31_v49_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_s31_v49_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
```

```
## SET LANG3FILE "mlf_s31_v49_french_paris.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG4FILE "mlf_s31_v49_german.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_s31_v49_german.txt"
##
## Larger Text Font File name
##   Specifies the loadable language file on the HTTP server
##   for the Large Text Font. 0 to 32 ASCII characters.
##
## SET LANGLARGEFONT "mlf_s31_v49_english_large.txt"
GOTO END
############## END OF 9650 IP Phone Settings ###############
################################################################
#
# SETTINGS9670
#
################################################################
##
## This section contains the phone model specific settings
## for the 9670 telephone.
##
####################  AUDIO SETTINGS  ######################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
############### Authentication section ######################
```

```
##
##  CERTIFICATE SETTINGS
##
## Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
##   Files may contain only PEM-formatted certificates.
## SET TRUSTCERTS avayaprca.crt,sip_product_root.crt,avayacallserver.crt
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## WMLIDLEURI may be used as an "idle screen" when the
## phone has been idle for WMLIDLETIME minutes. By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTES:
##
##   The WMLIDELURI idle screen is different than the
##   Avaya screen saver activated by the SCREENSAVERON
##   timer. While it is possible to use WMLIDLEURI as an
##   "idle screen", it is recommended that the SCREENSAVERON
##   timer and the Avaya Screen Saver display be used for
##   screen saver purposes.
##
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDELURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/9600/home.wml
## SET WMLIDLEURI http://www.mycompany.com/my_screen.wml
##
######  9670 H.323 Phone Multi-Language Administration  #######
##
## These settings are used to set the local display
## language of your 9670 H.323 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
##
## Note:
## It is recommended you install the latest version of the
## language files in all 96xx H.323 telephones, even if some
## phones are running an earlier release of software.
##
## SET LANG1FILE "mlf_s31_v49_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_s31_v49_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG3FILE "mlf_s31_v49_french_paris.txt"
```

```
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG4FILE "mlf_s31_v49_german.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_s31_v49_german.txt"
##
## Larger Text Font File name
##   Specifies the loadable language file on the HTTP server
##   for the Large Text Font. 0 to 32 ASCII characters.
##
## SET LANGLARGEFONT "mlf_s31_v49_english_large.txt"
GOTO END
############## END OF 9670 IP Phone Settings ###############
############################################################
#
# SETTINGS9608
#
############################################################
##
## This section contains the phone model specific settings
## for the 9608 telephone.
##
####################  AUDIO SETTINGS  ######################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
############### Authentication section ######################
##
```

```
##  CERTIFICATE SETTINGS
##
## Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
##   Files may contain only PEM-formatted certificates.
## SET TRUSTCERTS avayaprca.crt,sip_product_root.crt,avayacallserver.crt
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## WMLIDLEURI may be used as an "idle screen" when the
## phone has been idle for WMLIDLETIME minutes. By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTES:
##
##   The WMLIDELURI idle screen is different than the
##   Avaya screen saver activated by the SCREENSAVERON
##   timer. While it is possible to use WMLIDLEURI as an
##   "idle screen", it is recommended that the SCREENSAVERON
##   timer and the Avaya Screen Saver display be used for
##   screen saver purposes.
##
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDELURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/9600/home.wml
## SET WMLIDLEURI http://www.mycompany.com/my_screen.wml
##
######  9608 H.323 Phone Multi-Language Administration  #######
##
## These settings are used to set the local display
## language of your 9608 H.323 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
##
## Note:
## It is recommended you install the latest version of the
## language files in all 96x1 H.323 telephones, even if some
## phones are running an earlier release of software.
##
## SET LANG1FILE "mlf_S96x1_v55_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_S96x1_v55_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG3FILE "mlf_S96x1_v55_french_paris.txt"
##
```

```
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG4FILE "mlf_S96x1_v55_german.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_S96x1_v55_german.txt"
##
## Larger Text Font File name
##   Specifies the loadable language file on the HTTP server
##   for the Large Text Font. 0 to 32 ASCII characters.
##
## SET LANGLARGEFONT "mlf_S96x1_v55_english_large.txt"
##
## Variable Name :   PHNSCRALL
## Valid Values
##    0    filtered views are the Call Appearance filtered screen, containing all call
##         appearances (primary and bridged), and the Feature Button filtered screen,
##         containing all administered feature buttons.
##    1    filtered view is the Consolidated Phone Screen
##
## Description
##     Phone Screen Consolidation flag
##
## SET PHNSCRALL 0
##
## Variable Name :  CLDISPCONTENT
## Valid Values
##    0    Name & number both will be seen in History screen
##    1    Number will not be seen in History screen
##
## Description
##     Specifies Call Log Display Content control
##
## SET CLDISPCONTENT 1
GOTO END
############## END OF 9608 IP Phone Settings ###############
#############################################################
#
# SETTINGS9611
#
#############################################################
##
## This section contains the phone model specific settings
## for the 9611 telephone.
##
####################  AUDIO SETTINGS  ######################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
```

```
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
############### Authentication section ######################
##
##  CERTIFICATE SETTINGS
##
## Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
##   Files may contain only PEM-formatted certificates.
## SET TRUSTCERTS avayaprca.crt,sip_product_root.crt,avayacallserver.crt
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## WMLIDLEURI may be used as an "idle screen" when the
## phone has been idle for WMLIDLETIME minutes. By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTES:
##
##   The WMLIDELURI idle screen is different than the
##   Avaya screen saver activated by the SCREENSAVERON
##   timer. While it is possible to use WMLIDLEURI as an
##   "idle screen", it is recommended that the SCREENSAVERON
##   timer and the Avaya Screen Saver display be used for
##   screen saver purposes.
##
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDELURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/9600/home.wml
## SET WMLIDLEURI http://www.mycompany.com/my_screen.wml
##
######  9611 H.323 Phone Multi-Language Administration  #######
##
## These settings are used to set the local display
## language of your 9611 H.323 telephone.
##
```

```
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
##
## Note:
## It is recommended you install the latest version of the
## language files in all 96x1 H.323 telephones, even if some
## phones are running an earlier release of software.
##
## SET LANG1FILE "mlf_S96x1_v55_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_S96x1_v55_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG3FILE "mlf_S96x1_v55_french_paris.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG4FILE "mlf_S96x1_v55_german.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_S96x1_v55_german.txt"
##
##
## Variable Name :   PHNSCRALL
## Valid Values
##    0    filtered views are the Call Appearance filtered screen, containing all call
##         appearances (primary and bridged), and the Feature Button filtered screen,
##         containing all administered feature buttons.
##    1    filtered view is the Consolidated Phone Screen
##
## Description
##     Phone Screen Consolidation flag
##
## SET PHNSCRALL 0
##
## Variable Name :  CLDISPCONTENT
## Valid Values
##    0    Name & number both will be seen in History screen
##    1    Number will not be seen in History screen
##
## Description
##     Specifies Call Log Display Content control
##
## SET CLDISPCONTENT 1
GOTO END
############### END OF 9611 IP Phone Settings ###############
############################################################
#
# SETTINGS9621
#
############################################################
##
## This section contains the phone model specific settings
## for the 9621 telephone.
##
#####################  AUDIO SETTINGS  #####################
```

```
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
############### Authentication section ######################
##
##  CERTIFICATE SETTINGS
##
## Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
##   Files may contain only PEM-formatted certificates.
## SET TRUSTCERTS avayaprca.crt,sip_product_root.crt,avayacallserver.crt
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
## administer the 'Web' Application.
##
## WMLIDLEURI may be used as an "idle screen" when the
## phone has been idle for WMLIDLETIME minutes. By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTES:
##
##   The WMLIDELURI idle screen is different than the
##   Avaya screen saver activated by the SCREENSAVERON
##   timer. While it is possible to use WMLIDLEURI as an
##   "idle screen", it is recommended that the SCREENSAVERON
##   timer and the Avaya Screen Saver display be used for
##   screen saver purposes.
##
##   Avaya hosts a web site for IP Phones.
```

```
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDELURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/9600/home.wml
## SET WMLIDLEURI http://www.mycompany.com/my_screen.wml
##
######  9621 H.323 Phone Multi-Language Administration  #######
##
## These settings are used to set the local display
## language of your 9621 H.323 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
##
## Note:
## It is recommended you install the latest version of the
## language files in all 96x1 H.323 telephones, even if some
## phones are running an earlier release of software.
##
## SET LANG1FILE "mlf_S96x1_v55_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_S96x1_v55_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG3FILE "mlf_S96x1_v55_french_paris.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG4FILE "mlf_S96x1_v55_german.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_S96x1_v55_german.txt"
##
##
## Variable Name :   PHNSCRALL
## Valid Values
##    0    filtered views are the Call Appearance filtered screen, containing all call
##         appearances (primary and bridged), and the Feature Button filtered screen,
##         containing all administered feature buttons.
##    1    filtered view is the Consolidated Phone Screen
##
## Description
##     Phone Screen Consolidation flag
##
## SET PHNSCRALL 0
##
## Variable Name :  CLDISPCONTENT
## Valid Values
##    0    Name & number both will be seen in History screen
##    1    Number will not be seen in History screen
##
```

```
## Description
##     Specifies Call Log Display Content control
##
## SET CLDISPCONTENT 1
GOTO END
############## END OF 9621 IP Phone Settings ###############
############################################################
#
# SETTINGS9641
#
############################################################
##
## This section contains the phone model specific settings
## for the 9641 telephone.
##
####################  AUDIO SETTINGS  ####################
##
## Headset Sidetone
##   Controls the level of sidetone in the headset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHD 0
##
## Handset Sidetone
##   Controls the level of sidetone in the handset.
##
##   setting                level
##     0        NORMAL level for most users (default)
##     1        three levels softer than NORMAL
##     2        OFF (inaudible)
##     3        one level softer than NORMAL
##     4        two levels softer than NORMAL
##     5        four levels softer than NORMAL
##     6        five levels softer than NORMAL
##     7        six levels softer than NORMAL
##     8        one level louder than NORMAL
##     9        two levels louder than NORMAL
##
## SET AUDIOSTHS 0
##
############### Authentication section ######################
##
##  CERTIFICATE SETTINGS
##
## Authentication Certificates
##   List of trusted certificates to download to phone. This
##   parameter may contain one or more certificate filenames,
##   separated by commas without any intervening spaces.
##   Files may contain only PEM-formatted certificates.
## SET TRUSTCERTS avayaprca.crt,sip_product_root.crt,avayacallserver.crt
##
#################  WML BROWSER SETTINGS  ##################
##
## The WMLHOME setting is used to enable and
```

```
## administer the 'Web' Application.
##
## WMLIDLEURI may be used as an "idle screen" when the
## phone has been idle for WMLIDLETIME minutes. By default
## this URL is NULL ("") and this screen is not activated.
##
## NOTES:
##
##   The WMLIDELURI idle screen is different than the
##   Avaya screen saver activated by the SCREENSAVERON
##   timer. While it is possible to use WMLIDLEURI as an
##   "idle screen", it is recommended that the SCREENSAVERON
##   timer and the Avaya Screen Saver display be used for
##   screen saver purposes.
##
##   Avaya hosts a web site for IP Phones.
##   The WMLHOME and WMLIDLEURI parameters are set up
##   to point your IP telephones to this hosted site.
##   To enable access to this site, remove the "## "
##   from the SET WMLHOME ... and SET WMLIDLEURI ... lines.
##   To change the web site that your phones point to,
##   replace the provided URL in the SET WMLHOME .. and
##   SET WMLIDELURI ...lines with the URL of your site.
##
## SET WMLHOME http://support.avaya.com/elmodocs2/avayaip/9600/home.wml
## SET WMLIDLEURI http://www.mycompany.com/my_screen.wml
##
######  9641 H.323 Phone Multi-Language Administration  #######
##
## These settings are used to set the local display
## language of your 9641 H.323 telephone.
##
## First Language File Name
##   Contains the name of the first language file.
##   0 to 32 ASCII characters. File name must end in .txt
##
## Note:
## It is recommended you install the latest version of the
## language files in all 96x1 H.323 telephones, even if some
## phones are running an earlier release of software.
##
## SET LANG1FILE "mlf_S96x1_v55_russian.txt"
##
## Second Language File Name
##   Contains the name of the second language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG2FILE "mlf_S96x1_v55_spanish.txt"
##
## Third Language File Name
##   Contains the name of the third language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG3FILE "mlf_S96x1_v55_french_paris.txt"
##
## Fourth Language File Name
##   Contains the name of the fourth language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANG4FILE "mlf_S96x1_v55_german.txt"
##
## System-Wide Language
##   Contains the name of the default system language file.
##   0 to 32 ASCII characters.  File name must end in .txt
## SET LANGSYS "mlf_S96x1_v55_german.txt"
##
##
## Variable Name :   PHNSCRALL
```

```
## Valid Values
##    0    filtered views are the Call Appearance filtered screen, containing all call
##         appearances (primary and bridged), and the Feature Button filtered screen,
##         containing all administered feature buttons.
##    1    filtered view is the Consolidated Phone Screen
##
## Description
##     Phone Screen Consolidation flag
##
## SET PHNSCRALL 0
##
## Variable Name :  CLDISPCONTENT
## Valid Values
##    0    Name & number both will be seen in History screen
##    1    Number will not be seen in History screen
##
## Description
##     Specifies Call Log Display Content control
##
## SET CLDISPCONTENT 1
GOTO END
############## END OF 9641 IP Phone Settings ###############
# END
############## END OF CONFIGURATION FILE ###################
```

11. Reference Documentation

Document Title	Publication Number	Download Link	Description
Converging the Data Network with VoIP Fundamentals	NN43001-260	http://support.avaya.com/css/P8/documents/100100829	CS 1000 Release 7
IP Phones Fundamentals	NN43001-368	http://support.avaya.com/css/P8/documents/100096035	CS 1000 Release 7
UNIStim Software Release 4.2 for IP Deskphones		http://support.avaya.com/css/P8/documents/100110136	UNIStim 4.2 ReadMe
Avaya 1600 Series IP Deskphones – Administrator Guide	16-601443	http://support.avaya.com/css/P8/documents/100081874	Release 1.3.x
Ethernet Routing Switch 2500, Release 4.3 Document Collection	ERS2500_4.3_Doc_Collection_20100301		Ethernet Routing Switch 2500 Software Release 4.3
Ethernet Routing Switch 4500 Series, Release 5.4, Document Collection	ERS4500_5.4_Doc_Collection_02_20100519		Ethernet Routing Switch 4500 Software Release 5.4
Ethernet Routing Switch 5000 Series, Release 6.2 - Documentation Collection	ERS5000_6.2_Doc_Collection_20100706		Ethernet Routing Switch 5000 Software Release 6.2
Nortel Ethernet Routing Switch 8300 Series Release 3.0 Document Collection	ERS8300_4.2_DOC_COLLECTION_20090702		Ethernet Routing Switch 8300 Software Release 4.2
Nortel PoE Calculator			