

Separate VLAN for Avaya IP Phone and attached computer

For a VoIP installation, it is a “best practice” to have separate voice and data VLAN’s. Avaya IP endpoints support the standard for VLAN tagging, 802.1Q, and Cisco proprietary Auxiliary VLAN’s.

Notes:

- A VLAN is a logical Layer 2 broadcast domain with a corresponding Layer 3 IP subnet.
- A VLAN trunk on an Ethernet switch is one physical data port that is capable of supporting multiple VLAN’s.
- In the VLAN world, *port VLAN* and *native VLAN* are synonymous terms. The IEEE 802.1Q standard uses the term *port VLAN*, but Cisco uses *native VLAN*. Every port belongs to a VLAN – even without a specific configuration. VLAN 1 is the default.
- A Layer 3 routing process (router or MLS/Multi-Layer Switch) is required to send traffic between VLAN’s. If there is no routing process for a VLAN, devices on that VLAN can only communicate with other devices of the same VLAN.
- For a VoIP install, VLAN ID’s must be configured for the devices that are sharing the same physical Ethernet switch port.
 - When a computer is behind an IP Phone, it boots up and sends untagged frames to the Ethernet switch. This untagged traffic is assigned to the *port/native VLAN* (i.e. data VLAN) of the Ethernet switch port.
 - When an IP Phone boots up for the first time, it has no knowledge of the voice VLAN. The IP Phone will send untagged DHCP discovery messages to the Ethernet switch port. As described above, this untagged traffic is assigned to the *port or native VLAN* (i.e. data VLAN) of the Ethernet switch port. A DHCP server on the data VLAN will respond back to the IP Phone with the voice VLAN ID. Once the IP Phone receives this information, it will reboot and send DHCP discovery messages on the voice VLAN. A DHCP server supporting the voice VLAN will provide all of the necessary IP parameters to IP Phone.
- The following pages are not intended to be a step-by-step guide. It should be considered reference material as individual configurations will vary depending on the exact hardware/software that is deployed.

Sample DHCP VLAN Configurations

For IP Phones with pre-R1.8 firmware, the value 'L2Q=1' needs to be included in the SSON 176 string. This value enables 802.1Q tagging for these Phones. For IP Phones with at least R1.8 firmware, 802.1Q is enabled by default.

Microsoft 2003 Server

For simplicity, 'copy & paste' the SSON 176 string from the data scope to the voice scope.

Data Scope – SSON 176 string

The screenshot shows the DHCP console for the Data Scope [10.30.50.0]. The 'Scope Options' table is expanded, showing the following configuration:

| Option Name | Vendor | Value |
|--------------------------------|-------------------|--|
| 003 Router | Standard | 10.30.50.1 |
| 176 Avaya VoIP | Standard | MCIPADD=10.30.70.19,10.30.70.16,HTTPSRVR=10.30.50.13,TFTP SRVR=10.30.50.13,IRSTAT=0,VLANTEST=0, <u>L2QVLAN=70</u> ,FTPSRVR=10.30.50.13 |
| 002 Microsoft Release DHCP ... | Microsoft Options | 0x1 |
| 006 DNS Servers | Standard | 10.30.50.10, 10.30.50.11 |
| 015 DNS Domain Name | Standard | intranut.com |
| 042 NTP Servers | Standard | 192.43.244.18, 10.90.90.5 |
| 044 WINS/NBNS Servers | Standard | 10.30.50.10, 10.30.50.11 |
| 046 WINS/NBT Node Type | Standard | 0x8 |

Voice Scope – SSON 176 string

The screenshot shows the DHCP console for the Voice Scope [10.30.70.0]. The 'Scope Options' table is expanded, showing the following configuration:

| Option Name | Vendor | Value |
|--------------------------------|-------------------|--|
| 003 Router | Standard | 10.30.70.1 |
| 176 Avaya VoIP | Standard | MCIPADD=10.30.70.19,10.30.70.16,HTTPSRVR=10.30.50.13,TFTP SRVR=10.30.50.13,IRSTAT=0,VLANTEST=0, <u>L2QVLAN=70</u> ,FTPSRVR=10.30.50.13 |
| 002 Microsoft Release DHCP ... | Microsoft Options | 0x1 |
| 006 DNS Servers | Standard | 10.30.50.10, 10.30.50.11 |
| 015 DNS Domain Name | Standard | intranut.com |
| 042 NTP Servers | Standard | 192.43.244.18, 10.90.90.5 |
| 044 WINS/NBNS Servers | Standard | 10.30.50.10, 10.30.50.11 |
| 046 WINS/NBT Node Type | Standard | 0x8 |

Cisco IOS DHCP

Warning!!! You have accessed a private network.
UNAUTHORIZED ACCESS IS PROHIBITED BY LAW
Violators will be prosecuted to the fullest extent of the law.
Your access to this network is monitored and recorded for quality
assurance, security, performance and maintenance purposes.

User Access Verification

Username: *****
Password: *****

SOHO91#en
SOHO91#config t
Enter configuration commands, one per line. End with CNTL/Z.

(config)#service dhcp

```
(config)#ip dhcp pool data_scope
(config-dhcp)#network 10.30.50.0 255.255.255.0
(config-dhcp)#domain-name voipnut.com
(config-dhcp)#dns-server 10.30.50.10 10.30.50.11
(config-dhcp)#default-router 10.30.50.1
(config-dhcp)#lease 120
(config-dhcp)#option 176 ascii MCIPADD=10.30.70.19,10.30.70.16,HTTPSRVR=10.30.50.13,TFTPSRVR=10.30.50.13,IRSTAT=0,VLANTEST=0,L2QVLAN=70,FTPSRVR=10.30.50.13
(config-dhcp)#ip dhcp excluded-address 10.30.50.1
(config-dhcp)#exit
(config)#
```

```
(config)#ip dhcp pool voice_scope
(config-dhcp)#network 10.30.70.0 255.255.255.0
(config-dhcp)#domain-name voipnut.com
(config-dhcp)#dns-server 10.30.50.10 10.30.50.11
(config-dhcp)#default-router 10.30.70.1
(config-dhcp)#lease 120
(config-dhcp)#option 176 ascii MCIPADD=10.30.70.19,10.30.70.16,HTTPSRVR=10.30.50.13,TFTPSRVR=10.30.50.13,IRSTAT=0,VLANTEST=0,L2QVLAN=70,FTPSRVR=10.30.50.13
(config-dhcp)#ip dhcp excluded-address 10.30.70.1
(config-dhcp)#exit
(config)#
```

Linux DHCP

```
ddns-update-style ad-hoc;
option option-176 code 176 = string;
shared-network data_scope {
subnet 10.30.50.0 netmask 255.255.255.0 {
option routers 10.30.50.1;
option broadcast-address 10.30.50.255;
option option-176 "MCIPADD=10.30.70.19,10.30.70.16,HTTPSRVR=10.30.50.13,TFTPSRVR=10.30.50.13,IRSTAT=0,VLANTEST=0,L2QVLAN=70,FTPSRVR=10.30.50.13";
range 10.30.50.50 10.30.50.254;
}
}

shared-network voice {
subnet 10.30.70.0 netmask 255.255.255.0 {
option routers 10.30.70.1;
option broadcast-address 10.30.70.255;
option option-176 "MCIPADD=10.30.70.19,10.30.70.16,HTTPSRVR=10.30.50.13,TFTPSRVR=10.30.50.13,IRSTAT=0,VLANTEST=0,L2QVLAN=70,FTPSRVR=10.30.50.13";
range 10.30.70.50 10.30.70.254;
}
}

#[root@cvlan1 root]# service dhcpd start
Starting dhcpd: OK ]
[root@cvlan1 root]#

E[root@cvlan1 root]# service dhcpd status
dhcpd (pid 3613) is running...
[root@cvlan1 root]#
```