COM3000 MULTICAST

Alcatel-Lucent OMNISWITCHES

TECHNICAL SPECIFICATIONS

Table of Contents

1 SCOPE

1.1 PURPOSE

The information contained in this document represents the features of the listed Alcatel-Lucent Products.

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Product information contained in this document is subject to change and frequent updates without prior notice.

This document also provides an overview of the features and functionalities of the Alcatel-Lucent Omniswitch regarding the multicast Integration to COM3000.

1.2 APPLICABILITY

This document is applicable for guidelines on Omniswitch configuration and COM3000 configuration for multicast functionality.

1.3 REFERENCE DOCUMENTS

The latest versions of the reference documents listed below and available on Alcatel-Lucent Business Partner Website except where a specific revision number of a reference document is indicated.

Project Reference Documents

a) OmniSwitch AOS Release 6CLI Reference Guide

b) OmniSwitch AOS Release 8CLI Reference Guide

c) OmniSwitch AOS Release 8 Network Configuration Guide

d) OmniSwitch AOS Release 6 Network Configuration Guide

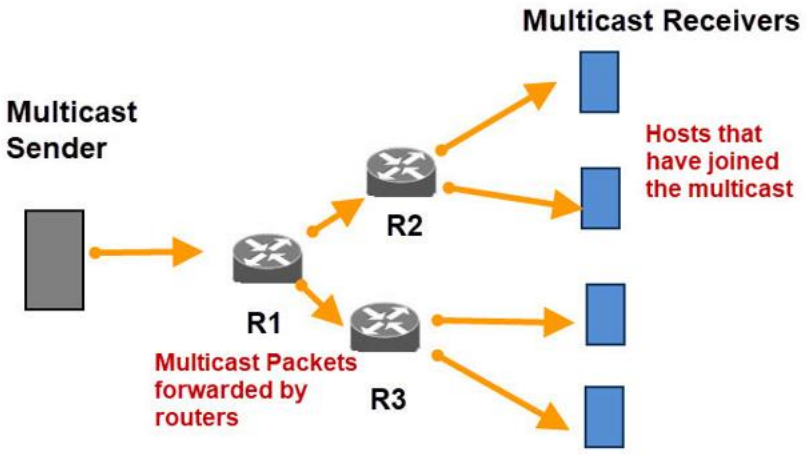
e) COM3000 Integrators Manual 3-1

2 IP MULTICAST

IP multicast is a technique for one-to-many communication over an IP network. The destination nodes send Internet Group Management Protocol join and leave messages, for example in the case of IPTV when the user changes from one TV channel to another. IP multicast scales to a larger receiver population by not requiring prior knowledge of who or how many receivers there are. Multicast uses network infrastructure efficiently by requiring the source to send a packet only once, even if it needs to be delivered to a large number of receivers. The nodes in the network take care of replicating the packet to reach multiple receivers only when necessary.

IP multicast is a method of sending Internet Protocol (IP) datagrams to a group of interested receivers in a single transmission. It is the IP-specific form of multicast and is used for streaming media and other network applications. It uses specially reserved multicast address blocks in IPv4 and IPv6.

Protocols associated with IP multicast include Internet Group Management Protocol, Protocol Independent Multicast and Multicast VLAN Registration. IGMP snooping is used to manage IP multicast traffic on layer-2 networks.



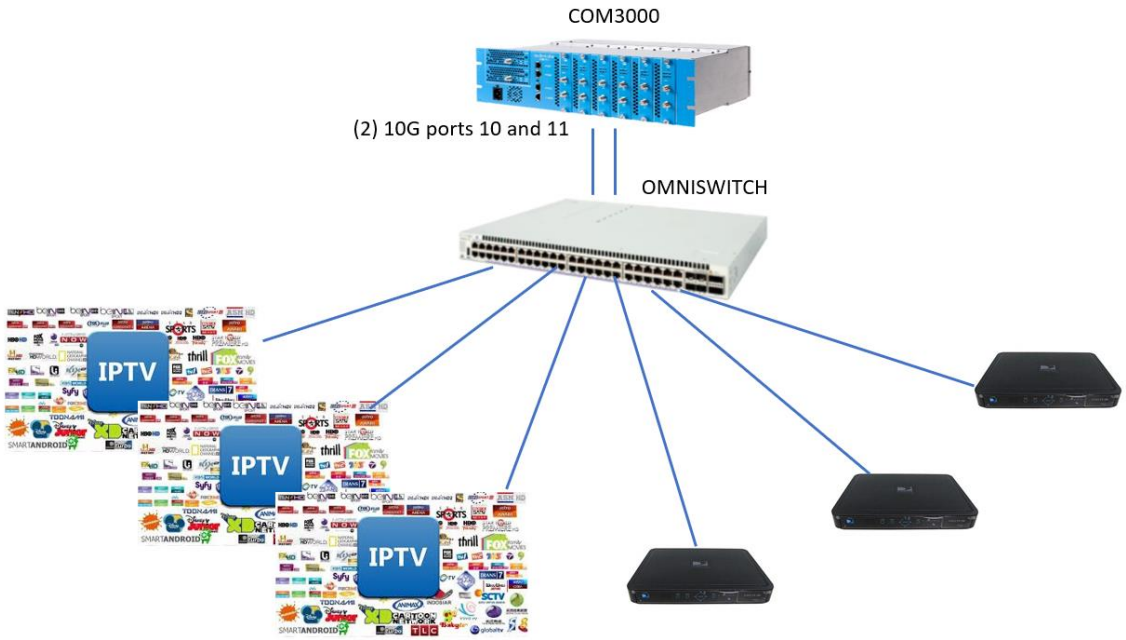
What is the difference between Unicast, Broadcast and Multicast messages? Broadcast messages are sent to all stations in the network. Whereas an unicast message is only sent to one station on the network. ... IPv4 addresses from 224.0.0.0 to 239.255.255.255 are MULTICAST IP addresses.

3 IP MULTICAST SWITCHING

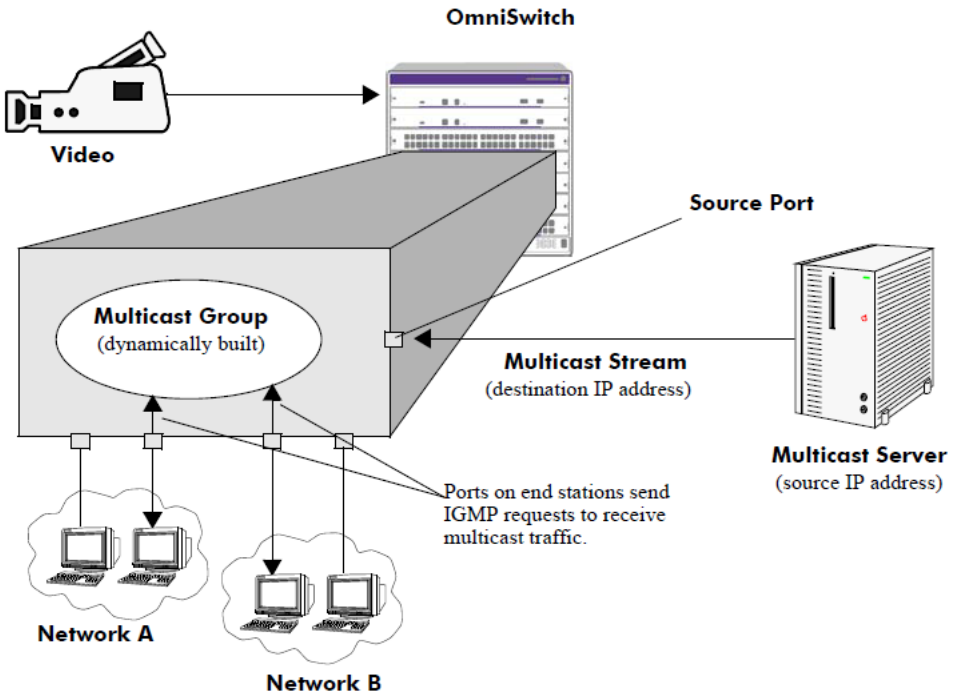
3.1 IP MULTICAST SWITCHING

In a networking environment where IP multicast traffic is used, destination hosts signal their intent to receive a specific IP multicast stream by sending an Internet Group Management Protocol (IGMP) request to a nearby switch. This process is referred to as IGMP Snooping. The switch then learns on which ports multicast group subscribers are attached and can intelligently deliver traffic only to the respective ports.

The OmniSwitch implementation of IGMP Snooping is called IP Multicast Switching (IPMS).



This example shows that a COM3000 can be configured with a unique IP address and a IP multicast address.



IP Multicast Switching is a one-to-many communication technique employed by emerging applications, such as video distribution, news feeds, conferencing, netcasting, and resource discovery (OSPF, RIP2). Unlike unicast, which sends one packet per destination, multicast sends one packet to all devices in any subnetwork that has at least one device requesting the multicast traffic. Multicast switching also requires much less bandwidth than unicast techniques and broadcast techniques, since the source hosts only send one data stream to the ports on which destination hosts that request it are attached.

Destination hosts signal their intent to receive a specific IP multicast stream by sending a request to do so to a nearby switch by using Internet Group Management Protocol (IGMP). This is referred to as IGMP Snooping. Destination hosts signal their intent to receive a specific IPv6 multicast stream by sending a request to do so to a nearby switch by using Multicast Listener Discovery (MLD) protocol. This is referred to as MLD Snooping. The switch then learns on which ports multicast group subscribers are attached and can intelligently deliver traffic only to the respective ports. The OmniSwitch implementation of IGMP Snooping is called IP Multicast Switching (IPMS) and MLD snooping is called IP Multicast Switching version 6 (IPMSv6). IPMS/IPMSv6 allows switches to efficiently deliver multicast traffic in hardware at wire speed.

3.2 RAPID SPANNING-TREE PROTOCOL (RSTP)

Non-Stacked switches are connected in a ring configuration. Rapid spanning-tree is used as a loop prevention mechanism to determine which way traffic flows through the Multicast network.

3.3 RESILIENCY AND REDUNDANCY

The ALE Omniswitches are designed to be resilient and fault tolerant in that any Fiber Optic or copper cable failure along the Multicast network allows traffic to flow in the opposite direction through the re-convergence of the Rapid Spanning-tree Protocol process.

The Omniswitch connectivity to two separate 10G connection to the COM3000. This is done using a multi-switch LAG. This means that there are two separate fiber optic or copper cables connecting the single omniswitch or stacked omniswitches to COM3000. This provides added bandwidth as well as a fiber/copper and switch fault tolerance.

4 ALCATEL-LUCENT ENTERPRISE OMNISWITCHES

4.1 1G/10G ETHERNET SWITCH (OS6860)

The Alcatel-Lucent OmniSwitch® 6860 Stackable LAN Switches (SLS) are compact, high-density Gigabit Ethernet (GigE), Multigigabit and 10 GigE platforms designed for the most demanding converged networks.

OS6860-P24

OS6860E-U28

OS6860E-P24Z8

OS6860E-48

The OmniSwitch 6860 supports the following resiliency features:

- Virtual chassis that provides management functionality and automatic election of primary and secondary managers
- Redundant backup power supplies
- Fault tolerant loop stacking
- Hot swappable chassis, power supplies, SFPs
- Image rollback to automatically re-load previous configurations and software versions
- Hitless loading of optional advanced routing software without re-booting

Multicast support:

• Internet Group Management Protocol (IGMP) v1/v2/v3 snooping
• Protocol Independent Multicast – Sparse- Mode (PIM-SM), Source Specific Multicast (PIM-SSM)
• Protocol Independent Multicast – Dense- Mode (PIMDM), Bidirectional Protocol Independent Multicast (PIM-BiDir)
• Distance Vector Multicast Routing Protocol (DVMRP)
• Multicast Listener Discovery (MLD) v1/v2 snooping
• PIM to DVMRP gateway support

	Gigabit ports	1G/10G SFP+ ports	2.5G ports	Virtual chassis ports	Description
Basic models					
OS6860-24	24	4	-	2	Fixed-configuration chassis in a 1U form factor with 24 10/100/1000 Base-T ports, four fixed SFP+ (1G/10G) ports and two Virtual Chassis link ports
OS6860-P24	24 PoE	4	-	2	Fixed-configuration chassis in a 1U form factor with 24 10/100/1000 Base-T PoE ports, four fixed SFP+ (1G/10G) ports and two Virtual Chassis link ports
OS6860-48	48	4	-	2	Fixed-configuration chassis in a 1U form factor with 48 10/100/1000 Base-T ports, four fixed SFP+ (1G/10G) ports and two Virtual Chassis link ports
OS6860-P48	48 PoE	4	-	2	Fixed-configuration chassis in a 1U form factor with 48 10/100/1000 Base-T PoE ports, four fixed SFP+ (1G/10G) ports and two Virtual Chassis link ports

4.2 1G/10G Ethernet Switch (OS6560)

The Alcatel-Lucent OmniSwitch™ 6560 Stackable Gigabit and Multi-Gigabit Ethernet LAN value switch family is an industry leading campus access solution for enterprise networks. With multi-gigabit ports for high-speed IEEE 802.11ac devices, 10 GigE uplinks and 20 GigE stacking, the OmniSwitch 6560 is the right solution for your next generation network.

Offering a design optimized for flexibility and scalability as well as low power consumption, the OmniSwitch 6560 is an outstanding edge solution. It uses the field-proven Alcatel-Lucent Operating System (AOS) to deliver highly available, secure, self-protective, easily managed and eco-friendly networks.

The Alcatel-Lucent OmniSwitch 6560 family is embedded with the latest technology innovations, and offers maximum investment protection.

OmniSwitch 6560-48X4/-P48X4

OmniSwitch 6560-24X4/-P24X4

Multicast Support:

• IGMPv1/v2/v3 snooping to optimize multicast traffic
• Multicast Listener Discovery (MLD) v1/v2 snooping+
• Up to 1000 multicast groups
• IP Multicast VLAN (IPMVLAN) for optimized multicast replication at the edge, saving network core resources

OmniSwitch 6560 Gigabit models	
OS6560-24X4	Gigabit fixed chassis in 1RU size. Includes 24 RJ-45 10/100/1G BaseT, 2xSFP(1G) and 4xSFP+ (1G/10G) uplink/stacking ports, internal AC supply, power cord, user guides, and 19" rack mount hardware.
OS6560-P24X4	Gigabit fixed chassis in 1RU size. Includes 24 RJ-45 10/100/1G BaseT PoE+, 2xSFP(1G) and 4xSFP+ (1G/10G) uplink/stacking ports, 600W AC supply, power cord, user guides, and 19" rack mount hardware.
OS6560-48X4	Gigabit fixed chassis in 1RU size. Includes 48 RJ-45 10/100/1G BaseT, 2xSFP(1G) and 4xSFP+ (1G/10G) uplink/stacking ports, internal AC supply, power cord, user guides, and 19" rack mount hardware.
OS6560-P48X4	Gigabit fixed chassis in 1RU size. Includes 48 RJ-45 10/100/1G BaseT PoE+, 2xSFP(1G) and 4xSFP+ (1G/10G) uplink/stacking ports, 920W AC supply, power cord, user guides, and 19" rack mount hardware.

4.3 1G/10G ETHERNET SWITCH (OS6450)

The Alcatel-Lucent OmniSwitch® 6450 Stackable Fast Ethernet and Gigabit Ethernet LAN value switch family offers versatile, 24/48-port fixed configuration switches with 10 GigE uplinks and provides upgrade paths for 10 Gigabit Ethernet (GigE) stacking, 10 GigE uplinks and metro Ethernet services.

Promoting a design optimized for flexibility, scalability, and low power consumption, the OmniSwitch 6450 is an outstanding edge solution. It uses the field-proven Alcatel-Lucent Operating System (AOS) to deliver highly available, secure, self-protective, easily managed and ecofriendly networks.

The OmniSwitch 6450 family is embedded with the latest technology innovations and offers maximum investment protection.

OmniSwitch 6450-24/P24/24X/P24X/24XM

OmniSwitch 6450-48/P48/48X/P48X

Multicast support:

¬ IGMPv1/v2/v3 snooping for optimized multicast traffic
¬ Multicast Listener Discovery (MLD) v1/v2 snooping
¬ Up to 1000 multicast groups per stack
¬ IP Multicast VLAN (IPMVLAN) for optimized multicast replication at the edge, saving network core resources

Model number	Description
OS6450-24L	Fast Ethernet chassis in a 1U form factor with 24 10/100 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules.
OS6450-P24L	Fast Ethernet chassis in a 1U form factor with 24 PoE 10/100 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules.
OS6450-48L	Fast Ethernet chassis in a 1U form factor with 48 10/100 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules.
OS6450-P48L	Fast Ethernet chassis in a 1U form factor with 48 PoE 10/100 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules.
OS6450-24	Gigabit Ethernet chassis in a 1U form factor with 24 10/100/1000 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules.
OS6450-24X	Gigabit Ethernet chassis in a 1U form factor with 24 10/100/1000 Base-T ports, 2 fixed SFP+ 10G ports enable by default and one expansion slot for optional stacking or uplink modules.
OS6450-24XM	Gigabit Ethernet chassis in a 1U form factor with 24 10/100/1000 Base-T ports, 2 fixed SFP+ 10G ports and one expansion slot for optional stacking or uplink modules. Metro ethernet services enable by default.
OS6450-P24	Gigabit Ethernet chassis in a 1U form factor with 24 PoE 10/100/1000 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules.
OS6450-P24X	Gigabit Ethernet chassis in a 1U form factor with 24 PoE 10/100/1000 Base-T ports, 2 fixed SFP+ 10G ports enable by default and one expansion slot for optional stacking or uplink modules.
OS6450-48	Gigabit Ethernet chassis in a 1U form factor with 48 10/100/1000 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules.
OS6450-48X	Gigabit Ethernet chassis in a 1U form factor with 48 10/100/1000 Base-T ports, 2 fixed SFP+ 10G ports enable by default and one expansion slot for optional stacking or uplink modules
OS6450-P48	Gigabit Ethernet chassis in a 1U form factor with 48 PoE 10/100/1000 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules.
OS6450-P48X	Gigabit Ethernet chassis in a 1U form factor with 48 PoE 10/100/1000 Base-T ports, 2 fixed SFP+ 10G ports enable by default and one expansion slot for optional stacking or uplink modules.

4.4 1G ETHERNET SWITCH (OS6350)

The Alcatel-Lucent OmniSwitch® 6350 Stackable family is a series of fixed-configuration Gigabit Ethernet switches available as 10-, 24- and 48- port, Power-over-Ethernet (PoE) and non-PoE models to create the exact network for your business.

The network capabilities of the OmniSwitch 6350 family include advanced security, quality of service and high availability features for your business-class data, voice and wireless technologies. These switches are simple to deploy, configure and manage.

OmniSwitch 6350-10
OmniSwitch 6350-P10

OmniSwitch 6350-24
OmniSwitch 6350-P24

OmniSwitch 6350-48
OmniSwitch 6350-P48

Multicast support:

- IGMPv1/v2/v3 snooping for optimized multicast traffic
- Multicast Listener Discovery (MLD) v1/v2 snooping
- Up to 1000 multicast groups
- IP Multicast VLAN (IPMVLAN) supported

Model Number	Description
OS6350-10	Gigabit Ethernet standalone chassis in a 1U by 1/2 rack form factor with 8 10/100/1000 Base-T ports, 2 Gigabit RJ45/SFP ports.
OS6350-P10	Gigabit Ethernet standalone chassis in a 1U by 1/2 rack form factor with 8 10/100/1000 Base-T ports, 2 Gigabit RJ45/SFP ports.
OS6350-24	Gigabit Ethernet stackable chassis in a 1RU form factor with 24 10/100/1000 Base-T ports, 2 Gigabit SFP ports and 2 SFP uplink/stacking ports
OS6350-P24	Gigabit Ethernet stackable chassis in a 1RU form factor with 24 10/100/1000 PoE Base-T ports, 2 Gigabit SFP ports and 2 SFP uplink/stacking ports
OS6350-48	Gigabit Ethernet stackable chassis in a 1RU form factor with 48 10/100/1000 Base-T ports, 2 Gigabit SFP ports and 2 SFP uplink/stacking ports
OS6350-P48	Gigabit Ethernet stackable chassis in a 1RU form factor with 48 10/100/1000 PoE Base-T ports, 2 Gigabit SFP ports and 2 SFP uplink/stacking ports

5 MULTICAST SWITCH CONFIGURATION

5.1 SAMPLE SWITCH CONFIGURATION

AOS 8.x.x.

```
************************************
system name COM3K-Test
system location " "
system timezone EST
system daylight savings time disable

vlan 1 disable name "VLAN 1"
```

```
vlan 2 enable name "COM3000"
vlan 2 members ports 1/1/1-24 untagged

ip service all
ip interface "Management" address 192.168.3.2 mask 255.255.255.0 vlan 2 ifindex 1

ip multicast status enable
ip multicast querying enable
ip multicast version 3
ip multicast robustness 5
ip multicast zapping enable
ip multicast querier-forwarding enable
ip multicast vlan 2 querier-forwarding enable

aaa authentication default "local"
aaa authentication console "local"
aaa authentication telnet "local"
aaa authentication ftp "local"
aaa authentication http "local"
aaa authentication snmp "local"

session prompt default "COM3K> "
ip static-route 0.0.0.0/0 gateway 192.168.3.1 metric 1
health threshold temperature 78
bridge mode 1x1

session prompt default "COM3K> "
ip helper dhcp-snooping vlan 2
ip helper dhcp-snooping binding enable
ip helper dhcp-snooping port 1/1 trust

swlog console level info
**********************************
```

AOS 6.x.x

```
************************************
system name COM3K-Test
system location " "
system timezone EST
system daylight savings time disable

vlan 1 disable name "VLAN 1"
vlan 2 enable name "COM3000"
vlan 2 port default  1/1-24


ip service all
ip interface "Management" address 192.168.3.2 mask 255.255.255.0 vlan 2 ifindex 1

ip multicast status enable
ip multicast querying enable
ip multicast version 3
ip multicast robustness 5
ip multicast zapping enable
ip multicast querier-forwarding enable
ip multicast vlan 2 querier-forwarding enable

aaa authentication default "local"
aaa authentication console "local"
aaa authentication telnet "local"
aaa authentication ftp "local"
aaa authentication http "local"
aaa authentication snmp "local"

session prompt default "COM3K> "
ip static-route 0.0.0.0/0 gateway 192.168.3.1 metric 1
health threshold temperature 78
bridge mode 1x1
```

```
session prompt default "COM3K> "
ip helper dhcp-snooping vlan 2
ip helper dhcp-snooping binding enable
ip helper dhcp-snooping port 1/1 trust

swlog console level info
**********************************
```

Note : this is minimum configuration for multicast and that a comprehensive configuration would address additional items (management and defending the network (snmp, syslog, ntp, management user rights, disabling unused management protocols & learned port security, loopback detection, bpdu guard,...).

5.2 AOS 6.x.x SWITCH CONFIGURATION (OS6450/OS6350)

Vlan (**AOS 6.x.x)**

Creates a new VLAN with the specified VLAN ID (VID) and an optional description.

vlan *vid* **[enable | disable] [name** *description***]**

no vlan *vid*

vlan port default (AOS 6.x.x)

Configures a new default VLAN for a single port or an aggregate of ports. The VLAN specified with this command is referred to as the *configured default VLAN* for the port.

vlan *vid* **port default {***slot/port | link_agg_num***} vlan** *vid*

no port default {*slot/port | link_agg_num***}**

ip interface **(AOS 6.x.x)**

Configures an IP interface to enable IP routing on a VLAN. Without an IP interface, traffic is bridged within the VLAN or across connections to the same VLAN on other switches.

ip interface *name* **[address** *ip_address***] [mask** *subnet_mask***] [admin [enable | disable]] [vlan** *vid***] [forward | no forward] [local-proxy-arp | no local-proxy-arp] [eth2 | snap] [primary | no primary] local-host-dbcast [enable | disable]**

no ip interface *name*

ip multicast status **(AOS 6.x.x)**

Enables or disables IP Multicast Switching and Routing on the specified VLAN, or on the system if no VLAN is specified.

ip multicast [vlan *vid***] status [{enable | disable}]**

ip multicast version **(AOS 6.x.x)**

Sets the default version of the IGMP protocol on the specified VLAN or on the system if no VLAN is specified.

ip multicast [vlan *vid***] version [***version***]**

ip multicast querying (AOS 6.x.x)

Enables or disables IGMP querying on the specified VLAN or on the system if no VLAN is specified.

ip multicast [vlan *vid***] querying [{enable | disable}]**

no ip multicast [vlan *vid***] querying**

ip multicast querier-forwarding (AOS 6.x.x)

Enables or disables IGMP querier forwarding on the specified VLAN or on the system if no VLAN is specified.

ip multicast [vlan *vid***] querier-forwarding [{enable | disable}]**

no ip multicast [vlan *vid***] querier-forwarding**

5.3 AOS 8.x.x SWITCH CONFIGURATION (OS6860/OS6560)

Vlan (AOS 8.x.x)

Creates a new VLAN with the specified VLAN ID (VID) and an optional description.

vlan *vlan_id* **[admin-state {enable | disable}] [name** *description***]**

no vlan *vlan_id*

vlan members untagged (AOS 8.x.x)

Configures a new default VLAN for a single port or an aggregate of ports. The VLAN specified with this command is referred to as the *configured default VLAN* for the port.

vlan *vlan_id***[-***vlan_id***] members {port** *chassis/slot/port***[-***port1***] | linkagg** *agg_id***[-***agg_id***]} untagged**

no vlan *vlan_id***[-***vlan_id***] members {port** *chassis/slot/port***[-***port1***]| linkagg** *agg_id***[-***agg_id***]}**

vlan members tagged (AOS 8.x.x)

Configures a port or link aggregate ID to send and receive 802.1q-tagged packets with the specified VLAN ID.

vlan *vlan_id***[-***vlan_id***] members {port** *chassis/slot/port***[-***port***] | linkagg** *agg_id***[-***agg_id***]} tagged**

no vlan *vlan_id***[-***vlan_id***] members {port** *chassis/slot/port***[-***port***] | linkagg** *agg_id***[-***agg_id***]}**

ip interface (AOS 8.x.x)

Configures an IP interface to enable IP routing on a VLAN or allow remote access. Without an IP interface, traffic is bridged within the VLAN or across connections to the same VLAN on other switches.

ip interface {*if_name* | **emp | master emp | local chassis-id** *chassis***} [{address | vip-address}** *ip_address***] [mask** *subnet_mask***] [admin-state [enable | disable]] [vlan** *vlan_id* **| service** *service_id***] [forward | no forward] [local-proxy-arp | no local-proxy-arp] [e2 | snap] [primary | no primary]**

no ip interface *if_name*

ip multicast admin-state (AOS 8.x.x)

Enables or disables IP Multicast Switching and Routing on the specified VLAN, Shortest Path Bridging (SPB) service, or on the system if no VLAN or SPB service is specified.

ip multicast [vlan *vlan_id***[**-*vlan_id2***] | service** *service_id***[-**service_id2***]] admin-state [enable | disable]**

no ip multicast [vlan *vlan_id***[**-*vlan_id2***] | service** *service_id***[-**service_id2***]] admin-state**

ip multicast querying (AOS 8.x.x)

Enables or disables IGMP querying on the specified VLAN or on the system if no VLAN is specified.

ip multicast [vlan *vlan_id***[-**vlan_id2***]] querying {enable | disable} [static-source-ip** *ip_address***]**

no ip multicast [vlan *vlan_id***[-**vlan_id2***]] querying [static-source-ip]**

ip multicast querier-forwarding (AOS 8.x.x)

Enables or disables IGMP querier forwarding on the specified VLAN, Shortest Path Bridging (SPB) service, or on the system if no VLAN or SPB service is specified.

ip multicast [vlan *vlan_id***[-**vlan_id2***] | service** *service_id***[-**service_id2***]] querier-forwarding [enable | disable]**

no ip multicast [vlan *vlan_id***[-**vlan_id2***] | service** *service_id***[-**service_id2***]] querier-forwarding**

ip multicast zapping (AOS 8.x.x)

Enables or disables IGMP zapping on the specified VLAN, Shortest Path Bridging (SPB) service, or on the system if no VLAN or SPB service is specified.

ip multicast [vlan *vlan_id*[-*vlan_id2*] **| service** *service_id*] **zapping [{enable | disable}]**

no ip multicast [vlan *vlan_id*[-*vlan_id2*] **| service** *service_id*[-*service_id2*]] **zapping**

ip multicast flood-unknown (AOS 8.x.x)

Enables or disables the flooding unknown multicast traffic for the specified VLAN, Shortest Path Bridging (SPB) service, or on the system if no VLAN or SPB service is specified. When a traffic flow is first seen on a port. there is a brief period of time where traffic may get dropped before the forwarding information is calculated. When flooding unknown multicast traffic is enabled, no packets are dropped before the forwarding information is available.

ip multicast [vlan *vlan_id*[-*vlan_id2*] **| service** *service_id*[-*service_id2*]] **flood-unknown [enable | disable]**

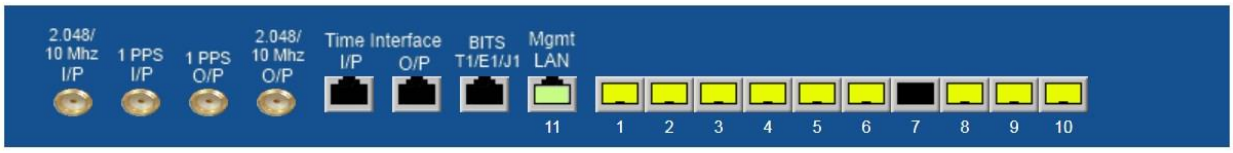
no ip multicast [vlan *vlan_id*[-*vlan_id2*] **| service** *service_id*[-*service_id2*]] **flood-unknown**

6 COM3000 CHASSIS IP SWITCH SETTINGS

6.1 COM400 PORT DEFINITION

When you first log into the COM400 the landing page will display the graphic shown below. Ports 1-11 are utilized in the COM400 chassis and a displayed as lit with a connection to each port is made.
Refer to the table below for port definitions.

Port State Overview



In this example all ports are connected except #7, the top QAM port.

Port #	COM400 Connection
1	COM51 slot 6
2	COM51 slot 5
3	COM51 slot 4
4	COM51 slot 3
5	COM51 slot 2
6	COM51 slot 1
7	QAM Port 2 (TOP)
8	QAM Port 1 (Bottom)
9	Unmanaged switch to both 1 GIG ports
10	Top 10 GIG
11	Bottom 10 GIG

Note: Since both 1 gigabit ports are connected to the same port on the layer 2 switch via an unmanaged switch all multicast traffic requested by one port will be present on the other. For this reason, it is recommended that the 1 gigabit ports not be used for multicast traffic.

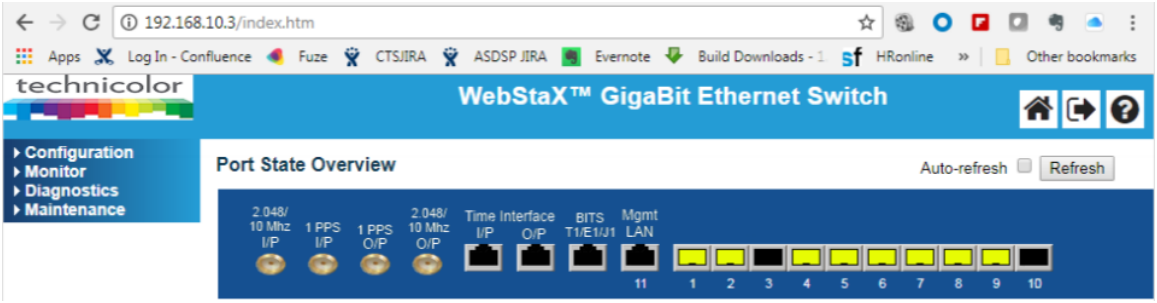
6.2 ACCESSING THE COM400 USER INTERFACE

➢ To determine the IP address of the COM400 user interface use the following formula:

o 192.168.10. (chassis id +1)

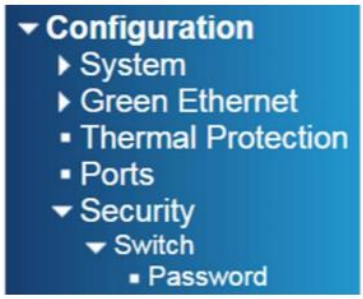
o For most one chassis configuration this would equate to 192.168.10.2

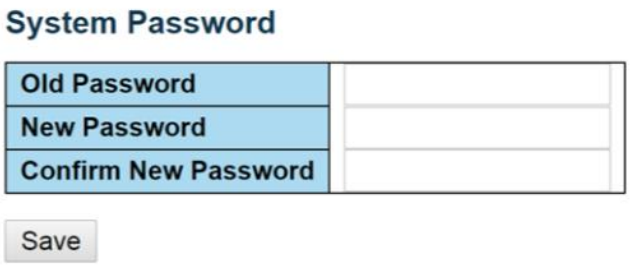
o Login is Admin, leave Password field blank



6.3 SETTING A PASSWORD

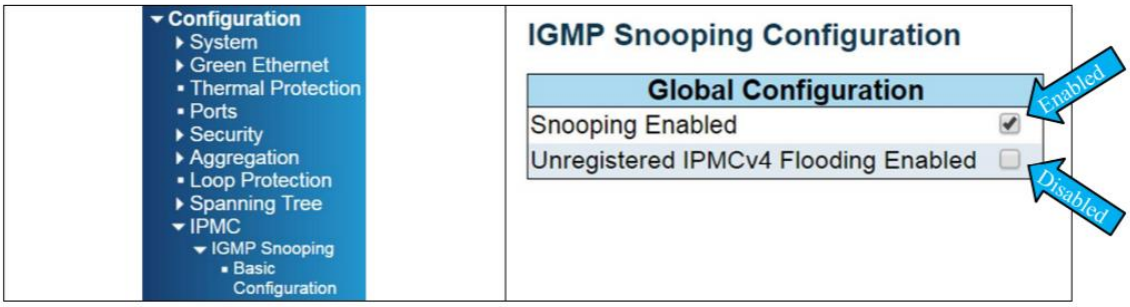
To set a password navigate to >Configuration>Security>Password



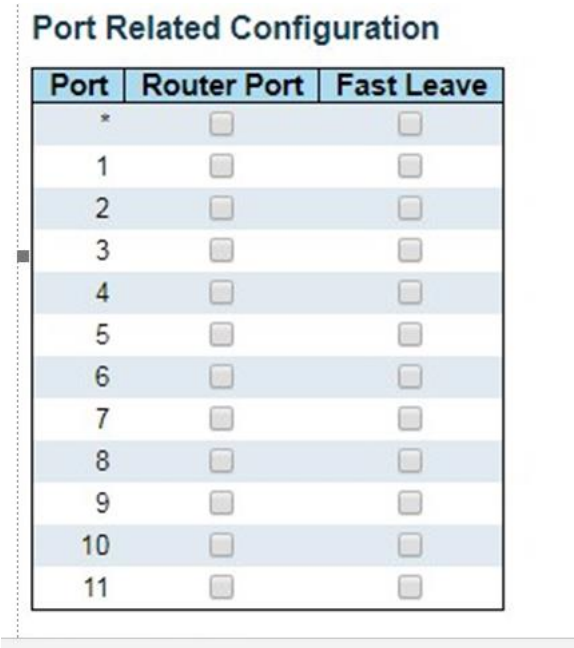


6.4 COM3000 IGMP ACTIVATION

IGMP Snooping is enabled by default, to access IGMP Snooping Configuration navigate to: Configuration>IPMC>IGMP Snooping>Basic Configuration as shown below Be sure Unregistered IPMCv4 Flooding in not enabled.



Verify **Snooping Enabled** is checked. If not check the box and then click **Save**
Fast leave settings may depend on the IP tuner being used. If you are testing or otherwise have a STB connected directly to the COM400 enable fast leave on all ports by checking the top box Port *



Disable Unregistered IPMCv4 Flooding enabled (default)
Enable unregistered IPMCv4 traffic flooding.
The flooding control takes effect only when IGMP Snooping is enabled.
When IGMP Snooping is disabled, unregistered IPMCv4 traffic flooding is always active in spite of this setting.

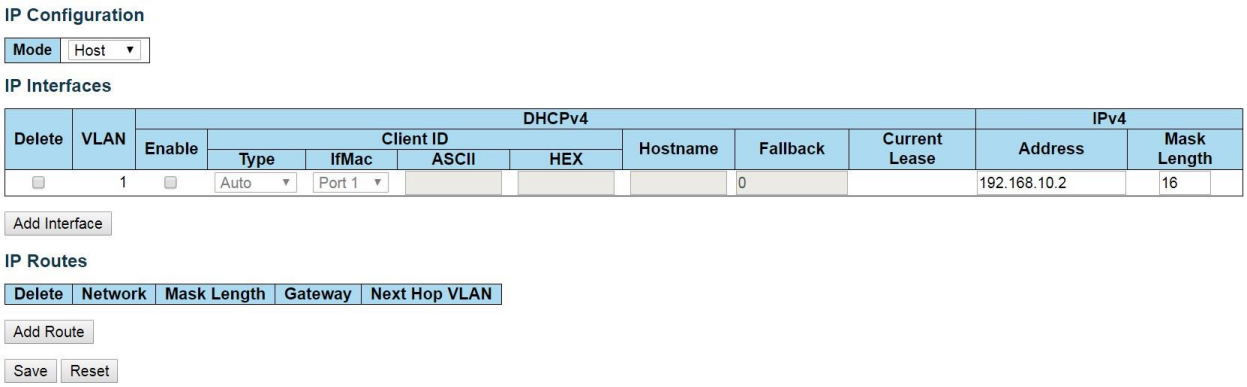
Fast Leave off (default)
Fast leave settings may depend on the IP tuner being used. If you are testing or otherwise have a STB connected directly to the COM400 enable fast leave on all ports by checking the top box Port

6.5 CHANGING THE CHASSIS MANAGEMENT IP ADDRESS AND ADDING VLAN

Management IP address should only be changed when it is necessary at manage the entire system from a different subnet. The COM51 cards IP address will need to be changed to the same subnet as the chassis. Change the COM51 card IP address and add an alternate IP address for the QAM before proceeding.

To change the IP address used to access the COM400 chassis navigate to:

Configuration->System->IP



Click on **Add Interface**

Set the following:
VLAN = 2
Fallback =1
IP address = new management IP address (for this example we will use 10.0.0.251)
Mask Length = 16
Click Enable
Click on **Save**

IP Interfaces

Delete	VLAN	DHCPv4								IPv4	
		Enable	Client ID				Hostname	Fallback	Current Lease	Address	Mask Length
			Type	IfMac	ASCII	HEX					
	1		Auto	Port 1				0		192.168.10.2	16
Delete	2	✓	Auto	Port 1				1		10.0.0.251	16

Then navigate to:
Configuration->VLANs->Configuration

In order to access the chassis and the associated COM cards and QAM from the same port all connected ports will need to be set to the same VLAN.
Set Allowed Access VLANs to 2
Refer to the chart on page 1 to identify the ports being used
Set each port to be used on VLAN2 to the following settings:
Mode = Hybrid
Port VLAN =2

Once the port is changed you will no longer be able to access the COM400 on the default IP address. It is recommended to leave one port on VLAN1 so the chassis can be accessed with the default IP.

In the example below both one gigabit ports (port9) and the top 10 gigabit port (port 10) will use the new VLAN IP assignment. Connecting directly to the bottom 10gigabit port (port 11) will allow connection with the default IP address.

Ports 5,6, and 8 have been set to the new VLAN settings. This sets COM51 cards in slot one and two and the QAM to VLAN2.

Global VLAN Configuration

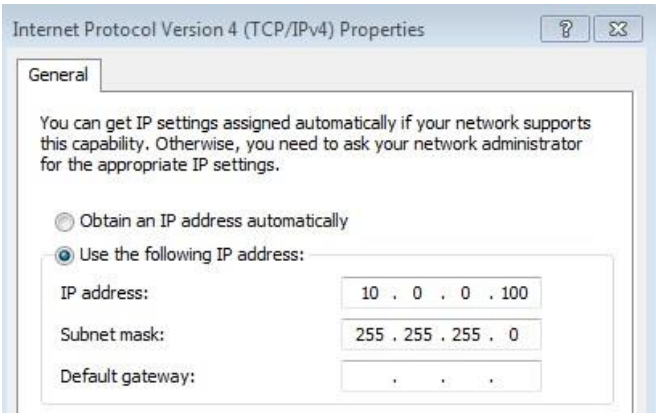
Allowed Access VLANs	2
Ethertype for Custom S-ports	88A8

Port VLAN Configuration

Port	Mode	Port VLAN	Port Type	Ingress Filtering	Ingress Acceptance	Egress Tagging	Allowed VLANs	Forbidden VLANs
*	<>	1	<>	☑	<>	<>	1	
1	Access	1	C-Port	☑	Tagged and Untagged	Untag All	1	
2	Access	1	C-Port	☑	Tagged and Untagged	Untag All	1	
3	Access	1	C-Port	☑	Tagged and Untagged	Untag All	1	
4	Access	1	C-Port	☑	Tagged and Untagged	Untag All	1	
5	Hybrid	2	C-Port	☐	Tagged and Untagged	Untag Port VLAN	1-4095	
6	Hybrid	2	C-Port	☐	Tagged and Untagged	Untag All	1-4095	
7	Access	1	C-Port	☑	Tagged and Untagged	Untag All	1	
8	Hybrid	2	C-Port	☐	Tagged and Untagged	Untag Port VLAN	1-4095	
9	Hybrid	2	C-Port	☐	Tagged and Untagged	Untag Port VLAN	1-4095	
10	Hybrid	2	C-Port	☐	Tagged and Untagged	Untag Port VLAN	1-4095	
11	Access	1	C-Port	☑	Tagged and Untagged	Untag All	1	

Save Reset

To verify the change has taken effect connect your PC to a 1 gigabit port, or the top 10 gigabit port. Change the IP settings in your PC's ethernet connection to the correct subnet to access the new IP address.



Enter the new IP address into the browser and verify you connect to the COM400 and the COM51 cards.

Change your IP setting back to match the default 192.168.3.XX, subnet 255.255.0.0. Connect to the bottom 10 gigabit port and verify you can access the COM400 at the default 192.168.10.2 address.

If you run into problems, reboot the COM400 chassis and all configurations will return to default.

6.6 SAVE CHANGES TO RUNNING CONFIGURATION

Once you have verified the changes you have made are correct save the changes to running config so they become persistent and do not revert to default after a power cycle.

Navigate to:
Maintenance > Configuration > Save as startup-config
Click **Save Configuration**

End of Document