Cumulus® Linux® Quick Reference Guide for NX-OS Users

Converting common NX-OS commands to Cumulus Linux

Contents

September 29, 2014

Out of the Box

Cumulus Linux	Cisco Nexus 3000 Series
Cumulus Linux network OS not installed—boot up in ONIE • ONIE discovery will look for and execute onie-installer *See: http://cumulusnetworks.com/docs/2.2/quick-start/quick-start.html*	Cisco NX-OS network OS installed
Connect to serial console port at 115200 baud *See: http://cumulusnetworks.com/docs/2.2/quick-start/quick-start.html*	Connect to serial console port at 9600 baud
Default management configuration: • hostname = <manufacturer name/device SKU> (e.g. dni7448) • Configure eth0 in /etc/network/interfaces (default is dchp) • Loopback (lo) preconfigured in /etc/network/interfaces • Set hostname, DNS, NTP, DCHP relay agent • Syslog enabled by default *See: http://cumulusnetworks.com/docs/2.2/quick-start/quick-start.html*	Default management configuration: • hostname = “switch” • eth0 preconfigured • loopback preconfigured • DNS, NTP, DCHP relay agent enabled • Syslog enabled and messages appear on console
Default switch port configuration: • All data plane switch ports (all Ethernet ports except management port) are disabled • MTU set to 1500 • Flow control disabled • LLDP enabled • STP disabled *See: http://cumulusnetworks.com/docs/2.2/quick-start/quick-start.html*	Default switch port configuration: • All switch ports in same bridge domain • All ports configured in VLAN 1 • MTU set to 1500 • Flow control disabled • CDP (LLDP) enabled • STP enabled on all VLANs

Auto Provisioning

Cumulus Linux	Cisco Nexus 3000 Series
Zero Touch Provisioning 1. Boot up Cumulus Linux on switch 2. Zero touch provisioning invoked if eth0 on switch is connected to management network and eth0 is set to DCHP (default) 3. If option 239 is present from DHCP server with URL, script execution (hosted on HTTP server, must contain CUMULUS-AUTOPROVISIONING flag) 4. Return code of script of 0 indicates provisioning complete *See: http://cumulusnetworks.com/docs/2.2/user-guide/system_management_diagnostics/provisioning.html*	Power On Auto Provisioning (POAP) 1. Power up and boot into POAP mode (if no configuration file found or **boot poap enable** command used) 2. USB discovery 3. DHCP discovery 4. Script execution (hosted on TFTP or HTTP server) 5. Post-installation reload

Basic System Management – Initial Configuration

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Default admin user: `cumulus` Default password: `CumulusLinux!` (Use **sudo** to execute commands with root privileges.) *See: http://cumulusnetworks.com/docs/2.2/quick-start/quick-start.html*	Default admin user: `admin` Default password: (none defined)

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Install Cumulus Linux license key (not tied to specific device) `cumulus@switch:~$ sudo cl-license -i license_file.txt` or `cumulus@switch:~$ sudo cl-license -i <license_file_URL>` and `cumulus@switch:~$ sudo reboot` *See:* *http://cumulusnetworks.com/docs/2.2/quick-start/quick-start.html*	Install Cisco NX-OS software feature license key (tied to specific device, if not already on device) `switch# install license bootflash:license_file.lic` `Installing license ..done` `switch# show license` `switch# show license usage`
Set hostname (e.g. to "Switch1") – short hostname – persistent `cumulus@switch:~$ sudo vi /etc/hostname` (syntax as follows) `Switch1` Set hostname – short hostname – non-persistent `cumulus@switch:~$ sudo hostname Switch1` Note: A reboot is needed to take effect. To have the hostname change take into effect without a reboot, you can use the *change_hostname.sh* script at *https://gist.github.com/skamithi/8561502* *See:* *http://cumulusnetworks.com/docs/2.2/quick-start/quick-start.html*	Set hostname (e.g. to "Switch1") – persistent `switch# configure terminal` `switch(config)# hostname Switch1` `Switch1(config)# exit` `Switch1# copy running-config startup-config`

Cumulus Linux	Cisco Nexus 3000 Series
Set hostname – FQDN `cumulus@switch:~$ sudo vi /etc/hosts` (syntax as follows) `127.0.0.1  localhost` `ip-address hostname` Configure DNS `cumulus@switch:~$ sudo vi /etc/resolv.conf` (syntax as follows, up to 3 nameservers at a time) `search isp` `nameserver ip-address1` `nameserver ip-address2` `nameserver ip-address3` *See: http://cumulusnetworks.com/docs/2.2/quick-start/quick-start.html*	Set hostname – FQDN and configure DNS `switch# configure terminal` `switch(config)# vrf context management` `switch(config-vrf)# ip host hostname ip-address` `switch(config-vrf)# ip name-server ip-address1 ip-address2  ip-address3` `switch(config)# exit` `switch# copy running-config startup-config`
Set message of the day (MOTD) `cumulus@switch:~$ sudo vi /etc/motd` *See: https://wiki.debian.org/motd*	Set message of the day (MOTD) (e.g. to “Welcome”) `switch# configure terminal` `switch(config)# banner motd #Welcome#` `switch(config)# exit` `switch# show banner motd` `switch# copy running-config startup-config`
Configure time zone and verify `cumulus@switch:~$ sudo tzconfg` `cumulus@switch:~$ sudo hwclock` *See: http://www.debian.org/doc/manuals/system-administrator/ch-sysadmin-time.html and http://cumulusnetworks.com/docs/2.2/user-guide/system_management_diagnostics/monitoring.html*	Configure time zone (e.g. to PST) and verify `switch# configure terminal` `switch(config)# clock timezone PST -8 0` `switch(config)# exit` `switch# show clock` `switch# copy running-config startup-config`

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Set NTP `cumulus@switch:~$ sudo vi /etc/ntp.conf` `cumulus@switch:~$ ntpd –q` *See: http://cumulusnetworks.com/docs/2.2/user-guide/system_management_diagnostics/monitoring.html and https://wiki.debian.org/DateTime*	Set NTP (e.g. to VDC 1) `switch# clock protocol ntp vdc 1`
Set clock `cumulus@switch:~$ sudo hwclock --set --date "MM/DD/YYYY HH:MM:SS"` *See: http://man.he.net/man8/hwclock*	Set clock `switch# clock set HH:MM:SS DD month YYYY`
Configure management interface `cumulus@switch:~$ sudo vi /etc/network/interfaces` (syntax as follows) `auto eth0` `iface eth0` (optional: add "`inet static`" if changing from dhcp) `address ipv4-address/subnet-mask` (only if set to static) `gateway default-gateway-ip-address` (only if set to static) Apply above persistent settings to eth0 `cumulus@switch:~$ sudo ifup eth0` *See: http://cumulusnetworks.com/docs/2.2/quick-start/quick-start.html and http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/ifupdown.html*	Configure management interface `switch# configure terminal` `switch(config)# interface mgmt 0` `switch(config-if)# ip address ipv4-address subnet-mask` `switch(config-if)# no shutdown` `switch(config-if)# exit` `switch(config)# vrf context management` `switch(config-vrf)# ip route 0.0.0.0 0.0.0.0 default-gateway-ip-address` `switch(config-vrf)# exit`
Stop and start management interface `cumulus@switch:~$ sudo ifdown eth0` `cumulus@switch:~$ sudo ifup eth0` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/ifupdown.html*	Stop and start management interface `switch# configure terminal` `switch(config)# interface mgmt 0` `switch(config-if)# shutdown` `switch(config-if)# no shutdown`

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Show management interface current configuration `cumulus@switch:~$ ifquery eth0` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/ifupdown.html*	Show management interface configuration `switch# show interface mgmt 0`
Add IP address to loopback lo interface. (Loopback lo is created by default) Add the following line to the lo configuration after "`iface lo inet loopback`": `cumulus@switch:~$ sudo vi /etc/network/interfaces` (syntax as follows) `address ip-address/subnet-mask`	Configure loopback interface `switch# configure terminal` `switch(config)# interface loopback0` `switch(config-if)# ip address ipv4-address subnet-mask` `switch(config-if)# exit`
Set speed/duplex of management interface, if necessary (e.g. 100 full duplex no autonegotiate) `cumukus@switch:~$ sudo ethtool -s eth0 speed 100 duplex full autoneg off` *See: https://wiki.debian.org/NetworkConfiguration* Add user account `cumulus@switch:~$ sudo adduser userid` Show users currently logged in `cumulus@switch:~$ sudo users` Show all defined user accounts `cumulus@switch:~$ sudo cat /etc/passwd` *See: http://www.debian.org/doc/manuals/system-administrator/ch-sysadmin-users.html and https://wiki.debian.org/ShellCommands*	Set speed/duplex of management interface, if necessary `switch# configure terminal` `switch(config)# interface mgmt 0` `switch(config-if)# speed speed` `switch(config-if)# duplex mode` Add user account `switch# configure terminal` `switch(config)# username userid` Show user sessions `switch# show users`

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Configure DHCP relay agent `cumulus@switch:~$ sudo apt-get install dhcp-helper`	Configure DCHP relay agent (enabled by default) `switch# configure terminal` `switch(config)# ip dhcp relay`
Configure DCHP server addresses to forward packets `cumulus@switch:~$ sudo dhcp-helper -s ip-address` *See: http://www.linuxcertif.com/man/8/dhcp-helper/ and http://amadys.blogspot.com/2010/09/dhcp-helper-dhcp-relay-agent-for-linux.html*	Configure DCHP server addresses to forward packets via an interface (e.g. switch slot 1 / port 1) `switch# configure terminal` `switch(config)# interface ethernet 1/1` `switch(config-if)# ip dhcp relay address ip-address`

CLI Basics

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Show command history `cumulus@switch:~$ history` *See: https://wiki.debian.org/CommandsFileManager*	Show command history `switch# show cli history`
Send message to all logged on users `cumulus@switch:~$ echo message | sudo wall` Send message to specific user `cumulus@switch:~$ sudo write user-id` *See: http://www.computerhope.com/unix/wall.htm and http://www.computerhope.com/unix/write.htm*	Send message to all logged-on users `switch# send message` Send message to specific user session `switch# show users` `switch# send session line message`
Reboot switch `cumulus@switch:~$ sudo reboot` *See: http://www.queryadmin.com/151/reboot-shutdown-debian-command-line/*	Reboot switch `switch# reload`

Configure Switch Front Panel Ports

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Define switch port interface (e.g. swp1) `cumulus@switch:~$ sudo vi /etc/network/interfaces` (syntax as follows) `auto swp1` `iface swp1` *See: http://cumulusnetworks.com/docs/2.2/quick-start/quick-start.html and http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/interfaces.html*	Configure interface as switch port (e.g. switch slot 1 / port 1) `switch# configure terminal` `switch(config)# interface ethernet 1/1` `switch(config-if)# switchport`
Add IP address to switch port (e.g. swp1) `cumulus@switch:~$ sudo vi /etc/network/interfaces` (syntax as follows) `auto swp1` `iface swp1` `address ipv4-address/subnet-mask` `address ipv6-address/subnet-mask` Apply above persistent settings to swp1 `cumulus@switch:~$ sudo ifup swp1` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/ifupdown.html#ifupdown*	Add IP address to switch port (e.g. switch slot 1 / port 1) All Ethernet ports are default Layer 2; to change to Layer 3, use `no switchport` `switch# configure terminal` `switch(config)# interface ethernet 1/1` `switch(config-if)# no switchport` `switch(config-if)# ip address ipv4-address/subnet-mask` `switch(config-if)# ipv6 address ipv6-address/subnet-mask` Save above settings for persistence at next startup. `switch(config)# copy running-config startup-config`

Cumulus Linux	Cisco Nexus 3000 Series
Set speed/duplex of interface, if necessary `cumulus@switch:~$ sudo vi /etc/network/interfaces` Add the following in the interface definition: (syntax as follows) `iface swp1` `  link-speed speed` `  link-duplex [full|half]` `  link-autoneg [on|off]` Apply above persistent settings to swp1 `cumulus@switch:~$ sudo ifup swp1` See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/ports_conf.html	Set speed/duplex of interface, if necessary `switch# configure terminal` `switch(config)# interface ethernet slot / port` `switch(config-if)# speed speed` `switch(config-if)# duplex mode` Save above settings for persistence at next startup. `switch(config)# copy running-config startup-config`
Set MTU size (e.g. to 9216) on switch port (e.g. swp1) `cumulus@switch:~$ sudo vi /etc/network/interfaces` Add the following in the interface definition: (syntax as follows) `iface swp1` `  mtu 9216` Apply above persistent settings to swp1 `cumulus@switch:~$ sudo ifup swp1` See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/interfaces.html	Set MTU size (e.g. to 9216, max) for all classes for all ports `switch# configure terminal` `switch(config)# policy-map type network-qos jumbo` `switch(config-pmap-nq)# class type network-qos class-default` `switch(config-pmap-c-nq)# mtu 9216` `switch(config-pmap-c-nq)# exit` `switch(config-pmap-nq)# exit` `switch(config)# system qos` `switch(config-sys-qos)# service-policy type network-qos jumbo` Save above settings for persistence at next startup. `switch(config)# copy running-config startup-config`

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Show current interface state for all switch ports `cumulus@switch:~$ ip -br link show`	Show current interface state for all switch ports `switch# show interface brief`
Show current interface status for all switch ports `cumulus@switch:~$ netstat –i`	Show current interface status for all switch ports `switch# show interface status`
Show current interface state for all switch ports that are up `cumulus@switch:~$ ip link show up` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/interfaces.html and http://www.linuxcommand.org/man_pages/netstat8.html*	Show current interface state for all switch ports that are up `switch# show interface status up`
Show current IP address (IPv4/IPv6) assignment for interfaces `cumulus@switch:~$ ip –br addr show` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/interfaces.html*	Show current IP address (IPv4/IPv6) assignment for interface `switch# show ip interface brief` `switch# show ipv6 interface brief`
Bring switch port (e.g. swp1) up or down `cumulus@switch:~$ sudo ifup swp1` `cumulus@switch:~$ sudo ifdown swp1` or `cumulus@switch:~$ sudo ip link set dev swp1 up` `cumulus@switch:~$ sudo ip link set dev swp1 down` *(First example uses interfaces file; second is electrical at device level)* *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/interfaces.html*	Bring interface (e.g. switch slot 1 / port 1) up or down `switch# configure terminal` `switch(config)# interface ethernet 1/1` `switch(config-if)# shutdown` `switch(config-if)# no shutdown`

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Show interface statistics for all switches and switch port (e.g. swp1) `cumulus@switch:~$ ip -s link` `cumulus@switch:~$ ip -s link show dev swp1` Show low-level interface statistics for switch port (e.g. swp1) `cumulus@switch:~$ sudo ethtool –S swp1` Show interface connector information for switch port (e.g. swp1) `cumulus@switch:~$ sudo ethtool –m  swp1` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/interfaces.html and http://cumulusnetworks.com/docs/2.2/user-guide/system_management_diagnostics/monitoring.html*	Show interface statistics for all switches and interface (e.g. switch slot 1 / port 1) `switch# show interface` `switch# show interface ethernet 1/1` Show Layer 3 interface statistics (e.g. for switch slot 1 / port 1) `switch# show interfaces` Show interface connector information (e.g. for switch slot 1 / port 1) `switch# show interface ethernet 1/1 transceiver`
Show interface neighbors `cumulus@switch:~$ sudo lldpcli show neighbors [summary|detail]` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/lldp.html*	Show interface neighbors `switch# show lldp neigbhors` Show neighbors for Cisco devices running CDP without LLDP support `switch# show cdp neigbhors`
Show ARP table `cumulus@switch:~$ arp –n` *See: http://www.lainoox.com/display-add-flush-arpcache-linux-arp/ and http://cumulusnetworks.com/docs/2.2/user-guide/network_diagnostics/index.html*	Show ARP table `switch# show ip arp`

Configure Switch Ports in Single Layer 2 VLAN

Cumulus Linux

Create a bridge domain (e.g. bridge-for-v10) and place all ports (swp1, swp2, swp3,…) into a single untagged VLAN (default IEEE).

cumulus@switch:~$ **sudo vi /etc/network/interfaces**

(syntax as follows)

```
auto swp1
iface swp1
auto swp2
iface swp2
auto swp3
iface swp3
...
```

Create a new domain bridge.

```
auto bridge-for-v10
iface bridge-for-v10
   bridge-ports swp1 swp2 swp3...
   address ip-address/subnet-mask   (if adding IP address to bridge)
```

Apply above persistent settings to bridge-for-v10

```
cumulus@switch:~$ sudo ifup bridge-for-v10
```

Note: all dependent interfaces need to be listed in /etc/network/interfaces before parent interfaces. Order lo, eth, swp, and bond interfaces before sub-interfaces, grouped by VLANs

See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/ifupdown.html

Cisco Nexus 3000 Series

Create a bridge domain (e.g. vlan-10) and place all ports (eth 1/1, eth 1/2, eth 1/3,…) into a single untagged VLAN (default IEEE).

Default out of the box configuration has all switch ports in a single domain on VLAN 1. In the following example, a new domain is created.

Create a new domain bridge.

```
switch# configure terminal
switch(config)# vlan 10
switch(config-vlan)# exit
```

Place all switch ports into a single VLAN.

```
switch(config)# interface eth 1/1-3
switch(config-if-range)# switchport
switch(config-if-range)# switchport mode access
switch(config-if-range)# switchport access vlan 10
```

Add IP address to bridge (e.g. SVI interface)

```
switch(config)# feature interface vlan
switch(config)# interface vlan 10
switch(config-if)# ip address ip-address/subnet-mask
switch(config-if)# no shutdown
```

Save above settings for persistence at next startup.

```
switch(config)# copy running-config startup-config
```

Cumulus Linux	Cisco Nexus 3000 Series
Show learned MAC address table `cumulus@switch:~$ sudo brctl showmacs bridgeID` *See: http://www.linuxdoc.org/HOWTO/BRIDGE-STP-HOWTO/set-up-the-bridge.html*	Show learned MAC address table `switch# show mac address-table`

Spanning Tree (STP and RSTP)

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Enable RSTP/STP on bridge (e.g. bridge1) (Cumulus Linux starts off with RSTP and falls back to STP) `cumulus@switch:~$ sudo vi /etc/network/interfaces` (syntax as follows) `auto bridge1` `iface bridge1` `  bridge-ports swp1 swp2 swp3...` `  bridge-stp on`	Enable Rapid PVST+ on switch (enabled by default on VLAN 1 and all subsequent VLANs created) `switch# configure terminal` `switch(config)# spanning-tree mode rapid-pvst` Disable/enable Rapid PVST+ on VLAN (e.g. vlan 2; VLAN 1 always enabled) `switch# configure terminal` `switch(config)# no spanning-tree vlan 2` `switch(config)# spanning-tree vlan 2`
Configure STP only (no RSTP) on bridge (e.g. bridge1) and set Spanning Tree parameters. `cumulus@switch:~$ sudo vi /etc/network/interfaces` (syntax as follows) `auto bridge1` `iface bridge1` `  mstpctl_ports swp1 swp2 swp3...` `  mstpclt_stp on` `  mstpctl-parameter value`	Configure Spanning Tree parameters `switch# configure terminal` `switch(config)# spanning-tree [vlan id] parameter value` Save above settings for persistence/next startup. `switch# copy running-config startup-config`
Apply above persistent settings to bridge1 `cumulus@switch:~$ sudo ifup bridge1` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/stp.html*	
Show RSTP/STP configuration on bridge (e.g. bridge1) `cumulus@switch:~$ sudo mstpctl showbridge bridge1` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/stp.html*	Show Rapid PVST+ Configuration `switch# show spanning-tree brief`

Link Aggregation

Cumulus Linux

Aggregate switch ports (e.g. swp1, swp2, swp3) into single Layer 3 bond (e.g. bond1) using LACP

```
cumulus@switch:~$ sudo vi /etc/network/interfaces
```

(syntax as follows)

```
auto bond1
iface bond1
   address ip-address/subnet-mask
   bond-slaves swp1 swp2 swp3
   bond-miimon 100
   bond-mode 802.3ad
   bond-use-carrier 1
   bond-lacp-rate 1
   bond-min-links 1
   bond-xmit_hash_policy layer3+4
```

Apply above persistent settings to bond1

```
cumulus@switch:~$ sudo ifup bond1
```

Note: all dependent interfaces need to be listed in /etc/network/interfaces before parent interfaces. Order lo, eth, swp, and bond interfaces before sub-interfaces, grouped by VLANs.

See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/bonding.html

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Configure Layer 3 port channel (e.g. port-channel 1, comprised of interfaces 1/1, 1/2, 1/3) using LACP

```
switch# configure terminal
switch(config)# feature lacp
switch(config)# interface port-channel 1
switch(config-if)# ip address ip-address/subnet-mask
switch(config-if)# no shutdown
switch(config)# interface ethernet 1/1-3
switch(config-if-range)# no switchport
switch(config-if-range)# channel-group 1 mode active
switch(config-if-range)# lacp rate fast
switch(config-if-range)# lacp min-links 1
switch(config-if-range)# exit
switch(config)# port-channel load-balance ethernet source-dest-port
switch(config)# end
```

Save above settings for persistence/next startup.

```
switch# copy running-config startup-config
```

Configure Static Routing

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Configure a static route via Quagga `cumulus@switch:~$ sudo vtysh` `Hello, this is Quagga (version 0.99.21).` `Copyright 1996-2005 Kunihiro Ishiguro, et al.` `rut# configure terminal` `rut(config)# ip route ip-address/subnet-mask next-hop` `rut# write mem` `Configuration saved to /etc/quagga/zebra.conf` `rut# end` or through the interfaces file under a specified interface `cumulus@switch:~$ sudo vi /etc/network/interfaces` (syntax as follows) `iface swp3` `post-up ip route add ip-address/subnet-mask via next-hop` `pre-down ip route del ip-address/subnet-mask via next-hop` Apply above persistent settings to swp3 `cumulus@switch:~$ sudo ifup swp3` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_3/static_routing.html and http://cumulusnetworks.com/docs/2.2/user-guide/layer_3/config.html*	Add a static route `switch# configure terminal` `switch(config)# ip route ip-address/subnet-mask next-hop` `switch(config)# end` Save above settings for persistence/next startup. `switch# copy running-config startup-config`

Cumulus Linux	Cisco Nexus 3000 Series
Remove a static route `cumulus@switch:~$ sudo ip route del ip-address/subnet-mask` or via Quagga `cumulus@switch:~$ sudo vtysh` `Hello, this is Quagga (version 0.99.21).` `Copyright 1996-2005 Kunihiro Ishiguro, et al.` `rut# configure terminal` `rut(config)# no ip route ip-address/subnet-mask next-hop` `rut# end` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_3/static_routing.html*	Remove a static route `switch# configure terminal` `switch(config)# no ip route ip-address/subnet-mask next-hop` `switch# exit`
Display information on static routes `cumulus@switch:~$ ip route show` or via Quagga `cumulus@switch:~$ sudo vtysh` `Hello, this is Quagga (version 0.99.21).` `Copyright 1996-2005 Kunihiro Ishiguro, et al.` `rut# show ip route static` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_3/static_routing.html*	Display information on static routes `switch# show ip static-route`

Configure Dynamic Routing

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Enable OSPFv2 by adding the following line to /etc/quagga/daemons `ospfd=yes` and restarting the Quagga daemon: `cumulus@switch:~$ sudo service quagga restart` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_3/config.html*	Enable OSPFv2 by activating licensed feature: `switch# configure terminal` `switch(config)# feature ospf`
Create OSPFv2 instance via Quagga: `cumulus@switch:~$ sudo vtysh` `rut# configure terminal` `rut(config)# router ospf` `rut(config-router)# router-id ip-address` `rut(config-router)# log-adjacency-changes detail` Explicitly enable OSPF on a specific interface, e.g. swp1 `rut(config)# interface swp1` `rut(config-if)# ip ospf area area-id` Enable OSPF on all interfaces in a subnet `rut(config)# router ospf` `rut(config-router)# network ip-address/subnet-mask area area-id` Set optional parameters on an interface (e.g. swp1): `rut(config)# interface swp1` `rut(config-if)# ip ospf parameter value` `(e.g. hello-interval 5)` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_3/ospf.html*	Create OSPFv2 instance: `switch# configure terminal` `switch(config)# router ospf instance-tag` `switch(config-router)# router-id ip-address` `switch(config-router)# log-adjacency-changes detail` `switch(config)# interface ethernet slot / port` `switch(config-if)# no switchport` `switch(config-if)# ip address ip-address/subnet-mask` `switch(config-if)# ip router ospf instance-tag area area-id` (Note: for IOS, use **network** command) `switch(config)# router ospf instance-tag` `switch(config-router)# network ip-address/subnet-mask area area-id` Set optional parameters on an interface (e.g. slot 1/port 1) `switch(config)# interface ethernet 1/1` `switch(config-if)# ip ospf parameter value` `(e.g. hello-interval 5)`

Cumulus Linux	Cisco Nexus 3000 Series
Enable OSPFv3 by adding the following line to /etc/quagga/daemons `ospf6d=yes` and restarting the Quagga daemon: `cumulus@switch:~$ sudo service quagga restart` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_3/ospf6.html*	Enable OSPFv3 by activating licensed feature: `switch# configure terminal` `switch(config)# feature ospfv3`
Create OSPFv3 instance on a specific interface (e.g. swp1) via Quagga: `cumulus@switch:~$ sudo vtysh` `rut# configure terminal` `rut(config)# router ospf6` `rut(config-router)# router-id ip-address` `rut(config-router)# log-adjacency-changes detail` `rut(config-router)# interface swp1 area area-id` Set optional parameters on interface (e.g. swp1): `rut(config)# interface swp1` `rut(config-if)# ipv6 ospf6 parameter value` `(e.g. hello-interval 5)` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_3/ospf6.html*	Create OSPFv3 instance: `switch# configure terminal` `switch(config)# router ospfv3 instance-tag` `switch(config-router)# router-id ip-address` `switch(config-router)# log-adjacency-changes detail` `switch(config)# interface ethernet slot / port` `switch(config-if)# ipv6 router ospfv3 instance-tag area area-id` (Note: for IOS, use **ipv6 ospf** command on a specific interface) `switch(config)# interface ethernet slot / port` `switch(config-if)# ipv6 ospf instance-tag area area-id` Set optional parameters on a specific interface (e.g. slot 1/port 1) `switch(config)# interface ethernet 1/1` `switch(config-if)# ospfv3 parameter value` `(e.g. hello-interval 5)`

Cumulus Linux	Cisco Nexus 3000 Series
Enable BGP by adding the following line to /etc/quagga/daemons `bgpd=yes` and restarting the Quagga daemon: `cumulus@switch:~$ sudo service quagga restart` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_3/bgp.html*	Enable BGP by activating licensed feature: `switch# configure terminal` `switch(config)# feature bgp`
Identify BGP node via Quagga: `cumulus@switch:~$ sudo vtysh` `rut# configure terminal` `rut(config)# router bgp ASN` `rut(config-router)# bgp router-id ip-address` Specify neighbors: `rut(config-router)# neighbor ip-address remote-as ASN` `rut(config-router)# address-family ipv4 unicast` `rut(config-router-af)# neighbor ip-address activate` `rut(config-router-af)# exit` `rut(config-router)# address-family ipv6 unicast` `rut(config-router-af)# neighbor ip-address activate` `rut(config-router-af)# exit` `rut(config-router)# address-family ipv4 unicast` `rut(config-router-af)# network ip-prefix` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_3/bgp.html*	Identify BGP node: `switch# configure terminal` `switch(config)# router bgp ASN` `switch(config-router)# router-id ip-address` Specify neighbors: `switch(config-router)# neighbor ip-address remote-as ASN` `switch(config-router-neighbor)# address-family ipv4 unicast` `switch(config-router-neighbor-af)# exit` `switch(config-router-neighbor)# address-family ipv6 unicast` `switch(config-router-neighbor-af)# exit` `switch(config-router-neighbor)# exit` `switch(config-router)# address-family ipv4 unicast` `switch(config-router-af)# network ip-prefix`

Show Running State and Persistent Configuration

Cumulus Linux	Cisco Nexus 3000 Series
Show running state `cumulus@switch:~$ sudo cat /proc/cpuinfo` `cumulus@switch:~$ sudo cat /proc/meminfo` *See: http://wiredrevolution.com/system-administration/view-system-information-with-proccpuinfo-and-procmeminfo*	Show CPU processes and utilization `switch# show processes cpu` `switch# show processes memory`
Show running settings from /etc/network/interfaces configuration: `cumulus@switch:~$ ifquery –r -a` Show running configuration settings from Quagga (items configured since last save are not persistent): `rut# show running-config`	Show running configuration settings (items configured since last save are not persistent) `switch# show running-config`
Persistent configuration files are stored in files in /etc. Notable files are: `/etc/network/interfaces` `/etc/quagga/daemons` `/etc/quagga/zebra.conf` `/etc/quagga/ospfd.conf` `/etc/quagga/ospf6d.conf` `/etc/quagga/bgpd.conf` `/etc/hostname` `/etc/hosts` `/etc/resolv.conf` `/etc/motd` `/etc/ntp.conf` `/etc/passwd` `/etc/default/grub`	Show persistent settings (what takes into effect upon next boot). `switch# show startup-config`

Configuration Backup and Restore

Cumulus Linux	Cisco Nexus 3000 Series
For persistence, configuration files must be modified—commands issued on the Cumulus Linux CLI are non-persistent. Settings changed via Quagga are saved into persistent configuration files.	Copy current settings in memory (non-persistent) for persistence at next startup. `switch# copy running-config startup-config` or Back up non-persistent settings to a remote server, e.g. 10.10.1.1 for use in copying back to switch `switch# copy running-config tftp://10.10.1.1/sw1-run-config.bak`
Back up user configuration from read-write user directories of current slot to persistent mount. `cumulus@switch:~$ sudo mkdir -p /mnt/persist/etc` and copy files from /etc to /mnt/persist/etc Files in the persistent mount will be copied to slot upon subsequent boot and then take into effect `cumulus@switch:~$ sudo reboot` Note: Files in persistent mount will ALWAYS be copied to active slot upon reboot—this means configuration files in the active slot will be overwritten by copies in the persistent mount. Remember to remove files from the persistent mount if they are no longer to be copied to slots upon reboot. *See: http://cumulusnetworks.com/docs/2.2/user-guide/system_management_diagnostics/img-mgmt.html*	N/A

Cumulus Linux	Cisco Nexus 3000 Series
Back up persistent settings (entire /etc directory) and copy to another server (e.g. my-server) `cumulus@switch:~$ sudo tar – cvf /home/cumulus/oldconfig.tar /mnt/persist/` `cumulus@switch:~$ sudo scp /home/cumulus/oldconfig.tar user@my-server:/home/user/.` *See: https://support.cumulusnetworks.com/hc/en-us/articles/201787486-Copying-Configurations-across-Switches*	Back up persistent settings to a remote server (e.g. 10.10.1.1). `switch# copy startup-config tftp://10.10.1.1/sw1-start-config.bak`
Log onto a remote server containing configuration backup and apply settings to a switch. `root@server:~# cat backup.tar | ssh root@switch tar zxf - -C /mnt/persist` Files placed into the persistent mount will be copied to slot upon subsequent boot and then take into effect `cumulus@switch:~$ sudo reboot` *See: https://support.cumulusnetworks.com/hc/en-us/articles/201787486-Copying-Configurations-across-Switches*	Apply configuration settings (running or startup) from another switch (e.g. 10.10.1.1), stored on a remote server. `switch# write erase` `switch# reload` `This command will reboot the system. (y/n)?  [n] y` `...` `Enter the password for "admin": <password>` `Confirm the password for "admin": <password>` `...` `Would you like to enter the basic configuration` `dialog (yes/no): n` `switch#` `switch# copy tftp://10.10.1.1/startup-config running-config` `switch# copy running-config startup-config`

Network OS Upgrade

Cumulus Linux	Cisco Nexus 3000 Series
Cumulus Linux consists of a single image	NX-OS consists of two images, kickstart and system
Show Cumulus Linux OS version by image slot `cumulus@switch:~$ sudo cl-img-select` *See: http://cumulusnetworks.com/docs/2.2/user-guide/system_management_diagnostics/img-mgmt.html*	Show running NX-OS version `switch# show version` Show NX-OS version configured for boot `switch# show boot`
Install Cumulus Linux image (upgrade or downgrade) stored on a remote, accessible server (e.g. 10.0.1.249) `cumulus@switch:~$ sudo cl-img-install http://10.0.1.249/incoming/cumulus-install-powerpc.bin` *See: http://cumulusnetworks.com/docs/2.2/user-guide/system_management_diagnostics/img-mgmt.html*	Upgrade (or downgrade) OS `switch# install all`

Monitoring

Cumulus Linux	Cisco Nexus 3000 Series
Show CPU processes and utilization `cumulus@switch:~$ ps aux` `cumulus@switch:~$ top` *See: http://docs.fedoraproject.org/en-US/Fedora/17/html/System_Administrators_Guide/ch-System_Monitoring_Tools.html#s1-sysinfo-system-processes*	Show CPU processes and utilization `switch# show processes` `switch# show processes cpu`

Cumulus Linux	Cisco Nexus 3000 Series
Show memory allocation `cumulus@switch:~$ vmstat` Show memory allocation real-time virtual memory usage `cumulus@switch:~$ vmstat 1` Show free memory `cumulus@switch:~$ free` *See: http://man.cx/vmstat(1) and http://www.computerhope.com/unix/free.htm*	Show memory allocation `switch# show processes memory`
Show hardware information `cumulus@switch:~$ dmidecode` *See: http://linux.die.net/man/8/dmidecode*	Show hardware information switch# **show inventory**
Show SPROM information cumulus@switch:~$ **decode-syseeprom**	Show SPROM information `switch# show sprom`
Show hardware states (temperature, fan, power) `cumulus@switch:~$ sensors` or enable smond to monitor system units and log changes in state to /var/log/messages *See: http://cumulusnetworks.com/docs/2.2/user-guide/system_management_diagnostics/monitoring.html*	Show hardware states (temperature, fan) `switch# show environment`

Cumulus Linux	Cisco Nexus 3000 Series
Check relevant log files `cumulus@switch:~$ cd /var/log` `cumulus@switch:~$ tail –f syslog` `cumulus@switch:~$ tail –f daemon.log` `cumulus@switch:~$ tail –f quagga/zebra.log` `cumulus@switch:~$ tail –f quagga/ospf.log` `cumulus@switch:~$ tail –f quagga/ospf6.log` `cumulus@switch:~$ tail –f quagga/bpgd.log` *See: https://support.cumulusnetworks.com/hc/en-us/articles/201787896-Relevant-Log-Files-in-Cumulus-Linux*	System messages are logged to console by default
Configure SNMP (Net-SNMP) `cumulus@switch:~$ sudo vi /etc/snmp/snmpd.conf` `cumulus@switch:~$ sudo vi /etc/snmp/snmptrapd.conf` *See http://cumulusnetworks.com/docs/2.2/user-guide/system_management_diagnostics/monitoring.html and http://www.debianhelp.co.uk/snmp.htm*	Configure SNMP `switch# configure terminal` `switch(config)# snmp-server host ip-address traps version 2c public`

Cumulus Linux	Cisco Nexus 3000 Series
Verify cabling using PTMD Create DOT file as /etc/ptm.d/topology.dot Enable PTMD via Quagga `cumulus@switch:~$ sudo vtysh` `rut# configure terminal` `rut(config)# ptm-enable` Check PTM status per interface (e.g. swp1) `rut# show interface swp1` *See: http://cumulusnetworks.com/docs/2.2/user-guide/layer_1_2/ptm.html*	N/A

Generate Tech Support Files

Cumulus Linux	Cisco Nexus 3000 Series
Generate Cumulus Linux diagnostics file to /var/support directory `cumulus@switch:~$ sudo cl-support` *See: http://cumulusnetworks.com/docs/2.2/user-guide/system_management_diagnostics/monitoring.html*	Generate switch diagnostics file `switch# show tech-support > filename`