
Dell EMC Networking Chef Integration Documentation

Release 0.1

Dell EMC Networking

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CHAPTER 1

Introduction

This information describes Chef and the Dell EMC Networking integration.

1.1 Chef

Chef is an open source configuration management tools that can configure infrastructure as code in a human-readable Chef domain specific language. The framework supports installation and configuration of devices in a data center. See <https://www.chef.io/chef/> for more information.

1.2 Dell EMC Networking Chef integration

Dell EMC Networking modules for Chef is available for download from Chef Supermarket. These modules can be used to manage and automate Dell EMC Networking switches running OS10 Enterprise Edition operating system.

There are three component included in the Chef setup.

1. Chef server - it works as a central repository for cookbooks.
2. Chef workstations - it is used to create cookbooks.
3. Chef client - it is installed on the switch.

Chef server and workstation can be installed on a standalone server that has connectivity to all the Dell EMC Networking devices that need to be managed under Chef (see <https://www.chef.io>).

2.1 Setup verification

Fetch configuration.

```
knife ssl fetch
```

Test the configuration.

```
knife client list
```

2.2 Bootstrap a new node with the knife command

```
knife bootstrap node_domain_or_IP -N testing -x demo -P password --sudo --use-sudo-password
```

For example, `knife bootstrap 10.16.204.64 -N testing64 -x linuxadmin -P linuxadmin --sudo --use-sudo-password`

2.2.1 Devops Ruby utils Debian package installation

The `os10_devops_infra_install.sh` script installs the dependency for the Chef client. The prerequisite for this installation is that the user `os10devops` should have been created with role as `sysadmin` (for example, use the

username command in CONF mode in the OS10 CLI).

```
OS10(config)#username os10devops password <password_str> role sysadmin
```

Download the `os10_devops_infra_install.sh` script in the switch from https://raw.githubusercontent.com/Dell-Networking/dellos10-ruby-utils/master/os10_devops_infra_install.sh. User can use “`wget`” or a `curl` utility. After downloading the script, change the permission using the `chmod +x os10_devops_infra_install.sh` command. Execute the `os10_devops_infra_install.sh` script to install devops Ruby utilities Debian package.

Usage

```
$ os10_devops_infra_install.sh chef_ruby_utils active_partition local/remote <os10_
↪devops_ruby_utils_url>
```

Options

- `chef_ruby_utils`: first option should be always the “`chef_ruby_utils`” string; Chef client should be already installed in the switch before installing devops ruby utils debian package for `chef_ruby_utils` option
- `active_partition`: denotes the installation will happen in an active partition
- `local`: denotes the relative path in the switch - `remote`: denotes the relative path in the remote machine using protocols like HTTPS, FTP, and so on
- `<os10_devops_ruby_utils_url>`: devops Ruby utilites URL link from GitHub if the previous option is remote (for example, <https://raw.githubusercontent.com/Dell-Networking/dellos10-ruby-utils/master/os10-devops-ruby-utils-1.0.0.deb>) - `<os10_devops_ruby_utils_url>`: download the `os10-devops-ruby-utils-1.0.0.deb` package in the local path of the switch if previous option is local (for example, `/home/admin/`)

Sample usage

```
./os10_devops_infra_install.sh chef_ruby_utils active_partition remote https://raw.githubusercontent.com/Dell-Networking/dellos10-ruby-utils/master/os10-devops-ruby-utils-1.0.0.deb
```

OR

```
./os10_devops_infra_install.sh chef_ruby_utils active_partition remote “-u ftp:ftp ftp:
//<remote_ip>://<path>/os10-devops-ruby-utils-1.0.0.deb”
```

OR

```
./os10_devops_infra_install.sh chef_ruby_utils active_partition local /home/admin/
```

2.2.2 Chef client installation after an image upgrade

When an OS10 image is upgraded manually or through Chef recipe, the Chef client will not be automatically installed in the upgraded partition. The prerequisite for this installation is the Chef should have been configured in the loaded partition (for example, the node should have been bootstrapped and the devops Ruby utilites Debian package should have been installed).

Download the `os10_devops_infra_install.sh` script in the switch from https://raw.githubusercontent.com/Dell-Networking/dellos10-ruby-utils/master/os10_devops_infra_install.sh. After downloading the script, change the permission using the `chmod +x os10_devops_infra_install.sh` command. Execute the

os10_devops_infra_install.sh script to install Chef and the devops Ruby utilities Debian package in the upgraded partition.

Usage

```
$ os10_devops_infra_install.sh chef standby_partition local/remote <chef_client_url>
↪ local/remote <os10_devops_ruby_utils_url>
```

Options

- chef: first option should be always the string 'chef'
- standby_partition: denotes the installation will happen in standby partition
- local: denotes the relative path in the switch - remote: denotes the relative path in the remote machine using protocols like HTTPS, FTP, and so on
- <chef_client_url>: Chef url should be an HTTPS/FTP path if previous option is remote (for example, https://packages.chef.io/files/stable/chef/13.8.5/debian/8/chef_13.8.5-1_amd64.deb) - <chef_client_url>: download the chef_13.8.5-1_amd64.deb package in the local path of the switch if previous option is local (for example, /home/admin/)
- <os10_devops_ruby_utils_url>: devops ruby utils URL link from GitHub if the previous option is remote (for example, <https://raw.githubusercontent.com/Dell-Networking/dellos10-ruby-utils/master/os10-devops-ruby-utils-1.0.0.deb>) - <os10_devops_ruby_utils_url>: download the os10-devops-ruby-utils-1.0.0.deb package in the local path of the switch if previous option is local (for example, /home/admin/)

Sample usage

```
./os10_devops_infra_install.sh chef standby_partition remote https://packages.chef.io/files/stable/chef/13.8.5/debian/8/chef\_13.8.5-1\_amd64.deb remote https://raw.githubusercontent.com/Dell-Networking/dellos10-ruby-utils/master/os10-devops-ruby-utils-1.0.0.deb
```

OR

```
./os10_devops_infra_install.sh chef standby_partition remote "-u ftp:ftp ftp://<remote_ip>:<path>/chef_13.8.5-1_amd64.deb" remote "-u ftp:ftp ftp://<remote_ip>:<path>/os10-devops-ruby-utils-1.0.0.deb"
```

OR

```
./os10_devops_infra_install.sh chef standby_partition local /home/admin local /home/admin
```

> **NOTE:** After the image upgrade and reload, execute any Chef resource. If the Chef client gives the LoadError "cannot load such file – xml/libxml", execute the `/opt/chef/embedded/bin/gem install libxml-ruby` below command in root/sudo mode.

Dell EMC Networking OS10 Chef modules

- `dellemcnetworking-dellos10`: Manage network configuration on devices running OS10
- `os10-devops-ruby-utils-1.0.0.deb`: Execute any OS10 command and gives the output to the caller
- `os10_devops_infra_install.sh`: Script file to install `os10-devops-ruby-utils-1.0.0.deb` debian package.

Dell EMC Networking Chef types

The Dell EMC Networking Chef types facilitate device provisioning running Dell EMC Networking OS10 software. This information describes the Chef types and attributes available in Dell EMC Networking Chef module.

4.1 Type: `os10_route`

The `os10_route` resource type is used to manage static routes in OS10 Enterprise Edition switches.

Attributes

Attribute	Description
<code>route_ip</code>	Target IP address to which the route must be configured This is the name property of <code>os10_route</code> resource
<code>next_hop</code>	List of the next-hop IP address for the route to be configured

4.2 Type: `os10_snmp`

The `os10_snmp` resource type is to used to manage SNMP configuration in OS10 EE switches. The `os10_snmp` resource is not an ensurable type and hence does not have an `ensure` attribute.

Attributes

Attribute	Description
community	This property is a dictionary of community string with its access right; will be the only list of community string entries present in the SNMP configuration (for example, {'public'=>'ro', 'private'=>'rw'})
contact	Contact property of SNMP server; there can be only one entry for contact, and an empty string for contact will remove the contact entry from the SNMP configuration
location	Location property of the SNMP server; there can be only one entry for location, and an empty string for location will remove the location entry
traps	Dictionary of entries where the key is trap category and values are the list of subcategory
host	Dictionary of entries where the key is list of ip, port, version and community string

4.3 Type: os10_monitor

The `os10_monitor` resource type is used to manage port monitor (mirroring) session configuration in OS10 Enterprise Edition switches.

Attributes

Attribute	Description
port_id	Configures the monitor session ID in the switch (1 to 18); this is the name property of <code>os10_monitor</code> resource
source	Configures the source interfaces for this monitoring session (for example, ['ethernet 1/1/9', 'ethernet 1/1/10'])
destination	Configures the destination interface to which traffic has to be mirrored (for example, 'ethernet 1/1/10')
flowbase	Enables or disable flow-based monitoring (true, false); this optional value defaults to false
shutdown	Enables or disables the monitoring session; if the shutdown is false, the session will be configured but in shutdown state; this operational value defaults to true

4.4 Type: os10_interface

The `os10_interface` resource type is used to manage interface configuration in OS10 Enterprise Edition switches.

Attributes

Attribute	Description
interface_name	Configures the interface name; this is the name property for <code>os10_interface</code> resource
desc	Configures the description of the interface
mtu	Configures the maximum transmission unit (MTU) of the interface
switchport_mode	Configures the switchport mode of the interface (either trunk or access in case of switchport; trunk, access, absent); can be false when not in L2 mode
admin	Configures the administrative state of the interface (up, down)
ip_address	Configures the IPv4 address and mask of the interface in ip/prefixlen format
ipv6_address	Configures the IPv6 address and mask of the interface in ip/prefixlen format
ipv6_autoconf	Enables or disables IPv6 autoconfig (true, false)
ip_helper	Specifies a string of IP addresses for the interface to which UDP broadcasts need to be forwarded to
portmode	Configures the port mode according to the device type
suppress_ra	Configures IPv6 router advertisements if set to true (true, false)

4.5 Type: os10_image_upgrade

The `os10_image_upgrade` resource type is used to upgrade / downgrade OS10EE images by providing the file-name and location of the image.

Attribute

Attribute	Description
<code>url</code>	Configures the location of the binary image in the remote server; image will be downloaded and installed in the standby partition of the switch

4.6 Type: os10_bgp

The resource definition for `os10_bgp` that is used to configure base bgp configuration in OS10 Enterprise Edition switches.

Attributes

Attribute	Description
<code>asn_num</code>	Configures the autonomous system (AS) number of the BGP configuration (1 to 4294967295 or 0.1 to 65535.65535)
<code>bestpath_as_path</code>	Configures the bestpath selection to either ignore or include prefixes received from different AS paths during multipath calculation
<code>bestpath_ignore_router_id</code>	Configures bestpath computation to ignore router identifier
<code>bestpath_med_confed</code>	Configures bestpath to compare MED among confederation paths
<code>bestpath_med_missing</code>	Configures bestpath to treat missing MED as the least preferred one
<code>fast_external_fallover</code>	Configures reset session if a link to a directly connected external peer goes down
<code>log_neighbor_changes</code>	Configures logging of neighbors up/down
<code>max_path_ebgp</code>	Configures the maximum number of paths to forward packets through eBGP (1 to 128)
<code>max_path_ibgp</code>	Configures the maximum number of paths to forward packets through iBGP (1 to 128)
<code>outbound_optimization</code>	Enables outbound optimization for IBGP peer-group members
<code>router_id</code>	Configures the IP address of the local BGP router instance

4.7 Type: os10_bgp_af

Attributes

Attribute	Description
<code>asn_num</code>	Configures the AS number of the BGP configuration (1 to 4294967295 or 0.1 to 65535.65535)
<code>address_family</code>	Specifies the address family mode (ipv4, ipv6)
<code>default_metric</code>	Sets the default metric of redistributed routes (1 to 4294967295)
<code>network_add_list</code>	Specifies a list of IPs and masks along with optional route-map string
<code>redistribute_connected</code>	Configures connected routes to be redistributed into BGP
<code>redistribute_ospf</code>	Configures OSPF routes to be redistributed into BGP
<code>redistribute_static</code>	Configures static routes to be redistributed into BGP

4.8 Type: os10_bgp_nbr

Attributes

Attribute	Description
asn_num	Configures the AS number of the BGP configuration (1 to 4294967295 or 0.1 to 65535.65535)
associate_peer	Specifies the inherit configuration of a peer-group; peer-group property should be configured first before configuring this property
advertisement_interval	Specifies the minimum interval between sending BGP routing updates; (1 to 600; default 30)
advertisement_delay	Sets the delay initiating OPEN message for the specified time
connection_retry	Sets the delay initiating OPEN message for the specified time (0 to 240)
password	Specifies the MD5 password for authentication (up to 128 characters)
peer_config	Specifies the neighbor router address
remote_as	Specifies the AS number of the BGP neighbor
remove_private	Enables or disables configuration to remove private AS number from outbound updates
send_community_ext	Enables or disables sending extended community attribute
send_community_std	Enables or disables sending standard community attribute
shutdown	Sets the shutdown state of the neighbor
timers	Specifies the array of two timer values - keepalive interval and holdtime values; keepalive value should be between 1-65535 with default of 60; holdtimer value should be between 3-65535 with default of 180
address_family	Specifies the address family mode (ipv4, ipv6 unicast)
allowas_in	Specifies to allow local AS number in as-path (1 to 10)“af_activate“ Enables the address family for this neighbor
af_activate	Enables the address family for this neighbor

4.9 Type: os10_bgp_nbr_group

Attributes

Attribute	Description
asn_num	Specifies the AS number of the BGP configuration (1 to 4294967295 or 0.1 to 65535.65535)
advertisement_interval	Specifies the minimum interval between sending BGP routing updates (1 to 600; default 30)
advertisement_delay	Sets the delay initiating OPEN message for the specified time (0 to 240)
connection_retry	Configures the peer connection retry timer (10 to 65535; default 60)
password	Sets the MD5 password for authentication (up to 128 characters)
peer_group_config	Specifies the neighbor template name
remote_as	Specifies the AS number of the BGP neighbor
remove_private	Enables or disables configuration to remove private AS number from outbound updates
send_community_ext	Enables or disables sending extended community attribute
send_community_std	Enables or disables sending standard community attribute
timers	Specifies the keepalive interval and holdtime values; keepalive value should be between 1 to 65535 with default value of 60; hold timer should be between 3 to 65535 with default value of 180
address_family	Specifies the address family mode (ipv4 or ipv6 unicast)
af_activate	Enables the address family for this neighbor

4.10 Type: os10_lldp

The `os10_lldp` resource type is used to manage global LLDP configuration in OS10 EE switches. The `os10_lldp` resource is not an ensurable type and hence does not have an `ensure` attribute.

Attributes

Attribute	Description
<code>holdtime_multiplier</code>	Configures the holdtime multiplier (2 to 10); an empty string will remove the holdtime multiplier value from the LLDP configuration
<code>reinit</code>	Configures the reinit value (1 to 10); an empty string will remove the reinit value from the LLDP configuration
<code>timer</code>	Configures the timer value (5 to 254); an empty string will remove the timer value from the LLDP configuration
<code>med_fast_start_repeat_count</code>	Configures the med fast start repeat count (1 to 10); an empty string will remove the med fast start repeat count value from the LLDP configuration
<code>enable</code>	Enables or disables LLDP globally (true, false)
<code>med_network_policy</code>	Configures the med network policy with a set of hash keys <code>id<1-32></code> , <code>app</code> , <code>vlan_id<1-4093></code> , <code>vlan_type<tag/untag></code> , <code>priority<0-7></code> , <code>dscp<0-63></code>

4.11 Type: os10_lldp_interface

The `os10_lldp_interface` resource type is used to manage LLDP configuration per interface in OS10 EE switches. The `os10_lldp` resource is not an ensurable type and hence does not have an `ensure` attribute. The per interface name is given as `arg` for the resource.

Attributes

Attribute	Description
<code>receive</code>	Enables or disables the reception of LLDP for that interface (true, false)
<code>transmit</code>	Enables or disables the transmission of LLDP for that interface (true, false)
<code>med</code>	Enables or disables the MED LLDP for that interface; LLDP MED can be enabled only when LLDP transmit and receive are enabled; LLDP receive/transmit can be disabled only when LLDP MED is disabled (true, false)
<code>med_tlv_select_inventory</code>	Enables or disables the MED TLV select inventory LLDP for that interface (true, false)
<code>med_tlv_select_network_policy</code>	Enables or disables the MED TLV select network policy LLDP for that interface (true, false)
<code>med_network_policy</code>	Configures the med network policy (1 to 32) to add and remove the network policies
<code>tlv_select</code>	Configures the tlv select option and suboption as array of values

CHAPTER 5

Frequently asked questions

CHAPTER 6

Release notes

This information contains the release notes for Dell EMC Networking Chef.

6.1 Release 1.0.0

Initial Chef support for Dell EMC Networking OS10.

New modules: - os10_bgp - os10_bgp_af - os10_bgp_neighbor - os10_bgp_neighbor_af - os10_image_upgrade - os10_interface - os10_lldp - os10_lldp_interface - os10_monitor - os10_route - os10_snmp

Known issues: - None

You can submit issues for Dell EMC Networking OS10 Chef modules at [Chef Github Issues](#).

7.1 Contact

You can send general comments and feedback to networking_devops_tools@dell.com

CHAPTER 8

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CHAPTER 9

Indices and tables

- `genindex`
- `modindex`
- `search`