Dell EMC Networking Puppet Integration Documentation

Release 0.1

Dell EMC Networking

Jul 07, 2018

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CHAPTER 1

Introduction

This information explains Puppet and the Dell EMC Networking Puppet integration.

1.1 Puppet

Puppet is an open source configuration management tools that can configure infrastructure as code in a human-readable Puppet domain-specific language. The framework supports installation and configuration of devices in a datacenter.

See How Puppet works for more information.

1.2 Dell EMC Networking Puppet integration

Dell EMC Networking modules for Puppet is available for download from Puppet Forge. These modules can be used to manage and automate Dell EMC Networking switches running the OS10 operating system. The current version of the module in Puppet forge has been tested and verified against Puppet version 5.3 and OS10 version 10.4.0.

CHAPTER 2

Installation

2.1 Puppet Master

Puppet Master needs to be installed on a standalone server that has connectivity to all the Dell EMC Networking devices to be managed under Puppet. The dellemcnetworking-dellos10 Puppet module is tested against Puppet Enterprise Edition version 5.3. The dellos10 module needs to be installed on the Puppet Master server.

```
$ puppet module install dellemcnetworking-dellos10
```

See Puppet Labs: Installing Modules for more information.

2.2 Puppet Agent

Each network device to be managed by Puppet requires a one-time installation of the Puppet agent. The `os10_devops_infra_install.sh` script installs the Puppet client and it's dependencies.

The user os10devops must be created with the role of sysadmin (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. After downloading the script, change the permissions using `chmod +x os10_devops_infra_install.sh`. Execute the `os10_devops_infra_install.sh` script to install Puppet and the devops Ruby utilities Debian package.

2.2.1 Usage

```
$ os10_devops_infra_install.sh puppet active_partition/standby_partition local/remote
↪<puppet_client_url> local/remote <os10_devops_ruby_utils_url>
$ os10_devops_infra_install.sh puppet_ruby_utils active_partition/standby_partition␣
↪local/remote <os10_devops_ruby_utils_url>
```

Options

- puppet: used to install both puppet and devops infra module - puppet_ruby_utils: used to install only devops Ruby utilities Debian package for Puppet; Puppet client should be already installed in the switch before installing devops Ruby utilities Debian package for the `puppet_ruby_utils` option
- active_partition: denotes current partition
- standby_partition: denotes standby partition; prerequisites for this option: - OS10 image should be upgraded in the standby partition - Puppet client should also be installed in the loaded or active partition
- local: denotes the relative path in the switch
- remote: denotes the relative path in the remote machine using protocols such as https, ftp, and so on
- <*puppet_client_url*>: Puppet URL should be an HTTPS/FTP path if previous option is remote (for example, https://apt.puppetlabs.com/puppet5-release-jessie.deb) - <*puppet_client_url*>: download the `puppet5-release-jessie.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 utilies URL link from GitHub if 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 puppet standby_partition remote https://apt.puppetlabs.com/puppet5-release-jessie.deb local /home/admin

OR

./os10_devops_infra_install.sh puppet active_partition remote https://apt.puppetlabs.com/puppet5-release-jessie.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 puppet active_partition local /home/admin/ local /home/admin/

OR

./os10_devops_infra_install.sh puppet_ruby_utils standby_partition local /home/admin

OR

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

> **NOTE**: After the image upgrade and reload, execute the Puppet client. If the Puppet client throws the "cannot load such file – xml/libxml" error, execute the /opt/puppetlabs/puppet/bin/gem install libxml-ruby command in root/sudo mode.

CHAPTER 3

Dell EMC Networking OS10 Puppet modules

- dellemcnetworking-dellos10: manage network configuration on devices running OS10
- os10-devops-ruby-utils-1.0.0.deb: execute any OS10 command and provides output to the caller
- os10_devops_infra_install.sh: script file to install Puppet client and `os10-devops-ruby-utils-1.0.0.deb` Debian package

CHAPTER 4

Dell EMC Networking Puppet types

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

4.1 Type: os10_route

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

Attributes

Attribute	Description
destination	Target IP address to which the route must be configured
prefix_len	Netmask of the target IP address
next_hop_list	List of the next-hop IP address for the route to be configured
ensure	Determine whether the route entry should be present or not

4.2 Type: os10_snmp

The `os10_snmp` resource type is to used to manage SNMP configurations in OS10 Enterprise Edition switches. The os10_snmp resource is not an ensurable type and does not have an ensure attribute.

Attributes

Attribute	Description
community_list	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
enabled_traps	Dictionary of entries where the key is trap category and values are the list of subcategory or all to enable traps for all subcategory items
trap_destination	Dictionary of entries where the key is list of [ip,Port] and value is a list with version string ("v1"/"v2") and community string

4.3 Type: os10_monitor

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

Attributes

Attribute	Description
id	ID of the monitor session in the switch; ID needs to be unique (1 and 18)
source	Values of the interfaces that will be configured as source interfaces for this monitoring session (for example, ['ethernet 1/1/9', 'ethernet 1/1/10'])
destination	Name of the destination interface to which traffic has to be mirrored (for example, 'ethernet 1/1/10')
flow_based	Value specifying whether to enable or disable flow-based monitoring (optional value which defaults to false)
shutdown	Property will decide whether to enable or disable the monitoring session; if set to false, the session will be configured but in shutdown state (optional value which 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
desc	Description of the interface
mtu	Maximum transmission unit of the interface
switchport_mode	Switchport mode of the interface; can be either trunk or access in the case of switchport, or can be false when not in L2 mode (trunk, access, absent)
admin	Administrative state of the interface (up, down)
ip_address	IPv4 address and mask of the interface in ip/prefixlen format
ipv6_address	IPv6 address and mask of the interface in ip/prefixlen format
ipv6_autoconfig	Enable or disable IPv6 autoconfig (true, false)
ip_helper	List of IP address for the interface to which UDP broadcasts need to be forwarded to

4.5 Type: os10_image_upgrade

The `os10_image_upgrade` resource type is used to upgrade/downgrade OS10 Enterprise Edition images by providing the filename and location of the image.

Attribute

Attribute	Description
`image_url`	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
`ensure`	Determines whether the BGP configuration should be present or not (true, false)
`asn`	Autonomous system (AS) number of the BGP configuration (1 to 4294967295 or 0.1 to 65535.65535)
`router_id`	Configures the IP address of the local BGP router instance
`max_path_ebgp`	Configures the maximum number of paths to forward packets through eBGP (1 to 64)
`max_path_ibgp`	Configures the maximum number of paths to forward packets through iBGP (1 to 64)
`graceful_restart`	Configures graceful restart capability (true, false)
`log_neighbor_changes`	Configures logging of neighbors up/down
`fast_external_fallover`	Configures reset session if a link to a directly connected external peer goes down
`always_compare_med`	Configures comparing MED from different neighbors
`default_loc_pref`	Configures the default local preference value (1 to 4294967295)
`confederation_identifier`	Sets the autonomous system identifier for the confederation routing domain (1 to 4294967295 or 0.1 to 65535.65535)
`confederation_peers`	Configures peer AS number entries in BGP confederation as a list (1 to 4294967295 and 0.1 to 65535.65535)
`route_reflector_client`	Configures client-to-client route reflection
`route_reflector_cluster_id`	Configures route-reflector cluster-id (1 to 4294967295 or A.B.C.D IPv4 address format)
`bestpath_as_path`	Configures the best-path selection to either ignore or include prefixes received from different AS paths during multipath calculation
`bestpath_med_confed`	Configures best-path to compare MED among confederation paths
`bestpath_med_missing_as_worst`	Configures best-path to treat missing MED as the least preferred one
`bestpath_routerid_ignore`	Configures best-path computation to ignore router identifier

4.7 Type: os10_bgp_af

Attributes

Attribute	Description
ensure	Configures whether the BGP address family section should be present or not
require	Configures the dependant os10_bgp configuration that should be configured before applying the os10_bgp_af configuration
asn	AS number of the BGP configuration (1 to 4294967295 or 0.1 or 65535.65535)
ip_ver	Configures the IP version of this instance of address family configuration (ipv4, ipv6)
aggregate_address	Configures ipv4/ipv6 BGP aggregate address and mask; values should be of the same version as provided in ip_ver parameter
dampening_state	Enable or disable route-flap dampening; when dampening_state is set to true, all timers should be defined
dampening_half_life	Sets dampening half-life time for the penalty (1 to 45)
dampening_reuse	Sets the time value to start reusing a route (1 to 20000)
dampening_suppress	Sets the time value to start suppressing a route (1 to 20000)
dampening_max_suppress	Sets the maximum time duration to suppress a stable route (1 to 255)
dampening_route_map	Configures the name of route-map to specify criteria for dampening (up to 140 characters)
default_metric	Sets the default metric of redistributed routes (1 to 4294967295)
network	List of IPs and mask along with optional route-map string
redistribute	Configures routing protocols that need to be redistributed; valid value is a list of (protocol value); protocol can be connected, ospf, or static; value can be blank or route-map string in the case of connected, static and blank or process-id in the case of ospf

4.8 Type: os10_bgp_neighbor

Attributes

Attribute	Description
require	Configures the dependant os10_bgp configuration that should be configured before applying the os10_bgp_neighbor configuration
ensure	Configures whether the os10_bgp_neighbor should be present or not
asn	AS number of the BGP configuration (1 to 4294967295 or 0.1 to 65535.65535)
neighbor	Specifies a neighbor router IP address or template name for the given configuration (IPv4 or IPv6 address; up to 16 characters)
type	Specifies whether the configuration is for neighbor IP or template
advertisement_interval	Configures the minimum interval between sending BGP routing updates
advertisement_start	Configures the delay initiating OPEN message for the specified time
connection_retry_timer	Configures the peer connection retry timer
remote_as	Specifies the AS number of the BGP neighbor
remove_private_as	Enables or disables configuration to remove private AS number from outbound updates
shutdown	Sets the shutdown state of the neighbor
password	Sets the MD5 password for authentication (up to 128 characters)
send_community_standard	Enables or disables sending standard community attribute
send_community_extended	Enables or disables sending extended community attribute
peergroup	Configures the neighbor to BGP peer-group; inherit configuration of peer-group template; template should be an existing configuration
ebgp_multihop	Configures the maximum-hop count value allowed in eBGP neighbors that are not directly connected (1 to 255)
fall_over	Configures the session fall on peer-route loss
local_as	Configure the local AS number for the BGP peer
route_reflector_client	Configures a BGP neighbor as route-reflector client
weight	Configure the default weight for routes from the neighbor interface (1 to 4294967295)

4.9 Type: os10_bgp_neighbor_af

The resource definition for os10_bgp_neighbor_af that is used to configure address family subconfiguration (for both IPv4 and IPv6) under BGP neighbor subconfiguration.

Attributes

Attribute	Description
require	Configures the dependant os10_bgp configuration that should be configured before applying the os10_bgp_neighbor configuration
ensure	Configures whether the *bgp_neighbor_af* subconfiguration should be present or not
asn	AS number of the BGP configuration (1 to 4294967295 or 0.1 to 65535.65535)
neighbor	Configures the neighbor route IP address to which the current address family subconfiguration
type	Specifies whether the neighbor configuration is of type ip or template
ip_ver	Configures either ipv4 or ipv6 address family
activate	Enables the address family for this neighbor
allowas_in	Configures the allowed local AS number in as-path (1 to 10)
add_path	Configures the setting to send or receive multiple paths; blank string removes the configuration
distribute_filters	Filters networks in routing updates; valid parameter is an array of two prefix-list names (up to 140 characters) for applying policy to incoming and outgoing routes respectively
next_hop_self	Enables or disables the next-hop calculation for this neighbor
route_map	Configures the names of the route-map; valid parameter is an array of two route-map names (up to 140 characters) for filtering incoming and outgoing routing updates

4.10 Type: os10_lldp

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

Attributes

Attribute	Description
holdtime_multiplier	Configures the holdtime multiplier (2 to 10); empty string will remove the holdtime multiplier value from the LLDP configuration
reinit	Configures the reinit value (1 to 10); empty string will remove the reinit value from the LLDP configuration
timer	Configures the timer value ((5 to 254); empty string will remove the timer value from the LLDP configuration
med_fast_start_repeat_count	Configures the med fast start repeat count value (1 to 10); empty string will remove the med fast start repeat count value from the LLDP configuration
enable	Enables disables LLDP globally
med_network_policy	Specifies the hash entries with a set of hash keys id<1-32>, app<guest-voice, guestvoice-signaling, softphone-voice, streaming-video, video-conferencing, voice-signaling, voice, video-signaling>, vlan_id<1-4093>, vlan_type<tag/untag>, priority<0-7>, dscp<0-63>

4.11 Type: os10_lldp_interface

The os10_lldp_interface resource type is to used to manage LLDP configuration per interface in OS10 Enterprise Edition switches. The os10_lldp resource is not an ensurable type and does not have an ensure attribute. The

per-interface name is given as argument for the resource.

Attributes

Attribute	Description
receive	Enables or disables the reception of LLDP for that interface (true, false)
transmit	Enable or diables the transmission of LLDP for that interface (true, false)
med	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)
med_tlv_inventory	Enables or disables the MED TLV select inventory LLDP for that interface (true, false)
med_tlv_network_policy	Enables or disables the MED TLV select network policy LLDP for that interface (true, false)
med_network_policy	Specifies MED policy IDs with a range of <1-32> to add and remove network policies
tlv_select	Specifies the hash of key value pair with LLDP TLV select option as key and suboption as array of values; tlv-select for all the interfaces are enabled by default in the device; values provided in the parameter are to disable the options per interface; values not in the list will be enabled; values for tlv_select options and suboptions are basic-tlv => [“management-address”, “port-description”, “system-capabilities”, “system-description”, “system-name”], dcbxp => [“”], dcbxp-appln => [“iscsi”], dot3tlv => [“macphy-config”, “max-framesize”], dot1tlv => [“link-aggregation”, “port-vlan-id”]

CHAPTER 5

Frequently asked questions

CHAPTER 6

Release notes

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

6.1 Release 1.0.0

Initial Puppet 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

CHAPTER 7

Support

You can submit issues for Dell EMC Networking OS10 Puppet modules at Puppet 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

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