CHAPTER 2

Auto Configuration

Overview

Auto Config REST APIs can be used by an external application to programmatically manage the configuration profiles used to deploy organizations, partitions and networks in the DFA cluster.

Auto Config Database Schema

Organization

Attributes	Type	Require
organizationName	String	Mandatory
description	String	Optional
orchestrationSource	String	Optional

Partition

Attributes	Type	Require
partitionName	String	Mandatory
partitionSegmentId	String	Mandatory
description	String	Optional
serviceNodeIpAddress	String	Optional
organizationName	String	Mandatory
dnsServer	String	Optional
secondaryDNSServer	String	Optional
vrfProfileName	String	Mandatory
vrfName	String	Optional

Attributes	Type	Require
dciId	String	Optional
configArg	String	Optional

Network

Attributes	Type	Require
organizationName	String	Mandatory
dvsId	String	Optional
staticIpStart	String	Optional
networkRole	String	Mandatory
gateway	String	Optional
netmaskLength	String	Optional
gatewayIpv6Address	String	Optional
prefixLength	String	Optional
secondaryGateway	String	Optional
staticIpEnd	String	Optional
vSwitchControllerNetworkId	String	Optional
networkName	String	Mandatory
segmentId	String	Mandatory
vlanId	String	Mandatory
mobilityDomainId	String	Mandatory
description	String	Optional
profileName	String	Mandatory
vSwitchControllerId	String	Optional
configArg	String	Optional
partitionName	String	Mandatory
dhcpScope	subnet	Optional
	gateway	Optional
	ipRange	Optional
vrfName	String	Optional

Profile

Attributes	Type	Require
forwardingMode	String	Mandatory
profileName	String	Mandatory
description	String	Optional
configCommands	String	Mandatory
profileType	String	Mandatory
profileSubType	String	Mandatory

Auto Config REST APIs

The Auto Config REST APIs are mentioned in Table 2-1.

Table 2-1   Auto Config REST APIs

API Function	HTTP Method	Resource at URL https://dcnm-ip/rest/
List organizations	GET	`/auto-config/organizations`
Create an organization	POST	`/auto-config/organizations`
Get an organization	GET	`/auto-config/organizations/{organization-name}`
Update an organization	PUT	`/auto-config/organizations/{organization-name}`
Delete an organization	DELETE	`/auto-config/organizations/{organization-name}`
List partitions	GET	`/auto-config/organizations/{organization-name}/partitions`
Create a partition	POST	`/auto-config/organizations/{organization-name}/partitions`
Get a partition	GET	`/auto-config/organizations/{organization-name}/partitions/{partition-name}`
Update a partition	PUT	`/auto-config/organizations/{organization-name}/partitions/{partition-name}`
Delete a partition	DELETE	`/auto-config/organizations/{organization-name}/partitions/{partition-name}`
List networks	GET	`/auto-config/organizations/{organization-name}/partitions/{partition-name}/networks`
Create a network	POST	`/auto-config/organizations/{organization-name}/partitions/{partition-name}/networks`

Table 2-1   Auto Config REST APIs (Continued)

API Function	HTTP Method	Resource at URL https://dcnm-ip/rest/
Get a network	GET	`/auto-config/organizations/{organization-name}/partitions/{partition-name}/networks/{network-id}`
Update a network	PUT	`/auto-config/organizations/{organization-name}/partitions/{partition-name}/networks/{network-id}`
Delete a network	DELETE	`/auto-config/organizations/{organization-name}/partitions/{partition-name}/networks/{network-id}`
List Auto Configuration Profiles	GET	`/rest/auto-config/profiles`
Create a Auto Configuration profile	POST	`/rest/auto-config/profiles`

Get a Auto Configuration profile	GET	`/rest/auto-config/profiles/{profile-name}`
		
		`/rest/auto-config/profiles/{profile-name}/type/IPVLAN`
		
		`/rest/auto-config/profiles/{profile-name}/type/FPBD`

Update a Auto Configuration profile	PUT	`/rest/auto-config/profiles/{profile-name}`
		
		`/rest/auto-config/profiles/{profile-name}/type/IPVLAN`
		
		`/rest/auto-config/profiles/{profile-name}/type/FPBD`

Delete a Auto Configuration Profile	DELETE	`/rest/auto-config/profiles/{profile-name}`
		
		`/rest/auto-config/profiles/{profile-name}/type/IPVLAN`
		
		`/rest/auto-config/profiles/{profile-name}/type/FPBD`

Get auto config settings	GET	`/auto-config/settings`
Update auto config settings	PUT	`/auto-config/settings`

Configuration Profiles Construct

The Dynamic Fabric Automation (DFA) network auto-configuration requires the use of configuration profiles (config profiles) to instantiate the required network onto a leaf. Config-profile templates are parameterized templates that allow for the instantiation of specific network config-profiles. They are analogous to a class in object oriented terminology. The combination of a class object with specific parameters represents an instance of that object.

Currently DFA supports two types of templates (aka classes); **org:partition config profile** and the **network config profile**. The network config-profile can optionally "include" the **org:partition** config profile in order to create a composite object which is an **organization** network config-profile. Many network config-profiles may include the same partition config profile if many networks belong to the same organization. If a network config-profile does not include a partition by name, then it exists in the default organization.

```
config-profile <network profile name>
[include profile <partition profile name>]
end
```

Note **config-profile + <*parameters*>** ➔ org network config-profile **instance**.

Once a network config-profile instance is populated in DCNM, it can then be pulled dynamically by leafs to instantiate the network onto the leafs.

Typically, config-profiles will be defined by the network administrator. A config-profile has a `ProfileName` and set of parameterized commands associated with it. The parameters are stored in the LDAP database. The REST APIs , can be employed to programmatically create, read, delete, and update these profiles and parameters from external applications as documented in the section in

Note The set of config-profiles created by one set of applications (Example; network administration applications) can further be made available to another set of applications (Example; compute/storage orchestration engines such as Openstack, UCS Director or any 3rd party applications) through the documented REST APIs.

Example 2:
The following is an example of a partition config-profile included by a network config-profile that can be used or created through the REST APIs.

```
config profile vrf-common
   vrf context $vrfName
    vni $include_l3_segid
    rd auto
    address-family ipv4 unicast
     route-target import 111:222
     route-target both auto
    address-family ipv6 unicast
     route-target import 111:222
     route-target both auto
    router bgp $asn
     vrf $vrfName
       address-family ipv4 unicast
```

```
            redistribute hmm route-map FABRIC-RMAP-REDIST-HOST
            redistribute direct route-map FABRIC-RMAP-REDIST-SUBNET
            maximum-paths ibgp 2
          address-family ipv6 unicast
            redistribute hmm route-map FABRIC-RMAP-REDIST-HOST
            redistribute direct route-map FABRIC-RMAP-REDIST-SUBNET
            maximum-paths ibgp 2
end

config profile defaultNetworkIpv4EfProfile
vlan $vlanId
    vn-segment $segmentId
    mode fabricpath
  interface vlan $vlanId
    vrf member $vrfName
    ip address $gatewayIpAddress/$netMaskLength
    fabric forwarding mode proxy-gateway
    no ip redirects
    no shutdown
  include profile vrf-common
end
```

When this config-profile is instantiated with specific parameters it may appear as follows:

```
    vrf context Pepsi
     vni 802004
     rd auto
     address-family ipv4 unicast
      route-target import 111:222
      route-target both auto
     address-family ipv6 unicast
      route-target import 111:222
      route-target both auto
     router bgp 100
      vrf Pepsi
       address-family ipv4 unicast
         redistribute hmm route-map FABRIC-RMAP-REDIST-HOST
         redistribute direct route-map FABRIC-RMAP-REDIST-SUBNET
         maximum-paths ibgp 2
       address-family ipv6 unicast
         redistribute hmm route-map FABRIC-RMAP-REDIST-HOST
         redistribute direct route-map FABRIC-RMAP-REDIST-SUBNET
         maximum-paths ibgp 2

vlan 3000
    vn-segment 11000
    mode fabricpath
interface vlan 3000
    vrf member Pepsi
    ip address 1.1.1.254/24
    fabric forwarding mode proxy-gateway
    no ip redirects
```

```
no shutdown
```

Pre-Packaged Config-Profiles

To cover most of the common scenarios, the following table lists the set of config-profiles that will come pre-packaged into the DCNM profiles database.

Table 2-2   DCNM Pre-Packaged Config-Profiles

Profile Type	Profile Name	Forwarding Mode	Profile Description
Network	defaultNetworkIpv4EfProfile	proxy-gateway	Profile for an IPv4 enabled network segment in the non-default partition with DFA Enhanced Forwarding mode.
Network	defaultNetworkIpv4TfProfile	anycast-gateway	Profile for an IPv4 enabled network segment in the non-default partition with DFA Traditional Forwarding mode.
Network	defaultNetworkIpv6EfProfile	proxy-gateway	Profile for an IPv6 enabled network segment in the non-default partition with DFA Enhanced Forwarding mode.
Network	defaultNetworkIpv6TfProfile	anycast-gateway	Profile for an IPv6 enabled network segment in the non-default partition with DFA Traditional Forwarding mode.
Network	defaultNetworkIpv4v6EfProfile	proxy-gateway	Profile for an IPv4 and IPv6 enabled network segment in the non-default partition with DFA Enhanced Forwarding mode.
Network	defaultNetworkIpv4v6TfProfile	anycast-gateway	Profile for an IPv4 and IPv6 enabled network segment in the non-default partition with DFA Traditional Forwarding mode.
Network	defaultNetworkdefault PartitionIpv4EfProfile	proxy-gateway	Profile for an IPv4 enabled network segment in the non-default partition with an edge service node with DFA Enhanced Forwarding mode.

Table 2-2 **DCNM Pre-Packaged Config-Profiles (Continued)**

Profile Type	Profile Name	Forwarding Mode	Profile Description
Network	defaultNetworkIpv4v6TfProfile	anycast-gateway	Profile for an IPv4 and IPv6 enabled network segment in the non-default partition with DFA Traditional Forwarding mode.
Network	defaultNetworkdefaultPartitionIpv4EfProfile	proxy-gateway	Profile for an IPv6 enabled network segment in the default partition with DFA Enhanced Forwarding mode.
Network	defaultNetworkdefaultPartitionIpv6TfProfile	anycast-gateway	Profile for an IPv6 enabled network segment in the default partition with DFA Traditional Forwarding mode.
Network	defaultNetworkdefaultPartitionIpv4v6EfProfile	proxy-gateway	Profile for an IPv4 and IPv6 enabled network segment in the default partition with DFA Enhanced Forwarding mode
Network	defaultNetworkdefaultPartitionIpv4v6TfProfile	anycast-gateway	Profile for an IPv4 and IPv6 enabled network segment in the default partition with DFA Traditional Forwarding mode.
Network	defaultNetworkL2GblVlanProfile	none	Profile for L2 network that is a global vlan
Network	defaultNetworkL2Profile	none	Profile for L2 network segment where DFA L3 routing is not enabled. Another node (service node or router) attached to a leaf node can do the routing as needed.
Network	defaultNetworkIpv4TfGblVlanProfile	anycast-gateway	Profile for a global vlan based IPv4 enabled network in the non-default partition with DFA Traditional Forwarding mode.
Network	defaultNetworkIpv6TfGblVlanProfile	anycast-gateway	Profile for a global vlan based IPv6 enabled network in the non-default partition with DFA Traditional Forwarding mode.

Table 2-2   DCNM Pre-Packaged Config-Profiles (Continued)

Profile Type	Profile Name	Forwarding Mode	Profile Description
Network	defaultNetworkIpv4v6TfGblVlanProfile	anycast-gateway	Profile for a global vlan based IPv4 and IPv6 enabled network in the non-default partition with DFA Traditional Forwarding mode.
Network	defaultNetworkdefaultPartitionIpv4TfGblVlanProfile	anycast-gateway	Profile for a global vlan based IPv4 enabled network in the default partition with DFA Traditional Forwarding mode
Network	defaultNetworkdefaultPartitionIpv6TfGblVlanProfile	anycast-gateway	Profile for a global vlan based IPv6 enabled network in the default partition with DFA Traditional Forwarding mode.
Network	defaultNetworkdefaultPartitionIpv4v6TfGblVlanProfile	anycast-gateway	Profile for a global vlan based IPv4 and IPv6 enabled network in the default partition with DFA Traditional Forwarding mode
Network	defaultNetworkIpv4EfEdgeServiceProfile	Proxy-gateway	Profile for an IPv4 enabled network segment in the non-default partition with an edge service node in DFA enhanced forwarding mode.
Network	defaultNetworkIpv4TfEdgeServiceProfile	anycast-gateway	Profile for an IPv4 enabled network segment in the non-default partition with an edge service node with DFA Traditional forwarding mode.
Network	defaultNetworkIpv4v6EfEdgeServiceProfile	proxy-gateway	Profile for an IPv4 and IPv6 enabled network segment in the non-default partition with an edge service node with DFA Enhanced Forwarding mode.
Network	defaultNetworkIpv4v6TfEdgeServiceProfile	anycast-gateway	Profile for an IPv4 and IPv6 enabled network segment in the non-default partition with an edge service node with DFA Traditional forwarding mode.

Table 2-2   DCNM Pre-Packaged Config-Profiles (Continued)

Profile Type	Profile Name	Forwarding Mode	Profile Description
Network	externalNetworkIpv4TfStaticRoutingProfile	anycast-gateway	Profile for an IPv4 enabled service network segment in the non-default external partition used for Edge service node with static routing in DFA traditional forwarding mode.
Network	serviceNetworkIpv4TfStaticRoutingProfile	anycast-gateway	Profile for an IPv4 enabled service network segment in the non-default partition used for service node interface with static routing in DFA traditional forwarding mode.
Network	serviceNetworkIpv4TfDynamicRoutingProfile	anycast-gateway	Profile for an IPv4 enabled service network segment in the non-default partition used for service node interface with dynamic routing in DFA traditional forwarding mode
Network	externalNetworkIpv4TfDynamicRoutingProfile	anycast-gateway	Profile for an IPv4 enabled service network segment in the non-default external partition used for Edge service node with dynamic routing in DFA traditional forwarding mode
Network	serviceNetworkIpv4TfL3VpathServiceNodeProfile	anycast-gateway	Profile for an IPv4 enabled vPath L3 mode service network segment used for vPath service nodes in DFA traditional forwarding mode
Network	serviceNetworkIpv4EfL3VpathServiceClassifierProfile	proxy-gateway	Profile for an IPv4 enabled vPath L3 mode service network segment used for service classifiers in DFA enhanced forwarding mode
Network	serviceNetworkL2VpathProfile	none	Profile for vPath L2 mode service network segment used for vPath service nodes
Network	serviceNetworkIpv4TfLBProfile	anycast-gateway	Profile for an IPv4 enabled service network segment in the non-default partition used for a Load Balancer service node in one-armed routed mode.

Table 2-2   *DCNM Pre-Packaged Config-Profiles (Continued)*

Profile Type	Profile Name	Forwarding Mode	Profile Description
Network	defaultNetworkIpv4EfLBProfile	proxy-gateway	Profile for an IPv4 enabled network segment in DFA enhanced forwarding mode in the non-default partition that has a Load Balancer service node
Network	defaultNetworkIpv4TfLBProfile	anycast-gateway	Profile for an IPv4 enabled network segment in DFA traditional forwarding mode in the non-default partition that has a Load Balancer service node.
Network	serviceNetworkIpv4TfLBChainl LBESProfile	anycast-gateway	Profile for an IPv4 enabled service network segment in the non-default partition comprising a service chain with a Load Balancer (LB) and Tenant Edge Firewall both in routed mode with dynamic routing enabled. This service segment is used for the LB
Network	serviceNetworkIpv4TfEdgeServ icesChainlLBESProfile	anycast-gateway	Profile for an IPv4 enabled service network segment in the non-default partition comprising a service chain with a Load Balancer (LB) and Tenant Edge Firewall both in routed mode with dynamic routing enabled. This service segment is used for the tenant edge firewall

Table 2-2   DCNM Pre-Packaged Config-Profiles (Continued)

Profile Type	Profile Name	Forwarding Mode	Profile Description
Network	defaultNetworkIpv4EfChainLBESProfile	proxy-gateway	Profile for an IPv4 enabled network segment in DFA enhanced forwarding mode in the non-default partition comprising a service chain with a Load Balancer (LB) and Tenant Edge Firewall both in routed mode with dynamic routing enabled
Network	defaultNetworkIpv4TfChainLBESProfile	anycast-gateway	Profile for an IPv4 enabled network segment in DFA traditional forwarding mode in the non-default partition comprising a service chain with a Load Balancer (LB) and Tenant Edge Firewall both in routed mode with dynamic routing enabled

For information on the default configuration profiles in the DCNM DFA package, see Appendix A, "Pre-Packaged Config Profiles".

For information on how to use the REST APIs for auto configuration, see Appendix B, "Auto Config Examples".