Hewlett Packard Enterprise

HPE aruba networking

AOS-CX 10.13 Update:
NAE Advanced Prefix Monitoring and Alerting

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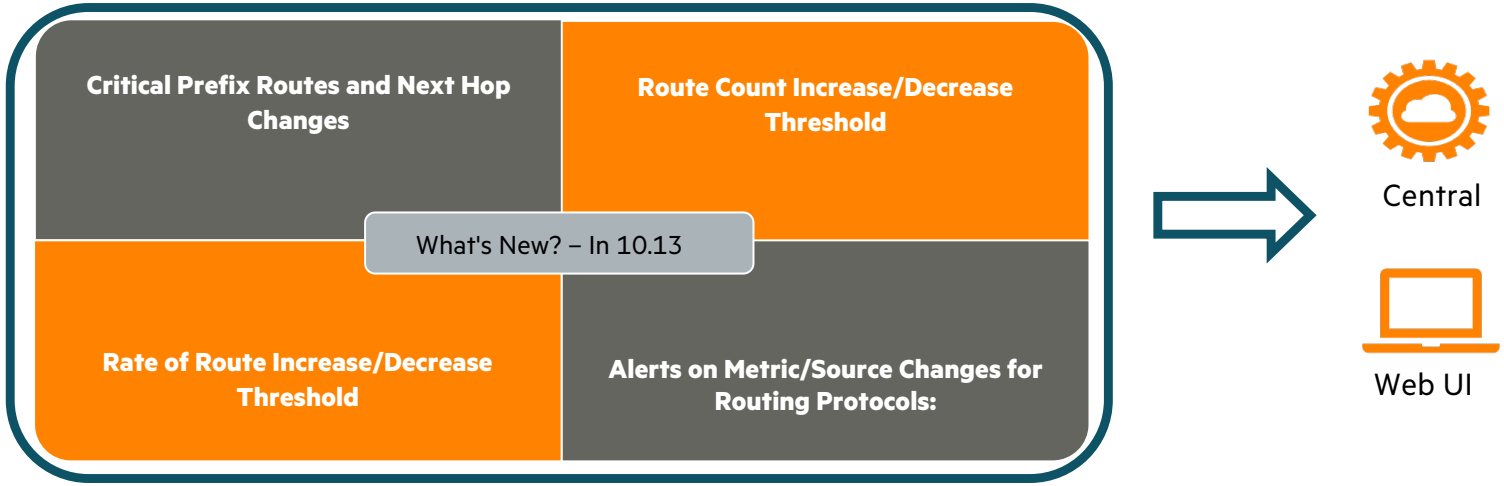
Overview

Overview

- This feature is an update to existing routing health NAE agent which helps user with advanced monitoring and notification capabilities, enabling them to maintain a resilient and responsive infrastructure.

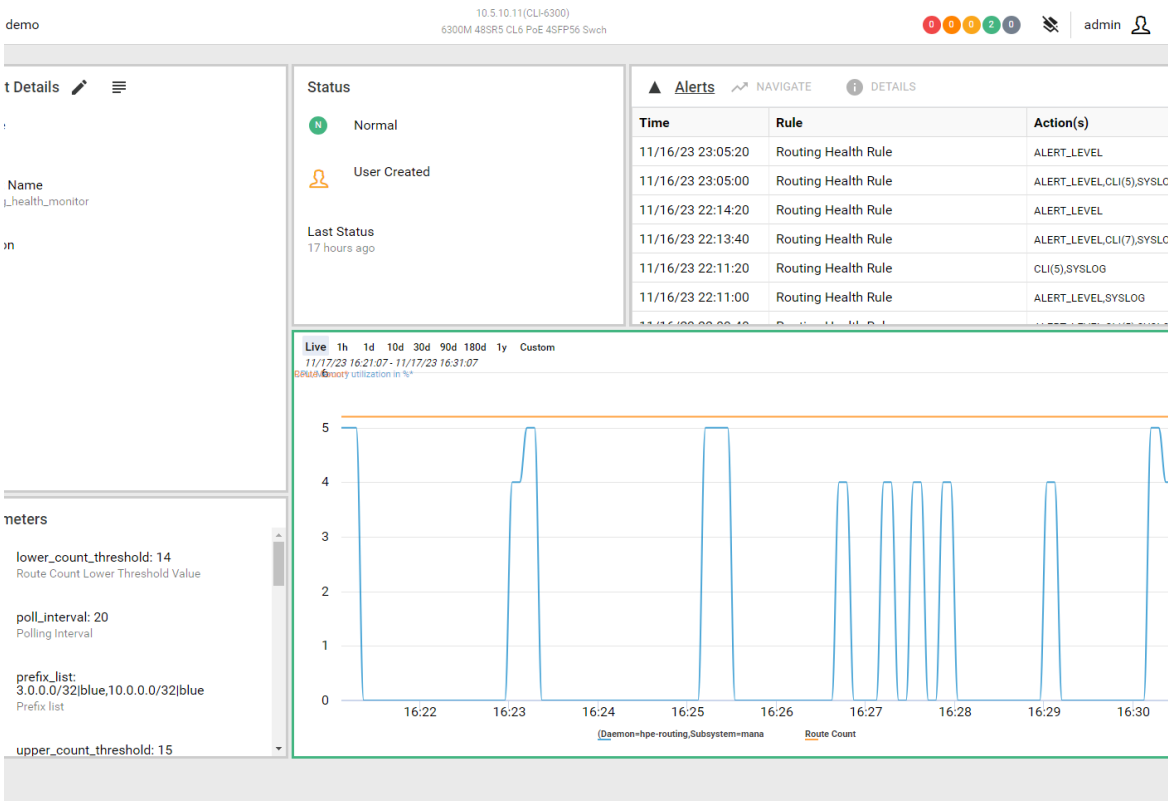


- The routing_health_monitor script provides a robust solution for monitoring and maintaining the health of network routing infrastructure and this data will be consumed by CNX

Use Cases

Use Cases

- Analytics for routing health of the devices thus helping in proactive issue resolution.
- Emerging issues are identified early, allowing for prompt intervention
- Enhanced network reliability and user satisfaction
- Root cause analysis
- Relevant historical data with configuration changes



Details

Details – Configurable parameters

Examples of how the parameters are modified

STRING	bgp_neighbor	BGP Neighbor	Default: *	
INTEGER	cpu_cooldown_interval	Time interval in seconds to pause monitoring routing health	Default: 300	
INTEGER	cpu_threshold	High CPU Threshold Percentage	Default: 80	
INTEGER	cpu_time_interval	Time interval in seconds to consider for CPU utilization	Default: 60	
STRING	hpe_routing_daemon	System daemon for hpe-routing	Default: hpe-routing	
INTEGER	lower_count_threshold	Route Count Lower Threshold Value	Default: 9500	14
STRING	ospf_area	OSPF area	Default: *	
STRING	ospf_interface	OSPF interface	Default: *	

Details - Configurable parameters

INTEGER	ospf_state_threshold	OSPF state threshold	Default: 300	
INTEGER	poll_interval	Polling Interval	Default: 60	20
STRING	prefix_list	Prefix list	Default:	3.0.0.0/32|blue,10.0.0.0/32
INTEGER	rate_of_decrease_threshold	Rate of decrease threshold (in percentage)	Default: 10	
INTEGER	rate_of_increase_threshold	Rate of increase threshold (in percentage)	Default: 10	
INTEGER	route_count_time_interval	Time interval in minutes for calculating rate of change of rou	Default: 1	
INTEGER	upper_count_threshold	Route Count Upper Threshold Value	Default: 10000	15
STRING	vrf	VRF	Default: *	

Configuration

Configuration & monitoring of - Prefix Route Deletion

Monitors critical prefixes entered by user

```
no ip route 4.0.0.0/32 10.0.0.2 vrf blue
```

Corresponding NAE-Alert

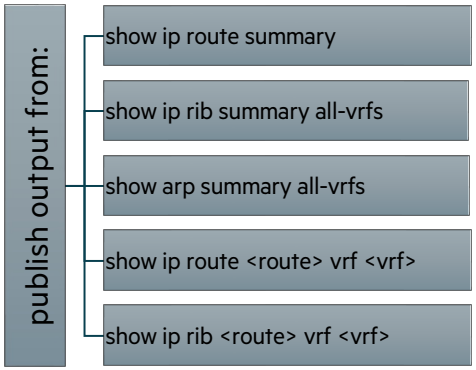
▲ Alert Details

Agent	demo
Rule	Routing Health Rule
Time	11/16/23 13:04:00
Action(s)	CLI(5),SYSLOG
Action Result(s):	
SYSLOG	[local] Prefixes got deleted: 4.0.0.0/32|blue
CLI (show ip route summary all-vrfs)	Output - SUCCESS
CLI (show arp summary all-vrfs)	Output - SUCCESS
CLI (show ip rib 4.0.0.0/32 vrf blue)	Output - SUCCESS
CLI (show ip rib summary all-vrfs)	Output - SUCCESS
CLI (show ip route 4.0.0.0/32 vrf blue)	Output - SUCCESS

```
ip route 4.0.0.0/32 10.0.0.2 vrf blue
```

▲ Alert Details

Agent	demo
Rule	Routing Health Rule
Time	11/16/23 16:04:20
Action(s)	SYSLOG
Action Result(s):	
SYSLOG	[local] Prefixes are added back: 4.0.0.0/32|blue



Configuration & monitoring of– Next hop Addition/deletion

```
ip route 3.0.0.0/32 10.0.0.3 vrf blue
ip route 3.0.0.0/32 10.0.0.4 vrf blue
```

```
no ip route 3.0.0.0/32 10.0.0.3 vrf blue
```

Next hops are monitored as a part of Prefix list changes, There isn't a separate filed to modify this parameter

▲ Alert Details

Agent	demo
Rule	Routing Health Rule
Time	11/16/23 22:11:20
Action(s)	CLI(5),SYSLOG
Action Result(s):	
SYSLOG	[local] Nexthops are added: {3.0.0.0/32|blue: [10.0.0.3, 10.0.0.4]}
CLI (show arp summary all-vrfs)	Output - SUCCESS
CLI (show ip rib 3.0.0.0/32 vrf blue)	Output - SUCCESS
CLI (show ip rib summary all-vrfs)	Output - SUCCESS
CLI (show ip route 3.0.0.0/32 vrf blue)	Output - SUCCESS
CLI (show ip route summary all-vrfs)	Output - SUCCESS

▲ Alert Details

Agent	demo
Rule	Routing Health Rule
Time	11/16/23 22:13:40
Action(s)	ALERT_LEVEL,CLI(7),SYSLOG
Action Result(s):	
Alert Level Changed	Mi Minor
SYSLOG	[local] Nexthops are deleted: {3.0.0.0/32|blue: [10.0.0.3]}
CLI (show ip rib summary all-vrfs)	Output - SUCCESS
CLI (show ip route 3.0.0.0/32 vrf blue)	Output - SUCCESS
CLI (show ip route summary all-vrfs)	Output - SUCCESS
CLI (ping 10.0.0.3 vrf blue repetitions 2)	Output - SUCCESS
CLI (show arp summary all-vrfs)	Output - SUCCESS
CLI (show arp vrf blue | inc 10.0.0.3)	Output - SUCCESS
CLI (show ip rib 3.0.0.0/32 vrf blue)	Output - SUCCESS

Configuration & Monitoring of Route count Increase/Decrease threshold

CRITICAL -Alert remains till route count is less than the lower threshold

Alert is generated if route count is greater than the upper threshold

▲ Alert Details

Agent	demo
Rule	Route count rule
Time	11/16/23 16:12:31
Action(s)	ALERT_LEVEL,SYSLOG
Monitors:	Route Count
Time Series:	Route_countSum_Route_count
Resources:	TimeInterval=,VRF=
Action Result(s):	
Alert Level Changed	Ma Major
SYSLOG	[local] Current route count is 13 which is below the lower threshold value of 14

```
no ip route 1.0.0.0/32 10.0.0.2 vrf blue
no ip route 2.0.0.0/32 10.0.0.2 vrf blue
no ip route 3.0.0.0/32 10.0.0.2 vrf blue
no ip route 4.0.0.0/32 10.0.0.2 vrf blue
no ip route 5.0.0.0/32 10.0.0.2 vrf blue
no ip route 6.0.0.0/32 10.0.0.2 vrf blue
no ip route 7.0.0.0/32 10.0.0.2 vrf blue
no ip route 8.0.0.0/32 10.0.0.2 vrf blue
ip route 9.0.0.0/32 10.0.0.2 vrf blue
ip route 10.0.0.0/32 10.0.0.2 vrf blue
ip route 11.0.0.0/32 10.0.0.2 vrf blue
ip route 12.0.0.0/32 10.0.0.2 vrf blue
ip route 13.0.0.0/32 10.0.0.2 vrf blue
ip route 14.0.0.0/32 10.0.0.2 vrf blue
ip route 15.0.0.0/32 10.0.0.2 vrf blue
ip route 16.0.0.0/32 10.0.0.2 vrf blue
ip route 17.0.0.0/32 10.0.0.2 vrf blue
ip route 18.0.0.0/32 10.0.0.2 vrf blue
ip route 19.0.0.0/32 10.0.0.2 vrf blue
ip route 20.0.0.0/32 10.0.0.2 vrf blue
ip route 21.0.0.0/32 10.0.0.2 vrf blue
```

Deleting Certain routes and checking the threshold

```
no ip route 1.0.0.0/32 10.0.0.2 vrf blue
no ip route 2.0.0.0/32 10.0.0.2 vrf blue
no ip route 3.0.0.0/32 10.0.0.2 vrf blue
no ip route 4.0.0.0/32 10.0.0.2 vrf blue
no ip route 5.0.0.0/32 10.0.0.2 vrf blue
ip route 6.0.0.0/32 10.0.0.2 vrf blue
ip route 7.0.0.0/32 10.0.0.2 vrf blue
ip route 8.0.0.0/32 10.0.0.2 vrf blue
ip route 9.0.0.0/32 10.0.0.2 vrf blue
ip route 10.0.0.0/32 10.0.0.2 vrf blue
ip route 11.0.0.0/32 10.0.0.2 vrf blue
ip route 12.0.0.0/32 10.0.0.2 vrf blue
ip route 13.0.0.0/32 10.0.0.2 vrf blue
ip route 14.0.0.0/32 10.0.0.2 vrf blue
ip route 15.0.0.0/32 10.0.0.2 vrf blue
ip route 16.0.0.0/32 10.0.0.2 vrf blue
ip route 17.0.0.0/32 10.0.0.2 vrf blue
ip route 18.0.0.0/32 10.0.0.2 vrf blue
ip route 19.0.0.0/32 10.0.0.2 vrf blue
ip route 20.0.0.0/32 10.0.0.2 vrf blue
ip route 21.0.0.0/32 10.0.0.2 vrf blue
```

▲ Alert Details

Agent	demo
Rule	Route count rule
Time	11/16/23 16:22:22
Action(s)	CLI(2),SYSLOG
Monitors:	Route Count
Time Series:	Sum_Route_countRoute_count
Resources:	TimeInterval=,VRF=
Action Result(s):	
SYSLOG	[local] Current route count is 16 which exceeds the upper threshold value of 15
CLI (show ip route summary all-vrfs)	Output - SUCCESS
CLI (show ipv6 route summary all-vrfs)	Output - SUCCESS

Configuration & monitoring of – Rate of change of routes

As a result of Deleting few routes ; the rate of decrease / increase of routes is captured by the routing-agent

▲ Alert Details

Agent	demo
Rule	Rate of change of routes count on the switch
Time	11/16/23 16:10:00
Action(s)	CLI(2),SYSLOG
Action Result(s):	
SYSLOG	[local] The rate of decrease of the routes on the switch which is 22.22% is greater than the threshold value of 10%
CLI (show ip route summary all-vrfs)	Output - SUCCESS
CLI (show ipv6 route summary all-vrfs)	Output - SUCCESS

▲ Alert Details

Agent	demo
Rule	Rate of change of routes count on the switch
Time	11/16/23 16:22:00
Action(s)	ALERT_LEVEL,CLI(2),SYSLOG
Action Result(s):	
Alert Level Changed	C Critical
SYSLOG	[local] The rate of increase of the routes on the switch which is 23.08% is greater than the threshold value of 10%
CLI (show ipv6 route summary all-vrfs)	Output - SUCCESS
CLI (show ip route summary all-vrfs)	Output - SUCCESS

Configuration & monitoring of – Metric/ distance update

Here, one of my static routes are changed to OSPF and NAE –agent alerts this change.

```
switch(config)# router ospf 1
switch(config-ospf-1)# distance 2
switch(config)# router ospf 1
switch(config-ospf-1)# default-metric 5
```

Alert Details

Agent	demo
Rule	Routing Health Rule
Time	11/16/23 23:05:00
Action(s)	ALERT_LEVEL,CLI(5),SYSLOG(3)
Action Result(s):	
Alert Level Changed	Mi Minor
SYSLOG	[local] Prefixes metric has changed: {3.0.0.0/32|blue: {old: 0, new: 5}}
SYSLOG	[local] Prefixes distance has changed: {3.0.0.0/32|blue: {old: 1, new: 2}}
SYSLOG	[local] Prefixes source has changed: {3.0.0.0/32|blue: {old: static, new: ospf}}
CLI (show ip rib summary all-vrfs)	Output - SUCCESS
CLI (show ip route 3.0.0.0/32 vrf blue)	Output - SUCCESS
CLI (show ip route summary all-vrfs)	Output - SUCCESS
CLI (show ip rib 3.0.0.0/32 vrf blue)	Output - SUCCESS
CLI (show arp summary all-vrfs)	Output - SUCCESS

CLOSE

Troubleshooting

Troubleshooting

```
CLI-6300(config)# show nae-agent alerts
<1> 2023-11-16 16:22:22 An action has been triggered by NAE agent demo
<2> 2023-11-16 16:22:00 An action has been triggered by NAE agent demo
<3> 2023-11-16 16:22:00 An action has been triggered by NAE agent demo
<4> 2023-11-16 16:12:31 An action has been triggered by NAE agent demo
<5> 2023-11-16 16:10:00 An action has been triggered by NAE agent demo
<6> 2023-11-16 16:09:00 An action has been triggered by NAE agent demo
<7> 2023-11-16 16:07:40 An action has been triggered by NAE agent demo
<8> 2023-11-16 16:04:20 An action has been triggered by NAE agent demo
<9> 2023-11-16 16:03:40 An action has been triggered by NAE agent demo
```

```
CLI-6300(config)# clear nae-data
This action will delete NAE data monitored so far.
Do you want to continue (y/n)?
```

```
CLI-6300(config)# show nae-script
-------------------------------------------------------
Script Name                  Version   Origin    Status
-------------------------------------------------------
routing_health_monitor       2.7       user      VALIDATED
system_resource_monitor      1.6       system    VALIDATED
```

Troubleshooting

- Show nae-agent alerts details

```
CLI-6300(config)# show nae-agent alerts details
Alert message       : 2023-11-16 16:22:22 An action has been triggered by NAE agent demo
Action(s) Performed : Syslog(1), CLI(2)


Action Details
=====================
Action Syslog       :
                      [local] Current route count is 16 which exceeds the upper threshold value of 15
Action CLI          :


<1> CLI command(s)
---------------------
show ip route summary all-vrfs
---------------------
Output
---------------------
CLI-6300# show ip route summary all-vrfs


 IPv4 Route Table Summary


 VRF name :  blue
  Protocol      Active Routes
 -------------- -------------
  connected      1
  local          1
  static         15
---------------------
```

Demo

Thank you

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