AOS-CX & IP-SLA POC

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Customer Requirements

- Two path: Active – Standby links
- NQA or IP-SLA must be used to select the path.
  - Switch detects failure -> Change to standby link automatically.
  - Automatic fallback to ppal link (when available).
- Dynamic routing cannot be used.
SW1: 172.16.0.101
SW2: 172.16.0.102
SW3: 172.16.0.103
SW4: 172.16.0.104
PC1: 172.16.0.108
PC2: 172.16.0.109
SW1 configuration

clock timezone america/bogota
logging 172.16.0.80 severity debug vrf mgmt
ssh server vrf mgmt

vlan 1
interface mgmt
   no shutdown
   ip static 172.16.0.101/24
default-gateway 172.16.0.11
interface 1/1/1
   no shutdown
   ip address 10.10.12.1/30
interface 1/1/2
   no shutdown
   ip address 10.10.13.1/30
interface 1/1/3
   no shutdown
   ip address 192.168.1.1/24
ip route 10.10.24.0/30 10.10.12.2
ip route 10.10.34.0/30 10.10.13.2
ip route 192.168.2.0/24 10.10.13.2 distance 10
ip route 192.168.2.0/24 10.10.12.2
ip dns server-address 8.8.8.8 vrf mgmt
https-server rest access-mode read-write
https-server vrf mgmt

Syslog server
WAN - ppal
WAN - backup
backup route
Main route
SW1
ip-sla ppal

icmp-echo 10.10.24.2 source 1/1/1 payload-size 400 probe-interval 10 start-test
Test connectivity between PC1 and PC2 – ppal link

```
PC1# traceroute 192.168.2.5 vrf default
traceroute to 192.168.2.5 (192.168.2.5), 1 hops min, 30 hops max, 3 sec. timeout, 3 probes
   1  192.168.1.1  1.403ms  1.235ms  1.021ms  SW1
   2 10.10.12.2  2.357ms  1.822ms  1.819ms  SW2
   3 10.10.24.2  2.521ms  2.146ms  2.161ms  SW4
   4 192.168.2.5  2.976ms  2.996ms  2.818ms
PC1#
PC1# ping 192.168.2.5
PING 192.168.2.5 (192.168.2.5) 100(128) bytes of data.
108 bytes from 192.168.2.5: icmp_seq=1 ttl=61 time=3.46 ms
108 bytes from 192.168.2.5: icmp_seq=2 ttl=61 time=2.73 ms
108 bytes from 192.168.2.5: icmp_seq=3 ttl=61 time=2.98 ms
108 bytes from 192.168.2.5: icmp_seq=4 ttl=61 time=3.79 ms
108 bytes from 192.168.2.5: icmp_seq=5 ttl=61 time=3.26 ms
--- 192.168.2.5 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4088ms
rtt min/avg/max/mdev = 2.732/3.248/3.792/0.369 ms
PC1#
```
SW1
ip-sla backup
icmp-echo 10.10.34.2 source 1/1/2 payload-size 400 probe-interval 10 start-test
Test connectivity between PC1 and PC2 – backup link

**Manual config change to backup link**

```plaintext
SW1# conf t
SW1(config)# no ip route 192.168.2.0/24 10.10.12.2

SW4# conf t
SW4(config)# no ip route 192.168.1.0/24 10.10.24.1
```

```plaintext
PC1# traceroute 192.168.2.5
traceroute to 192.168.2.5 (192.168.2.5), 1 hops min, 30 hops max, 3 sec. timeout, 3 probes
 1   192.168.1.1  1.766ms  1.225ms  1.313ms
 2   10.10.13.2   3.202ms  2.508ms  2.194ms
 3   10.10.34.2   3.228ms  2.652ms  2.833ms
 4   192.168.2.5   3.944ms  3.735ms  3.431ms

PC1# ping 192.168.2.5
PING 192.168.2.5 (192.168.2.5) 100(128) bytes of data.
100 bytes from 192.168.2.5: icmp_seq=1 ttl=61 time=3.78 ms
100 bytes from 192.168.2.5: icmp_seq=2 ttl=61 time=3.97 ms
100 bytes from 192.168.2.5: icmp_seq=3 ttl=61 time=3.90 ms
100 bytes from 192.168.2.5: icmp_seq=4 ttl=61 time=3.46 ms
100 bytes from 192.168.2.5: icmp_seq=5 ttl=61 time=3.64 ms

--- 192.168.2.5 ping statistics ---
 5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 3.465/3.752/3.970/0.189 ms
```

SW1  SW3  SW4
IP-SLA LAN2LAN

SW1
ip-sla LAN2LAN
icmp-echo 192.168.2.1 source 1/1/3 payload-size 400 probe-interval 10 start-test
- “ArubaOS-CX supports only SLA configuration through CLI and thresholds can be configured using NAE agents using WebUI/REST.”

- “ArubaOS-CX supports only forever test.”

- “NAE agents must be triggered for each IP-SLA test on every switch.”

- “Predefined actions are action functions that are built in to the Aruba Network Analytics Engine framework. These functions enable the agents of a script to:
  - Execute CLI commands in the ArubaOS-CX network operating system ()
  - Send messages to the system log.”
Install the connectivity_monitor script
LAN2LAN IP-SLA Agent

Create Agent

Script
connectivity_monitor

Agent Name
LAN2LAN-Connection
## LAN2LAN IP-SLA Agent

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Description</th>
<th>More Info</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTEGER</td>
<td>connectivity_check_rate</td>
<td>Connectivity Check Rate (in minutes)</td>
<td>Default: 1</td>
<td>1</td>
</tr>
<tr>
<td>STRING</td>
<td>ipsla_session_name</td>
<td>IP-SLA Session Name</td>
<td>Default:</td>
<td>LAN2LAN</td>
</tr>
</tbody>
</table>

- **Save running config to startup**
  - **CREATE**
  - **CANCEL**
WAN-Backup IP-SLA Agent

Create Agent

Script
connectivity_monitor

Agent Name
WAN-BACKUP-Connection
# WAN-Backup IP-SLA Agent

<table>
<thead>
<tr>
<th>Type</th>
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<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTEGER</td>
<td>connectivity_check_rate</td>
<td>Connectivity Check Rate (in minutes)</td>
<td>Default: 1</td>
<td>1</td>
</tr>
<tr>
<td>STRING</td>
<td>ipsla_session_name</td>
<td>IP-SLA Session Name</td>
<td>Default: backup</td>
<td>backup</td>
</tr>
</tbody>
</table>

- **Save running config to startup**

[CREATE] [CANCEL]
Download the connectivity_monitor script
Edit the connectivity_monitor script, rename it

```python
Manifest = {
    'Name': 'connectivity_monitor_ppal',
    'Description': 'This script monitors the reachability between two devices given the IP-SLA session. The IP-SLA session has to be configured in the switch. This script will check connectivity/reachability between two devices.',
    'Version': '1.1',
    'Author': 'Aruba Networks'
}
```

ParameterDefinitions = {
    'connectivity_check_rate': {
        'Name': 'Connectivity Check Rate (in minutes)',
        'Description': 'The rate at which, status of the connectivity is checked. The value should be (at least) twice the probe-interval of the IP-SLA session. \n\n-{measured in minutes}\nDefault value is 1 minute \n{assuming the min probe-interval as 5 seconds.} \nMANDATORY FIELD',
    }
}
```
Edit the connectivity_monitor script, save it

When alert is removed, enter the static IP route

When alert changes to critical, remove the static IP route
Click to upload a script

<table>
<thead>
<tr>
<th>Status</th>
<th>System Created</th>
<th>Name</th>
<th>Version</th>
<th># Agents</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>configuration_change_service ...</td>
<td>1.1</td>
<td>1</td>
<td>Aruba Netv</td>
</tr>
<tr>
<td></td>
<td></td>
<td>connectivity_monitor</td>
<td>1.1</td>
<td>2</td>
<td>Aruba Netv</td>
</tr>
<tr>
<td></td>
<td></td>
<td>system_resource_monitor</td>
<td>1.2</td>
<td>1</td>
<td>Aruba Netv</td>
</tr>
</tbody>
</table>
Select the script

Upload Script

Specify a script file to upload

connectivity_monitor_ppal.py - 7.63 KB

BROWSE

NEXT  CANCEL
Click on “upload”
Success

connectivity_monitor_ppal has been successfully uploaded. The result of the operation and any other changes on the device have been saved onto the startup configuration.
WAN-PPAL IP-SLA Agent

Create Agent

Script:
connectivity_monitor_ppal

Agent Name:
WAN-PPAL-CONNECTION
# WAN-PPAL IP-SLA Agent

## WAN-PPAL-CONNECTION

### Parameters

<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td>INTEGER</td>
<td>connectivity_check_rate</td>
<td>Connectivity Check Rate (in minutes)</td>
<td>Default: 1</td>
<td>1</td>
</tr>
<tr>
<td>STRING</td>
<td>ipsla_session_name</td>
<td>IP-SLA Session Name</td>
<td>Default:</td>
<td>ppal</td>
</tr>
</tbody>
</table>

- **Save running config to startup**
WAN-PPAL-CONNECTION has been successfully created.
The result of the operation and any other changes on the device have been saved onto the startup configuration.
Test configuration
SW2: int 1/1/1 shutdown ppal link failure
Backup link being used

Config change applied

```bash
SWI# checkpoint diff CPC20200520020410 running-config
+++ /tmp/running-config1589941660259 2020-05-19 21:26:40.257924118 -0500
@@ -11,7 +11,6 @@
ip route 10.10.24.0/30 10.10.12.2
 ip route 10.10.34.0/30 10.10.13.2
distance 10
-ip route 192.168.2.0/24 10.10.14.2
+ip route 192.168.2.0/24 10.10.12.2
distance 10
ip dns server-address 6.8.8.8 vrf mgnt
https-server rest access-mode read-write
https-server vrf mgnt
```
SW2: int 1/1/1 no shutdown ppal link up
Main link being used

Config change applied

```
$W$# checkpoint diff CFC2020E52002611 running-config
@@ -31,6 +31,7 @@
ip route 10.19.24.0/30 10.16.12.2
 ip route 10.19.24.0/30 10.16.13.2
 ip route 192.168.2.0/24 10.19.13.2 distance 10
+ip route 192.168.2.0/24 10.19.13.2
 ip dns server-address 8.8.8.8 vrf mgmt
 https-server rest access-mode read-write
 https-server vrf mgmt
```
Syslogs collected

```
ubuntu@ubuntu:~$ cat /var/log/syslog | grep 21:2
May 19 21:25:05 SW1 hpe-policyd[1867] Event [6901] LOG_INFO | AMM | - | An action has been triggered by the NAE agent WAN-PPAL-CONNECTION
May 19 21:25:05 SW1 hpe-policyd[1867] Event [5507] LOG_INFO | AMM | - | Monitored remote IP is not reachable, response Rx-packets were not received for the IP-SLA session ppal.
May 19 21:25:08 SW1 hpe-policyd[1867] Event [6901] LOG_INFO | AMM | - | An action has been triggered by the NAE agent LAN2LAN-connection
May 19 21:25:08 SW1 hpe-policyd[1867] Event [5507] LOG_INFO | AMM | - | Monitored remote IP is not reachable, response Rx-packets were not received for the IP-SLA session LAN2LAN.
May 19 21:25:40 SW1 lldpd[889] Event [106] LOG_INFO | AMM | - | LLDP neighbor 08:00:00:18:ec:57 deleted on 1/1/1
May 19 21:26:04 SW1 hpe-policyd[1867] Event [6901] LOG_INFO | AMM | - | An action has been triggered by the NAE agent LAN2LAN-Connection
May 19 21:26:04 SW1 hpe-policyd[1867] Event [5507] LOG_INFO | AMM | - | Monitored remote IP is not reachable, response Rx-packets were not received for the IP-SLA session LAN2LAN.
May 19 21:26:08 SW1 hpe-policyd[1867] Event [6901] LOG_INFO | AMM | - | An action has been triggered by the NAE agent WAN-PPAL-CONNECTION
May 19 21:26:08 SW1 hpe-policyd[1867] Event [5507] LOG_INFO | AMM | - | Monitored remote IP is not reachable, response Rx-packets were not received for the IP-SLA session ppal.
May 19 21:26:31 SW1 hpe-policyd[1867] Event [6901] LOG_INFO | AMM | - | An action has been triggered by the NAE agent Configuration-Change
May 19 21:27:05 SW1 hpe-policyd[1867] Event [6901] LOG_INFO | AMM | - | An action has been triggered by the NAE agent LAN2LAN-Connection
May 19 21:27:05 SW1 hpe-policyd[1867] Event [5507] LOG_INFO | AMM | - | Monitored remote IP is reachable, received response Rx-packets for the IP-SLA session LAN2LAN.
ubuntu@ubuntu:~$
References


- ArubaOS-CX 10.04 Network Analytics Engine Guide 6200, 6300, 6400, 8320, 8325, 8400 Switch Series
Thanks!