

1 Table of Contents

Table of Contents

1	Table of Contents	1
1.1	Revision History	1
2	Branch Gateway Redundancy	2
2.1	Assumptions	2
2.2	Topology	2
2.3	HA Group Configuration	3
2.4	System IP Configuration	3
2.5	WAN Uplink Configuration	4
2.6	High Availability Clustering Group Configuration	6
2.7	Device Level Interface Configuration	6
2.8	Device Level VRRP and WAN Redundancy Configuration	7
2.9	Checking VRRP Configuration	8
2.10	DHCP Configuration	10
2.11	DHCP Sync Monitor	12
2.12	WAN Uplink Sharing	13
2.13	WAN Uplink Sharing Testing	15
3	HA Failover Timing	17
3.1	Baseline	17
3.2	Failover Testing	20

1.1 Revision History

DATE	VERSION	EDITOR	CHANGES
03 Jun 2023	0.1	Ariya Parsamanesh	Initial creation
06 Jul 2023	0.2	Ariya Parsamanesh	Added the failover timing test section

2 Branch Gateway Redundancy

The aim for this technote is to provide branch gateways (BGW) redundancy and to be able to share the uplinks on each of the branch gateways.

The gateways in a High Availability (HA) group establishes a virtual link (GRE Tunnel) between redundant Aruba Gateways to share the WAN interfaces. This happens only if WAN ports are configured with different uplink VLANs. You should note that the uplinks on both BGWs can be active.

The second part of this is by configuring VRRP between all the VLANs on the LAN side. It is recommended to configure the same SD-WAN Gateway as the Conductor for all the VLANs.

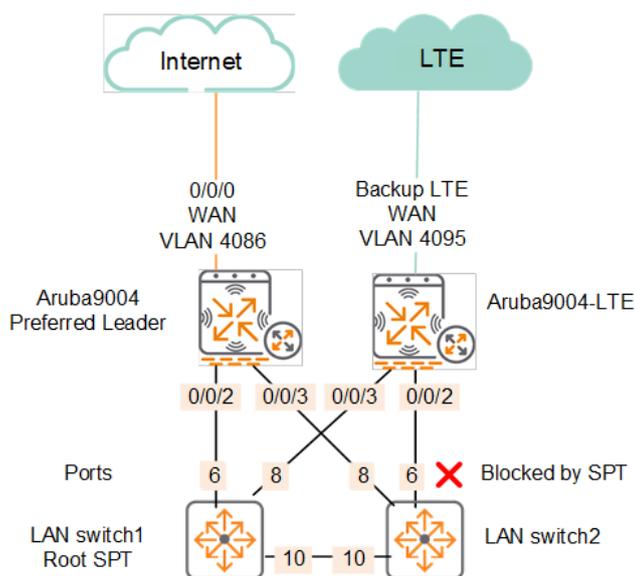
2.1 Assumptions

- The two BGWs are already added to the Aruba Central account
- The BGWs are running AOS 10.4.0.1 firmware
- BGWs are licenses with Foundation gateway foundation
- One of the BGWs is 9004 and the other is 9004-LTE

2.2 Topology

In this topology we are not using any VPNCs, we have 2x BGWs in a HA sharing their uplinks between them. One of them has wired Internet link while the other has LTE link.

The topology diagram shows a typical deployment for it where we have 2 LAN switches that are dual connected to BGWs. In this topology the LAN switches are not stackable switches, this is to highlight the importance of Spanning tree root.



Once you configure the Clustering and its associated VRRP along with WAN uplink sharing, you'll have the following tunnels.

- Clustering - Establishes 1x IPsec Tunnel with peer system-IP address
- Uplink Sharing - Establishes 1x GRE Tunnel with peer, for each uplink VLAN not present on the gateway itself
- Overlay - Establishes 1x IPsec over each configured uplinks (Virtual/Shared or Physical) to all configured VPNCs

2.3 HA Group Configuration

The easiest way to configure HA is at the group creation. So start with basic guided workflow.

aruba Central Guided Setup for Branch Gateway Group BGW-HA

1 System
2 LAN
3 WAN

This wizard will guide you through the essential steps to configure the branch gateways in the Group BGW-HA.
You can exit this wizard at any time by clicking cancel. You will be able to relaunch the wizard at any time as long as you have not yet completed all the steps.
After completing this initial setup, you can change the settings at any time.

Cancel Begin

aruba Central Guided Setup for Branch Gateway Group BGW-HA

1 System
2 LAN
3 WAN

1 Platform 2 Time 3 DNS 4 Management User 5 Summary

Model A9004-LTE



This gateway group includes HA pairs ←

In Automatic site clustering, all gateways belonging to the same site will act as a single gateway to allow better performance and redundancy. When disabled, each gateway operates individually.

Enable automatic site clustering ←

Cancel Back Next

Here we are not showing the rest of the workflow but once it is completed you should get the following when you move the gateways to this group.

2.4 System IP Configuration

Once the gateways are in the group you need to assign them their system-IP.

Its mandatory to have LAN mgmt subnet as the system IP of the gateways for HA branch GW Clustering to work as expected. So the gateways should not use the pool mgmt. as their system IP. This is done at the device level

Customer: Ariya Publ...

← Aruba9004

Manage

- Overview
- WAN
- LAN
- Device**
- Clients
- Applications
- Security

Analyze

- Alerts & Events
- Audit Trail
- Tools

Gateway

System | WAN | Interface | Security | VPN | Routing | High Availability | Config Audit

General | Admin | Certificates | SNMP | Logging | Switching | External Monitoring

- > Basic Info
- > Clock
- > Domain Name System
- > Dynamic Domain Name System
- > Dynamic Domain Name System (HTTPS)
- > System IP Address
 - MAC address: 20:4c:03:82:0f:0a
 - IPv4 address: **VLAN 5 10.10.5.1**
- > Loopback Interface
- > Capacity Threshold
- > Location

Customer: Ariya Publ...

← Aruba9004-LTE

Manage

- Overview
- WAN
- LAN
- Device**
- Clients
- Applications
- Security

Analyze

- Alerts & Events
- Audit Trail
- Tools

Gateway

System | WAN | Interface | Security | VPN | Routing | High Availability | Config Audit

General | Admin | Certificates | SNMP | Logging | Switching | External Monitoring

- > Basic Info
- > Clock
- > Domain Name System
- > Dynamic Domain Name System
- > Dynamic Domain Name System (HTTPS)
- > System IP Address
 - MAC address: 20:4c:03:bc:2f:ba
 - IPv4 address: **VLAN 5 10.10.5.2**
- > Loopback Interface
- > Capacity Threshold
- > Location

Note that changing the system-IP of gateways will cause them to reboot.

2.5 WAN Uplink Configuration

Now at the group level we'll configure the WAN uplinks.

Customer: Ariya Publ...

← BGW-HA

Manage

- Overview
- Devices**
- Clients
- Guests
- Applications
- Security

Analyze

- Alerts & Events

Access Points | Switches | **Gateways**

System | **WAN** | Interface | Security | VPN | Routing | High Availability | Config Audit

Uplink | Dynamic Path Steering | SAAS Express | WAN Scheduler | Health Check

Compression:

Loadbalancing mode: Uplink utilization

Uplink VLANs

LINK	ID	OPERATION STATE	BACKUP LINK	BANDWIDTH PERCENTAGE	SOURCE NAT VLAN
inet_inet	4086	✓		100	--
cellular_lte	4095	✓	✓	--	--

SELECTED GROUP TYPE
Branch Gateway

Note that the LTE interface is configured as backup only and it will always use internal VLAN 4095

The screenshot shows the configuration page for a Branch Gateway (BGW-HA) in Aruba Central. The left sidebar contains navigation options like Overview, Devices, Clients, Guests, Applications, Security, Alerts & Events, Audit Trail, Tools, Reports, Firmware, and Organization. The main content area is divided into tabs: System, WAN, Interface, Security, VPN, Routing, High Availability, and Config Audit. Under the WAN tab, there are sub-tabs for Uplink, Dynamic Path Steering, SAAS Express, WAN Scheduler, and Health Check. The Uplink configuration includes a 'Compression' checkbox (unchecked), a 'Loadbalancing mode' dropdown set to 'Uplink utilization', and a table of 'Uplink VLANs'. The table has columns for LINK, ID, OPERATION STATE, BACKUP LINK, BANDWIDTH PERCENTAGE, and SOURCE NAT VLAN. The 'cellular_lte' entry is highlighted in green, indicating it is active. Below the table, the 'Uplink > cellular_lte' configuration is shown with various settings: Active SIM slot (SIM 1 selected), Access point name (APN) (TELSTRA.INTERNET), Public land mobile network (PLMN) (Auto selected), Mode (Auto selected), Data usage tracking (disabled), Interface VLAN ID (4095, with a note 'This VLAN is reserved for LTE USB or Internal'), NAT outside (checked), Use only as backup link (checked), Weight (10), and Speed (empty field).

Remember we will not make any changes to the WAN uplinks in the device level configuration.

Once this is done add the BGWs to a site, that refers to a physical location where a set of devices are installed. Aruba Central allows you to use sites as a primary navigation element.

Organization -> Network Structure -> Sites

The screenshot shows the 'Network Structure' page in Aruba Central. The left sidebar is similar to the previous screenshot but includes 'Organization' at the bottom. The main content area is divided into 'Network Structure' and 'Platform Integration'. The 'Network Structure' section displays a table of sites with columns for Site Name, Address, and Device Count. The 'AryiaStore' site is highlighted in green. To the right, there is a table showing the configuration for the selected site, with columns for Name, Group, and Type. The table lists 'Aruba9004' and 'Aruba9004-LTE' as BGW-HA Gateways. At the bottom, there is a '+ New Site' button and a '7 Sites' indicator.

2.6 High Availability Clustering Group Configuration

With AOS10 firmware we'll be using the clustering function that comes with it.

Customer: Ariya Publ... | SELECTED GROUP TYPE: Branch Gateway

Access Points | Switches | Gateways

System | WAN | Interface | Security | VPN | Routing | High Availability | Config Audit

Clusters | Redundancy

Cluster mode: Automatic: Auto Group Auto Site

Default gateway mode: [v] [o]

CLUSTER NAME	GATEWAYS	SITE NAME	MANUAL CONFIGURATION PRESENT
auto_gwcluster_site_9_260_0	2	AriyaStore	No

Note that the auto-clustering will happen only when you have assigned the gateways to a site. Then you can select the cluster name and choose one of the gateways to be preferred leader.

Customer: Ariya Publ... | SELECTED GROUP TYPE: Branch Gateway

Access Points | Switches | Gateways

System | WAN | Interface | Security | VPN | Routing | High Availability | Config Audit

Clusters | Redundancy

Cluster mode: Automatic: Auto Group Auto Site

Default gateway mode: [v] [o]

CLUSTER NAME	GATEWAYS	SITE NAME	MANUAL CONFIGURATION PRESENT
auto_gwcluster_site_9_260_0	2	AriyaStore	No

Gateways in auto_gwcluster_site_9_260_0 Cluster

GATEWAY	PREFERRED LEADER
Aruba9004	<input checked="" type="checkbox"/>
Aruba9004-LTE	<input type="checkbox"/>

Management VLAN: [None-] [o]

Note that mgmt. VLAN is important when you want to do CoA from the VRRPs. All the VRRP configuration for different LAN side VLANs are done at the device level not at the group level.

Customer: Ariya Publ... | SELECTED GROUP TYPE: Branch Gateway

Access Points | Switches | Gateways

System | WAN | Interface | Security | VPN | Routing | High Availability | Config Audit

Clusters | Redundancy

Virtual Router Table

When Clustering is enabled in default-gateway mode, Virtual Router IP configurations must be done from the device-level Cluster configuration pages.

ROUTER ID	IPV4 ADDRESS	VLAN	ADMINISTRATION STATE
-----------	--------------	------	----------------------

2.7 Device Level Interface Configuration

Before proceeding with VRRP for the LAN side interfaces, you need to configure the IP address for the relevant VLANs.

PORT	TYPE	ADMIN STATE	POLICY	MODE	NATIVE VLAN	ACCESS VLAN	TRUNK VLANS	TRUSTED VLANS	SPANNING TREE	DESCRIPTION
GE-0/0/0	WAN	Enabled	Per-Session	access	--	4086	--	4086	✓	INET_inet
GE-0/0/1	--	Enabled	Not-defined	access	--	1	--	1-4094	✓	GE0/0/1
GE-0/0/2	LAN	Enabled	Not-defined	trunk	5	--	5,105,205	5,105,205	✓	GE0/0/2
GE-0/0/3	--	Enabled	Not-defined	access	--	1	--	1-4094	✓	GE0/0/3

This table shows the IP address

	VLAN5	VLAN105	VLAN205
Aruba9004	10.10.5.1/24	10.10.105.1/24	10.10.205.1/24
Aruba9004-LTE	10.10.5.2/24	10.10.105.2/24	10.10.205.2/24

The general recommendation is to set LAN interfaces to be “untrusted” so that all devices in the branch get tracked by the role-based firewall. Make sure the peer gateway is placed in a role where VRRP and GRE communication is allowed.

2.8 Device Level VRRP and WAN Redundancy Configuration

We’ll start with the first gateway.

Cluster mode: Automatic Auto Group Auto Site

Default gateway mode:

GATEWAY	PREFERRED LEADER
Aruba9004	<input checked="" type="checkbox"/>
Aruba9004-LTE	<input type="checkbox"/>

Management VLAN:

WAN Redundancy

Peer gateway IP address:

VLAN ID connecting to peer gateway:

VRRPID	VLANID	VIRTUAL IPADDRESS	CLUSTER MANAGEMENT
220	5	10.10.5.3	<input checked="" type="checkbox"/>
105	105	10.10.105.3	<input type="checkbox"/>
205	205	10.10.205.3	<input type="checkbox"/>

And here is the other LTE gateway.

Customer: Ariya Publ... SELE Bra

← Aruba9004-LTE

Gateway

System WAN Interface Security VPN Routing **High Availability** Config Audit

Clusters Redundancy

Cluster mode
Automatic:
Auto Group Auto Site

Default gateway mode:

Gateways in auto_gwcluster_site_9_260_0 Cluster

GATEWAY	PREFERRED LEADER
Aruba9004	<input checked="" type="checkbox"/>
Aruba9004-LTE	<input type="checkbox"/>

Management VLAN: 5

Virtual IP address: 10.10.5.3

WAN Redundancy

Peer gateway IP address: 10.10.5.1

VLAN ID connecting to peer gateway: 5

Cluster Virtual Router IPs

VRRPID	VLANID	VIRTUAL IPADDRESS	CLUSTER MANAGEMENT
220	5	10.10.5.3	<input checked="" type="checkbox"/>
105	105	10.10.105.3	<input type="checkbox"/>
205	205	10.10.205.3	<input type="checkbox"/>

2.9 Checking VRRP Configuration

For all the CLI commands in this guide, we are using the console access that is available from Aruba Central.

aruba Central Search or ask Aruba

Customer: Ariya Publ...

Network Check Device Check Commands **Console**

← Manage **BGW-HA**

Overview Devices Clients Guests Applications Security

Analyze Alerts & Events Audit Trail

Tools Reports Maintain Firmware Organization

Remote Console Session

New Session Saved Sessions

Device Type

REMOTE CONSOLE

Console session for the device: Aruba9004(CNJFKLB01M)

```
admin@Aruba9004(CNJFKLB0... [11:22:20 AM] x +
(Aruba9004) #
```

Now checking the configuration for the Aruba9004

```
(Aruba9004) #show vrrp
```

```
Virtual Router 105:
```

```
Description  
Admin State UP, VR State MASTER  
IP Address 10.10.105.3, MAC Address 00:00:5e:00:01:69, vlan 105  
Priority 100, Advertisement 1 sec, Preemption Disable Delay 0  
Auth type NONE *****  
tracking is not enabled  
cluster-preempt enabled
```

```
Virtual Router 205:
```

```
Description  
Admin State UP, VR State MASTER  
IP Address 10.10.205.3, MAC Address 00:00:5e:00:01:cd, vlan 205  
Priority 100, Advertisement 1 sec, Preemption Disable Delay 0  
Auth type NONE *****  
tracking is not enabled  
cluster-preempt enabled
```

```
Virtual Router 220:
```

```
Description  
Admin State UP, VR State MASTER  
IP Address 10.10.5.3, MAC Address 00:00:5e:00:01:dc, vlan 5  
Priority 255, Advertisement 1 sec, Preemption Enable Delay 0  
Auth type NONE *****  
tracking is not enabled
```

```
(Aruba9004) #
```

Here is the configuration for the Aruba9004-LTE

```
(Aruba9004-LTE) #show vrrp
```

```
Virtual Router 105:
```

```
Description  
Admin State UP, VR State BACKUP  
IP Address 10.10.105.3, MAC Address 00:00:5e:00:01:69, vlan 105  
Priority 100, Advertisement 1 sec, Preemption Disable Delay 0  
Auth type NONE *****  
tracking is not enabled  
cluster-preempt enabled
```

```
Virtual Router 205:
```

```
Description  
Admin State UP, VR State BACKUP  
IP Address 10.10.205.3, MAC Address 00:00:5e:00:01:cd, vlan 205  
Priority 100, Advertisement 1 sec, Preemption Disable Delay 0  
Auth type NONE *****  
tracking is not enabled  
cluster-preempt enabled
```

```
Virtual Router 220:
```

```
Description  
Admin State UP, VR State BACKUP  
IP Address 10.10.5.3, MAC Address 00:00:5e:00:01:dc, vlan 5  
Priority 235, Advertisement 1 sec, Preemption Enable Delay 0  
Auth type NONE *****  
tracking is not enabled
```

At this point the clustering should also be formed as indicated in the WebUI

Customer: Ariya Publ...

← auto_gwcluster_s...

Manage

Overview

Analyze

Alerts & Events

Audit Trail

Summary Gateways Tunnels

CLUSTER INFO

CLUSTER NAME auto_gwcluster_site_9_260_0	CLUSTER CLIENT CAPACITY 8192	VLAN MISMATCH Yes	CURRENT LEADER VERSION 10.4.0.1_86647
MAX GATEWAY FAILURE WITHSTAND COUNT 2	SITE AriyaStore		

CLIENT CAPACITY

ARUBA9004
ARUBA9004-LTE

Legend: > 80% (Dark Blue), > 40% (Medium Blue), < 40% (Light Blue), Invalid (Grey)

Customer: Ariya Publ...

← auto_gwcluster_s...

Manage

Overview

Analyze

Alerts & Events

Audit Trail

Summary Gateways Tunnels

Gateways (2)

Name	IP Address	Status	Client Capacity (Active Standby)	Model	Role	Version
Aruba9004	10.10.5.1	Up	0 (0 0)	A9004	Leader	10.4.0.1_86647
Aruba9004-LTE	10.10.5.2	Up	0 (0 0)	A9004-LTE	Member	10.4.0.1_86647

GATEWAYS | ARUBA9004

Gateway Peer Detail (2)

Type	IP Address	Status	Role	VLAN Mismatch
SELF	10.10.5.1	-	Leader	-
PEER	10.10.5.2	Connected	Member	1

And here is the CLI command for checking it.

```
(Aruba9004) #show lc-cluster group-membership

Cluster Enabled, Profile Name = "auto_gwcluster_site_9_260_0"
One-to-one-redundancy Enabled
Heartbeat Threshold = 900 msec
Cluster Info Table
-----
Type IPv4 Address      Priority Connection-Type STATUS
-----
self      10.10.5.1      255          N/A CONNECTED (Leader)
peer      10.10.5.2      128          L2-Connected CONNECTED (Member)
(Aruba9004) #
```

```
(Aruba9004-LTE) #show lc-cluster group-membership

Cluster Enabled, Profile Name = "auto_gwcluster_site_9_260_0"
One-to-one-redundancy Enabled
Heartbeat Threshold = 900 msec
Cluster Info Table
-----
Type IPv4 Address      Priority Connection-Type STATUS
-----
peer      10.10.5.1      255          L2-Connected CONNECTED (Leader)
self      10.10.5.2      128          N/A CONNECTED (Member)
(Aruba9004-LTE) #
```

2.10 DHCP Configuration

As most of the BGWs will also provide DHCP services for the branches, we need to configure the scope for the HA pair at group level. First, we need to configure NTP.

The screenshot shows the configuration page for a BGW-HA device under the 'Gateways' section. The 'Clock' tab is active, showing the following settings:

- Time: Get time from NTP server (dropdown)
- NTP servers table:

IP ADDRESS/FQDN	BURST MODE	AUTHENTICATION KEY
216.239.35.4	Yes	--
- Source interface: -None- (dropdown)
- NTP server VLAN: -Choose an option- (dropdown)
- Use NTP authentication:
- Time zone: Australia: Australia/Melbourne (UTC+...)

The next step is to create DHCP scopes for VLAN 5, 105 and 205, here we'll show VLAN 105.

The screenshot shows the DHCP configuration page for a BGW-HA device under the 'Interface' section. The 'DHCP' tab is active, showing the following configuration:

- IP DHCP server:
- Pool configuration table:

IP VERSION	NAME	NETWORK	DEFAULT ROUTER
IPv4	vlan_105	10.10.105.0	10.10.105.3
IPv4	vlan_205	10.10.205.0	10.10.205.3
IPv4	vlan_5	10.10.5.0	10.10.5.3
- Pool Configuration > vlan_105 details:
 - IP version: IPv4
 - Pool name: vlan_105
 - Network IP address type: Static (dropdown)
 - Network IP address: 10.10.105.0
 - Network IP mask: 255.255.255.0
 - Default routers: 10.10.105.3 (Note: Multiple Default Routers should be separated by spaces)

2.11 DHCP Sync Monitor

This is how we can check if DHCP is in sync between the BGWs

```
(Aruba9004) #show ip dhcp binding failover-peer

failover peer "hpe-aruba-failover-partner" state {
  my state normal at epoch 1686634193; # Tue Jun 13 15:29:53 2023
  partner state normal at epoch 1686634229; # Tue Jun 13 15:30:29 2023
}

WARNING: Normal functioning of a DHCP server is dependent on NTP clock synchronization and
network reachability between branch-gateway peers in a HA setup.
Please ensure that both the peers are running and have connectivity.
(Aruba9004) #
```

And here is the current DHCP database

```
(Aruba9004) #show ip dhcp database

DHCP enabled

# Failover peer profile
failover peer "hpe-aruba-failover-partner" {
  primary;
  address 10.10.5.1;
  port 647;
  peer address 10.10.5.2;
  peer port 647;
  max-response-delay 60;
  max-unacked-updates 10;
  mclt 3600;
  split 128;
  load balance max seconds 3;
}
# vlan_5
subnet 10.10.5.0 netmask 255.255.255.0 {
  option domain-name-servers 8.8.8.8;
  option routers 10.10.5.3;
  pool {
    failover peer "hpe-aruba-failover-partner";
    range 10.10.5.4 10.10.5.254;
  }
  authoritative;
}
# vlan_205
subnet 10.10.205.0 netmask 255.255.255.0 {
  option domain-name-servers 8.8.8.8;
  option routers 10.10.205.3;
  pool {
    failover peer "hpe-aruba-failover-partner";
    range 10.10.205.2 10.10.205.2;
    range 10.10.205.4 10.10.205.254;
  }
  authoritative;
}
# vlan_105
subnet 10.10.105.0 netmask 255.255.255.0 {
  option domain-name-servers 8.8.8.8;
  option routers 10.10.105.3;
  pool {
    failover peer "hpe-aruba-failover-partner";
    range 10.10.105.2 10.10.105.2;
    range 10.10.105.4 10.10.105.254;
  }
}
```

```

    authoritative;
}
(Aruba9004) #

```

The DHCP syncing happens between the system IPs (VLAN5) on port 647

```

(Aruba9004) #show datapath session | include 647
10.10.5.2      10.10.5.1      6      54171 647      0/0      0      0      0      tunnel 11      f68 391
22993         C              1
10.10.5.1      10.10.5.2      6      647    54171 0/0      0      0      1      tunnel 11      f68 426
25192         1
(Aruba9004) #

```

2.12 WAN Uplink Sharing

In the previous configuration we enabled WAN redundancy. So, there is no configuration to be done for it here, but it is important to understand the tunnels that gets established for it.

- Aruba9004 will build 1x IPsec to Aruba9004-LTE for clustering over VLAN 5
- Aruba9004 will build 1x GRE to BGW-LTE-2 for VLAN 4095 as virtual uplink
- Aruba9004-LTE will build 1x GRE to Aruba9004 for VLAN 4086 as virtual uplink
- Each GW will build 1x IPsec tunnel over each configured Uplink (Physical or Virtual/Shared) to each configured VPNC. (but in this topology we don't have VPNCs)

Just for reference this was configured on Aruba9004

WAN Redundancy

Peer gateway IP address:

VLAN ID connecting to peer gateway:

Cluster Virtual Router IPs

VRRPID	VLANID	VIRTUAL IPADDRESS	CLUSTER MANAGEMENT
220	5	10.10.5.3	<input checked="" type="checkbox"/>
105	105	10.10.105.3	<input type="checkbox"/>
205	205	10.10.205.3	<input type="checkbox"/>

From the CLI we can check the communication between gateways

<pre> (Aruba9004) #show branch-gateway-peer IP Address of Transit VLAN in Peer: 10.10.5.2 Transit VLAN Interface: 5 Transit VLAN ip: 10.10.5.1 Peer Mac Address: 20:4c:03:bc:2f:ba Peer Serial: CNK7KSP05H (Aruba9004) # </pre>	<pre> (Aruba9004-LTE) #show branch-gateway-peer IP Address of Transit VLAN in Peer: 10.10.5.1 Transit VLAN Interface: 5 Transit VLAN ip: 10.10.5.2 Peer Mac Address: 20:4c:03:82:0f:0a Peer Serial: CNJFKLB01M (Aruba9004-LTE) # </pre>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Once the peer gateways is configured, there will be a GRE tunnel created between the BGWs which then will look at the type of uplinks being WAN that will then be shared with the peer gateways.

Customer: Ariya Publ... SELECTED DEVICE TYPE
Branch Gateway

Aruba9004-LTE

Gateway

System **WAN** Interface Security VPN Routing High Availability Config Audit

Uplink Dynamic Path Steering SAAS Express WAN Scheduler Health Check

Compression:

Loadbalancing mode: Uplink utilization

LINK	ID	OPERATION STATE	BACKUP LINK	BANDWIDTH PERCENTAGE	SOURCE NAT VLAN
inet_inet	4086	✓		100	--
cellular_lte	4095	✓	✓	--	--

But when you check the port status, we see that 0/0/0 is up in Aruba9004 and down in Aruba9004-LTE

```
(Aruba9004) #show port status

Port Status
-----
Slot-Port  PortType  AdminState  OperState  PoE  Trusted  SpanningTree  PortMode  Speed  Duplex  PortError
-----
0/0/0      GE        Enabled     Up         N/A  Yes      Disabled      Access    1 Gbps Full    -
0/0/1      GE        Enabled     Down       N/A  Yes      Disabled      Access    Auto   Auto    -
0/0/2      GE        Enabled     Up         N/A  Yes      Disabled      Trunk     1 Gbps Full    -
0/0/3      GE        Enabled     Up         N/A  Yes      Disabled      Trunk     1 Gbps Full    -

(Aruba9004) #
```

```
(Aruba9004-LTE) #show port status

Port Status
-----
Slot-Port  PortType  AdminState  OperState  PoE  Trusted  SpanningTree  PortMode  Speed  Duplex  PortError
-----
0/0/0      GE        Enabled     Down       N/A  Yes      Disabled      Access    Auto   Auto    -
0/0/1      GE        Enabled     Down       N/A  Yes      Disabled      Access    Auto   Auto    -
0/0/2      GE        Enabled     Up         N/A  Yes      Disabled      Trunk     1 Gbps Full    -
0/0/3      GE        Enabled     Up         N/A  Yes      Disabled      Access    1 Gbps Full    -

(Aruba9004-LTE) #
```

The key thing in the above screenshot is that each BGW should have 1x WAN uplinks that needs to be shared not 2. Make sure the uplink interfaces used by both gateways are tied to different VLANs, or the uplinks won't be shared as we have done here.

2.13 WAN Uplink Sharing Testing

Now let's check to see if the configuration has worked by checking first to see if the virtual tunnels between the BGWs is up and running. Checking the LTE gateway.

```
(Aruba9004-LTE) #show ip interface brief

Interface          IP Address / IP Netmask      Admin  Protocol  VRRP-IP
-----
vlan 5             10.10.5.2 / 255.255.255.0      up     up         10.10.5.3
vlan 2             192.168.255.2 / 255.255.255.255          up     up
vlan 90            unassigned / unassigned      up     down
vlan 105           10.10.105.2 / 255.255.255.0    up     up         10.10.105.3
vlan 205           10.10.205.2 / 255.255.255.0    up     up         10.10.205.3
vlan 4086          unassigned / unassigned      up     down
loopback           unassigned / unassigned      up     up
tunnel 12 (INT)    172.16.50.9 / 255.255.255.255  up     up

DHCP is enabled on VLAN(s) 90, 4086
(Aruba9004-LTE) #
```

Now let's check to ensure we have 2x uplinks on Aruba9004-LTE. Note that the LTE uplink is down because we have put it in backup mode. So, it'll be Up only when the uplink on the Aruba9004 gateways is not operational.

```
(Aruba9004-LTE) #show uplink

Uplink Manager: Enabled
Uplink Health-check: Enabled FQDN: pqm.arubanetworks.com(3.104.166.215)
Uplink Load-balancing:Enabled Mode: Uplink-utilization

Uplink Management Table
-----
Uplink Type  Properties                Uplink-id  State                Gateway        Reachability
WAN Type    Speed      Weight  B/w utiln  Max b/w
-----
Cellular    Internal-LTE (Backup)  cellular_lte  Disconnected from  ISP  --                Not Established
LTE 100 Mbps  10      0.00%      100%
Virtual    tunnel 12              inet_inet     Connected           10.224.254.1  Reachable
Internet  50 Mbps  100      0.00%      100%

(Aruba9004-LTE) #
```

Now on Aruba9004 we should see only 1x uplink which is local to it.

```
(Aruba9004) #show ip interface brief

Interface                IP Address / IP Netmask      Admin  Protocol  VRRP-IP
vlan 5                   10.10.5.1 / 255.255.255.0    up     up        10.10.5.3
vlan 2                   192.168.255.1 / 255.255.255.255  up     up
vlan 105                 10.10.105.1 / 255.255.255.0   up     up        10.10.105.3
vlan 205                 10.10.205.1 / 255.255.255.0   up     up        10.10.205.3
vlan 4086                10.224.254.63 / 255.255.255.128 up     up
vlan 4094                unassigned / unassigned      up     down
loopback                 unassigned / unassigned      up     up

DHCP is enabled on VLAN(s) 4086, 4094
(Aruba9004) #show uplink

Uplink Manager: Enabled
Uplink Health-check: Enabled FQDN: pqm.arubanetworks.com(13.239.61.151)
Uplink Load-balancing:Enabled Mode: Uplink-utilization

Uplink Management Table
-----
Uplink Type  Properties                Uplink-id  State                Gateway        Reachability  WAN Type  Speed  Weight
B/w utiln  Max b/w
-----
Wired        vlan 4086                inet_inet  Connected           10.224.254.1  Reachable    Internet  50 Mbps  100
0.00%       100%

(Aruba9004) #
```

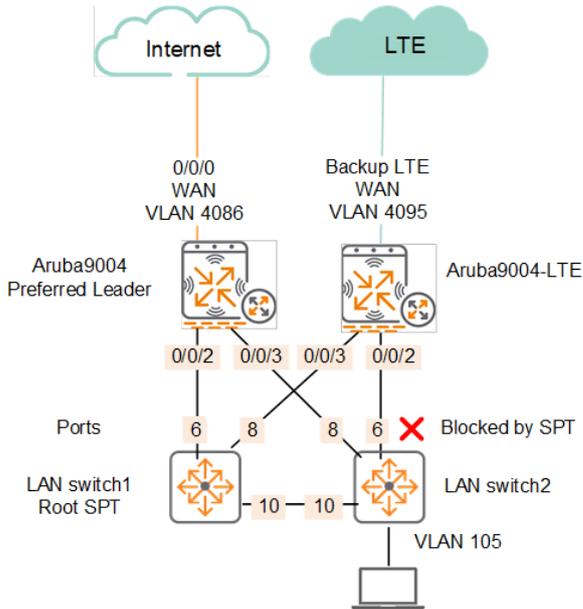
You will only see the INT tunnel on this gateway when the current uplink is down.

3 HA Failover Timing

In this section I'll explore the general time it takes for

1. 9004-LTE BGW to bring up its LTE interface when WAN uplink 0/0/0 is disconnected
2. Reconnected WAN uplink on 0/0/0 to become active for the user traffic
3. Backup LTE BGW to be the active gateway when the LAN interfaces on 9004 Gateway is disconnected.
4. The pre-emption of the preferred leader(9004 BGW) when it's LAN interfaces are reconnected

Here is the topology, the User (VLAN105) is connected to switch2 and does continuous ping to 1.1.1.1 with -w 1000



Customer: Ariya Publ...

AriyaStore

Manage

- Overview
- Devices
- Clients**
- Applications
- Security

CLIENTS | ALL

All	Connecting	Connected	Failed	Offline	Blocked	Wireless	Wired	Remote
1	0	1	0	0	0	0	1	0

Client Name	Status	IP Address	VLAN	Connected To	SSID/Port	AP Role	Gateway Role
T4405-SSD	Connected	10.10.105.128	105	Aruba9004	0/0/2		vlan105

3.1 Baseline

First we'll take a baseline before we start our tests.

```
(Aruba9004) #show uplink

Uplink Manager: Enabled
Uplink Health-check: Enabled FQDN: pqm.arubanetworks.com(13.239.61.151)
Uplink Load-balancing:Enabled Mode: Uplink-utilization

Uplink Management Table
-----
Uplink Type  Properties  Uplink-id  State      Gateway      Reachability  WAN Type  Speed  Weight
B/w utiln   Max b/w
-----
Wired        vlan 4086   inet_inet  Connected  10.224.254.1  Reachable    Internet  50 Mbps  100
0.00%       100%
(Aruba9004) #
```

```
(Aruba9004) #show ip interface b
```

Interface	IP Address / IP Netmask	Admin	Protocol	VRRP-IP
vlan 5	10.10.5.1 / 255.255.255.0	up	up	10.10.5.3
vlan 2	192.168.255.1 / 255.255.255.255	up	up	
vlan 105	10.10.105.1 / 255.255.255.0	up	up	10.10.105.3
vlan 205	10.10.205.1 / 255.255.255.0	up	up	10.10.205.3
vlan 4086	10.224.254.63 / 255.255.255.128	up	up	
vlan 4094	unassigned / unassigned	up	down	
loopback	unassigned / unassigned	up	up	

```
DHCP is enabled on VLAN(s) 4086, 4094
```

```
(Aruba9004) #
```

```
(Aruba9004) #show lc-cluster group-membership
```

```
Cluster Enabled, Profile Name = "auto_gwcluster_site_9_260_0"
```

```
One-to-one-redundancy Enabled
```

```
Heartbeat Threshold = 900 msec
```

```
Cluster Info Table
```

```
-----  
Type IPv4 Address Priority Connection-Type STATUS  
-----  
self 10.10.5.1 255 N/A CONNECTED (Leader)  
peer 10.10.5.2 128 L2-Connected CONNECTED (Member)
```

```
(Aruba9004) #
```

```
(Aruba9004) #show vrrp
```

```
Virtual Router 105:
```

```
Description
```

```
Admin State UP, VR State MASTER
```

```
IP Address 10.10.105.3, MAC Address 00:00:5e:00:01:69, vlan 105
```

```
Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
```

```
Auth type NONE *****
```

```
tracking is not enabled
```

```
cluster-preempt enabled
```

```
Virtual Router 205:
```

```
Description
```

```
Admin State UP, VR State MASTER
```

```
IP Address 10.10.205.3, MAC Address 00:00:5e:00:01:cd, vlan 205
```

```
Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
```

```
Auth type NONE *****
```

```
tracking is not enabled
```

```
cluster-preempt enabled
```

```
Virtual Router 220:
```

```
Description
```

```
Admin State UP, VR State MASTER
```

```
IP Address 10.10.5.3, MAC Address 00:00:5e:00:01:dc, vlan 5
```

```
Priority 255, Advertisement 1 sec, Preemption Enable Delay 0
```

```
Auth type NONE *****
```

```
tracking is not enabled
```

```
(Aruba9004) #
```

```
(Aruba9004-LTE) #show uplink
```

```
Uplink Manager: Enabled
```

```
Uplink Health-check: Enabled FQDN: pqm.arubanetworks.com(13.239.61.151)
```

```
Uplink Load-balancing:Enabled Mode: Uplink-utilization
```

```
Uplink Management Table
```

```
-----  
Uplink Type Properties Uplink-id State Gateway Reachability  
WAN Type Speed Weight B/w utiln Max b/w  
-----  
Virtual tunnel 12 inet_inet Connected 10.224.254.1 Reachable  
Internet 50 Mbps 100 0.00% 100%
```

```
Cellular      Internal-LTE (Backup)  cellular_lte  Disconnected from ISP  --      Not Established
LTE 100 Mbps   10    0.00%        100%
(Aruba9004-LTE) #
```

```
(Aruba9004) #show ip interface brief
```

Interface	IP Address / IP Netmask	Admin	Protocol	VRRP-IP
vlan 5	10.10.5.2 / 255.255.255.0	up	up	10.10.5.3
vlan 2	192.168.255.2 / 255.255.255.255	up	up	
vlan 90	unassigned / unassigned	up	down	
vlan 105	10.10.105.2 / 255.255.255.0	up	up	10.10.105.3
vlan 205	10.10.205.2 / 255.255.255.0	up	up	10.10.205.3
vlan 4086	unassigned / unassigned	up	down	
loopback	unassigned / unassigned	up	up	
tunnel 12 (INT)	172.16.50.10 / 255.255.255.255	up	up	

```
DHCP is enabled on VLAN(s) 90, 4086
```

```
(Aruba9004-LTE) #show ip route
```

```
Codes: C - Connected, O - OSPF, IA - OSPF Inter Area, E1 - OSPF External Type 1, R - RIP
       E2 - OSPF External Type 2, N1 - OSPF NSSA External Type 1, N2 - OSPF NSSA External Type 2
       B I - BGP Interior, B E - BGP Exterior, S - Static
       U - BGW Peer Uplink, M - Management, Ru - Route Usable, * - Candidate Default
       V - RAPNG VPN/Branch, I - Crypto-Cfgset, N - Not Redistributed, Bc - Cloud Overlay Protocol
```

```
S* 0.0.0.0/0 [50/10] via 10.224.254.1
C 10.10.205.0/24 is directly connected, VLAN205
C 192.168.255.2/32 is directly connected, VLAN2
C 10.10.105.0/24 is directly connected, VLAN105
C 172.16.50.10/32 is directly connected, Loopback
C 10.10.5.0/24 is directly connected, VLAN5
```

```
(Aruba9004-LTE) #
```

```
(Aruba9004-LTE) #show lc-cluster group-membership
```

```
Cluster Enabled, Profile Name = "auto_gwcluster_site_9_260_0"
One-to-one-redundancy Enabled
Heartbeat Threshold = 900 msec
Cluster Info Table
```

Type	IPv4 Address	Priority	Connection-Type	STATUS
peer	10.10.5.1	255	L2-Connected	CONNECTED (Leader)
self	10.10.5.2	128	N/A	CONNECTED (Member)

```
(Aruba9004-LTE) #
```

```
(Aruba9004-LTE) #show vrrp
```

```
Virtual Router 105:
Description
Admin State UP, VR State BACKUP
IP Address 10.10.105.3, MAC Address 00:00:5e:00:01:69, vlan 105
Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
Auth type NONE *****
tracking is not enabled
cluster-preempt enabled
```

```
Virtual Router 205:
Description
Admin State UP, VR State BACKUP
IP Address 10.10.205.3, MAC Address 00:00:5e:00:01:cd, vlan 205
Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
Auth type NONE *****
tracking is not enabled
cluster-preempt enabled
```

```
Virtual Router 220:
Description
Admin State UP, VR State BACKUP
IP Address 10.10.5.3, MAC Address 00:00:5e:00:01:dc, vlan 5
```

```

Priority 235, Advertisement 1 sec, Preemption Enable Delay 0
Auth type NONE *****
tracking is not enabled
(Aruba9004-LTE) #

```

3.2 Failover Testing

This table captures the rough estimated time it takes for the backup link to be established when the main WAN links is disconnected. It also shows the time it takes for pre-emption to occur when the main WAN link is reconnected.

	BGW-1	BGW-LTE-2	Ping timeout	LTE return to backup state
Uplink	0/0/0 Wired Active	LTE backup		
LAN 0/0/1 – 0/0/2	Connected	Connected		
lc-cluster group-membership				
Self	CONNECTED (Leader)	CONNECTED (Member)		
peer	CONNECTED (Member)	CONNECTED (Leader)		
VRRP VLAN5	Master	Backup		
VRRP VLAN105	Master	Backup		
VRRP VLAN105	Master	Backup		
WAN main uplink failure test				
	Disconnect 0/0/0		9 sec	
	Reconnect 0/0/0		4-5 sec	42 sec
	Disconnect 0/0/0		10 sec	
	Reconnect 0/0/0		4-5 sec	46 sec
	Disconnect 0/0/0		16 sec	
	Reconnect 0/0/0		5-6 sec	47 sec
LAN Link failure test				
Uplink	0/0/0 Wired Active	LTE Active		
lc-cluster group-membership				
Self	ISOLATED (Leader)	ISOLATED (Leader)		
peer	DISCONNECTED	DISCONNECTED		
VRRP VLAN5	Master	Master		
VRRP VLAN105	Init	Master		
VRRP VLAN105	Init	Master		
	Disconnect 0/0/1-2		7 sec	
	Reconnect 0/0/1-2		4-5 sec	44 sec
	Disconnect 0/0/1-2		6 sec	
	Reconnect 0/0/1-2		2-3 sec	43 sec
	Disconnect 0/0/1-2		6 sec	
	Reconnect 0/0/1-2		2-3 sec	46 sec
Uplink	0/0/0 Wired Active	LTE backup		
lc-cluster group-membership				
Self	CONNECTED (Leader)	CONNECTED (Member)		
peer	CONNECTED (Member)	CONNECTED (Leader)		
VRRP VLAN5	Master	Backup		
VRRP VLAN105	Master	Backup		
VRRP VLAN105	Master	Backup		

Here are the outputs of the relevant show commands after WAN uplink 0/0/0 was disconnected on Aruba9004.

```
(Aruba9004) #show ip interface b
```

```

Interface          IP Address / IP Netmask      Admin  Protocol  VRRP-IP
vlan 5             10.10.5.1 / 255.255.255.0    up     up        10.10.5.3
vlan 2             192.168.255.1 / 255.255.255.255 up     up
vlan 105           10.10.105.1 / 255.255.255.0  up     up        10.10.105.3
vlan 205           10.10.205.1 / 255.255.255.0  up     up        10.10.205.3
vlan 4086          unassigned / unassigned      up     down

```

```
vlan 4094                unassigned / unassigned    up    down
loopback                 unassigned / unassigned    up    up
tunnel 12 (INT)         172.16.50.4 / 255.255.255.255 up    up
```

DHCP is enabled on VLAN(s) 4086, 4094

(Aruba9004) #show ip route

Codes: C - Connected, O - OSPF, IA - OSPF Inter Area, E1 - OSPF External Type 1, R - RIP
 E2 - OSPF External Type 2, N1 - OSPF NSSA External Type 1, N2 - OSPF NSSA External Type 2
 B I - BGP Interior, B E - BGP Exterior, S - Static
 U - BGW Peer Uplink, M - Management, Ru - Route Usable, * - Candidate Default
 V - RAPNG VPN/Branch, I - Crypto-Cfgset, N - Not Redistributed, Bc - Cloud Overlay Protocol

```
S*  0.0.0.0/0 [50/10] via 10.97.49.120
C   10.10.205.0/24 is directly connected, VLAN205
C   192.168.255.1/32 is directly connected, VLAN2
C   172.16.50.4/32 is directly connected, Loopback
S   10.3.8.2/32 [50/10] via 10.97.49.120
S   10.3.56.162/32 [50/10] via 10.97.49.120
C   10.10.105.0/24 is directly connected, VLAN105
C   10.10.5.0/24 is directly connected, VLAN5
```

(Aruba9004) #

(Aruba9004) #show uplink

Uplink Manager: Enabled
 Uplink Health-check: Enabled FQDN: pqm.arubanetworks.com(8.8.8.8)
 Uplink Load-balancing:Enabled Mode: Uplink-utilization

Uplink Management Table

Uplink Type	Properties	Uplink-id	State	Gateway	Reachability	WAN Type
Speed	Weight B/w	utiln Max b/w				
-	-	-	-	-	-	-
Wired	vlan 4086	inet_inet	Waiting for link	--	Not Established	Internet 50
Mbps	100	0.00%	100%			
Virtual	tunnel 12	cellular_lte	Connected	10.97.49.120	Reachable	LTE 100
Mbps	10	0.00%	100%			

(Aruba9004) #

(Aruba9004) #show lc-cluster group-membership

Cluster Enabled, Profile Name = "auto_gwcluster_site_9_260_0"
 One-to-one-redundancy Enabled
 Heartbeat Threshold = 900 msec

Cluster Info Table

Type	IPv4 Address	Priority	Connection-Type	STATUS
self	10.10.5.1	255	N/A	CONNECTED (Leader)
peer	10.10.5.2	128	L2-Connected	CONNECTED (Member)

(Aruba9004) #

(Aruba9004) #show vrrp

Virtual Router 105:

Description
 Admin State UP, VR State MASTER
 IP Address 10.10.105.3, MAC Address 00:00:5e:00:01:69, vlan 105
 Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
 Auth type NONE *****
 tracking is not enabled
 cluster-preempt enabled

Virtual Router 205:

Description
 Admin State UP, VR State MASTER

```
IP Address 10.10.205.3, MAC Address 00:00:5e:00:01:cd, vlan 205
Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
Auth type NONE *****
tracking is not enabled
cluster-preempt enabled
```

Virtual Router 220:

```
Description
Admin State UP, VR State MASTER
IP Address 10.10.5.3, MAC Address 00:00:5e:00:01:dc, vlan 5
Priority 255, Advertisement 1 sec, Preemption Enable Delay 0
Auth type NONE *****
tracking is not enabled
```

(Aruba9004) #

(Aruba9004) #show ip interface b

Interface	IP Address / IP Netmask	Admin	Protocol	VRRP-IP
vlan 5	10.10.5.2 / 255.255.255.0	up	up	10.10.5.3
CELL	10.97.49.119 / 255.255.255.240	up	up	
vlan 2	192.168.255.2 / 255.255.255.255	up	up	
vlan 90	unassigned / unassigned	up	down	
vlan 105	10.10.105.2 / 255.255.255.0	up	up	10.10.105.3
vlan 205	10.10.205.2 / 255.255.255.0	up	up	10.10.205.3
vlan 4086	unassigned / unassigned	up	down	
loopback	unassigned / unassigned	up	up	

DHCP is enabled on VLAN(s) 90, 4086

(Aruba9004-LTE) #show ip route

Codes: C - Connected, O - OSPF, IA - OSPF Inter Area, E1 - OSPF External Type 1, R - RIP
E2 - OSPF External Type 2, N1 - OSPF NSSA External Type 1, N2 - OSPF NSSA External Type 2
B I - BGP Interior, B E - BGP Exterior, S - Static
U - BGW Peer Uplink, M - Management, Ru - Route Usable, * - Candidate Default
V - RAPNG VPN/Branch, I - Crypto-Cfgset, N - Not Redistributed, Bc - Cloud Overlay Protocol

```
S* 0.0.0.0/0 [50/10] via 10.97.49.120
C 10.10.205.0/24 is directly connected, VLAN205
C 192.168.255.2/32 is directly connected, VLAN2
C 10.97.49.112/28 is directly connected, Loopback
S 10.3.8.2/32 [50/10] via 10.97.49.120
S 10.3.56.162/32 [50/10] via 10.97.49.120
C 10.10.105.0/24 is directly connected, VLAN105
C 10.10.5.0/24 is directly connected, VLAN5
```

(Aruba9004-LTE) #show uplink

```
Uplink Manager: Enabled
Uplink Health-check: Enabled FQDN: pqm.arubanetworks.com(13.239.61.151)
Uplink Load-balancing:Enabled Mode: Uplink-utilization
```

Uplink Management Table

Uplink Type	Properties	Uplink-id	State	Gateway	Reachability	WAN Type
Speed	Weight B/w utiln Max b/w					
Cellular	Internal-LTE (Backup)	cellular_lte	* Connected *	10.97.49.120	Reachable	LTE
100 Mbps	10 0.01% 100%					

(*) Backup Uplink is connected

(Aruba9004-LTE) #show lc-cluster group-membership

```
Cluster Enabled, Profile Name = "auto_gwcluster_site_9_260_0"
One-to-one-redundancy Enabled
Heartbeat Threshold = 900 msec
Cluster Info Table
```

Type	IPv4 Address	Priority	Connection-Type	STATUS
peer	10.10.5.1	255	L2-Connected	CONNECTED (Leader)
self	10.10.5.2	128	N/A	CONNECTED (Member)

```
(Aruba9004-LTE) #show vrrp

Virtual Router 105:
  Description
  Admin State UP, VR State BACKUP
  IP Address 10.10.105.3, MAC Address 00:00:5e:00:01:69, vlan 105
  Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
  Auth type NONE *****
  tracking is not enabled
  cluster-preempt enabled

Virtual Router 205:
  Description
  Admin State UP, VR State BACKUP
  IP Address 10.10.205.3, MAC Address 00:00:5e:00:01:cd, vlan 205
  Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
  Auth type NONE *****
  tracking is not enabled
  cluster-preempt enabled

Virtual Router 220:
  Description
  Admin State UP, VR State BACKUP
  IP Address 10.10.5.3, MAC Address 00:00:5e:00:01:dc, vlan 5
  Priority 235, Advertisement 1 sec, Preemption Enable Delay 0
  Auth type NONE *****
  tracking is not enabled
(Aruba9004-LTE) #
```

Here are the outputs of the relevant show commands after LAN ports 0/0/2-3 were disconnected form Aruba9004

```
(Aruba9004) #show lc-cluster group-membership

Cluster Enabled, Profile Name = "auto_gwcluster_site_9_260_0"
One-to-one-redundancy Enabled
Heartbeat Threshold = 900 msec
Cluster Info Table
-----
Type IPv4 Address      Priority Connection-Type STATUS
-----
self   10.10.5.1           255           N/A ISOLATED (Leader)
peer   10.10.5.2           128           N/A DISCONNECTED
```

```
(Aruba9004) #show vrrp

Virtual Router 105:
  Description
  Admin State UP, VR State INIT
  IP Address 10.10.105.3, MAC Address 00:00:5e:00:01:69, vlan 105
  Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
  Auth type NONE *****
  tracking is not enabled
  cluster-preempt enabled

Virtual Router 205:
  Description
  Admin State UP, VR State INIT
  IP Address 10.10.205.3, MAC Address 00:00:5e:00:01:cd, vlan 205
  Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
  Auth type NONE *****
  tracking is not enabled
  cluster-preempt enabled

Virtual Router 220:
  Description
  Admin State UP, VR State MASTER
```

```
IP Address 10.10.5.3, MAC Address 00:00:5e:00:01:dc, vlan 5
Priority 255, Advertisement 1 sec, Preemption Enable Delay 0
Auth type NONE *****
tracking is not enabled
(Aruba9004) #
```

```
Aruba9004-LTE) #show uplink
```

```
Uplink Manager: Enabled
Uplink Health-check: Enabled FQDN: pqm.arubanetworks.com(13.239.61.151)
Uplink Load-balancing:Enabled Mode: Uplink-utilization
```

```
Uplink Management Table
```

Uplink Type	Properties	Uplink-id	State	Gateway	Reachability	WAN Type
Speed	Weight B/w utiln Max b/w					
Cellular	Internal-LTE (Backup)	cellular_lte	* Connected *	10.97.49.120	Reachable	LTE
100 Mbps	10 0.00% 100%					

```
(* ) Backup Uplink is connected
```

```
(Aruba9004-LTE) #show lc-cluster group-membership
```

```
Cluster Enabled, Profile Name = "auto_gwcluster_site_9_260_0"
One-to-one-redundancy Enabled
Heartbeat Threshold = 900 msec
Cluster Info Table
```

Type	IPv4 Address	Priority	Connection-Type	STATUS
peer	10.10.5.1	255	N/A	DISCONNECTED
self	10.10.5.2	128	N/A	ISOLATED (Leader)

```
(Aruba9004-LTE) #
```

```
(Aruba9004-LTE) #show vrrp
```

```
Virtual Router 105:
```

```
Description
Admin State UP, VR State MASTER
IP Address 10.10.105.3, MAC Address 00:00:5e:00:01:69, vlan 105
Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
Auth type NONE *****
tracking is not enabled
cluster-preempt enabled
```

```
Virtual Router 205:
```

```
Description
Admin State UP, VR State MASTER
IP Address 10.10.205.3, MAC Address 00:00:5e:00:01:cd, vlan 205
Priority 100, Advertisement 1 sec, Preemption Disable Delay 0
Auth type NONE *****
tracking is not enabled
cluster-preempt enabled
```

```
Virtual Router 220:
```

```
Description
Admin State UP, VR State MASTER
IP Address 10.10.5.3, MAC Address 00:00:5e:00:01:dc, vlan 5
Priority 255, Advertisement 1 sec, Preemption Enable Delay 0
Auth type NONE *****
tracking is not enabled
```

```
(Aruba9004-LTE) #
```