Deployment Guide
June-2019 rev. a

vAPV High Availability Deployment Guide for AVX Series Network Functions Platform

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1. Introduction

Array Networks' AVX Series network functions platforms host multiple Array, 3rd-party and open-source virtual appliances, providing the agility of cloud and virtualization with the guaranteed performance of dedicated appliances.

Array's AVX Series network functions platform hosts up to 32 fully independent virtual appliances (VAs), including Array load balancing and SSL VPN as well as 3rd-party VAs from leading networking and security vendors. Designed with managed service providers and enterprises in mind, the AVX Series enables data center consolidation without sacrificing the agility of cloud and virtualization or the performance of dedicated appliances. Uniquely capable of assigning dedicated CPU, SSL, memory and interface resources per VA, the AVX Series network functions platform is the only solution to deliver guaranteed performance in shared environments.

The following sections will describe the steps required to deploy an Array Networks vAPV Application Delivery Controller in HA (High Availability) mode on the AVX Series network functions platform.

The Array vAPV is a virtual application delivery controller that improves application availability, performance and security while enabling dynamic, flexible and elastic provisioning in cloud and virtual environments. For the purposes of this deployment guide the vAPV will be deployed on the AVX as a VA instance to provide server load balancing.

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2. Prerequisites

This deployment guide requires the following hardware and software products.

2.1. Array Networks AVX Network Functions Platform

- Two AVX Series (x600 or x800 models) network functions platforms running version ArrayOS 2.7.0.34 or later with valid licenses.

The AVX appliances can be purchased from Array Networks or authorized resellers. For more information on deploying the AVX appliances, please refer to the AVX Web UI Guide, which is accessible through the product's Web User Interface.

2.2. Array Networks vAPV Series Application Delivery Controllers

- Two vAPV (small, medium or large instance size) virtual appliances running version ArrayOS 8.6.1.80 or later for server load balancing with valid licenses. One vAPV instance will be deployed on each AVX platform. Ensure the AVX platforms have enough hardware resources to support the vAPV instances.

The vAPV appliances can be purchased from Array Networks or authorized resellers. For more information on deploying the vAPV appliance for AVX, please refer to the APV ArrayOS™ Web UI Guide, which is accessible through the product's Web User Interface.

Note: Assuming you have all these components, it should roughly take **120** minutes to complete the entire configuration in this deployment guide.

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3. Network Topology

Figure 1 shows a detailed configuration of the vAPV HA on AVX deployment.

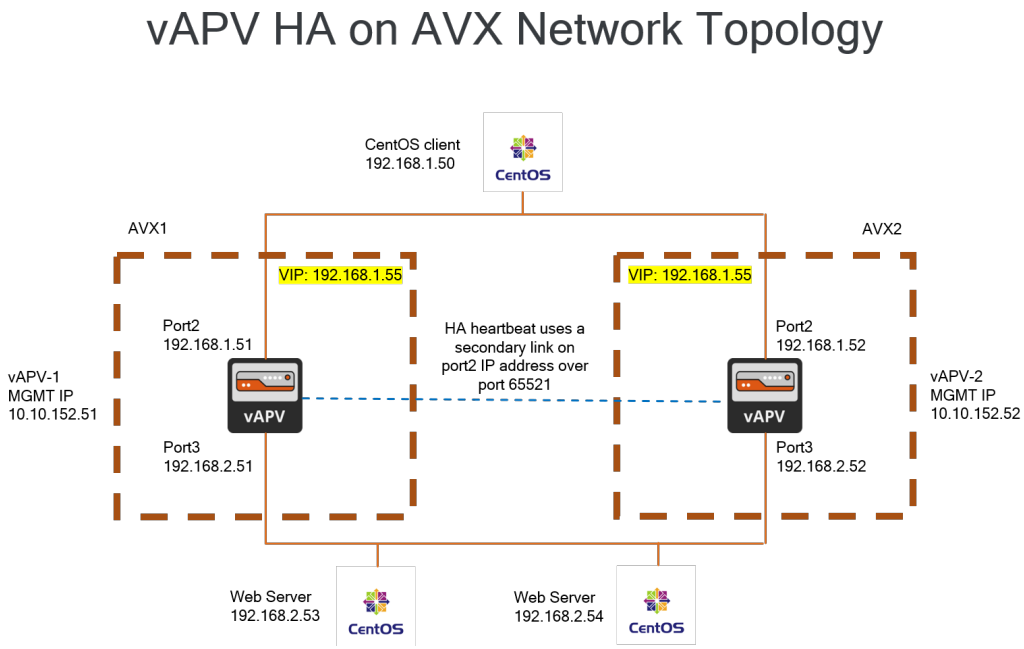

Figure 1 – Deployment Details

In this deployment, there is one vAPV instance running on each of the AVX platforms. The vAPV instances will have identical IP configuration on the ingress (port2) and egress (port3) interfaces. Port2 and port3 are the traffic ports and both use the SR-IOV ports. A secondary link on port2 is required for HA heartbeat packets transmission. The secondary link uses port 65521 on the port2 IP address.

Typical Traffic Flow: Inbound

The client machine and the web server are running CentOS, both external to the AVX platform. The two CentOS machines are required only to validate the design.

The client (top) will generate web server (bottom) requests to the CentOS web servers via the active/master vAPV instance. In the event of HA failure and the master/active vAPV instance fails, the standby vAPV instance will take over as the master/active vAPV. If the original master/active vAPV instance becomes active again, it will resume ownership as the master/active instance.

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4. Configuring AVX1

To configure the first AVX appliance, follow these steps:

1. Login to the AVX console using default credentials.

   ```
   Login: array

   Password: admin
   ```

2. Type “enable” and hit the <Enter> key (twice) to enter enable mode. No password is required.

   ```
   AN>enable

   Enable password:

   AN#
   ```

3. Type “config terminal” to enter config mode.

   ```
   AN#config terminal

   AN(config)#
   ```

4. Change the hostname to AVX1.

   ```
   AN(config)#hostname AVX1

   AVX1(config)#
   ```

5. Configure the IP address and default gateway for the management port.

   ```
   AVX1(config)#ip address 10.10.152.171 255.255.255.0 (use your own IP)

   AVX1(config)#ip route default 10.10.152.1 (use your own gateway IP)
   ```

6. Enable WebUI.

   ```
   AVX1(config)#webui on
   ```

7. Save changes.

   ```
   AVX1(config)#write memory
   ```

You may now access the AVX1 appliance using the WebUI at https://<IP>:8888. In this example, https://10.10.152.171:8888.

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5. Deploying the vAPV VA Instance on AVX1

To deploy the vAPV instance on the AVX appliance, follow these steps:

1. Obtain the image of the vAPV
2. Import the image to the AVX appliance
3. Create a VA instance with the image on the AVX appliance
4. Assign Virtual Traffic ports to the VA instance
5. Start the VA instance

5.1. Obtain the Image of the vAPV

By default, the vAPV is already preloaded as a VA image on the AVX. If not, please contact Array Networks to obtain the image. Please consult the AVX Application Guide or AVX CLI Handbook for additional information on how to upload and create a VA instance.

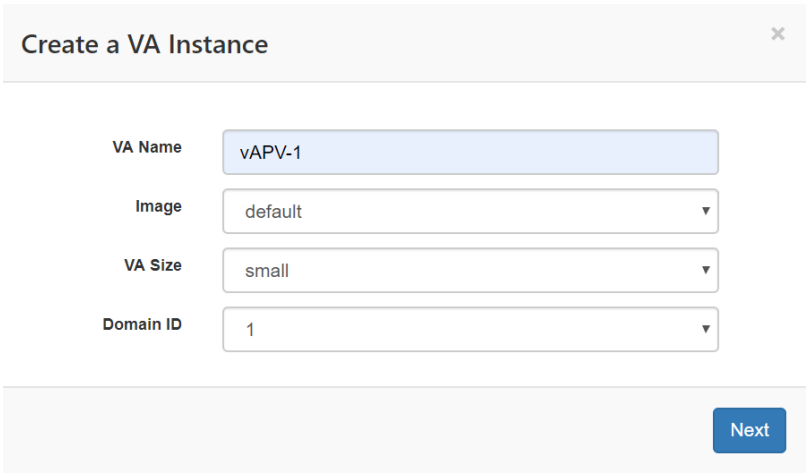
5.2. Import the Image to the AVX Appliance

On the AVX WebUI, navigate to **VA Management > VA Image** to upload the vAPV image.

5.3. Create a VA Instance with the Image on the AVX Appliance

On the AVX WebUI, navigate to **VA Management > VA** to create the VA instance using the vAPV image.

1. Create a vAPV VA instance named vAPV-1.



2. Configure two traffic ports using the SR-IOV ports. Select the Manual option.

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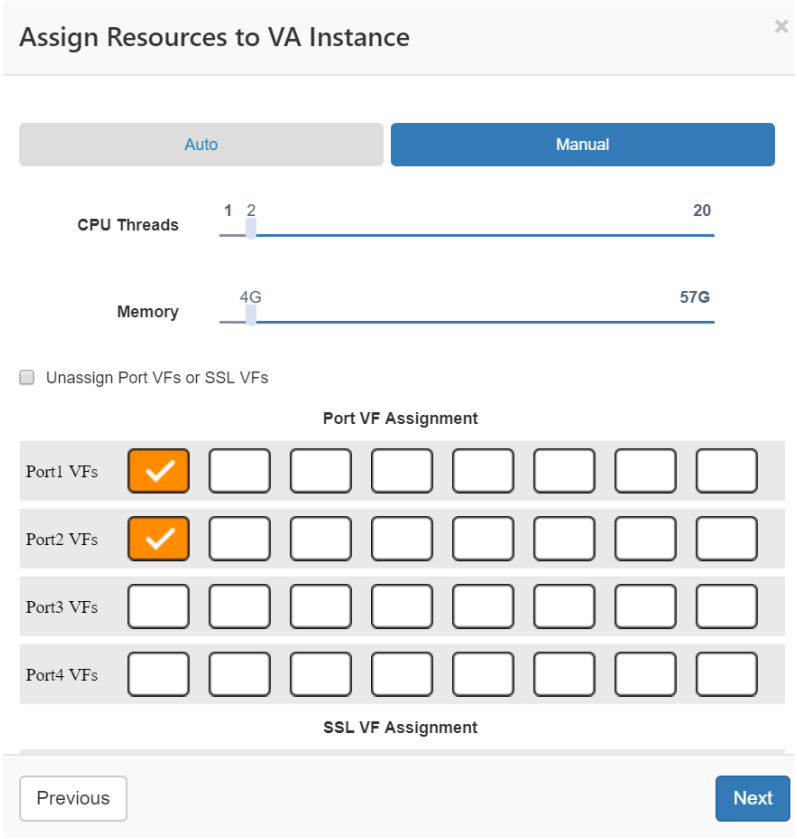
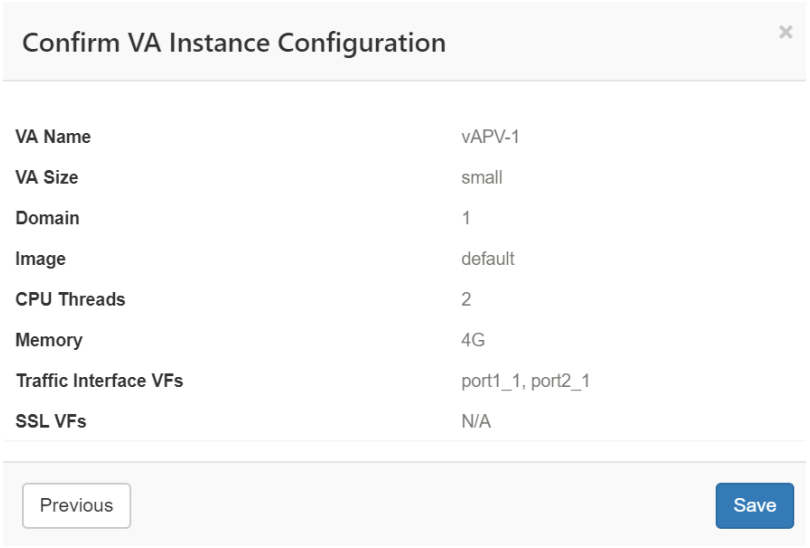
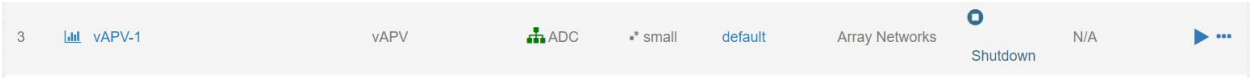


3. Confirm the VA Instance Configuration.



4. Click on **Save**. Navigate to **VA Management > VA** to view your newly created VA instance.



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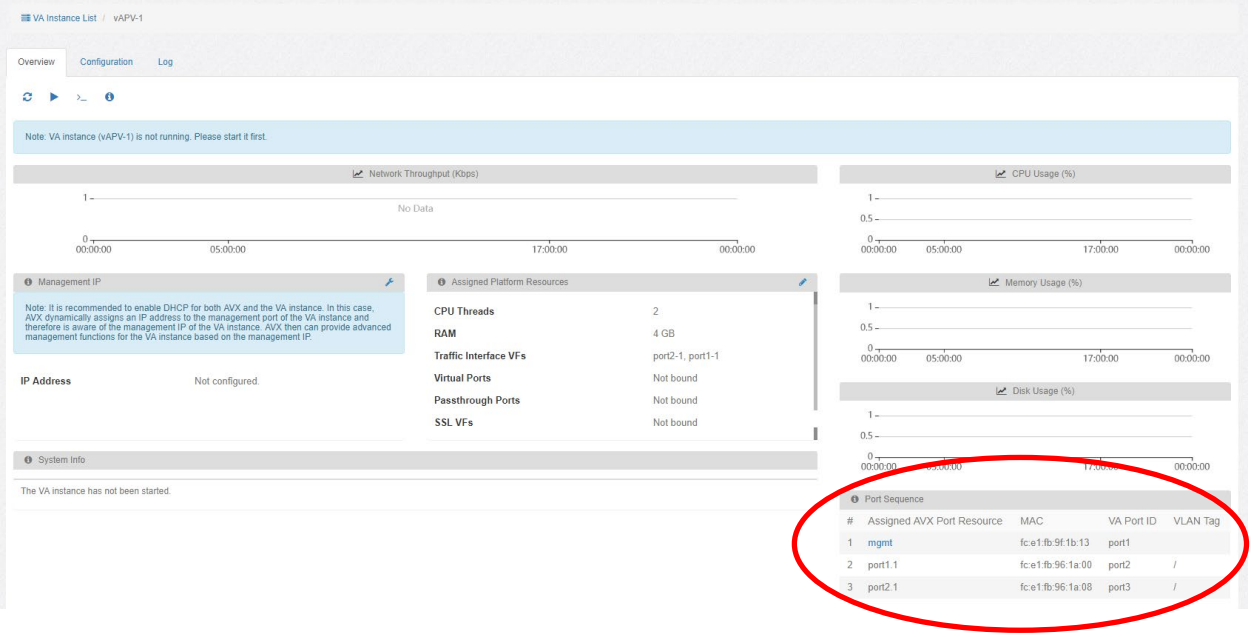
5. Confirm the correct interfaces by clicking on vAPV-1.

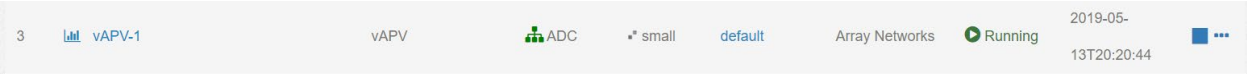


You should see one management port and two SR-IOV traffic ports.

5.4. Start the VA Instance

On the AVX WebUI, navigate to **VA Management > VA** to start the VA instance.

1. Locate the VA instance named vAPV-1 and click on the ▶ symbol under the Action column to start the VA instance.



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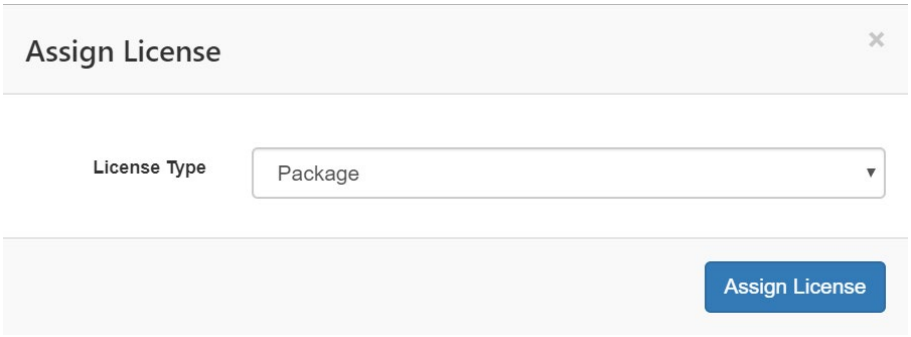
6. Assigning a License to the vAPV VA Instance on AVX1

Please ensure that you have purchased a vAPV License Package Key from Array Networks or an authorized reseller. The vAPV License Package Key will allow you to assign licenses to vAPV VA instances deployed on the AVX appliance.

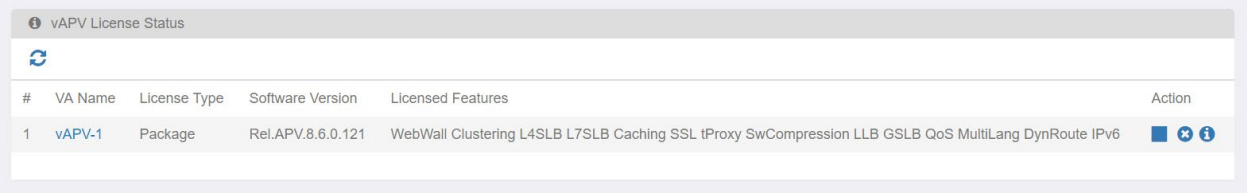
To assign the license to the vAPV VA instance, follow these steps:

1. On the AVX WebUI, navigate to **Platform > System > System Management.** Scroll down to the vAPV License Status section to view the deployed vAPV VA instance.

2. On the far right under the **Action** column, click on the icon.



3. Click on the **Assign License** box in the popup.
4. After a few seconds, your vAPV VA instance will have a valid license assigned.



7. Configuring the vAPV VA Instance on AVX1

To configure the vAPV VA instance on AVX1, follow these steps:

1. Login to AVX1 console using default credentials.

```
AVX1>enable (no password)

AVX1#

AVX1#config terminal

AVX1(config)#
```

2. Login to vAPV-1 console using default credentials.

```
AVX1(config)#va console vAPV-1 <Enter> <Enter>

Array Networks Login (AN): array

Password: admin

AN>enable (no password)

AN#config terminal

AN(config)#
```

3. Change hostname to APV1.

```
AN(config)#hostname APV1

APV1(config)#
```

4. Configure IP configuration for management port (port1), ingress (port2), egress (port3) and gateway. (*use your own IPs*)

```
APV1(config)#ip address port1 10.10.152.51 255.255.255.0

APV1(config)#ip route default 10.10.152.1

APV1(config)#ip address port2 192.168.1.51 255.255.255.0

APV1(config)#ip address port3 192.168.2.51 255.255.255.0
```

5. Enable WebUI.

```
APV1(config)#webui on
```

6. Save changes.

```
APV1(config)#write memory
```

You may now access the vAPV-1 VA instance on AVX1 using the WebUI at https://<IP>:8888. For our example, https://10.10.152.51:8888.

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8. Configuring AVX2

To configure the second AVX appliance, follow these steps:

1. Login to the AVX console using default credentials.

   ```
   Login: array

   Password: admin
   ```

2. Type “enable” and hit the <Enter> key (twice) to enter enable mode. No password is required.

   ```
   AN>enable

   Enable password:

   AN#
   ```

3. Type “config terminal” to enter config mode.

   ```
   AN#config terminal

   AN(config)#
   ```

4. Change the hostname to AVX2.

   ```
   AN(config)#hostname AVX2

   AVX2(config)#
   ```

5. Configure the IP address and default gateway for the management port.

   ```
   AVX2(config)#ip address 10.10.152.172 255.255.255.0 (use your own IP)

   AVX2(config)#ip route default 10.10.152.1 (use your own gateway IP)
   ```

6. Enable WebUI.

   ```
   AVX2(config)#webui on
   ```

7. Save changes.

   ```
   AVX2(config)#write memory
   ```

You may now access the AVX2 appliance using the WebUI at https://<IP>:8888. For our example, https://10.10.152.172:8888.

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9. Deploying the vAPV VA Instance on AVX2

To deploy the vAPV instance on the AVX appliance:

1. Obtain the image of the vAPV
2. Import the image to the AVX appliance
3. Create a VA instance with the image on the AVX appliance
4. Assign Virtual Traffic ports to the VA instance
5. Start the VA instance

9.1. Obtaining the Image of the vAPV

By default, the vAPV is already preloaded as a VA image on the AVX. If not, contact Array Networks to obtain the image. Consult the AVX Application Guide or AVX CLI Handbook for additional information on how to upload and create a VA instance.

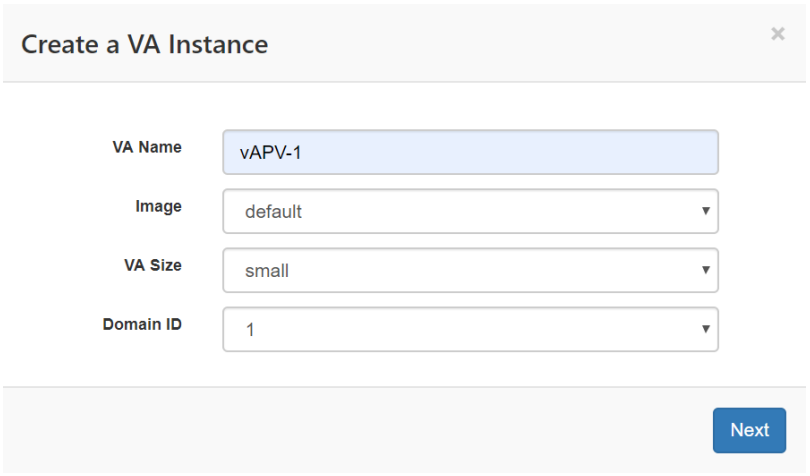
9.2. Importing the Image to the AVX Appliance

On the AVX WebUI, navigate to **VA Management > VA Image** to upload the vAPV image.

9.3. Creating a VA Instance with the Image on the AVX Appliance

On the AVX WebUI, navigate to **VA Management > VA** to create the VA instance using the vAPV image.

1. Create a vAPV VA instance named vAPV-1.



2. Configure two traffic ports using the SR-IOV ports. Select the Manual option.

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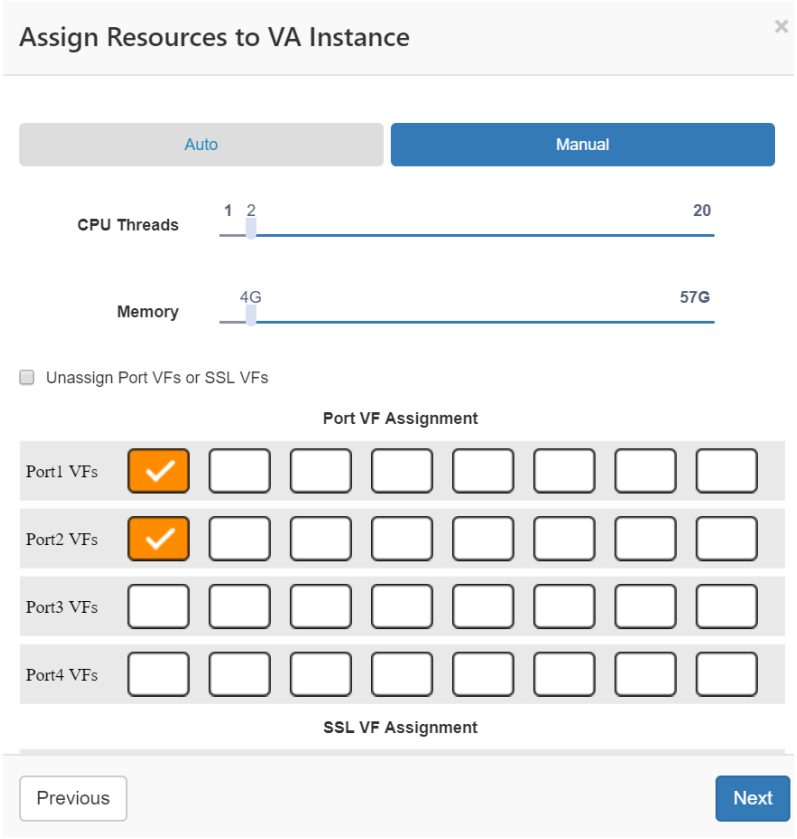
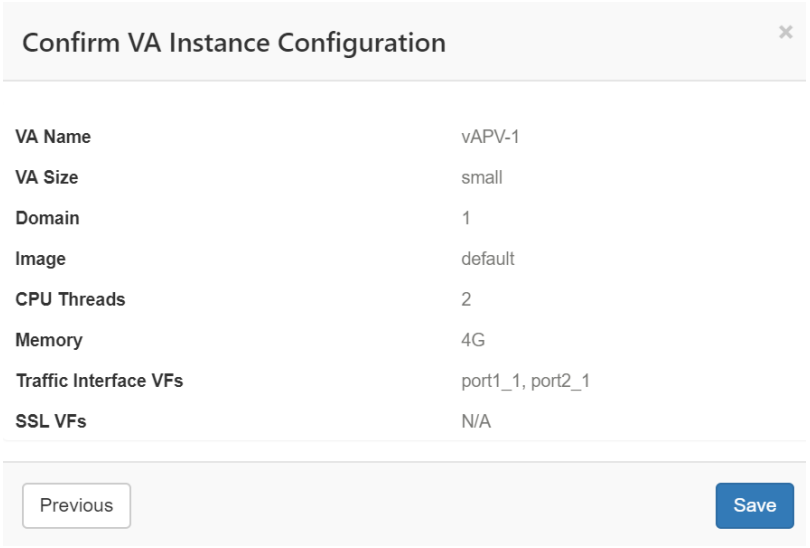
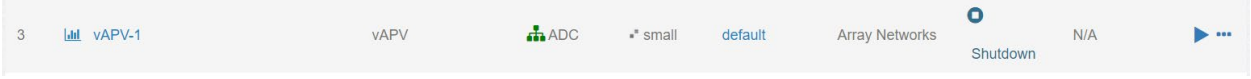


3. Confirm the VA Instance Configuration.



4. Click **Save**. Navigate to **VA Management > VA** to view your newly created VA instance.



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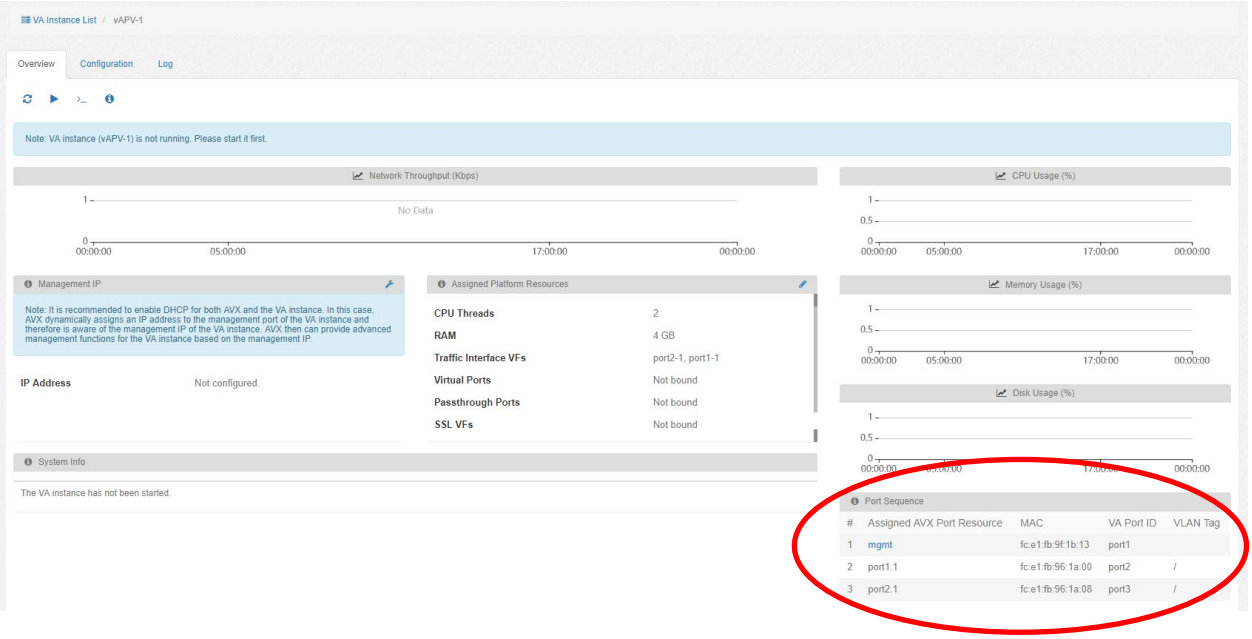
5. Confirm the correct interfaces by clicking on vAPV-1.

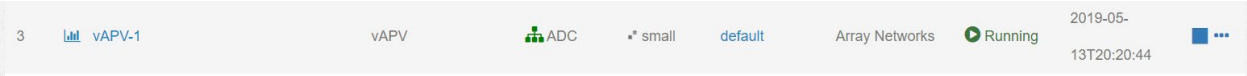


You should see one management port and two SR-IOV traffic ports.

9.4. Starting the VA Instance

On the AVX WebUI, navigate to **VA Management > VA** to start the VA instance.

1. Locate the VA instance named vAPV-1 and click on the ▶ symbol under the Action column to start the VA instance.



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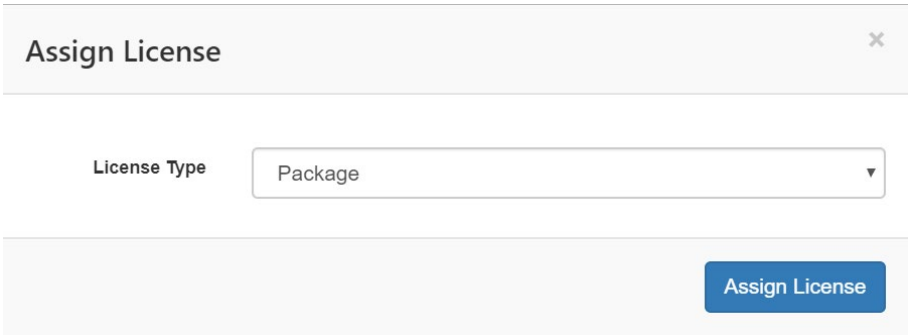
10. Assigning a License to the vAPV VA Instance on AVX2

Please ensure that you have purchased a vAPV License Package Key from Array Networks or an authorized reseller. The vAPV License Package Key will allow you to assign licenses to vAPV VA instances deployed on the AVX appliance.

To assign the license to the vAPV VA instance, follow these steps:

1. On the AVX WebUI, navigate to **Platform > System > System Management.** Scroll down to the vAPV License Status section to view the deployed vAPV VA instance.

2. On the far right under the **Action** column, click on the icon.



3. Click on the **Assign License** box in the popup.
4. After a few seconds, your vAPV VA instance will have a valid license assigned.

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11. Configuring the vAPV VA Instance on AVX2

After the vAPV VA instance is up, to complete the initial configuration, follow these steps:

1. Login to AVX2 console using default credentials.

```
AVX2>enable (no password)

AVX2#

AVX2#config terminal

AVX2(config)#
```

2. Login to vAPV-1 console using default credentials.

```
AVX2(config)#va console vAPV-1 <Enter> <Enter>

Array Networks Login (AN): array

Password: admin

AN>enable (no password)

AN#config terminal

AN(config)#
```

3. Change hostname to APV2.

```
AN(config)#hostname APV2

APV2(config)#
```

4. Configure IP configuration for management port (port1), ingress (port2), egress (port3) and gateway. (*use your own IPs*)

```
APV2(config)#ip address port1 10.10.152.52 255.255.255.0

APV2(config)#ip route default 10.10.152.1

APV2(config)#ip address port2 192.168.1.52 255.255.255.0

APV2(config)#ip address port3 192.168.2.52 255.255.255.0
```

5. Enable WebUI.

```
APV2(config)#webui on
```

6. Save changes.

```
APV2(config)#write memory
```

You may now access the vAPV-2 VA instance on AVX2 using the WebUI at https://<IP>:8888. For our example, https://10.10.152.52:8888.

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12. Configuring SLB on vAPV1 on AVX1

To complete configuring server load balancing (SLB) on vAPV1 on AVX1, follow these steps:

1. Login to vAPV-1 console using default credentials via the AVX1 console.

```
AVX1>enable (no password)
AVX1#
AVX1#config terminal
AVX1(config)#
AVX1(config)#va console vAPV-1
APV1#
APV1#config terminal
APV1(config)#
APV1(config)#slb real http "RS_WEB_1" 192.168.2.53 80 1000 tcp 3 3
APV1(config)#slb real http "RS_WEB_2" 192.168.2.54 80 1000 tcp 3 3
APV1(config)#slb group method "GROUP_HTTP_1" rr
APV1(config)#slb group member "GROUP_HTTP_1" "RS_WEB_1" 1 0
APV1(config)#slb group member "GROUP_HTTP_1" "RS_WEB_2" 1 0
APV1(config)#slb virtual http "VS_HTTP_1" 192.168.1.55 80 arp 0
APV1(config)#slb policy default "VS_HTTP_1" "GROUP_HTTP_1"
APV1(config)#write memory
```

Note: Since HA is being deployed, you only need to configure SLB on the master/active vAPV. When the HA synconfig commands are executed, all settings on the master/active vAPV will overwrite the slave/passive vAPV. *Please consult the APV User Guide for more information on how to configure HA.*

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13. Configuring HA on vAPV1 on AVX1

To complete configuring HA on both vAPV1 on AVX1, follow these steps:

1. Enter the following on APV1.

```
APV1(config)#ha log on
APV1(config)#ha log level emerg
APV1(config)#ha unit "1" 192.168.1.51 65521
APV1(config)#ha unit "2" 192.168.1.52 65521
APV1(config)#ha group id 5
APV1(config)#ha group fip 5 192.168.1.55 port2
APV1(config)#ha group priority "1" 5 100
APV1(config)#ha group priority "2" 5 50
APV1(config)#ha group preempt on 5
APV1(config)#ha group enable 5
APV1(config)#ha arp interval 30
APV1(config)#ha synconfig bootup on
APV1(config)#ha synconfig runtime on
APV1(config)#ha ssf on
APV1(config)#ha on
APV1(config)#write memory
```

Note: Since HA is being deployed, you only need to configure HA on the master/active vAPV. When the HA synconfig commands are executed, all settings on the master/active vAPV will overwrite the slave/passive vAPV. *Please consult the APV User Guide for more information on how to configure HA.*

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14. Configuring HA Synconfig Peer on vAPV1/AVX1 and vAPV2/AVX2

To complete configuring HA synconfig peer on both vAPV-1 on AVX1 and vAPV-2 on AVX2, follow these steps:

1. Enter the following on APV1 on AVX1.

   APV1(config)#synconfig peer "vAPV1" 192.168.1.51

   APV1(config)#synconfig peer "vAPV2" 192.168.1.52

2. Enter the following on APV2 on AVX2.

   APV2(config)#synconfig peer "vAPV1" 192.168.1.51

   APV2(config)#synconfig peer "vAPV2" 192.168.1.52

3. Enter the following on APV1 on AVX1.

   APV1(config)#synconfig to vAPV2

```
APV1(config)#synconfig to vAPV2

checking version and licenses....
ArrayOS Rel.APV.8.6.0.121 build on Mon Sep 10 10:08:55 2018  ArrayOS Rel.APV.
8.6.0.121 build on Mon Sep 10 10:08:55 2018
Licensed Features :  WebWall  Clustering  L4SLB  L7SLB  Caching  SSL  tProxy
 SwCompression  LLB  GSLB  QoS  MultiLang  DynRoute  IPv6
sync config for 192.168.1.52 starts...
Synchronizing ssl hosts ...
Synchronizing CLI ...
Synchronizing proxy ...
Synchronizing ePolicy ...
Synchronizing healthcheck script ...
Synchronizing ipregion files ...
Synchronizing crontab files ...
Synchronizing enable password ...
Synchronizing bind9 configurations...
Clearing the running configuration...
Applying the new settings ...
sync config completed, writing to the current config
```

4. Save changes on both APV1 and APV2.

   APV1(config)#write memory

   APV2(config)#write memory

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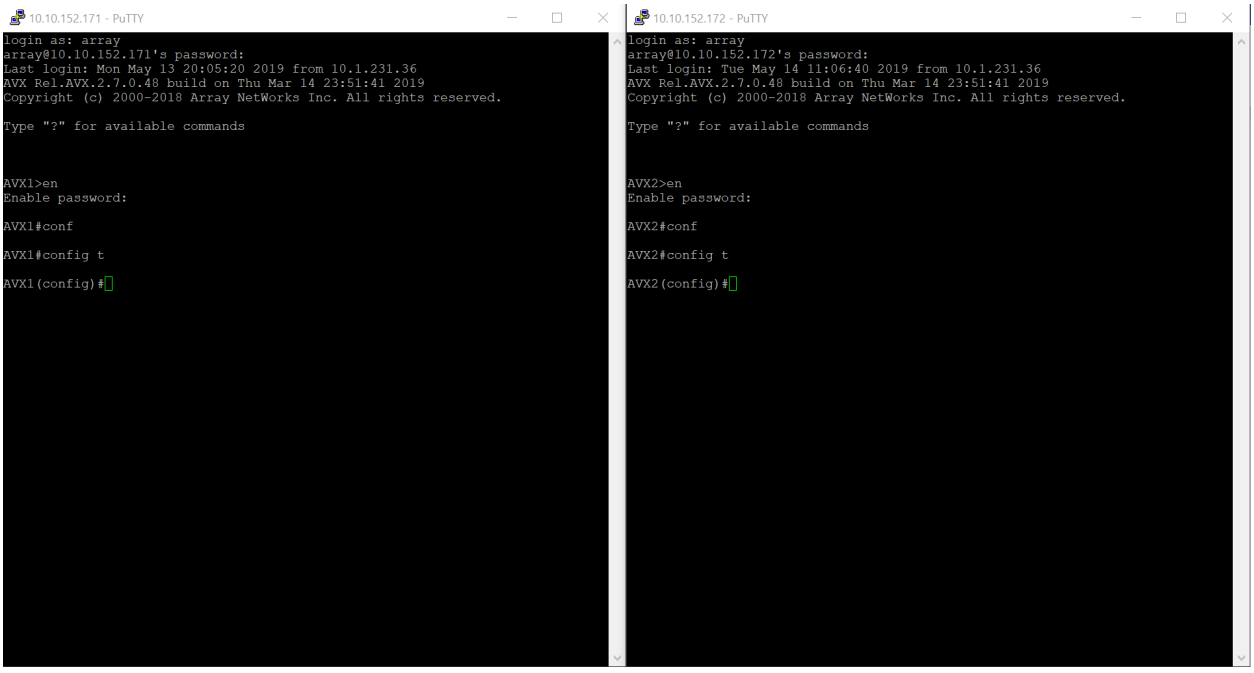
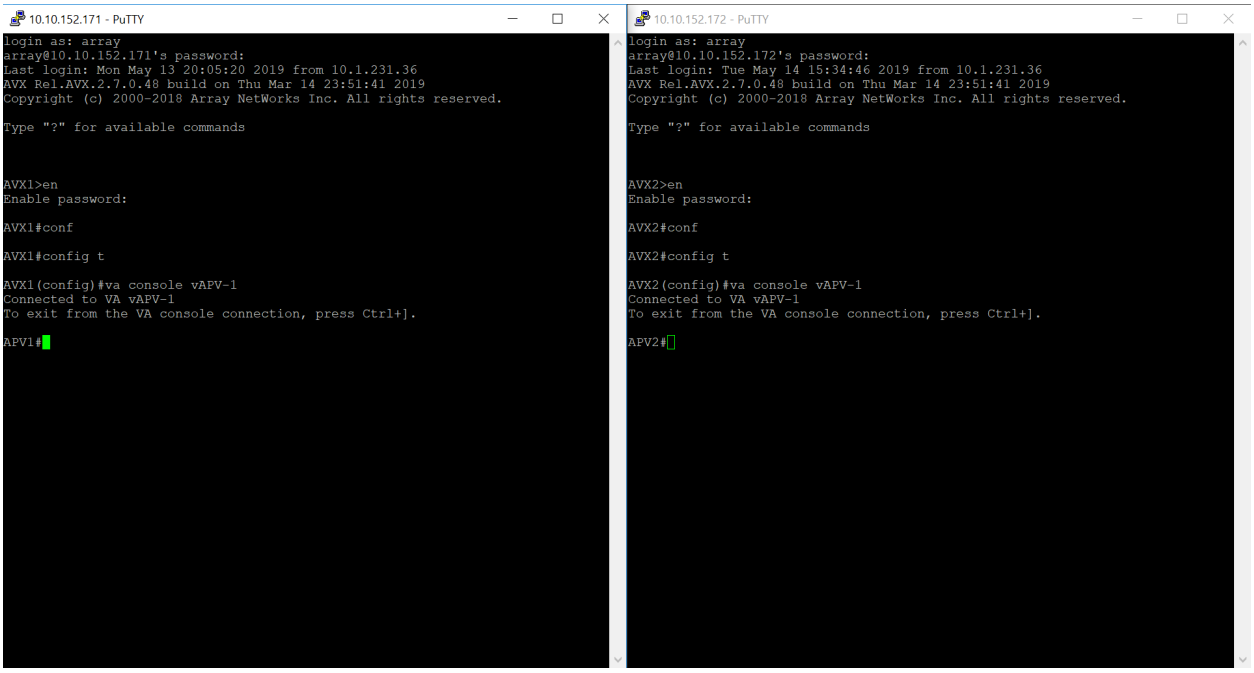
15. Verifying the vAPV HA on AVX Configuration

To test and verify that the vAPV HA on AVX configuration is working, you must now simulate a failure of the master or active vAPV VA instance over to the slave or passive vAPV VA instance.

1. Login to the console on both AVX1 and AVX2.



2. Login to vAPV1 on AVX1 and vAPV2 on AVX2 via console.



3. Type “show ha status” to obtain the HA status of the cluster.

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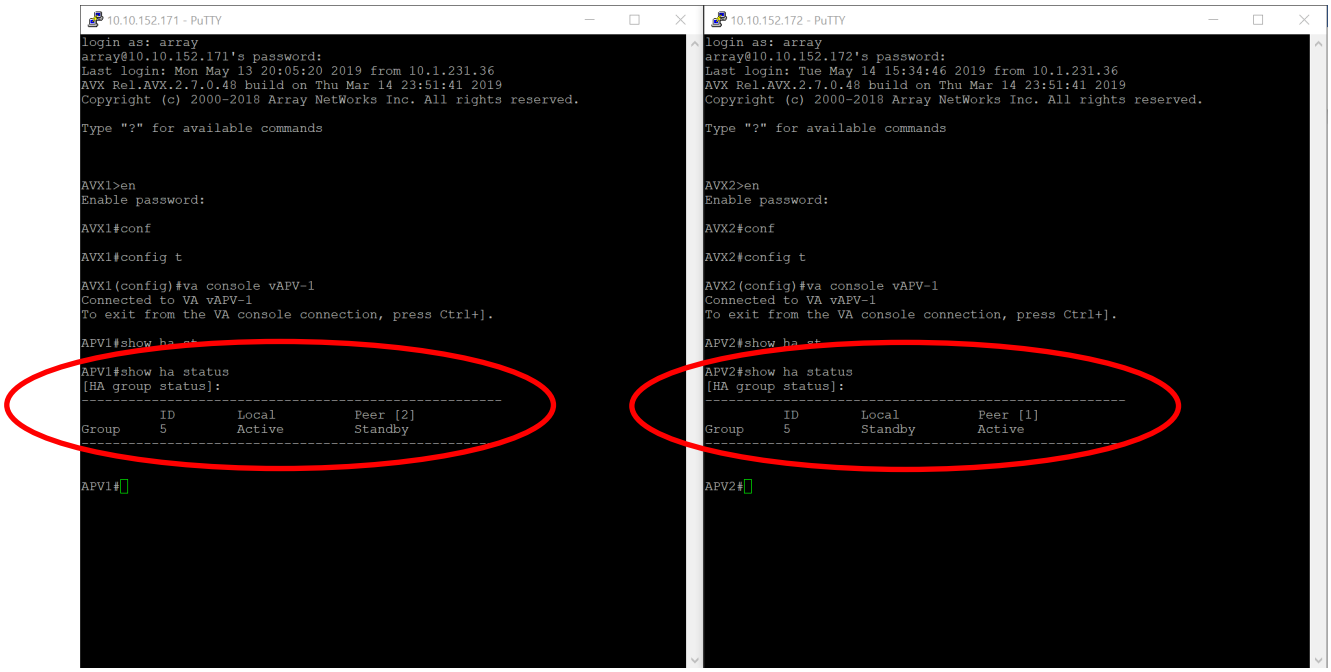
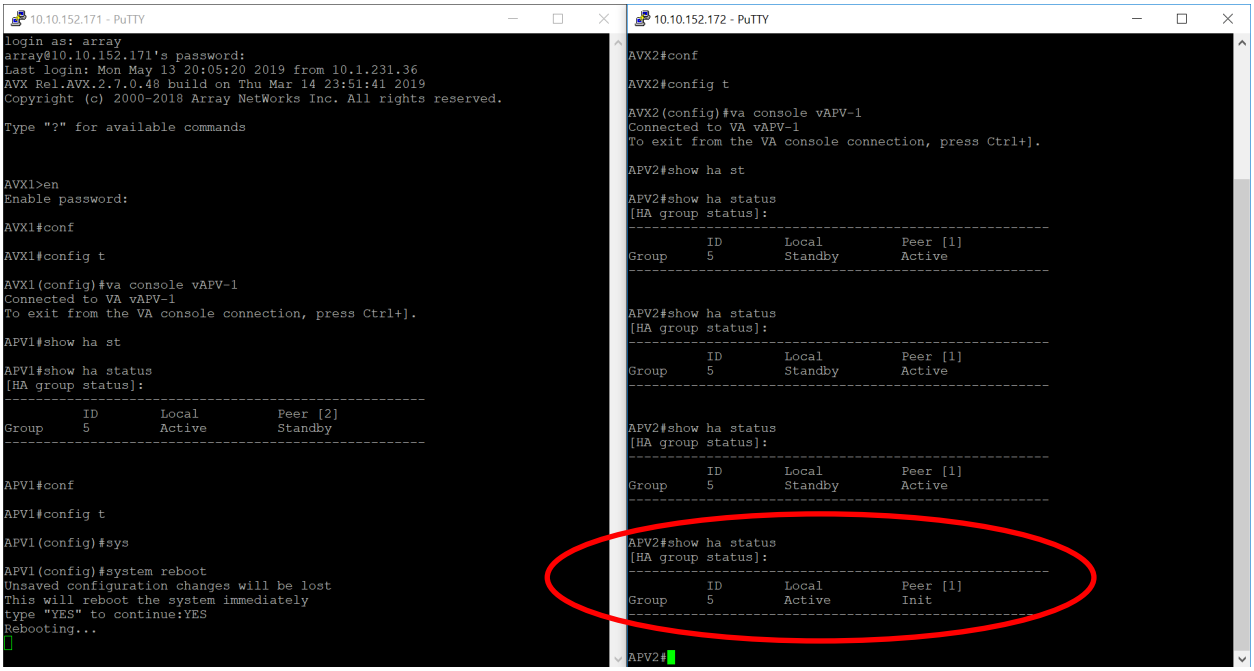


Note that the Master/Active VA instance is APV1 on AVX1 (left-hand side) and the Slave/Passive VA instance is APV2 on AVX2 (right-hand side).

4. Now force a failure by rebooting the Master/Active VA instance on AVX1 and checking the status on AVX2.



Note that the new Master/Active VA instance is APV2 on AVX2 (right-hand side).

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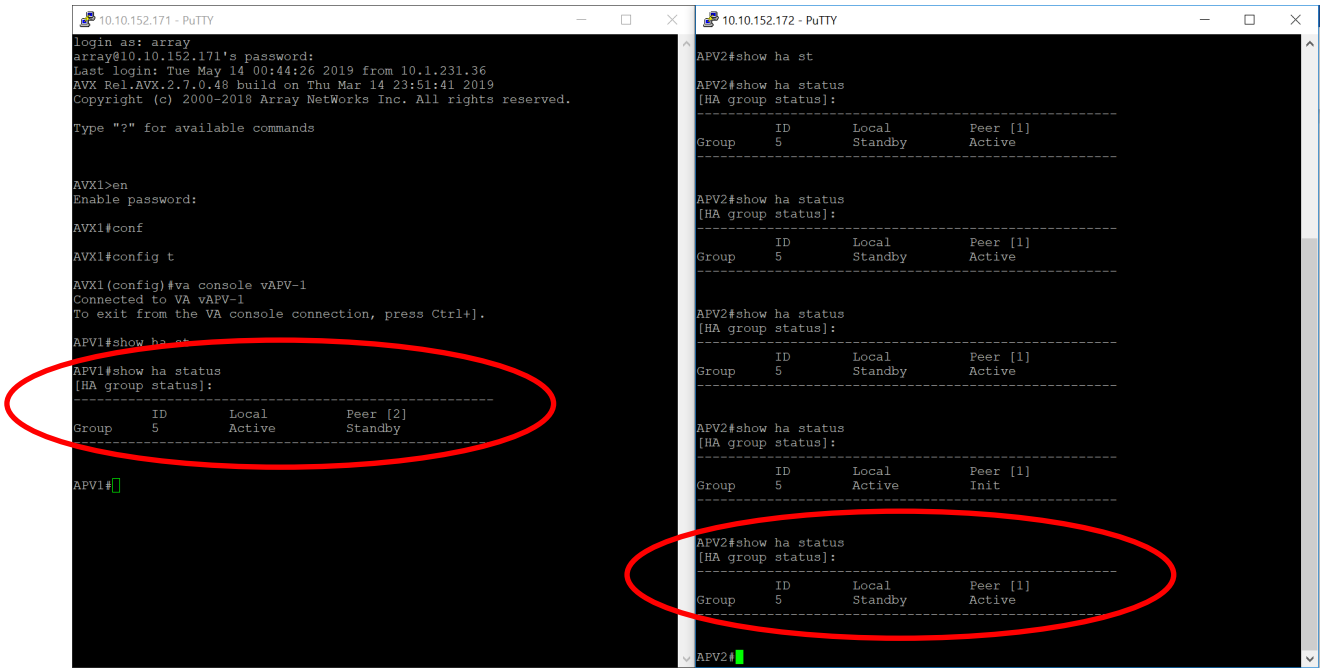
5. When the APV1 VA instance on AVX1 (left-hand side) boots back up successfully, it will resume ownership as the Master.



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About Array Networks

Array Networks develops purpose-built systems for deploying virtual app delivery, networking and security functions with guaranteed performance. Headquartered in Silicon Valley, Array is backed by over 250 worldwide employees and is poised to capitalize on explosive growth in the areas of virtualization, cloud and software-centric computing. Proven at over 5000 worldwide customer deployments, Array is recognized by leading analysts, enterprises and service providers, for next-generation technology that delivers agility at scale.

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