

# vAPV Administration Guide

## For ArrayOS APV 8.6 Release

June 15, 2016

### 1 Server Hardware Requirement

The server hosting vAPV must meet the following minimal requirements:

- CPU: One or more 64-bit x86 multi-core CPUs with virtualization assist (Intel-VT or AMD-V) enabled
- RAM: 2 GB available for vAPV
- NIC: 1 x 1 Gbps NIC or 2 x 1 Gbps NICs
- Storage: 40 GB of available hard drive space for vAPV

### 2 Hypervisor Guest Machine Definition

The following hypervisors are supported for vAPV administration:

- VMware ESXi 4.1 or later (64-bit only)
- Citrix XenServer 5.6 or later (64-bit only)
- KVM in CentOS 6.0 or later
- OpenXen in OpenSUSE 12.3 or later
- Microsoft Hyper-V (64-bit only)

The VMware ESXi virtual machine guest environment for the vAPV must include:

- 2 vCPUs
- 2 GB vRAM
- 4 x 1 virtual e1000 Ethernet adapters (other Ethernet adapter types are not supported, for example, VMXNET)
- 40 GB of available hard drive space

The Citrix XenServer virtual machine guest environment for the vAPV must include:

- 2 vCPUs
- 2 GB vRAM
- 4 x 1 virtual network interfaces
- 40 GB of available hard drive space

The OpenXen virtual machine guest environment for the vAPV must include:

- 2 vCPUs
- 2 GB vRAM
- 4 x 1 virtual network interfaces
- 40 GB of available hard drive space

The KVM virtual machine guest environment for the vAPV must include:

- 2 vCPUs

- 2 GB vRAM
- 4 x 1 virtual network interfaces
- 40 GB of available hard drive space

The Microsoft Hyper-V virtual machine guest environment for the vAPV must include:

- 2 vCPUs
- 2 GB vRAM
- 4 x 1 virtual network interfaces
- 40 GB of available hard drive space

### 3 Deploying the vAPV Virtual Machine

#### 3.1 Deploying the vAPV Virtual Machine on VMware ESXi

The first step in deploying the vAPV virtual machine on VMware ESXi is to download the OVA file to your local system. Next, you must run the “**Deploy OVF Template**” wizard from within the VMware vSphere™ client. Detailed steps are as follows:

1. Please contact Array Networks Customer Support (Email: support@arraynetworks.com) for download instructions.
2. Download the Array vAPV file package with the “.ova” extension name.
3. From the “**File**” menu, select “**Deploy OVF Template**”. (This will start the “**OVF Template**” wizard.)
4. In the “**Source**” pane, click “**Deploy from file**” and locate the OVA file using the “**Browse**” button. For example, the OVA file is in the path “\MyDocuments\Work\Virtualization\- 5. Click “**Next**” to open the “**OVF Template Details**” pane and verify that the OVF template details are correct.
- 6. Click “**Next**” to open the “**Name and Location**” pane.
- 7. In the “**Name**” field, type a name for the vAPV virtual machine, for example, “vAPV”.
- 8. In the “**Disk Format**” pane, select “**Thick provisioned format**”.
- 9. Click “**Next**” to open the “**Ready to Complete**” screen.
- 10. Verify that all deployment settings are correct and click “**Finish**”.
- 11. Once the Virtual Machine is deployed, it can be started up.

#### 3.2 Deploying the vAPV Virtual Machine on Citrix XenServer

The first step in deploying the vAPV virtual machine on Citrix XenServer is to download the .rar containing the XVA file to your local system. Next, you must run the “**Import**” from within the XenCenter. Detailed steps are as follows:

1. Please contact the Array Customer Support (Email: support@arraynetworks.com) for download instructions.
2. Download the .rar file containing the .xva image.
3. Open the .rar file by using the WinRAR archiver and extract the Array vAPV file package ending with .xva.
4. From the “**File**” menu, select “**Import**”. (This will start the “**XVA import**” wizard.)
5. In the “**Import Source**” pane, locate the XVA file using the “**Browse**” button. For example, the XVA file is in the path “\MyDocuments\Work\Virtualization\- 6. Click “**Next**” to open the “**Home server**” pane, and select the home server on which the Virtual Machine should be run.

7. Click “**Next**” to open the “**Storage**” pane, and select the storage repository to store the virtual disks for the new Virtual Machine.
8. Click “**Import >**” to prepare the importing process.
9. In the “**Network**” pane, add or delete any existing networks.
10. Click “**Next**” to open the “**Finish**” screen.
11. Select the check box at the bottom of the “**Finish**” pane to start the Virtual Machine as soon as the import process is over.
12. The Virtual Machine would be deployed and started automatically.

### 3.3 Deploying the vAPV Virtual Machine on OpenXen

The first step in deploying the vAPV virtual machine on OpenXen is to download the .gzip file containing the bootable hard disk of the Virtual Machine and the vAPV configuration file. Next you must create a Virtual Machine by using these files. Detailed steps are as follows:

1. Please contact the Array Customer Support (Email: support@arraynetworks.com) for download instructions.
2. Download the .gzip file containing the disk0.raw file and vAPV configuration file to “/var/lib/xen/images”. Please make sure that you have more than 40 GB of free space after the download.
3. Open the .gzip file by using the “**tar -xvzf <vAPV\_image>.tar.gz**” command.
4. This creates a folder “vAPV” which contains the disk0.raw file and vAPV configuration file.
5. Place the vAPV configuration file in the path “/etc/xen/vm”.
6. Edit the vAPV configuration file to specify the appropriate bridge name that you want the interfaces to be connected to. The disk, CPU, and memory may also need to be specified in the vAPV configuration file if required. Please do not change any other fields as it might lead to licensing conflicts.
7. Attach the Virtual Machine to OpenXen by issuing “**xm new vAPV**”.
8. Start the Virtual Machine by issuing “**xm start vAPV**”.



**Note:** The deployment steps of vAPV on OpenXen are based on the OpenSUSE 12.3 environment. The deployment steps on other Linux environments are similar. For any questions on the deployment, please contact the Array Customer Support (Email: support@arraynetworks.com).

### 3.4 Deploying the vAPV Virtual Machine on KVM

The first step in deploying the vAPV virtual machine on KVM is to download the compressed file containing the bootable hard disk of the Virtual Machine and the XML formatted configuration file. Next you must create a Virtual Machine by using these files. Detailed steps are as follows:

1. Please contact the Array Customer Support (Email: support@arraynetworks.com) for download instructions.
2. Download the compressed file (for example, vAPV\_image.tar.gz) containing the disk0.raw disk image file and the XML configuration file (for example, vAPV.xml). Please make sure that you have more than 40 GB of free space after the download.
3. Open the compressed file by using the “**tar -xvzf <vAPV\_image>.tar.gz**” command. This creates a folder “vAPV\_image” which contains the disk0.raw disk image file and the XML configuration file.
4. Enter the folder “vAPV\_image”, and edit the XML configuration file to specify the appropriate bridge name that you want the interfaces to be connected to. Specify the disk, CPU, and memory in the vAPV configuration file if required. Please do not change any other fields as it might lead to licensing conflicts.
5. Create a virtual machine from the XML configuration file by using the “**virsh define vAPV.xml**” command.

6. Start the virtual machine by using the “**virsh start vAPV**” command.



**Note:** The deployment steps of vAPV on KVM are based on the CentOS 7.0 environment. The deployment steps on other Linux environments are similar. For any questions on the deployment, please contact the Array Customer Support (Email: support@arraynetworks.com).

### 3.5 Deploying the vAPV Virtual Machine on Microsoft Hyper-V

The first step in deploying the vAPV virtual machine on Microsoft Hyper-V is to download the .zip file to your local system. Next, you must decompress the .zip file, and then run the “**Import the Virtual Machine**” wizard from within the Microsoft Hyper-V Manager. Detailed steps are as follows:

1. Please contact the Array Customer Support (Email: support@arraynetworks.com) for download instructions.
2. Download the Array vAPV file package ending with .zip.
3. Decompress the .zip file. This creates three folders “Snapshots”, “Virtual Machine Hard Disks” and “Virtual Machines”.
4. Connect the Microsoft Hyper-V server using the Microsoft Hyper-V Manager. Right-click the Microsoft Hyper-V server and select “**Import the Virtual Machine**”. (This will start the “**Import the Virtual Machine**” wizard.)
5. Click “**Next**” on the wizard and locate the decompressed folders of the .zip file using the “**Browse**” button. For example, the decompressed folders of the .zip file are in the path “D:\export-vapv\vAPV21\vAPV”.
6. Then the virtual machine name will be displayed on the “**Select the Virtual Machine**” pane. Select the virtual machine “vAPV” and click “**Next**”.
7. In the “**Select the Import Type**” pane, select “**Copy the Virtual Machine**” and click “**Next**”.
8. Select the storage repository to store the virtual machine file and click “**Next**”. To change the default path, please select the “**Store the Virtual Machine in another Location**” check box.
9. Select the storage repository to store the virtual hard disk file and click “**Next**”.
10. Verify that all deployment settings are correct and click “**Finish**”.
11. Once the Virtual Machine is deployed, it can be started.

## 4 Post-Installation Configuration

1. Please finalize all Virtual Machine configurations before requesting a new license.
 

**Caution:** Any Virtual Machine configuration change may invalidate current license.
2. Please contact the Array Customer Support (Email: support@arraynetworks.com) to obtain a license key.

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Once the virtual machine starts, the login shell will appear on the console tab of the vAPV virtual machine, for example, on the Citrix XenCenter, VMware vSphere™ client, Virtual Machine Manager or Microsoft Hyper-V Manager. Please note that it may take a couple of minutes for the login shell to appear.

The initial username/password is array/admin.

## 6 Minimum Initial Configuration

Three ways are available to connect the vAPV to begin configuration:

1. Console (recommended)

2. SSH
3. Web browser

To set up the vAPV via SSH or a Web browser, first you need to complete the network setting of the vAPV through the Console connection.

It is recommended to access the vAPV system via the virtual machine console tab on the Citrix XenCenter, VMware vSphere™ Client, Virtual Machine Manager or Microsoft Hyper-V Manager. The vAPV will prompt you for a User Privilege Password. The prompt like “Array Networks Login (AN):” may appear. If this is the first time you connect the vAPV, or if you have not changed the default password, then enter the user name “array” and the password “admin”.

Now enter “**enable**” and press “**Enter**” to switch to the enable mode. You will be prompted to enter an enable password. The default enable password is null. Therefore, just press “**Enter**”. The prompt like “AN#” will appear.

Now enter “**config terminal**” and press “**Enter**” to switch to the configuration mode. The prompt like “AN(config)#” will appear. At this point, the administrator will have full access to the vAPV CLI.

The CLI commands required for minimum configuration are listed below. It is recommended that you set port1, the default route, and WebUI IP address and port.

**ip address** {system\_ifname/mnet\_ifname/vlan\_ifname/bond\_ifname} <ip\_address> {netmask/prefix}

Allows the user to set each interface IP address and netmask or prefix length.

**ip route default** <gateway\_ip>

Allows the user to set the default gateway IP address.

**webui ip** <ip\_address>

Allows the user to set the IP address that the vAPV will accept Web User Interface commands via the Web browser. It is recommended that a management IP address be used for configuring the WebUI IP address.

**webui port** <port>

Allows the user to set the port from which the vAPV will accept WebUI commands. The port must be designated within the range from 1024 to 65000. The default port is 8888.

**webui** {on|off}

Enables or disables the WebUI.

With the above network setting completed for the vAPV, you may set up the vAPV via SSH or a Web browser. You may use a Web browser to connect to the WebUI IP address assigned to the vAPV (with WebUI enabled) or establish an SSH connection to the IP address of the vAPV.



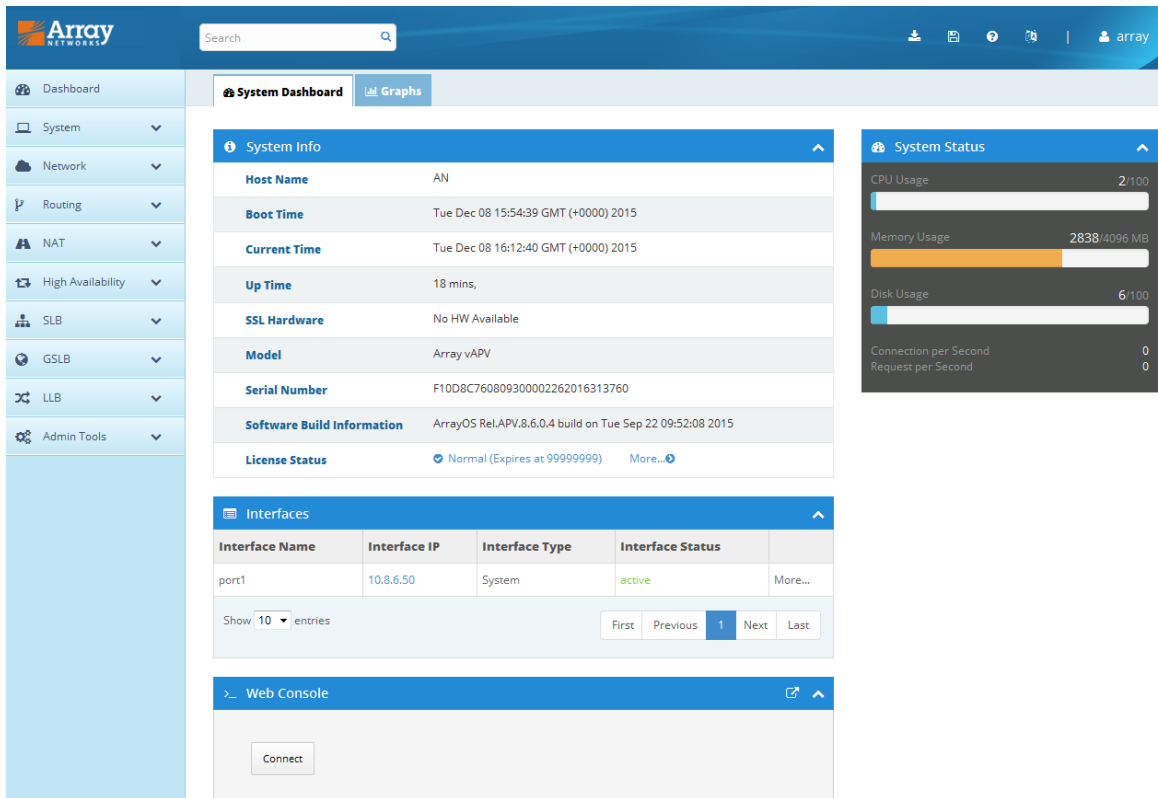
**Note:** If you change the setting of the vAPV’s port1 IP address or WebUI IP address, the connection to the vAPV will be terminated and you will have to reconnect the vAPV with the new network addresses.

### Configuration Example

```
AN(config)#ip address port1 10.8.6.50 255.255.255.0
AN(config)#ip route default 10.8.6.1
AN(config)#webui ip 10.8.6.50
AN(config)#webui port 8888
AN(config)#webui on
```

After completing these steps, administrators may continue to configure the vAPV via the CLI or WebUI. To access and configure vAPV via WebUI, enter the URL **https://10.8.6.50:8888** in the address bar of a browser. Then follow

the prompts to log in the vAPV and enter the password for the “enable” mode. After you entered the “enable” mode, the following window will be displayed.



For more detailed configuration information, please refer to the User Guide and CLI Handbook of the APV series products.

## 7 Known Limitations

- Fast Failover (FFO) is not supported.
- Hardware compression SR-IOV is not supported.
- Hardware monitoring (on fan speed, system/CPU temperature, etc.) is not supported.
- Software SSL can run only on Intel CPUs.
- If the Network Interface Card (NIC) type is “i82545em\_copper” or “i82545em\_fiber”, the system will not perform hardware checksums even if the command “**system tune hwcksum on**” is configured.
- The Maximum Transmission Unit (MTU) cannot be set greater than 1500 for vAPV deployed on Microsoft Hyper-V.
- Bond is not supported for vAPV deployed on Microsoft Hyper-V.
- Trunk Virtual Local Area Network (VLAN) is not supported for for vAPV deployed on Microsoft Hyper-V.
- The 8.6.0.x vAPV image does not support downgrades to non-8.6.0.x versions of vAPV images.

## 8 vAPV FAQ

### 8.1 General

- How is vAPV upgraded?

For vAPV running as a virtual appliance, the system update is the same as APV, that is, use the command “**system update ...**” for ArrayOS update.

Please be reminded that upgrading the vAPV virtual appliance from earlier 8.3 builds will require a new license.



**Note:** After the update from ArrayOS APV 8.3.x to ArrayOS APV 8.6.0.x in OpenXen, if port information in the output of the “**show interface**” command is incomplete, check the Network Interface Card (NIC) type via the virtual machine manager and change it to netfront.

- How many vCPUs are supported?  
A maximum of four vCPUs are supported.
- Is SSL offload supported?  
Yes. SSL offload (software only solution) is supported.
- Can I use a third party hardware SSL accelerator?  
No. You cannot install any third party hardware accelerator and expect it to work with vAPV.
- Can I put vAPV in a cluster/HA configuration with physical APV?  
No, vAPV cluster with physical APV is not supported.
- Why is a vAPV as an HA unit remain active when its port becomes “DOWN”?  
Because vAPV uses virtual NICs, hypervisors do not provide the physical port status to our virtual device. For HA to work, condition of gateway health check (using the command “**monitor network gateway**”) should be used instead of port status condition, for the port status is always “UP”.
- Why there is no default IP address assigned like APV does?  
The default IP address assignment is removed from vAPV to avoid potential IP address conflicts in the case that multiple instances of vAPV are first installed on the same hypervisor.
- Is VMWare VMotion supported?  
Yes. Because VMotion operates on the VMWare using generic interfaces, it requires no GuestOS support. vAPV is proven to work with VMotion. Array Networks will work with customers if any issues are found while vAPV is working with VMotion.
- Is VMWare HA supported?  
Yes. vAPV supports VMware HA. Array Networks will work with customers if any issues are found while vAPV is running VMware HA.
- Are virtio NIC and disk supported on KVM?  
Yes. The virtio NIC and disk are supported on KVM.
- Why can't I ping successfully after changing the MAC address of vAPV port?  
To enable the “MAC Address Spoofing” option on hypervisor can help avoid this issue.

## 8.2 Configuration

- **How to configure bond interfaces on VMware ESXi?**

Configuring bond interfaces on vAPV will cause duplicate packets. Thus, it is recommended to use the VMware ESXi NIC teaming function to configure bond interfaces for vAPV. Detailed steps are as follows:

1. Select the target VMware ESXi host.

2. Click “**Configure > Network > Add Network**”. Select the physical interfaces for bonding while creating the vSphere standard switch (vSwitch), and complete the operation as prompted.
  3. Select the vAPV that requires interface bonding, and click “**Edit Virtual Machine Setting**”. Then, associate the network adapter (vAPV’s virtual network interface) with the vSwitch just created.
- **How to configure trunk VLAN on VMware ESXi?**
    1. Edit the virtual machine portgroup associated with the vAPV by setting the VLAN ID as 4095. Thus, VMware ESXi will not untag the VLAN.
    2. Configure VLAN on the vAPV and the peer physical switch respectively.
  - **How to configure bond on Citrix XenServer?**

Citrix XenServer supports creating bond interfaces for vAPV. Detailed steps are as follows:

    1. Enter the XenCenter, click the Citrix XenServer host that requires interface bonding, and select “**NICs**”.
    2. Click “**Create Bond**”.
    3. Select the interfaces for bonding, and click “**Create**” to complete the bond creation.
    4. Reboot the Citrix XenServer host.
    5. Associate the bond just created with the interfaces of the vAPV.
  - **How to configure VLAN on Citrix XenServer?**

Virtual machines running on Citrix XenServer do not see VLAN tags. To support VLAN tagging it must be configured on Citrix XenServer. Detailed steps are as follows:

    1. Enter the Citrix XenCenter, select the target Citrix XenServer host, and click “**Networking > Add Network > External Network > Next**”.
    2. In the new “**New Network**” pane, select the NIC which you want set VLAN on it.
    3. Set the VLAN ID, which should be the same as the VLAN ID set on the switch connected with the Citrix XenServer, and click “**Finish**”.
    4. Select the desired vAPV, and click “**Networking > Add Interface**”.
    5. In the new “**Add Virtual Interface**” pane, select the network to set VLAN on it. Then, click “**Add**” to complete the operation.
  - **How to configure bond interfaces on OpenXen?**

The bond interfaces can be configured on the hypervisor or dom0, to bond the NICs.
  - **How to configure trunk VLAN on OpenXen?**

VLAN can be configured on the hypervisor or dom0 and interfaces can be added to the Virtual Machine.
  - **How to limit interface speed on vAPV?**

On vAPV, the interface speed setting only supports the “auto” mode, indicating that the interface automatically negotiates the speed. Even if you set the interface speed manually on vAPV, the setting will not work.

### 8.3 License



- How to import a valid license to vAPV?

Please perform the following steps to generate a serial number and import a new valid license:

1. Generate a new serial number by executing the command “**system serialnumber**”.
2. Contact the Array Customer Support (Email: support@arraynetworks.com) to apply for a new license based on the serial number in the output of the command “**show version**”.
3. Import the license obtained from the Array Customer Support (Email: support@arraynetworks.com) by executing the command “**system license**”.

For example:

```
AN(config)#system license "be99af00-ef53d5fd-e21501ad-9eee8179-3dd843b3-1108c600-1505fdab-20130108-99999999"
```



**Note:** You cannot copy and paste the command out when accessing the system via the server’s console. It is recommended to access the system via SSH in order to generate serial number and import a valid license.

### 8.4 Performance

- What is the expected performance on my server?

The performance you should expect largely depends on the available CPU power of your server up to the licensed amount of bandwidth. Below is a reference table of performance data collected from QA lab (using Intel X5680 CPU and Intel 10G NIC).

vAPV (8.6)					
Hypervisor	OpenXen 4.1.2 (on OpenSUSE 12.3)	Citrix XenServer 6.1.0	VMware ESXi 5.0	KVM-1.1.1-1.8.1 (on OpenSUSE 12.3)	Microsoft Hyper-V
vCPU	2	2	2	2	2
vNIC	4	4	4	4	4
RAM	2 GB	2 GB	2 GB	2 GB	2 GB
L4 Throughput	2.2 Gbps	2.6 Gbps	5.6 Gbps	3.8 Gbps	3.3 Gbps
L4 CPS	30K	8K	130K	80K	85K
L4 Concurrent Connection	250K	247K	1M	250K	1M
L7 Throughput	2.2 Gbps	2.4 Gbps	5.6 Gbps	3.8 Gbps	3.3 Gbps
L7 RPS	125K	150K	390K	220K	255K
L7 Concurrent Connection	60K	62.5K	250K	62.5K	250K
SSL (1024-bit) TPS	850	980	2950	950	3000
SSL (2048-bit) TPS	850	810	1050	940	1150
SSL Concurrent Connection	10K	10K	10K	10K	10K
SSL Bulk Crypto	600 Mbps	600 Mbps	1 Gbs	680 Mbps	1.2 Gbps



**Note:** All L4 performance data, including L4 Throughput, L4 CPS, and L4 Concurrent Connection, are measured with the DirectFWD function enabled (by the “**slb directfwd on**” command).

- Can more than one vAPV instance run on the same hypervisor?

Yes.

- Can I add more vCPUs to boost the performance?

You can only license up to 2 vCPUs on the vAPV. If more performance is needed, please move the vAPV instance to a more power server running a faster processor.

- Why do I observe CPU usage while no traffic is running through my vAPV?

This is the same behavior as APV. APV is constantly monitoring the system and looking for work to do. This CPU usage is already accounted for when measuring the performance. In another word, this “extra” CPU usage does not affect the overall system performance.