

# BreakingPoint VE

Installation Guide



Version 8.50

BreakingPoint VE

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# **Related Documenation**

The latest documentation for each release can be found on the Ixia Support website.

#### Related Documentation

Documentation	Description
BreakingPoint User Guide	Provides information on how to use the Control Center to set up, customize, and run traffic through devices under test.
BreakingPoint Release Notes	Provides information about new features, resolved customer issues, known defects and workarounds (if available).
BreakingPoint Online Help	Online documentation for all BreakingPoint products. Proper viewing will require a supported HTML browser.

# **BreakingPoint Virtual Edition Feature Support**

The tables in this section describe the feature support for BreakingPoint Virtual Edition and BreakingPoint for Amazon Web Services.

Network Neighborhood	BPS VE	BPS on AWS
IPv4/IPv6 Static Hosts	$\checkmark$	$\checkmark$
IPv4/IPv6 External Hosts	$\checkmark$	$\checkmark$
NAT	$\checkmark$	NS
VLAN	$\checkmark$	NS
IPv4/IPv6 Router	$\checkmark$	$\checkmark$
DHCPv4 (client/server)	$\checkmark$	NS
DHCPv6 (client/server)	NS	NS
IPv4 DNS	$\checkmark$	$\checkmark$
IPv6 DNS	$\checkmark$	$\checkmark$
IPsec IKEv1/IKEv2	NS	NS
LTE(IPv4)	$\checkmark$	NS
LTE(IPv6)	NS	NS
3G	NS	NS
6RD	NS	NS
DSLite	NS	NS
IPv6 SLAAC	NS	NS

Test Components	BPS VE	BPS on AWS
Live Application Simulator	$\checkmark$	NS

Application Simulator	✓	$\checkmark$
Client Simulation	$\checkmark$	$\checkmark$
Security	$\checkmark$	✓ *1
Malware	$\checkmark$	✓ *1
Session Sender	~	~
Stack Scrambler	~	√ *2
SSL/TLS	~	~
Packet Capture	~	~
Impairment	NS	NS
Bit Blaster	~	NS
Routing Robot	~	~
Recreate	~	√ *3
SCTP	$\checkmark$	$\checkmark$

\*1- Some attacks may get blocked by AWS.

\*2 - Some invalid IP packet patterns are not compatible with AWS (traffic might get dropped by AWS).

\*3 - Limited support. This is because Replay Capture File Without Modification mode replays libpcap formatted capture files without modifying Layer 2 through Layer 7 and AWS requires BPS to use the MAC address that corresponds to the interface that is sending the packets.

BreakingPoint Labs	BPS VE	BPS on AWS
Session Sender Lab	✓	NS
RFC 2544 Lab	√	NS
Multicast Lab	√	NS
Lawful Intercept Lab	✓	NS
Device Validation Lab	NS	NS
Multibox Testing	NS	NS
Resiliency Score	NS	NS

Data Center Resiliency	NS	NS
LTE Lab	NS	NS
DDoS Lab	<b>v</b>	NS

## **CHAPTER 1** BPS VE Install on Hypervisor

This section of the guide describes how to install BreakingPoint Virtual Edition on a VMware or KVM hypervisor.

## **Overview**

BreakingPoint Virtual Edition is a software-based test platform that enables you to run a BreakingPoint vController and traffic generation blades on a virtual chassis.

BreakingPoint Virtual Edition offers the following benefits:

- Low Hardware Cost You can use low-cost servers or dedicated virtualization servers to generate the traffic.
- More Efficient use of Hardware The same servers used to generate Ixia traffic can also be used for other non-Ixia applications; or the virtual Ixia ports can be hosted on a virtualization server used to host other applications.
- Ease of Use The BreakingPoint Virtual Edition user interface is nearly identical to the standard hardware versions which reduces the learning time.
- Reduced System Administration The The BreakingPoint Virtual Edition chassis does not need be maintained or monitored in a lab because it is virtual in nature.
- Rapid and Easy Deployment Virtual Ixia ports can be instantiated as necessary, used to generate traffic, and then destroyed when no longer needed.
- The BreakingPoint Virtual Edition is delivered as a pre-configured .ova template for VMware and as qcow2 image for KVM.

#### **Basic Elements**

The basic elements involved in the BreakingPoint Virtual Edition

- A simple installer based on a single OVA image, qcow2 image or installation script.
- Deployment and discovery tools for easy provisioning of Virtual Blades (vBlades).
- Standalone vBlade installation options.
- A license server that also runs on the BreakingPoint vController.

#### **Components of the BreakingPoint Virtual Edition**

The components of BPS VE are:

- vBlades for virtualization of load modules:
  - A single management interface
  - From two to eight virtual test ports

See the Hardware Requirements for minimum vBlade specifications.

- vController for virtualization of the System Controller:
  - Controls up to 12 vBlades and up to 96 vPorts
  - Controls vBlades spanning across different physical servers

The following image depicts the components of the BreakingPoint Virtual Edition.



## **System Requirements**

Before you deploy a BreakingPoint Virtual Chassis in a Virtual Environment, it is important to be aware of the following requirements and features.

- Hardware Requirements below
- Software Requirements on the facing page
- BPS VE Adaptability to Low Resource Footprint on the facing page
- Open Port Requirements for BPS VE on page 102

#### **Hardware Requirements**

The recommended minimum hardware requirements to install BreakingPoint in a Virtual Environment are as follows:

**Note:** Starting with release 8.10, BPS VE support is only available on DPDK enabled hardware. This functionality is currently supported with the Amazon ENA (Elastic Network Adapter) driver.

- Physical server based on Intel x86-64 architecture
- BreakingPoint vController Hardware Requirements 8 GB RAM, 8 vCPU, 100 GB available hard disk space

- BreakingPoint vBlade Hardware Requirements 8 GB RAM, 4 vCPU, 10 GB available hard disk space
- **Note:** A BreakingPoint Virtual Chassis includes a vController and up to 12 vBlades.

### **Software Requirements**

- VMware ESX/ESXi Installation:
  - Firmware ESXi 5.5.0 or ESXi 6.0 (Firmware vSphere Hypervisor)
  - Firmware vSphere Client 5.5.0 or 6.0.
  - BreakingPoint installation OVA files for VMware
- KVM Installation
  - CentOS 7.x (also tested on 6.7)
  - Ubuntu 14.04, Ubuntu 16.04

### **BPS VE Adaptability to Low Resource Footprint**

BPS VE has resource adaptive features that allows the system to adapt and perform in a low resource footprint.

#### In a low resource environment, the minimum requirements for a BPS VE vBlade are:

- 1 GB RAM
- 1 vCPU
- 1 vNIC

# The number of components that are available is based on the given vCPU and available memory as follows:

- Per GB of memory there will be 2 components if there is sufficient vCPUs.
- Per vCPU there will be 2 components if there is sufficient memory.
- Per vCPU there will be 4 components when memory is 2GB or more.

#### Super Flow and Throughput Objectives:

- BPS VE will try to achieve 125,000 super flow per second per component.
- BPS VE will try to achieve 10,000 Mbps per component.
- **Note:** Capture is only supported when there is more than 2.5 GB of RAM available.
- **Note:** The vBlade and vController <u>Memory Errors</u> that can occur are described in the Troubleshooting section.

R

## **Performance Acceleration**

BPS VE supports a performance acceleration mode based on DPDK support. This functionality is currently supported with the Amazon ENA (Elastic Network Adapter) driver.

- Note: A maximum of 4 components per vBlade can be run in performance acceleration mode. To run a maximum of 8 components per vBlade, the "Enable Performance Acceleration" option needs to be unchecked.
- **Note:** Performance Acceleration is not supported for KVM Hypervisor.

Prerequisites for Performance Acceleration:

- 1. vBlade processor should have SIMD extensions SSSE3 or above enabled.
- 2. At least 8GB of RAM per vBlade.
- 3. Ixia recommends using VMware ESXi 6.0 with build number 3029758 or above.
- Ixia recommends using the default settings of Hypervisor>Configuration>Software>Advance Settings>Net.

#### To enable Performance Acceleration:

Each vBlade on the Device Status page of the GUI displays a slot configuration button at the top-right corner.

- 1. Click the slot configuration button.
- 2. Select the Enable Performance Acceleration option.
- 3. Click the **Apply** button.

## **Getting Started**

In a Virtual Environment, a virtual chassis consists of one virtual system controller (BreakingPoint vController) and up to 12 virtual blades (vBlades). Each vBlade allows you to provision from two to eight vPorts. The vBlades that send/receive traffic are also the traffic generation modules of BreakingPoint Virtual Edition.

The BreakingPoint vController runs the BreakingPoint Virtual Edition firmware and provides access to the HTML browser based BreakingPoint user interface.

## **Deployment Scenarios**

You can deploy a vController and vBlades on the physical hosts in two scenarios:

- Single host setup
- Multi host setup

## **Single Host Setup**

In a Single Host Setup, the vController and vBlades are on the same physical host supporting up to 12 vBlades per vController. The vController acts as a Virtual Machine (VM) and vBlades are the Linux VMs.



## **Multi Host Setup**

In a Multi Host Setup, the vController is present on a single host, with or without vBlades. In all cases, a vController can support up to 12 vBlades. The other physical hosts are for vBlades only whereas multiple Linux VMs act as vBlades.



## **Network Topology Diagram**

The test scenario shown in the image below has a minimum of two networks, a Virtual Machine Network (VM Network) and a Test Network.

- **Management Network** (control plane) A Management Network is required to access the vContoller from a HTML browser (BPS user interface) as well as to communicate between the vController and vBlades. In this scenario, the vController and vBlades are split across several hypervisors. The Management Network (VM Network in the diagram below) in each hypervisor provides the Management-to vController-to-vBlade communications. To configure this topology, assign eth0 and eth1 of the vController (BPS System Controller) and eth0 of the vBlades (BPS NP VM #) to the Management network (VM Network). The vController can receive an IP address from a DHCP server via NICO in its hypervisor or the IP address can be manually configured. A vBlade can also optionally receive an IP address from a DHCP server. The NICO cards in both hypervisors are connected to the LAN Network.
- Test Network (data plane) A Test Network is required to communicate within vPorts (port-to-Port test) or communicate to the virtual DUT (port-to-DUT test). Therefore, assign the Eth# ports

in the vBlades (except eth0, which is used for internal management) to the Test Network. You should also assign the NIC of the Virtual DUT to the same Test Network.

- **Note:** In this scenario, all DUTs are present within the hypervisor. But a DUT may be present outside the hypervisor. In that scenario, assign the physical NICs except NIC0 (NIC0 in the hypervisor is already assigned to the management network) to the test network.
- **Note:** By default, both vController interfaces are mapped to the VM Network (vSwitch0).



**Note:** A BP Virtual Chassis is resource sensitive. Not having the necessary resources may lead to instabilities in vBlade performance. It is essential that you utilize only the required number of vBlades/ports on a hypervisor. See the <u>Hardware Requirements</u> to calculate the resources that are required to support the vController/vBlades that will be used for your testing.

### vController Management Interfaces

A vController has two management interfaces:

- External Management Used to access the vController through web (BPS VE User Interface).
- Internal Management Used for the internal communication between the vController and vBlades.



By default, both management interfaces are mapped to the vSwitch0 containing Management Network (Hypervisor IP address) and VM Network.

Alternatively, a dedicated internal management network can be created to connect the corresponding internal management interfaces of the vController and vBlades.

vBlades have one management interface:

- Used for the internal communication between vController and vBlades
- Must be in the same IP subnet with the vController internal management IP

## Install BPS VE

This section provides detailed instructions for installing BreakingPoint Virtual Edition. Please ensure that you review the <u>System Requirements</u> before you begin.

There are 2 options for BPS VE hypervisor installation.

- VMware Installation
- KVM Installation

## **VMware Installation**

This section describes the network configuration required for VMware and the vController VMware installation procedures.

## **Configure VMware vSwitch and Network**

This section explains the vSwitch and network configuration required in VMWare before deploying BreakingPoint Virtual Edition.

It is recommended that you configure the following settings in all vSwitches across the hypervisors. If these settings are not configured, all of the network traffic may be available to all of the virtual machines, resulting in a non-functioning VLAN.

ESX server settings:

- vSwitch Traffic Shaping set as Disabled
- vSwitch Security tab > Promiscuous Mode set as Accept or Reject
  - Note: See Promiscuous Mode Recommendations on page 16 before configuring this setting
- vSwitch Properties, set the VLAN ID (Optional) from None (0) to All (4095)

#### To perform vSwitch and Network configuration perform the following tasks:

1. Log on to the hypervisor using the firmware vSphere Client as depicted in the following image.

🕗 VMware vSphere Client		
vmware <sup>.</sup> VMware vSphere <sup>.</sup> Client		
In vSphere 5.5, all new vSphere features are available only through the vSphere Web Client. The traditional vSphere Client will continue to operate, supporting the same feature set as vSphere 5.0, but not exposing any of the new features in vSphere 5.5. The vSphere Client is still used for the vSphere Update Manager (VLM) and Host Client, along with a few solutions (e.g. Site Recovery Manager).		
To directly manage a singl To manage multiple hosts, vCenter Server.	e host, enter the IP address or host name. enter the IP address or name of a	
IP address / Name:	10.205.27.71	
User name:	root	
Password:	*********	
	Use Windows session credentials	
	Login Close Help	

2. Click **Configuration** > **Networking**.

isidga-vmware-3.ixiacom.com VMware ESXI, 5.5.0, 1623387 Getting Started Summary Virtual Machines Resource Allocation Performance Configuration Local Users & Groups Events Permissions			
Hardware Health Status	View: vSphere Standard Switch Networking		
Processors Memory	Standard Switch: vSwitch0	Remove Properties	Default Network Entry
Storage  Networking	-Virtual Machine Port Group	Physical Adapters	
Storage Adapters Network Adapters	Management Network		
Advanced Settings Power Management	vmk0 : 10.205.27.71 fe80::225:90ff:fe2d:5f34		
Software			]
Licensed Features Time Configuration			
DNS and Routing			
Virtual Machine Startup/Shutdown			
Virtual Machine Swapfile Location Security Profile			
Host Cache Configuration System Resource Allocation			
Agent VM Settings Advanced Settings			

3. Add test networks to support a back-to-back/virtual Device Under Test (DUT) or a real DUT.

**Note:** A Virtual DUT is not mapped to a physical Network Interface Card (NIC) of the hypervisor whereas a real DUT is mapped to a physical NIC.

View: vSphere Standard Switch

tandard Switch: vSwitch0	Remove Properties
Virtual Machine Port Group	Physical Adapters
VM Network	👱 🔶 🕳 📟 vmnic0 100 Full 🖓
2 virtual machine(s)   VLAN ID: All (4095	)
SC190 (	I - vController (System Controller)
VirtualBlade01	D+ Virtual Blade (NP-VM)
-VMkernel Port	
Management Network	Note: etnu & ctriu(etn1) of vController
VMK0 : 10.205.27.71   VLAN ID: All (4095	and etho of virtual Blade are mapped
Te80::225:90ff:fe2d:5f34	
tandard Switch: vSwitch2	Remove Properties
Virtual Machine Port Group	Physical Adapters
🖓 Test Network 1	B2B or Virtual Device under Test
1 virtual machine(s)   VLAN ID: All (4095	
VirtualBlade01	Port 1 & 2 mapped in B2B
Virtual Machine Port Group	
Test Network 2	
Vietus Plade01	Part 2 8 4 manual to Virtual Davias
Virtualbiadeor	Fort 3 & 4 mapped to virtual bevice
tandard Switch: vSwitch3	Remove Properties
Virtual Machine Port Group	Physical Adapters
🖓 Test Network 3	• 📟 vmnic2 10000 Full 🖓 Physical Device under lest
1 virtual machine(s)   VLAN ID: 3000	
VirtualBlade01	Port 5 & 6 mapped to Physical Device
tandard Switch: vSwitch4	Remove Properties
_Virtual Machine Port Group	Physical Adapters
🖓 Test Network 4 👤 👤	🔶 🖷 vmnic3 10000 Full 🖓 Physical Device under Test
1 virtual machine(s)   VLAN ID: 4000	

## Hypervisor Deployed with vController and vBlades

dga-vmware-3.ixiacom.com VMware E	SXI, S.S.O, 1623387	Demicione
Hardware	View: VSphere Standard Switch	a Jeanson a
Health Status Processors	Networking	
Memory	Chandred Custobia Custobia	NICO or eth0 of Virtual Blades mapped to NICO
Storage	Standard Switch: VSwitchu	of hypervisor under VM Network
<ul> <li>Networking</li> </ul>	Virtual Hachine Port Group	
Storage Adapters	3 virtual machine(s)   VLAN ID: All (4095)	
Network Adapters	VirtualBladeB01	
Advanced Settings	VirtualBladeB02	
Power Management	VirtualElade803	
Software	Vitioemal Port	
Licensed Features	vmk0 : 10.205.27.71   VLAN ID: All (4095)	
Time Configuration	fe80::225:90ff:fe2d:5f34	
DNS and Routing		
Authentication Services	Derrore Derrore Derection	Text NICs is a sth1 ath2 ath9 of Virtual Plade(s)
Virtual Machine Startup/Shutdown	Standard Switch: vSwitch2 Network Properces	manned under Test Network(s) for back 2-back
Virtual Machine Swapfile Location	Virtual Machine Port Group  Text Network 3  No adapters	reaparie or Virtual Davice Under Test Configurations
Security Profile	E 1 virtual machine(c)	scenario or virtual bevice order rest configurations
Host Cache Configuration	Vetual Flade BD3	
System Resource Allocation	- Vinui Machine Dur Geun	
Agent VM Settings	Test Network 2	
Advanced Settings	1 virtual machine(s)	
	VirtualBladeB02	
	Vitual Machine Port Group	
	🖓 Test Network 1 😥 🔶	
	1 virtual machine(s)	
	VirtualBladeB01 👸 🔶	
		J
	Standard Suitebury Suitebus Rettorye Properties	Test NICs mapped under Test Network(s) to physical
	- United Marking Data Group Diversid Advatage	NICs present at the hypervisor to push traffic out of th
	C Test Network 4	hypervisor i.e. Real Device Under Test Configurations.
	Standard Switch: vSwitch6 Remove Properties	
	- Virtual Machine Port Group	

Hypervisor Deployed with vBlades Only

## **Promiscuous Mode Recommendations**

Promiscuous Mode is an ESX server security policy setting that has two options, **Accept** and **Reject**. Enabling the **Accept** option allows a virtual machine to see all of the network traffic traversing a virtual switch. Enabling the Reject option allows a virtual machine to only see the packets that are destined for it. An example use case for enabling the Accept option is when testing an IDS or packet sniffer that needs to analyze all of the traffic on a network segment. The table below describes how the virtual machine Promiscuous Mode/BPS Network Neighborhood (NN) settings should be configured for packets to flow as expected.

vNIC Promiscuous Mode Setting	NN "Use vNIC MAC Address" Setting
Accept	Disabled or Enabled (because when the vNIC Promiscuous Mode is set to "Accept", all packets are passed regardless of this setting).
Reject	Enabled

Note: In a 2 arm test configuration, packet traffic will flow regardless of the configuration settings described in the table above. A 2-arm test uses one Ixia test component (Session Sender, AppSim, etc.) to simulate both client and server in a scenario where traffic flows between Ixia ports (Ixia <-> Ixia).

## Install BPS VE Controller On VMware

- 1. Get the BreakingPoint vController file from the Ixia website or Installation CD.
- 2. Log on to the hypervisor.
- Click File > Deploy OVF Template.
   The Deploy OVF Template dialog box appears.
- In the Deploy OVF Template dialog box, click Browse to locate the OVA file that has been saved to your computer. Alternatively, provide a URL address to install the OVF package from the Internet. Click Next.
- 5. Verify the **OVF Template Details** and click **Next**.
- 6. Accept the License Agreement. Click Next.
- 7. Specify a **Name** for the deployed template. Click **Next**.
- 8. Select the following **Disk Format**.
  - Thick Provision Lazy Zeroed
  - **Note:** You can select the **Thin Provision** option if you need to save disk space.

Disk Format In which format do you wa	nt to store the virtual disks?		
Source OVF Template Details End User License Agreement	Datastore:	datastore 1	
Name and Location Disk Format Network Mapping	Available space (GB):	81.1	
Ready to Complete	Thick Provision Lazy 2	eroed	
	C Thick Provision Eager	Zeroed	
	C Thin Provision		

Click Next.

9. In the **Network Mapping** section, correctly map the **Source Networks** with the **Destination Networks**. Click **Next**.

**Note:** A single interface will be selected by default.

10. In the **Ready to Complete** section, verify the **Deployment settings**.

Select the **Power on after deployment** check box, if you want to automatically power on the virtual machines. If this box is not checked, you will have to manually power on the virtual machines post deployment. By default, this box is unchecked.

Click Finish to start the OVA image file deployment.

- **Note:** By default, the interface will request network configuration information (IP address, gateway, etc.) from a DHCP server. Alternatively, you can manually configure a static IP address as described in the section: <u>Manually Set a Static IP for the Management Port on page 28</u>.
- 11. Click **Finish**. The system starts the deployment of the BPS Controller in the hypervisor.
- 12. To add an additional interface to the vController perform the following steps:
  - **Note:** Adding an additional interface will allow you to deploy the BPS VE controller in environments where the external/public network used to access the web interface is separated from the internal/private network used for chassis backplane communication.
  - a. Power OFF the vController.
  - b. Edit the Virtual Machine options.

Hardware Options Resources			Virtual Machine Version: vmx-09
Show All Devices	Add Remove	Memory Config	
Hardware	Summary	512 GB -	Memory Size: 8 - GB
Memory	8192 MB	256 GB-	<ul> <li>Maximum recommended for this</li> <li>guest OS: 1011 GB.</li> </ul>
Video card	8 Video card	128 GB -	Maximum recommended for best performance: 49144 MB.
<ul> <li>VMCI device</li> <li>Hard disk 1</li> </ul>	Restricted Virtual Disk	64 GB-	Default recommended for this quest OS: 2 GB.
Network adapter 1	VM Network	32 GB-	Minimum recommended for this auest OS: 512 MB.

- c. Click Add.
- d. Select Ethernet Adapter as the Device Type. Click Next.

What type of network do	you want to add?
Device Type	Adapter Type
Network connection	Type: VMXNET 3
ready to complete	Adapter choice can affect both networking performance and migration compatibility Consult the VMware KnowledgeBase for more information on choosing among the network adapters supported for various guest operating systems and hosts.
	Network Connection
	Network label:
	VM Network
	Port: N/A
	Device Status
	Connect at newsr on

- e. Select **VMXNET 3** as the Network Type. Click **Next**.
- f. Click Finish.
- g. Power ON the vController.
- The vController will now operate with two interfaces.
- 13. Upon completion, you can Deploy and Assign vBlades.

## **KVM Installation**

This section describes how to install BPS VE on KVM over CentOS or Ubuntu.

## Install on KVM

This section describes how install BPS VE on KVM.

- **Note:** This same procedure can be used to install the BPS vController on KVM and to perform the manual install of a BPS vBlade on KVM.
- **Note:** To install the **vController**, use the following file: Ixia\_BreakingPoint\_**Virtual\_ Controller**\_x.x.x\_EA\_KVM.qcow2.

To manually install a **vBlade**, use the following file: Ixia\_BreakingPoint\_**Virtual\_Blade**\_x.x.x\_ EA\_KVM.qcow2.

Note: Whenever you deploy a new vController or vBlade on a system, do not use the same image that was used during an earlier deployment on the system. Make a copy of the original qcow2 image and use the copied image for deployment. Using the same qcow2 image for multiple deployments may corrupt the image. Attempts to use the same image for multiple deployments will result in the message shown below. If you receive this message, reply **No**, and follow the procedure described earlier in this note.

Disk "/home/bps/new_ Ixia_BreakingPoint_Vir is already in use by ot Do you rea	bps/ tual_Blade_8.0.0_EB_KVM.qcow2" her guests ['vm_new'] ally want to use the disk?
No	Yes

#### To Deploy a BPS vController or vBlade:

- 1. Download the required qcow2 image described above from the Ixia Downloads & Updates web page or from the installation CD.
- 2. Copy the qcow2 image to the KVM system.
- 3. Open the system's Virtual Machine Manager.
- 4. Click **Create a new virtual machine**. The window for configuring Step 1 displays.

Construction of the second
View Help
Open ⊳ 🔢 🛞 🖌
chine New VM x
Create a new virtual machine
Step 1 of 4
r your virtual machine details
Name: Warthering
onnection: localhost (QEMU/KVM)
se now you would like to install the operating system
Local install media (ISO image or CDROM)
Network Install (HTTP, FTP, or NFS)
Network Boot (PXE)
Import existing disk image
Cancel Back Ecoward
Cancel

- a. Enter a name in the **Name** field. For example, if you are installing a vController, the Name could be "vController1", for a vBlade the name could be "vBlade1", etc.
- b. Select Import existing disk image.
- c. Click **Forward**. The window for configuring Step 2 displays.

wn.		New VM	×
Cre Step	ate a new v 2 of 4	rirtual machine	
Provide the	existing stora	ge path:	
	chisting store		Browse
			biowse
Choose an o	perating system	em type and version	
OS type:	Generic	0	
Version:	Generic	0	
		Cancel Da	ek Feguard
		Cancer Ba	rorward

- d. Configure the **Provide the existing storage path** field by clicking **Browse** and selecting the Ixia\_BreakingPoint\_Virtual\_Controller\_x.x.x\_EA\_KVM.qcow2 image.
- e. Click **Forward**. The window for configuring Step 3 of 4 displays.

5. Choose **Memory** and **CPU** settings. For example, 8GB/8CPUs for a vController or 8GB/4CPUs for a vBlade. You can also reference <u>Hardware Requirements on page 5</u> for more information.

va	New VM ×
	Create a new virtual machine Step 3 of 4
Choos	e Memory and CPU settings
Mer	nory (RAM): 8192 🗘 MB
	Up to 24022 MB available on the host
	CPUs: B
	Up to 12 available
	Conset Dark Connert
	Cancel Back Forward

- a. Configure Memory (RAM).
- b. Configure number of CPUs.
- c. Click **Forward**. The window for configuring Step 4 displays.
- 6. Select Customize configuration before install.

WR.	New VM ×
Cre Ste	eate a new virtual machine p 4 of 4
Ready to be	egin installation of
OS:	Generic
Install:	Import existing OS image
Memory:	8192 MB
CPUs:	8
Storage:	8.4 GB /home/tirts_trainghene_treasing/home_strease_contrainer
	☑ Customize configuration before install
Advance	ed options
	Cancel Back Finish

- a. Click **Finish**. You will be returned to the vController Virtual Machine window.
- 7. Select **Disk 1**.

Overview Processor Memory Boot Options	Virtual Disk Target device: Disk 1 Source path:S_Build/Ixia_BreakingPoint_Virtual_Controller_8.0_GA_KVM.qcow/ Storage size: 8.88 GB
Disk 1 NIC :96:7b:92 Input Display VNC Sound: default Console Video Controller USB Controller USB Controller USB Controller USB	Readonly: Shareable: Shareable: Shareable: Disk bus: default Serial number: Storage format: qcow2 Performance options Tip: 'source' refers to information seen from the host OS, while 'target' refers to information seen from the guest OS
Add Hardware	Remove Cancel Apply

- a. Expand the Advanced Options section and configure the Storage format as "qcow2".
- b. Click Apply.



- 8. Add the NICs that are required for testing.
- a. Configure the NIC driver as "virtio".
- b. Click **Finish**. You will be returned to the vController Virtual Machine window.
- 9. Click **Begin Installation**. Wait for the vController or vBlade to load.

vBlades must be assigned before they can be used for testing.

## **Deploy and Assign vBlades**

vBlades can be deployed on various hypervisors using the BPS VE UI or with a BPS VE vBlade installation file and your own automation/management tools.

There are 3 vBlade deployment options:

Automatic vBlade Deployment for VMware or KVM

(Using vController VM Deployment Wizard)

Manual vBlade Deployment for VMware

Manual vBlade Deployment for KVM

After vBlades are successfully deployed, see the <u>Manage vBlades</u> section to learn how to discover, delete and unassign vBlades.

### **Automatic vBlade Deployment**

**Note:** This procedure applies to both VMware ESXi and KVM hypervisor deployments. It does not require any additional vBlade installation images for either hypervisor.

#### Log on to the BPS VE UI:

- 1. Find the IP address of the vController.
- 2. Enter the vController IP address into the URL field of your HTML browser.
- 3. Enter a **Username** and **Password**. The default username is "admin". The default password is "admin".

#### Create a Virtual Blade (vBlade)

- 1. After logging on to the BPS VE UI, click the **Administration** link in the upper right corner of the window.
- 2. Click VM Deployment > Create Virtual Blades > Configure Virtual Blade.
  - **Note: For VMware:** To access the hypervisor, make sure to enable the ssh service in all target hypervisors (which is configured in **vSphere** > **Security Profile** > **SSH**).

A dialog box displays the vBlade settings as shown in the image below. For setting descriptions, refer to the Virtual Blade Configuration Parameters on page 26 table.

- 3. Select the **Host Type** from the drop-down list.
- 4. In the **HOST INFO** section, enter the **Hostname/IP** of the hypervisor where you want to deploy the VM.
- 5. Enter the correct **Username/Password** of the target server where the vBlade will reside and click **Connect**.

				_			
HOST TYPE							
VMware ESXi							
HOST INFO							
Hostname/IP		Username			Password		
10.215.191.216		root					
CONNECTED							
VIRTUAL BLADE INFO							
Name		Number			Datastore		
VirtualBlade		3		A	datastore2		
Management ID Conf		Managamant	Curitals		) vidao		
Management IP Con	Ig	Management	vSwitch		snage		
Static	~	VMNetwork_7		•			
Name	IP		Mask			Gateway	
VirtualBlade01	11	.11.11.1	255.255.254.0		4.0	11.11.10.1	
VirtualBlade02	11	.11.11.2	255.255.254.0		4.0	11.11.10.1	
VirtualBlade03	11	.11.11.3	255.255.254.0		4.0	11.11.10.1	
Test Network Adapte	rs	Network Adapte	r	Те	st Netwo	rk	
		Network Adapt	er 1	C1	C2		
		Network Adapter 2 C		C1	C1C2		
APPLY							

- 6. Enter the name for the vBlades in the **Name** field.
- 7. Enter the the number of vBlades required in the **Name** field.
- 8. Select Static or DHCP from the Management IP Configuration drop-down list.
  - **Note:** If you select the DHCP **IP Configuration** option, a DHCP server will be required in order to provide IP addresses to the BPS VE vController and vBlade interfaces.
  - **Note:** If you select the Static **IP Configuration** option, default IP addresses are assigned to the vBlades in ascending order based on the network address of the vController (as shown in the image above). You can edit the vBlade IP addresses by double-clicking the IP Address field.
- 9. Select the **Datastore**. The network topology present in the hypervisor along with the **Datastore** (HDD) details are available in the <u>Virtual Load Module Info</u> section.
- 10. Select the required **Management Network** for the vBlades.

11. In the **Test Network** list, select the **Network Adapter** and map them to the relevant **Test Network**.

vBlades can support two to eight vPorts. vPorts are directly mapped with a Network Adapter. vPort-1 refers to Network Adapter 1, vPort-2 refers to Network Adapter 2 and so on. Assign a Test Network (created in the vSwitch and Network Configuration section) to the respective vPort.

#### 12. Click Apply.

The status of the deployment is displayed (as shown in the image below). If errors occur, an error message will display in a pop-up. After successful validation, a new vBlade entry is created.

IXIA WEB APPS				ADMINISTR	ATION   SESSIONS   RESULTS   MY PRO	
USERS SYSTEM SETTINGS VM DEPLOYMENT	CONFISURE VIRTUAL BLADE	MENT				
Create Virtual Diades	Hypervisors->Virtual Blades	Start Time	Duration	Status	Detailed Info	
Manage Virtual Chassis ▶	Concerner Prodess for VM Virtualise     Concerner Prodess	1)]142014-2338 4 6	5 min	rinsred	Finished (Image File already exists on the hyp Finished Finished Finished Finished Finished Finished Finished Finished (IP: 111.1.1.155 / sidt: 4) Finished (IP: 111.1.1.157 / sidt: 5) Finished (IP: 111.1.1.1.57 / sidt: 5)	Ŭ

#### Virtual Blade Configuration Parameters

Parameter	Description			
Host Type	Select the type of host you will be installing a vBlade on.			
HOST INFO				
Hostname/IP	Enter the host name or IP of the hypervisor.			
Username	Enter the valid user name to log on to the hypervisor.			
Password	Enter the valid password to log on to the hypervisor.			
VIRTUAL LOAD MODULE INFO				
Name	Enter a name for the vBlade.			
Number	Enter the number of vBlades (virtual machines) to be deployed.			
Management IP Configuration	Select a DHCP or Static IP configuration.			
Datastore	Datastores are logical containers, analogous to file systems, that hide specifics of each storage device and provide a uniform model for storing virtual machine files. Datastores can also be used for storing ISO images, virtual machine templates, and floppy images.			

Parameter	Description
Management vSwitch/vBridge	The <b>Management vSwitch/vBridge</b> is used for the internal communication between vController and vBlades. It must be in the same IP subnet with the vController internal management IP.
	Select at least two <b>Network Adapters</b> and map the <b>Test Network</b> to these adapters. The Test Network is used send and receives BPS VE test traffic.

## Manually Set a Static IP for the Management Port

The management port IP address can be configured using the **setip** console command as shown in the image below. The command allows you to set the static IP address for the management interface of a vController or vBlade.

Note: You must log in as netadmin to perform this command.

Note: iface (interface name) options include "eth0" and "ctrl0".

```
netadmin:
netadmin:~$ setip -h
usage: setip [-h] -iface IFACE [-dhcp] [-ip IP] [-mask MASK] [-gw GW]
Sets the IPv4 address for the specified interface.
optional arguments:
 -h, --help
              show this help message and exit
 -iface IFACE Interface
               DHCP/Static
 -dhcp
 -ip IP
               IP Address
 -mask MASK
               Netmask
 -gw GW
               Gateway
etadmin:~$
 etadmin:~$ setip -iface eth0 -ip 10.205.216.212 -mask 24 -gw 10.205.216.1
```

## Find the BPS VE vController IP Address

The BPS VE vController IP Address can be used to access the BPS VE UI. To access the BPS VE UI enter the controller IP address into the URL field of your HTML browser and proceed to Log on to the BPS VE User Interface on the next page.

To find the System Controller IP address:

- Access the Console on the vController (System Controller) Virtual Machine (VM)
- Run the networkInfo command

### Access the Console on VMware

- 1. Start the Console from vSphere to System Controller Virtual Machine (VM).
- 2. Log on using the proper credentials. For example:

User ID - admin

Password - admin

The system displays the BPS prompt.

3. <u>Run the networkInfo command</u> to display the vController (System Controller) IP Address.

### Access the Console on KVM

1. Connect to the Console on the vController Virtual Machine (VM).

**Note:** ttyS0 will need to be enabled within the VM if it is not currently enabled.
Log on to the system using the proper credentials. For example: User ID - admin

Password - admin

3. <u>Run the networkInfo command</u> to display the vController (System Controller) IP Address.

#### Run the networkInfo Command

 Type the following command at the prompt. BPS> networkInfo

## Log on to the BPS VE User Interface

The BPS VE is used to manage BPS VE and Deploy vBlades.

To log on to the BPS VE user interface (also known as Ixia Web Apps), perform the following tasks:

- Open a web browser, type the <u>vController IP</u> address in the URL field, and press Enter. The log on window appears.
- 2. In the **Username** field, type your user ID. The default username is "admin".
- In the **Password** field, type your password. The default password is "admin".
- 4. If you want the browser to remember the log on credentials, select the **Remember me** check box.
- 5. Click Login.



The **Ixia WEB APPS** window opens as shown in the figure below.

The Web Administration page consists of links as listed and described in the following table.

Links	Description
Administration	Perform administration tasks. For example, creating/managing user accounts, manage the Ixia Web Application and manage BreakingPoint in the Virtual Environment (VE).
Sessions	Open the BreakingPoint Control Center to manage the BreakingPoint sessions (Individual or multiple instances of running tests).
Results	View the list of completed and currently running tests.
My Profile	View and edit the properties of your account. For example, your user name and password can be modified.
Help	View the product user guides, download the latest software, and perform system diagnostics.

# Install BPS VE using OpenStack

OpenStack is a free and open-source software platform for cloud computing. This section provides a detailed graphical example of BPS VE installation and setup using Openstack.

## **Network Topology**

The topology shown in the image below will be used for the example OpenStack BPS VE Installation.



## **OpenStack Login**

Log in to your OpenStack dashboard.

	openstack	
Log In		
User Name		
Password		
		۲
		Connect

# **Create Networks**

Create the required networks based on the <u>Network Topology</u>.

								🛔 manish 💌
Project ^	Networks							
Compute ~							Filter	Q + Create Network
Network ^	Name	Subnets Associated		Shared	Status	Admin Stat	e	Action
Network Topology				No items to display.				
Networks	Displaying D items							
Routers								
Load Balancers								
vchestration ~								
atabase ~								
ata Processing 🗸 🗸								
bject Store 🗸 🗸								
lentity ~								
Create N	letwork				2	c		
Create N	letwork Subnet	Subnet Details			3	(		
Create N Network	Subnet	Subnet Details	Consta a pour actua	e la adética a su	)	¢		
Create N Network Network Name Internal Netw	Subnet	Subnet Details	Create a new network car	rk. In addition, a su n be created in the r	bnet associated hext panel.	(		
Create N Network Network Name Internal Netw Admin State @	Subnet	Subnet Details	Create a new netwo with the network car	rk. In addition, a su n be created in the r	> bnet associated next panel.	c		
Create N Network Network Name Internal Netw Admin State @	Subnet	Subnet Details	Create a new netwo with the network car	rk. In addition, a su n be created in the r	bnet associated next panel.	c		
Create N Network Network Name Internal Netw Admin State Q UP Create Subr	letwork Subnet vork	Subnet Details	Create a new netwo with the network car	rk. In addition, a su n be created in the r	bnet associated next panel.			

## Create Network

Network Subnet Subnet Details	
Subnet Name Internal_Network	Create a subnet associated with the network. Advanced configuration is available by clicking on the "Subnet
Network Address O	Details" tab.
192.168.0.0/16	
IPv4 *	
Gateway IP •	
Disable Gateway	
	Cancel « Back Next »
Create Network	×
Network Subnet Subnet Details	
Enable DHCP Allocation Pools	Specify additional attributes for the subnet.
DNS Name Servers Ø	
Host Routes <b>O</b>	
	Cancel « Back Create

 $\times$ 

Create Network	×
Network Subnet Subnet Details	
Network Name	Create a new network. In addition, a subnet associated
Test Network	with the network can be created in the next panel.
Admin State O	
UP *	
Create Subnet	
	Cancel « Back Next »
Orrecto Maturada	3

Create Network	
Network Subnet Subnet Details	
Subnet Name	Create a subnet associated with the network. Advanced
Test	configuration is available by clicking on the "Subnet Details" tab.
Network Address 0	
20.20.0/16	
IP Version	
IPv4 •	
☑ Disable Gateway	
	Cancel « Back Create

#### Create Network

Network	> Si	tonet Subnet Details						
Enable DHC	Р		Specify additional at	tributes for the subn	et.			
Allocation Pool	ls 🖸							
DNS Name Ser	vers (	o						
Host Routes 0			6					
Tiost roones 🗸								
			A					
				Cancel « B	ack Next »			
🧾 openstack		services •						🛔 manish 🔹
Project ^	Ne	etworks						
Compute ~						Filter	Q + Create Network	× Delete Networks
Network ^		Name	Subnets Associated		Shared	Status	Admin State	Actions
Network Topology		Internal Network	Internal_Network 192.168.0.0/16		No	Active	UP	Edit Network 💌
Networks		Test Network	Test 20.20.0.0/16		No	Active	UP	Edit Network 💌
Routers	Displ	aying 2 items						
Load Balancers								
Orchestration ~								
Database v								
Data Processing ~								
Object Store ~								

 $\times$ 

## **Create a Router**

Create R	outer					×	
Router Name *			Description	<b>o</b> .			
router1			Description	1.			
Admin State			Creates a router w	ith specified parameter	rs.		
UP		٣					
External Netwo	rk						
public		۲					
				Cancel	Create Router		
openstack	🖾 services 💌						🛓 manish 🕶
Project ^	Routers						
Compute ~					Filte	Q + Create Ro	uter × Delete Routers
Network ^	Name	Status	External Network		Admin State		Actions
Networks	Disclaying 1 item	Active	public		UP		Clear Gateway
Routers							
Load Balancers							
Orchestration ~							
Database ~							
Data Processing ~							
Identity ~							
-							
openstack	Boutor Dataila						🛔 manish 🕶
Project ^							Clear Category -
Network	Overview Interfaces Static Routes						Cical Galeway
Network Topology							+ Add Interface
Networks	Name	Fixed IPs	Status	Туре	Admi	n State	Actions
Routers				No items to display.			
Load Balancers	Displaying 0 items						
Orchestration ~							
Database v							
Object Store							
Identity v							

## Add Interface

Subnet *			_					
Internal N	ietwork: 192.168.0.0/16 (Interr	nal_Netv 🔻	Descri	ption:				
IP Address	(optional) O		You can co The default gateway of	IP address of the selected se	ed subnet to the router. the interface created is a Jonet. You can specify			
Router Nam	e *		select a su	address of the bnet to which the from the above	nterrace nere, you must ne specified IP address liet			
router1			belongs to	nom the above	H3L.			
Router ID *								
f2b53c2e-f	fa10-4801-86fc-5a4ee07e66b4	ļ.						
					Cancel Add interface			
openstack	🖾 services 🕶							🛔 manish 🕶
oject ^	Router Details							
ompute ~							Clear	r Gateway 💌
Natural Tassian	Overview Interfaces Static Routes						A traditional and the	
Networks	Name	Fixed IPs		Status	Туре	Admin State	Add Interface     Actic	ons
Routers	(a2e64158-6c61)	192.168.1.1		Active	Internal Interface	UP	De	lete Interface
Load Balancers	Displaying 1 item						_	
chestration ~								
atabase ~								
ata Processing ~								
bject Store ~								
sentity ~								

×

## **Create Flavors**

**Note:** Flavors can only be created using the Admin account.

openstack	-	admin 👻									📥 admin 👻
Project ~	Fla	avors									
Admin ^									iter	Create Flavor	× Delete Flavors
System ^		Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	Swap Disk	ID	Public	Motodata	Actions
Overview		m1.tiny	1	512MB	168	0GB	OMB	1	Yes	No	Edit Flavor
Resource Usage				200	2008	000			Max		
Hypervisors		m 1. smail	1	208	2008	UGB	UMD	4	Tes	NO	Edit Flavor
Host Aggregates	•	m1.medium	2	4GB	40GB	OGB	OMB	3	Yes	No	Edit Flavor 💌
Instances		m1.large	4	8GB	80GB	OGB	OMB	4	Yes	No	Edit Flavor 💌
Volumes		m1.xlarge	8	16GB	160GB	0GB	OMB	6	Yes	No	Edit Flavor ·
Flavors	Disp	iaying 5 items									
Images											
Networks											
Routers											
Defaults											
Metadata Definitions											
System Information											
Identity ~											

**Note:** The minimum Root Disk required to launch the System Controller (BPS vController) is 110 GB.

Create Flavor	×
Flavor Information * Flavor Access	
Name *	Flavors define the sizes for RAM, disk, number of cores,
BPS-SC	and other resources and can be selected when users deploy instances.
ID O	
auto	
VCPUs *	
8	
RAM (MB) *	
8192	
Root Disk (GB) *	
110	
Ephemeral Disk (GB)	
0	
Swap Disk (MB)	
Q =	
	Cancel Create Flavor

**Note:** The minimum Root Disk required to launch a virtual blade (BPS vBlade) is 14 GB.

### Create Flavor

Flavor Information * Flavor Access	
Name *	Flavors define the sizes for RAM, disk, number of cores.
BPS-NP	and other resources and can be selected when users deploy instances.
ID <b>O</b>	
auto	
VCPUs *	
4	
RAM (MB) *	
8192	
Root Disk (GB) *	
14	•
Ephemeral Disk (GB)	
0	
Swap Disk (MB)	
0	

 $\times$ 

🚺 open	istack		admin 🕶										🛔 admir	•
Project	~	Fla	avors											
Admin	^									Filter	Q	+ Create Flavor	X Delete Flavo	rs -
System	^		Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	Swap Disk	ID		Public	Metadata	Actions	
	Overview		BPS-NP	4	8GB	14GB	OGB	OMB	33f108fe-c06d-4571-914b-ac727555c018		Yes	No	Edit Flavor	•
	Resource Usage Hypervisors		BPS-SC	8	8GB	110GB	OGB	OMB	fe02fd4d-762d-4634-b7d6-765c4d146dc5		Yes	No	Edit Flavor	•
	Host Aggregates		m1.large	4	8GB	80GB	OGB	OMB	4		Yes	No	Edit Flavor	•
	Instances	۰	m1.medium	2	4GB	40GB	OGB	OMB	3		Yes	No	Edit Flavor	•
	Volumes		m1.small	1	2GB	20GB	OGB	OMB	2		Yes	No	Edit Flavor	•
	Images		m1.tiny	1	512MB	1GB	OGB	OMB	1		Yes	No	Edit Flavor	•
	Networks		m1.xlarge	8	16GB	160GB	OGB	OMB	5		Yes	No	Edit Flavor	•
	Routers	Displ	rying 7 items											
	Defaults													
	Metadata Definitions													
	System Information													
Identity	~													

Cancel Create Flavor

# Add Images

**Note:** The BPS vController is also described as the System Controller.

openstack 📾 services 🗸							🛔 manish 🔹
Project ^ Images							
Compute ^					♣ Project (1) If Shared with Me (0)	+ Create Image	<b>x</b> Delete Images
Overview 🔄 Image Name	Туре	Status	Public	Protected	Format	Size	Actions
Instances			No items to display.				
Volumes Deplaying 0 items							
Access & Security							
Network *							
Orchestration ~							
Database ~							
Data Processing ~							
Object Store ~							
Identity ~							
Create An Image					^		
Name *		Dee	cription:				
BPS-SC		Des	cription.	- Neble - Ce			
Description		suppor	tly only images av ted. The image lo	cation mus	an MITP URL are st be accessible to the		
System Controller		Image	Service. Compres	sed image	e binaries are		
		Please	note: The Image	Location f	field MUST be a valid		
Image Source		and dir	rect URL to the im	age binary	URLs that redirect or		
Image File	•	serve	error pages will res	sult in unus	sable images.		
Image File O							
Choose File Ixia_BreakKVM.qcow2							
Format *							
QCOW2 - QEMU Emulator	*						
A sub-literature							
Architecture							
Minimum Disk (GB) 🛛							
Minimum RAM (MB) Ø							
Public							
Protected							
				Care	el Create Image		
				Cance	er create image		

Create An Image				×		
Name *	_					
BPS-Vblade	Descri	ption:				
Description	Currently or supported. Image Serv	nly images av The image lo vice. Compres	vailable via an HTTP cation must be acco used image binaries	P URL are essible to the are		
[]	supported (	.zip and .tar.g	jz.)			
Image Source	Please not and direct I	te: The Image URL to the im	Location field MUS age binary. URLs th	T be a valid at redirect or		
Image File	serve error	pages will re-	sult in unusable ima	ges.		
Image File V Choose File Ixia_BreakKVM.qcow2						
QCOW2 - QEMU Emulator	,					
Architecture						
Minimum Disk (GB) O						
Minimum RAM (MB) O						
Public						
Protected						
			Cancel	reate Image		
🔹 openstack 🚥 services 🕶						🛔 manish 🕶
roject _ Images						
ompute				Project (0) 😢 Shared with Me (0)	Public (2)	image x Delete Images
Overview Image Name Type	Status F	Public	Protected	Format	Size	Actions
Instances BPS-Vblade Image	Active	(es	No	QCOW2	1.5 GB	Launch Instance •
Volumor						

Access & Security

Network Orchestration Database Data Processing Object Store Identity

🧧 openstack	🗐 S	ervices •									🛔 manish 🔻
Project ^	Ac	cess & Securi	ty								
Compute ^	Secu	urity Groups Key Pairs Fi	cating IPs API Access								
Overview	v						Filter	Q	+ Create Security Group	× Delet	e Security Groups
Instances		Name		Description	tion						Actions
Volumes		default		Default security group						1	Manage Rules
Images	Displ	laying 1 item									
Access & Security	1										
Network ~											
Orchestration ~											
latabase v											
ata Processing ~											
bject Store 🗸											
dentity ~	-										

# **Security Group Management**

**Note:** All Egress traffic and intercommunication in the default group are allowed and all ingress from outside of the default group is dropped by default. To avoid dropped traffic, add the appropriate rules.

openstack		services •						🛔 manish 🕶					
Project ^	Ν	Manage Security Group Rules: default (ba7132d5-109d-47d8-8e3d-f391c4ae0c4a)											
Compute ^							+	Add Rule × Delete Rules					
Overview	· .	Direction	Ether Type	IP Protocol	Port Range	Remote IP Prefix	Remote Security Group	Actions					
Instances		Egress	IPv6	Any	Any	::/0		Delete Rule					
Volumes		Ingress	IPv4	Any	Any		default	Delete Rule					
Access & Security		Egress	IPv4	Any	Any	0.0.0.010	•	Delete Rule					
Network ~		Ingress	IPv6	Any	Any		default	Delete Rule					
Orchestration ~	c	isplaying 4 items											
Database ~													
Data Processing ~													
Object Store													

Identity ~

Add Rule	9						×					
Rule *												
ALL ICMP				, De	Description:							
Direction				Rule	Rules define which traffic is allowed to instances assigned to the security group. A security group rule							
Ingress				v cons	consists of three main parts:							
Remote * 0				Custo	Rule: You can specify the desired rule template or use custom rules, the options are Custom TCP Rule, Custom UDP Rule, or Custom ICMP, Rule.							
CIDR				* One	ULP KUR, of Custom ICMP Rule.							
CIDR 0				choo	se to open either a s	single port or a range of p	orts. with					
0.0.0/0				spac	e to provide both the e. For ICMP rules vo	e starting and ending port ou instead specify an ICN	s for the IP type					
				and	code in the spaces p	provided.						
				(Sec soun acce	unity Group). Selecti ce will allow any oth ss to any other inst:	ing a security group as th er instance in that securit ance via this rule. Cancel	e y group Add					
openstack		services 🕶						👗 manish 👻				
Project ^	Ma	anage Secur	rity Group Rule	es: default (ba	a7132d5-109d-4	7d8-8e3d-f391c4ae0	)c4a)					
Overview		Direction	Ether Tune	ID Protocol	Port Pange	Demote ID Drefix	Pamote Security Group	+ Add Rule × Delete Rules				
Instances		Egress	IPv6	Any	Any	:/0		Delete Rule				
Volumes		Ingress	IPv4	Any	Any		default	Delete Rule				
Access & Security		Egress	IPv4	Any	Any	0.0.0.0/0		Delete Rule				
Network ~		Ingress	IPv6	Any	Any		default	Delete Rule				
Orchestration ~		Egress	IPv4	ICMP	Any	0.0.0.0/0		Delete Rule				
Database ~		Ingress	IPv4	ICMP	Any	0.0.0.0/0		Delete Rule				
Data Processing ~	Θ	Ingress	IPv4	TCP	1 - 65535	0.0.0.0/0		Delete Rule				
Object Store ~		Egress	IPv4	TCP	1 - 65535	0.0.0.0/0	-	Delete Rule				
Identity ~		Ingress	IPv4	UDP	1 - 65535	0.0.0.0/0	-	Delete Rule				
	•	Egress	IPv4	UDP	1 - 65535	0.0.0.0/0		Delete Rute				

Create k	Key Pair				×
Key Pair Name	e *				
ixia			Description: Key pairs are ssh credentials images when they are launch registers the public key and d .pem file).	which are injected into ed. Creating a new key lownloads the private ke	pair y (a
			Protect and use the key as yo private key.	ou would any normal ssi	h
			Ca	Create Key P	lair
🧾 openstack	services •				🛓 manish 🕶
Project ^	Access & Security				
Overview	Security Groups Key Pairs Fround Ins APT Access			Filter	+ Create Key Pair 1 moort Key Pair * Detete Key Pairs
Instances	Key Pair Name	Fingerprint			Actions
Volumes	i ixia	cd:7c:e4:b8:50.c	c 1.cc:a6ied:f0.22ieb:8f.d6i00.52		Dolete Key Pair
Images	Displaying 1 item				
Access & Security					
Network ~					
Orchestration ~					
Database ~					
Data Processing ~					
Ubject Store v					
identity v					

# Launch Instances

ct ^	Images						
ipute ^						# Project (0)	h Me (0) 👹 Public (2)
Overview	Image Name	Туре	Status	Public	Protected	Format	Size
Instances	BPS-NP	Image	Active	Yes	No	QCOW2	1.5 GB
Volumes	BPS-SC	Image	Active	Yes	No	QCOW2	8.5 GB
Access & Security	Displaying 2 items						
r ~							
stration ~							
e v							
rocessing ~							
Store ~							
i ~							
ounch	Instance						×
aunch	Instance						
Details *	Access & Security	Networking *	Post-C	reation Ad	dvanced Options		
vailability Z	Zone		0	A she details if	lestere the second		
vailability 2	Zone		Spec	ify the details f	for launching an ir	nstance.	
vailability Z nova	Zone		The o	ify the details f hart below sho	for launching an ir ows the resources ject's quotas.	nstance. s used by this p	project
lvailability 2 nova nstance Nan	Zone		<ul> <li>Spec</li> <li>The c in rel</li> <li>Flay</li> </ul>	ify the details f hart below sho ation to the pro	for launching an ir ows the resources ject's quotas.	nstance. s used by this p	roject
nova nova nstance Nan BPS-SC	Zone ne *		Spec The o in rel Flav	ify the details f thart below sho ation to the proj ror Details	for launching an in ows the resources ject's quotas.	nstance. s used by this p	vroject
Availability 2 nova nstance Nan BPS-SC	Zone ne *		* The o in rel Flav	ify the details f thart below sho ation to the pro ror Details ne	for launching an in ows the resources ject's quotas. BPS-SC	nstance.	roject
Availability 2 nova Instance Nan BPS-SC Flavor * •	Zone ne *		The of in rel Flav	ify the details f thart below sho ation to the pro- vor Details ne PUs	for launching an in ows the resources ject's quotas. BPS-SC 8	nstance. s used by this p	roject
Availability 2 nova Instance Nan BPS-SC Flavor * BPS-SC	Zone ne *		Spec     The c     in rel     Flav     Nar     VCl     Roc	ify the details f that below sho ation to the pro- ror Details ne PUs t Disk	for launching an in ows the resources ject's quotas. BPS-SC 8 110 GB	nstance.	project
Availability 2 nova Instance Nan BPS-SC Flavor * BPS-SC Instance Cou	zone ne *		Spec     The c     in rel     Flav     Nar     VCl     Roc     Epl	ify the details f that below sho ation to the pro- ror Details ne PUs bt Disk bemeral Disk	for launching an in ows the resources ject's quotas. BPS-SC 8 110 GB 0 GB	nstance. ; used by this p	project
Availability 2 nova Instance Nan BPS-SC Flavor * • BPS-SC Instance Cou 1	Zone ne *		Spec     The c     in rel     Flav     Nar     VCI     Roc     Epl     Tot	ify the details f chart below sho ation to the pro- ror Details ne PUs ot Disk semeral Disk al Disk	for launching an in ows the resources ject's quotas. BPS-SC 8 110 GB 0 GB 110 GB	nstance. a used by this p	roject
Availability 2 nova Instance Nan BPS-SC Flavor * • BPS-SC instance Cou 1 nstance Boo	ant * O		Spec     The c     in rel     Flav     Nar     VCl     Roc     Epl     Tot     RAI	ify the details f that below sho ation to the proj for Details ne PUs of Disk temeral Disk al Disk	for launching an in ows the resources ject's quotas. BPS-SC 8 110 GB 0 GB 110 GB 8,192 MB	nstance. a used by this p	roject
Availability 2 nova Instance Nan BPS-SC Flavor * • BPS-SC Instance Cou 1 Instance Boo Boot from	Ine *		Spec     The c     in rel     Flav     Nar     VCl     Roc     Epl     Tot     RAJ	ify the details f chart below sho ation to the proj ror Details ne PUs ot Disk emeral Disk al Disk M	for launching an in ows the resources ject's quotas. BPS-SC 8 110 GB 0 GB 110 GB 8,192 MB	nstance. s used by this p	roject
Availability 2 nova Instance Nan BPS-SC Flavor * BPS-SC Instance Cou 1 Instance Boo Boot from	zone ne * unt * • ot Source * • image		Spec     The c     in rel     Flav     Nar     VCl     Roc     Epl     Tot     RAl      Proj	ify the details f chart below sho ation to the pro- ror Details ne PUs ot Disk semeral Disk al Disk M ect Limits	for launching an in ows the resources ject's quotas. BPS-SC 8 110 GB 0 GB 110 GB 8, 192 MB	nstance. s used by this p	project
Availability 2 nova Instance Nan BPS-SC Flavor * • BPS-SC Instance Cou 1 Instance Boo Boot from Image Name	ant * •		Spec     The c     in rel     Flav     Nar     VCl     Roc     Epl     Tot     RAI     Proj     Num	ify the details f chart below sho ation to the pro- ror Details ne PUs ot Disk to Disk al Disk M ect Limits ber of Instance	for launching an in ows the resources ject's quotas. BPS-SC 8 110 GB 0 GB 110 GB 8,192 MB es	nstance. s used by this p	Project
Availability 2 nova Instance Nan BPS-SC Flavor * • BPS-SC Instance Cou 1 Instance Boo Boot from Image Name BPS-SC (6	t Source * O image .* 8.5 GB)		Spec     The c     in rel     Flav     Nar     VCl     Roc     Epl     Tot     RAl     Proj     Num     V	ify the details f chart below sho ation to the pro- ror Details ne PUs of Disk bemeral Disk al Disk M ect Limits ber of Instance	for launching an in ows the resources ject's quotas. BPS-SC 8 110 GB 0 GB 110 GB 8, 192 MB es	s used by this p	Project
Availability 2 nova Instance Nan BPS-SC Flavor * • BPS-SC Instance Cou 1 Instance Boo Boot from Image Name BPS-SC (6	zone me * unt * • ot Source * • image * 8.5 GB)		Spec     The c     in rel     Flav     Nar     VCl     Roc     Epl     Tot     RAI     Proj     Num     Num	ify the details f chart below sho ation to the pro- ror Details ne PUs or Disk bereral Disk al Disk M ect Limits ber of Instance ber of VCPUs	for launching an in ows the resources ject's quotas. BPS-SC 8 110 GB 0 GB 110 GB 8,192 MB es	o of 10 0 of 20	vroject Used
Availability 2 nova Instance Nan BPS-SC Flavor * • BPS-SC Instance Cou 1 Instance Boo Boot from Image Name BPS-SC (6	Ine " Int " •		Spec     The c     in rel     Flav     Nar     VCl     Roc     Epl     Tot     RAI     Proj     Num     Num	ify the details f chart below sho ation to the proj ror Details ne PUs ot Disk at Disk at Disk demeral Disk det Limits ber of Instance ber of VCPUs	for launching an in ows the resources ject's quotas. BPS-SC 8 110 GB 0 GB 110 GB 8,192 MB es	0 of 10	roject
Availability 2 nova Instance Nan BPS-SC Flavor * • BPS-SC Instance Cou 1 Instance Boo Boot from Image Name BPS-SC (§	Ine " Int " Int " Int "  Int "  Int "  Int "  Int "  Int "		Spec     The c     in rel     Flav     Nar     VCl     Roc     Epi     Tot     RAJ     Proj     Num     Total	ify the details f chart below sho ation to the proj ror Details ne PUs ot Disk to Disk al Disk demeral Disk det Limits ber of Instance ber of VCPUs RAM	for launching an in ows the resources ject's quotas. BPS-SC 8 110 GB 0 GB 110 GB 8, 192 MB es	0 of 51,200 MB	roject

Launch Instance			×
Details * Access & Security Key Pair O ixia Security Groups O I default	Networking *	Post-Creation Control access groups, and oth	Advanced Options to your instance via key pairs, security ter mechanisms.
Launch Instance			Cancel Launch
Details * Access & Security	Networking *	Post-Creation	Advanced Options
Selected networks	420410-	Choose networ networks by pu change NIC on	k from Available networks to Selected ush button or drag and drop, you may der by drag and drop as well.
Available networks	9629-9469-4229.000		
			Cance

### Launch Instance

Details * Access & Security Networking *	Post-Creation A	dvanced Options
Availability Zone	Specify the details	for launching an instance.
nova 🔻	The chart below sh	ows the resources used by this project
Instance Name *	in relation to the pro	oject's quotas.
BPS-Vblade	r lavor Details	
Flavor * <b>O</b>	Name	BPS-NP
BPS-NP *	VCPUs	4
Instance Count 10	Root Disk	14 GB
Instance Count - O	Ephemeral Disk	0 GB
•	fotal Disk	14 GB
Instance Boot Source * O	RAM	8,192 MB
Boot from image	Project Limits	
Image Name *	Number of Instanc	tes 1 of 10 Used
BPS-NP (1.5 GB) *		
	Number of VCPUs	8 of 20 Used
	Total RAM	8,192 of 51,200 MB Used
		Carrel
		Carrier
Launch Instance		
Details * Access & Security Networking *	Post-Creation	Advanced Options
Key Pair 🛛	Control access	to your instance via key pairs, security
	groups, and oth	er mechanisms.
003		
toa T		
Security Groups D		
Security Groups O		
Security Groups O		
Security Groups D		
Security Groups O		Cancel

×

aunch Instance		
Details * Access & Security	Networking *	Post-Creation Advanced Options
Selected networks		Choose network from Available networks to Selected networks by push button or drag and drop, you may
NC1 Internal Network association	4034375	change NIC order by drag and drop as well.
Available networks		
		Cance
openstack I services -		
Instances		

📮 openstack		services •										🛔 manish 💌
Project ^	In	stances										
Compute ^								Instance Name		Filter	Launch Instance × Terminate Insta	More Actions •
Overview		Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
Instances Volumes Images		BPS-Vblade	BPS-NP	Internal Network 192.168.1.5 Test Network 20.20.0.2	BPS-NP		Active	nova	None	Running	0 minutes	Create Snapshot 💌
Access & Security	0	BPS-SC	BPS-SC	192.168.1.3	BPS-SC		Active	nova	None	Running	11 minutes	Create Snapshot 💌
Orchestration ~ Database ~ Data Processing ~	Disp	laying 2 tems										

Object Store

openstack		services •										📥 manish 👻
Project ^												
Compute ^	OpticAd     Second     OpticAd     Second     OpticAd     Second     OpticAd     Second     Second											
Overview		Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
Instances				Internal Network								
Volumes		BPS-Vblade	BPS-NP	192.168.1.5	BPS-NP		Active	nova	None	Running	0 minutes	Create Snapshot 💌
Images	Instruction     Inst											
Access & Security												Attach Interface
Network ~		BPS-SC	BPS-SC	192.168.1.3	BPS-SC		Active	nova	None	Running	11 minutes	Detach Interface
	Disple	rying 2 items										Edit Instance
Orchestration ~												Contole
Database ~												View Log
Data Processing												Pause Instance
												Suspend Instance
Object Store ~												Shelve Instance
Identity ~												Resize Instance
												Lock Instance
												Unlock Instance
												Soft Reboot Instance
												Hard Reboot Instance
												Shut Off Instance
												Terminate Instance

# **Define Multiple Test NICs**

openstack		services 🕶										🛔 manish 👻
Project ^	Ins	stances										
Compute ^								Instance Name * Filter		Filter	Launch Instance × Terminate	Instances More Actions -
Overview		Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
Instances Volumes Images		BPS-Vblade	BPS-NP	Internal Network 192.168.1.5 Test Network 20.20.0.2	BPS-NP		Active	nova	None	Running	0 minutes	Create Snapshot    Associate Floating IP
Access & Security	8	BPS-SC	BPS-SC	192.168.1.3	BPS-SC	-	Active	nova	None	Running	11 minutes	Attach Interface Detach Interface
kenotrik v Trchestration v Database v Data Processing v Ubject Store v dentity v	Displa	yng 2 Nens									,	Erit Intrace Edit Secury Groups Console Ver Lop Pause Instance Suerel Instance Sole Instance Loci Instance Loci Instance Loci Instance Hale Resol Instance Sol Resol Instance Sol Chatance Shull Cintance Rebuilt Instance
Attach Int	tei	rface								×		
Network					Deee							
Test Network					Desci	iptioi	1.					
					Select the	e network	for int	erface attaching.				
								Cancel	tach li	nterface		

🧧 openstack		services •										🛔 manish 💌
Project ^	Ins	stances										
Compute ^								Instance Name		Filter	Launch Instance × Terminate Inst	ances More Actions •
Overview		Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
Instances Volumes Images Access & Security		BPS-Vblade	BPS-NP	Internal Network 192.168.1.5 Test Network 20.20.0.2 20.20.0.3	BPS-NP	-	Active	nova	None	Running	20 minutes	Create Snapshot 💌
Network ~		BPS-SC	BPS-SC	192.168.1.3	BPS-SC		Active	nova	None	Running	31 minutes	Create Snapshot 💌
Orchestration ~	Displa	aying 2 items										
Database     ~       Data Processing     ~       Object Store     ~       Identity     ~												

**Note:** After attaching the interface, the instance needs to be rebooted/service restarted in order for the change to be reflected in the BPS VE user interface. This step will complete this procedure.

openstack	-	services -										📥 manish 👻
Project ^	Ins	stances										
Compute ^								Instance Name T	07	Filter	A Launch Instance x Terminate	Instances More Actions •
Overview												
laster er		Instance Name	Image Name	IP Address	SIZe	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
instances				Internal Network								
Volumes		BDS.Molada		192.168.1.5	BDS.ND		Activo	001/2	None	Rupping	Edaus 2 hours	Create Secondaria
Images		010-10400		Test Network	Dr U-W		PAGUTO	liora	TRUTTE	Ronning	5 days, 2 nours	Create Griapanos
Access & Security				20.20.0.2 20.20.0.3								Associate Floating IP
				192 168 1 3								Datach Interface
Network ~		BPS-SC	BPS-SC	Floating IPs:	BPS-SC		Active	nova	None	Running	5 days, 2 hours	Edit Instance
Orchestration ~				10.216.110.184								Edit Security Groups
Detabase	Disple	aying 2 items										Console
Database												View Log
Data Processing ~												Pause Instance
												Suspend Instance
Object Store ~												Shelve Instance
Identity ~												Resize Instance
												Lock Instance
												Unlock Instance
												Soft Reboot Instance
												Hard Reboot Instance
												Shut Off Instance
												Rebuild Instance
												Terminate Instance

# **Associate Floating IP Address**

**Note:** Associating a floating IP address allows the BPS vController to be accessed from a LAN.

openstack		services 🕶										🚢 manish 🖛
Project ^	In	stances										
Compute ^								Instance Name • Filter		Filter	A Launch Instance	* Terminate Instances More Actions •
Overview	0	Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since crea	ted Actions
Instances				Internal Network								
Volumes Images Access & Security		BPS-Vblade	BPS-NP	192.168.1.5 Test Network 20.20.0.2 20.20.0.3	BPS-NP		Active	nova	None	Running	36 minutes	Create Snapshot 💌
Network ~		BPS-SC	BPS-SC	192.168.1.3	BPS-SC		Active	nova	None	Running	47 minutes	Create Snapshot 👻
Orchestration · · Database · · Data Processing · · Object Store · · Identify · ·	Disp	nyky 2 tems										Associale Floating (P) Associale Floating (P) Associal (P) Cetach Interface Eat Evature Eat Evatore Consile View Log Pause Instance Suspend Instance Braile Instance Eat Instance Lock Instance Eat Instance Soft Recontenance Reside Instance Reside Instance Reside Instance Ball (P) Instance Reside Instance Reside Instance

🧧 openstack		services •										📥 manish 👻
Project ^	Ins	stances										
Compute ^								Instance Name  * Filter		Filter	Launch Instance × Terminate Inst	Ances More Actions •
Overview	0	Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
Instances Volumes Images Access & Security		BPS-Vblade	BPS-NP	Internal Network 192.168.1.5 Test Network 20.20.0.2 20.20.0.3	BPS-NP	-	Active	nova	None	Running	40 minutes	Create Snapshot 💌
Network ~ Orchestration ~		BPS-SC	BPS-SC	192.168.1.3 Floating IPs: 10.216.110.184	BPS-SC		Active	nova	None	Running	52 minutes	Create Snapshot 💌
Database ~	Displ	aying 2 items										
Data Processing ~ Object Store ~												
Identity ~												

## **Configure the OpenStack Environment**

This sections describes several options that can be used to configure your OpenStack environment for BPS VE.

## Allow All MAC and IPs through OpenStack

By default, OpenStack allows only one MAC and one IP address through the test networks. The workaround to remove this limitation is to disable port-security on the test ports.

Perform the following tasks to allow all MACs and IPs through OpenStack:

1. Add the following line in /etc/neutron/plugins/ml2/ml2 conf.ini file to enable the ml2

port\_security extension driver:

```
extension drivers = port security
```

```
2. Run the following command to restart the neutron services:
```

service restart neutron-server

service restart neutron-dhcp-agent

service restart neutron-13-agent

service restart neutron-metadata-agent

service restart neutron-plugin-openvswitch-agent

3. Run the following command to list the neutron ports:

neutron port-list

4. Search for the test ports used on the VLMs and run the following commands on them:

neutron port-update <port-id> --no-security-groups

neutron port-update <port-id> --port-security-enabled=False

**Note**: In order to update a batch of ports with the above port security commands, you can use the following script:

a. Create an update\_port\_security.sh file with the following contents:

```
vi update_port_security.sh
#! /bin/bash
if [ $# -gt 1 ]; then
echo "Incorrect usage!"
echo -e "./update_port_security.sh [port_IP_format]\n"
```

```
echo -e "ex.:\n./update port security.sh 192.168."
exit 1
elif [ $# -eq 1 ]; then
PORT IP=$1
echo -e "Searching for ports starting with IP: $PORT IP"
else
PORT IP="192.168."
echo -e "No IP selected!\nSearching for ports with default IP: $PORT IP"
fi
echo ""
echo "Grabbing the ports list..."
PORTS=$(neutron port-list | grep $PORT IP | awk '{print $2}')
NUM PORTS=$(neutron port-list | grep $PORT IP | awk '{print $2}' | wc -1)
echo "Done!"
if [ -z "$PORTS" ]; then
echo "No ports found starting with IP $PORT IP!"
exit 1
else
echo "Found $NUM PORTS ports starting with IP $PORT IP!"
fi
echo ""
ERRORS=0
ERROR PORTS=""
echo -e "Disabling port security on the ports...\n"
for PORT in $PORTS;
do
neutron port-update $PORT --no-security-groups
FST=$?
```

```
neutron port-update $PORT --port-security-enabled=False
SND=$?
if [ $FST -eq 0 ] && [ $SND -eq 0 ]; then
echo "Successfully disabled port security on port $PORT!"
else
echo "Error on disabling port security for port $PORT!"
ERRORS=1
ERROR PORTS=$ERROR PORTS" "
fi
echo ""
done
if [ $ERRORS -eq 0 ]; then
echo "Finished updating all the ports!"
exit 0
else
echo "Found errors on updating the following ports: $ERROR PORTS"
exit 1
fi
 b. Run the following command to give it exec permissions.
```

```
chmod +x update port security.sh
```

The script applies the command only on a specific subset of ports, identified by an IP format (for example, 192.168.X.X). The test networks intended for creating for IxVM OpenStack use will have associated a subnet. You can easily identify the ports on which you must apply the configurations, based on the IPs associated by the test network in use. For example, setting subnet 192.168.10.0/24 on a test network results in test ports having allocated IPs from that range—192.168.10.2, 192.168.10.3, and so on).

```
c. Run the script.
```

```
./update_port_security.sh
```

By default, the script searches for ports starting with 192.168. as the IP. You can change this IP by providing an additional parameter when running the script. For example, ./update\_port\_security.sh 172.16., updates the ports having IPs with the 172.16.X.X format.

./update\_port\_security.sh 172.16.

# **CHAPTER 2** BPS VE Install on Amazon Web Services

This section of the guide describes how to install BPS VE on Amazon Web Services.

# **BPS on AWS Overview**

This section of the document provides a straightforward workflow that will assist you while deploying the Breaking Point AMIs in Amazon Web Services (AWS). It will also help you create a sample setup for your device under test.

This document assumes you are familiar with the basics of the Amazon AWS Virtual Private Cloud (VPC) and Elastic Compute Cloud (EC2) features. If not, we encourage you to study the tutorials provided by Amazon at <a href="https://aws.amazon.com/training/intro\_series/">https://aws.amazon.com/training/intro\_series/</a>.

## **BPS VE AMI Deployment**

This section of the document discusses the following methods for BreakingPoint AMI Deployment on Amazon Web Services.

- <u>AMI Deployment below</u>
- <u>CloudFormation Template Generator on page 59</u>

## **AMI Deployment**

Note: You can find the AMIs for the Ixia BreakingPoint System Controller and Ixia BreakingPoint vBlade on the EC2 console (Instances > Launch Instance > Community AMIs) using the AMI IDs or by searching for Ixia BreakingPoint.

To deploy BPS VE on Amazon EC2, you need to perform the following steps:

- 1. Select EC2 Dashboard > Images > AMIs.
- 2. Select the BPS AMIs and click Launch and then follow the steps in the wizard.

Ē	Launch	Actions 🐃																			
	Owned b	yme 👻 🔍 Filter by tags	and attrib	utes or search b	y keyw	vord															0
	Nam	e	Ŧ	AMI Name	•	AMI ID -	Source	9	- 0	Owner	Ŧ	Visibility	Ŧ	Status	Ť	Creation Date	Ŧ	Platform	-	Root Device 1+	Virtual
	BPS	VE_Controller_8.21.0_EA_x	:	import-ami-fg1	l j	ami-47845728	195734	586973/i	19	95734586973	3	Private		available		April 5, 2017 at 5:23:29 PN	I	Other Linux		ebs	hvm
	BPS	VE_Blade_8.21.0_EA		import-ami-fg6	<b>i</b> 1	ami-3b75a554	195734	586973/i	19	95734586973	3	Private		available		April 4, 2017 at 2:08:21 PN		Other Linux		ebs	hvm

- 3. Choose an instance type based on your computing needs:
  - vController Minimum requirements: 8vCPUs, 8 GB RAM, 100 GB HDD
  - vBlade Minimum requirements 4vCPUs, 8 GB RAM, 10 GB HDD
- 4. On the Configuration Instance Details page, select:
  - a. Create a new VPC (you can also select an existing VPC)
    - i. Create the VPC and assign a subnet block, e.g: IPv4 CIDR block = 10.0.0.0/16
    - ii. Configure the VPC subnets (at least two subnets are required at this stage, one for External Management and one for Internal Management), for example:
      - 10.0.0.0 /24 ; ixia-management used to access the vController WebUI (BPS GUI)
      - $\circ~$  10.0.1.0 /24 ; ixia-control used for the internal communication between vController and vBlade

ggircu_ixia_control	subnet-5104912b	available	vpc-7ab53812   ggircu_BPS_VE	10.0.1.0/24
ggircu_ixia_management	subnet-9d0792e7	available	vpc-7ab53812   ggircu_BPS_VE	10.0.0/24

- Note: Optionally, you can use the same subnet for External Management and Internal Management. In this scenario, please remember to add both of the network interfaces (attached to the vController instance) as well as the primary network interface (eth0 - attached to the vBlade instance) to the same management subnet.
- iii. Create the route table (the table controls the routing for the subnet)
  - i. Go to Route Tables and select Create Route Table
  - ii. To ensure that your instances can communicate with the Internet, you must also attach an Internet gateway to your VPC
  - iii. Go to Internet Gateways and select Create Internet Gateway
  - iv. Right click and select Attach to your VPC
  - v. Go back to the route table configuration > Select Routes > Add another route
  - vi. Add a route over the Internet gateway (the destination is 0.0.0/0, and the target is the Internet gateway you just created).

rtb-0e88f766   BPS	_VE_route_table	9				
Summary	Routes	Subnet Associations	Ro	ute Propa	gation	Tags
Edit	V:					
	view:	All rules				
Destination		Target		Status	Propaga	ated
10.0.0/16		local		Active	No	
0.0.0/0		igw-9b6464f2		Active	No	

iv. Go to VPC > Subnets, then select your subnets and change the Current Route Table to the route table you just created

#### b. For **Subnet**, select:

- i. ixia-management, when deploying the vController instance
- ii. ixia-control, when deploying the vBlade instances

#### c. Auto-assign Public IP:

- Use subnet settings
- d. Network interfaces:
  - i. **vController** When deploying the controller instance, make sure you add a **second network interface** (vController has two management interfaces):
    - The 1st interface must be added to the External Management subnet: eth0
    - The 2nd interface must be added to the Internal Management subnet: eth1
      - Note: If you start an instance with more than one network interface, it will no longer use a regular public IP address. If you connect to instances in your VPC using public IPs, you will need to assign an **Elastic IP** to the BPS vController instance.

<ul> <li>Netwo</li> </ul>	ork interfaces 🕕					
Device	Network Interface	Subnet	Primary IP	Secondary IP addresses	IPv6 IPs	
eth0	New network interface -	subnet-5a6b182( v	Auto-assign	Add IP		
eth1	New network interface -	subnet-c46516b	Auto-assign	Add IP		8

- ii. vBlade
  - Has only one management interface
  - Needs to be in the same IP subnet with the vController Internal Management IP
- 5. Under **Add Storage**, the default storage size should be enough.
- 6. Under **Add Tags**, the recommendation is to add some tags to allow easily finding the instance, e.g, set the Key to Username and set the value to your login.
- 7. Configure the security group, e.g.:

#### a. Inbound

- i. HTTPS must be allowed only from your personal or corporate network IP (range)
- ii. HTTP must be allowed only from your personal or corporate network IP (range)
- iii. SSH must be allowed only from your personal or corporate network IP (range)
- TCP traffic on port 8880 must be allowed only from your personal or corporate network IP (range)
- v. ALL traffic must be allowed within the security group (if configuring different security groups for the vController and the vBlade, make sure that ALL traffic is allowed between the security groups)

sg-f390a798   bp	sVPCx		
Summary	Inboun	d Rules	Outbound Rules
Edit			
Туре	Protocol	Port Range	Source
ITTP (80)	TCP (6)	80	109.100.41.154/32
TTP (80)	TCP (6)	80	::/0
ALL Traffic	ALL	ALL	sg-f390a798
SSH (22)	TCP (6)	22	109.100.41.154/32
SSH (22)	TCP (6)	22	::/0
Custom TCP Rule	TCP (6)	8880	109.100.41.154/32
Custom TCP Rule	TCP (6)	8880	::/0
ONS (TCP) (53)	TCP (6)	53	109.100.41.154/32
DNS (TCP) (53)	TCP (6)	53	::/0
ITTPS (443)	TCP (6)	443	109.100.41.154/32
HTTPS (443)	TCP (6)	443	::/0

#### b. **Outbound**

i. Traffic must be allowed to any IP address

It is highly recommended not to allow arbitrary (inbound) access to your BPS VE instances – only IPs from your company or home should be allowed to access this machine. This will help to protect any confidential data stored on this instance/network.

- 8. Review the settings you've selected and then click **Launch**.
- 9. Select an existing key pair (or create a new one) and check the **I acknowledge** check box. Click **Launch Instances**.
  - **Note:** In the current version, BPS VE instances cannot be accessed using the Amazon keypair.

## **CloudFormation Template Generator**

The deployment of Breaking Point AMIs can be automated by using CloudFormation templates. This option automates most of the manual steps that have been detailed in the <u>AMI Manual Deployment</u> section.

In order to generate a CloudFormation template, you can use the following helper page:

bps-deploy.s3-website.eu-central-1.amazonaws.com.

**Note:** The AWS BPS Configurator helper page described below is supported on the Mozilla Firefox and Chrome web browsers.

**Note:** When deploying a CloudFormation template generated by the AWS BPS Configurator helper page, the maximum number of IPs supported by the instance type will be automatically configured on the elastic network interfaces (ENIs) connected to the vBlade.

NS BPS Co	onfigurator			
GLOBALS			RESULT	
PREFIX	BPSVE	]	GET AWS CONFIGURATION JSON SAVE	AS
USERNAME	String used for tagging deployed resources	]	{     "AWSTemplateFormatVersion"; "2010-09-09";     "Description": TPSVE CloudFormation";     "Besources"; (	Í
PROJECT	bps-ve-cloud		">DefaultyPC"; { "Typeh: "AWS:EC2:\/PC", "Properties"; { "ClarBlock"; "10.10.0.0/16", "InstanceTenany!" 'default",	
OCATION		q	"EnableDnsSupport: "true", "EnableDnsHostnames": "true", "Tags": [ { "Key": "Name",	
REGION	EU (Frankfurt)		"Value", "BPSVEVPCx" }, "Key": "Username",	
AZ	eu-central-1a 🔹		"Value": "" } { "Key": "Project", "Value": "bps-ve-cloud"	
MI Ø			} } } "VPCxDhcpOptions": {	
CONTROLLER	ami-149b427b		"Type": "AWS:EC2:DHCPOptions", "Properties"; "DomainName": "VPC:DhcpOptions", "DomainNameServes";	
BLADE	ami-96835ffa	]	"8.8.8.8" "8.8.4.4", "*AnazonProvidedDNS" ]. "Tags": [	
DDRESSING			{	
LLOW ONLY MY IP	8		( "Key": "Username", "Value": "	
MY IP	109.100.41.154		{ "Keyn": "Project", "Value": "bps ve-cloud"	
VPC 🛛			, 1	

The helper page offers various configuration options including:

- AMI selection for BPS System Controller and vBlade
- AWS Deployment Region and Availability Zone
- VPC configuration
- Test and Management IP range configuration
- System Controller and vBlade instance types
- Number of vBlades
- Number of Test Ports per vBlade

CloudFormation templates are generated by clicking **Generate AWS Configuration JSON**. These templates can be used as-is or can serve as a starting point for further customization.

Note: When deploying a CloudFormation template in AWS, the vBlades are automatically connected to the BPS System Controller and will appear in the Administration > VM
 Deployment > Manage Virtual Chassis window.

Parameter		Description
Globals	Prefix	Insert the prefix. This string will be appended to the name of the resources that the AWS CloudFormation template generates.
	Username	Insert the username tag. AWS CloudFormation Resource Tags property is used to apply tags to resources, which can help you identify and categorize those resources.
	Project	Insert the project tag. AWS CloudFormation Resource Tags property is used to apply tags to resources, which can help you identify and categorize those resources.
Location	Region	Select a Region that specifies where your resources are managed.
	AZ	Select the Availability Zone. Availability zones are isolated locations within data center regions from which public cloud services originate and operate.
AMI	Controller	Insertthe ID of the vController AMI. You can find the AMIs for the Ixia BreakingPoint System Controller and Ixia BreakingPoint vBlade on the EC2 console ( <b>Instances</b> > <b>Launch Instance</b> > <b>Community AMIs</b> ) using the AMI IDs or by searching for Ixia BreakingPoint.
	Blade	<b>Insert</b> the ID of the <b>vBlade</b> AMI. You can find the AMIs for the Ixia BreakingPoint System Controller and Ixia BreakingPoint vBlade on the EC2 console ( <b>Instances</b> > <b>Launch Instance</b> > <b>Community AMIs</b> ) using the AMI IDs or by searching for Ixia BreakingPoint.

Parameter			Description
Addressing	Allow only My IP		Use this setting in order to not allow arbitrary (inbound) access to your BPS instances. When enabled, only the specified IP will be allowed to access these machines. This helps protect any confidential data stored on these instances and the rest of the network.
	MY IP		The IP address to be used in the security rules. Your public IP address is automatically filled in.
	VPC	Name	Insert the name of the VPC. It can only contain alphanumeric characters.
		CIDR	Insert the IPv4 address range for your VPC as a Classless Inter-Domain Routing (CIDR) block. CIDR notation is a compact representation of an IP address and its associated routing prefix. The notation is constructed from an IP address, a slash ('/') character, and a decimal number.
	Management Subnet	Name	Insert the name of the Management Subnet. It can contain only alphanumeric characters.
		CIDR	Insert the IPv4 address range for your Management Subnet, as a Classless Inter-Domain Routing (CIDR) block. CIDR notation is a compact representation of an IP address and its associated routing prefix. The notation is constructed from an IP address, a slash ('/') character, and a decimal number.
	Test Subnet	Name	Insert the name of the Test Subnet. It can contain only alphanumeric characters.
		CIDR	Insert the IPv4 address range for your Test Subnet, as a Classless Inter-Domain Routing (CIDR) block. CIDR notation is a compact representation of an IP address and its associated routing prefix. The notation is constructed from an IP address, a slash ('/') character, and a decimal number.

Parameter			Description
Instance Configuration	Controller	Instance Type	When you launch an instance, the instance type that you specify determines the hardware of the host computer used for your instance. Each instance type offers different compute, memory, and storage capabilities and are grouped in instance families based on these capabilities. Select an instance type for the BPS vController based on the requirements of the application or software that you plan to run on your instance.
	Blade	Index	The index of the blade.
		Instance Type	When you launch an instance, the instance type that you specify determines the hardware of the host computer used for your instance. Each instance type offers different compute, memory, and storage capabilities and are grouped in instance families based on these capabilities. Select an instance type for the BPS vBlade based on the requirements of the application or software that you plan to run on your instance.
		Port Count	Specify the number of ports per vBlade (from one to eight virtual test ports). *Please note that an extra-port will be added for management purposes. The maximum number of IP Addresses per Network Interface depends on the Instance Type. Make sure to consult <u>http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/using-eni.html</u> in order to check the limits for the maximum number of network interfaces, IPv4/IPv6 addresses per Interface per Instance Type.

# **Configuring Test Interfaces on AWS**

BPS on Amazon Web Services requires additional test interfaces that will be used for sending test traffic into your network. These interfaces must be configured to connect to private subnets (not connected to the internet) with permissive security rules to allow many different (and unconventional) types of traffic to flow through your network. Each interface that you add should share a subnet with a single interface on your device. The minimum number of network interfaces that must be added is two.

Please ensure that there is network connectivity between the outbound BPS VE vBlade Test Interfaces and the interfaces of the Device Under Test.

An example configuration is shown below.



# **Running a Test on AWS**

In order to run a test, enter the Elastic IP of the vController instance into the URL field of your HTML browser.
	Connect	Actions *										
C Filter by ta	gs and attributes or se	earch by keyword										
Name		* Username		Instance ID v	Instance Type 👻	Availability Zone 👻	Instance State 👻	Status Checks	~	Alarm Status	P	ublic DNS (IPv4)
GUIRAUAR	SIDIAGEI			19000000000000000000000000000000000000	C4.4Alaiye	cu-contrair ra	- running	🐱 2/2 спеска разаеч			¢	
emitstXts	stController			i-0f2705698ecf81da6	t2.large	eu-central-1a	running	2/2 checks passed		None 🏷	e e	:2-52-57-77-33.eu-cen
geotstXts	stBlade1			i-06954e1ca6535d6aa	r4.4xlarge	eu-central-1a	running	2/2 checks passed		None 🍡	6	
ggircutst)	XtstBlade1			i-08c06f356f5a8200a	m4.16xlarge	eu-central-1c	stopped			None 🍾	6	
geotstXts	stController			i-0b6937d12c50e0398	t2.xlarge	eu-central-1a	running	2/2 checks passed		None 🍾	e e	2-35-158-144-154.eu-
ggircutst)	XtstController			i-0ea80eb36d045a71b	t2.xlarge	eu-central-1c	stopped			None 🏷	e e	:2-35-157-168-188.eu-
geotstXts	stBlade2			i-0f4e5498a898ca116	r4.4xlarge	eu-central-1a	running	2/2 checks passed		None 🏷	ő	
IcretuVP	CLaviniaBlade1			i-00405d84f3dab9573	i3.8xlarge	eu-central-1a	running	2/2 checks passed		None 🍾	6	
IcretuVP	CLaviniaController			i-087ee7252ddbd786c	t2.large	eu-central-1a	running	2/2 checks passed		None 🏷	a e	:2-35-156-219-225.eu
AndreiSa	ndreisvpcController			i-00b7e5ad449824ec2	t2.large	eu-central-1b	stopped			None 👌	- a e	:2-52-57-53-162.eu-ce
AndreiSa	ndreisvpcBlade1			i-0dd020d419977b759	r4.4xlarge	eu-central-1b	stopped			None 👌		
							• • • • • • • • • • • • • • • • • • • •			•	·	
nstance: i-0	)87ee7	(		Controller) Elastic	IP: 35.156.219.225							
Description	Status Checks	Monitoring	Т	ags								
	Instance ID	i-087ee7252ddb	d786	c				Public DNS (IPv4)	ec2-3	<u>35-156-219</u> -225.	eu-cer	tral-1.compute.amazo
	Instance state	running						IPv4 Public IP	35.1	56.219.225		
	Instance type	t2.large						IPv6 IPs	-			
Elastic IPs 35.156.219.225*					Private DNS ip-22-22-106-232.eu-central-1.compute.in			-1.compute.internal				
	Availability zone	eu-central-1a						Private IPs	22.22	2.128.10, 22.22.	106.23	2
	Security groups				view inbound rules			Secondary private IPs				
Scheduled events No scheduled events						VPC ID vpc-f3c8a29b						
	AMI ID	BPS-VE-8.30.0	0.3094	156.30 (ami-48ea4d27)				Subnet ID	subn	et-27380b4f		
	Platform	-						Network interfaces	eth0			

The BreakingPoint user interface will display. For detailed information regarding the user interface, please see the BreakingPoint User Guide.

When running in the AWS environment, the test IPs configured in the BreakingPoint Network Neighborhood should match the IPs assigned to the Test Interfaces on the vBlade instance for the corresponding test. This ensures proper network connectivity between BreakingPoint and any Device Under Test.

BreakingPoint will automatically detect any mismatch between the IPs configured in the Network Neighborhood and the IPs assigned to the test interfaces and indicate the status on the **Test Status** button. When the Test Status details window is opened, you will be given the option to automatically match the IP addresses by clicking the **Fix All** button.

CONTROL CENTER TEST				
Retwork Neighborhood	to Share	D COMPONENT SETTINGS		SUMMARY INFORMATION
BPS_sw_mtu_1500_8_port 🗹 =				emi_RR
Test Components 🔍 🖌 ADD NEW 🕂				Description:
Application Simulator				
Live AppSim	Cur			
Client Simulation	2,00 meg	us		
Session Sender	Result	Message	Fix Action	Total Unique Superflows
Routing Robot     (1)	Warning	The Period Between Samples ("1.0") is too small for th	he test given duratio	0
o RoutingRobot_1	o warning	IP '1.1.0.1' not available on interface 1.	* IP will be changed to '22.22.128.12' and the Ga.	Total Unique Strikes
Advanced Routing Robot	Total warning	Netmask /8 not available on interface 1.	Netmask will be changed to /17.	Tables
Bit Blaster	Cur warning	IP '1.2.0.1' not available on interface 2.	IP will be changed to '22.22.128.42' and the Ga.	131068
Security	0 warning	Count 65534 not available on interface 2.	🏠 Count will be changed to 30.	Total Subsata
Malware	warning	Netmask /8 not available on interface 2.	☆ Netmask will be changed to /17.	2
Recreate	Cur	Overall Bandwidth		Paguired MTU
Stack Scrambler	131, in ac pass	Interface 2 Bandwidth		576
	pass	Network Layout		
	Cur pass	Resource Allocation		Seed Override:
	1			Lock Test to This User
	seco	_		
	Fix All		Close	
Test Criteria				
No Custom Criteria Defined				
Device Under Test				
BreakingPoint Default				
Test Status Export Import Re	evert			Save Save As Save and Run

If the option to match IP addresses is ignored, a warning message will display when you attempt to run the test

CONTROL CENTER TEST	MANAGERS HELP			 10
Network Neighborhood	SHARED COMPONENT :	SETTINGS		SUMMARY INFORMATION
BPS_sw_mttq_1500_8_poit  PSS_sw_mttq_1500_8_poit  PSS_sw_mttq_1500_8_poit  Application  Seesion Sender  RoutingRobot_1  Advanced Routing Robot  Bitaste  Security  Makense  Recreate  Bitack Scremider	Maximum Flow Creation Rate Council Draws fee: Total Bandwidth Council 2,000 magabitify fac: Maximum Concurrent Flows Council Bross Council Cou	Crignal Crignal 2,000 megabit/dec Crignal 2,000 Megabit/dec Crignal Cr	Percent Charge 100 s Percent Charge 100 s Percent Charge 100 s t rest tematically fixed.	est Name: m_RR escription: Total Unique Superflows 0 Total Unique Strikes 0 Total Unique Strikes 0 Total Unique Strikes 0 Total Unique Strikes 2 Total Subnats 2 Regute MITU 576
Test Criteria No Custom Criteria Defined 2 Povice Under Test Enskinoform Default 2	The period between data samples Gurent 3 seconds	Original 1 seconds	Percent Change	Seed Override:
Test Status Export Import Rev	vert			Save Save As Save and Run

# Unassign/Assign a vBlade

**Note:** To ensure proper vBlade operation, Ixia recommends that vBlades are in the powered ON state before they are unassigned.

To assign or unassign a vBlade:

- 1. Click Manage Virtual Chassis.
- On the Assign Virtual Blades To Empty Slots tab. Select the plus (assign) or minus (unassign) icon that is displayed at the far right side of a slot's row (as shown in the image below).

\* Management IP = The management IP of the vBlade instance

	REMOVE VIRTUAL BLADES FR	M SELECTED SLOTS	ASSIGN VIRTUAL	BLADES TO EMPTY SLOTS			
	Slot Number	Machine I	Name	Management IP	No. of Test Interfaces	Hypervisor	
Create Virtual Blades 🔹	Slot 1	Unavailat	de	10.215.190.110	2	Unavailable	
	Slot 2	slat empt	y.				
Manage Virtual Chassis	Slot 3	slat empt	y.				
manage vir caar chasais v	Slot 4	slat empt	γ.				
	Slot 5	slot empt	Y.				
	Slot 6	slot empt	ý.				
	Slot 7	slot empt	Y				
	Slot 8	slot empt	y.				
	Slot 9	slot empt	Y				
	Slot 10	slot empt	Y.				
	Slot 11	slat empt	Y				
	Slot 12	slat empt	Y				

- Note: For BPS on AWS When manually deploying the vBlade instance, you can attach one more network interface to your instance during launch (in addition to the management interface). After you've launched your instance, you can attach more network interfaces using the EC2 console. Please make sure that after you attach more interfaces, you reboot the vBlade instance (using the EC2 console) in order for the changes to take effect.
- **Note:** Unassigning a vBlade will only break the connection between the controller and the vBlade. The vBlade will not be removed or powered off.

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# **CHAPTER 3** Nested Environment Installation

This sections provides a detailed description of the steps required and resolve problems that may occur when attempting to deploy a vBlade in a nested OpenStack environment.

- Log in into the Virtual Blade and check the "ixvmbps.log" in /etc/var/log. If the log has the following error: "This system does not support "SSSE3", then the following action needs to be performed:
  - a. Nested OpenStack Setup
    - i. Edit "/etc/nova/nova.conf"
    - ii. Add under "[libvirt]" cpu\_mode = host-model
    - iii. Restart Nova services
    - iv. Restart the vBlade
    - v. Add the vblade
  - b. KVM from UI
    - i. Select the specific vBlade
    - ii. Edit the vBlade settings
    - iii. Go to "Processor"
    - iv. Under "Configuration", set the "Model" to "Copy host CPU configuration"
  - c. KVM from CLI
    - i. virsh edit <vBlade\_name>
    - ii. Add the following:
    - <cpu mode='host-model'>
    - <model fallback='allow' />

</cpu>



- iii. Restart the vblade
- iv. Add the vblade
- 2. To solve problem 2, log in into the Compute and Controller Node:
  - a. Edit "/etc/nova/nova.conf"
  - b. Add under "[neutron] " allow\_duplicate\_networks = True
  - c. Restart the Controller and Compute Node

# **CHAPTER 4** Manage vBlades

This section describes the procedures for discovering, deleting and unassigning vBlades.

#### **Discover vBlades**

After successfully deploying the vBlades (NP-VM), you can view them in the **Manage Virtual Chassis** tab, which is also known as the Discovery window and BPS Virtual Chassis window.

IXIA WEB APPS		ADMINISTRATION   SESSIONS   RESULTS   MY PROFILE +   HELP +				
USERS SYSTEM SETTINGS VM DEPLOYMENT						
	C REMOVE VIRTUAL BLADES I	FROM SELECTED SLOTS				
	Slot Number	Machine Name	Management IP	No. of Test Interfaces	Hypervisor	
Create Virtual Blades	Slot 1	VirtualBlade01	111.11.11.49	8	10.205.27.47	
	Slot 2	VirtualBlade02	111.11.11.50	8	10.205.27.47	
	Slot 3	VirtualBlade03	111.11.11.48	8	10.205.27.47	
manage in taal enassis v	Slot 4	VirtualBlade201	111.11.11.58	2	10.205.27.71	
	Slot 5	VirtualBlade202	111.11.11.57	2	10.205.27.71	
	Slot 6	VirtualBlade203	111.11.11.56	2	10.205.27.71	
	Slot 7	slot empty				
	Slot 8	slot empty				
	Slot 9	slot empty				
	Slot 10	slot empty				
	Slot 11	slot empty				
	Slot 12	slot empty				

#### **Virtual Chassis Field Descriptions**

Field	Description
Slot Number	Indicates the slot number of the vBlades in a virtual chassis, which ranges from 1 to 12. A system controller can control a maximum of 12 vBlades.
Machine Name	The name of the virtual load module as shown in the image above.
Management IP	The IP of the virtual machine, through which you can manage the vBlades.
No. of Test Interfaces	The number of vPorts on the vBlades.
Hypervisor	The IP of the hypervisor where VMs are deployed.

#### vBlade Deletion and Assignment Rules

Note the differences between vBlades that are manually deployed and vBlades that are deployed automatically (using the BPS VE UI):

- Deletion will not be possible for vBlades that are assigned manually. The **Delete** check box on the **Manage Virtual Chassis** tab will not be visible for manually deployed vBlades.
- In the **Manage Virtual Chassis** table, the **Machine Name** and **Hypervisor** fields will indicate "unavailable" because the user is not required to provide this information when vBlades are manually deployed.

- All vBlades can be unassigned, irrespective of the way they were deployed.
  - Note that unassignment will only break the connection between the vController and the vBlade.
  - Unassigned vBlades can be assigned and then managed by other vController.

#### Unassign/Assign a vBlade

**Note:** To ensure proper vBlade operation, Ixia recommends that vBlades are in the powered ON state before they are unassigned.

To assign or unassign a vBlade:

- 1. Click Manage Virtual Chassis.
- 2. On the **Assign Virtual Blades To Empty Slots** tab. Select the plus (assign) or minus (unassign) icon that is displayed at the far right side of a slot's row (as shown in the image below).

\* Management IP = The management IP of the vBlade instance

	REMOVE VIRTUAL BLADES FR	OM SELECTED SLOTS	AL BLADES TO EMPTY SLOTS			
	Slot Number	Machine Name	Management IP	No. of Test Interfaces	Hypervisor	
Create Virtual Blades 🗼	Slot 1	Unavailable	10.215.190.110	2	Unavailable	E
	Slot 2	slot empty				
Manage Virtual Chassis	Slot 3	slat empty				
manage medal chasas	Slot 4	slot empty				
	Slot 5	slot empty				
	Slot 6	slot empty				
	Slot 7	slot empty				
	Slot 8	slot empty				
	Slot 9	slot empty				
	Slot 10	slot empty				
	Slot 11	slot empty				
	Slot 12	slot empty				

- Note: For BPS on AWS When manually deploying the vBlade instance, you can attach one more network interface to your instance during launch (in addition to the management interface). After you've launched your instance, you can attach more network interfaces using the EC2 console. Please make sure that after you attach more interfaces, you reboot the vBlade instance (using the EC2 console) in order for the changes to take effect.
- **Note:** Unassigning a vBlade will only break the connection between the controller and the vBlade. The vBlade will not be removed or powered off.

#### Delete a vBlade

To delete a vBlade, perform the following tasks:

- 1. Click Manage Virtual Chassis.
- 2. Click Remove Virtual Blades from Selected Slots.
- 3. Select the slots you want to delete vBlades from.
- 4. Click Apply.

# **CHAPTER 5** Licensing

The licensing utility helps in the license management of BreakingPoint System (BPS), by allowing the activation/deactivation of licenses.

By using Ixia's license management mechanism, you can do the following:

- Centralize and monitor your software usage.
- Maintain an accurate license inventory.
- Smoothly transfer licenses across different hosts and teams.

The Activation Code for the purchased Ixia product(s) is sent via email message, when you purchase a BreakingPoint Virtual Edition license. Enter this Activation Code in the **VM License LS+** window and activate the license.

The licensing operation is done with a simple wizard and can be run from one of the following options:

- The same VM Controller on which the software was installed; in case internet is available on the VM Controller
- Any other computer connected to internet, in case the internet is unavailable on the VM Controller. This option pertains to offline registration mode.

The computer (used for performing the licensing process) must be connected to the internet.

Before activating a license, you must have the following:

- The e-mail message from Ixia with the activation code. The key contents of this e-mail message are as follows:
  - Activation Code: A unique number for the license.
  - Quantity: The number of licenses.
  - Effective Date: The date from which the license can be activated.
  - Expiration Date: The date on which the licenses will expire.

# **Different Types of Licenses**

Ixia provides the following types of licenses for BreakingPoint Virtual Edition:

- Floating Licenses
  - (Subscription and Perpetual)

# **Floating Licenses**

This type of license is stored on a license server and allows a set number of workstations to use product software features. The workstations using this license must be connected to the license server and the server must be up and running. Additional users for the product features are denied once the set number of licenses is completely being used by the current users.

# **Licensing Utility**

The Licensing utility is a one-stop solution, which helps to activate, deactivate, sync and check the current licenses that are checked out. It is available on BreakingPoint vController at the following location:

```
BPS Session > Control Center > Administration > Licensing
```

**Note:** Using a web browser, connect to the BreakingPoint vController IP address and navigate to the above mentioned location.

The following figure displays the Licensing user interface.

License server:	localhost 🔻	Manage Servers	Host ID:	0287ce-28c	5 <b>f7-d929</b> 0b	0-9c00 Lic	ense statistic	<u>:s</u>	
Activate License:	BDE1-AFE2-30EF-5FF9	1	* *	Activate D	e-Activate	Sync Licenses	Offline Act	ivation	
Product	Description 🔺	Qua	ntity	Expiration Dat	e	Maintena	nce End Date		Activation Code
939-9600	BreakingPoint, Virtual Ec	lition (VE) F 49		2015-06-07 23	:59:59	2015.060	7		BDE1-AFE2-30EF-5F.
			Mana	ige License Serv	ers			×	
			Add	License Server:	Enter IP	or hostname	Add		
			Serv	ver List	н	ost ID			
		loca	localhost 0287ce-28c6f7-d92			290b-9c00	面		
			10.2	05.29.21	03	21189-8c9deb-74	290b-9c00	▤	
			_						-
							CI	ose	Class
							_		Close

The following table provides information about the fields and description:

Field/Section	Description
License server	Specify the license servers IP address or the hostnames. The default value is <b>localhost</b> . Localhost points to the computer where BreakingPoint is installed. Select a remote computer's hostname or IP address to view, activate, deactivate and sync licenses on it.
Manage Servers	Click to open the <b>Manage License Servers</b> dialog box, where you can add, view , and delete the license servers.
Host ID	A unique ID of the computer where the License Server is installed.
License statistics	Click this link to open a new window, which provides the details about the quantity of licenses available as illustrated in <u>License Statistics below</u> .
Activate	Click this button to activate a license. Specify the <b>Activation Code</b> and <b>Quantity</b> of licenses you want to activate. The quantity of licenses issued, effective date and expiration date are also mentioned in the email.
Deactivate	Click this button to deactivate the selected license. Specify the <b>Quantity</b> of licenses you want to deactivate.
Sync Licenses	If licenses are renewed in the back-end, click <b>Sync</b> in utility to reflect the changes.
Product	The part number of the license bundle.
Description	The description of the license bundle.
Quantity	The total quantity of licenses.
Expiration Date	The date on which the license expires for <b>Subscription</b> or <b>Evaluation</b> licenses or <b>Perpetual</b> for a permanent license.
Activation Code	The code that activates the license for BreakingPoint. Refer to the email to know the activation code to install and use the application.

### **License Statistics**

The **License Statistics** window provides the number of licenses that are available for use. The following figure illustrates the License Statistics:

Enter Filter Criteria> Cie eature Maintai Borrowable Available User Host IP Count Ta Borrowed Duration Hours Used Days I PS-VM-PERPETUAL No 100.00 PS-VM-SUBSCRIPTION No 5.00 Cie	Licenses											
eature         Maintai         Borrowable         Available         User         Host         IP         Count Ta         Borrowed         Duration         Hours Used         Days I           PS-VM-PERPETUAL         No         100.00         Image: Count Ta         Borrowed         Image: Count Ta         Borrowed         Duration         Hours Used         Days I           PS-VM-PERPETUAL         No         100.00         Image: Count Ta         Borrowed         Image: Count Ta         Image: Count Ta         Borrowed         Image: Count Ta         Borrowed         Image: Count Ta         Borrowed         Image: Count Ta         Image	<enter criteria="" filter=""></enter>											
PS-VM-PERPETUAL         No         100.00           PS-VM-PERPETUAL         No         100.00           PS-VM-SUBSCRIPTION         No         5.00	eature	Maintai	Borrowable	Available	User	Host	IP	Count Ta	Borrowed	Duration	Hours Used	Days Left
PS-VM-PERPETUAL No 100.00 PS-VM-SUBSCRIPTION No 5.00	PS-VM-PERPETUAL		No	100.00								
PS-VM-SUBSCRIPTION No 5.00	PS-VM-PERPETUAL		No	100.00								
	PS-VM-SUBSCRIPTION	l i	No	5.00								
												_
												Close

The following table	provides	information	about the	fields and	description	in VM	Licenses	window:
---------------------	----------	-------------	-----------	------------	-------------	-------	----------	---------

Field/Section	Description
Feature	The type of the floating license feature.
Maintenance Until	The last date for which software updates are available. Software published before or on this date is licensed.
Borrowable	If the license can be borrowed.
Available	Shows the number of licenses that are available for use.
User	The name of the users who have the currently activated licenses.
Host	The host name of the computer which has the currently activated license in the license server.
IP	The IP address of the computer which has the currently activated license in the license server.

Field/Section	Description
Count Taken	The number of licenses which the user have checked out from the license server.
Borrowed	Shows if the license is borrowed. Borrowed licenses are activated for a specific time period.
Duration	It indicates the duration of time of the activated borrowed license.
Hours Used	Shows the number of hours for which the license has been already used.
Days Left To Expire	The number of days left before the expiry of the license.
Clear	Click to clear the text entered in the filter text box. Once cleared, the tool tip <b><enter criteria="" filter=""></enter></b> appears in the filter text box.
Close	Click this button to close the VM Licenses window.

# **Activating Licenses**

# **Before Starting Activation**

Ensure the following information is available before starting the license activation process:

Activation code for the license: An email is sent with the Activation Code when you purchase Ixia software. Enter the Activation Code in the **VM License LS+** window to activate the license.

An example e-mail message with the Activation code underlined is shown here:

```
Dear Ixia QA representative,
Thank you for your recent Ixia software purchase. This document contains
important information for activating your software products. Please retain this
information for future reference.
Organization: Ixia QA
Ixia Sales Order#: IxiaQA-RESOHB7X
This document provides the right to activate the following product(s) under
Entitlement IxiaQA-RESOHB7X:
```

Product	939-9600, BreakingPoint, Virtual Edition (VE) FLOATING Subscription License
Quantity	100
Activation Code	AA3B-C6CF-3780-3044
Effective Date	2015-01-27
Maintenance Expiration Date	2015-02-26

```
As a registered customer, you can access software, release notes, and
installation instructions from the Ixia website:
<a href="http://www.ixiacom.com/support/downloads">http://www.ixiacom.com/support/downloads</a> and updates/index.php
If you do not currently have a username and password for the Ixia website, you
can request one: <a href="http://www.ixiacom.com/support/pwrequest.php">http://www.ixiacom.com/support/pwrequest.php</a>
Ixia Technical Support is available to licensed customers who have active
software maintenance for their applicable software products. To obtain technical
support, go to the support section of Ixia web site:
<a href="http://www.ixiacom.com/support">http://www.ixiacom.com/support</a>
Alternatively, you can contact Ixia Technical Support directly:
<a href="support@ixiacom.com">support@ixiacom.com</a>
Domestic: (877) FOR-IXIA
International: +1-818-871-1800 (press 1)
Sincerely,
Ixia Order Fulfillment
```

# **Activate License**

Ensure that vController is connected to internet and that the necessary information discussed previously in Before Starting Activation on the previous page is available.

To activate a license, perform the following tasks:

- 1. Connect to the management IP of vController using a web browser.
- 2. Go to BPS Session > Control Center > Administration > Licensing.

The VM Licenses window opens.

- 3. In the License server box, select the license server IP or Localhost.
  - **Note:** If you want to add a new license server, click the **Manage Servers** button and provide server details in the **Manage License Servers** dialog box.

License server:	local	host	Ŧ	Manage Se	rvers H	lost ID:	0287ce-2	28c6f7-d929	0b-9c00 <u>Li</u>	cense statisti	<u>CS</u>	
Activate License:	BDE:	1-AFE2-30EF-5FF9		1		* *	Activate	De-Activate	Sync Licenses	Offline Ac	tivation	
Product		Description 🔺			Quanti	ty	Expiration	Date	Mainten	ance End Date	3	Activation Code
939-9600		BreakingPoint, Virtu	al Edi	ition (VE) F	49		2015-06-0	7 23:59:59	2015.06	)7		BDE1-AFE2-30EF-5F
						Mana	ge License §	ervers			×	
						Add L	icense Ser	ver: Enter i	IP or hostname	Add		
						Serv	er List		Host ID			
						local	host		0287ce-28c6f7-d9	290b-9c00	đ	
						10.2	05.29.21		021189-8c9deb-7	4290b-9c00	đ	
											lose	Close

4. In the **Activate License** text box, enter the Activation Code and the license quantity as depicted in the following image.

Activate License:     BDE1-AFE2-30EF-5FF9     1     Activate     De-Activate     Sync Licenses     Offline Activation       Product     Description A     Quantity     Expiration Date     Maintenance End Date     Activ	License server:	localhost 💌 Manage Se	Host ID:	0287ce-28c6f7-d9290b-9c00	License statistics		
Product         Description           Quantity         Expiration Date         Maintenance End Date         Activ	Activate License: BDE1-AFE2-30EF-5FF9 1 Activate De-Activate Sync Licenses Offline Activation						
	Product	Description 🔺	Quantity	Expiration Date	Maintenance End Date	Activ	
939-9600 BreakingPoint, Virtual Edition (VE) F 49 2015-06-07 23:59:59 2015.0607 BDE1	939-9600	BreakingPoint, Virtual Edition (VE) F	49	2015-06-07 23:59:59	2015.0607	BDE1	

5. Click **Activate**. The activated license is now available in the **VM Licenses** window.

License server:	localhost 💌 Man	age Servers Host ID:	0287ce-28c6f7-d9290b-9c0	0 License statistics	
Activate License:	enter 1 activation code	×	Activate De Activate Syn	CLICENSES Offline Activation	
Product	Description 🔺	Quantity	Expiration Date	Maintenance End Date	Activation Code
939-9600	BreakingPoint, Virtual Edition (VI	E) F 50	2015-06-07 23:59:59	2015.0607	BDE1-AFE2-30EF-5F

# **10G Subscription and Perpetual Licenses**

This section of the installation guide describes BPS VE licensing that allows a single user to run tests with a TPUT (throughput) between 1Gbps to 10Gbps (maximum).

One unit of this license will allow a single user to execute a test consisting of the following:

- 10Gbps TPUT or 20,000,000 (20 million) CC
- Up to 2 security components

During license checkout, the four license types will be checked out in sequence shown based on the algorithm described in detail below.

- 10G-Subs (Subscription)
- 10G-Perp (Perpetual)
- 1G- Subs
- 1G-Perp

**Note:** Subscription license types get higher preference than perpetual license types.

### **License Checkout Algorithm**

For each of the license types, based on the sequential order (that is, 10G-Subs, 10G-Perp, 1G-Subs, 1G-Perp), BPS VE will check with each license server for availability of license count.

- 1. License count is decided by the expression **Floor** (Remaining-license-count / (Multiplicative-factor for the test component considered).
- License type of immediate preceding value (10G-\*) in the sequence mentioned will be considered if a lower valued license type (1G-\*) is not available. In that case, license count is 1. The surplus lower valued licenses will be released.

### **License Checkout Examples**

#### Case 1

For this example, consider a premises that has 2 license servers. The different types of BPS VE licenses counts are shown in the following table:

License Servers	10G-Subs	10G-Perp	1G-Subs	1G-Perp
LicSvr1	2	1	12	2
LicSvr2	10	0	0	0

A user needs to run a 41Gbps TPUT test. The License Checkout sequence will be as described below:

Test Type - non security TPUT. Multiplicative factors are 10 and 1 respectively for 10G-\* and 1G-\*.

License Checked out	Remaining License Count	License Requested	License Granted	Remaining
2 x 10G-Subs from LicSvr1.	41	Floor(41/10) = 4	2	41 - (2 * 10) = 21
2 x 10G-Subs from LicSvr2.	21	Floor(21/10) = 2	2	21 - (2 * 10) = 1
1 x 1G-Subs from LicSvr1.	1	Floor(1/1) = 1	1	1 - (1 * 1) = 0

### Case 2

For this example, consider the license count available in the servers is as shown below:

License Servers	10G-Subs	10G-Perp	1G-Subs	1G-Perp
LieSvr1	1	0	0	0
LicSvr2	10	0	0	0

A user needs to run a test with 5 security components. Multiplicative factors are 2 and 1 respectively.

License Checked out	Remaining License Count	License Requested	License Granted	Remaining			
1 x 10G-Subs from LicSvr1.	5	Floor(5/2) = 2	1	5 - (1 * 2) = 3			
1 x 10G-Subs from LicSvr2.	3	Floor(3/2) = 1	1	3 - (1 * 2) = 1			
With 1 pending unit and no 1G-* license available, the algorithm will now look for the license type of the immediately preceding value (10G-*).							
1 x 10G-Subs from LicSvr2.	1	1	1	NA			

## Case 3

For this example, consider the license count available in the servers is as shown below:

License Servers	10G-Subs	10G-Perp	1G-Subs	1G-Perp
-----------------	----------	----------	---------	---------

LicSvr1	2	0	1	0
LicSvr2	0	0	1	3

The user needs to run a test with TPUT of 17Gbps.

License Checked out	Remaining License Count	License Requested	License Granted	Remaining			
1 x 10G-Subs from LicSvr1.	17	Floor(17/10) = 1	1	17 - (1*10) = 7			
1 x 1G-Subs from LicSvr1.	7	Floor(7/1) = 7	1	7 - (1 * 1) = 6			
1 x 1G-Subs from LicSvr2.	6	Floor(6/1) = 6	1	6 - (1 * 1) = 5			
3 x 1G-Perp from LicSvr2	5	Floor(5/1) = 5	1	5 - (3 * 1) = 2			
With 2 pending unit and no 1G-* license available, the algorithm will now look for the license type of the immediately preceding value (10G-*).							
1 x 10G-Subs from LicSvr2.	2	1	1	Surplus = $10 - 2 = 8$			
Release lower valued licenses up to surplus number.							
Release 2x1G-Subs							
Release 3x1G-Subs							

# **De-Activating Licenses**

# Introduction

A license, once activated, is said to be assigned to the license server specified during activation process. It may only be served to various applications on various workstations from this license server.

A license can be deactivated, including all of its features, at any time.

Before starting the deactivation process, ensure that the following information is available:

- 1. Activation Code for the license to be deactivated.
- 2. **Workstation name**: This is the name of the vController that currently uses the licensed software.

3. License Server Hostname/IP: The license server where the licenses are currently being registered to.

An example of the Ixia activation e-mail message, with the activation number is provided in <u>Before</u> <u>Starting Activation on page 78</u>.

# **License Deactivation**

To deactivate a license, perform the following tasks:

- 1. Connect to the management IP of the vController using a web browser.
- Go to BPS Session > Control Center > Administration > Licensing. The VM Licenses window opens.
- 3. In the **License server** box, select the license server IP or Localhost.
  - **Note:** If you want to add a new license server, click the **Manage Servers** button and provide server details in the **Manage License Servers** dialog box.

License server:	localhost	Manage Se	ervers H	lost ID: 0287ce-28c6f7-d9	290b-9c00 License statis	tics	
Activate License:	BDE1-AFE2-30EF-5FF9	1		Activate De-Activ	ate Sync Licenses Offline A	ctivation	
Product	Description 🔺		Quanti	ty Expiration Date	Maintenance End Da	te	Activation Code
939-9600	BreakingPoint, Virtual	Edition (VE) F	49	2015-06-07 23:59:59	2015.0607		BDE1-AFE2-30EF-5F
				Manage License Servers		×	
				Add License Server: Ente	er IP or hostname		
				Server List	Host ID		
				localhost	0287ce-28c6f7-d9290b-9c00	đ	
				10.205.29.21	021189-8c9deb-74290b-9c00	đ	
					_	_	
						Close	Close

4. In the **Activate License** text box, enter the Activation Code and the license quantity that you want to deactivate as depicted in the following image.

License server:	localhost 💌 Manage	Servers Host ID:	0287ce-28c6f7-d9290b-9c0	0 License statistics	
Activate License:	BDE1-AFE2-30EF-5FF9 1	•	Activate De-Activate Sync	Licenses Offline Activation	
Product	Description 🔺	Quantity	Expiration Date	Maintenance End Date	Activation Code
939-9600	BreakingPoint, Virtual Edition (VE) F	50	2015-06-07 23:59:59	2015.0607	BDE1-AFE2-30EF-5F

5. Click **Deactivate**. The activated license is now removed from the corresponding license server window.

License server:	ocalhost 💌 Manage Se	ervers Host ID:	0287ce-28c6f7-d9290b-9c0	0 License statistics	
Activate License:	enter 1 activation code	<b>^</b>	Activate De-Activate Syn	C Licenses Offline Activation	
Product	Description 🔺	Quantity	Expiration Date	Maintenance End Date	Activation Code
939-9600	BreakingPoint, Virtual Edition (VE) F	49	2015-06-07 23:59:59	2015.0607	BDE1-AFE2-30EF-5F

# **Overview of Offline Activation/Deactivation**

Offline activation/deactivation of licenses is required when the BreakingPoint Virtual Edition is deployed in a network that cannot access the internet. As a solution, you can generate the license file from a computer with internet and then transfer the file to the vController running as license server. The license file when imported, activates/deactivates the license.

For both activation and deactivation, it is required to generate the license file from the Fulfillment Router (FR) page.

# **Offline Activation**

Ensure network connectivity and that the necessary information discussed in <u>Before Starting</u> <u>Activation on page 78</u> is available. The steps for offline activation process are as follows:

- Step 1: Generate the license file from a computer with internet connection below
- Step 2: Import the License File on page 87

#### Step 1: Generate the license file from a computer with internet connection

To generate the license file, perform the following tasks:

1. Go to Fulfillment Router (FR) page at: https://fulfillment-prod.ixiacom.com/activation



#### **Activate Licenses**

Instructions:

- 1. Enter the Host ID.
- 2. Enter the Activation Code, Quantity. One per line.
- 3. Click the Activate button.

If you are unable to activate your licenses, please contact Ixia Support at: support@ixiacom.com

Host ID

Host ID

Activation Codes and License Quantities

```
Example:
A79E-D768-4D1F-0BEA,30
D768-4D1F-0BEA-A748,23
```

Note: The quantity represents the final license quantity for the Activation Code entered.

#### Activate

- In the Host ID text box, enter the Host ID of the vController where the licenses are going to be installed.
  - a. Using a web browser, connect to the BreakingPoint vController IP address.
  - b. Click BPS Session > Control Center > Administration > Licensing. The VM Licenses window opens.
  - c. Select the required License Server.
  - d. Get the Host ID from Host ID field.
- 3. In the **Activation Codes and License Quantities** text box, enter the activation codes as specified in the e-mail and quantity of licenses you want to activate.
  - Here, the **Quantity** represents the final license quantity that you want to activate. For example, if an **Activation Code** with six quantities is already registered in the license server, and when you specify the **Activation Codes and License Quantities** as seven for the same **Activation Code**, then it means the effective quantity is seven and not 13.

 You can perform offline activation for multiple activation codes at once. The syntax is: <ActCode1>, <FinalQty1><NEWLINE>
 <ActCode2>, <FinalQty2><NEWLINE>

#### 4. Click Activate.

The system generates the license file in .bin format, prompting you to open or save it.

5. Save the license file in the required location and transfer it to the vController where the licenses are going to be installed.

#### Step 2: Import the License File

To import the license file, perform the following tasks:

- 1. Connect to the management IP of the vController.
- Go to BPS Session > Control Center > Administration > Licensing. The VM Licenses window opens.
- 3. In the **License server** box, select the license server IP or Localhost.
  - **Note:** If you want to add a new license server, click the **Manage Servers** button and provide server details in the **Manage License Servers** dialog box.



#### 4. Click Offline Activation.

Offline Operation ×	
Importing a license file.	
Instructions: 1. Get 'Activation Code' and 'License Quantity' from sales rep or Order email. 2. On a remote PC that is connected to the internet, enter the URL of one of the pages: -> <u>Offline Activation</u>	
<ul> <li>-&gt; <u>Offline Deactivation</u></li> <li>3. Enter the HostID, Activation Code and quantity into the appropriate fields, on the webe page. The provided quantity marks the desired number of total active licenses.</li> <li>4. Click the 'Accept' button to download the license file onto the remote PC.</li> <li>5. Transfer the license file from the remote PC to this PC. You can use ftp, or use removable media.</li> <li>6. Click the 'Import License' button to select the license file.</li> </ul>	
7. Import the license.	
Last Confirmation Code: Import	
Finish Cancel	

5. In the **Offline Operation** dialog box, Click **Import**.

The BreakingPoint Systems window appears asking you to Upload License File.

<b>Breaking</b>	Upload License File
Find it before they do.™	Remote URL: File: Choose File No file chosen
	Upload

6. Click **Choose File** and open the license file intended for import.

7. Click **Upload** to complete the import.

On successful upload, the following message appears.



8. In the **Offline Operation** dialog box, click **Finish** to complete the activation process. The license is now available for use on the relevant license server.

### **Offline Deactivation**

Before starting the deactivation process, ensure that the following information is available:

- Host ID of the computer
- Activation Code for the license to be deactivated

The steps for offline deactivation process are as follows:

- Step 1: Generate License File below
- Step 2: Import License File on page 92
- Step 3: Submit Confirmation Code on page 95

#### Step 1: Generate License File

To generate the license file, perform the following tasks:

1. Go to the Fulfillment Router (FR) page at: https://fulfillment-prod.ixiacom.com/deactivation.



#### **Deactivate Licenses**

Instructions:

- Step 1. Enter your Host ID and click the Submit button.
- Step 2. Select the Activation Code and enter the New License Count. Click the Submit button to generate the license file.
- Step 3. Click on the Get Deactivation License button to obtain your new license file.
- Step 4. After installing the new license file, enter the Confirmation Code provided. Click on the Commit button to continue.

Note: The Confirmation Code must be entered withing one hour after the license file is generated. If the confirmation code is not supplied, the deactivation process is automatically canceled.

If you are unable to deactivate your licenses, please contact Ixia Support at: support@ixiacom.com or call +1 818 595 2599

Host ID

Host ID

Submit

2. In the **Host ID** text box, enter the Host ID of the vController where the licenses are going to be installed.

3. Click Submit.

The system lists all the licenses activated for the specified host.



#### **Deactivate Licenses**

Instructions:

- 1. Enter your Host ID; select Submit
- 2. Select the Product/Activation Code to adjust the license count. Enter the license quantity (New License Count); select Submit to generate the license file
- 3. Enter the Confirmation Code provided by the product after installing the new license file, the Confirmation Code is only valid for 1 hour; select Commit

If you are unable to deactivate your licenses, please contact Ixia Support - Email support@ixiacom.com or call +1 818 595 2599

Host ID						
AA	A-AAA-AAA-AAA		Submit			
	Product(s) Licensed	Activation Code(s)	Status	Qty Assigned	New License Count	
0						Submit
Cor	firmation Code					
Co	nfirmation Code	Commit				

- 4. Specify a new value in the **New License Count** list for the selected license. The system updates the license quantity to this new value. Selecting zero, completely deactivates the license.
  - **Note:** At a time, you can perform deactivation for a single activation code only.
- 5. Click Submit.
- 6. Click **Get Deactivation License** to generate the license file.

ixia	
Deactivate Licenses	
Instructions:	

- Step 1. Enter your Host ID and click the Submit button.
- Step 2. Select the Activation Code and enter the New License Count. Click the Submit button to generate the license file.
- Step 3. Click on the Get Deactivation License button to obtain your new license file.
- Step 4. After installing the new license file, enter the Confirmation Code provided. Click on the Commit button to continue.

Note: The Confirmation Code must be entered withing one hour after the license file is generated. If the confirmation code is not supplied, the deactivation process is automatically canceled.

#### If you are unable to deactivate your licenses, please contact Ixia Support at: support@ixiacom.com or call +1 818 595 2599

Host ID		
01bcbc-9b2a78-14563f-c412		Submit
Get Deactivation License	Abort	
Confirmation Code		
1		Commit

7. Save the license file in the required location and transfer it to the vController where the licenses are going to be installed.

At this point, you must enter the **Confirmation Code**, and then click **Commit** to complete the deactivation. **Confirmation Code** is available after importing the license file as explained in <u>Step 2:</u> <u>Import License File on the facing page</u>. The validity of the confirmation code is 48 hours and you have to submit the confirmation code within the time frame to complete the deactivation process.

After generating the license file, FR maintains the state of Host ID for 48 hours. It means, during this period, server cannot perform additional activation/deactivation in the FR for that Host ID, until you either submit the confirmation code or abort the deactivation process.

You can perform the following actions in **Deactivate Licenses** window:

- **Abort** Cancel the offline deactivation process. The licensed quantities are retained as before.
- **Get Deactivation License** Generate the deactivation license file that must be imported to the computer installed with BreakingPoint. In case the file is lost, click again to regenerate the license file.
- **Commit** Submit the confirmation code. Until the confirmation code is committed, the deactivation process in not complete.

#### Step 2: Import License File

- 1. Connect to the management IP of the vController using a web browser.
- In the computer installed with BreakingPoint, click BPS Session > Control Center > Administration > Licensing

The VM Licenses window opens.

- 3. In the **License server** box, select the license server IP or Localhost.
  - **Note:** If you want to add a new license server, click the **Manage Servers** button and provide server details in the **Manage License Servers** dialog box.

icense server:	localhost	Ψ.	Manage Se	rvers	lost ID:	0287ce-28c6	7-d9290b-	9c00 <u>Li</u>	cense statistic	<u>cs</u>	
Activate License:	BDE1-AFE2-30EF-5	FF9	1		* *	Activate De	Activate	Sync Licenses	Offline Act	tivation	
Product	Description 🔺			Quanti	ty	Expiration Date		Maintena	ance End Date		Activation Code
939-9600	BreakingPoint, \	Virtual Edit	ion (VE) F	49		2015-06-07 23:	59:59	2015.060	07		BDE1-AFE2-30EF-5F
					Mana	ige License Serve	s			×	
					Add I	License Server:	Enter IP o	or hostname	Add		
					Serv	er List	Ho	st ID			
					loca	lhost	02	87ce-28c6f7-d9	290b-9c00	đ	
					10.2	05.29.21	02:	1189-8c9deb-7	4290b-9c00	Ē	
									_	_	
									CI	ose	Close

4. Click **Offline Activation**. The **Offline Operation** dialog box opens.

Offline Operation ×
Importing a license file.
Instructions: 1. Get 'Activation Code' and 'License Quantity' from sales rep or Order email. 2. On a remote PC that is connected to the internet, enter the URL of one of the pages: -> <u>Offline Activation</u> -> <u>Offline Deactivation</u> 3. Enter the HostID, Activation Code and quantity into the appropriate fields, on the webe page. The provided quantity marks the desired number of total active licenses. 4. Click the 'Access' buttee to download the license file costs the remate PC
<ol> <li>Click the Accept button to download the license file onto the remote PC.</li> <li>Transfer the license file from the remote PC to this PC. You can use ftp, or use removable media.</li> </ol>
6. Click the 'Import License' button to select the license file. 7. Import the license
Last Confirmation Code: Import
Finish Cancel

5. Click Import.

The BreakingPoint Systems window appears asking you to Upload License File.

<b>Breaking</b>	Upload License File
Find it before they do.™	Remote URL: File: Choose File No file chosen
	Upload

6. Click **Choose File** and open the license file intended for import.

7. Click Upload to complete the import.

On successful upload, the following message appears.



8. In the Offline Operation dialog box, Click Finish.

The system generates the **Confirmation Code** as depicted in the following image. You have to submit this code in the deactivation window. Make a note of this code.

Offline Operation		×
Importing a license file.		
Instructions: 1. Get 'Activation Code' a 2. On a remote PC that is pages: -> <u>Offline Activation</u> -> <u>Offline Deactivation</u> 3. Enter the HostID, Activ webe page. The provider 4. Click the 'Accept' butt 5. Transfer the license fill removable media. 6. Click the 'Import Licer 7. Import the license.	and 'License Quantity' f s connected to the inte vation Code and quant d quantity marks the de on to download the lic e from the remote PC t nse' button to select th	from sales rep or Order email. ernet, enter the URL of one of the tity into the appropriate fields, on the esired number of total active licenses. ense file onto the remote PC. to this PC. You can use ftp, or use e license file.
Last Confirmation Code:	E6DC8B9C	Import

Note: In case you lose the Confirmation Code, click the Offline Activation button again. The Offline Operation dialog box displays the Last Confirmation Code for the Last Imported File.

#### **Step 3: Submit Confirmation Code**

- 1. Go to step 6 in Step 1: Generate License File on page 89.
- 2. Enter the **Confirmation Code**.
- 3. Click **Commit**.

The license is now deactivated.

# **CHAPTER 6** Troubleshooting

This chapter provides recommended solutions for issues you may encounter while deploying or using BreakingPoint Virtual Edition.

# **Unable to Track Modified IPs**

After the deployment of the System Controller and Virtual Blades, the IP addresses for these components are stored in the vController and displayed at the console. These IP addresses allow the components to recognize each other and populate slot information in the **Manage Virtual Chassis** and **Device Status** areas of the user interface.

If the IP addresses of the vBlades change for any reason (for example, due to new IP addresses being issued from DHCP) the vController will not be aware of the new IP addresses. This will result in the BPS Chassis View indicating that ports are not available.

#### Solution

Perform the following tasks to resolve the problem:

- 1. Go to **VM Deployment** > **Manage Virtual Chassis**. Delete one of the slots. This task empties the slot in the Manage Controller.
- 2. Delete the virtual machine from vSphere. This Virtual Machine (VM) should not be used for any other purpose.
- Install the Virtual Blades again from the VM Deployment. New IP addresses for the Virtual Machine (VM) are added in the Manage Virtual Chassis and Device Status areas of the user interface.

# **Virtual Blades Not Available**

In a scenario where the IP address of the System Controller has changed, the vBlades will not be available in the **Manage Virtual Chassis** area of the user interface. Note that NIC1 of the vController (Refer to <u>Network Topology Diagram</u>) is used for System Controller and vBlade communications.

#### Solution

Perform the following tasks to resolve this problem:

- 1. Go to Manage Virtual Chassis and delete all Virtual Blades from the vSphere.
- 2. Deploy VM again so that new entries are created in the vController and recognized in **Manage Virtual Chassis** and **Device Status**.

# **Cannot Connect to a Hypervisor from the BPS VE User Interface**

In a scenario where you cannot connect to a Hypervisor from the BreakingPoint Virtual Edition user interface, try making the following modifications on the Hypervisor to resolve the issue.

#### Solution

- 1. sudo vi /etc/ssh/sshd\_config
- 2. Modifiy line "PermitRootLogin without-password" with "PermitRootLogin yes"
- 3. sudo service ssh restart

# Permission Denied/Temp Error Occurs at Power Up

While trying to deploy vBlades from the BreakingPoint Virtual Edition UI, you may receive the following error, "permission denied /temp".

#### Solution

Make the following modifications on the Hypervisor to resolve the issue.

- UBUNTU Setup
- Add " /tmp/\* rw," in the file /etc/apparmor.d/abstractions/libvirt-qemu to grant write permission on /tmp
- 2. Restart AppArmor: #/etc/init.d/apparmor restart
- CENTOS Setup

SELinux needs to be disabled on the host machine.

- 1. Set SELINUX=permissive in file /etc/sysconfig/selinux and Save
- 2. Reboot the system

# **BP VE User Interface Not Performing as Expected**

The user interface has become unresponsive or is not performing as expected.

#### Solution

Make the following operating system modifications at the host.

- 1. Export PATH variable export PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/bin
- 2. Execute command: apt-get update
- 3. Add following entries to /etc/sysctl.conf: net.bridge.-nf-call-ip6tables = 0 net.bridge.-nf-call-iptables = 0 net.bridge.-nf-call-arptables = 0 net.bridge.-nf-filter-vlan-tagged = 0

- 4. Execute command: sysctl -p
- 5. Recreate bridges
- 6. Set txqueuelen for vnet1 & vnet2 to 12000
- 7. Select Model as "Nehalem" under processor configuration section and click "Copy Host CPU Configuration"
- 8. Delete unwanted devices
- 9. Before running the test ensure that: vhost\_net module loaded using command: lsmod | grep vhost
- 10. Turn off the firewall using the command: ufw disable

# Permission Denied Error Occurs While Trying to Deploy vController

A "permission denied" error may be observed in the console or Virtual Machine Manager at the host while trying to deploy the vController.

#### Solution

- Enable root access for QEMU guests:
  - Edit file /etc/libvirt/qemu.conf and uncomment Line (1)User = "root" and (2)group = "root"
- Restart libvirt daemon:
  - #/etc/init.d/libvirt-bin restart
  - #/etc/init.d/libvirtd restart

# **Restart Connection Interruption During KVM vBlade Deployment**

Please be aware that during vBlade deployment from the BPS user interface in the KVM setup, a restart connection interruption may occur in the Virtual Machine Manager on the host machine due to the Libvirt service.

# **vBlade Memory Errors**

When the system has 64MB or less of free memory, a vBlade will generate low memory error messages in 120 second intervals.

#### Solution

In a scenario where the system becomes unstable due to low memory, try the following steps to resolve the issue. For best results, perform these steps in order.

- 1. Reduce "Maximum Simultaneous Super Flows".
- 2. If running a multicomponent test, reduce the number of components.

- 3. Reduce the number of vBlade NICs that are used.
- 4. Reduce the number of IP addresses if "Per-host Stats" is enabled.

# vController Memory Errors

When the system has 64MB or less of free memory, a System Controller will generate low memory error messages in 120 second intervals.

**Note:** There should be a balance between the System Controller and the number of supported vBlades based on the resources provided to the System Controller.

# **CHAPTER 7** Upgrade the BPS VE Software

In order to upgrade BreakingPoint VE software, you must download the appropriate update file from either of the following sites (which will require a password for access):

https://strikecenter.ixiacom.com/bps/osupdates

http://www.ixiacom.com/downloads-updates (select BreakingPoint Virtual Edition)

You will also need to obtain the applicable release notes from the website. The release notes describe new features, resolved issues and known issues that may affect the BPS VE installation, upgrade and operation.

**Note:** You must have BreakingPoint VE controller version 3.4.2 or higher to perform this upgrade.

#### To upgrade BPS VE:

- 1. Download the BreakingPoint Virtual Edition VM update file.
- 2. Log in to the Ixia BreakingPoint VE System.
- 3. Navigate to **ADMINISTRATION -> SYSTEM SETTINGS -> UPDATES**.
- 4. Select **UPDATE SYSTEM** and then see the image below.
  - a. After you have created a backup of your vController, select the, **I already created a backup**, option.
  - b. Browse to the location of the BreakingPoint VE update file and select **OK** to start the update.

UPD.	Please your v proces	TEM make sure Controller	e you created before startin	a backup of Ig the update
۲	l alread	ly created a	a backup	
	SLOT	VERSION	PROD BUILD	STRIKE BUILD
	0	3.4.2	236924	236208
۲	Local File			
0				
0	Server	Location		v

- 5. The BreakingPoint VE update will take 15-20 minutes to complete.
- 6. To verify that the update has been installed, see the version information in the Installed Applications section of the **UPDATES** tab.
Note: After upgrading the BPS VE vController from 8.01 (or earlier releases) to release 8.10, the vController will continue to display 2 interfaces. To operate using a Single Interface
 vController, access the Virtual Machine Properties and delete the 2nd interface (Network adapter2) as shown in the image below. Do not delete the 1st interface.



# **APPENDIX A** Open Port Requirements for BPS VE

The following ports may need to be included in the security exception list to allow the respective BPS interfaces to pass through firewalls.

#### Interface between client UI browser (or TCL) and vController (System Controller):

- 80
- 443
- 843
- 1099
- 8880
- 8881

#### Interface between vController (System Controller) and vBlade (Network processor)

- 8887
- 8889 8939
- 8943 8945

#### Interface between vController (System Controller) and an external License Server

- 4502
- 27002
- 47392

This page intentionally left blank.

## **APPENDIX B** Console Commands

This sections provides and overview of the commands that can be from the console of the vController Virtual Machine (VM). For a complete list of console commands, run the **help** command as described below.

You can access the console from your VMware or KVM user interface or SSH.

The following login is required:

user: netadmin

password: netadmin

#### **Welcome Screen**

After logging in, a Welcome screen similar to the one shown below will display.

netadmin@10.21 Last login: Mo	<pre>~&gt; ssh netadmin@10.216.110.231 16.110.231's password: on Sep 7 19:06:18 2015 from</pre>	101000100
+   eth0   ctrl0   Machine   Kernel   System	: 10.216.110.231 : 10.216.110.73 : x86_64 : 2.6.32-504.1.3.el6.x86_64 : CentOS release 6.6 (Final)	-+   ,   ,
netadmin:~\$ netadmin:~\$ netadmin:~\$		

### help

Enter "?" or **help** at the console to see a list of all console commands as shown in the image below.

netadm	in:~Ş				
netadm	in:~\$ ?				
clear	help	lpath	lsudo	restartservice	showdate
exit	history	ls	pwd	setip	showip
netadm	in:~\$				
netadm	in:~\$ hel	р			
clear	help	lpath	lsudo	restartservice	showdate
exit	history	ls	pwd	setip	showip
netadm	in:~\$				
netadm	in:~\$				

For help with the parameters of a specific command, enter the command followed by "-h". For example, **restartservice -h**.

#### restartservice

See the example below.

```
netadmin:~$
netadmin:~$
restartservice -h
usage: restartservice [-h] -s SERVICE
Restarts the service specified.
optional arguments:
   -h, --help show this help message and exit
   -s SERVICE Service, e.g. network
netadmin:~$
netadmin:~$
```

#### Showdate

See the example below.

```
netadmin:~$
netadmin:~$
showdate -h
usage: showdate [-h]
Prints the system date and time.
optional arguments:
    -h, --help show this help message and exit
netadmin:~$
netadmin:~$
showdate
Mon Sep 7 19:20:05 PDT 2015
netadmin:~$
netadmin:~$
netadmin:~$
```

### Showip

See the example below.

```
netadmin:~$
netadmin:~$
netadmin:~$
showip [-h]
Displays the status of the currently active interfaces.
optional arguments:
    -h, --help show this help message and exit
netadmin:~$
netadmin:~$
showip
eth0 : 10.216.110.231
ctrl0 : 10.216.110.73
netadmin:~$
netadmin:~$
```

## Setip

See the example below.

netadmin:~\$
netadmin:~\$
netadmin:~\$
netadmin:~\$
setip [-h] -iface IFACE [-dhcp] [-ip IP] [-mask MASK] [-gw GW]
Sets the IPv4 address for the specified interface.
optional arguments:
 -h, --help show this help message and exit
 -iface IFACE Interface
 -dhcp DHCP/Static
 -ip IP IP Address
 -mask MASK Netmask
 -gw GW Gateway
netadmin:~\$
netadmi

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