BreakingPoint Virtual Edition

Installation Guide

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Corporate Headquarters	Ixia Worldwide Headquarters 26601 W. Agoura Rd. Calabasas, CA 91302 USA +1 877 FOR IXIA (877 367 4942) +1 818 871 1800 (International) (FAX) +1 818 871 1805 sales@ixiacom.com	Web site: www.ixiacom.com General: info@ixiacom.com Investor Relations: ir@ixiacom.com Training: training@ixiacom.com Support: support@ixiacom.com +1 818 595 2599 For the online support form, go to: http://www.ixiacom.com/support/inquiry/
EMEA	Ixia Europe Limited Part 2nd floor, Clarion House, Norreys Drive Maidenhead, UK SL6 4FL +44 (1628) 408750 FAX +44 (1628) 639916 salesemea@ixiacom.com	Support: support-emea@ixiacom.com +40 21 301 5699 For the online support form, go to: http://www.ixiacom.com/support/inquiry/?location=emea
Asia Pacific	Ixia Pte Ltd 210 Middle Road #08-01 IOI Plaza Singapore 188994	Support: support-asiapac@ixiacom.com +91 80 4939 6410 For the online support form, go to: http://www.ixiacom.com/support/inquiry/
Japan	Ixia KK Nishi-Shinjuku Mitsui Bldg 11F 6-24-1, Nishi-Shinjuku, Shinjuku-ku	Support: support-japan@ixiacom.com +81 3 5326 1980 For the online support form, go to: http://www.ixiacom.com/support/inquiry/

	Tokyo 160-0023 Japan	
India	Ixia Technologies Pvt Ltd Tower 1, 7th Floor, UMIYA Business Bay Cessna Business Park Survey No. 10/1A, 10/2, 11 & 13/2 Outer Ring Road, Varthur Hobli Kadubeesanahalli Village Bangalore East Taluk Bangalore-560 037, Karnataka, India +91 80 42862600	Support: support-india@ixiacom.com +91 80 4939 6410 For the online support form, go to: http://www.ixiacom.com/support/inquiry/?location=india
China	Ixia Technologies (Shanghai) Company Ltd Unit 3, 11th Floor, Raffles City, Beijing Beijing, 100007 P.R.C.	Support: support-china@ixiacom.com 400 898 0598 (Greater China Region) +86 10 5732 3932 (Hong Kong)

For viewing the FAQs related to the product, go to Ixia Technical Support Online: https://ebsoprod.ixiacom.com/OA_HTML/jtflogin.jsp

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Contents

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Welcome

Welcome to the Ixia BPS-VE (BreakingPoint Virtual Edition) Installation Guide. Ixia's BPS-VE provides scalable real-world application and threat simulation in an elastic deployment model by leveraging virtualization and industry-standard hardware platforms.

About the BreakingPoint Virtual Edition Installation Guide

The BreakingPoint Virtual Edition Installation Guide explains how to install, run, and manage a BreakingPoint Virtual Chassis.

NOTE The *BreakingPoint Virtual Edition User Guide* provides detailed information about using the BPS user interface to configure and run tests. The latest documentation can be found in the Documentation area of the Ixia BreakingPoint Strike Center.

Intended Audience

Th BreakingPoint Virtual Edition Installation Guide is intended for all customers who plan to deploy the BreakingPoint Virtual Chassis.

Manual Organization

The BreakingPoint Virtual Edition Installation Guide is organized into the following sections:

- Introduction - Provides a brief overview of the BreakingPoint System in a virtual environment.
- Prerequisites - Explains the prerequisite software and hardware required to install and run BreakingPoint Virtual Edition.
- Getting Started - Explains the basic installation and configuration procedures needed to start using the application.
- vSwitch and Network Configuration - Explains the steps involved in the configuration of the hypervisor Network Topology.
- Installing BreakingPoint Virtual Edition - Provides an explanation of the installation of BreakingPoint Virtual Edition and BreakingPoint vController.
- Find System Controller IP Address - Explains how to locate the IP address of the System Controller. This IP address is used to log on to the BPS management and configuration user interface.
- Network Topology Diagram - Explains the mapping of the Network Interface Cards (NICs) associated with the BreakingPoint vController and vBlades in the network topology diagram.
- vController Management Interfaces - Describes the purpose of the management interfaces and their mapping in the network.
- Deploying vBlades - Explains how to create, discover, and delete vBlades on a BreakingPoint Virtual Chassis.
- Deployment Scenarios - Explains how to set up the BreakingPoint vController and vBlades on the physical hosts.
- Licensing - Explains the different license types and the procedure to activate/deactivate licenses.
- Troubleshooting - Describes solutions to problems that may be encountered in BreakingPoint Virtual Edition.

Typographic Conventions

The following table lists typographic conventions followed throughout the document that are used to represent command syntax, user interface, and so on.

Convention	Description
Text in **boldface**	Represents the Graphical User Interface (GUI) items, which include window names, dialog box names, command buttons, GUI labels, text box names, and so on.
Text in *italics*	Represents the reference to documents, like user guides, installation guide, administration guide and so on.
Text in `courier`	Represents commands, APIs, or scripts.
>	Separates two menu items. For example, **Tools** > **Internet Options** means click **Tools**, and then **Internet Options**.
CAUTION	Caution denotes hazard, calling attention to the operating procedure or practice that require adherence to rules, bypassing them could result in damage to the product or loss of important data. Informs that one should not proceed beyond the CAUTION notice, until the indicated conditions are fully understood and met.
WARNING	Warning denotes hazard, calling attention to the operating procedure or practice that require adherence to rules, bypassing them could result in personal injury or death. Informs that one should not proceed beyond the WARNING notice, until the indicated conditions are fully understood and met.
NOTE	Note indicates helpful suggestion or reference to additional information.

Related Documentation

Documentation	Description
BreakingPoint Virtual Edition User Guide	Provides information about the BPS VE user interface, options, tests and parameters.

Software Components

The following table lists the software components included in BreakingPoint Virtual Edition in the current release.

Section	Software Component(s)
Network Neighborhood	IPv4/IPv6 Static Hosts IPv4/IPv6 External Hosts VLAN IPv4/IPv6 Router
BreakingPoint Test Component	Application Simulator Client Simulation Lawful Intercept

Section	Software Component(s)
	Recreate RFC2544 Routing Robot Security Security NP Session Sender Lab Stack Scrambler SSL/TLS
Breaking Point Labs	Session Sender Lab

Acronyms and Abbreviations

The following table lists the acronyms/abbreviations used throughout the document, with their respective expansions.

Acronyms/Abbreviations	Expansion
BPS	BreakingPoint System
CD	Compact Disc
GUI	Graphical User Interface
IP	Internet Protocol
NIC	Network Interface Card
NP-VMs	Network Processor-Virtual Machines
vBlades	Virtual Blades
vController	Virtual Controller
VE	Virtual Edition
VM	Virtual Machine

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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 GUI is nearly identical to the standard hardware versions, reducing the learning time.
- Reduced System Administration - 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.
- BreakingPoint Virtual Edition is delivered as a pre-configured `.ova` template.

Basic Elements

The basic elements involved in the BreakingPoint Virtual Edition are:

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

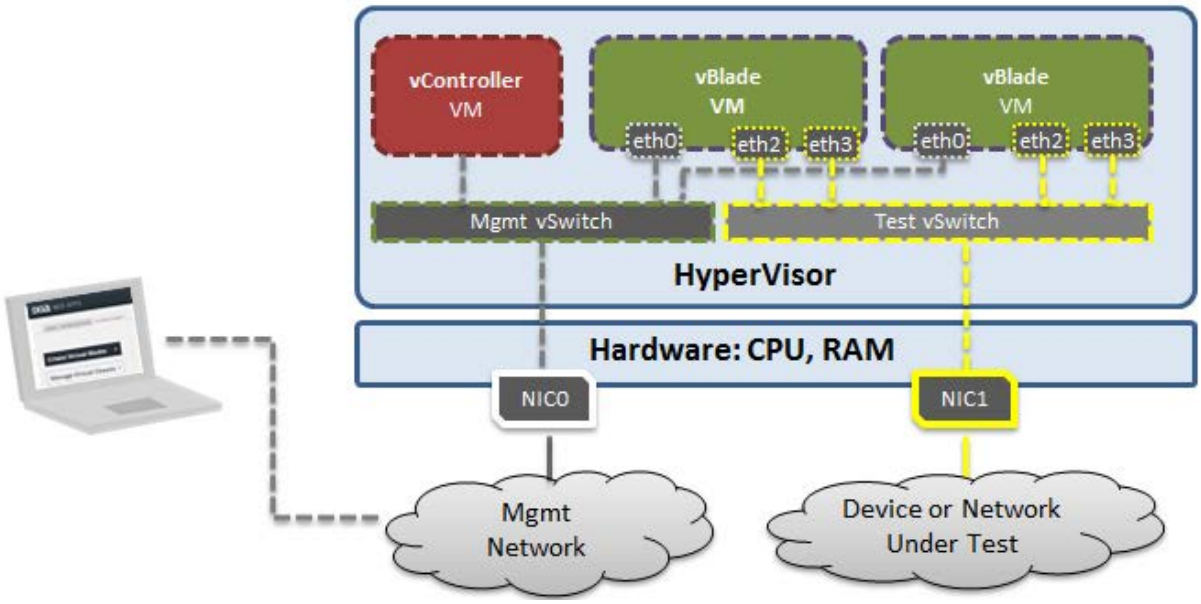
Components of BreakingPoint Virtual Edition

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 BreakingPoint Virtual Edition.



Prerequisites

Before you deploy a BreakingPoint Virtual Chassis in a Virtual Environment, it is important to verify that the following requirements are met:

- Hardware Requirements
- Software Requirements
- Other Requirements

Hardware Requirements

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

- 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 from 1 to 12 vBlades.

Software Requirements

- VMware ESX/ESXI Installation
  - Firmware ESXi 5.5.0 (Firmware vSphere Hypervisor)
  - Firmware vSphere Client 5.5.0
  - ESXI - BreakingPoint vController (OVA file) - version 1.0.1.6 or later
- KVM Installation
  - KVM - BreakingPoint vController (.sh file)

Other Requirements

The presence of a DHCP server is required in order to provide IP addresses to the interfaces of the BreakingPoint vController and vBlades in the virtual chassis. Static IP address assignment for these interfaces is not supported.

TIP While a DHCP server is required for deployment of BreakingPoint Virtual Edition, the IP addresses that will be used can be managed. After BPS-VE has been deployed and the BPS System Controller and vBlades have received MAC addresses/IP addresses from the DHCP server, the DHCP server can be configured to issue specific IP addresses to the MAC addresses assigned to the BPS -VE components.

NOTE It is recommended that you use persistent IP assignment through DHCP. Changes to vController and vBlade ip addresses can cause technical issues as described in Troubleshooting.

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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.

You can deploy the BreakingPoint vController using the BreakingPoint vController OVA file or running the BreakingPoint vController installation script on KVM.

Known Limitations

Note the following limitation:

- BreakingPoint Virtual Edition deployment uses DHCP for assigning IP addresses to the management interfaces. Configuration of static IP addresses is not supported.

TIP	While a DHCP server is required for deployment of , the IP addresses that will be used can be managed. After BPS-VE has been deployed and the BPS System Controller and vBlades have received MAC addresses/IP addresses from the DHCP server, the DHCP server can be configured to issue specific IP addresses to the MAC addresses assigned to the BPS -VE components.

NOTE	It is recommended that you use persistent IP assignment through DHCP to maintain the chassis integrity.

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Installing BreakingPoint Virtual Edition

VMware ESX/ESXi Installation

To deploy BreakingPoint Virtual Edition to VMware ESX/ESXI, perform the following tasks.

Deploying BreakingPoint Virtual Edition on VMware High Level Overview

1. Create the required network and vSwitches on the hypervisor where the system controller will be deployed. See VMware vSwtich and Network Configuration.
2. Install the OVA file from vSphere. See Install the BP vController OVA on VMware
3. Get the System Controller (vController) IP address, which is used to log on to the BPS User Interface, from the Hypervisor Console. See Locate the System Controller IP Address.
4. Log on to the BPS User Interface using the System Controller IP address.
5. Install and configure the hypervisor in all targets where a vBlade must be installed. .
6. Configure the network and vSwitches on the additional hypervisors. See VMware vSwtich and Network Configuration.

   NOTE After deployment, vBlades get their IP address from the network DHCP server. The System Controller discovers all vBlades deployed from the UI using these IP addresses. Static IP configuration is not supported.
7. Manage and provision the vBlades using the Manage Virtual Chassis options in the BPS UI.

   NOTE A System Controller can control a maximum of 12 vBlades.

Prerequisite VMware vSwitch and Network Configuration

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

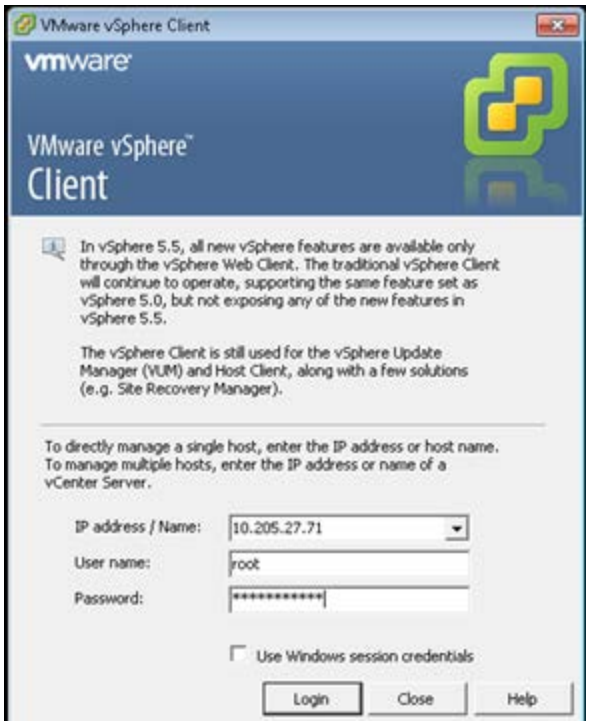
It is recommended that you configure the following settings in all vSwitches across the hypervisors. If these settings are not configured, all of the network traffic may be available to all of the virtual machines, resulting in a non-functioning VLAN.

ESX server settings:

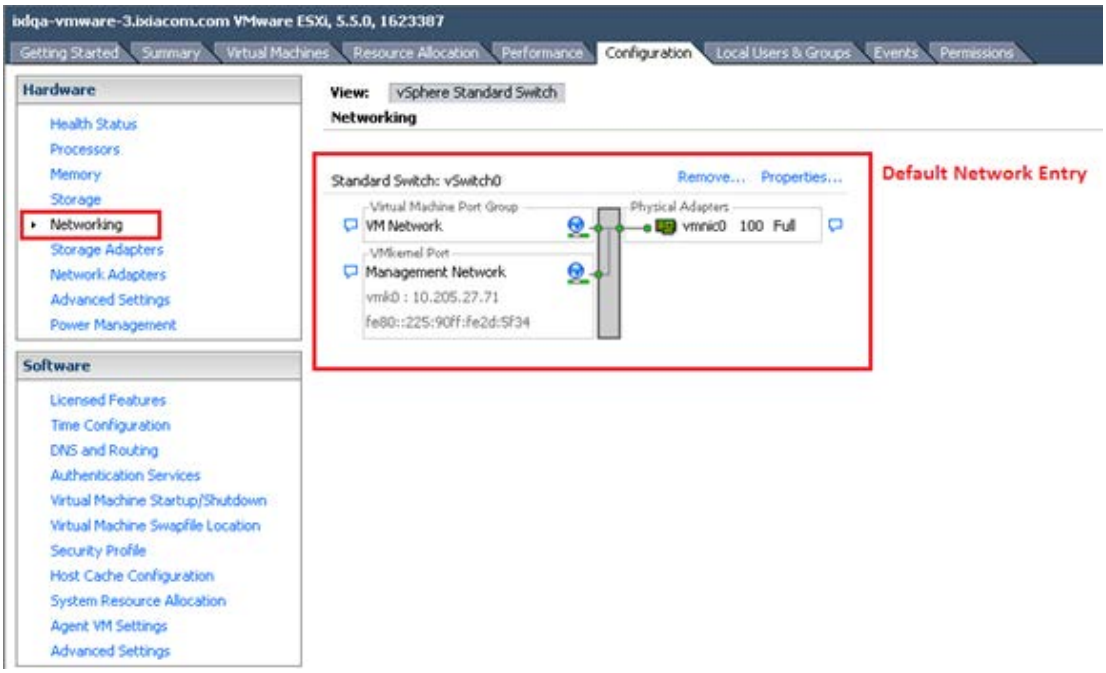
- vSwitch Traffic Shaping set as Disabled
- vSwitch Security tab > Promiscuous Mode set as Reject
- vSwitch Properties, set the VLAN ID (Optional) from None (0) to All (4095)

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.



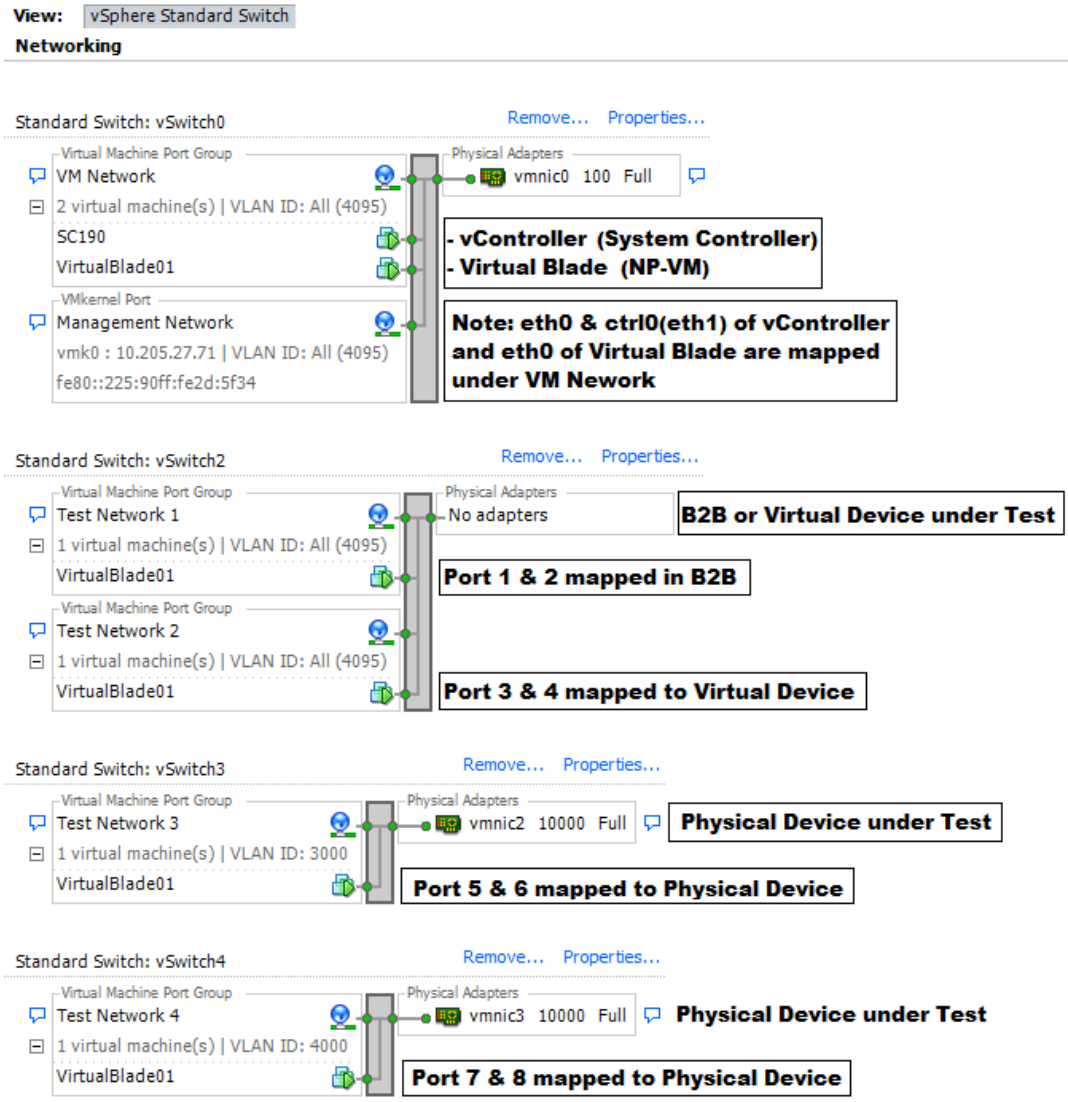
2. Click **Configuration** > **Networking**.



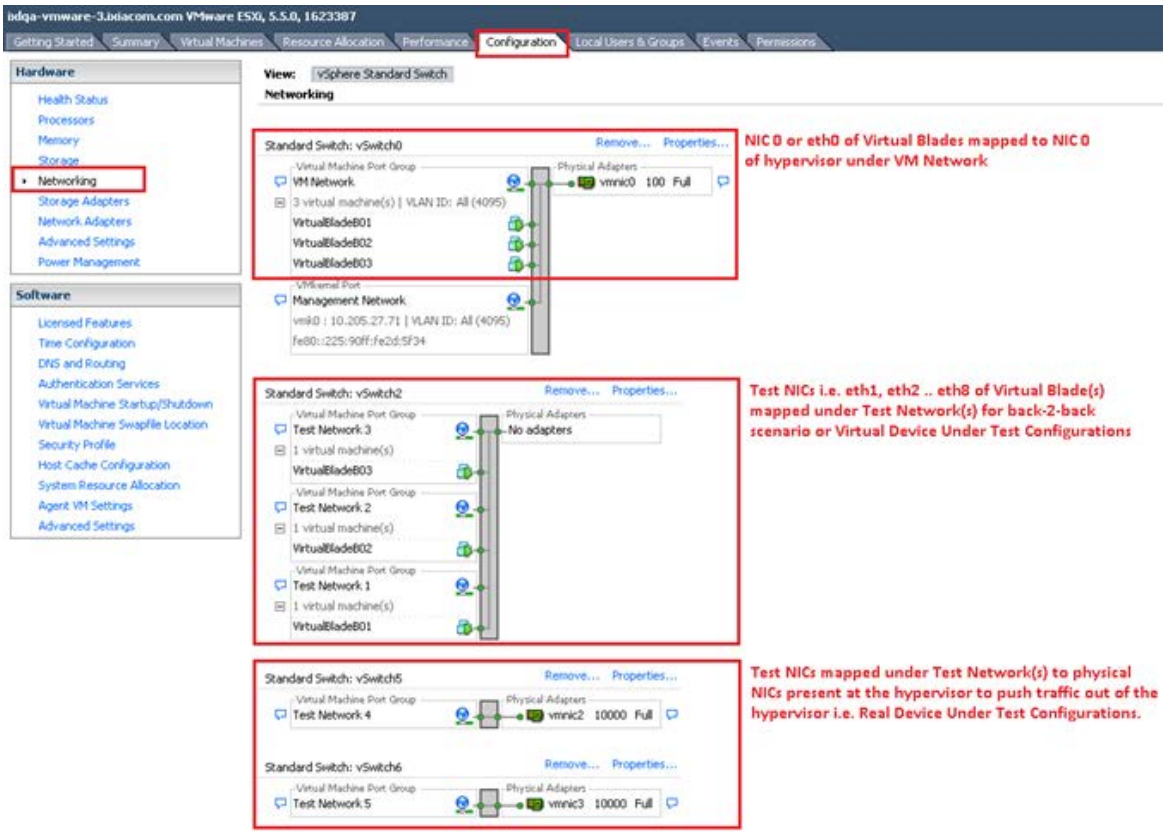
3. Add test networks to support a back-to-back/virtual Device Under Test (DUT) or a real DUT.

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.

Hypervisor Deployed with vController and vBlades



Hypervisor Deployed with vBlades Only



Install the BP vController OVA on VMware

1. Get the Prerequisites from the Ixia website or Installation CD.
2. Log on to the hypervisor.
3. Click **File** > **Deploy OVF Template**.

   The **Deploy OVF Template** dialog box appears.
4. 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. Specify a **Name** for the deployed template. Click **Next**.
7. Click the desired **Disk Format** from the following options. Click **Next**.
   - **Thick Provision Lazy Zeroed**
   - **Thick Provision Eager Zeroed**
   - **Thin Provision (recommended)**
8. In the **Network Mapping** section, correctly map the **Source Networks** with the **Destination Networks**. Click **Next**.

NOTE

- This option is available only if there are at least two networks created in the hypervisor (by default there is only one).
- The destination network is used to access the management IP address (both internal and external) for the BreakingPoint vController.

NOTE

- The source network is the network used in the OVF template and the destination network is your lab or corporate network.
- External Management is used to access the vController using a browser.
- Internal Management is used for the internal communication between vController and vBlades.
- By default, both management interfaces are mapped to the vSwitch0 containing the Management Network (Hypervisor IP address) and VM Network.

9. In the **Ready to Complete** section, verify the **Deployment settings** and click **Finish** to start the OVA image file deployment.

   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..
10. Click **Finish**. The system starts the deployment of the BPS Controller in the hypervisor.
11. Upon completion, you can Deploy vBlades.

KVM Installation

To deploy BreakingPoint Virtual Edition to a KVM hypervisor, perform the following tasks.

Deploying BreakingPoint Virtual Edition on KVM High Level Overview

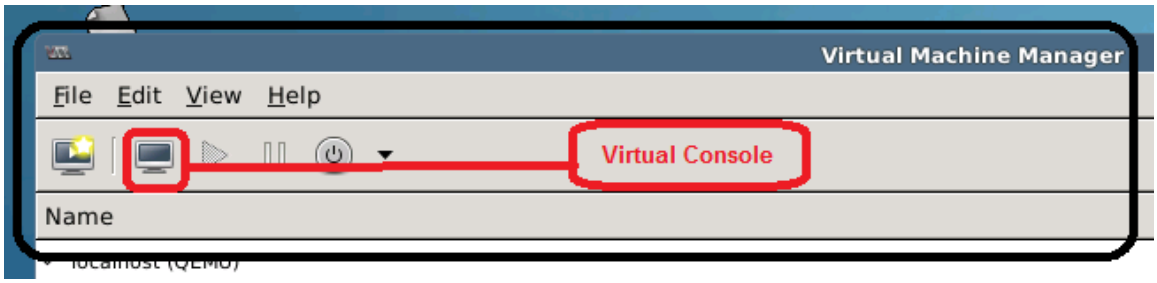
1. Get the BreakingPoint vController .sh file for KVM from the Ixia website or Installation CD
2. Install the KVM .sh Script
3. Get the BPS Management IP address from the Hypervisor Console. See Locate the System Controller IP Address.
4. Log on to the BPS User Interface (UI).
5. Install and configure the hypervisor in all targets where a vBlade must be installed.
6. Manage and provision the vBlades using the Manage Virtual Chassis options in the BPS UI.

NOTE A system controller can control a maximum of 12 vBlades.

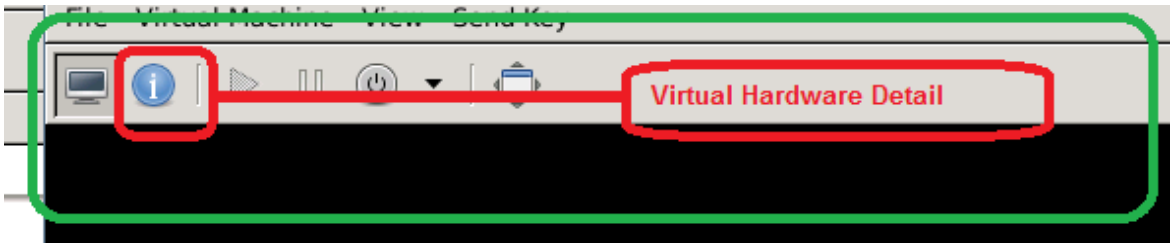
Install the KVM .sh Script

1. Download the BreakingPoint vController for KVM .sh file from the Ixia website (or install from CD) to the host machine.
2. On the host where the Breaking Point vController will be installed, open a terminal and move to the .sh directory.
3. Make the.sh file executable, `chmod +x BreakingPoint_vController_3.4.2.xxxxxx.sh`.
4. Run the command `./BreakingPoint_vController_3.4.2.xxxxxx.sh`.
5. After approximately 10 minutes a Terms of Agreement message will appear.
   a. To avoid this message, press the **Q** key on the keyboard or press the space bar to scroll through the agreement pages.
6. A menu will display with the following options.
   a. Do you accept the terms of agreement? Select **yes**.
   b. Enter the Virtual Machine (domain) Name: For this example, we entered KVM_153.
   c. Enter the management network name or the id preceded by '#': For this example, we entered #1.
7. Go to the **Virtual Machine Manager** window.
8. Click the **System Controller** that was created.

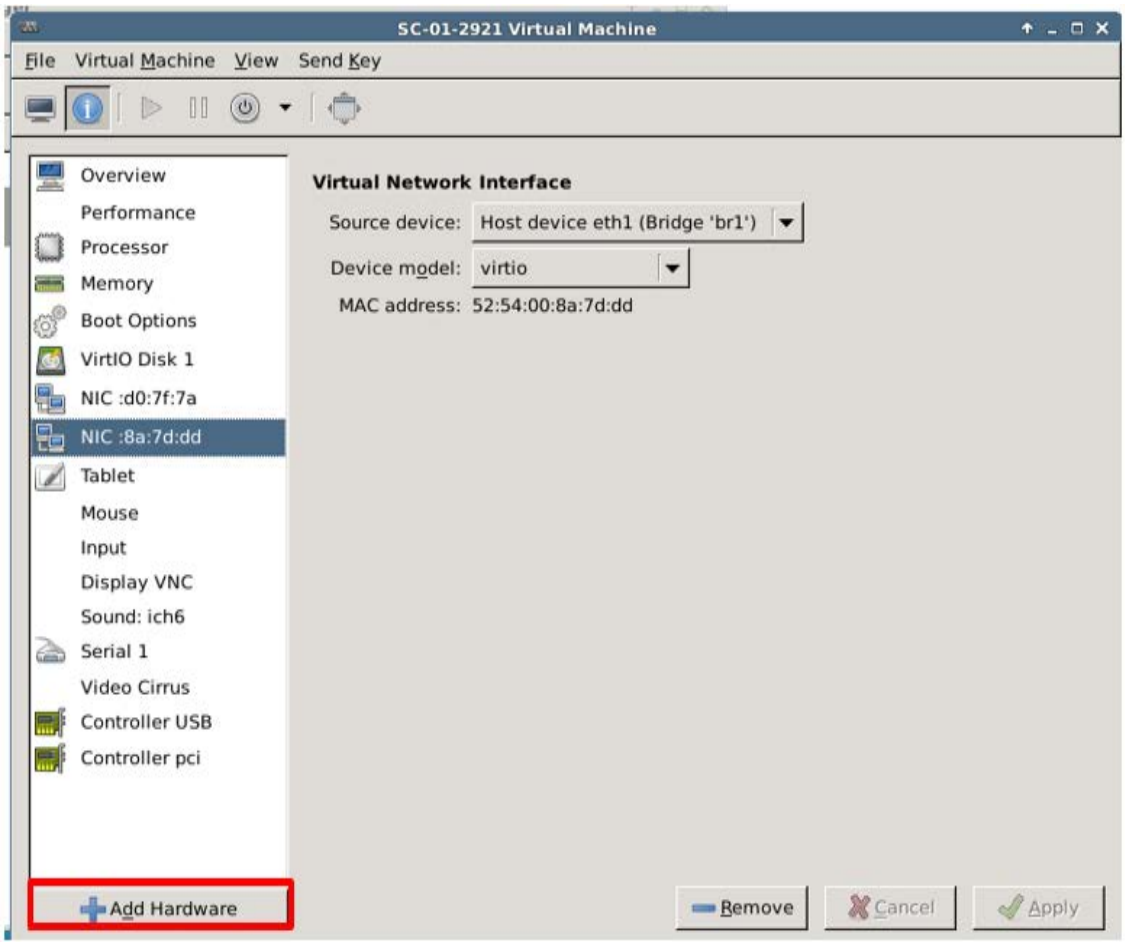
9. Click the **Virtual Machine Console** icon as shown in the image below.



10. Click the **Show Virtual Hardware Detail** icon as shown in the image below.

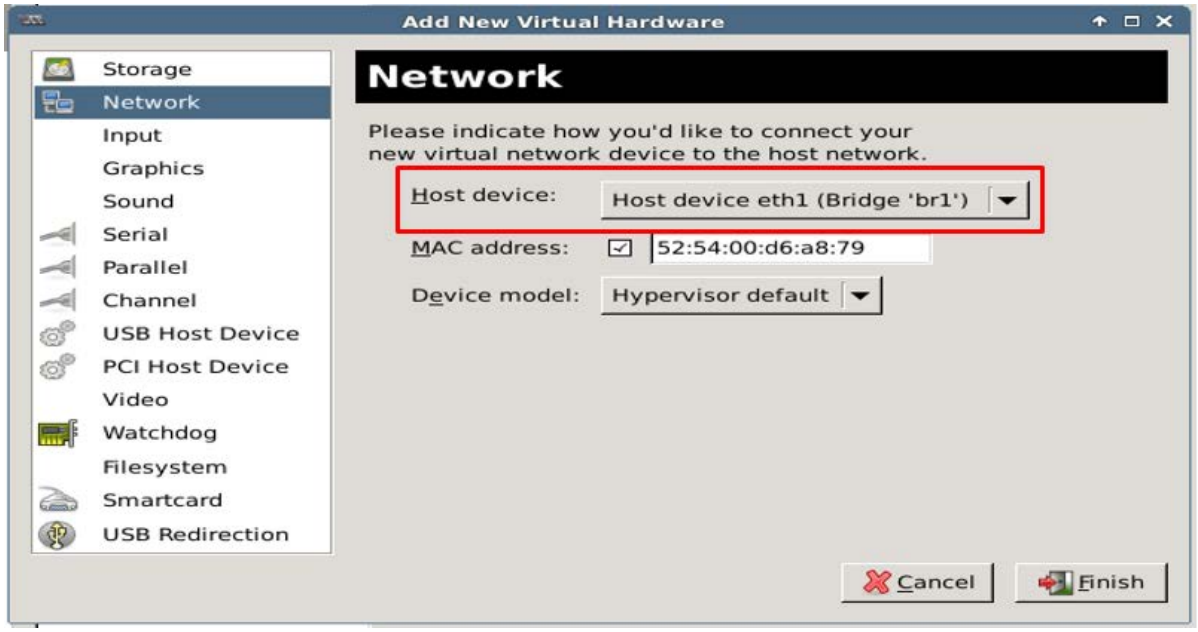


11. The **Virtual Machine** window will display as shown in the figure below.

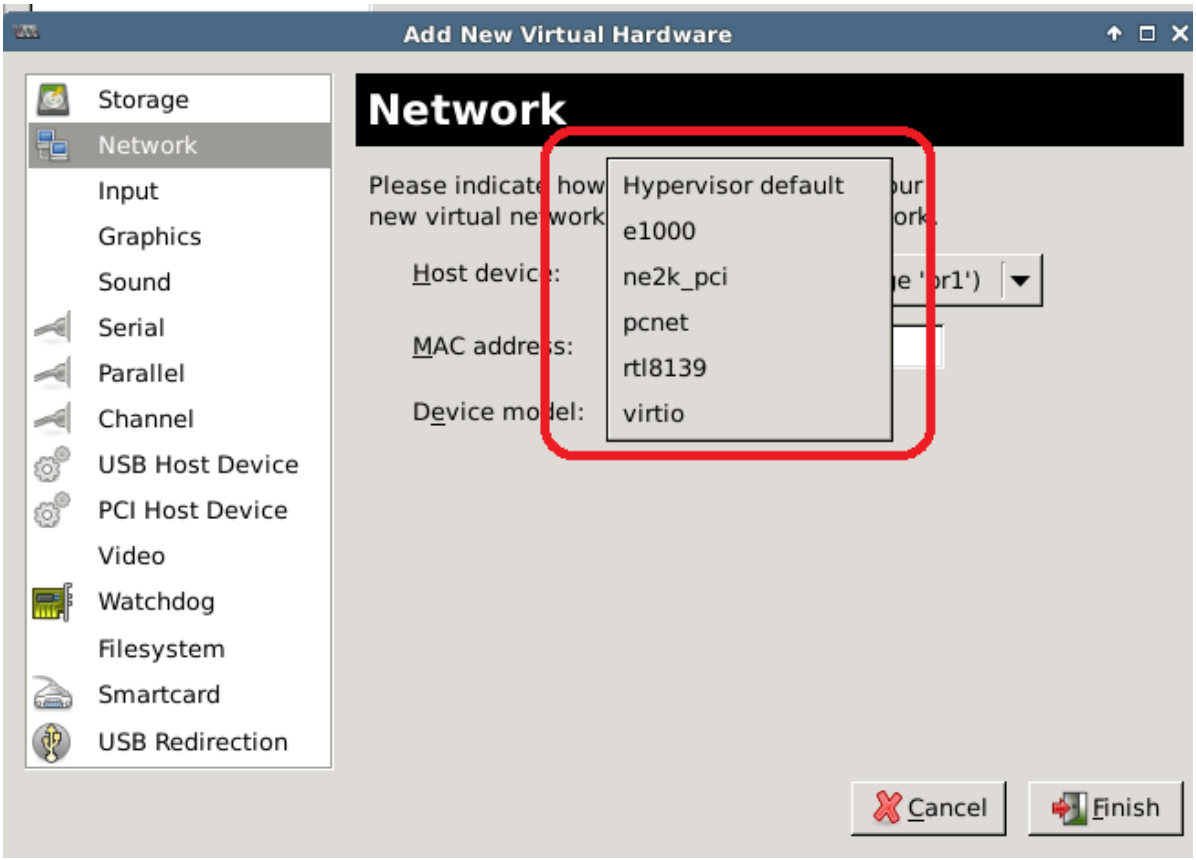


12. Click **Add Hardware** at the bottom left side of the window. The **Add New Virtual Hardware** window will display.

13. Click **Network**. The configuration settings for the **Network** option will display.



14. These settings will be configured for **ctrl0**. In the **Host Device** list, click the device that indicates where the Local DHCP server is located (**ctrl0** will get its IP address from this device).



15. In the **Device model** list, click **virtio**.
16. Click **Finish**.
17. Right-click the System Controller and select **Shutdown > Reboot.**
18. Upon completion, you can Deploy vBlades.

Locate the System Controller IP Address

The System Controller IP Address can be used to access the BPS UI from an HTML browser. After accessing the BPS UI, see the section on Deploying vBlades.

To find the System Controller IP address you need to:

- Access the Console on the 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. Run the networkInfo command to display the System Controller IP Address.

Access the Console on KVM

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

   NOTE ttyS0 will need to be enabled within the VM if it is not currently enabled.

2. Log on to the system using the proper credentials. For example:
   User ID - admin
   Password - admin
3. Run the networkInfo command to display the System Controller IP Address.

Run the networkInfo Command

1. Type the following command at the prompt.
   ```
   BPS> networkInfo
   ```
   The system displays following information.
   ```
   dhcp="true"
   hostname="localhost.localdomain.bpointsys.int"
   ip="10.200.225.38" <==== IP of System Controller
   netmask="22"
   gw=""
   currip="10.200.225.38"
   ........................
   ```

Updating the BreakingPoint VE Software

In order to update 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)

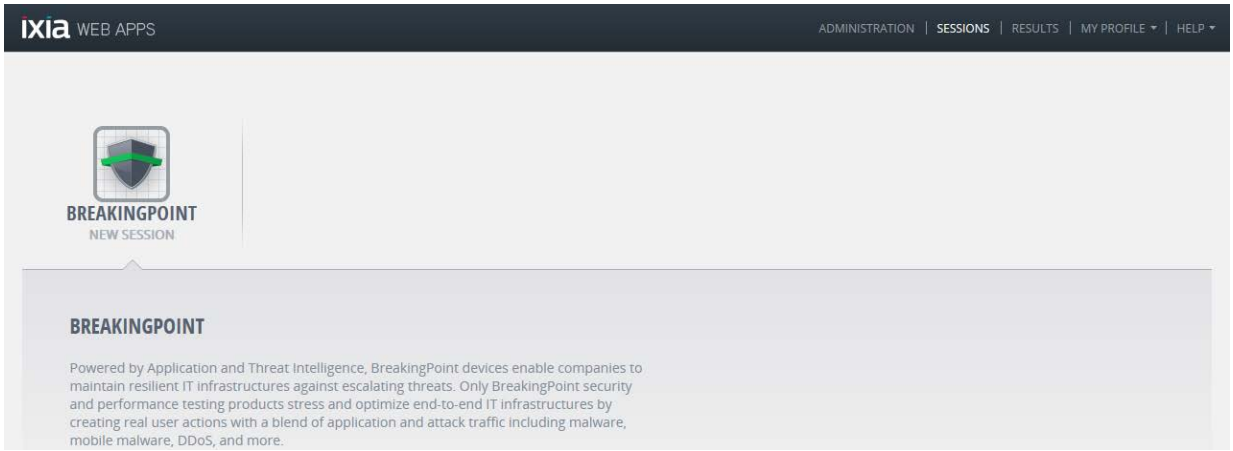
You will also need to obtain the release notes that apply to the update version from the website. The release notes describe new features, resolved issues and known issues and provides detailed update instructions for BreakingPoint VE.

Log on to the BPS User Interface

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

1. Open a web browser, type the vController IP address in the URL field, and press Enter.
   The log on window appears.
2. In the **Username** field, type your user ID.
3. In the **Password** field, type your password.

   NOTE Use `admin` as the default login credential for both **Username** and **Password**.
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.

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Deploying vBlades

vBlades are deployed on various hypervisors using the BreakingPoint vController. To log on to the BreakingPoint VE UI using a web browser, you must first retrieve the IP address of the vController . If you are deploying on VMware, make sure that the internal management network or vSwitches (towards system controller communication) and traffic network/vSwitches are configured in all target hypervisors from the vSphere client.

Prerequisites for vBlade Deployment

- IP of the BreakingPoint vController
- BreakingPoint vController deployed and accessible through the Web Administration page
- Sufficient resources to deploy the required number of vBlades
- SSH enabled on VMware ESX (If you are deploying on VMware)

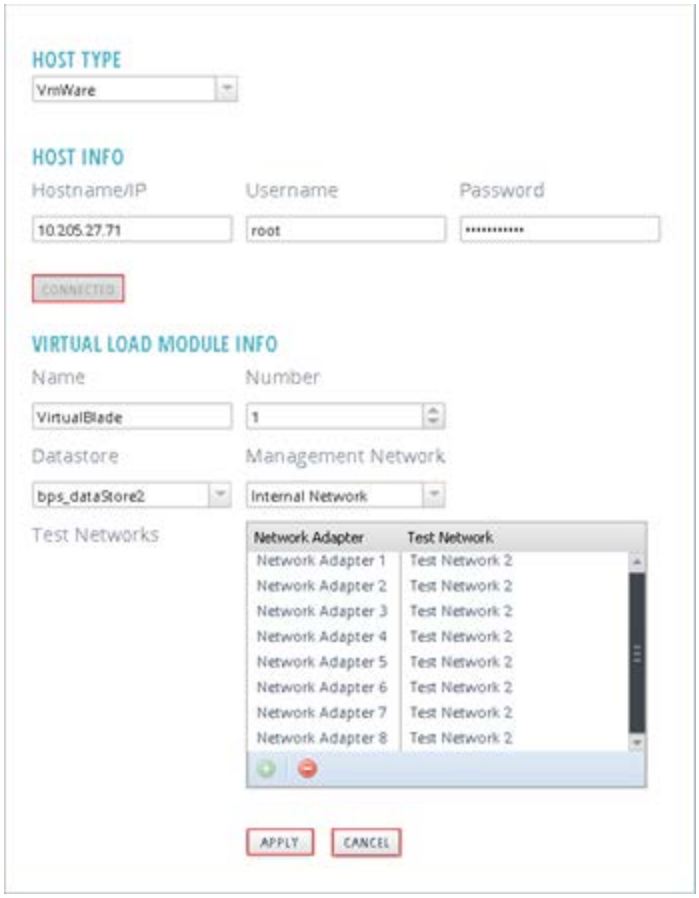
Create a Virtual Blade (vBlade)

To create a vBlade, perform the following tasks:

1. Log on to BreakingPoint VE UI using the System Controller/BreakingPoint vController IP address.
2. Click the **Administration** link.
3. Click **VM Deployment** > **Create Virtual Blades** > **Configure Virtual Blade**.

   NOTE To access the hypervisor, make sure to enable the ssh service in all target hypervisors (which is configured in **vSphere** > **Security Profile** > **SSH**).

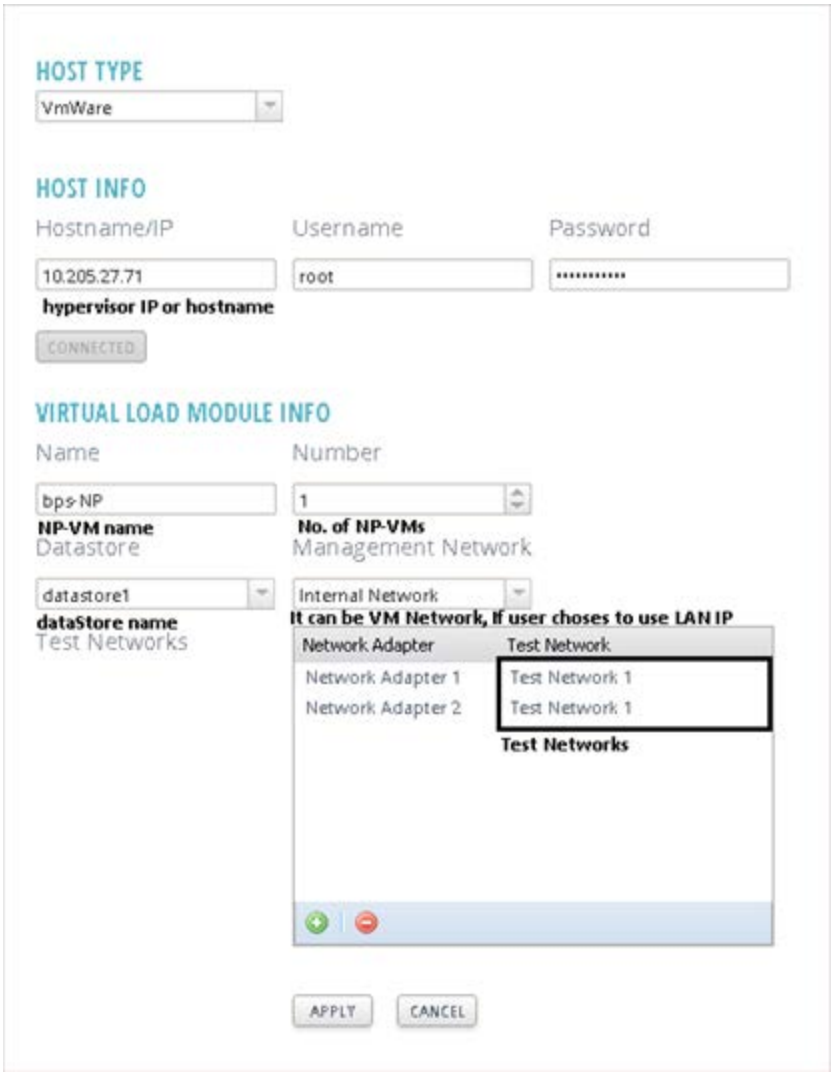
   A pop-up to configure vBlade appears as shown in the following table. For field descriptions, refer to the Virtual Blade Configuration Parameters table.



4. Select the **Host Type**.
5. In the **HOST INFO** section, enter the **Hostname/IP** of the hypervisor, where you want to deploy the VM.
6. Enter the correct **Username**/**Password** of the target VMWare ESX server where vBlade is residing and click **Connect**.

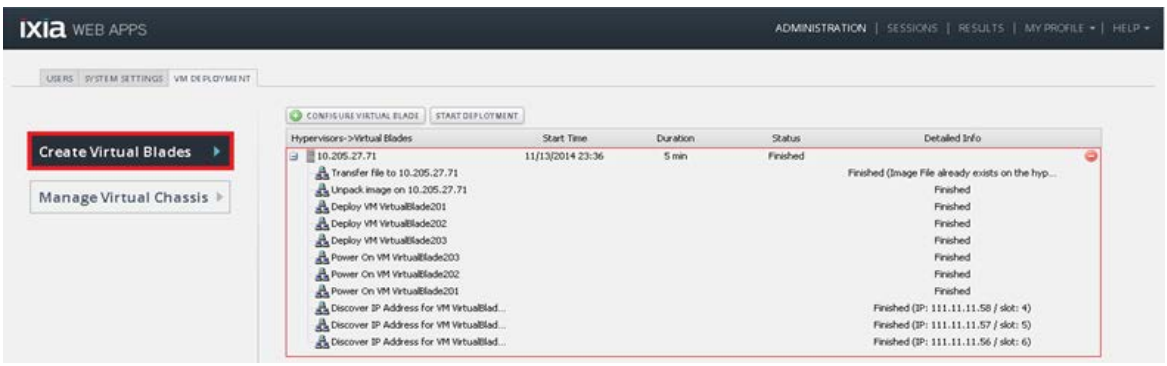
   The network topology present in the hypervisor along with the **Datastore** (HDD) details are available in the VIRTUAL LOAD MODULE INFO section.
7. Provide the **Name** and the **Number** of vBlades required in the respective text boxes.
8. Select the required **Management Network** for the vBlades.
9. In the **TEST NETWORKS** list, select the **Network Adapter** and map them to the relevant **Test Network**.

   vBlades contain two to eight vPorts. vPorts are directly mapped with Network Adapter. vPorts-1 mean Network Adapter 1, vPorts-2 mean Network Adapter 2 and so on. Assign Test Network (created in the vSwitch and Network Configuration section) to the respective vPorts according to the requirement. For example, if you want to run port to port test, then assign Network Adapter 1 (vPort-1) and Network Adapter 2 (vPort-2) to the same test network (in this case Test Network 1). If you want to run a test against external server (connected to the VMNIC2), then assign Network Adapter 1 (vPort-1) to the network connected to that physical NIC (in this case Test Network 4).



10. Click **Apply**. A new job entry is created.

    The system validates the name of the vBlade against the existing names. After successful validation, new vBlade entry is created.



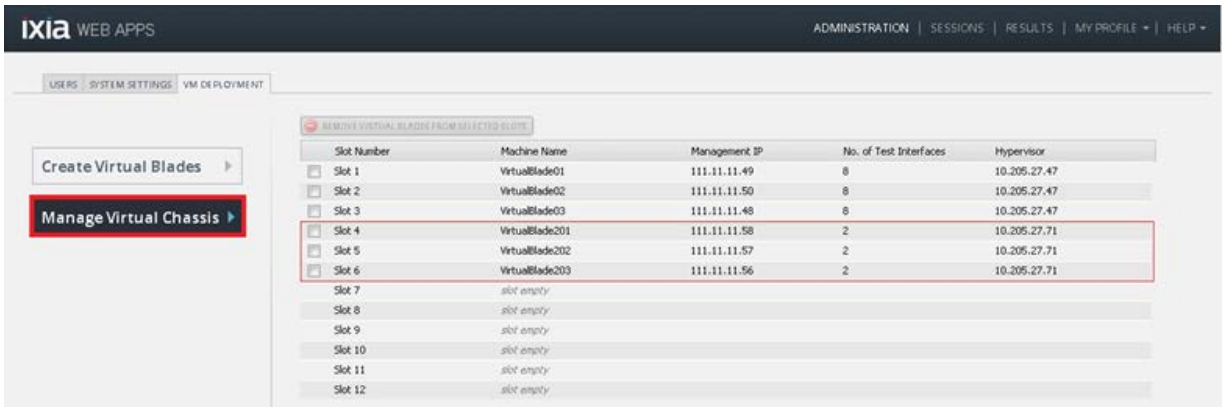
11. Select the new job entry, which is in pending status, and click **Start Deployment**. Wait until the deployment of vBlade is complete. After deployment is complete, the system lists the IP addresses of the vBlades.

Virtual Blade Configuration Parameters

Parameter	Description
Host Type	By default, Host Type is set to Firmware.
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 NP-VMs to be deployed.
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.
Management Network	**Management Network** 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 **Network Adapters** and map the **Test Network** to these adapters. Through this network, BPS traffic component sends/receives the test traffic.

Discover a vBlade

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



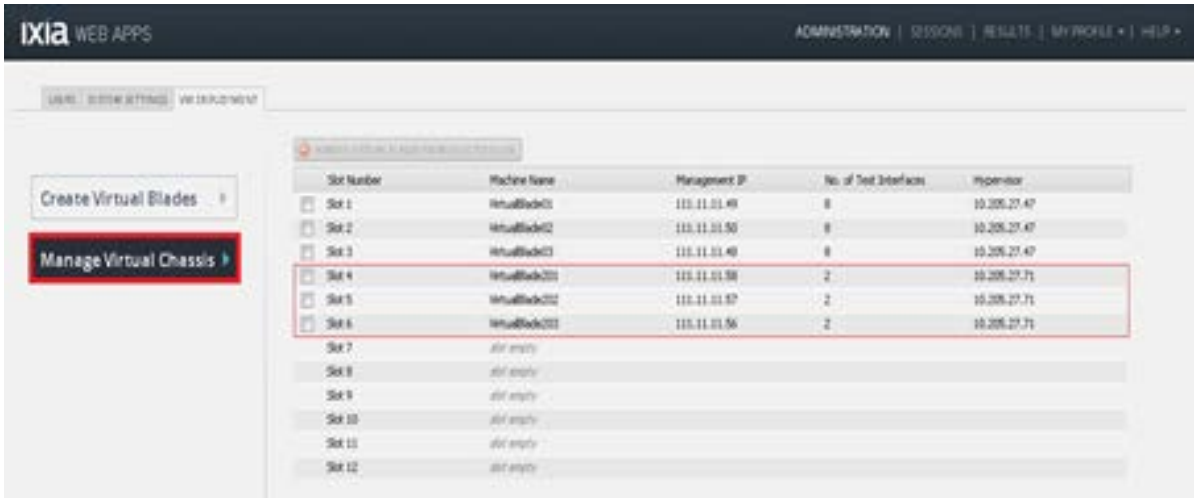
Virtual Chassis Field Descriptions

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 provided while Create a Virtual Blade (vBlade).
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.

Delete a vBlade

To delete a vBlade, perform the following tasks:

1. Click **Manage Virtual Chassis** tab.
2. Select the required slots that you want to delete.
3. Click **Remove Virtual Blades from Selected Slots**.



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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

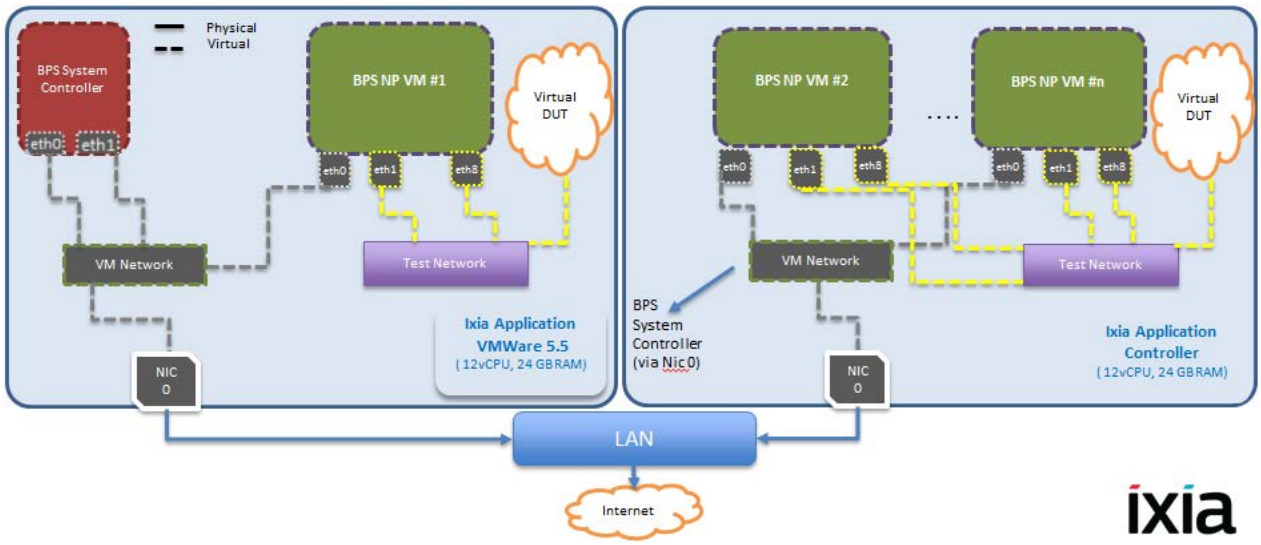
The test scenario shown in the image below has a minimum of two networks, a Virtual Machine Network (VM Network) and a Test Network.

- **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 and vBlades must receive IP addresses from a DHCP server via NIC0 in their respective hypervisors. The NIC0 cards in both hypervisors are connected to the LAN Network where the DHCP server is located.
- **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).

System Controller and vBlades get their IP addresses from a LAN DHCP Server (Preferred Topology)

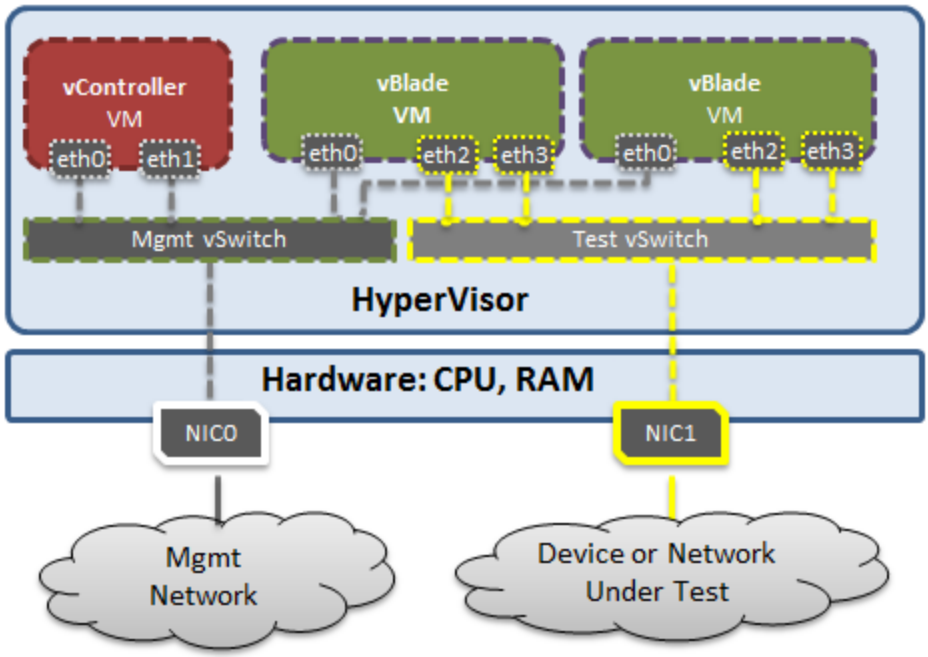


NOTE A BP Virtual Chassis is resource sensitive. Not having the necessary resources may lead to instabilities in vBlade performance. It is essential that you utilize only the required number of vBlades/ports on a hypervisor. See the Hardware Requirements to calculate the resources that are required to 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 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 (a DHCP server is also mandatory for the new network).

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

NOTE	An active DHCP server is required because all management interfaces of the vController and vBlades support DHCP only.

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.

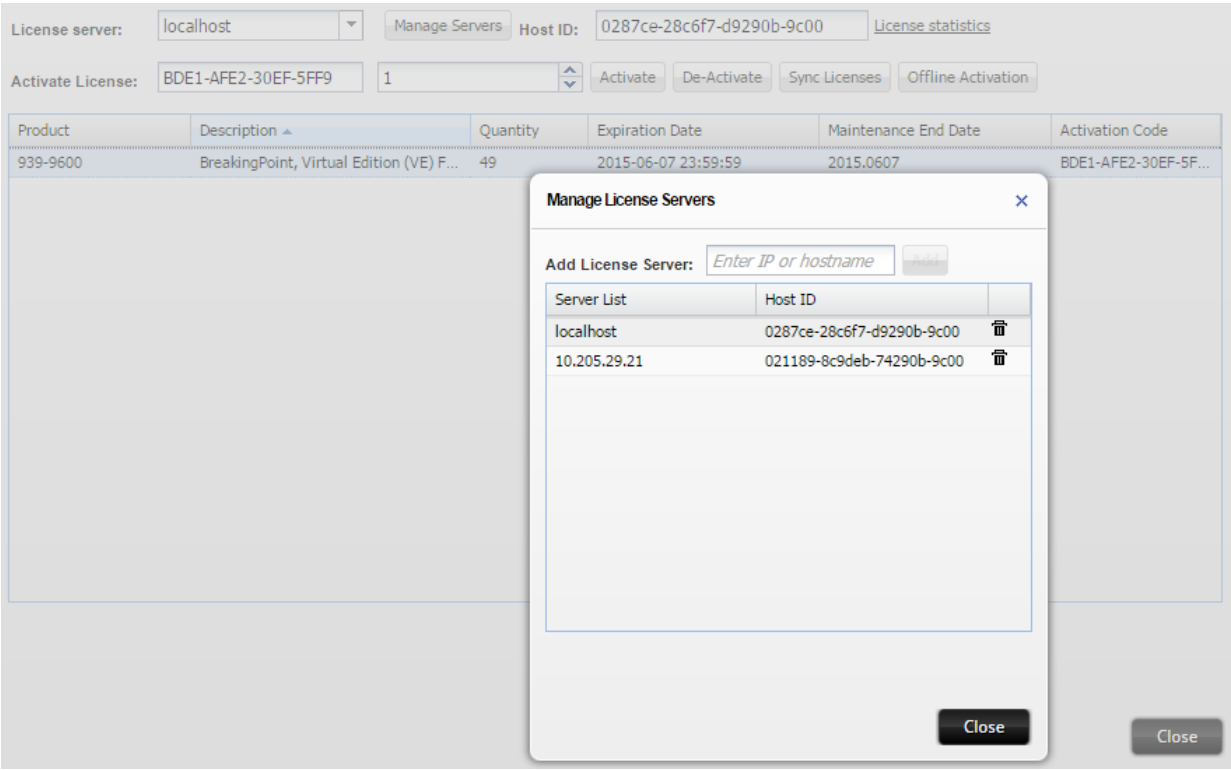
Licensing Utility

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.



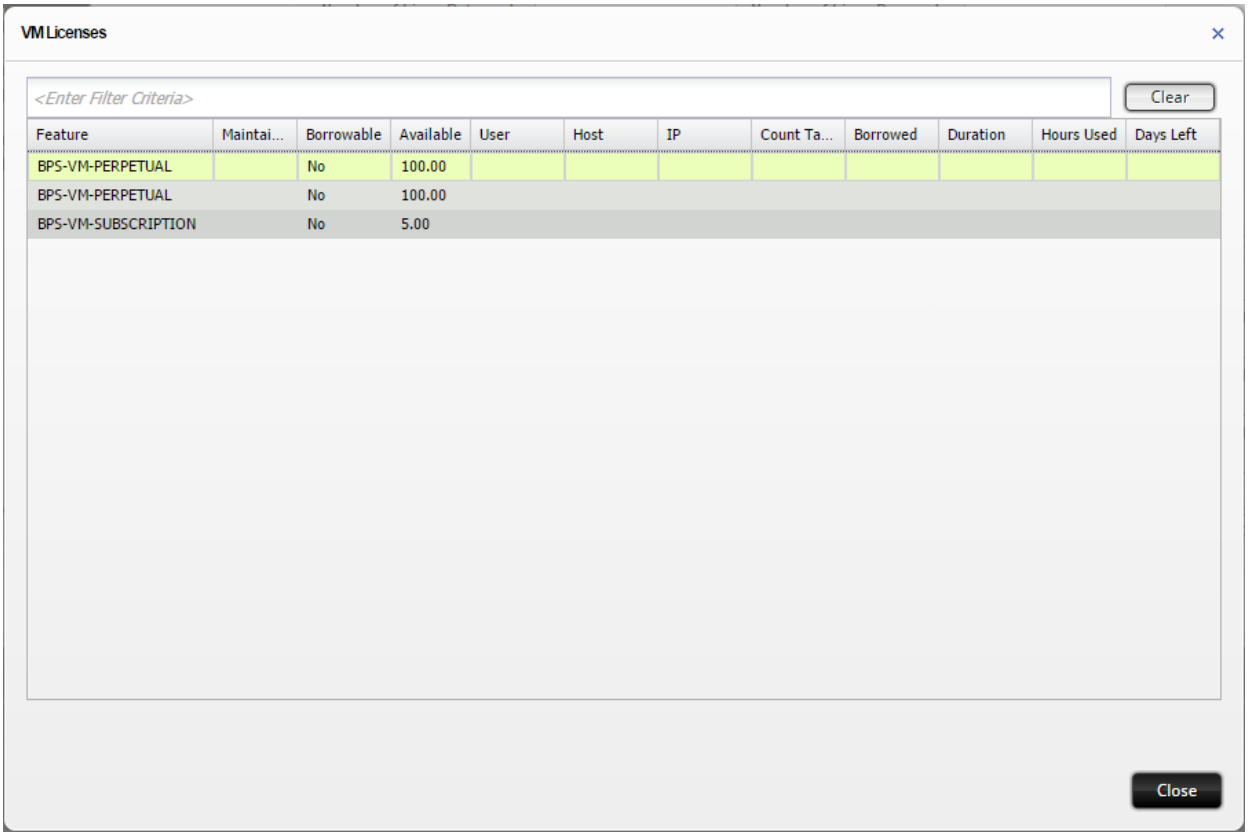
The following table provides information about the fields and description:

Field/Section	Description
License server	Specify the license servers IP address or the hostnames. The default value is **localhost**. 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 **Manage License Servers** 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 License Statistics.
Activate	Click this button to activate a license. Specify the **Activation Code** and **Quantity** 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 **Quantity** of licenses you want to deactivate.
Sync Licenses	If licenses are renewed in the back-end, click **Sync** 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 **Subscription** or **Evaluation** licenses or **Perpetual** for a permanent license.

Field/Section	Description
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:



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.
Count Taken	The number of licenses which the user have checked out from the license server.
Borrowed	Shows if the license is borrowed.

Field/Section	Description
	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 **<Enter Filter Criteria>** 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-RES0HB7X

This document provides the right to activate the following product(s) under
Entitlement IxiaQA-RES0HB7X:

 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:
http://www.ixiacom.com/support/downloads_and_updates/index.php

If you do not currently have a username and password for the Ixia website, you
can request one: http://www.ixiacom.com/support/pwrequest.php

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:
http://www.ixiacom.com/support

Alternatively, you can contact Ixia Technical Support directly:
```

support@ixiacom.com

Domestic: (877) FOR-IXIA

International: +1-818-871-1800 (press 1)

Sincerely,

Ixia Order Fulfillment

Activate License

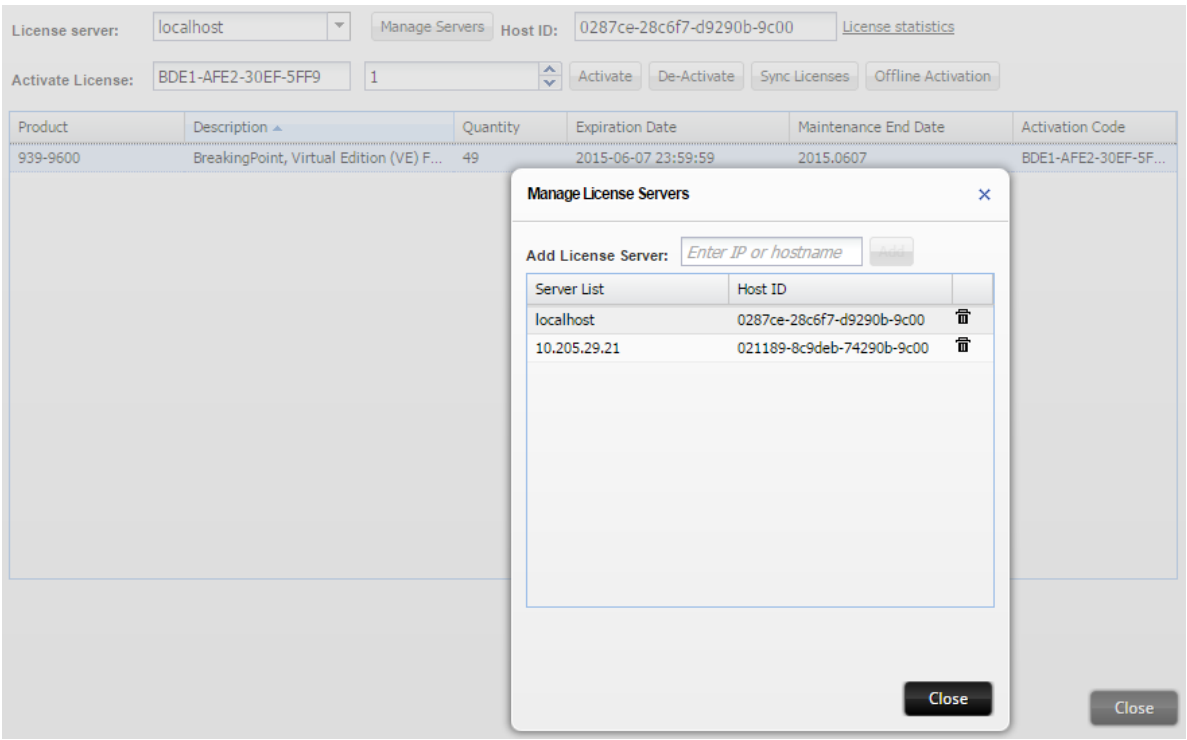
Ensure that vController is connected to internet and that the necessary information discussed previously in Before Starting Activation is available.

To activate a license, perform the following tasks:

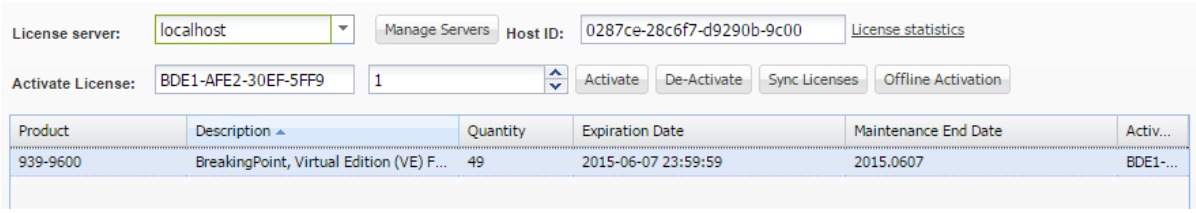
1. Connect to the management IP of vController using a web browser.
2. Go to **BPS Session** > **Control Center** > **Administration** > **Licensing**.

   The **VM Licenses** window opens.
3. In the **License server** box, select the license server IP or Localhost.

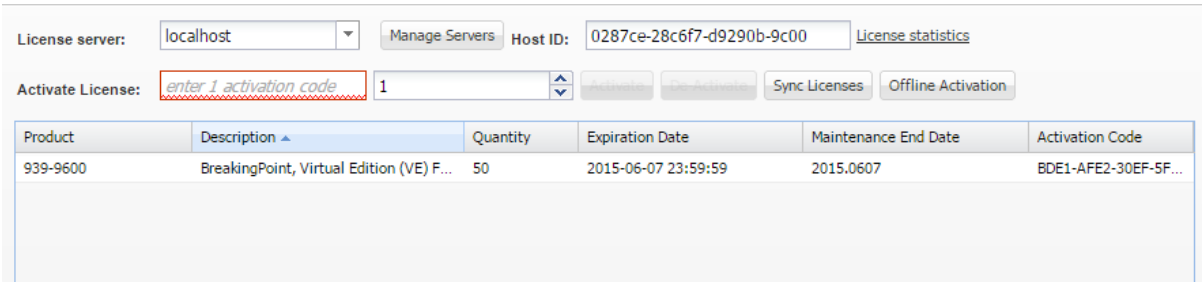
   NOTE If you want to add a new license server, click the **Manage Servers** button and provide server details in the **Manage License Servers** dialog box.



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



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



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 Before Starting Activation.

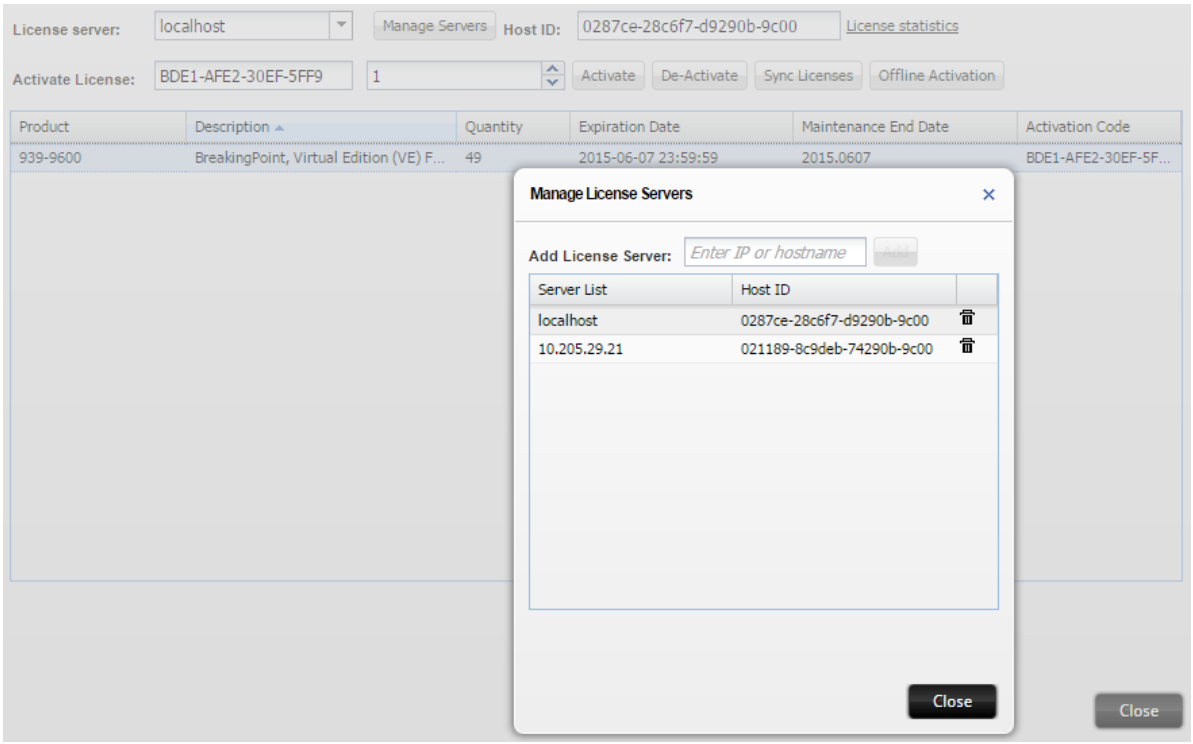
License Deactivation

To deactivate a license, perform the following tasks:

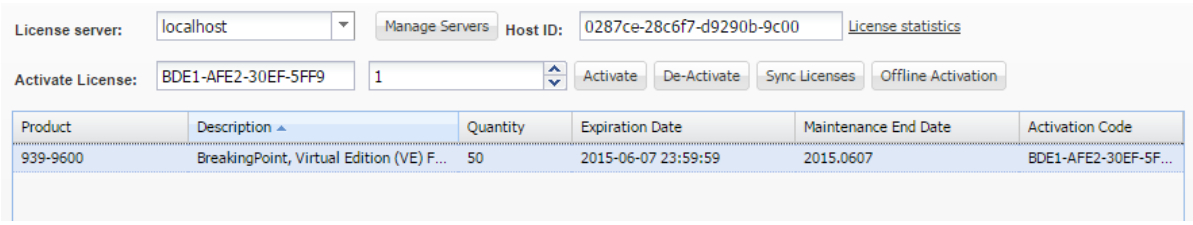
1. Connect to the management IP of the vController using a web browser.
2. Go to **BPS Session** > **Control Center** > **Administration** > **Licensing**.

   The **VM Licenses** window opens.
3. In the **License server** box, select the license server IP or Localhost.

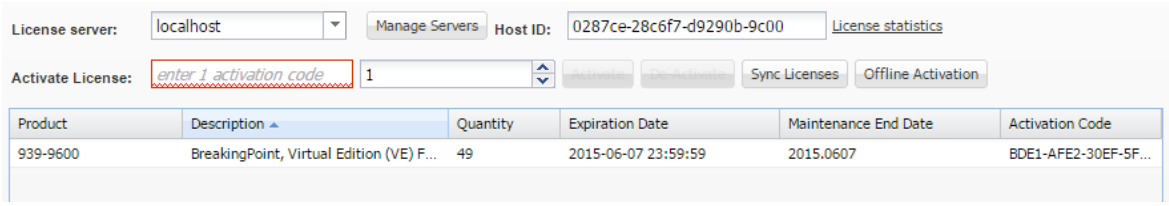
> **NOTE** If you want to add a new license server, click the **Manage Servers** button and provide server details in the **Manage License Servers** dialog box.



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.



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



Overview of Offline Activation/Deactivation

Offline activation/deactivation of licenses is required when the BreakingPoint vController 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

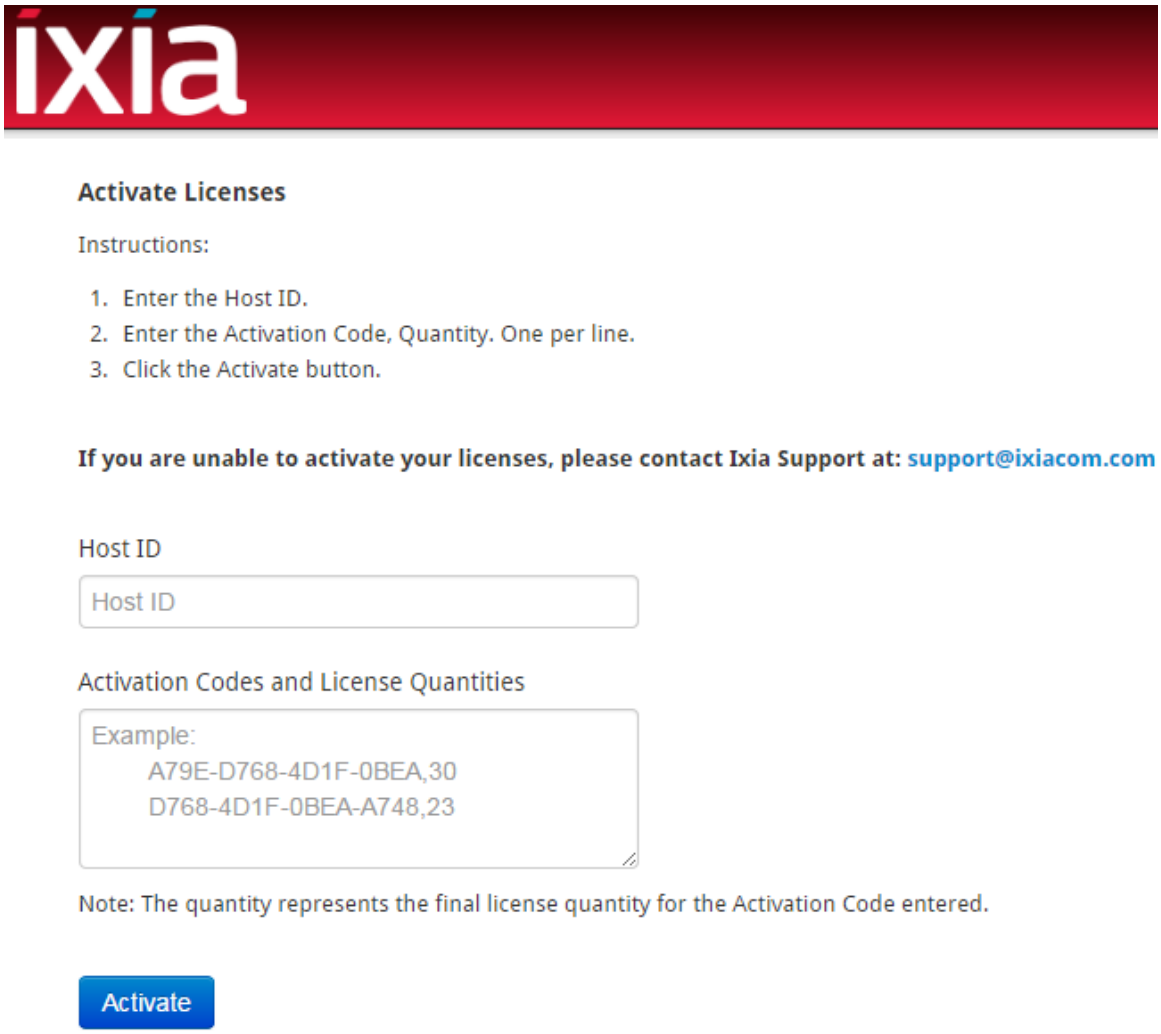
Ensure network connectivity and that the necessary information discussed in Before Starting Activation is available. The steps for offline activation process are as follows:

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

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



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

NOTE

   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.

NOTE

- 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.

NOTE

- 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.

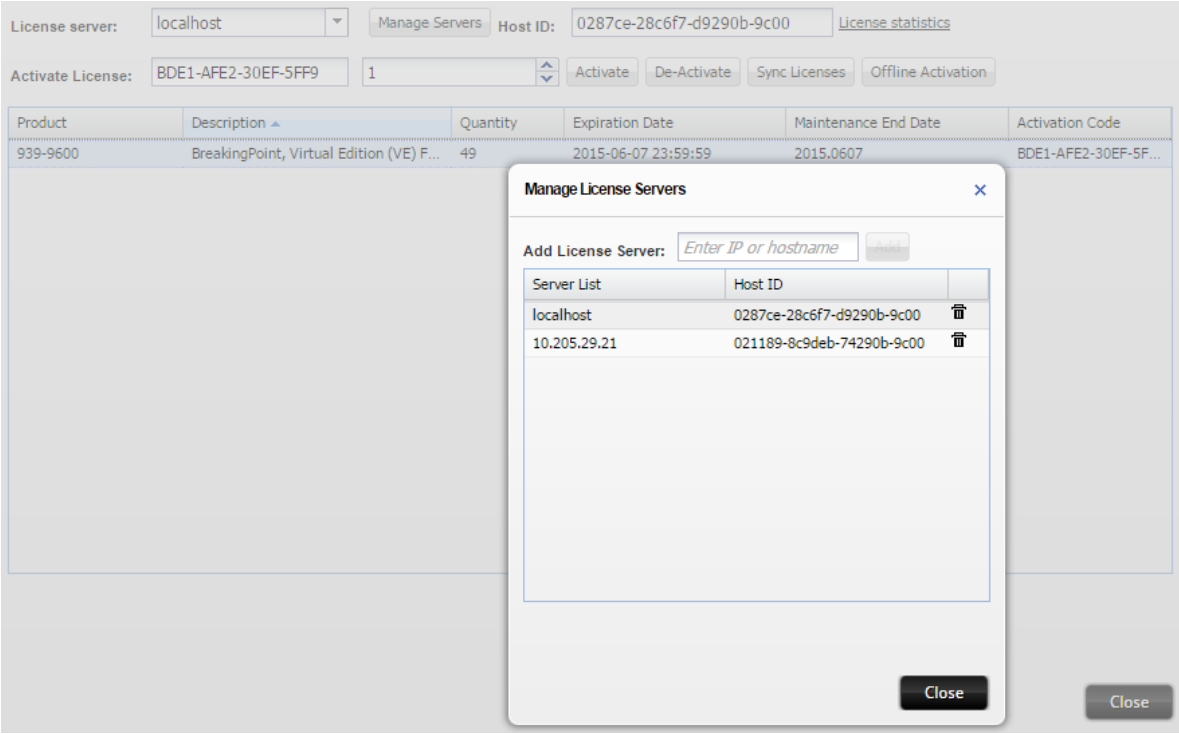
Step 2: Import the License File

To import the license file, perform the following tasks:

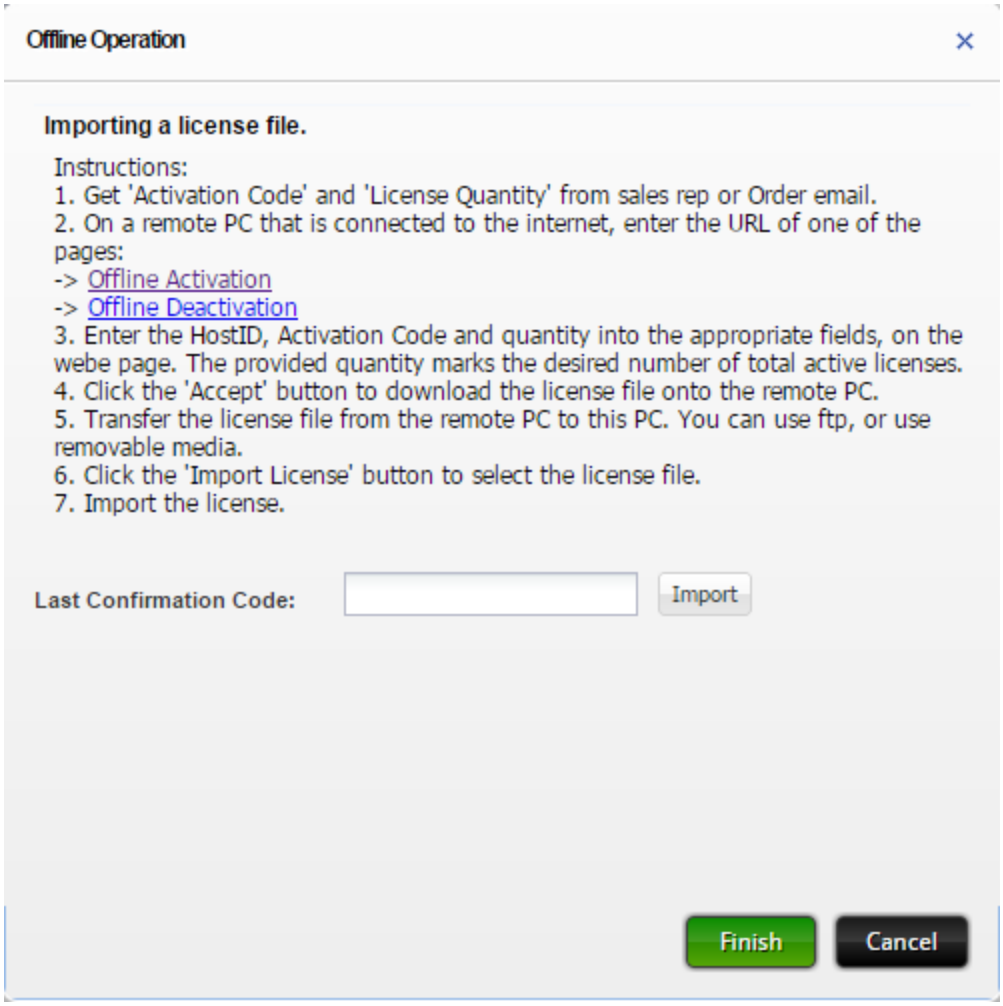
1. Connect to the management IP of the vController.
2. Go to **BPS Session** > **Control Center** > **Administration** > **Licensing**.
   The **VM Licenses** window opens.
3. In the **License server** box, select the license server IP or Localhost.

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.

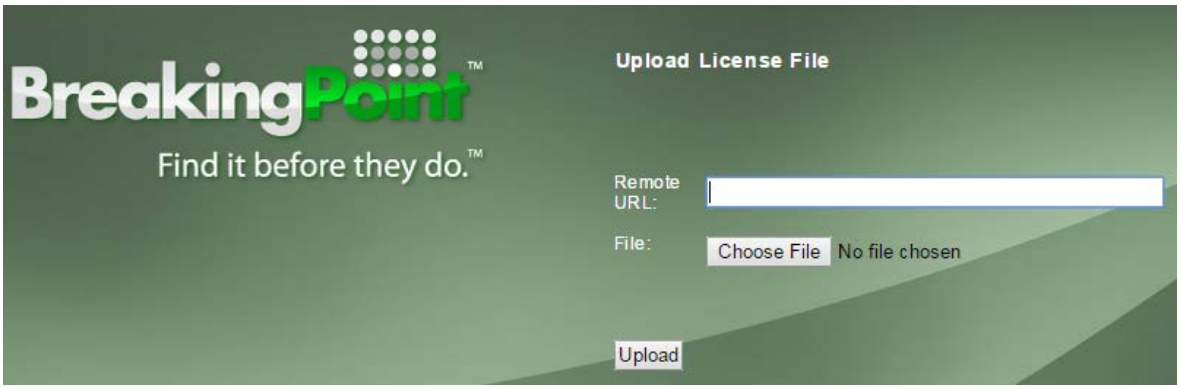


4. Click **Offline Activation**.



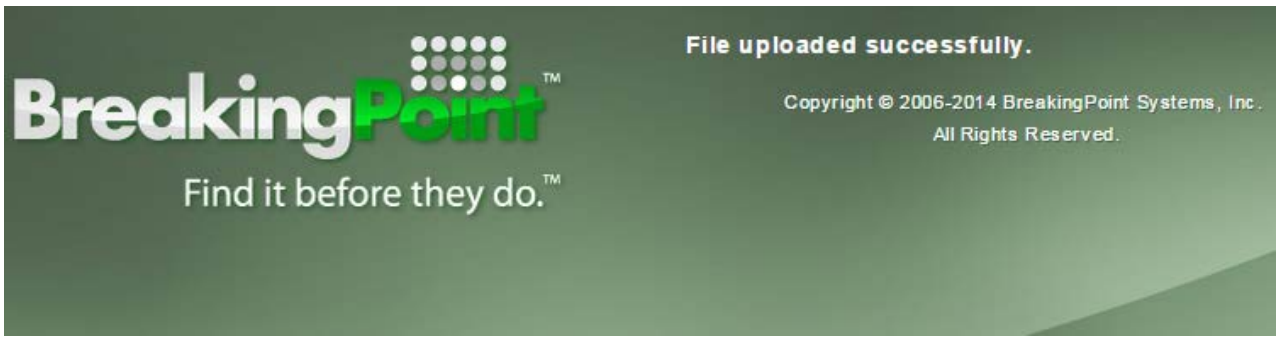
5. In the **Offline Operation** dialog box, Click **Import**.

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



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

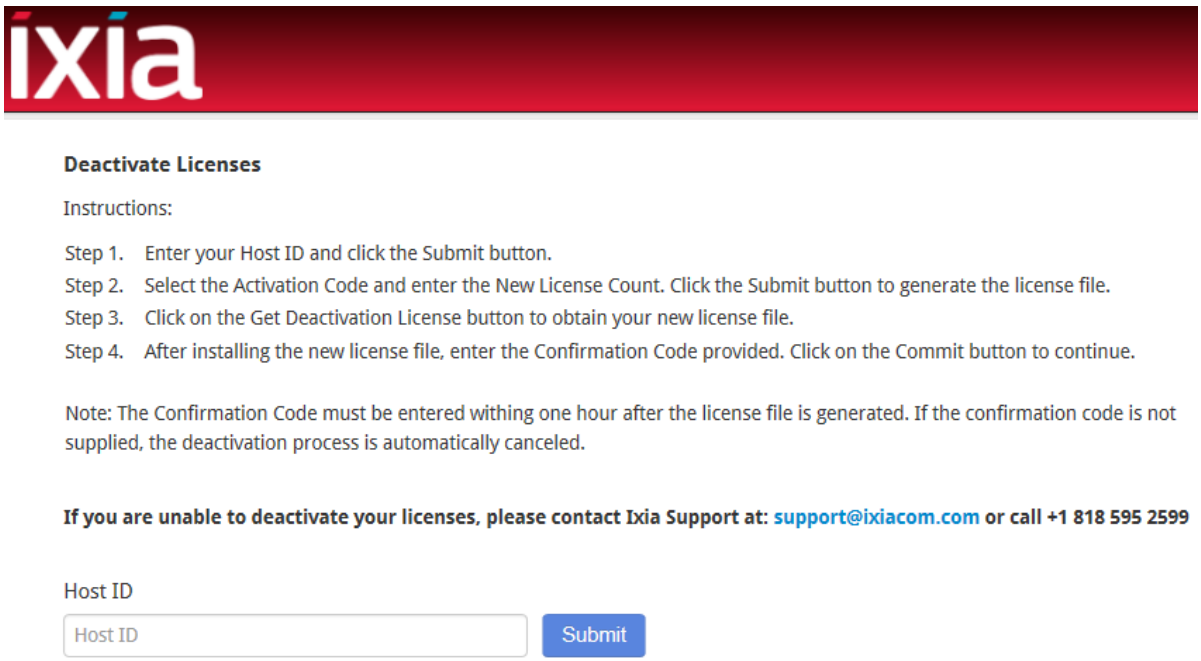
The steps for offline deactivation process are as follows:

- Step 1: Generate License File
- Step 2: Import License File
- Step 3: Submit Confirmation Code

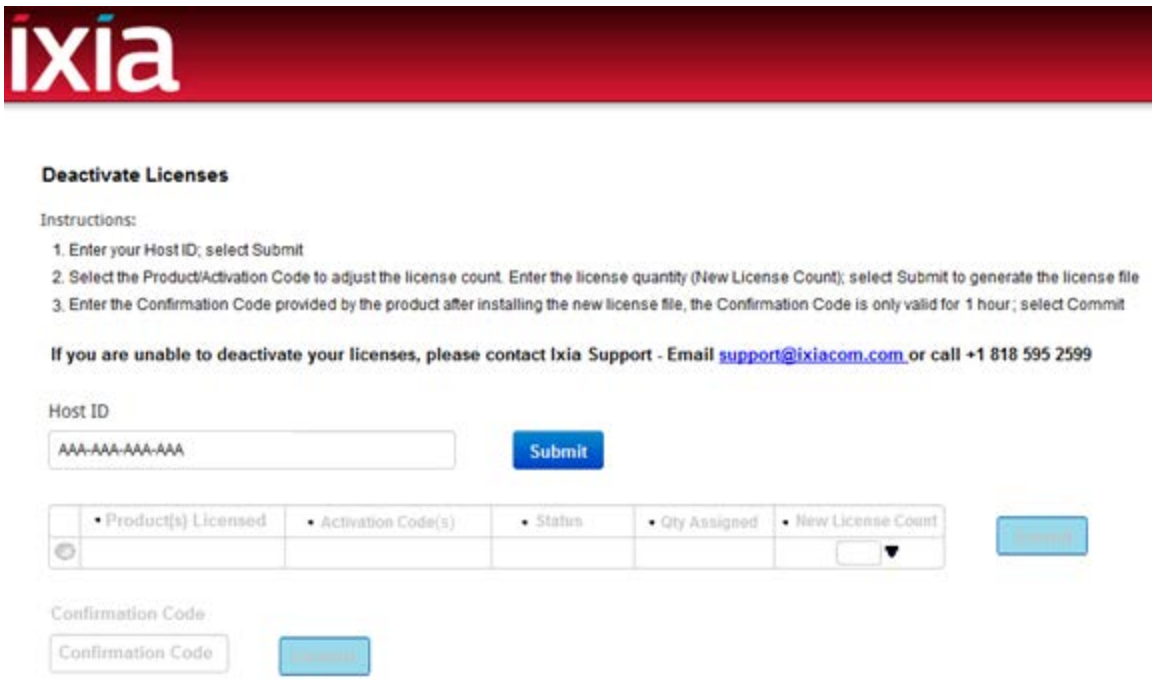
Step 1: Generate License File

To generate the license file, perform the following tasks:

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



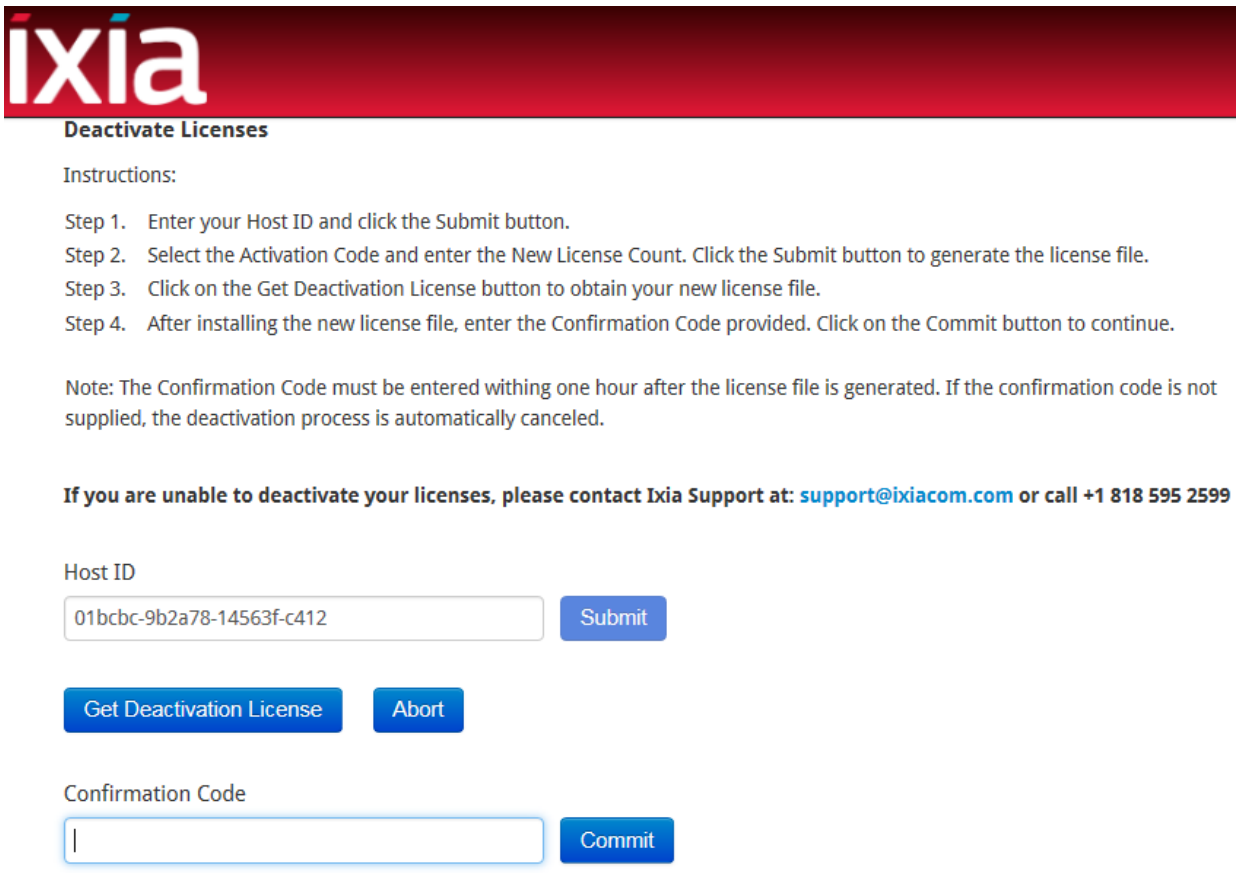
2. In the **Host ID** text box, enter the Host ID of the vController where the licenses are going to be installed.
3. Click **Submit**.
   The system lists all the licenses activated for the specified host.



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.



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 Step 2: Import License File. 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:

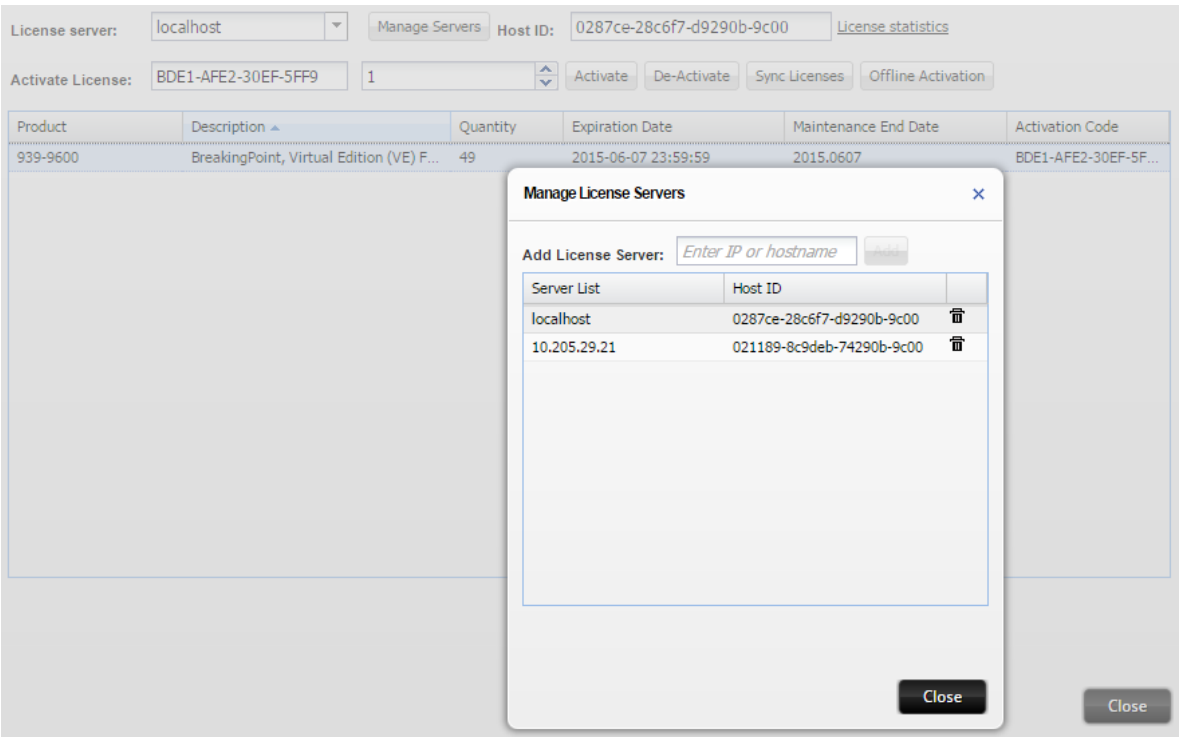
- **Abort** - Cancel the offline deactivation process. The licensed quantities are retained as before.
- **Get Deactivation License** - Generate the deactivation license file that must be imported to the computer installed with BreakingPoint. In case the file is lost, click again to regenerate the license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

Step 2: Import License File

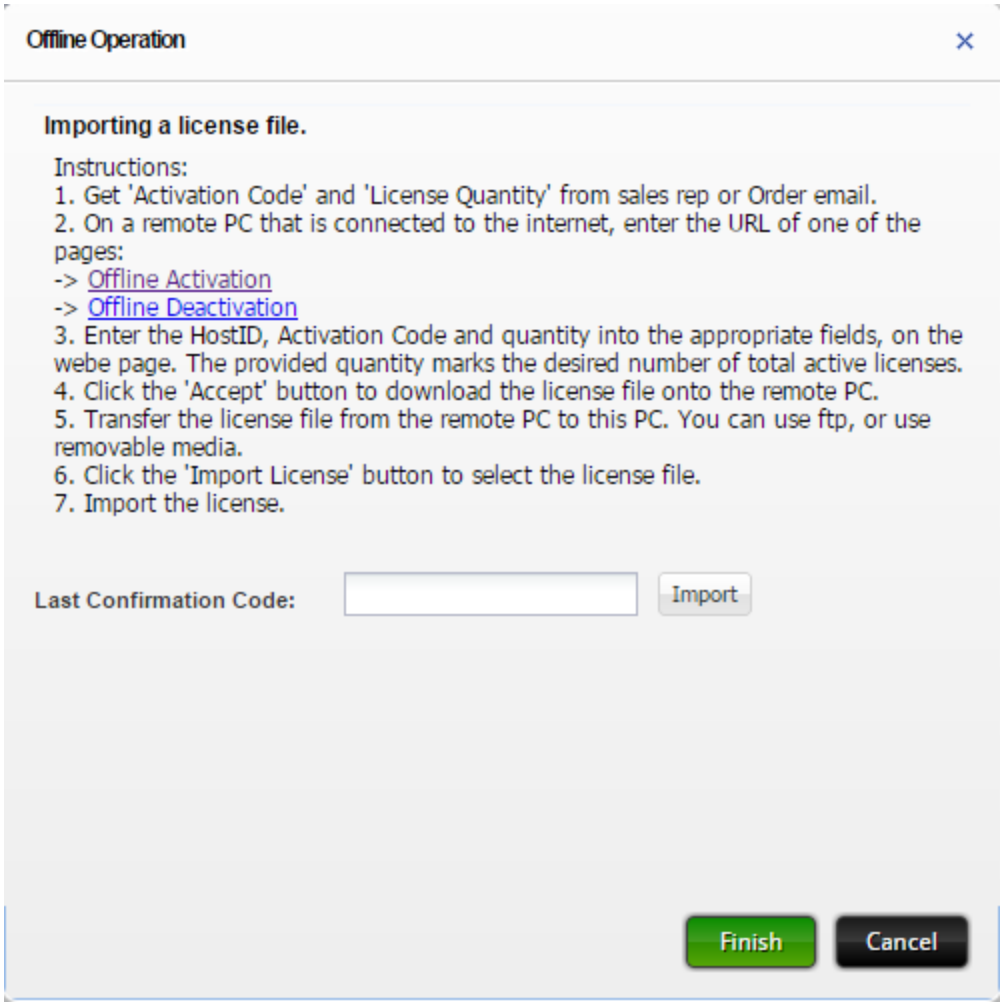
1. Connect to the management IP of the vController using a web browser.
2. In the computer installed with BreakingPoint, click **BPS Session** > **Control Center** > **Administration** > **Licensing**

   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.

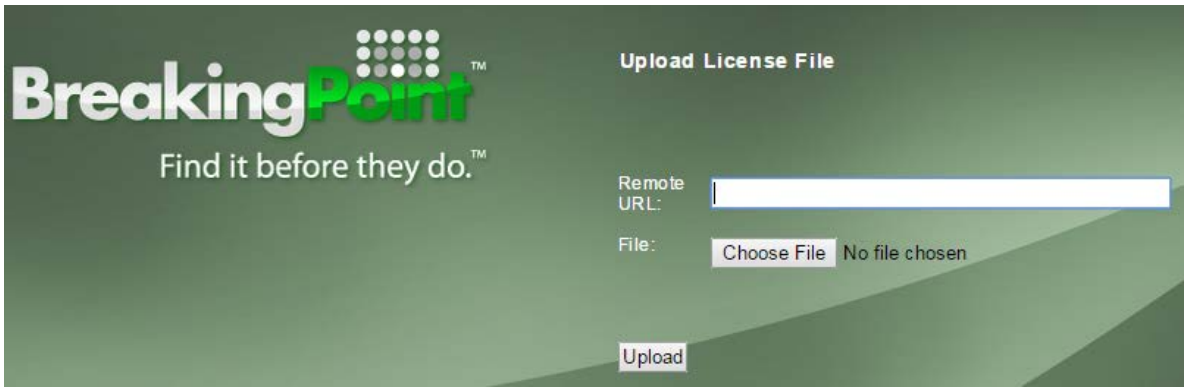


4. Click **Offline Activation**. The **Offline Operation** dialog box opens.



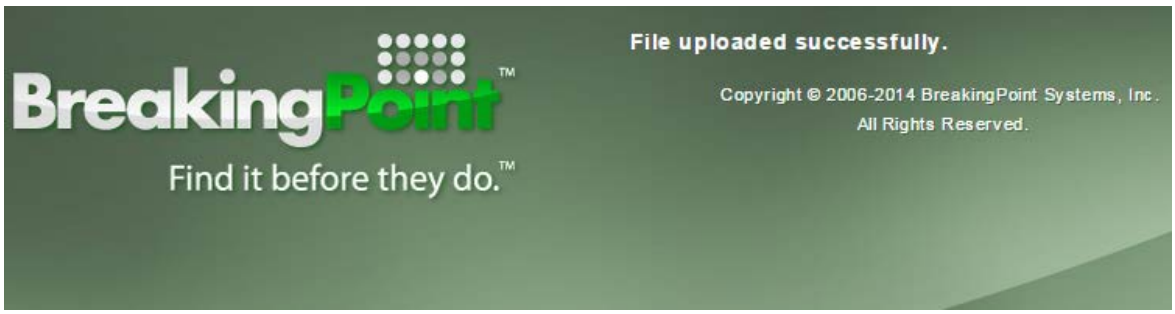
5. Click **Import**.

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



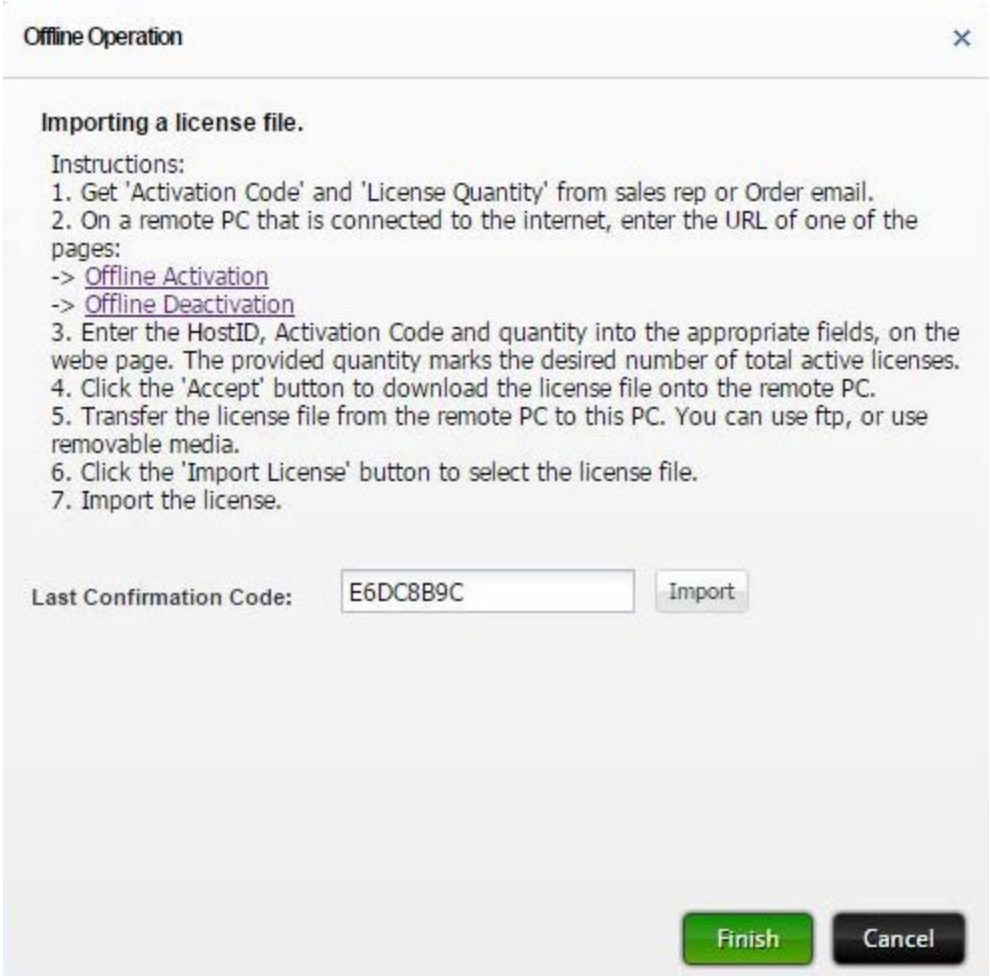
6. Click **Choose File** and open the license file intended for import.
7. Click Upload to complete the import.

   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.



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.
2. Enter the **Confirmation Code**.
3. Click **Commit**.

The license is now deactivated.

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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.
3. 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 Network Topology Diagram) 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

1. 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:/sbin:/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.

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