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Brocade 5600 vRouter Quick Start Guide

Supporting Brocade 5600 vRouter 3.5R6

BROCADE 

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Preface

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Document conventions

The document conventions describe text formatting conventions, command syntax conventions, and important notice formats used in Brocade technical documentation.

Text formatting conventions

Text formatting conventions such as boldface, italic, or Courier font may be used in the flow of the text to highlight specific words or phrases.

Format	Description
bold text	Identifies command names Identifies keywords and operands Identifies the names of user-manipulated GUI elements Identifies text to enter at the GUI
<i>italic text</i>	Identifies emphasis Identifies variables Identifies document titles
<code>Courier font</code>	Identifies CLI output Identifies command syntax examples

Command syntax conventions

Bold and italic text identify command syntax components. Delimiters and operators define groupings of parameters and their logical relationships.

Convention	Description
bold text	Identifies command names, keywords, and command options.
<i>italic text</i>	Identifies a variable.
value	In Fibre Channel products, a fixed value provided as input to a command option is printed in plain text, for example, --show WWN.

Convention	Description
[]	Syntax components displayed within square brackets are optional. Default responses to system prompts are enclosed in square brackets.
{ x y z }	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options. In Fibre Channel products, square brackets may be used instead for this purpose.
x y	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, for example, passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, <i>member[member...]</i> .
\	Indicates a “soft” line break in command examples. If a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

Notes, cautions, and warnings

Notes, cautions, and warning statements may be used in this document. They are listed in the order of increasing severity of potential hazards.

NOTE

A Note provides a tip, guidance, or advice, emphasizes important information, or provides a reference to related information.

ATTENTION

An Attention statement indicates a stronger note, for example, to alert you when traffic might be interrupted or the device might reboot.



CAUTION

A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.



DANGER

A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Brocade resources

Visit the Brocade website to locate related documentation for your product and additional Brocade resources.

You can download additional publications supporting your product at www.brocade.com. Select the Brocade Products tab to locate your product, then click the Brocade product name or image to open the individual product page. The user manuals are available in the resources module at the bottom of the page under the Documentation category.

To get up-to-the-minute information on Brocade products and resources, go to [MyBrocade](#). You can register at no cost to obtain a user ID and password.

Release notes are available on [MyBrocade](#) under Product Downloads.

White papers, online demonstrations, and data sheets are available through the [Brocade website](#).

Contacting Brocade Technical Support

As a Brocade customer, you can contact Brocade Technical Support 24x7 online, by telephone, or by e-mail. Brocade OEM customers contact their OEM/Solutions provider.

Brocade customers

For product support information and the latest information on contacting the Technical Assistance Center, go to <http://www.brocade.com/services-support/index.html>.

If you have purchased Brocade product support directly from Brocade, use one of the following methods to contact the Brocade Technical Assistance Center 24x7.

Online	Telephone	E-mail
<p>Preferred method of contact for non-urgent issues:</p> <ul style="list-style-type: none"> • My Cases through MyBrocade • Software downloads and licensing tools • Knowledge Base 	<p>Required for Sev 1-Critical and Sev 2-High issues:</p> <ul style="list-style-type: none"> • Continental US: 1-800-752-8061 • Europe, Middle East, Africa, and Asia Pacific: +800-AT FIBREE (+800 28 34 27 33) • For areas unable to access toll free number: +1-408-333-6061 • Toll-free numbers are available in many countries. 	<p>support@brocade.com</p> <p>Please include:</p> <ul style="list-style-type: none"> • Problem summary • Serial number • Installation details • Environment description

Brocade OEM customers

If you have purchased Brocade product support from a Brocade OEM/Solution Provider, contact your OEM/Solution Provider for all of your product support needs.

- OEM/Solution Providers are trained and certified by Brocade to support Brocade® products.
- Brocade provides backline support for issues that cannot be resolved by the OEM/Solution Provider.

- Brocade Supplemental Support augments your existing OEM support contract, providing direct access to Brocade expertise. For more information, contact Brocade or your OEM.
- For questions regarding service levels and response times, contact your OEM/Solution Provider.

Document feedback

To send feedback and report errors in the documentation you can use the feedback form posted with the document or you can e-mail the documentation team.

Quality is our first concern at Brocade and we have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission, or you think that a topic needs further development, we want to hear from you. You can provide feedback in two ways:

- Through the online feedback form in the HTML documents posted on www.brocade.com.
- By sending your feedback to documentation@brocade.com.

Provide the publication title, part number, and as much detail as possible, including the topic heading and page number if applicable, as well as your suggestions for improvement.

About This Guide

This guide gets you started using and configuring the Brocade 5600 vRouter (referred to as a virtual router, vRouter, or router in the guide). It describes how to deploy the router and introduces you to the CLI and web GUI interfaces that you can use to access, configure, and manage the router.

Welcome

- [This guide](#)..... 11
- [Additional resources](#)..... 11

This guide

Thank you for choosing the Brocade vRouter.

Brocade has changed the networking world by developing the first commercially supported, open-source networking, security, and service solution that provides an alternative to over-priced, inflexible products from proprietary vendors. Brocade solutions offer industry-standard routing and management protocols, support for most commonly used network interfaces, and configuration through a command-line interface (CLI) or graphical user interface (GUI).

Brocade vRouter delivers the features, performance, and reliability of an enterprise-class secure router with the added benefits of flexible deployment options—x86 hardware, blade servers, virtualization—the freedom to integrate applications, and the economic advantages of commodity hardware and components.

Use this guide to get the following benefits:

- An overview of the deployment options and help to determine the best way to deploy the Brocade vRouter in your environment
- An overview of the user interfaces that are available on the system
- A walk-through of fundamental system configuration based on example scenarios

Additional resources

The Brocade vRouter technical library provides full product documentation. To see what documentation is available for your release, refer to *Guide to Brocade 5600 vRouter Documentation*. This guide is posted with every release of Brocade vRouter software and provides a great starting point for locating the information you need.

Additional resources

Deploying the Brocade vRouter

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- [Install on hardware](#)..... 13
- [Install into a virtualized environment or cloud](#)..... 14

Run from LiveCD

LiveCD runs the Brocade vRouter software on a RAM disk that resides on the host system. The system uses the RAM disk for writeable sections of the file system and uses an external system, such as a TFTP server or USB memory stick, for the storage of configuration files.

LiveCD runs on a system with an existing operating system without disturbing or changing the previously installed operating system. Configuration is not stored on the system, but you can save configuration to a persistent device, such as a USB memory stick. In addition, you cannot upgrade an installation from LiveCD; each upgrade requires fresh LiveCD. While you are running the system from LiveCD, you are not able to access other applications or programs on your system.

LiveCD is also required to install the Brocade vRouter to a persistent device, such as a hard disk.

As a method of deployment, running from LiveCD is best suited for evaluation and test scenarios.

You can read about using LiveCD in *Installing the System: Using a LiveCD*.

Install on hardware

The Brocade vRouter installs and runs on most standard x86 servers and PCs. The system installs from Brocade vRouter LiveCD onto a variety of persistent devices, including a hard drive, USB memory stick, and compact Flash.

You install the system from LiveCD, which you create before installation. The installation process uses LiveCD as the source image, formats the device on which the system is being installed, installs the system, and, if possible, preserves configuration from previous installations. When the installation is completed, you reboot your system and the newly installed system begins running.

NOTE

Not all hardware supports the ability to boot from a USB device or compact Flash; check the BIOS of your hardware to see if it does.

You can read about installing onto a hard disk or other persistent device in *Installing and Upgrading Brocade 5600 vRouter on Hard Disks and Persistent Devices*.

Install into a virtualized environment or cloud

The Brocade vRouter runs as a software appliance in a virtual or cloud computing environment, allowing you to virtualize your network. The Brocade vRouter software appliance is optimized for a number of virtual environments. These environments provide a great deal of flexibility as to how the virtual machine is configured, especially with respect to memory and Ethernet interfaces. Multiple Brocade vRouter systems run simultaneously on a single hardware platform that is configured for multiple virtual machines.

The Brocade vRouter software runs in the following virtual environments:

- [VMware](#) on page 14
- [XenServer](#) on page 14
- [Hyper-V](#) on page 14
- [RedHat KVM](#) on page 15
- [Amazon machine image](#) on page 15

VMware

Like other virtualization platforms, VMware products provide the ability to run multiple virtual systems on a single hardware platform. The Brocade vRouter can be run on VMware ESX and ESXi. VMware ESX and ESXi are virtualization platforms that run directly on system hardware in a 64-bit environment.

Brocade provides a prebuilt VMware template that can be used to create Brocade vRouter virtual machines on VMware ESX or ESXi. Brocade also provides an ISO that can be installed on VMware ESX or ESXi.

You can read about installing onto VMware in *Installing and Upgrading Brocade 5600 vRouter on VMware*.

XenServer

Citrix XenServer is a server virtualization platform. Like other virtualization platforms, XenServer provides the ability to run multiple virtual machines on a single hardware platform.

XenCenter is the management system for XenServer. XenCenter allows you to manage multiple physical servers running XenServer in addition to all the virtual machines running on each physical server.

You can read about installing onto XenServer in *Installing and Upgrading Brocade 5600 vRouter on XenServer*.

Hyper-V

Hyper-V is a hypervisor-based virtualization platform running in a Microsoft Windows Server role. Like other virtualization platforms, it provides the ability to run multiple virtual machines on a single hardware platform.

A Hyper-V system is managed by either Hyper-V Manager or Virtual Machine Manager (VMM). VMM allows you to manage multiple physical machines running Hyper-V in addition to all virtual machines running on each physical server.

You can read about installing onto Hyper-V in *Installing and Upgrading Brocade 5600 vRouter on Hyper-V*.

RedHat KVM

The Brocade vRouter supports the Red Hat Kernel-based Virtual Machine (KVM) hypervisor on Red Hat Enterprise Linux (RHEL). Like other virtualization platforms, the Red Hat KVM provides the ability to run multiple virtual systems on a single hardware platform. Brocade provides a prebuilt system image that runs on the KVM on RHEL.

You can read about installing onto RedHat KVM in *Installing and Upgrading Brocade 5600 vRouter on Linux KVM*.

Amazon machine image

Amazon Web Services (AWS) is the cloud computing service for Amazon. AWS provides the tools and infrastructure required by businesses to run computing environments “within the cloud.”

At the core of AWS is an Amazon Machine Image (AMI). An AMI is a virtual machine template. You instantiate virtual-machine instances from the template within the AWS cloud. A variety of AMIs are available from a number of vendors.

You can read about installing and using a Brocade vRouter AMI in AWS in *Installing and Upgrading Brocade 5600 vRouter AMI*.

Amazon machine image

Creating and Using LiveCD

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- [Creating LiveCD.....](#) 17
- [Specifying the boot device in the system BIOS.....](#) 17
- [Testing the system.....](#) 18

About LiveCD

LiveCD runs the Brocade vRouter software on a RAM disk that resides on the host system. The system uses the RAM disk for writeable sections of the file system and uses an external system, such as a TFTP server or USB memory stick, for the storage of configuration files.

LiveCD runs on a system with an existing operating system without disturbing or changing the previously installed operating system. Configuration is not stored on the system, but you can save configuration to a persistent device, such as a USB memory stick. In addition, you cannot upgrade an installation from LiveCD; each upgrade requires fresh LiveCD. While you are running the system from LiveCD, you are not able to access other applications or programs on your system.

LiveCD is also required to install the Brocade vRouter to a persistent device, such as a hard disk.

As a method of deployment, running from LiveCD is best suited for evaluation and test scenarios.

Creating LiveCD

LiveCD must be bootable. Refer to documentation for your CD-burning utility for information on how to burn a bootable ISO image.

To create a bootable LiveCD disk:

1. Download an ISO software image.
2. Use CD-burning software to create a bootable ISO image. Note the following requirements:
 - The CD must be an ISO image; just copying files onto the CD does not work.
 - The CD must be bootable.

Specifying the boot device in the system BIOS

Insert the LiveCD disk into the CD drive of the system on which you want to run it. If your system is not already configured to boot from a CD or DVD, if one is present, you must configure it to boot from LiveCD.

To specify the boot device:

1. During the boot sequence, press the appropriate key (for example, <F2>) to interrupt the boot sequence and enter the BIOS setup program for your system.
2. In the boot sequence menu, arrange the boot devices such that the device name for the CD or DVD drive is first in the list. This arrangement allows the system to boot from a CD or DVD, if one is present.
3. Save the settings and reboot the system. When the system restarts, it boots from LiveCD.

After the system has booted, confirm that you can access it from your network.

Testing the system

After the system has successfully booted, you see the **vyatta login:** prompt. This prompt indicates that the system is operational.

Perform the following procedures:

- [Verifying the release and system type](#) on page 18
- [Verifying connectivity](#) on page 18

Verifying the release and system type

We must confirm that the correct release version is running on the system.

To verify the release and system type:

1. Log in with the username and password that you provided during installation. During installation, if the default user of `vyatta` was not chosen and a new user was created, then use the new username and password to log in. Use the default password of `vyatta` unless you have changed it.
2. Run the **show version** command.
 - The **Version:** line displays the version number of the system that is running. Make sure that the displayed result is the version you require.
 - The **System type:** line displays the type of hardware on which the system is running and whether it is in a virtual environment. Make sure that the displayed result is the version you require.
 - The **Boot via:** line displays the type of system that is running.

Verifying connectivity

After you confirm that the correct vRouter version is running, you must confirm that the Brocade vRouter can be accessed on the local network. A quick-and-easy way to do this is to configure an Ethernet interface on the system and then ping the interface from another host on the network.

NOTE

In the Brocade vRouter, a dataplane interface is an abstraction that represents the underlying physical or virtual Ethernet interface of the systems. The terms Ethernet interface and dataplane interface are synonymous in this guide.

To test system connectivity:

1. At the command prompt, enter the commands that are shown in the example, substituting an IP address from your existing subnet. The example uses the following network and IP address.

- The network is 192.168.1.0/24.
- The IP address of the interface is 192.168.1.81.

Make the appropriate substitutions for your network, as shown in the following example.

```
vyatta@vyatta:~$ configure
vyatta@vyatta# set interfaces dataplane dp0sN address 192.168.1.81/24
vyatta@vyatta# commit
vyatta@vyatta# save
vyatta@vyatta# exit
vyatta@vyatta:~$
```

2. From another host on the same subnet, ping the interface to ensure that it is up. From a Linux or Windows command prompt, enter the following command, substituting the IP address you assigned to the interface.

```
ping 192.168.1.81
```

If the Brocade vRouter can be reached, you see replies from it in response to the pings. If so, your system is installed and can be accessed on your network.

CLI and Web GUI

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- [Web GUI](#)..... 25

CLI

The Brocade vRouter supports a rich and flexible CLI and a basic web GUI. This chapter provides an introduction to these two interfaces.

With the Brocade vRouter, it is also possible to remotely execute commands by using the Brocade vRouter Remote Access API. For more information about this API, refer to *Brocade 5600 vRouter Remote Access API Reference Guide*.

This section presents the following topics:

- [Vyatta CLI and system shell](#) on page 21
- [Command modes](#) on page 21
- [CLI help](#) on page 22
- [Command completion](#) on page 23
- [Viewing long output \(“more”\)](#) on page 24
- [Showing support information](#) on page 24

Vyatta CLI and system shell

The CLI of the Brocade vRouter includes two kinds of commands:

- Commands for operating and configuring the Brocade vRouter
- Commands provided by the operating system shell in which the Vyatta CLI operates

The commands you can execute depend on your user role and its privileges. However, any command for which you have the privileges to execute, including operating system commands, can be executed from within the Vyatta CLI.

Command modes

The Vyatta CLI has two command modes: operational mode and configuration mode.

- Operational mode provides access to operational commands for showing and clearing information and enabling or disabling debugging as well as commands for configuring terminal settings, loading and saving a configuration, and restarting the system.
- Configuration mode provides access to commands for creating, modifying, deleting, committing and showing configuration information as well as commands for navigating through the configuration hierarchy.

When you log in to the system, the system is in operational mode.

- To enter configuration mode from operational mode, use the **configure** command.
- To return to operational mode from configuration mode, use the **exit** command. If there are uncommitted configuration changes, you must either commit the changes by using the **commit**

command or discard the changes by using the **exit discard** command before you can exit to operational mode.

Entering the **exit** command in operational mode logs you off the system.

Enter configuration mode

In configuration mode, you can set, delete, and show information. Enter configuration mode by using the **configure** command at the command prompt in operational mode.

```
vyatta@vyatta:~$ configure
[edit]
vyatta@vyatta#
```

Notice that the command prompt changes to remind you of the mode.

Exit configuration mode

Exiting configuration mode returns you to operational mode.

```
vyatta@vyatta# exit
exit
vyatta@vyatta:~$
```

CLI help

You can get CLI help by entering or pressing any of the following commands or keys at the command prompt.

Enter or press this	To display this
help	Available system shell commands
help <i>command</i>	Help and usage guidelines for the specified shell command
<Tab> or ?	All available Brocade vRouter commands and completion of commands

Find available commands

At the command prompt in operational mode, press the <Tab> key or the ? key.

```
vyatta@vyatta:~$ <Tab>
Possible completions:
  add          Add an object to a service
  clear       Clear system information
  clone       Clone an object
  configure   Enter configure mode
  copy       Copy an object
  delete     Delete an object
  force      Force an operation
  generate   Generate an object
  install    Install a new system
  monitor    Monitor system information
  mtrace     Show multicast path in ASCII graphic format
  ping       Send IPv4 Internet Control Message Protocol (ICMP) echo request
  poweroff  Poweroff the system
  reboot    Reboot the system
  release    Release specified variable
  rename    Rename an object
```

```

renew          Renew specified variable
reset         Reset a service
restart       Restart a service
set           Set operational options
show          Show system information
telnet        Telnet to a node
traceroute    Track network path to node
update        Update data for a service
vyatta@vyatta:~$

```

Command completion

To save keystrokes when typing command strings, the Brocade vRouter provides two methods of completing commands. The first method allows you to use unambiguous command prefixes when specifying a command. For example, entering **sh configu** in operational mode is equivalent to entering **show configuration**. Entering an ambiguous command prefix, for example, **sh conf**, produces an error message that explains the ambiguity and a list of possible completions. The second method uses the <Tab> key to complete an unambiguous command. For example, typing **sh** <Tab> in operational mode produces **show**. If the command prefix you type is ambiguous, following it with <Tab> produces a list of possible completions. Pressing <Tab> a second time produces help strings for the list of possible completions.

NOTE

The ? key, like the <Tab> key, provides help strings for commands.

Use command completion on an unambiguous command

The following example shows how to request command completion for the **sh** entered string. In this example, the command to be completed is unambiguous.

```

vyatta@vyatta:~$ sh<Tab>
vyatta@vyatta:~$ show

```

Use command completion on an ambiguous command

The following example shows how to request command completion for the **s** entered string. In this case, more than one command can complete the entry and the system lists all valid completions.

```

vyatta@vyatta:~$ s<Tab>
set          show
vyatta@vyatta:~$ s

```

Display help strings for commands

The following example shows how to request command completion for the **s** entered string a second time. In this case, help strings for the possible completions are displayed.

```

vyatta@vyatta:~$ s<Tab>
Possible completions:
  save          Save configuration to a file
  set           Set the value of a parameter or create a new element
  show          Show the configuration (default values may be suppressed)
vyatta@vyatta:~$ s

```

Viewing long output (“more”)

If the information being displayed is too long for your screen, the screen indicates a line number where the information breaks. The Linux operating system provides several commands for controlling information in a “more” display; the following table shows a few important ones. (Refer to Linux documentation for additional control of “more” displays.)

To do this	Press this
Exit “more”	q
Scroll down one whole screen	<Space>
Scroll up one whole screen	b
Scroll down one line	<Enter>
Scroll up one line	<Up Arrow>

Show system configuration

Entering **show** in configuration mode displays information that you have explicitly set. Entering **show -all** displays information that you have set plus all default information.

Enter configuration mode and enter **show -all** at the command prompt. The full default system and the “more” prompt are displayed. (Some lines have been removed from the example to save space.)

```
vyatta@vyatta:~$ configure
[edit]
vyatta@vyatta# show -all
...
interfaces {
    dataplane dp0p160p1 {
        address 10.1.17.201/24
        mtu 1500
    }
    loopback lo {
    }
}
...
```

Exit from a “more” display

Within the “more” display, enter **q**. You are returned to the command prompt.

```
    dataplane dp0p1p4{
        address 192.168.1.85/24
        duplex auto
        hw-id 00:14:bf:5a:84:f9
        speed auto
    }
: q
[edit]
vyatta@vyatta#
```

Showing support information

If you have to report a bug or request support, you need to supply version information for your software. You can supply this information in operational mode.

Show support information

If you are in configuration mode, return to operational mode.

```
vyatta@vyatta# exit
exit
vyatta@vyatta:~$
```

Enter the **show version** command to display version information.

```
vyatta@vyatta:~$ show version
Version:          3.2R1
Description:     Brocade Vyatta vRouter 5600 3.2 R1
Copyright:      2006-2014 Vyatta, a Brocade Company.
Built on:       Sun Apr 27 22:16:24 UTC 2014
System type:    Intel 64bit
Boot via:       image
Hypervisor:     VMware
HW model:       VMware Virtual Platform
HW S/N:         VMware-56 4d 09 36 a8 b1 e4 0c-b7 44 63 5d ef f6 ab 1a
HW UUID:        564D0936-A8B1-E40C-B744-635DEFF6AB1A
Uptime:         17:53:45 up 10 min,  2 users,  load average: 0.02, 0.04, 0.05
vyatta@vyatta:~$
```

Web GUI

The web GUI is an alternative user interface for interacting with the Brocade vRouter. For security reasons, the GUI is turned off by default. If you want to use the GUI, you must enable it through the CLI.

Any operation that can be performed through the CLI (except enabling the GUI) can also be performed through the web GUI. The GUI essentially reflects the structure of the CLI; in particular, the command hierarchy in the GUI follows the basic CLI configuration structure. If you are familiar with the CLI, the structure of the GUI should be straightforward to understand.

Supported browsers include Firefox 3, Internet Explorer 7 and 8, and Google Chrome 5.

This section presents the following topics:

- [Enabling access to the web GUI](#) on page 25
- [Logging in to the web GUI](#) on page 26
- [Basic navigation in the web GUI](#) on page 27
- [Dashboard](#) on page 27
- [Statistics](#) on page 29
- [Configuration](#) on page 29
- [Operation](#) on page 31

Enabling access to the web GUI

All you have to do to access the web GUI is to enable the HTTP Secure (HTTPS) service. (Note that enabling HTTPS access allows only access to the web GUI; it does not provide general SSL access.)

To access the web GUI from the network, you also have to configure an Ethernet interface with an IP address. In the examples, it is assumed that you have configured an Ethernet interface with an IP address.

To enable web GUI access

In configuration mode, enable HTTPS access to the web GUI on the Brocade vRouter and commit the change.

```
vyatta@R1# set service https
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Logging in to the web GUI

For security purposes, all communication to the web GUI is over HTTPS, the secure version of HTTP, using a self-signed certificate. As with any self-signed certificate, when you initially connect with a web browser you may receive a warning that the certificate is not trusted. Because this certificate is generated on the Brocade vRouter specifically for browser access, this message can be safely ignored and the certificate stored for future access.

To access and log in to the GUI

NOTE

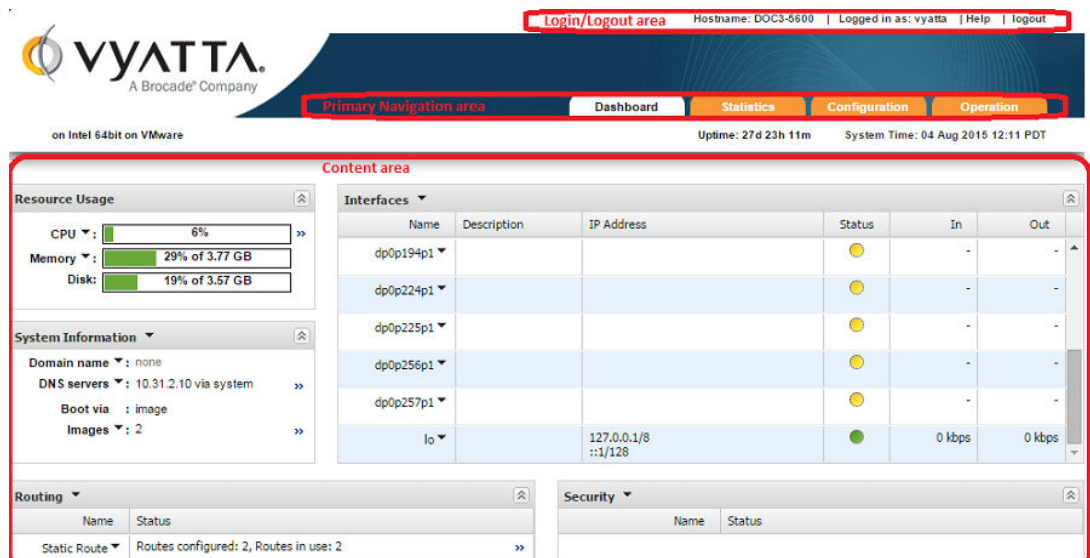
For security reasons, it is strongly recommended that each user accessing the system from a web browser have an individual user account.

1. Point your web browser at the IP address defined for the Ethernet interface. (Prefixing the IP address with **https://** is optional.) The login screen opens in your browser.
2. Log in. Any nonroot user may log in to the router through the GUI. Root login through the GUI is not supported for security reasons. The default nonroot user ID and password are as follows:

```
User name: vyatta
Password: vyatta
```

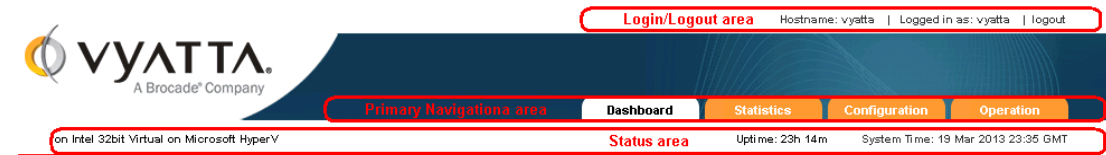
Passwords are independent of the means of access: the CLI and the GUI use the same login credentials.

After you have logged in, the web GUI opens to its dashboard.



Basic navigation in the web GUI

On the Dashboard screen, notice three areas of the screen that are common to all web GUI pages: the **Login**, the **Primary Navigation area**, and the **Status area**. These areas occur on all web GUI screens.



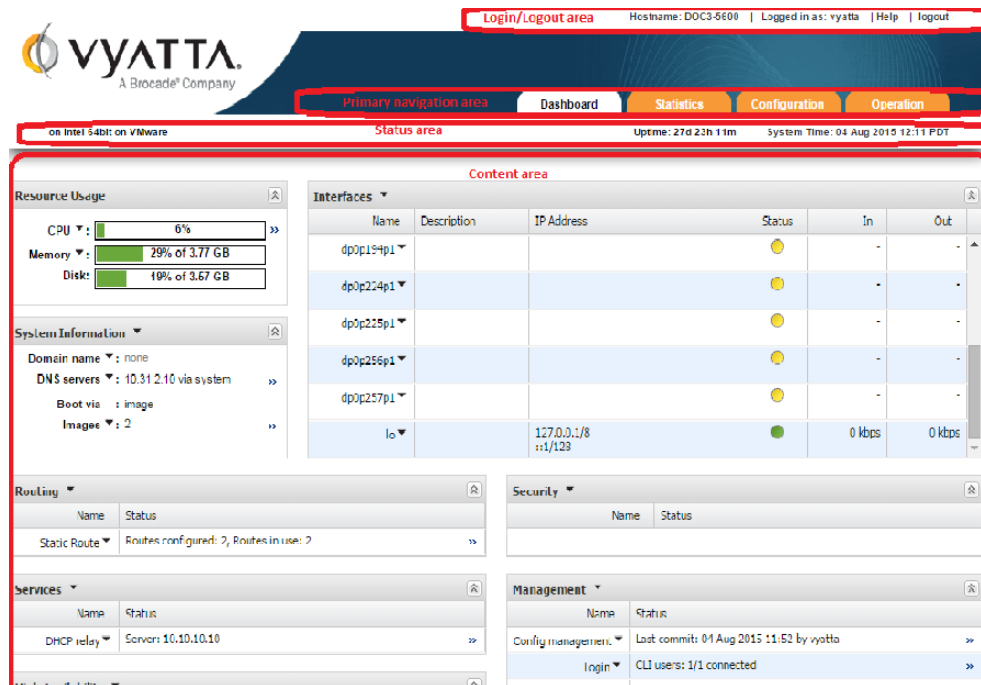
The **Login** or **Logout area** provides information about the system being accessed and the username of the user who is logged in. There is also a **logout** link you can use to log off the system. The host name specified in the **Login** or **Logout area** is a hyperlink. You can click the link to quickly navigate to the **Configuration** tab, where you can configure the host name.


The **Primary Navigation area** provides tabs to allow you to move back and forth between the main areas of the GUI: **Dashboard**, **Statistics**, **Configuration**, and **Operation**.


The **Status area** shows you the version of the system you are running, amount of time the system has been up, and system time. The system time is a hyperlink. You can click the link to quickly navigate to the **Configuration** tab, where you can change the system time.

Dashboard


The **Content area** of the **Dashboard** displays operational status and configuration for key areas of the system.



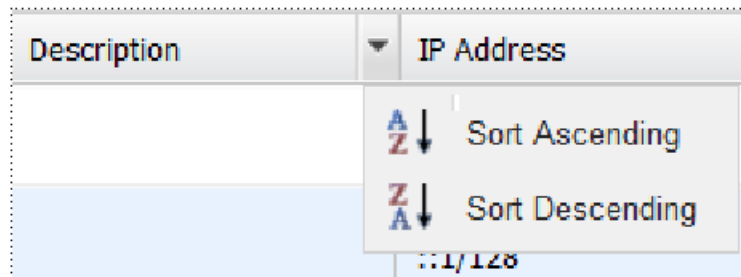
Expand or collapse information by clicking the Expand/Collapse icon 

The Down Arrow icon  gives you access to a context-sensitive menu.

- When the Down Arrow icon appears in the header of a subsection, clicking the icon allows you to configure items within the subsection (provided your user account has the privileges to do so).
- When the Down Arrow icon appears within a form or table row, clicking the icon allows you to configure the item to the left of the icon or run operational commands associated with the item to the left of the icon (provided your user account has the privileges to do so).

Clicking the Right Arrow icon  allows you to access more-detailed information for an item.

To sort a table column, place the cursor over the column header. A Down Arrow icon appears at the right side of the column header. If the column can be sorted, then clicking this icon opens menu options to sort the column in ascending or descending order. (If the column cannot be sorted, this menu is grayed out.)



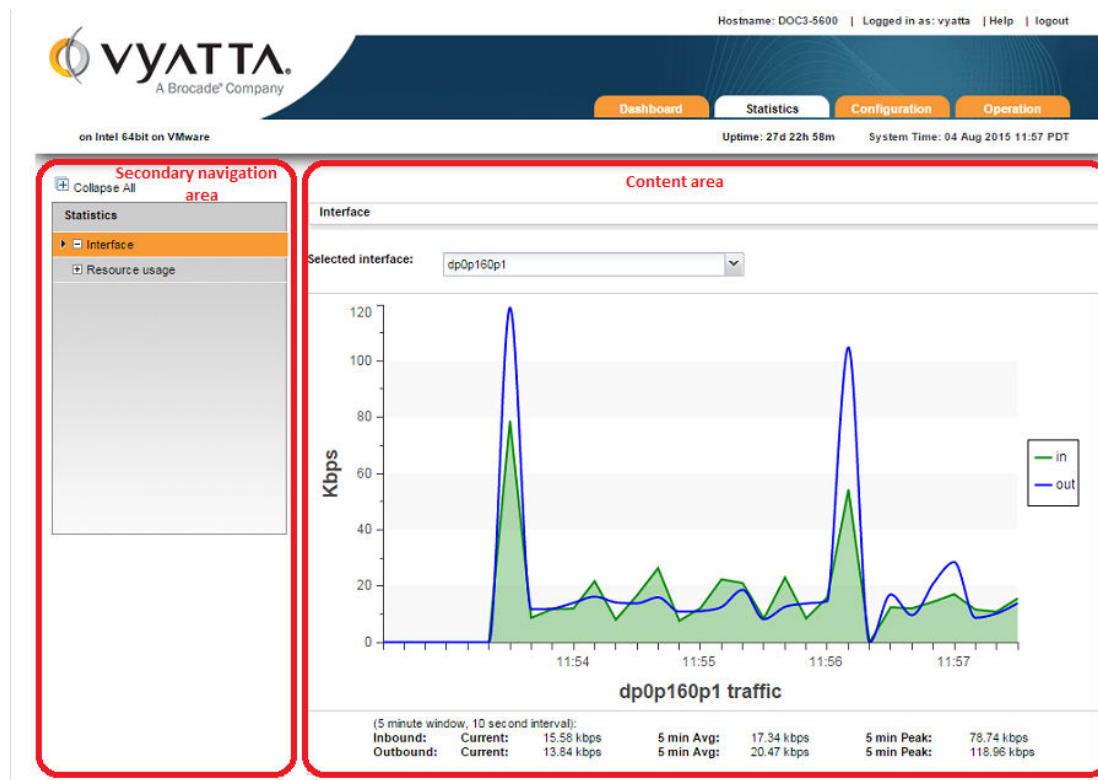
Statistics

The **Statistics** screen shows a visual representation of ongoing system statistics you select.

The **Secondary navigation area** allows you to navigate to the system component for which you want to see statistics.

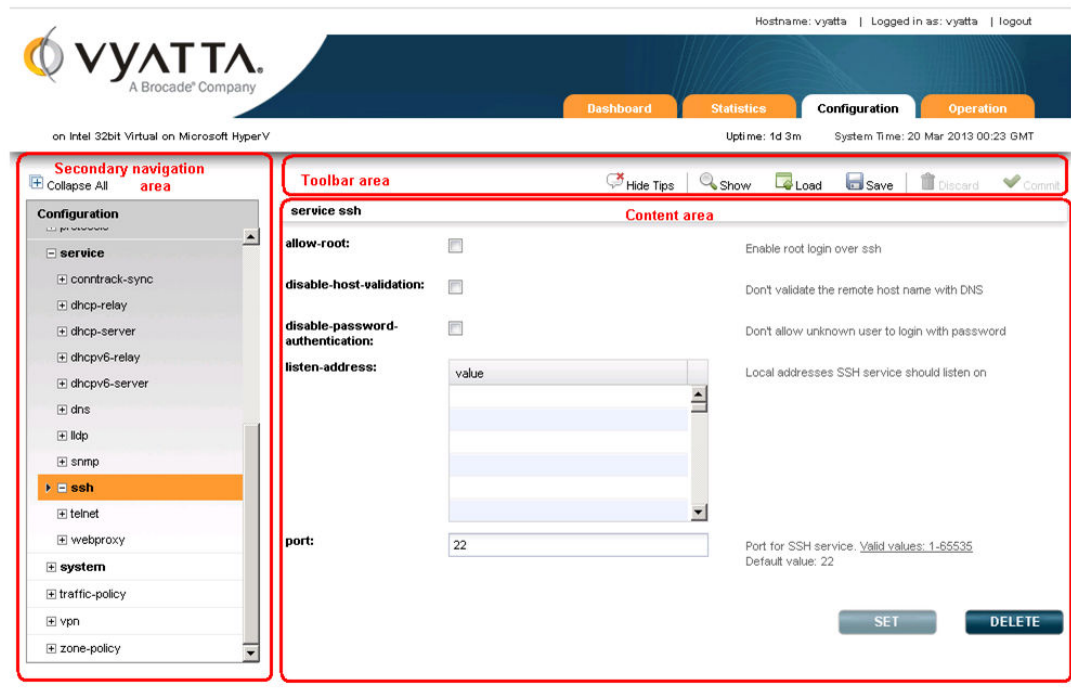
The **Content area** shows real-time statistics for the selected component.

The following **Statistics** screen displays statistics for the eth1 interface.



Configuration

The **Configuration** screen allows you to configure system components. The configuration options available on this screen are the same as the configuration options available in the Vyatta CLI. To learn about these options, refer to the Brocade vRouter documentation.



The **Toolbar area** of the **Configuration** screen provides access to tools that are available for a given configuration command. The following buttons are available on the toolbar:

- **Hide Tips** or **Show Tips**: Toggles between showing and hiding help tips within the **Content area**.
- **Show**: Displays the proposed configuration. New or modified fields are indicated with a plus sign (+). Deleted fields are indicated with a minus sign (-). After the proposed configuration is committed and becomes the active configuration, these indicators are removed.
- **Load**: Loads the specified configuration to become the active configuration. The configuration file specified can be local or remote.
- **Save**: Saves the active configuration. The file can be stored either locally or remotely.
- **Discard**: Discards any changes (indicated by yellow dots) that have been made before **Commit** is pressed.
- **Commit**: Commits changes to the active configuration.

The **Secondary navigation area** allows you to navigate to the component you want to configure. As you progress down the navigation hierarchy, control is passed to the appropriate level within the hierarchy.

The **Content area** is where configuration is modified. The following buttons are available in context within the **Content area**:

- **Set**: Confirms changes made to the current screen. Pressing **Commit** activates the changes.
- **Delete**: Removes the selected configuration node. Pressing **Commit** activates the change.
- **Create**: Creates a new configuration node. Pressing **Commit** activates the change.
- **Add**: Adds an entry to a multivalued leaf node. Pressing **Commit** activates the change.
- **Trash can**: Removes an entry from a multivalued leaf node. Pressing **Commit** activates the change.

The following indicators provide information regarding commands and configuration fields:

- **Bold text in the hierarchy**: Indicates that the node is currently configured on the system.
- **Plain text in the hierarchy**: Indicates that the node is not currently configured in the system but is available for configuration.

- **Red asterisk:** Indicates that a field is a required field.
- **Yellow dot:** Indicates that the configuration has been modified. A - inside the dot indicates that the node is to be deleted. Pressing **Commit** activates the change.
- **Red dot:** Indicates that the configuration is in error and must be changed before it is accepted.

Operation

The **Operation** screen allows you to run operational commands. These commands are the same commands that are available in operational mode within the CLI. To learn about these commands, refer to the Brocade vRouter documentation.

The screenshot shows the Brocade vRouter web interface. At the top, the Vyatta logo and navigation tabs (Dashboard, Statistics, Configuration, Operation) are visible. The 'Operation' tab is active. On the left, the 'Secondary navigation area' contains a tree view of operational commands, with 'interfaces' selected. The main 'Content area' displays the output of the 'show interfaces' command for the interface 'dpOp16Op1'. The output includes interface details and statistics for RX and TX.

```

dpOp16Op1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 500
link/ether 00:0c:29:43:52:84 brd ff:ff:ff:ff:ff:ff link-netnsid 2415938
inet 10.18.170.203/24 brd 10.18.170.255 scope global dpOp16Op1
    valid_lft forever preferred_lft forever
inets fe80::20c:129ff:fe43:5284/64 scope link
    valid_lft forever preferred_lft forever
uptime: 27 days, 23 hours, 5 minutes, and 38 seconds transitions: 1 last-change: 2015-07-07T12:59:46-0700

RX: bytes  packets  errors  ignored  overrun  mcast
   83400391 1334472    0      146      0      1214696
TX: bytes  packets  errors  dropped  carrier  collisions
   4672286   34694    0        0        0          0
  
```

The **Secondary navigation area** at the left allows you to navigate among the available operational commands.

The **Content area** is where commands are run and output, if any, is displayed.

The following buttons are available within the **Content area** of the **Operation** screen:

- **Run:** Runs the selected command.
- **Stop:** Stops the output for commands that generate output.
- **Pause:** Pauses the output for commands that generate output.

The **Operation** screen also has a toolbar. The following button is available within the toolbar:

- **Hide Tips** or **Show Tips:** Toggles between showing and hiding help tips within the **Content area**.

Quick Start Configuration Scenarios

- [Configuration Basics in the CLI](#)..... 33
- [Scenario: Basic System Configuration](#)..... 38
- [Scenario: Internet Gateway](#)..... 42

Configuration Basics in the CLI

This section presents the following topics:

- [Configuration hierarchy](#) on page 33
- [Adding and modifying configuration](#) on page 33
- [Deleting configuration](#) on page 34
- [Committing configuration changes](#) on page 35
- [Discarding configuration changes](#) on page 35
- [Saving configuration](#) on page 36
- [Loading a configuration](#) on page 37
- [Changing the default configuration file](#) on page 37

Configuration hierarchy

From a system perspective, a configuration *leaf node* is different from a simple configuration *nonleaf node*. A configuration leaf node takes the form *node value* , as in the following example.

```
protocol-version v2
```

A nonleaf node always has an enclosing pair of braces ({}), which may be empty, as in the following example.

```
loopback lo {  
}
```

or nonempty, as in the following example.

```
ssh {  
  port 22  
  protocol-version v2  
}
```

Adding and modifying configuration

Add new configuration by creating a configuration node with the **set** command in configuration mode. Modify existing configuration also by using the **set** command in configuration mode.

Add configuration

In configuration mode, set the IP address of the dp0p1p1 Ethernet interface by using the **set** command.

```
vyatta@vyatta# set interfaces dataplane dp0p1p1 address 192.0.2.21/24
[edit]
vyatta@vyatta#
```

Note that the configuration node for the dp0p1p1 interface already exists, assuming that your system has at least one Ethernet interface. It exists because the system automatically discovers physical interfaces on startup and creates configuration nodes for them. For the same reason, the hardware ID (MAC address) of the dp0p1p1 interface is also known to the system.

Now use the **show** command to see the addition.

```
vyatta@vyatta# show interfaces dataplane dp0p1p1
+address 192.0.2.21/24
  hw-id 00:13:46:e6:f6:87
[edit]
vyatta@vyatta#
```

Notice the plus sign (+) in front of the new statement. This + shows that this statement has been added to the configuration, but the change is not yet committed. The change does not take effect until configuration is committed by using the **commit** command.

Another option is to use the **compare** command to see the change.

```
vyatta@vyatta# compare
[edit interfaces dataplane dp0p1p1]
+address 192.0.2.21/24
[edit]
vyatta@vyatta#
```

The configuration tree is nearly empty when you first start up, except for a few automatically configured nodes. You must create a node for any functionality you want to configure on the system. When a node is created, any default values that exist for its attributes are applied to the node.

Modify configuration

For the most part, modifying configuration is the same as adding configuration by using the **set** command. This modification works for identifiers of nodes containing a single instance. To change the identifier of a node for which there can be multiple instances (a “multinode”), such as a DNS server or an IP address for an interface, you must delete the node and recreate it with the correct identifier.

You can modify configuration from the root of the configuration tree or use the **edit** command to navigate to the part of the tree where you want to make a change or an addition. Edit mode allows you to abbreviate a series of similar configuration commands.

Deleting configuration

You delete configuration statements, or complete configuration nodes by using the **delete** command.

Delete configuration

Delete a configuration node.

```
vyatta@vyatta# delete interfaces dataplane dp0p1p1 address 192.0.2.21/24
[edit]
vyatta@vyatta#
```

Now use the **show** command to see the deletion.

```
vyatta@vyatta# show interfaces dataplane dp0p1p1
-address 192.0.2.21/24
 hw-id 00:13:46:e6:f6:87
[edit]
vyatta@vyatta#
```

Notice the minus sign (-) in front of the deleted statement. This - shows that this statement has been deleted from the configuration, but the change is not yet committed. The change does not take effect until configuration is committed by using the **commit** command.

Another option is to use the **compare** command to see the change.

```
vyatta@vyatta# compare
[edit interfaces dataplane dp0p1p1]
-address 192.0.2.21/24
vyatta@vyatta#
```

Some configuration nodes and statements are mandatory; these nodes and statements cannot be deleted. Some configuration statements are mandatory but have default values; if you delete one of these statements, the default value is restored.

Committing configuration changes

In the Brocade vRouter, configuration changes do not take effect until you commit them.

Uncommitted changes are flagged with a plus sign (+) for additions, a greater-than sign (>) for modifications, and a minus sign (-) for deletions.

```
vyatta@vyatta# show interfaces dataplane dp0p1p1
-address 192.08.2.21/24
 hw-id 00:13:46:e6:f6:87
[edit]
vyatta@vyatta#
```

Commit configuration changes

Commit any uncommitted changes by entering the **commit** command in configuration mode.

After you commit the changes, the indicator disappears. Notice also that the nonmandatory configuration node (**address**) is removed from the configuration.

```
vyatta@vyatta# commit
[edit]
vyatta@vyatta# show interfaces dataplane dp0p1p1
 hw-id 00:13:46:e6:f6:87
[edit]
vyatta@vyatta#
```

Discarding configuration changes

Instead of deleting many specific changes, you can abandon all changes made within a configuration session by using the **discard** command or by using the **exit** command with the **discard** option.

Discard configuration changes by using discard

Using the **discard** command is the same as deleting all changes made within a configuration session and then committing the changes. Notice also that after the **discard** command has run, you stay in configuration mode.

```
vyatta@vyatta# show interfaces dataplane dp0p1p1
+address 192.0.2.21/24
+description "This is a test"
  hw-id 00:13:46:e6:f6:87
[edit]
vyatta@vyatta# discard
Changes have been discarded
[edit]
vyatta@vyatta# show interfaces dataplane dp0p1p1
  hw-id 00:13:46:e6:f6:87
[edit]
vyatta@vyatta#
```

You cannot exit from configuration mode with uncommitted configuration changes; you must either commit the changes or discard them. If you do not want to commit the changes, you can discard them by using the **exit** command with the **discard** option.

Discard configuration changes by using exit discard

Try exiting from configuration mode with uncommitted configuration changes; you are not able to do so. Discard the changes by entering the **exit discard** command.

```
vyatta@vyatta# exit
Cannot exit: configuration modified.
Use 'exit discard' to discard the changes and exit.
[edit]
vyatta@vyatta# exit discard
exit
vyatta@vyatta:~$
```

Saving configuration

The running configuration can be saved by using the **save** command in configuration mode. By default, configuration is saved to the **config.boot** file in the **/config** configuration directory.

The **save** command writes only committed changes. If you try to save uncommitted changes, the system warns you that it is saving only the committed changes.

NOTE

Unless you save your configuration changes to the default configuration file, they do not persist when the system is restarted. On restart, the configuration is loaded from the **config.boot** file.

Save configuration to the default configuration file

Save the configuration to the **config.boot** file in the default directory by entering **save** in configuration mode.

```
vyatta@vyatta# save
Done
[edit]
vyatta@vyatta#
```

Saving configuration to another file

Save the configuration to a different file in the default directory by specifying a different file name.

```
vyatta@vyatta# save testconfig
Saving configuration to '/config/testconfig'...
Done
[edit]
vyatta@vyatta#
```

Saving the configuration to a file provides the ability to have multiple configuration files for different situations (for example, test and production).

You can also save a configuration file to a location path other than the standard **/config** configuration directory by specifying a different path. You can save to a hard drive, compact Flash, or USB device by including the directory on which the device is mounted in the path.

Loading a configuration

A configuration can be loaded by using the **load** command in configuration mode. You can load only a file that has first been saved by using the **save** command.

Load a configuration from the default directory

Load a configuration from the default directory by specifying only the file name.

```
vyatta@vyatta# load testconfig
Loading configuration file /config/testconfig...
No configuration changes to commit
Done
[edit]
vyatta@vyatta#
```

To load a configuration from a directory other than the default directory, the full path must be specified.

Changing the default configuration file

To change the default configuration file to one that you have previously saved, use both the **load** and **save** commands.

Load a previously saved configuration and save it as the default configuration

Load the previously saved configuration file (**testconfig**) from the default directory by specifying only the file name and then save it to the default file (**config.boot**).

```
vyatta@vyatta# load testconfig
Loading configuration file /config/testconfig...
No configuration changes to commit
Done
[edit]
vyatta@vyatta# save
Saving configuration to '/config/config.boot'...
Done
[edit]
vyatta@vyatta#
```

At this point, the configurations in the **testconfig** and **config.boot** files are the same. The currently active configuration is the same as what is loaded when the system restarts.

Scenario: Basic System Configuration

This section steps you through initial system configuration tasks by using the CLI. These tasks are required for almost any scenario in which you might use the Brocade vRouter. The tasks include the following:

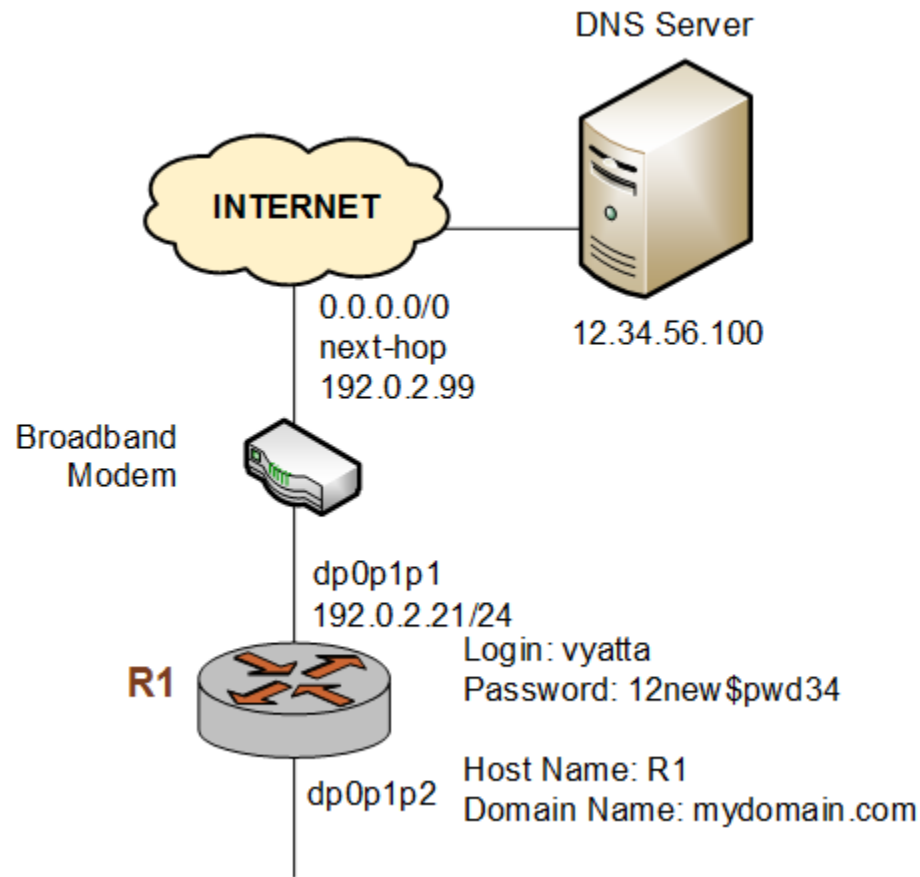
- [Overview](#) on page 38
- [Logging in](#) on page 39
- [Entering configuration mode](#) on page 39
- [Setting the host name](#) on page 40
- [Setting the domain name](#) on page 40
- [Changing the password](#) on page 40
- [Configuring interfaces](#) on page 41
- [Configuring access to a DNS server](#) on page 42
- [Saving the configuration](#) on page 42

Overview

The figure and examples shown in the basic system configuration scenario employ a system with two Ethernet interfaces: one interface to the office LAN and the other to the Internet. This scenario focuses on configuring the router to reach the Internet and the LAN hosts itself. Providing the hosts with Internet connectivity is covered in the next Internet gateway scenario.

[Figure 1](#) shows a network diagram of a basic system configuration.

FIGURE 1 Scenario: basic system configuration



Logging in

The first step in configuration is to log in. The examples use the predefined user of **vyatta**.

Login

Log in as the **vyatta** user. The default password for this user is **vyatta**. The password is not echoed onto the screen.

```
Welcome to Vyatta - vyatta tty1
vyatta login: vyatta
Password:
Welcome to Vyatta
Version:      3.2R1
Description:  Brocade Vyatta vRouter 5600 3.2 R1
Copyright:    2006-2014 Vyatta, a Brocade Company.
vyatta@vyatta:~$
```

Entering configuration mode

When you log in, you are in operational mode. To configure the system, you must enter configuration mode.

Enter configuration mode

Enter configuration mode by using the **configure** command.

```
vyatta@vyatta:~$ configure
[edit]
vyatta@vyatta#
```

Notice that the command prompt changes to mark the move from operational mode (:~\$) to configuration mode (#).

Setting the host name

The default host name for a Brocade vRouter is **vyatta**. You can change this name to fit your environment. The example uses a host name of R1.

Set the host name

Change the host name to R1 by using the **set system host-name** command. Remember to commit all configuration changes.

```
vyatta@vyatta# set system host-name R1
[edit]
vyatta@vyatta# commit
[edit]
vyatta@vyatta#
```

The command prompt changes to reflect the new host name the next time you log in.

Setting the domain name

In addition to changing the host name, you must specify the domain name of the system. The examples use mydomain.com as the domain name.

Set the domain name

Set the domain name by using the **set system domain-name** command.

```
vyatta@R1# set system domain-name mydomain.com
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Changing the password

The Brocade vRouter has one predefined user account:

```
user ID: vyatta                password: vyatta
```

To secure your system, you should change the password for this user account.

Change your password

Change the password of the **vyatta** user to 12new\$pwd34 by using the **set system login user** command.

```
vyatta@R1# set system login user vyatta authentication plaintext-password 12new$pwd34
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Configuring interfaces

The kind and number of interfaces you configure depend on your physical device and the topology of your network. However, almost every topology requires that at least one Ethernet interface is configured. The Brocade vRouter automatically discovers all physical interfaces on startup and creates configuration nodes for them.

In this basic scenario, the dp0p1p1 dataplane interface is configured as an Internet-facing interface. This configuration allows the system to reach the DNS server and default gateway through a default route configured in subsequent steps.

The loopback interface, which is a software interface, is also automatically created on startup, preconfigured to the 127.0.0.1/8 IP address. The loopback interface is always available as long as the device can be reached. This availability makes the loopback interface particularly useful for mapping to the system host name as a router ID in routing protocols, such as BGP and OSPF, or as a peer ID for internal BGP peers.

Configure an Internet-facing Ethernet interface

Configure the dp0p1p1 interface with an IP address of 192.0.2.21 and a prefix length of 24.

```
vyatta@R1# set interfaces dataplane dp0p1p1 address 192.0.2.21/24
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

To view the configuration, use the **show interfaces** command.

```
vyatta@R1# show interfaces
  interfaces {
    dataplane dp0dp1dp1 {
      address 192.0.2.21/24
    }
    loopback lo {
  }
[edit]
vyatta@R1#
```

Configuring a default route

To reach the default gateway, configure a default route with the next-hop address of 192.0.2.99.

```
vyatta@R1# set protocols static route 0.0.0.0/0 next-hop 192.0.2.99
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

To view the configuration, use the **show protocols** command.

```
vyatta@R1# show protocols
protocols {
  static {
    route 0.0.0.0/0 {
      next-hop 192.0.2.99
    }
  }
}
[edit]
vyatta@R1#
```

Configuring access to a DNS server

To be able to translate host names (such as `www.example.com`) to IP addresses (such as `192.0.2.3`), the system must be able to access a DNS server.

Specify a DNS server

In the example, the DNS server is at the `12.34.56.100` IP address. Add the DNS server by using the **set system name-server** command.

```
vyatta@R1# set system name-server 12.34.56.100
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Saving the configuration

For the running configuration to persist after a system restart, it must be saved.

Save the system configuration

Save the system configuration by using the **save** command.

```
vyatta@R1# save
[edit]
vyatta@R1#
```

This step completes basic system configuration by using the CLI.

Scenario: Internet Gateway

This configuration scenario builds on the basic system configuration scenario and steps through the process of configuring the system as a basic Internet gateway. The goal of the Internet gateway scenario is for the system to provide the following:

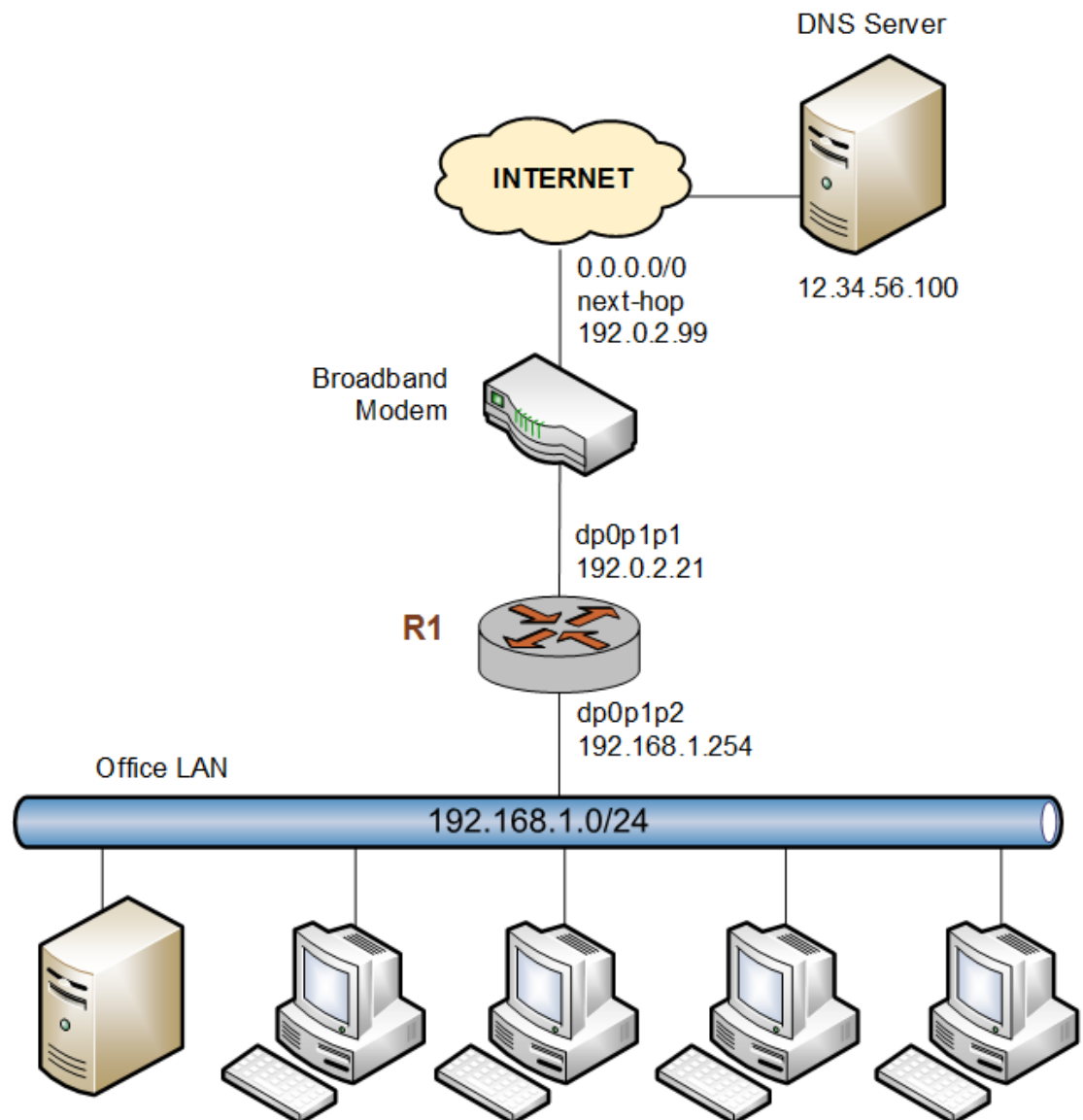
- Ability to route traffic between the office LAN and the Internet
- Ability for users to access the system from the local network by using SSH
- DHCP capability for providing dynamic IP addresses to internal devices
- NAT capability for translating multiple internal addresses to a single external address
- Firewall capability for preventing system access from the Internet

Overview

The figure and examples shown in the Internet gateway configuration scenario employ a system with two Ethernet interfaces: one interface to the office LAN and the other to the Internet. It is assumed in this scenario that the basic system configuration is completed. In this scenario, the LAN hosts are enabled to connect to the Internet by using DHCP, NAT, and a basic firewall that limits inbound connections.

Figure 2 shows a network diagram of an Internet gateway configuration.

FIGURE 2 Scenario: internet gateway configuration



For the examples shown in this scenario, it is assumed that you have completed the configuration shown in the basic scenario (see [Scenario: Basic System Configuration](#) on page 38).

Configuring interfaces

In the basic system scenario, an Internet-facing Ethernet interface is configured. To act as an Internet gateway, the system needs an additional Ethernet interface that faces the office LAN. The example employs the dp0p1p2 interface as the interface to the LAN.

Configure the office LAN-facing Ethernet interface

Assign the 192.168.1.254 IP address to the dp0p1p2 interface with a prefix length of 24, which is the prefix length of the office subnet.

```
vyatta@R1# set interfaces dataplane dp0p1p2 address 192.168.1.254/24
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Here are the interfaces that are configured now.

```
vyatta@R1# show interfaces
dataplane dp0p1p1 {
    address 192.0.2.21/24
}
dataplane dp0p1p2 {
    address 192.168.1.254/24
}
loopback lo {
}
[edit]
vyatta@R1#
```

Enabling SSH access

The SSH service of the gateway should allow users to access SSH from the office LAN but not from the Internet. In this step, access to the SSH service on the system is enabled by using an SSH client. (Preventing access from the Internet is done later by using the firewall of the Brocade vRouter.)

Note that setting up Telnet or web GUI access is similar to setting up access to SSH by using the **set service telnet** or **set service https** command, respectively.

Enable SSH access

To allow SSH access, you enable the SSH service on the system. By default, the system is set to use the more-secure SSH version 2.

```
vyatta@R1# set service ssh
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Configuring the DHCP server

DHCP provides dynamic IP addresses to hosts on a specified subnet. In the Internet gateway scenario, the DHCP server provides addresses to hosts on the office LAN, which is attached to the dp0p1p2 interface.

Set up the DHCP server

For the DHCP server, define an address pool from 192.168.1.100 to 192.168.1.199 to dynamically assign addresses to hosts on the office LAN. In addition, set the default router and DNS server to the values that are assigned to hosts on the office LAN. The default router for these devices is the LAN-facing interface of the Internet gateway.

```
vyatta@R1# set service dhcp-server shared-network-name dp0p1p2_POOL subnet
192.168.1.0/24 start 192.168.1.100 stop 192.168.1.199
[edit]
vyatta@R1# set service dhcp-server shared-network-name dp0p1p2_POOL subnet
192.168.1.0/24 default-router 192.168.1.254
[edit]
vyatta@R1# set service dhcp-server shared-network-name dp0p1p2_POOL subnet
192.168.1.0/24 dns-server 12.34.56.100
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Here is this configuration.

```
vyatta@R1# show service dhcp-server
  shared-network-name dp0p1p2_POOL {
    subnet 192.168.1.0/24 {
      start 192.168.1.100 {
        stop 192.168.1.199
      }
      dns-server 12.34.56.100
      default-router 192.168.1.254
    }
  }
[edit]
vyatta@R1#
```

Configuring NAT

The Internet gateway should send outbound traffic from the office LAN out through the Internet-facing interface, translating all internal private IP addresses to a single public address. This translation is done by defining a Network Address Translation (NAT) rule.

Define a NAT rule

Define a rule that allows traffic from the 192.168.1.0/24 network to proceed to the Internet through the dp0p1p1 interface and translates any internal addresses to the IP address of dp0p1p1. (This translation is called “masquerade” translation.)

```
vyatta@R1# set service nat source rule 10 source address 192.168.1.0/24
[edit]
vyatta@R1# set service nat source rule 10 outbound-interface dp0p1p1
[edit]
vyatta@R1# set service nat source rule 10 translation address masquerade
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Here is this configuration.

```
vyatta@R1# show nat source
  rule 10 {
    outbound-interface dp0p1p1
    source {
      address 192.168.1.0/24
    }
    translation {
```

```

        }
        address masquerade
    }
}
[edit]
vyatta@R1#

```

Configuring firewall

As it is shipped, the Brocade vRouter does not restrict traffic flow. That is, unless a firewall rule is applied to an interface, the interface allows all traffic through it. The firewall functionality provides packet filtering, delivering flexibility in restricting traffic as required.

In general, to configure a firewall on an interface, follow these steps:

1. Define a number of named firewall rule sets, each of which contains one or more firewall rules.

When applying a firewall rule set, keep in mind that after the final user-defined rule, an implicit rule of “deny all” takes effect.

2. Apply each of the named rule sets to an interface as a filter. You can apply one named rule set to each of the following on an interface:
 - **in**. If you apply the rule set to an interface as **in**, the rule set filters packets entering the interface.
 - **out**. If you apply the rule set to an interface as **out**, the rule set filters packets leaving the interface.

Define a firewall rule set

The following example shows how to define a firewall rule set and add a firewall rule to the set.

By default, when you create a firewall rule, it denies all traffic (**in** and **out**) on the interface to which the firewall rule set is applied. To allow outbound traffic, you must specify the sources of the outbound traffic. To allow inbound traffic, you must specify the sources of the inbound traffic.

NOTE

If you allow only outbound traffic, outbound connections cannot be established properly because the required response packets are denied by the firewall. A rule that allows outbound traffic and denies all other traffic blocks session creation for new outbound connections.

```

vyatta@R1# set security firewall name FROM_INTERNET
[edit]
vyatta@R1# set security firewall name FROM_INTERNET rule 10 action accept
[edit]
vyatta@R1# set security firewall name FROM_INTERNET rule 10 source address 10.0.0.1
[edit]
vyatta@R1# set security firewall name FROM_INTERNET rule 10 destination address
10.0.0.2
[edit]
vyatta@R1# commit
[edit]

```

Apply the rule set to an interface

The following example shows how to apply the FROM_INTERNET rule as **in** on the dp0p1p1 Internet-facing interface.

```

vyatta@R1# set interfaces dataplane dp0p1p1 firewall in FROM_INTERNET
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#

```

Here is the firewall rule set that is created.

```
vyatta@vyatta# show security firewall
firewall {
    name FROM_INTERNET {
        rule 10 {
            action accept
            destination {
                address 10.0.0.2
            }
            source {
                address 10.0.0.1
            }
        }
    }
}
```

Saving the system configuration

For the running configuration to persist after a system restart, it must be saved.

Save the system configuration

Save the system configuration by using the **save** command.

```
vyatta@R1# save
[edit]
vyatta@R1#
```

This step completes the configuration of a basic Internet gateway.

Saving the system configuration