VYATTA, INC. | Vyatta System

Quick Start Guide

VYATTA

Contents

Welcome

Thank you for choosing the Vyatta System.

Vyatta has changed the networking world by developing the first commercially supported, open-source router/firewall/VPN solution to provide an alternative to over-priced, inflexible products from proprietary vendors. Vyatta solutions offer industry-standard routing and management protocols, support for most commonly used network interfaces, and configuration via a single command-line interface (CLI).

Vyatta 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—freedom to integrate applications, and the economic advantages of commodity hardware and components.

This document is intended to:

- Provide an overview of the deployment options, and help you determine the best way to deploy the Vyatta System in your environment

- Provide an overview of the user interface available on the system

- Walk you through basic configuration of the system based on a sample scenario

- Tell you how to upgrade your system software

For more details on the operational and configuration commands available, please consult the *Vyatta System Command Reference*. For comprehensive detailed configuration examples, please consult the *Vyatta System Configuration Guide*.

Chapter 1: Deploying the Vyatta System

The Vyatta System supports a number of flexible deployment options. This chapter describes each option so that you can determine the best option for your needs and environment and explains how to deploy in each case.

This chapter presents the following topics:

- Deployment Options
- You'll Need a LiveCD
- Running from LiveCD
- Running from Hard Disk
- Running from USB Memory Stick
- Running from Compact Flash
- Running as a Virtual Machine
- Testing Your Installation

Deployment Options

The Vyatta system can be deployed in a number of different ways.

Option	What it is	Best for
LiveCD	No installation is required, but you must use a floppy disk to save configuration changes.	Evaluation and test scenarios
Persistent Device	Hard disk, compact Flash, USB key. The system is installed to the persistent device from a LiveCD. Installation is quite quick, though longer than using LiveCD directly. Configuration is stored on the device.	Permanent deployments and lab trials
Virtual machine	The system is installed onto a VMware or Xen-based virtual machine from a LiveCD. Installation is as for a persistent device. This option allows multiple systems to be installed on a single physical device, and still leaves the operating system available for other uses.	Permanent deployments and lab trials

You'll Need a LiveCD

For any deployment option except a VMware installation you'll need to create a LiveCD.

The LiveCD runs the Vyatta software on a RAM disk on the host machine. The system uses the RAM disk for writeable sections of the file system, and the floppy drive or a TFTP server for saving configuration files.

The LiveCD can run on a machine with an existing operating system without disturbing or changing the previously installed operating system. While you are running the system from a LiveCD, you will not be able to access other applications or programs on your machine.

Tip: See the documentation for your CD burning utility for information on how to burn an ISO image.

You can download the software image directly from the Vyatta web site and create your own CD. If you are burning a CD from downloaded software, make sure you burn the software onto the CD as an ISO image (not as a file system).

Running from LiveCD

▶ Try it   ▶ **Create the LiveCD**

Create the LiveCD from one of the ISO images available at http://www.vyatta.org.

Burn the ISO image onto a CD-ROM using your favorite CD-burning software. The CD must be a bootable ISO image: don't just copy files onto the CD.

▶ Try it   ▶ **Get ready**

- Create the LiveCD.

- Make sure the BIOS of the host machine is configured to boot from CD-ROM.

▶ Try it   ▶ **Boot from LiveCD**

Begin with your system powered down.

1   With the system still powered down, connect a VGA monitor and keyboard to the host.

2   Insert the Vyatta LiveCD into the CD drive and close the drive.

3   Power up the system.

NOTE   *Systems with a Flash device may boot slowly from LiveCD, as the system looks for DMA that does not exist on the IDE device. This is expected behavior.*

After the startup messages complete, the login prompt appears:

```
vyatta login:
```

At this point, your system is running. Go to the section "Testing Your Installation" on page 13 to confirm that you can access the system from your network.

Running from Hard Disk

To run from hard disk, you must install to the hard disk from a LiveCD. The software image on the LiveCD includes an installation script for installing the Vyatta system software onto the persistent device.

▶ Try it   ▶ **Get ready**

- Create the LiveCD.

- Make sure your BIOS is configured to boot from the CD-ROM.

- To install the operating system and Vyatta system software, you need a minimum of 450 MB of free space on your hard drive for a root partition.

• You will need to know the device name (for example, **/dev/sda**) onto which the software is to be installed.

NOTE   The installation process will reformat the specified partition so it is critical specified the correct partition.

▶ Try it   ▶ **Install onto hard disk**

Begin with your system powered down.

1   With the system still powered down, connect a VGA monitor and keyboard to the host.

2   Insert the Vyatta LiveCD into the CD drive and close the drive.

3   Power up the system.

NOTE   Systems with a Flash device may boot slowly from LiveCD, as the system looks for DMA that does not exist on the IDE device. This is expected behavior.

After the startup messages complete, the login prompt appears:

```
vyatta login:
```

4   Log on to the system as **root** with the password **vyatta**.

5   At the system command prompt enter the following:

```
install-system
```

The installer launches. The installer is an interactive install script that prompts you for some basic information and confirmation during the install.

The following example shows a sample install session.

```
Last login: Mon Oct 29 15:37:50 2007
Linux vyatta 2.6.20 #1 SMP Fri Sep 21 02:22:08 PDT 2007
i686
Welcome to Vyatta.
This system is open-source software. The exact
distribution terms for
each module comprising the full system are described in
the individual
files in /usr/share/doc/*/copyright.
vyatta:~# install-system
Welcome to the Vyatta install program.  This script
will walk you through the process of installing the
Vyatta image to a local hard drive.

Would you like to continue? (Yes/No) [Yes]: <Enter>
Probing drives: OK
The Vyatta image will require a minimum 450MB root.
```

```
Would you like me to try to partition a drive automatically
or would you rather partition it manually with parted?  If
you have already setup your partitions, you may skip this
step.

Partition (Auto/Parted/Skip) [Auto]: <Enter>

I found the following drives on your system:
 sda     1074MB


Install the image on? [sda] <Enter>

This will destroy all data on /dev/sda.
Continue? (Yes/No) [No]: Yes

How big of a root partition should I create? (450MB -
1074MB) [1074]MB: 512
Creating filesystem on /dev/sda1: OK
Mounting /dev/sda1
Copying system image files to /dev/sda1:OK
I found the following configuration files
/opt/vyatta/etc/config/config.boot
Which one should I copy to sda?
[/opt/vyatta/etc/config/config.boot]: <Enter>

Would you like to set passwords for system users (Yes/No)
[Yes]: No

I need to install the GRUB boot loader.
I found the following drives on your system:
 sda     1074MB

Which drive should GRUB modify the boot partition on?
[sda]: <Enter>

Setting up grub: OK
Done!
vyatta:~#
```

> **NOTE** *It's a good idea to set the passwords for system users during this procedure. It was not done in this example so that other examples within the Vyatta documentation could refer to known passwords.*

6 Remove the CD from the drive and reboot. When the system starts, it will be running from the local install and you will see the following:

```
Welcome to Vyatta - vyatta on tty1
vyatta login:
```

At this point, your system is running. Go to the section "Testing Your Installation" on page 13 to confirm that you can access the system from your network.

Running from USB Memory Stick

Tip: Not all hardware supports the ability to boot from USB device; check the BIOS of your your hardware to see if yours does.

To run from a USB memory stick, you must install to the USB device from a LiveCD. The software image on the LiveCD includes an installation script for installing the Vyatta system software onto the persistent device.

The procedure for installing to a USB device is similar to that for installing the software on a hard disk. The main difference is that, after installing the system onto the USB device, you must modify your system BIOS configuration so that it boots from the USB memory stick.

▶ Try it

▶ **Get ready**

• Check the BIOS setup of your hardware to confirm that it supports the ability to boot from a USB device.

• Create the LiveCD.

• Make sure your BIOS is configured to boot from the CD-ROM.

• To install the operating system and Vyatta system software, you need a minimum of 450 MB of free space on the USB stick for a root partition.

• You will need to know the device name (for example, **/dev/sdb**) onto which the software is to be installed.

▶ Try it

▶ **Install onto a USB device**

Begin with your system powered down.

1 With the system still powered down, connect a VGA monitor and keyboard to the host.

2   Insert the Vyatta LiveCD into the CD drive and close the drive.

3   Power up the system.

NOTE   *Systems with a Flash device may boot slowly from LiveCD, as the system looks for DMA that does not exist on the IDE device. This is expected behavior.*

4   After the startup messages complete, the login prompt appears:

```
vyatta login:
```

5   Log on to the system as **root** with the password **vyatta**.

6   Insert the USB memory stick into a USB port. The system will detect that the USB device is installed and notify you.

7   Record the name of the device as displayed in the system message (for example, **/dev/sdb**).

8   At the system command prompt enter the following:

```
install-system
```

The installer launches. The installer is an interactive install script that prompts you for some basic information and confirmation during the install.

9   Follow the prompts and specify the USB device name recorded above when required until a system prompt displays.

10   Remove the CD from its drive and reboot.

11   During the boot sequence press the appropriate key sequence (for example, <F2>) to interrupt the boot sequence and enter your system's BIOS setup program.

12   In the boot sequence menu arrange the boot devices such that the USB device name (for example "USB HDD") is first in the list so that the system will attempt to boot from it first.

13   Save the settings and reboot the system. When the system restarts, it will be running from the USB memory stick and you will see the following:

```
Welcome to Vyatta - vyatta on tty1
vyatta login:
```

At this point, your system is running. Go to the section "Testing Your Installation" on page 13 to confirm that you can access the system from your network.

Running from Compact Flash

Tip: Not all hardware supports the ability to boot from compact Flash; check the BIOS of your your hardware to see if yours does.

To run from a compact Flash, you must install to the Flash device from a LiveCD. The software image on the LiveCD includes an installation script for installing the Vyatta system software onto the persistent device.

The procedure for installing to a Flash device is similar to that for installing the software on a hard disk. The main difference is that, after installing the system onto the Flash device, you must modify your system BIOS configuration so that it boots from the Flash.

▶ Try it

▶ **Get ready**

• Check the BIOS setup of your hardware to confirm that it supports the ability to boot from compact Flash.

• Create the LiveCD.

• Make sure your BIOS is configured to boot from the CD-ROM.

• To install the operating system and Vyatta system software, you need a minimum of 450 MB of free space on the Flash disk for a root partition.

• You will need to know the device name (for example, **/dev/hda**) onto which the software is to be installed.

▶ Try it

▶ **Install onto a compact Flash**

Begin with your system powered down.

1   With the system still powered down, connect a VGA monitor and keyboard to the host.

2   Insert the Vyatta LiveCD into the CD drive and close the drive.

3   Power up the system.

NOTE   Systems with a Flash device may boot slowly from LiveCD, as the system looks for DMA that does not exist on the IDE device. This is expected behavior.

4   After the startup messages complete, the login prompt appears:

```
vyatta login:
```

5   Log on to the system as **root** with the password **vyatta**.

6   At the system command prompt enter the following:

```
install-system
```

The installer launches. The installer is an interactive install script that prompts you for some basic information and confirmation during the install.

7   Follow the prompts and specify the compact Flash device name recorded above when required until a system prompt displays.

8   Remove the CD from its drive and reboot.

9   During the boot sequence press the appropriate key sequence (for example, <F2>) to interrupt the boot sequence and enter your system's BIOS setup program.

10   In the boot sequence menu arrange the boot devices such that the compact Flash device name (for example "IDE" or "SATA") is first in the list so that the system will attempt to boot from it first.

11   Save the settings and reboot the system. When the system restarts, it will be running from the compact Flash and you will see the following:

```
Welcome to Vyatta - vyatta on tty1
vyatta login:
```

At this point, your system is running. Go to the section "Testing Your Installation" on page 13 to confirm that you can access the system from your network.

Running as a Virtual Machine

The Vyatta System can be run as a virtual appliance on a VMware product such as VMware Server®. VMware provides a great deal of flexibility as to how the virtual machine is configured, especially with respect to memory and Ethernet interfaces. Multiple Vyatta Systems can be run as virtual appliances simultaneously on a single hardware platform configured for multiple virtual machines.

VMware Server can be downloaded free of charge from VMware at
http://www.vmware.com

NOTE *Information about VMware and how to use it is beyond the scope of this document. For that information, please consult VMware documentation at* http://www.vmware.com.

▶ Try it

▶ **Install the Vyatta virtual appliance**

1 Navigate to the download area of the Vyatta web site.

http://www.vyatta.com/download/

2 From the download options, choose to download the VMware virtual appliance. Download the ZIP file to your local host, in the location where you are storing your VMware virtual machines.

3 Extract the ZIP file.

4 Launch the VMware Server Console.

NOTE *This procedure assumes VMware Server but also works on other VMware products, such as like VMware ESX and VMware Workstation, though the steps may differ slightly.*

5 In the VMware Server Console, select Open Existing Virtual Machine.

6 Click Browse... and navigate to the directory to which you extracted the Vyatta VMware virtual appliance files. Select the VMX file and click Open.

7 Start the virtual machine by selecting Power > Power On. This launches the Vyatta VMware virtual appliance.

•   To interact with the Vyatta VMware virtual appliance, click the text screen.

•   To return control to your host operating system, press <Ctrl>-<Alt>.

•   To stop the Vyatta VMware virtual appliance, select Power > Power Off in the VMware Server Console.

At this point, your system is running. Go to the section "Testing Your Installation" on page 13 to confirm that you can access the system from your network.

Testing Your Installation

The easiest and fastest way to confirm that the Vyatta System is working is to configure an Ethernet interface on the system and then ping the interface from another host on the network.

▶ Try it

▶ **Test the system**

1   Log on to the system as user **vyatta** with the password **vyatta**.

2   At the command prompt, enter the commands shown in the example, substituting an IP address on your existing subnet. In the example:

   •   The subnet is 192.168.1.0/24

   •   The IP address of the interface is 192.168.1.81

Make the appropriate substitutions for your network.

```
vyatta@vyatta> configure
[edit]
vyatta@vyatta# set interfaces ethernet eth0 address
192.168.1.81/24
[edit]
vyatta@vyatta# commit
[edit]
vyatta@vyatta# exit
exit
vyatta@vyatta>
```

1   From another host on the same subnet, ping the interface to ensure that it is up.

2   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 Vyatta system is reachable, you will see replies from it in response to the pings.

If so, your system is installed and accessible on your network, and you are ready to review user interface options and configure the system.

Chapter 2: User Interface Options

You interface with the Vyatta System through a command-line interface (CLI) similar to those found on closed-source routers with which you may be familiar. This chapter provides a brief overview of the CLI on the Vyatta system.

The Command-Line Interface (CLI)

This section presents the following topics:

- The Vyatta CLI and the System Shell
- Command Modes
- CLI Help
- Command Completion
- Viewing Long Output ("More")
- Showing Support Information

The Vyatta CLI and the System Shell

The CLI of the Vyatta system includes two kinds of commands:

- Vyatta-specific commands for operating and configuring the Vyatta system.
- Commands provided by the operating system shell in which the Vyatta CLI operates. The system command shell is a Bourne Again (**bash**) shell.

All Vyatta users have access to commands in the **bash** shell as well as Vyatta CLI commands. The amount of access to the **bash** shell varies with the user privilege level.

The **bash** shell commands and constructs are available from any point within the Vyatta CLI.

Command Modes

There are two command modes in the Vyatta CLI: 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 configuration, and restarting the system.
- Configuration 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 on to the system, the system is in operational mode.

- To enter configuration mode from operational mode, issue the **configure** command.

- To return to operational mode from configuration mode, issue the **exit** command. If there are uncommitted configuration changes, you must either commit the changes using the **commit** command, or enter **exit discard** to discard the changes before you can exit to operational mode.

Issuing the **exit** command in operational mode logs you out of the system.

▶ Try it

▶ **Enter configuration mode**

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

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

Notice how the command prompt changes to remind you what mode you are in.

▶ Try it

▶ **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 any of the following at the command prompt:

Type this:	To see this:
help	Displays available system shell commands
help *command*	Help and usage guidelines for the specified shell command.
<Tab> <Alt>-?	For non-root users, displays all available Vyatta commands and provides command completion. For the root user, displays all available Vyatta and shell commands and provides command completion.

▶ Try it   ▶ **Find available commands**

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

```
vyatta@vyatta:~$ <Tab>
clear           init-floppy     reboot          terminal
configure       install-system  set             traceroute
debug           no              show            undebug
delete          ping            telnet          vpn
vyatta@vyatta:~$
```

Command Completion

Unlike some proprietary router CLIs that accept an unambiguous prefix, the Vyatta System requires that you type the full command name. Thus, command completion is very important for usability. As an example, Cisco allows you to type "sh config". The Vyatta System would require you to type "show configuration", but you can get the same effect in the Vyatta System with "sh<Tab>config<Tab>" as the <Tab> completes the unambiguous command.

Pressing the <Tab> key or pressing <Alt>+? provides command completion. You can use the <Tab> to show you:

• All available commands

• All valid completions for a command partially typed in

• The next available set of options for a command. You can use the <Tab> key iteratively in this way to discover complete command syntax.

▶ Try it   ▶ **Use command completion on an unambiguous command**

The following example requests command completion for the typed string **sh**. In this example, the command to be completed is unambiguous.

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

▶ Try it   ▶ **Use command completion on an ambiguous command**

The following example requests command completion for the typed string **s**. In this case, there is more than one command that could complete the entry and the system lists all valid completions.

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

▶ Try it   ▶ **Display help strings for commands**

The following example requests command completion for the typed string **s** a second time. In this case, help strings for the possible completions are displayed.

```
vyatta@vyatta:~$ s<Tab>
Possible completions:
    set      Set system or shell options
    show     Show system information

vyatta@vyatta:~$ s
```

Note that neither the <Tab> key nor the <Alt>+? key combination provides a help function when double-quoted. When used within double quotes, the <Tab> key generates a tab character and the <Alt>+? key combination generates a question mark ("?") character.

Viewing Long Output ("More")

If the information being displayed is too long for your screen, the screen will show a line number indication where the information breaks. There are lots of commands for controlling information in a "More" display; a few important ones are shown below.

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\>

▶ Try it

▶ **Show system configuration**

Entering **show** in configuration mode shows information you've explicitly set. Entering show -all shows information you've set plus all default information.

Enter configuration mode and enter **show -all** at the command prompt. The full default system displays and the "More" prompt displays. (Some lines are left out of the example to save space.)

```
vyatta@vyatta:~$ configure
[edit]
vyatta@vyatta# show -all
:
:
    ethernet eth3 {
        duplex auto
        hw-id 00:14:bf:5a:84:f9
        link-detect
        speed auto
    }
:
:
[lines 1-24]
```

▶ Try it

▶ **Exit from a "More display"**

Within the "More" display, enter **q**. You are returned to the command prompt

```
    ethernet eth3 {
        duplex auto
        hw-id 00:14:bf:5a:84:f9
        link-detect
        speed auto
    }
:
:
[lines 1-24] q
[edit]
vyatta@vyatta#
```

Showing Support Information

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

▶ Try it

▶ **Show support information**

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

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

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

```
vyatta@vyatta:~$ show version
Version  :   3.0.2
Copyright:   2006-2008 Vyatta, Inc.
Built by :   autobuild@vyatta.com
Built on :   Wed Apr 16 08:26:33 UTC 2008
Build ID :   080416082620a705a
Boot via :   livecd
Uptime   :   14:22:45 up 35 min,  2 users,  load average:
0.00, 0.00, 0.00
vyatta@vyatta:~$
```

Chapter 3: Configuration

This chapter introduces you to basic configuration concepts, and then steps you through two configuration scenarios:

• Basic system configuration tasks

• A scenario with the Vyatta system acting as an Internet gateway.

The examples in this chapter use the Vyatta CLI and assume that the Vyatta system is installed on a hard disk.

This chapter presents the following topics:

• Configuration Basics

• Scenario: Basic System Configuration

• Scenario: Internet Gateway

Configuration Basics

This section presents the following topics

- Configuration Hierarchy
- Adding and Modifying Configuration
- Deleting Configuration
- Committing Configuration Changes
- Discarding Configuration Changes
- Saving Configuration
- Loading Configuration

Configuration Hierarchy

From the system's point of view, a configuration node is different from a simple configuration attribute statement. A configuration *attribute statement* takes the form *attribute value*, as in the following example.

```
protocol-version v2
```

A configuration *node* always has an enclosing pair of braces, which may be empty, as in the following example:

```
name-server 12.34.56.100 {}
```

or non-empty, as in the following example:

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

Adding and Modifying Configuration

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

▶ Try it

▶ **Add configuration**

In configuration mode, set the IP address of Ethernet eth0 interface using the **set** command.

```
vyatta@vyatta# set interfaces ethernet eth0 address
192.0.2.21/24
[edit]
vyatta@vyatta#
```

Note that the configuration node for interface eth0 will already exist, assuming that your system has at least one Ethernet. That's 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 interface eth0 will also be known to the system.

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

```
vyatta@vyatta# show interfaces ethernet eth0
+address 192.0.2.21/24
 hw-id 00:13:46:e6:f6:87
[edit]
vyatta@vyatta#
```

Note the "+" 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 using the **commit** command.

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.

▶ Try it

▶ **Modify configuration**

For the most part, modifying configuration is the same as adding configuration by using the **set** command. This works for identifiers of nodes containing a single instance. To change the identifier of a node for which there can be multiple instances (a "multi-node"), 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 change or add. This can speed up editing.

Deleting Configuration

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

▶ Try it

▶ **Delete configuration**

Delete a configuration node:

```
vyatta@vyatta# delete interfaces ethernet eth0 address
192.0.2.21/24
[edit]
vyatta@vyatta#
```

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

```
vyatta@vyatta# show interfaces ethernet eth0
-address 192.0.2.21/24
hw-id 00:13:46:e6:f6:87
[edit]
vyatta@vyatta#
```

Note the "-" 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 using the **commit** command.

Some configuration nodes and statements are mandatory; these nodes or 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 Vyatta System, configuration changes do not take effect until you commit them.

Uncommitted changes are flagged with either a plus sign (for added or modified changes) or a minus sign (for deleted changes).

```
vyatta@vyatta# show interfaces ethernet eth0
-address 192.08.2.21/24
hw-id 00:13:46:e6:f6:87
[edit]
vyatta@vyatta#
```

Once you commit the changes, the indicator disappears. Also note that the non-mandatory configuration node (**address**) is removed from the configuration.

```
vyatta@vyatta# commit
[edit]
vyatta@vyatta# show interfaces ethernet eth0
hw-id 00:13:46:e6:f6:87
[edit]
vyatta@vyatta#
```

▶ Try it

▶ **Commit configuration changes**

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

```
vyatta@vyatta# commit
[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.

▶ Try it   ▶ **Discard configuration changes using "discard"**

Using the **discard** command is the same as deleting all changes made within a configuration session and then committing the changes. Also notice that after the **discard** command has completed you stay in configuration mode.

```
vyatta@vyatta# show interfaces ethernet eth0
+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 ethernet eth0
hw-id 00:13:46:e6:f6:87
[edit]
vyatta@vyatta#
```

You can't exit from configuration mode with uncommitted configuration changes; you must either commit the changes or discard them. If you don't want to commit the changes, you can discard them using the **exit** command with the **discard** option.

▶ Try it   ▶ **Discard configuration changes using "exit discard"**

Try exiting from configuration mode with uncommitted configuration changes; you won't be able to. Discard the changes by issuing 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 using the **save** command in configuration mode. By default, configuration is saved to the file **config.boot** in the standard configuration directory.

- For hard disk installs the configuration directory is **/opt/vyatta/etc/config**

- For installations running off LiveCD, the configuration directory is **/media/floppy/config**.

Note that 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.

▶ Try it   ▶ **Save configuration to the default configuration file**

To save to the **config.boot** file in the default configuration directory, just enter **save** in configuration mode.

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

▶ Try it   ▶ **Saving configuration to another file**

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

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

This 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 configuration directory **/opt/vyatta/etc/config**, by specifying a different path. You can save to a hard drive, compact Flash or USB device by including the drive identifier in the path.

If you are running the system from LiveCD, configuration can be saved only to floppy disk (**/media/floppy/config/config.boot**). If you do not save your running configuration to floppy disk, any changes are lost on reboot.

Before saving to floppy disk, you must initialize the floppy disk for use on the system.

▶ Try it   ▶ **Initialize a floppy disk for configuration files**

The floppy drive is referred to as **/dev/fd0**. It is automatically mounted in the directory **/media/floppy**.

1   Insert a blank floppy disk into the floppy disk drive.

2   At the system command prompt, enter the following:

```
vyatta@vyatta:~$ init-floppy
```

The system prepares the floppy to receive configuration files. It also saves a copy of the current configuration to **/media/floppy/config/config.boot**.

▶ Try it   ▶ **Save LiveCD configuration to the default location on floppy disk**

If you want to be able to boot from the configuration file, save configuration to **/media/floppy/config/config.boot**.

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

▶ Try it   Save LiveCD configuration to another file on floppy disk

If you just want to save a record of configuration, save to a different file name in **/media/floppy/config**.

```
vyatta@vyatta# save testconfig1
Saving configuration to
'/media/floppy/config/testconfig1'...
Done
[edit]
vyatta@vyatta#
```

Loading Configuration

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

▶ Try it   ▶ **Load configuration from the default directory**

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

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

To load from a directory other than the default directory the entire path must be specified.

Scenario: Basic System Configuration

This section steps you through initial system configuration tasks. These are tasks that are required for almost any scenario in which you might use the Vyatta system. These include:

• Logging On

• Entering Configuration Mode

• Setting the Host Name

• Setting the Domain Name

• Changing Passwords

• Configuring Interfaces

• Configuring Access to a DNS server

• Specifying a Default Gateway

Figure 3-1 shows a network diagram of the basic system configuration scenario.

Figure 3-1   Scenario: Basic System Configuration
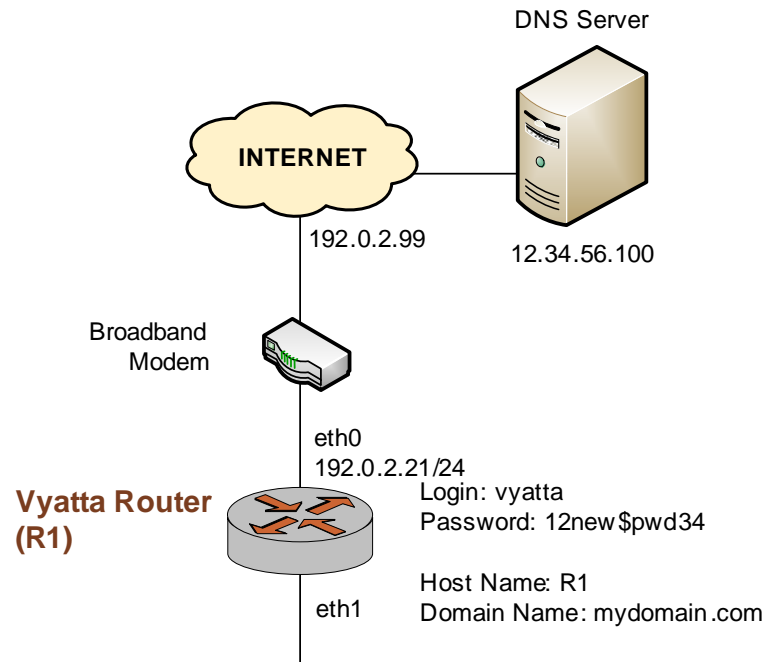
Logging On

The first step is to log on. Our examples use the predefined non-root user **vyatta**.

▶ Try it

▶ **Log on**

Log on as user **vyatta**. 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:
Linux vyatta 2.6.20 #1 SMP Fri Sep 21 02:22:08 PDT 2007 i686
Welcome to Vyatta.
This system is open-source software. The exact distribution
terms for each module comprising the full system are described
in the individual files in /usr/share/doc/*/copyright.
Last login: Sat Nov 10 16:48:48 2007 on tty1
vyatta@vyatta:~$
```

Entering Configuration Mode

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

▶ Try it   ▶ **Enter configuration mode**

Enter configuration mode by entering **configure**.

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

Notice how the command prompt changes to mark the move from operational mode (":~$") and configuration mode ("#").

Setting the Host Name

The default host name for a Vyatta device is **vyatta**. You can change this to fit in with your environment. In our example we use a host name of R1.

▶ Try it   ▶ **Set the host name**

Change the host name to R1 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@R1#
```

Notice how the command prompt changes to reflect the new host name.

Setting the Domain Name

In addition to changing the host name, you must specify the system's domain name. In our examples we use **mydomain.com** as the domain name.

▶ Try it   ▶ **Set the domain name**

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

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

Changing Passwords

The Vyatta system has two pre-defined user accounts:

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

To secure your system, you should change the passwords for both user accounts.

▶ Try it   ▶ **Change your password**

Change the password of user **vyatta** to **12new$pwd34** using the **set system login user** command, as follows:

```
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 will depend on your physical device and the topology of your network. However, almost every topology will require that at least one Ethernet interface configured.

The Vyatta System automatically discovers all physical interfaces on startup and creates configuration nodes for them. In this basic scenario, we'll configure the Ethernet interface eth0 as an Internet-facing interface.

The loopback interface, which is a software interface automatically created on startup is preconfigured to IP address 127.0.0.1/8. The loopback interface will always be available as long as the device is reachable at all. This 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.

▶ Try it

▶ Configure an Internet-facing Ethernet interface

Configure interface eth0 with an IP address of 192.0.2.21 and a prefix length of 24. This will allow the system to reach the DNS server and default gateway configured in subsequent steps.

```
vyatta@R1# set interfaces ethernet eth0 address 192.0.2.21/24
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

To view the configuration we use the show command:

```
vyatta@R1# show interfaces
ethernet eth0 {
    address 192.0.2.21/24
    hw-id 00:40:63:e2:e4:00
    link-detect
}
loopback lo {
}
[edit]
vyatta@R1#
```

Configuring Access to a DNS server

In order to be able to translate host names (such as www.vyatta.com) to IP addresses (such as 69.59.150.141), the system must be able to access a DNS server.

▶ Try it

▶ Specify a DNS server

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

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

Specifying a Default Gateway

When the local system does not know what route to use for a given destination, it forwards packets to the "default gateway." In our example, the ISP's gateway at 192.0.2.99 acts as the default gateway.

▶ Try it   ▶ **Specify the default gateway**

Add the default gateway using the **set system gateway-address** command.

```
vyatta@R1# set system gateway-address 192.0.2.99
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Performing a Package Upgrade to the Latest Version

If you want to be able to retrieve the latest updates of Vyatta software, you must inform the system of the location of the Vyatta software repository. Then you'll be able to find out what software updates are available for your system.

▶ **Specify the location of the Vyatta software repository**

Tip: If you are a Vyatta support subscriber, you can access the subscriber software repository. Find out how from your Vyatta representative.

The Vyatta software archive is located at **http://packages.vyatta.com/vyatta**. The standard repository parameters can be seen by issuing the **show system package repository** command. The system comes preconfigured with this information.

```
vyatta@R1# show system package repository
 community {
     components main
     distribution stable
     url http://packages.vyatta.com/vyatta
 }
[edit]
vyatta@R1#
```

Once the system knows where to look for the software repository, it can synchronize the list of packages installed on your system with those available in the repository. The system will maintain a list of available updates for you.

▶ Try it   ▶ **Download and install the updates**

To download and install updates you must first be logged in as root. At that point you can get into configuration mode and run the **apt-get** commands that get and install the updated software. Once this is done the system should be rebooted to ensure that any kernel changes are captured.

```
R1:~# configure
[edit]
root@R1# apt-get update
Get:1 http://archive.vyatta.com community Release.gpg [65B]
Get:2 http://archive.vyatta.com community Release [2711B]
Get:3 http://archive.vyatta.com community/main Packages
[115kB]
Fetched 118kB in 2s (46.7kB/s)
Reading package lists...
[edit]
root@R1# apt-get upgrade
Reading package lists...
Building dependency tree...
Reading state information...
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
[edit]
root@R1# reboot
Proceed with reboot? [confirm]y

Broadcast message from root@R1 (pts/0) (Wed Mar 5 03:39:01
2008):

The system is going down for reboot NOW!
[edit]
root@R1#
```

This completes basic system configuration.

Scenario: Internet Gateway

This configuration scenario builds off of the Basic System Configuration scenario above and steps through the process of configuring the system as a basic Internet Gateway. The goal is for the system to provide the following:

1   The ability to route traffic between the Office LAN and the Internet.

2   The ability for users to access the system from the local network using SSH.

3   DHCP capability for providing dynamic IP addresses to internal devices.

4   NAT capability for translating multiple internal addresses to a single external address.

5   Firewall capability for preventing system access from the Internet.

The example assumes a system with two Ethernet interfaces: one interface facing the office LAN and the other facing the Internet.

Figure 3-2 shows a network diagram of this sample scenario.

Figure 3-2   The Vyatta system configured as an Internet gateway
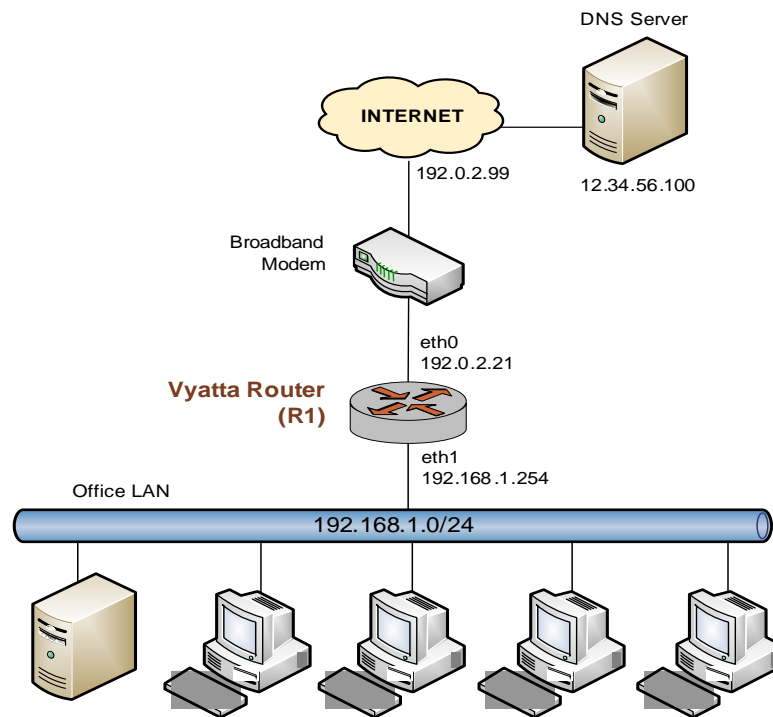
The examples in this scenario assume that you have completed the configuration shown in the basic scenario (see page 29).

This section presents the following topics:

*   Configuring Interfaces

*   Enabling SSH Access

*   Configuring DHCP

- Configuring NAT

- Configuring Firewall

Configuring Interfaces

In the basic scenario, we configured an Internet-facing Ethernet interface. To act as an Internet gateway, the system will need an additional Ethernet interface facing the Office LAN. We'll use interface eth1 for this.

▶ Try it   ▶ **Configure the Office LAN–facing Ethernet interface**

Assign IP address 192.168.1.254 to interface eth1 with a prefix length of 24, which is the prefix length of the office subnet.

```
vyatta@R1# set interfaces ethernet eth1 address
192.168.1.254/24
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Let's look at the interfaces configured now:

```
vyatta@R1# show interfaces
ethernet eth0 {
   address 192.0.2.21/24
   hw-id 00:40:63:e2:e4:00
   link-detect
}
ethernet eth1 {
   address 192.168.1.254/24
   hw-id 00:13:46:e6:f6:87
   link-detect
}
loopback lo {
}
[edit]
vyatta@R1#
```

Enabling SSH Access

The gateway should allow users to access the SSH service from the office LAN, but not from the Internet. In this step, we enable the SSH service on the system, which will be accessed by an SSH client (Preventing access from the Internet will be done later, using the Vyatta system's firewall.)

▶ Try it

*Tip: Setting up Telnetis done the same way: by issuing **set service telnet**.*

▶ **Enable SSH access**

To allow SSH access, you enable the SSH service on the system. By default SSH uses the more secure "v2" protocol version.

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

Configuring DHCP

DHCP provides dynamic IP addresses to hosts on a specified subnet. In our scenario, the DHCP server provides addresses to hosts on the Office LAN (attached to interface eth1).

▶ Try it

▶ **Set up DHCP**

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. Also, set the default router and DNS server to the values that will be assigned to hosts on the Office LAN. The default router for these devices will be the LAN-facing interface of the Internet gateway.

```
vyatta@R1# set service dhcp-server shared-network-name
ETH1_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
ETH1_POOL subnet 192.168.1.0/24 default-router 192.168.1.254
[edit]
vyatta@R1# set service dhcp-server shared-network-name
ETH1_POOL subnet 192.168.1.0/24 dns-server 12.34.56.100
[edit]
vyatta@R1# commit
[edit]
```

```
vyatta@R1#
```

Let's view this configuration.

```
vyatta@R1# show service dhcp-server
   shared-network-name ETH1_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 and translate all internal private IP addresses to a single public address. This is done by defining a Network Address Translation (NAT) rule.

▶ Try it

▶ **Define a NAT rule**

Define a rule that allows traffic from network 192.168.1.0/24 to proceed to the Internet through interface eth0, and translates any internal addresses to eth0's IP address. (This is called "masquerade" translation.)

```
vyatta@R1# set service nat rule 1 source address
192.168.1.0/24
[edit]
vyatta@R1# set service nat rule 1 outbound-interface eth0
[edit]
vyatta@R1# set service nat rule 1 type masquerade
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Let's view this configuration.

```
vyatta@R1# show service nat
   rule 1 {
       type masquerade
       outbound-interface eth0
       source {
           address 192.168.1.0/24
       }
   }

[edit]
vyatta@R1#
```

Configuring Firewall

As it is shipped the Vyatta System does not restrict traffic flow through it. That is, unless a firewall rule is applied to an interface it will allow all traffic through it. The firewall functionality provides packet filtering which enables great flexibility in restricting traffic as required. In this simple scenario, the Internet gateway should allow hosts on the local network and services on the gateway itself to initiate traffic to the Internet, but it should drop all traffic that is initiated from the Internet. This section sets up a basic firewall configuration to do this. Essentially, this sequence defines a firewall rule set allowing traffic initiated from, or passing through, the gateway to the Internet. All other packets are implicitly denied, because there is an implicit **deny all** rule at the end of any rule set.

In general, to configure a firewall on an interface:

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

*Tip: 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   You apply the each of the named rule sets to an interface as a filter. You can apply one named rule set as 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.

- **local.** If you apply the rule set to an interface as **local**, the rule set filters packets destined for the system itself.

▶ Try it   ▶ **Define a firewall rule set**

For our simple example, the natural inclination is to simply create a rule to deny all inbound traffic (i.e. from any source network to any destination network) on the internet-facing interface. The problem with this approach is that outbound connections will not complete properly because response packets required to complete these connections will be denied as well. To circumvent this issue we must explicitly allow only these response packets as shown in the following example. This can be interpreted as "accept packets from established connections only" (where "established connections" includes responses to new connections). Because the final (implicit) rule in the rule set is **deny all**, this rule set will deny all other traffic on the interface destination (i.e. **in**, **out**, or **local**) that it is applied to.

```
vyatta@R1# set firewall name ALLOW_ESTABLISHED
[edit]
vyatta@R1# set firewall name ALLOW_ESTABLISHED rule 10
[edit]
vyatta@R1# set firewall name ALLOW_ESTABLISHED rule 10 action
accept
[edit]
vyatta@R1# set firewall name ALLOW_ESTABLISHED rule 10 state
established enable
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

▶ Try it   ▶ **Apply the rule set to an interface**

Now that we have the rule set, we need to apply it as **in** and **local** on the internet-facing interface (eth0 in our example) so that connections can only be established from these locations to the Internet.

```
vyatta@R1# set interfaces ethernet eth0 firewall in name
ALLOW_ESTABLISHED
[edit]
vyatta@R1# set interfaces ethernet eth0 firewall local name
ALLOW_ESTABLISHED
[edit]
vyatta@R1# commit
[edit]
vyatta@R1#
```

Let's view the firewall rule set we created:

```
vyatta@R1# show firewall
name ALLOW_ESTABLISHED {
    rule 10 {
        action accept
        state {
            established enable
        }
    }
}

[edit]
vyatta@R1#
```

Now let's see this rule set applied as a filter to **in** and **local** on interface eth0:

```
vyatta@R1# show interfaces ethernet
ethernet eth0 {
    address 192.0.2.21/24
    firewall {
        in {
            name ALLOW_ESTABLISHED
        }
        local {
            name ALLOW_ESTABLISHED
        }
    }
    hw-id 00:40:63:e2:e4:00
    link-detect
}
ethernet eth1 {
    address 192.168.1.254/24
    hw-id 00:13:46:e6:f6:87
    link-detect
}
```

This completes configuration of a basic Internet Gateway.

Additional Resources

For further information please refer to the Vyatta technical library, www.vyatta.com, or www.vyatta.org.

The Vyatta technical library includes the following publications:

Vyatta v514 Hardware Installation Guide	Explains how to install and set up Vyatta 514 hardware.
Vyatta System Quick Start Guide	Explains how to install the system software, and provides some basic configuration to get you started.
Vyatta Security Reference Guide	Provides command reference material and configuration examples for features providing network security, such as IPsec site-to-site VPN, remote access VPN, firewall, Intrusion Protection System, and anti-virus.
Vyatta High Availability Reference Guide	Provides command reference material and configuration examples for features providing high availability, such as WAN load balancing, clustering, and VRRP.
Vyatta System Command Reference	Provides command reference material for all Vyatta commands not documented in other reference guides.

Chapter 4: Updating Vyatta Software from LiveCD

Upgrading from LiveCD is just performing a new install of the standard Vyatta release from LiveCD, as described in the section "Running from Hard Disk" on page 5.

Upgrading a hard disk install from LiveCD provides a "clean" install of the standard Vyatta release, with everything but your saved configuration wiped clean. You should only upgrade from LiveCD if:

- You haven't installed additional packages beyond the standard Vyatta release (or you don't care if you lose them), and

- You have your configuration file on a floppy disk (or you don't care if you lose your configuration)