BIGip

GETTING STARTED
WITH THE BIG/ip LB
CONTROLLER

F5 LABS f5

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Product Version

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Getting Started with the BIG/ip LB Controller

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Working with the BIG/ip LB Controller

The BIG/ip LB Controller, a member of the BIG/ip® platform, provides basic load balancing for network devices in Internet, intranet, extranet, and e-commerce environments. The BIG/ip LB Controller offers the following main features:

- Load balancing for network servers, routers, and router-like devices, such as transparent firewalls

- Connection management for multiple Internet or intranet sites

- BIG/config™, a web-based configuration and monitoring tool

- Support for command line administration via Telnet

- Remote monitoring of the availability of load balanced servers or network devices

- Easy upgrade to BIG/ip HA and HA+ packages

Note that these features are also available in all packages on the BIG/ip platform. The BIG/ip HA and HA+ products provide additional features, such as hardware redundancy, sophisticated service checking, and advanced load balancing modes.

This guide provides you with specific information on how to get started with installing and configuring the BIG/ip LB Controller. The *BIG/ip Installation and Users Guide* provides detailed information about these features and other aspects of the BIG/ip platform.

Understanding load balancing

When you configure a BIG/ip LB Controller, you need to choose a load balancing configuration and a load balancing mode. The BIG/ip LB Controller supports two load balancing configurations and four different load balancing modes. The load balancing configuration depends on whether you want the BIG/ip LB Controller to route traffic to servers, or route traffic to router-like devices, such as firewalls, routers, and gateways. The load

balancing mode determines how the BIG/ip LB Controller distributes connections across the array of servers, or the array of router-like devices.

Choosing a load balancing configuration

The BIG/ip LB Controller supports two types of load balancing configurations:

- **Normal Mode**
  In a Normal Mode configuration, the BIG/ip LB Controller load balances connections for network servers. The BIG/ip LB Controller accepts incoming connections from clients via the Internet or an intranet, and load balances the connections across an array of network servers.

- **Transparent Node Mode**
  In a Transparent Node Mode configuration, the BIG/ip LB Controller accepts outgoing connections from an internal network or an intranet, and load balances the connections across an array of routers, or router-like devices.

Configuring Normal Mode

In the following network scenario, the *external interface* is the network interface on which the BIG/ip LB Controller receives connection requests. The *internal interface* is the network interface on which the BIG/ip LB Controller distributes connections. Figure 1.1 illustrates how the BIG/ip LB Controller is connected to the network for load balancing in a normal configuration.

Figure 1.1 *Normal Mode configuration*

The BIG/ip LB Controller uses a load balancing algorithm to determine how it should distribute the connections across the servers in the server array.   If the load balancing mode is ***Round Robin***, the connection is distributed to the next available server in the array. For more information about the load balancing modes available in the BIG/ip LB Controller, see *Choosing a load balancing mode*, on page 1-6.

Configuring Transparent Node Mode

Figure 1.2 illustrates how the BIG/ip LB Controller is connected to the network for load balancing in a Transparent Node Mode configuration.
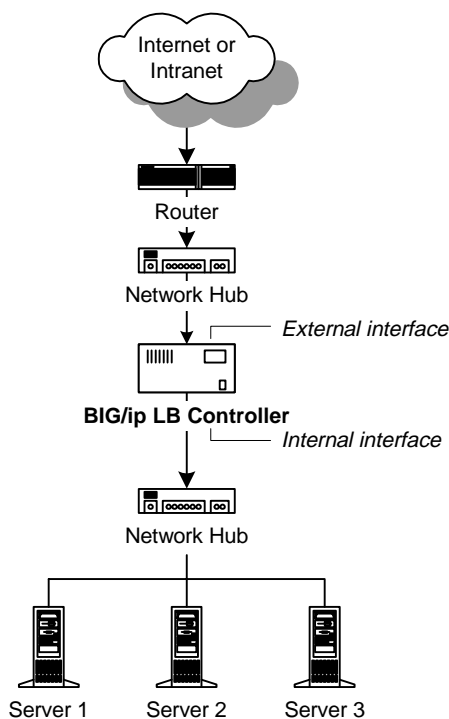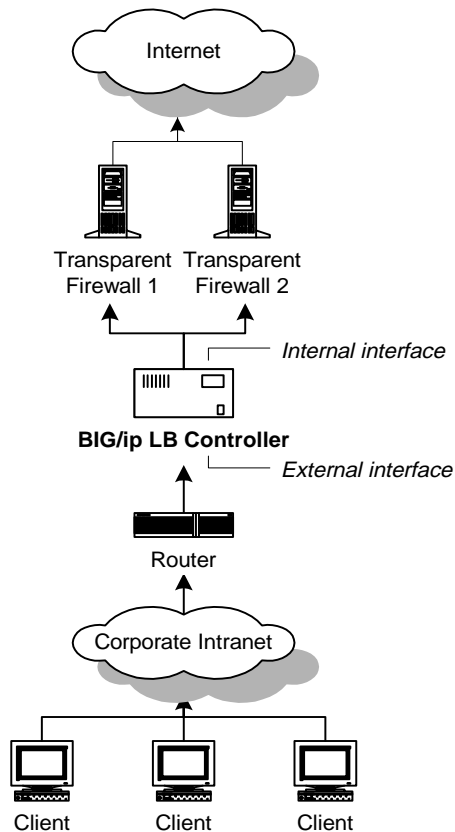
Figure 1.2 *Transparent Node Mode load balancing*

In a Transparent Node Mode configuration, the BIG/ip LB Controller accepts connection requests for all traffic going to outside Internet sites, or intranet sites that are on the other side of the transparent firewall or router array. Note that the placement of the BIG/ip LB Controller internal and external interfaces is reversed, in comparison to their placement in the normal configuration. The external interface is actually connected to the intranet, and the internal interface is connected to the array of transparent firewalls, routers, or other network devices.

Choosing a load balancing mode

Load balancing refers to the way in which the BIG/ip LB Controller distributes network traffic among many lines or servers to smooth or accelerate access in order to meet the demand. Load balancing modes define the algorithms and methods by which the traffic is routed. The BIG/ip LB Controller supports four load balancing modes, including:

- **Round Robin**
  Round Robin mode distributes each new connection to the next available server in the array. Over time, this mode results in an even connection distribution across the server array.

- **Ratio**
  Ratio mode distributes new connections according to the ratio value defined for each individual server in the array. Over time, this mode results in connections being distributed in proportion to the ratios you define.

- **Fastest**
  Fastest mode distributes new connections to the server which currently exhibits the fastest performance.

- **Least Connections**
  Least Connections mode distributes new connections to the server which currently hosts the fewest number of connections.

The default load balancing mode is Round Robin, which is adequate for most configurations. If the servers in your network vary greatly in speed and performance however, you may want to choose an alternate load balancing mode so that your high-performance servers handle the majority of the load.

Note that the BIG/ip LB controller supports persistence for TCP and UDP connections. Persistence requires the BIG/ip LB Controller to bypass load balancing, and send a returning client to the same server that the client connected to last time.

Understanding virtual servers

The BIG/ip LB Controller supports the use of *virtual servers* (a combination of a virtual IP address and a port number or service), which map to many nodes on the servers. A *node* is a combination of an IP address and a port or service associated with a server. Each content site that the BIG/ip LB Controller manages has a virtual server associated with it. Note that virtual server mappings typically include multiple nodes, which are referred to as *members* of the virtual server. Also note that a virtual server may be mapped to nodes on more than one physical server.

When you are planning your network configuration, you should consider how you want to configure the various services for your site, and then implement the virtual servers accordingly. For example, you may want to configure several virtual servers in Transparent Node Mode to support shopping carts and purchasing transactions for your e-commerce site, and then also create other virtual servers to handle traffic for your corporate web site and virtual private network (VPN) accounts. Virtual servers are defined by using the BIG/config application or by using the BIG/pipe™ command line utility.

You may want to have a few virtual addresses, each of which points to the same node on multiple servers. For example, you may configure a virtual address as *www.SiteOne.com* and have it served by port 80 on three different physical servers in order to balance your web site performance. Alternately, if you want to configure an FTP site, you would have another virtual address, *ftp.SiteOne.com*, that points to port 20 or 21 on the same three servers. The virtual address is that which you publicly advertise to customers and clients. Chapter 2 of this guide discusses virtual servers and planning for them in more detail.

2

Installing and Configuring the BIG/ip LB Controller

- **Understanding the installation process**

- **Unpacking and installing the hardware**

- **Configuring the basic system elements**

- **Configuring the BIG/ip LB software for Normal Mode**

- **Configuring the BIG/ip LB software for Transparent Node Mode**

- **Finding more details**

Understanding the installation process

When you set up a BIG/ip LB controller, you must first complete an initial installation process. This process includes installing hardware for the BIG/ip LB Controller, as well as defining basic system elements that allow the unit to connect to the network. Once you complete the initial installation process, you can then begin configuring BIG/ip software.

This chapter covers the initial installation tasks and takes you up to the point where you can begin configuring the BIG/ip software from a remote administrative workstation. Configuration tasks for BIG/ip software are covered in Chapter 4 and Chapter 5 of the *The BIG/ip Installation and Users Guide*.

The initial installation process consists of three basic tasks:

- Installing the hardware
- Connecting the BIG/ip LB Controller to the network
- Booting the unit and defining basic system elements, such as root user information and IP addresses

Before you actually begin the initial installation, we strongly recommend that you review both the *Familiarizing yourself with the BIG/ip LB Controller hardware* section and the *Complying with Environmental requirements and guidelines* section provided in this chapter.

Once you complete the initial installation process, you can use either the BIG/config web application, or the BIG/pipe command line utility, to configure your BIG/ip software from a remote administrative workstation.

Unpacking and installing the hardware

The following checklists outline the hardware provided with your BIG/ip LB Controller, as well as the peripheral hardware that you must supply.

Equipment provided with a BIG/ip LB Controller

For the BIG/ip LB Controller, F5 Labs provides you with the following items:

- One power cable
- One PC/AT-to-PS/2 keyboard adapter
- Four rack mounting screws
- Two keys for the front panel lock
- One extra fan filter

In addition, F5 Labs provides you with one each of the following manuals:

- *Getting Started with the BIG/ip LB Controller*
- *BIG/ip Installation and Users Guide*

◆ Note

*Additional documentation, including technical notes and frequently asked questions, is available in the Technical Support section of F5 Labs' web site at **http://tech.F5.com**. To access this site, you need to obtain a customer ID and a password from your F5 service engineer.*

Peripheral hardware that you provide

For the BIG/ip LB Controller, you need to provide the following peripheral hardware:

- Either a VGA monitor and PC/AT-compatible keyboard, or a serial terminal and a null modem cable, for direct administrative access to the BIG/ip LB Controller.
- Two network devices that are compatible with the network interface cards installed on your BIG/ip LB Controllers. The devices can support either 10/100 Ethernet or FDDI/CDDI (including multiple FDDI and full duplex).
  - For Ethernet you need either a 10 Mb/sec or 100 Mb/sec hub or switch.
  - For FDDI/CDDI you need either a concentrator or a switch.

We also recommend that you have a remote administrative workstation in place from which you can configure and monitor the BIG/ip LB Controller.

Familiarizing yourself with the BIG/ip LB Controller hardware

Before you being to install the BIG/ip redundant system, review the figures below which illustrate all controls and ports on both the front and the back of a BIG/ip LB Controller unit. The hardware installation instructions refer to ports and other controls on the unit by the numbers they are identified by in the following figures.

Figure 2.1 shows the front of a BIG/ip LB Controller, where you can turn the unit on or you can reset the unit.
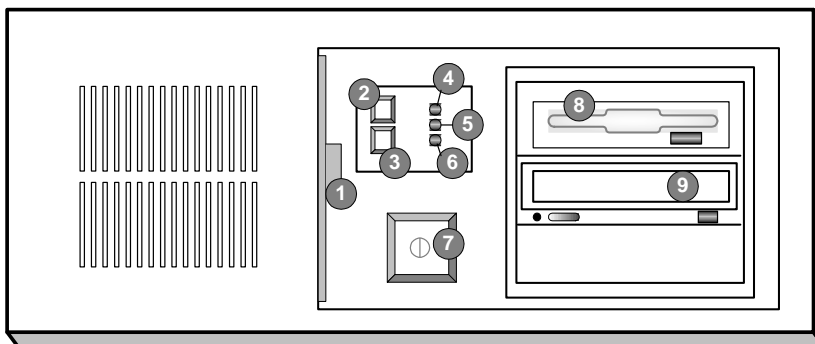

Figure 2.1 *Front view of a BIG/ip LB Controller*

1. Fan filter

2. Keyboard lock

3. Reset button

4. Keyboard lock LED

5. Hard disk drive LED

6. Power LED

7. On/off button

8. 3.5 floppy disk drive

9. CD-ROM drive

Figure 2.2 shows the back of a BIG/ip LB Controller. Note that all ports are labeled, even those which are not intended to be used with the BIG/ip LB Controller.
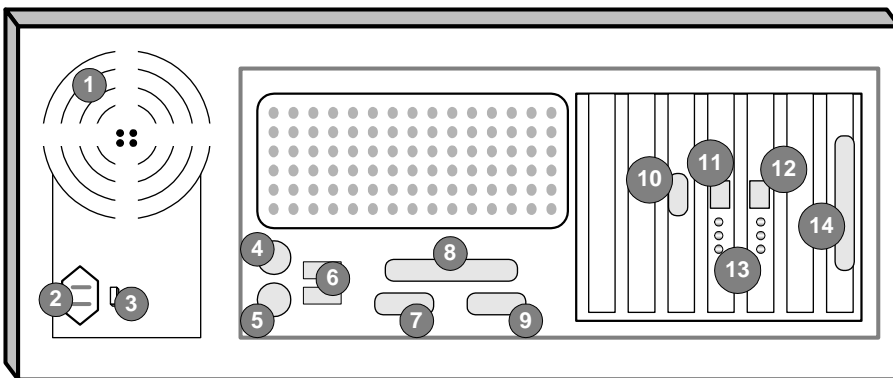

Figure 2.2 *Back view of a BIG/ip LB Controller*

1. Fan

2. Power in

3. Voltage selector

4. Mouse port*

5. Keyboard port

6. Universal serial bus ports*

7. Terminal serial port

8. Printer port*

9. Fail-over port*

10. Video (VGA) port

11. Internal interface (RJ-45)

12. External interface (RJ-45)

13. Interface indicator LEDs

14. Timer reboot card*

◆ **Note**

Ports marked with an asterisk (*) do not need to be connected to any peripheral hardware.

Complying with Environmental requirements and guidelines

A BIG/ip LB Controller is an industrial network appliance, designed to be mounted in a standard 19-inch rack. To ensure safe installation and operation of the unit, be sure to take the following into consideration before you install the unit in the rack:

• The rack itself should be installed according to the manufacturer's instructions, and should be checked for stability before you install any BIG/ip LB Controller hardware.

• The maximum air temperature in the room cannot exceed 50° C. Internal temperatures should be considered for continued safe operation.

• The rack should be structured and positioned so that once the BIG/ip LB Controller is installed, the power supply and the vents on both the front and back of the unit are unobstructed. There should be adequate ventilation around the unit at all times.

• The branch circuit into which you plug the unit should not be shared by more electronic equipment than it is designed to manage at one time.

• The unit must be connected to Earth ground, and it should have a reliable ground path maintained at all times.

- International customers should verify that the voltage selector is set appropriately before connecting a power cable to the unit.

◆ **WARNING**

The BIG/ip LB Controller contains a lithium battery. There is danger of an explosion if you replace the lithium battery incorrectly. We recommend that you replace the battery with only the same or an equivalent type of battery originally installed in the unit. Be sure to discard all used batteries according to the manufacturer's instructions.

Installing and connecting the hardware

There are five basic steps to installing the hardware. Note that you should not turn a BIG/ip LB Controller on until all of the peripheral hardware is connected to the unit.

To install the hardware

1. Insert the BIG/ip LB Controller in the rack and secure it using the four rack mounting screws provided.

2. Connect the hardware that you have chosen to use for input/output:

   - If you are using a VGA monitor and keyboard, connect the monitor connector cable to port number 10 and the keyboard connector cable to port number 5 (Figure 2.2, on page 2-5). Note that a PC/AT-to-PS/2 keyboard adapter is included with each BIG/ip LB Controller (see the packing list on page 2-3).

   - If you are using a serial terminal, connect the null modem cable to port 7 (Figure 2.2, on page 2-5). Configure the serial terminal settings as follows:

     - 9600 baud

     - 8 bits

     - 1 stop bit

     - No parity

3. Connect the external interface (port 12 in Figure 2.2) to the network from which the BIG/ip LB Controller receives connection requests. In a normal configuration, this is typically the network connected directly to the Internet or other external network. In a Transparent Node Mode configuration, this is typically your internal network. For more details about configuring the BIG/ip LB Controller for Transparent Node Mode, see *Balancing and managing connections for routers and router-like devices* on page 7-7 of the *BIG/ip Installation and Users Guide*.

4. Connect the internal interface (port 11 in Figure 2.2) to the network that houses the array of servers, routers, or firewalls that the BIG/ip LB Controller load balances. In a normal configuration, this is typically the internal network that houses your content servers. In a Transparent Node Mode configuration, this is typically the external network that houses your routers, transparent firewalls, or other transparent devices.

5. Connect the power cable to the BIG/ip LB Controller, and then connect it to the power source.

◆ **WARNING**

International customers should make sure that the voltage selector is set appropriately before connecting the power cable to a power supply.

Working with more than two network interface cards

The BIG/ip Controller is available with more than two network interface cards (NICs). If you have purchased a unit with three or more NICs, be sure to note how you connect the cables to the internal and external interfaces. The First Time Boot Utility automatically detects the number of interfaces that are installed and prompts you to configure more external interfaces, if you wish. It's important to select the correct external interface based on the way you have connected the cables to the back of the unit.

Once you complete these steps, you are ready to define system elements that allow you to access the BIG/ip LB Controller from the network. You perform this task using the First-Time Boot utility, which runs automatically when you start the BIG/ip LB Controller for the first time. Note that the First-Time Boot utility prompts you to enter specific configuration information. We do not recommend that you turn the unit on until you have compiled the necessary information and are ready to enter it in the system.

Configuring the basic system elements

The next task in the installation process is to turn the unit on, and configure a few basic elements, such as passwords, IP addresses, and other items that allow administrative access via the network. To complete this task, you use the monitor and keyboard, or the serial terminal, that you attached to the BIG/ip LB Controller. You cannot complete this task from a remote workstation.

Using the First-Time Boot utility

The First-Time Boot utility guides you through the process of setting up fundamental features of your BIG/ip LB Controller configuration, including the F5 web server and IP addresses through which you will be able to directly access the operating system on the BIG/ip LB Controller. The F5 web server provides remote administration and monitoring of your BIG/ip LB Controller.

This utility walks you through setting up the following items:

- **Defining a root password**
  The root password is the administrative password, which allows the highest security level access to the BIG/ip operating system. You need to enter this password any time that you connect to the BIG/ip LB Controller via a Telnet session.

- **Defining a host name**
  The host name is the name that you want to use to identify the BIG/ip LB Controller in place of an IP address.

- **Configuring the interfaces to the external and internal networks**
  For each interface card, you simply define an IP address.

- **Configuring Telnet and FTP administration**
  For security purposes, the BIG/ip LB Controller accepts Telnet connections only from the IP address, or range of IP addresses, that you specify in this step.

- **Configuring the default route**
  The default route is the IP address of the default gateway router on the external interface for your network.

- **F5 web server**
  The BIG/ip LB Controller includes an administrative web server that hosts the BIG/config application, for which you define a host name that represents the web server on the internal interface, and a different host name that represents the web server on the external interface.

The First-Time Boot utility allows you to review and confirm configuration settings before it saves them and completes the configuration process.

◆ **Note**

The F5 web server uses the domain you enter in the browser to identify the BIG/ip controller. If you use the IP address and port to connect to the F5 web server, your browser may generate an error because it detects a mismatch between the domain name it is looking for, and the IP address and port which you have typed in your browser.

To boot the BIG/ip LB Controller, turn on the power button. Newer models have the power button located on the front of the BIG/ip LB Controller (see Figure 2.1, number 7), but older models have a power switch on the back.

When you boot the unit, the First-Time Boot utility automatically starts. Press a key to begin the configuration. When the BIG/ip LB Controller starts, you see the Welcome screen shown in Sample Screen 2.1.

```
W E L C O M E

            Thank you for purchasing BIG/ip(tm)!
                  BIG/ip Controller - 2.0.1
             Copyright (C) 1996-1999, F5 Labs, Inc.
                      All Rights Reserved
                  For Technical Assistance:
                  Voice: +1 (206) 505-0800
                    Email: support@f5.com

                [ press any key to continue ]
```

Sample Screen 2.1 *The initial Welcome screen*

Simply press any key on the keyboard to start the First-Time Boot utility. Once it starts, the screen shown in Sample Screen 2.2 displays.

```
                      First-Time Boot
                 System Configuration Utility

  Welcome to BIG/ip(tm).   Before using your
  BIG/ip Controller, you will have to configure the
  root password, host name, and interface cards.
  This utility will take you through this
  process step-by-step.

  Before any configuration files are written to
  disk, you will be asked to confirm all your
  selections.

         [ Press ctrl-E to exit and configure manually ]

                 [ press any key to continue ]
```

Sample Screen 2.2 *The First-Time Boot Utility screen*

Defining a root password

A root password allows you administrative access to the system on the BIG/ip LB Controller. The password must contain at least 6 characters, but no more than 128 characters. Passwords are case-sensitive, and we recommend that your password contain a combination of uppercase and lowercase, as well as punctuation characters. Once you enter a password, the First-Time Boot utility prompts you to confirm the root password by typing it in a second time. For security purposes, you can change the root password as often as you want (see Chapter 6, *Additional System and Network Configuration*, in the *BIG/ip Installation and Users Guide*).

◆ Note

Once you define and confirm the root password at this screen, you cannot change the root password until the First-Time Boot utility completes and you reboot the BIG/ip LB Controller (see Chapter 6, Additional System and Network Configuration, in the BIG/ip Installation and Users Guide).

Defining a host name

The host name identifies the BIG/ip LB Controller itself. There are no restrictions on host names, other than those imposed by your own network configuration. Choose a unique host name that clearly identifies the unit on your network.

```
SET BIG/ip(tm) HOSTNAME

     Enter BIG/ip(tm) Hostname:
```

Sample Screen 2.3 *The Set Hostname screen*

Configuring the interfaces to the external and internal networks

When you configure an interface that connects the BIG/ip LB
Controller to the external or internal network, the configuration
utility prompts you for the following information:

• Interface IP address

• Netmask

• Broadcast address

• Interface media type

The *external network* is that from which the BIG/ip LB Controller
receives connection requests. The *internal network* is that which
houses the server array, or array of transparent network devices, for
which the BIG/ip LB Controller provides load balancing.

Understand that the IP address of the external network interface is
not the IP address of your site or sites. You use the external
network interface IP address for remote administration of the

BIG/ip LB Controller. The IP addresses of the sites themselves are specified by the virtual IP addresses associated with each virtual server you configure.

The BIG/ip LB Controller uses a default netmask of `255.255.255.0`. The default broadcast address is based on the IP address and the default netmask. You can define a different netmask and broadcast, or you can accept the default settings. If you have more than two network interface cards, the utility asks if you want to configure more external interfaces. After you configure the external interfaces, the First Time Boot utility automatically assigns the remaining interfaces to the internal network.

Once you select the appropriate interface, you can enter the IP address and media type. You can also optionally set the netmask and broadcast address. The BIG/ip LB Controller uses a ***10/100 Network Interface card*** (NIC), which supports five media types, as seen in Sample Screen 2.4.

```
CONFIGURE EXTERNAL INTERFACE

  Enter IP Address for External Interface [exp0]:207.17.112.254

  Enter Netmask for External Interface [exp0]:
    [CR for default of 255.255.255.0]

  Enter Broadcast Address for External Interface [exp0]
    [CR for default of 207.17.112.255

  Select Media Type for External Interface

  auto
  10base T
  10base T,FDX
  100base TX
  100base TX, FDX
                [ press any key to continue ]
```

Sample Screen 2.4 *The Configure External Interface screen*

◆ **Note**

The configuration utility lists only the network interface devices that it detects during boot up. If the utility lists only one interface device, the network adapter may have come loose during shipping. Check the LED indicator on the network adapters to ensure that the utility has detected all the available BIG/ip LB Controller media.

Configuring Telnet and FTP administration

The BIG/ip LB Controller uses Telnet for remote administration. You must explicitly set access to the unit by configuring Telnet and FTP. To allow for command line administration via a Telnet session, you specify a single IP address, or a range of IP addresses, from which the BIG/ip controller accepts Telnet connections. This information is stored in the administrative IP access file, */etc/hosts.allow.* To specify a range of IP addresses, include the asterisk character (*) as a wildcard character in the IP addresses. Even if you do not plan to use command line administration via a

Telnet session, you still need to enter an IP address. Sample screen 2.5 shows how to configure remote administration from all hosts on the 192.168.2.0 network.

```
SET ADMINISTRATIVE IP ADDRESS

Remote Administrative IP address [<CR> for none]:

  The Administrative IP Address is the IP Address from which
   all remote administration, configuration and monitoring
    of your BIG/ip(tm) will be conducted using Telnet.

  You may enter a '*' to specify a range of IP addresses-
for instance, 192.168.2.* would allow all hosts on the
                   192.168.2 network.
```

Sample Screen 2.5 *The Set Administrative IP Address screen*

After configuring Telnet access, you follow the same steps to configure FTP. The required information is the same as you specified for the Telnet configuration.

Configuring the default route

If a BIG/ip LB Controller does not have a predefined static route for network traffic, the unit automatically sends traffic to the IP address that you define as the default route. Enter the IP address on the external interface of the default gateway router for your network in order to correctly configure the default route.

Confirming configuration settings

The next step in the First-Time Boot utility is to confirm the following configuration settings for the BIG/ip LB Controller:

• Host name

• Interface settings

• Administrative IP address

• Default route

Configuring settings for the F5 web server

The F5 web server requires a host name for the server on both the internal and the external interfaces, which you define. For the F5 web server, you also define a user ID and password.

Note that if you ever change the IP addresses or host names on the BIG/ip LB Controller interfaces, you need to reconfigure the F5 web server to reflect your new settings. You can run the F5 web server configuration utility from the command line using the following command:

`config-httpd`

If you wish to create a new password for the F5 web server, delete the */var/f5/httpd/basicauth/users* file before entering the `config-httpd` command. If the `config-httpd` utility does not detect this file, it prompts you to define new user ID and password information.

You can also add users to the existing password file, change a password for an existing user, or recreate the password file, without actually going through the F5 web server configuration process. For more information, see Chapter 6, *Additional System and Network Configuration*, in the *BIG/ip Installation and Users Guide*.

◆ WARNING

If you have modified the F5 web server configuration outside of the configuration utility, be aware that some changes may be lost when you run the `config-httpd` *utility. This utility overwrites the httpd.conf file, but it warns you before doing so.*

Confirming configuration settings for the F5 web server

The final step in the First-Time Boot utility is to confirm your configuration settings for the F5 web server. Before each file is overwritten, you are prompted to confirm your selections.

Saving configuration settings with the First-Time Boot Utility

After you confirm all of the configuration settings for both the BIG/ip LB Controller and the F5 web server, the First-Time Boot utility saves the configuration settings in the following files:

- *Administrative IP access file*
  The */etc/hosts.allow* file contains the configuration information for the address or range of addresses from which the BIG/ip LB Controller can accept connections for remote administration.

- *Interfaces table*
  The */etc/bigip.interfaces* file stores information about your external and internal interfaces.

- *Configuration file*
  The */etc/bigip.conf* file is the default configuration file for the BIG/ip LB Controller. It contains configuration information for virtual server definitions.

- *Network configuration file*
  The */etc/netstart* file defines the host name and default route for the BIG/ip LB Controller, as well as additional aliases for each interface.

- *Hosts file*
  The */etc/hosts* file contains the IP addresses for the default router, the internal network interface, and the external network interface. It also contains place holders for host names associated with both the virtual servers and the content servers that the BIG/ip LB Controller will manage.

- *ARP table mappings*
  The */etc/ethers* file contains ARP mappings between true IP addresses and their ethernet addresses on the BIG/ip LB Controller. These mappings directly manipulate the ARP table.

Once the First-Time Boot utility finishes saving the configuration, reboot the BIG/ip LB Controller so that it runs using the new settings. You may want to add additional names for virtual servers and content servers to the hosts file before rebooting. Once you have rebooted the unit, you can finish the configuration process on your own workstation; you no longer have to work at the console.

Defining host names for network devices

After the First-Time Boot utility finishes, you may want to insert additional host names and IP addresses for network devices into the */etc/hosts* file to allow for more user-friendly system

administration. You can define host names for network devices such as routers, network interface cards, nodes, addresses, and virtual addresses used by the BIG/ip LB Controller.

The */etc/hosts* file, as created by the First-Time Boot utility, is similar to the following example, shown in Sample Screen 2.6.

```
#bigip host table ( default )
127.0.0.1 localhost localhost.host.domain
# add your default gateway here
207.17.112.254
#  real - external interface
207.17.112.230 bigip ext
# real - internal interface
192.168.1.100 int
# VIPs  ( add as necessary )
# nodes ( add as necessary )
```

Sample Screen 2.6 *The /etc/hosts file created by the First-Time Boot utility*

Configuring the BIG/ip LB software for Normal Mode

Once you connect the BIG/ip LB Controller to the network, you are ready to configure the BIG/ip software. Essentially, you need to specify a load balancing mode, and configure the virtual servers and nodes that the BIG/ip LB Controller manages. You can use BIG/config or Telnet to make changes, or you can edit the files on your administrative workstation and use FTP to transfer the files to the BIG/ip LB Controller. If you plan on using only the BIG/config web application, you do not need to perform any additional installation steps. For information about using BIG/config, refer to Chapter 4, *Working with the BIG/config Application*, in the *BIG/ip Installation and Users Guide*.

If you plan on using command line utilities, such as BIG/pipe™ and BIG/top™, for system configuration and monitoring, you need to set up Telnet on a workstation. You should have already defined the IP address for Telnet administration during the First-Time Boot utility.

Configuring items in BIG/config

Using the BIG/config application, you configure the following items:

- Load balancing
- Virtual servers and their properties
- Nodes and their properties
- Node pings and service check frequencies

You can also configure other BIG/ip LB Controller features, such as simple service checking, NATs, or SNMP. For more information about advanced configuration options, refer to Chapter 4, *Working with BIG/config* and Chapter 7, *Advanced Configurations*, in the *BIG/ip Installation and Users Guide*.

To start the BIG/config web application

1. From your browser on the administrative workstation, connect to the BIG/ip LB Controller.

2. On the see/IT home page, click the **BIG/config** button.

◆ **Note**

The see/IT home page allows you to create hyperlinks to all other BIG/ip LB Controllers running in your network. Click the Add BIG/ip Controller shortcut on the home page and enter the URL of the BIG/ip LB Controller you want to add.

Choosing a load balancing configuration

The default load balancing configuration is Normal Mode. If you installed the BIG/ip LB hardware in a Transparent Node Mode configuration, you need to set the BIG/ip software to run in Transparent Node Mode. For an example of Normal Mode and Transparent Node Mode networks, refer to Figures 1.1 and 1.2.

To set the BIG/ip LB Controller to Transparent Node Mode

1. Choose **Advanced Properties** from the BIG/ip System Properties screen.

2. Check the **Transparent Node Mode** option on the BIG/ip System Control Variables screen.

To turn on Transparent Node Mode from the command line, enter the following command:

```
sysctl -w bigip.bonfire_mode=1
```

To save your changes, edit the */etc/rec.sysctl* file, using **vi** or **pico**, and add the Transparent Node Mode setting to your standard configuration.

Configuring the BIG/ip LB Controller for site management

The next part of the configuration process involves configuring the information that allows the BIG/ip LB Controller to manage your sites and the server array. You need to configure virtual servers, nodes, node pings, and service checks.

Configuring virtual servers and nodes

Virtual servers are configured according to the services you want to provide to your clients. The definition of a virtual server includes a virtual address, and a virtual port. You can set properties for virtual servers, virtual addresses, and virtual ports. The virtual address must be the IP address that is registered for the site's domain name. This is the same IP address that is advertized to clients. The virtual port must correspond to the TCP or UDP port number that is known to client programs.

To create a virtual server with BIG/config

1. Click **Virtual Servers** in the BIG/config tree.

2. On the toolbar, click **Add Virtual Server**.

3. Enter the IP address, netmask, broadcast, port, node address, and port number information in the boxes.

4. Click **Add** to create the virtual server.

Once you define the virtual server, you can add other nodes to the virtual server mapping.

1. Click **Virtual Servers** in the BIG/config tree.

2. Click the virtual server to which you want to add nodes.

3. In the specific Virtual Server screen, click **Add Node**.

4. Enter the IP address and node port number or service.

5. Click **Add** to send the changes to the BIG/ip LB Controller.

◆ **Note**

The virtual ports are not required to correspond to the server node ports.

Configuring node ping and service checking

Node ping checks the state of each node address that the BIG/ip LB Controller manages. If the node address responds to the ping, then the BIG/ip LB Controller marks that node address as *up*. When a node address is up and the node is up, it is available to accept connections. Node ping is set *on* by default and you can change its setting in the BIG/config System Properties screen.

To change the node ping system variable

1. Click **BIG/ip** in the BIG/config tree.

2. Enter the number of seconds for Node Ping and Timeout in the boxes.

3. Click Apply.

For more detailed information, refer to Chapter 4, *Working with the BIG/config Application*, in the *BIG/ip Installation and Users Guide*.

◆ **Note**

When you turn node ping off, the BIG/ip LB Controller retains the last known state for that node. If you turn node ping off while the node is down, when the node comes back up, the BIG/ip LB Controller has no means of knowing that the node is available to receive traffic again. You must turn node ping on again for that node, in order for the BIG/ip LB Controller to see that it is up.

While node ping checks the state of addresses, service checking applies to ports and services. The BIG/ip LB Controller can also validate a node using *service checking*, where it tries to connect with the node and see if it is *up*. If only node ping is on, and a node address is *up*, all nodes associated with the address are considered *up*. If service checking is on, a node is marked up only if the node address is responsive to node pings, and the service or port responds to the service check.

The BIG/ip LB controller performs simple service checking, which means that the BIG/ip LB Controller connects and then shuts down the connection without further activity. Advanced service checking features, such as Extended Content Verification (ECV) and Extended Application Verification (EAV) are available in the BIG/ip HA and HA+ systems. For more information about service checking, refer to Chapter 7, *Advanced Configurations*, in the *BIG/ip Installation and Users Guide*.

Configuring the BIG/ip LB software for Transparent Node Mode

Transparent Node Mode is a way to install and configure the BIG/ip LB Controller to load balance and route traffic from workstations on your internal network, where the clients connect through a firewall, to external networks, such as the Internet. When you

choose Transparent Node Mode as your load balancing configuration, the BIG/ip LB Controller load balances and manages transparent devices in your network, such as a set of transparent firewalls. For example, just as a transparent firewall appears as a router to its clients, the BIG/ip LB Controller appears as a router to its clients when it is placed in front of transparent firewalls.

When using the BIG/ip LB Controller in the Transparent Node Mode configuration, you create a wildcard virtual server to load balance transparent services. Setting the unit into Transparent Node Mode is described in *Choosing a load balancing configuration*, in this chapter.

Creating wildcard virtual servers

The virtual address 0.0.0.0 has a special function in Transparent Node Mode. It is known as a wildcard virtual address. Generally, traffic passing through a transparent network device will not match any regular server address, because that traffic has an indeterminate destination address on the Internet. A default wildcard virtual server is effective for all ports. However, you can specify an individual port, if necessary. Note that port numbers in packets will not be translated.

First, you must enable each virtual port for which you want to define a virtual server. Enabling a virtual port allows traffic to flow through it. For wildcard virtual servers, you must allow port 0.

To allow traffic on a virtual port

1. Click **Virtual Servers** in the BIG/config tree.

2. Double-click a virtual server that contains the port you want to allow.

3. On the Virtual Server Properties screen, double-click the actual port number or name.

4. Check the **Enabled** option on the Global Virtual Port Properties screen for that port.

To create a wildcard virtual server in BIG/config

1. Click **Virtual Servers** in the BIG/config tree.

2. On the toolbar, click **Add Virtual Server**.

3. Type **0.0.0.0** in the address field.

4. Type **0** in the port field.

5. Type the Node Address and Node Port you want to use.

6. Click **Add** to create the wildcard virtual server.

Creating wildcard virtual servers from the command line

You can create a default wildcard virtual server from the command line as well as with the BIG/config application. You can configure only port-specific virtual servers, if you want. The BIG/ip LB Controller attempts to match the specific port before reverting to the default port (port 0). The following example defines a default wildcard virtual server for the HTTP port, where port 80 is the service check port:

```
bigpipe vip 0.0.0.0:0 define fw0:80 fw1:80
```

For more information on the **bigpipe** command syntax for this and other commands, consult Appendix B, *BIG/pipe Command Reference*, in the *BIG/ip Installation and Users Guide*.

Note that you can still configure and use normal virtual servers while operating in Transparent Node Mode. For example, you can configure virtual servers for traffic routing through non-transparent proxies. You can also configure virtual servers to route email traffic through SMTP gateways on a firewall. For information about configuring virtual servers in general, refer to Chapter 4, *Working with the BIG/config Application*, in the *BIG/ip Installation and Users Guide*.

Finding more details

You are now done with the essential configuration tasks for installing and integrating the BIG/ip LB Controller into your network. For more information and detailed instructions on using and maintaining your BIG/ip LB Controller, consult the *BIG/ip Installation and Users Guide*.

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