Cobalt CacheQube

User Manual

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Important Safeguards

For your protection, please read all these instructions regarding your Cobalt CacheQube and retain for future reference.

1. Read Instructions

All the safety and operating instructions should be read and understood before the appliance is operated.

2. Ventilation

The bottom vents and fan opening on the Cobalt CacheQube are provided for ventilation and reliable operation of the product and to protect it from overheating. These openings must not be blocked or covered. This product should not be placed in a built-in installation unless proper ventilation is provided.

3. Lithium Battery

The lithium battery on the system board provides power for the real-time clock and CMOS RAM. The battery has an estimated useful life expectancy of 5 to 10 years. If your system no longer keeps accurate time and date settings, it may be time to change the battery. Contact Cobalt for service information. No user serviceable parts inside.

Caution: There is a danger of explosion if the battery is incorrectly replaced. Do not attempt to replace the battery yourself.

4. Electrical Shock

To reduce the risk of electrical shock, do not disassemble this product. Instead, take it to a qualified service person when service or repair work is required. Opening or removing covers may expose you to dangerous voltage or other risks. Incorrect reassembly can cause electric shock when this product is subsequently used.

Browsers

Both Netscape Navigator® and Microsoft® Internet Explorer have bugs that can cause intermittent, unexplained failures. When using a web browser to interact with your Cobalt CacheQube, you may occasionally experience a browser failure. Released product versions of the browsers are usually more reliable than beta versions, and later versions seem to work the most reliably. A browser program failure, although annoying, will not adversely affect your Cobalt CacheQube's data.

Regulations and Information

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her expense.

This equipment is in compliance with Underwriters Laboratories (UL) and is UL listed.

Contents

Introduction

The Cobalt CacheQube is a dedicated World Wide Web caching device — it stores documents that have been retrieved from the Web. Once a document has been retrieved from the Web, users can obtain it from the Cobalt CacheQube without having to access the Web again. This reduces the communication load on the Wide Area Network (WAN) and helps users obtain Web documents much more quickly.

The Cobalt CacheQube can operate in several modes:

- **Traditional Proxy Caching mode**. Client Web browsers are configured explicitly to request documents from the Cobalt CacheQube. The browsers can be configured to do this by either individual users or a central manager of browser configuration files.
- **Transparent Caching mode**. All client network traffic is automatically routed through the Cobalt CacheQube. Software on the Cobalt CacheQube detects users' requests for Web documents (HTTP requests), which are then handled by the caching software. No browser configuration is necessary.
- **Clustering**. Several Cobalt CacheQubes are configured in a cluster. The *Cluster Master* receives clients' HTTP (HyperText Transfer Protocol) requests by either of the two methods described above. Each request is forwarded dynamically to one of the *Cluster Slaves*. The Cluster Slave retrieves the document, either from its cache or from the document's original server. The Cluster Slave returns the document to the Cluster Master, which forwards it on to the requestor. Because the work of managing cached documents is divided evenly among Cluster Slaves, clustering allows for a greater volume of HTTP traffic.

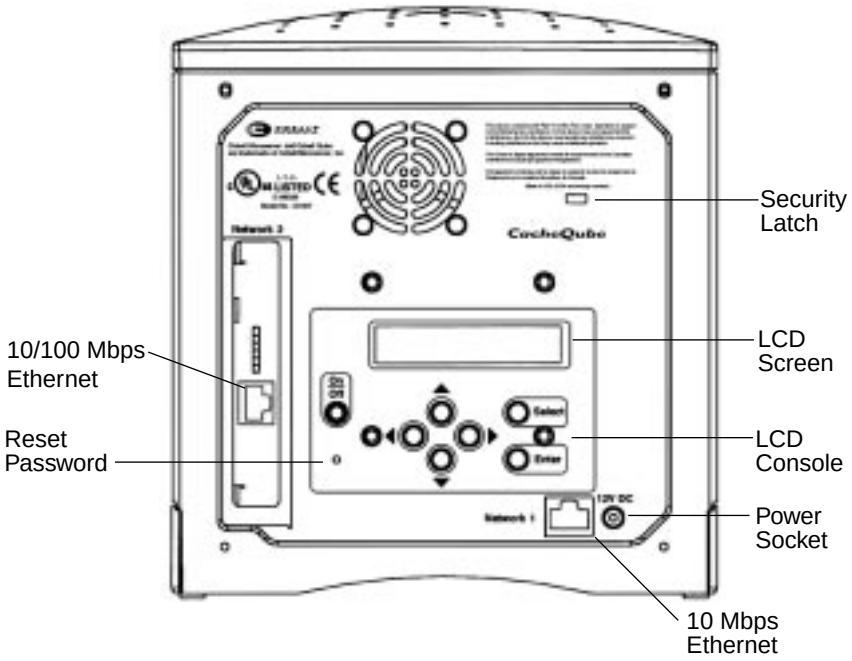
Chapter 1

Product Overview

Front View

The indicator light bar glows green when the Cobalt CacheQube is powered on.

Back View



- The **Reset Password** port is used if you forget the Cobalt CacheQube's administrator password. (See "Resetting the Admin Password" in Appendix A.)
- The **Security Latch** secures your Cobalt CacheQube with a standard computer-locking security cable (e.g., Kensington Microsaver Security System or compatible).
- The **LCD Screen** displays status and network information, including messages that require user response.
- The **LCD Console** is used to enter network configuration information and perform maintenance operations such as shutting down the Cobalt CacheQube.
- The **Power Socket** accepts the power connector from the power adaptor.
- The **10 Mbps Ethernet** interface accepts a 10Base-T Ethernet cable.
- The **10/100 Mbps Etherne**t interface accepts a 10Base-T or 100 Base-TX Ethernet cable.

Chapter 1

How to Use This Guide

This guide describes how to configure and operate the Cobalt CacheQube. You should be familiar with TCP/IP networking concepts and know how to use either the Netscape Navigator® or the Microsoft® Internet Explorer Web browser.

Organization of This Guide

Chapter 1, “Introduction,” includes an overview of the Cobalt CacheQube’s features and describes this guide.

Chapter 2, “Setting Up the Cobalt CacheQube,” explains installation and configuration.

Chapter 3, “Cobalt CacheQube Administration,” describes how to maintain the Cobalt CacheQube and how to view the statistics that describe its ongoing operation.

Appendix A, “Using the LCD Console,” describes how to use the Cobalt CacheQube’s LCD console functions — configuring (and resetting) the Cobalt CacheQube’s network settings, rebooting, and powering down.

Appendix B, “Cobalt CacheQube Technical Specifications,” contains the product specifications and functional information.

Appendix C, “Example Network Topologies,” shows examples of how the Cobalt CacheQube can be used within a network.

Requirements

- The Cobalt CacheQube operates in a TCP/IP network on 10Base-T or 100Base-T Ethernet. To use Transparent Caching mode, you need 10Base-T (for the 10 Mbps Ethernet interface).
- You need a Web browser that supports frames and JavaScript™; Netscape Navigator or Microsoft Internet Explorer, versions 3.0 or later, will work.
- You need to get an IP address and netmask for each configured Ethernet interface and a gateway address from your network administrator. To use Transparent Caching, you should either be, or work closely with, the network administrator to perform the appropriate setup procedure, as described in Chapter 2, “Setting Up the Cobalt CacheQube.”

Other Information

You can get the latest information about the Cobalt CacheQube at http://www.cobaltnet.com/, in the Support section of the website.

There you can view a list of Frequently Asked Questions with Answers. You can also send e-mail to support@cobaltnet.com.

Cobalt Networks provides telephone technical support at no charge for the first 30 days. If you're in the United States, call (888) 70-COBALT or (888) 702-6225. From outside the United States, call +1-650-930-2500.

Setting Up the Cobalt CacheQube

This chapter explains how to configure the Cobalt CacheQube for your network. If it has been configured previously for a different network, refer to “Changing the Network Configuration,” in Appendix A.

The configuration process occurs in two phases.

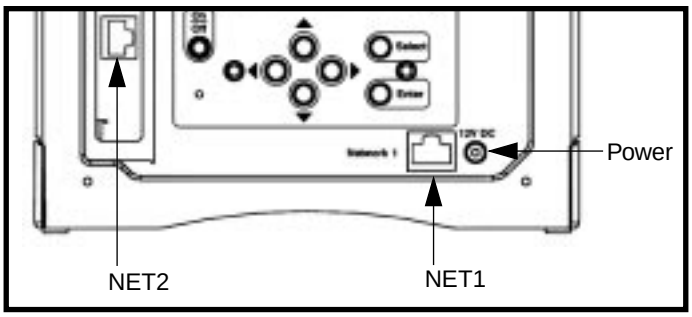
- “Phase 1: Configuring the Network,” explains how to install the Cobalt CacheQube on your network.
- “Phase 2: Setting Up With the Browser,” includes the configuration steps you need to perform after the Cobalt CacheQube is up and running on the network.

Phase 1: Configuring the Network

Before configuring the Cobalt CacheQube’s network settings, determine which of the network interfaces you need to use:

- To use Transparent Caching, you need to use both network interfaces (NET1 and NET2, shown in the next figure). Client computers need to be accessible via one interface, and the external Internet must be accessible via the other interface.
- To use only Traditional Proxy Caching, you can use either (or both) of the interfaces. If you have a 100 Mbps Ethernet network, it’s best to use the NET2 (10/100 Mbps) interface. If you have a 10 Mbps Ethernet network, you can use either (or both) of the interfaces.

Once you’ve determined which of the Cobalt CacheQube's network interface(s) to use, connect the interface(s) to your network with twisted-pair Ethernet cabling (see the following diagram).



Connecting the Power Supply

Connect the small round end of the power supply cord into the **12V DC** power socket. Connect the other end of the power supply cord to an electrical outlet.

Powering On the Cobalt CacheQube

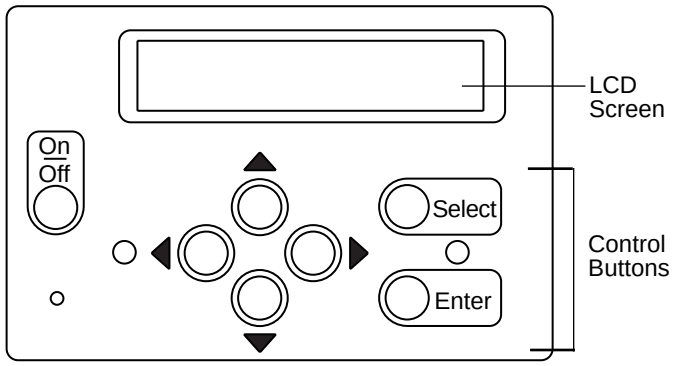
Turn on the power by pressing the **On/Off** switch on the back panel.

The hard disk “spins up” and the fan turns on. The light bar on the front blinks a few times and then glows steadily.

Status messages appear on the LCD screen as the Cobalt CacheQube completes its boot process.

Caution: It is important to follow the proper power-down procedure before turning off the Cobalt CacheQube. Refer to “Powering Down” in Appendix A.

Using the LCD Console During Setup



During startup, the LCD console displays status information relating to the boot process itself. During setup, it's used to enter network configuration information for the Cobalt CacheQube. After setup, the LCD console is used to change network configuration information, to reboot, and to power down the system.

The LCD screen displays two lines. The top line of the LCD presents instructions on data to enter, and the bottom line displays the data already entered. You use the control buttons immediately below the LCD screen to enter the required network information manually.

Here's how the control buttons work:


The **Left** button moves the cursor left between the digits displayed in the LCD screen.


The **Right** button moves the cursor right between the digits displayed in the LCD screen.


The **Up** button increments the digit located at the cursor position.


The **Down** button decrements the digit located at the cursor position.

The **Select** button selects the next option.

The **Enter** button accepts the information entered.

Refer to Appendix A, "Using the LCD Console," for more information.

Configuring Network Settings

Now that you've made the network and power connections, you're ready to configure the network settings.

This section explains how to enter the following network information using the LCD console:

- IP address and subnet mask for the onboard Ethernet interface,"NET1." (The NET1 connector is near the lower-right corner of the back panel, next to the power connector.)
- IP address and subnet mask for the 10/100 Mbps Ethernet interface, "NET2" (the connector on the left side of the Cobalt CacheQube's back panel, in the expansion card slot).
- Gateway IP address and connecting interface.

To configure the Ethernet interfaces, you need to know the IP address and netmask for the interface(s) you want to use, as well as the IP address of the gateway you'll be using to connect to the outside Internet. If you're not the network administrator, you need to obtain this information from your network administrator.

Note: To determine which Ethernet interface(s) you need to use, see the first paragraphs of "Phase 1: Configuring the Network," earlier in this chapter.

After the Cobalt CacheQube is turned on and ready to have its network configuration entered, the following message appears on the LCD screen:

```
SELECT:
    SETUP NET1
```

To Begin Configuring NET1

Press the Enter button, then follow the numbered steps listed below (in "Steps for Configuring NET1 or NET2") to configure NET1.

To Begin Configuring NET2

If you don't want to use NET1, press the Select button until you see:

```
SELECT:
    SETUP NET2
```

Press the Enter button, then follow the numbered steps listed below (in "Steps for Configuring NET1 or NET2") to configure NET2.

To Begin Configuring Both NET1 and NET2

First configure NET1, following the numbered steps listed below. When you're done, the following message appears:

```
SELECT:
    SETUP NET2
```

Press Enter and repeat the steps below to configure NET2.

Steps for Configuring NET1 or NET2

1. Follow the instructions above to select the interface you want to configure (NET1 or NET2).

   You'll see the message:

   ```
   ENTER IP ADDR:
   000.000.000.000
   ```

2. Using the Left, Right, Up, and Down keys, set the digits in the second line of the display so that this number matches the IP address for this interface.

   To set the digit that's currently selected, use the Up and Down keys.

   To select a different digit, use the Left and Right keys.

3. When the number on the display matches the correct IP address for this interface, press the Enter button.

   Note: If a message appears indicating that the IP address is invalid, re-enter the IP address, using the Left, Right, Up, and Down keys. Then press Enter again.

   When you've entered a valid IP address, the next message appears:

   ```
   ENTER NETMASK:
   000.000.000.000
   ```

4. Using the Left, Right, Up, and Down keys, set the digits in the second line of the display so that this number matches the subnet mask for this interface.

Note: If you see a message indicating that the netmask is invalid, re-enter it, using the Left, Right, Up, and Down keys. Then press Enter again.

When you've entered a valid subnet mask, the following prompt appears:

```
[S]AVE/ [C]ANCEL
```

5. If you want to re-enter the IP address or subnet mask, use the Left and Right keys to select Cancel (this option leaves the system unchanged).

   Otherwise, select Save to save your settings.

6. When you've made your choice, press Enter.

   This returns you to a menu that gives you the following options:

   ```
   SETUP NET1
   SETUP NET2
   SETUP GATEWAY
   ```

   SETUP GATEWAY is available only if you've already configured NET1 or NET2. Press Select to scroll among the menu options; press Enter to select an option.

Configuring the Gateway

After you've configured the Ethernet interface(s), you should configure the gateway address. The gateway is a network device, typically a router or a firewall, that the Cobalt CacheQube uses to communicate with the Internet. If you're not the network administrator, you'll need to obtain your network's gateway address from your network administrator.

To configure the gateway:

1. Press the Select button until you see:

   ```
   SELECT:
       SETUP GATEWAY
   ```

2. Press the Enter button.

   The following message appears:

   ```
   ENTER GATEWAY:
   000.000.000.000
   ```

3. Using the Left, Right, Up, and Down keys, set the digits in the number displayed so that it matches the IP address of your gateway.
4. Press Enter.

> Note: If the gateway IP address you entered is invalid, repeat steps 3 and 4 to re-enter it.

The following prompt appears:

```
NET[1] NET[2]
```

5. Using the Left and Right keys, select the appropriate interface to use for connecting to the gateway. (The LCD screen's cursor indicates which interface is currently selected.)

   If you're using only one interface, choose that one. If you're using both interfaces (for example, for Transparent Caching), select the interface through which the Cobalt CacheQube will communicate with the gateway to the external Internet.

6. Press Enter when you've selected the right interface.

   The following prompt appears:

   ```
   [S]AVE/ [C]ANCEL
   ```

7. Use the Left and Right keys to choose Save or Cancel, and then press Enter.

   If you choose Cancel, the gateway information you entered is ignored.

   If you choose Save, the gateway address you entered is tested to ensure that the host exists on the network. If the host exists, the gateway information is saved. If the Cobalt CacheQube can't reach the gateway you entered, the `ENTER GATEWAY` prompt reappears. At this point, you should fix the gateway address.

After you've entered a valid gateway, the `SELECT` prompt reappears. If you need to change any of the configuration settings, you can press the Select button and make the changes, as explained above.

When you're satisfied with the settings, choose `FINISHED` and then press Enter. The Cobalt CacheQube will continue its startup process. The remaining configuration steps will be done through a Web browser.

Any time you need to change the settings described above, see "Changing the Network Configuration" in Appendix A. It explains how to return to this interface once the system is up and running. Appendix A also describes other options available from the LCD panel interface.

Phase 2: Setting Up With the Browser

After you've configured the Cobalt CacheQube's network interfaces and gateway, you can complete the configuration procedure using a Web browser. You need to use a browser that supports frames and JavaScript (for example, you can use Netscape Navigator or Microsoft Internet Explorer, versions 3.0 or later). Once the setup process is complete, the Cobalt CacheQube can be managed from any browser-enabled computer on the network.

To begin browser-based configuration:

1. Launch the Web browser on any computer connected to the network.
2. Be sure to enable JavaScript in your browser, if you normally disable it.
3. To access the Cobalt CacheQube, enter its IP address (or its hostname) into the browser's URL field. For example:

4. Press the **Return** key on the computer keyboard.

   A Welcome page appears, with the Cobalt logo at the top and a Start button at the bottom.

5. Click the Start button to begin the Setup Wizard configuration process.

   A second browser window opens to the Setup Wizard.

The Setup Wizard guides you through several configuration screens, each of which requires you to enter some information. After entering the requested information, click the NEXT button to move to the next screen in the Setup Wizard. You can return to earlier screens by clicking the Setup Wizard's BACK button. All of the Setup Wizard configuration options can be accessed from the

Cobalt CacheQube's normal Web interface, so you can come back and change any setting at any time after finishing the Setup Wizard.

The Setup Wizard presents the following four steps, each with its individual screen: Network Integration, Cache Settings, Administrator Setup, and Time Setup. It's a good idea to read through the descriptions of these screens before you begin, to make sure you have all the required information.

1. Network Integration

The Network Integration screen allows you to configure network-related settings that aren't configured via the LCD interface, including:

- Hostname
- Domain name
- Primary DNS server address
- Secondary DNS server address

The Hostname, Domain name, and Primary DNS Server Address must be entered. If you are not the network administrator, you can obtain the correct values for these fields from your network administrator.

For informational purposes, the Network Integration page displays your configured Gateway along with the IP address, netmask, and Ethernet (MAC) address for the two Ethernet interfaces. These fields can be configured only through the LCD panel interface.

When you've entered the required information, click **NEXT** to move to the next screen.

2. Cache Settings

The Cache Settings screen allows you to configure the Cobalt CacheQube's caching software.

The most important setting on this page is the first one — the check-box for **Enable Transparent Caching**. Click this check box if you want to enable Transparent Caching mode.

The next setting, **Refresh Frequency**, determines how often the Cobalt CacheQube's caching software will refresh cached Web pages. A refresh occurs when the caching software decides that a requested document (that's in the cache) should be checked

against its original server to ensure that it's up to date. The Refresh Frequency setting determines how long cached documents are allowed to stay in the cache without being refreshed. A lower setting indicates less time — lower settings decrease the likelihood that out-of-date documents will be obtained from the cache. Higher settings increase this likelihood, but also save bandwidth and improve response time. With a value of 5 for Refresh Frequency, the likelihood that any particular document will be out of date when retrieved from the cache is under 1%. This probability decreases further with lower values of Refresh Frequency.

The third setting, **Maximum Size of Cacheable Documents**, specifies the largest possible cached document. This setting can prevent exceedingly large documents from evicting many small documents from the cache.

The fourth setting, **Disk Space for Log Files**, controls how much of the Cobalt CacheQube's disk space is devoted to storing log files. One log file is generated each day — it's used to generate the information in the Cache Statistics section of the Web interface. It's a good idea to set a large value for this (several hundred megabytes), enough for a month or two of log files. You may need to increase this setting if users at your site generate heavy HTTP traffic.

Click NEXT to move to the next Setup Wizard screen.

3. Administrator Setup

The Cobalt CacheQube has an Administrator user for performing normal administrative and maintenance tasks. These tasks are performed via the Web interface. You must authenticate yourself as user *admin* before you can access the administrative functions.

The Administrator Setup page lets you specify the admin password, enter a full name for the admin user, and specify an e-mail address that the Cobalt CacheQube can use to notify the Administrator of any problems that might arise.

The only required field on this screen is the Password for admin.

If you forget or want to reset the admin password, see "Resetting the Admin Password" in Appendix A, which describes the procedure for resetting it.

Click the **NEXT** button to move to the next screen.

4. Time Setup

The last Setup Wizard screen is Time Setup, where you enter time and time zone information.

When you're finished, click NEXT. At this point, if the Cobalt CacheQube has been configured with a functional gateway and a functional DNS server, you can register via e-mail, using the form displayed in the Setup Wizard. Otherwise, use the printed registration card that came in the box. It's a good idea to register your Cobalt CacheQube, so that you can be notified about software updates, new product information, special promotions, and so on.

Click FINISH to finish the Setup Wizard configuration. Once this is complete, your Cobalt CacheQube is ready for operation.

Cobalt CacheQube Administration

This chapter describes the Cobalt CacheQube's administrative functions, which are available through the Web interface. This interface includes the following items:

- Network Setup
- Cache Setup
- Admin Setup
- Time Setup
- Cache Statistics
- CPU Usage
- Network Usage
- Update Software

The Network Setup, Admin Setup, and Time Setup functions work exactly as described for steps 1, 3, and 4 in the Setup Wizard. For information on these options, see the descriptions of the Setup Wizard screens in “Phase 2: Setting Up With the Browser” in Chapter 2.

The options not described in Chapter 2 are described below.

Cache Setup

Four options on the Cache Setup page — Enable Transparent Caching, Refresh Frequency, Maximum Size of Cacheable Documents, and Disk Space for Log Files — also appear in the Setup Wizard. These options are described in “2. Cache Settings” in Chapter 2.

The Cache Setup page presents some additional configuration options that aren’t in the Setup Wizard. This section describes these additional options.

Empty Cache Now. If, for some reason, you need to empty the Cobalt CacheQube's disk cache of documents, click this button. In normal usage, this feature isn't necessary because the caching software manages its own disk storage by removing old, infrequently-requested documents when the available disk space is low.

Cache Cluster Settings. This option lets you configure the Cobalt CacheQube as a Cluster Master. To do this, you simply enter the host names (or IP addresses) of Cluster Slaves in the fields marked "Cluster Slave 1," "Cluster Slave 2," etc. Make sure that the specified Cluster Slaves are on the network and are up and running. No other configuration of the Cluster Slaves is necessary. For optimal performance, the Cluster Slaves should be configured for Traditional Proxy Caching only (that is, do not enable Transparent Caching on the Cluster Slaves).

The Cluster Master can operate in Traditional Proxy mode; in this mode, all clients should be configured to send HTTP requests to the Cluster Master. The Cluster Master can also operate in Transparent Caching mode, in which case client network traffic should be routed through the Cluster Master.

Inter-Cache Protocol (ICP) Settings. The Inter-Cache Protocol (ICP) is an Internet standard used to create cache hierarchies. The ICP Configuration option allows you to configure ICP peer hosts for the Cobalt CacheQube. You might want to configure ICP if, for example, your Internet Service Provider (ISP) operates an ICP-compliant cache with which you want to peer. On the IPC Configuration page, each peer requires you to specify the following information: the peer host name, an indication of whether the peer is a "parent" or a "sibling" (in ICP terminology), and HTTP and ICP port numbers to use for the specified peer. Optionally, you can configure the peer to be "Proxy-only," in which case documents retrieved from this peer will be returned to clients but won't be stored locally by the Cluster Master.

Cache Clustering can be used in conjunction with ICP in the following way: Configure the Cluster Master as described in "Cache Cluster Settings," above, but do not configure any ICP peers for it. On the Cluster Slaves, configure the desired ICP peers, as described above in "Inter-Cache Protocol (ICP) Settings."

Cache Statistics

The Cobalt CacheQube's caching software records information on all HTTP requests it receives. Statistics are calculated nightly from this data and are available on a daily basis for the preceding two months, assuming that enough disk space has been allocated to store two months of log files. (The amount of disk space devoted to log file storage can be configured from the Cache Settings page, described in "2. Cache Settings" in Chapter 2.)

The Cache Statistics page displays a calendar showing the current month and the previous month. Days for which statistics are available are clickable on the calendar. Also, "Stats for Yesterday" is a quick link to yesterday's statistics page (it displays the same information as the page linked from the clickable calendar).

After each day of operation, the Cobalt CacheQube computes the following statistics:

- **Number of cache hits**. A *cache hit* is a request in which the requested document was delivered from the cache — the document didn't have to be downloaded from the original server.
- **Number of cache misses**. A *cache miss* is a request in which the requested document was not in the cache and had to be retrieved from the original server.
- **Total number of documents sent to clients**
- **Cache hit rate**. This number refers to the ratio of cache hits to total cache requests.
- **Number of bytes sent to clients from cache hits**
- **Number of bytes sent to clients from cache misses**
- **Total number of bytes sent to clients**
- **Bandwidth savings**. This number reflects the amount of client HTTP traffic that did not result in documents being downloaded from the Internet, which results in saved bandwidth.
- **Average cache hit latency**. This is the average (mean) amount of time (in seconds) it took the Cobalt CacheQube to deliver a document from its cache to a client.
- **Average cache miss latency**. This is the average amount of time it took the Cobalt CacheQube to deliver a document that had to be requested from the original server.

- **Weighted average request latency**. This is the average cache hit latency multipled by the cache hit rate, plus the average cache miss latency multiplied by the cache miss rate.
- **Request speedup**. This number quantifies the Cobalt CacheQube's performance improvement in terms of user-perceived latency. It is the difference between cache miss latency and weighted average request latency, expressed as a percentage of weighted average request latency**.**

The Cache Statistics page also includes a link to a page that allows you to access Detailed Statistics. The Detailed Statistics page lets you view HTTP traffic statistics for individual clients (users) and individual HTTP servers. A calendar allows you to specify the precise time periods (over the last two months) for which you want to see usage statistics. The following options are available:

- **All clients**. This option returns a one-line summary of usage (documents requested and bytes requested) for all clients that utilized the Cobalt CacheQube.
- **A specific client**. For a specified client host name or IP address, this option returns a list of servers accessed by this client.
- **All servers**. This option returns a one-line summary of requests made and bytes retrieved from all HTTP servers from which the Cobalt CacheQube requested documents on behalf of users.
- **Specific server**. For a specified server host name or IP address, this option returns a list of clients who made requests for documents from the specified server.

All of the above options return both a count of requests made (for clients) or of documents returned (for servers) and a sum of bytes transferred (bytes to clients or bytes from servers). Each of the above options can be sorted by number of documents or by number of bytes. Finally, you can specify the number of sites to be displayed by each of the above options.

Note that the Detailed Statistics output can take some time to generate, depending on the size and complexity of the log files. The log file complexity is determined by the number of requests made by clients to the Cobalt CacheQube, the number of unique clients that made requests, and the number of unique servers that delivered documents.

Update Software

From time to time, Cobalt may issue updates to critical software that runs on its products. Updates can be obtained from the Cobalt Web page (www.cobaltnet.com), or from the Cobalt FTP site (ftp.cobaltnet.com). Updates come in the form of a "Package" file with a ".pkg" file name suffix. The Update Software page in the Web interface allows you to install new packages on the Cobalt CacheQube.

To install a package, enter the filename of the .pkg file you want to install. The "Browse..." button lets you find the file on the computer running your Web browser.

Once you've entered the name of the package file you want to install, enter the admin password and click the "Install a '.pkg' Package" button. (The admin password is required as a security precaution.)

CPU Usage

The CPU Usage page displays a graphical representation of the load on the Cobalt CacheQube's processor. (The quantity graphed is the load average, as calculated by the Linux kernel.) Load average provides a rough estimate of the load that browsing clients are placing on the Cobalt CacheQube. The CPU Usage graph requires Java to be present and enabled in your Web browser.

Network Usage

The Network Usage page shows statistics for network packets sent and received on the Cobalt CacheQube's two Ethernet interfaces. If an interface is unused, the statistics will be 0 for that interface.

Packets are counted in the following categories:

- **Good**. A packet was received or sent without error.
- **Error**. Some kind of send / receive error occurred that's not covered by the categories below.
- **Dropped**. A packet was ignored (dropped) by the operating system because of temporary lack of buffer memory.
- **Collisions**. The Cobalt CacheQube attempted to transmit a packet while another host was in the process of transmitting

a packet. A high rate of collisions relative to packets sent indicates a potentially overloaded network.

Using the LCD Console

During startup, the LCD screen displays status information relating to the boot process itself.

During setup, the LCD console is used to enter network configuration information.

Once the Cobalt CacheQube is running, the LCD console also serves multiple purposes:

- Change network configuration information — useful if the Cobalt CacheQube's location is changed.
- Reboot the system.
- Power down — necessary if you need to unplug the Cobalt CacheQube's power.
- Reset network — resets all IP addresses, netmasks, and other network information. This is useful if incorrect data has been entered and you want to start again.

IMPORTANT: Follow the proper power-down procedure before turning off the Cobalt CacheQube.

You access each of these functions by holding down the Select button for approximately two seconds. This causes the LCD screen to enter its function mode. Then, press the Select button until the function you want appears on the LCD screen. To cancel the LCD's function mode, select the `EXIT` function, press the Enter button, then select `[Y]ES`.

Changing the Network Configuration

To change an Ethernet interface's IP address or netmask, or to change the Cobalt CacheQube's gateway:

1. From the LCD console, hold down the Select button down for approximately 2 seconds.

The LCD screen displays:

```
SELECT:
 SETUP NETWORK
```

2. Press the Enter button.
3. Press Select to cycle among the options in the network configuration menu:

   `SETUP NET1`

   `SETUP NET2`

   `SETUP GATEWAY`

   `FINISHED`
4. Press Enter to select the option you want.

See “Phase 1: Network Configuration” in Chapter 2 for detailed instructions on setting these options.

`SETUP NET1` lets you configure the IP address and netmask for the 10 Mbps Ethernet interface (near the lower-right corner on the back panel).

`SETUP NET2` lets you configure the IP address and netmask for the 10/100 Mbps Ethernet interface (on the left side of the back panel).

`SETUP GATEWAY` allows you to configure the Cobalt CacheQube's gateway address to the Internet.

Choosing `FINISHED` brings you back to the main LCD menu.

To exit the main LCD menu:

1. Press Select until `EXIT` appears.
2. Press Enter.
3. Choose `[Y]ES`.
4. Press Enter again.

The hostname and IP address will appear on the LCD.

Rebooting

To reboot the Cobalt CacheQube:

1. From the LCD console, hold down the Select button for approximately 2 seconds.

The LCD screen displays:

```
SELECT:
 SETUP NETWORK
```

2. Press the Select button *once* until `REBOOT` appears in the LCD display:

```
SELECT:
        REBOOT
```

3. Press the Enter button.
4. Using the control keys, toggle the cursor between `[Y]ES` and `[N]O` and select `[Y]ES` to reboot the system.
5. Press Enter again to accept `[Y]ES`.

   The Cobalt CacheQube will reboot.

Powering Down

Caution: To prevent the potential loss of data, it is important to follow the proper power-down procedure before turning off the Cobalt CacheQube.

To select the power-down application:

1. From the LCD console, hold down the Select button for approximately 2 seconds.

   The LCD screen displays:

```
SELECT:
 SETUP NETWORK
```

2. Press the Select button *twice* until power down appears in the LCD display:

```
SELECT:
    POWER DOWN
```

3. Press the Enter button to choose the power-down application.
4. Using the control keys, toggle the cursor between `[Y]ES` and `[N]O` and select `[Y]ES` to power down the system.

5. When the Cobalt CacheQube is ready to be turned off, the LCD displays:
   ```
   PLEASE SWITCH
   POWER OFF NOW
   ```
6. Press the On / Off button to turn off the Cobalt CacheQube.

Resetting the Network Configuration

The Reset Network function resets the Hostname, IP Address, Netmask, Gateway, and DNS information to that of a new, unconfigured system. This function may be useful if you're moving the Cobalt CacheQube to a new network.

To reset the Cobalt CacheQube to a factory-fresh network state, perform the following steps:

1. From the LCD console, hold down the Select button for approximately 2 seconds.

   The LCD screen will display:

   ```
   SELECT:
    SETUP NETWORK
   ```
2. Press the Select button *three times* until `RESET NETWORK` appears in the LCD display:

   ```
   SELECT:
       RESET NETWORK
   ```
3. Press the Enter button.
4. Using the control keys, toggle the cursor between `[Y]ES` and `[N]O` and select `[Y]ES` to reset the network configuration.
5. Press Enter when the cursor highlights `[Y]ES`.

   After resetting, the Cobalt CacheQube powers down and the LCD displays:

   ```
   PLEASE SWITCH
   POWER OFF NOW
   ```

Resetting the Admin Password

If you forget the Administrator password, here's how to reset it:

1. Push a paper clip into the Reset Admin Password port (directly under the On / Off switch on the back panel) and hold for approximately 2 seconds. The LCD screen displays `RESETTING ADMIN PASSWORD`.

Caution: After you've cleared the password, be sure to set a new one as soon as possible (as described below) to prevent unauthorized access to the Administrator functions.

2. In your Web browser, enter the URL

   http: / / *IP address* /

   IP address is the Cobalt CacheQube's assigned IP address.

3. Go to the Administrator Setup screen.

   If you're prompted for a username or password, enter admin as the username, and enter any name or word for the password.

4. Enter a new password in the Password field on the Administrator Setup screen.

5. Click Save Changes to save the new password.

Appendix A

Cobalt CacheQube Technical Specifications

Caching Features

Caches HTTP, FTP, and Gopher traffic (including Java™ applets)

Configurable for both Transparent Caching and Traditional Proxy Caching mode

Supports HTTP / 1.1 persistent connections (keep-alives)

DNS caching

Cobalt InstaCache Cluster support for scalability

ICP Support

Supports SSL tunneling and cookies

Persistent cache across reboots

Log files compatible with Harvest, Squid, and CERN Proxy standards

Performance

Supports 1 to 2 T1 or E1 lines

Supports 200 simultaneous requests

Scalability through Cobalt InstaCache Clustering

Built-in support for Level 4 switch (e.g. Alteon's ACEDirector) for scalability and failover protection

Stores metadata and hot objects in RAM for fast cache lookups

System Management

Browser-based Management Interface

Compatible with Netscape Navigator or Microsoft Internet Explorer, versions 3.0 or later

Setup Wizard guides administrator through initial setup

Password protection for browser-based management interface

Online ActiveAssist real-time help

Advanced management via remote login (telnet)

Performance and Usage Reporting and Logging

Detailed event logging and Web-based statistical reporting (see “Cache Statistics” in Chapter 3)

Complete log files available for download and processing through FTP

Auto log rotation

SNMP agent

Active Monitor

Real-time pro-active system maintenance daemons

E-mail and pager alerts

Cache Configuration Settings

User-definable content refresh frequency

User-definable maximum cacheable object size

Miscellaneous

Automatic system restart (after power outage and restore)

Browser-based software upgrade

Year 2000 compliant

Hardware

4.5 GB disk cache capacity (approximately 400,000 cached objects)

64 MB of memory

Dual Ethernet network interface (10 Mbps and 10/100 Mbps autonegotiation, full duplex)

110-240V, 50/60Hz

25 watts maximum power consumption

Physical Specifications

Dimensions: 7.25 in. x 7.25 in. x 7.75 in. (18.4 cm x 18.4 cm x 19.7 cm)

Weight: 6.25 lbs. (2.8 kg)

Power requirements: Input rating 110-240V, 50/60 Hz

Maximum power consumption: 25 W

Operating environment: 39^{o} to 108^{o}F (5^{o}to 40^{o}C), 10% to 80% humidity (non-condensing)

LEDs: Power, Network Activity, Link

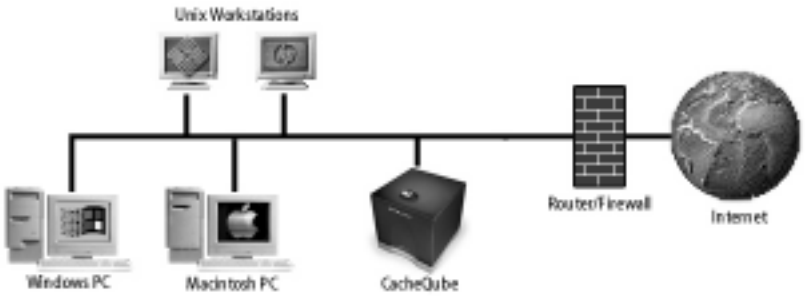
Regulatory approval: FCC Class A, CE, CSA, C/UL, VCCI-A

Appendix B

Example Network Topologies

This appendix shows how the Cobalt CacheQube can be used in a variety of ways in different network environments. It illustrates the connections among the network components and gives configuration details for each setup.

Cobalt CacheQube in Traditional Mode



Installation Notes

- Configure the Cobalt CacheQube for Traditional Proxy mode (that is, leave Transparent mode off).
- Configure clients' browsers to use the Cobalt CacheQube as the HTTP Proxy.

Instructions for Internet Explorer Version 4

1. Choose Internet Options from the View menu.
2. Click the Connection tab.
3. Check "Access the Internet using a proxy server."
4. Click the Advanced button.
5. Under HTTP / *Address of proxy to use*, enter the Cobalt CacheQube's hostname or IP address.
6. Under HTTP / *Port*, enter 3128.

Instructions for Netscape Navigator Version 4

1. Choose Preferences from the Edit menu.
2. In the Category list, click Advanced and Proxies.
3. Choose Manual Proxy Configuration.
4. Click View.
5. Under HTTP / *Address of proxy server to use*, enter the Cobalt CacheQube's hostname or IP addess.
6. Under HTTP / *Port*, enter 3128.

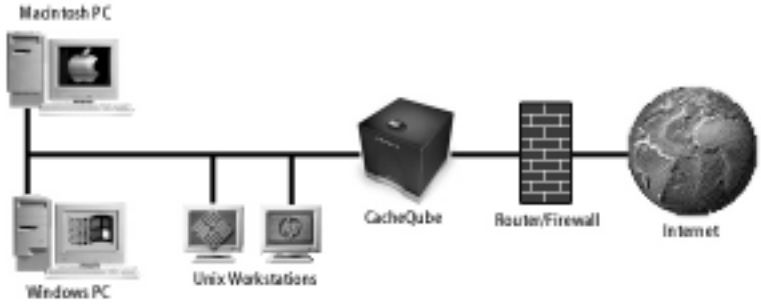
Advantage

If the Cobalt CacheQube fails, the outside network is still accessible (contrast with Transparent mode, next page).

Disadvantage

Requires changes to the clients' browser configuration.

Cobalt CacheQube in Transparent Mode



Installation Notes

- To avoid changes to the clients' configuration, assign the existing gateway address used by the clients to the Cobalt CacheQube's NET2 interface.
- Create a new subnet containing two hosts: the router (assign it a new address) and the NET1 interface. Make sure that the IP addresses you assign to NET1 and the router are on a subnet different from the clients' network. This is necessary for the Cobalt CacheQube to pass traffic through from the clients to the router.

Advantage

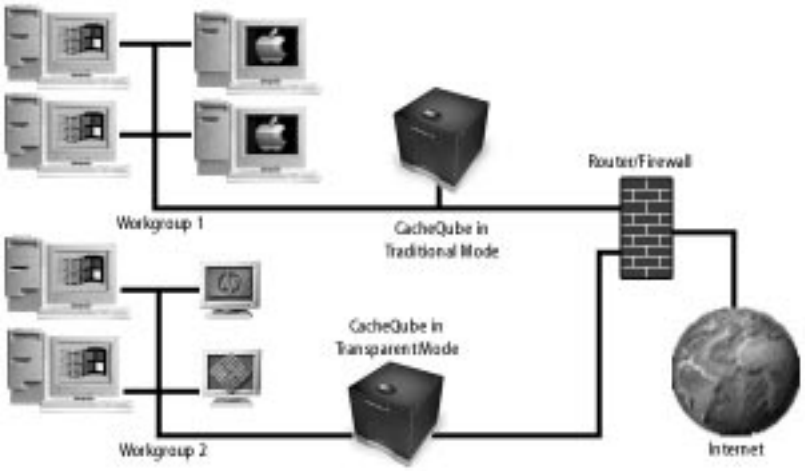
No special configuration for the client machines is necessary.

Disadvantage

If the Cobalt CacheQube fails, the clients cannot access the outside network until the Cobalt CacheQube comes back on-line.

Appendix C

Cobalt CacheQube for Workgroups



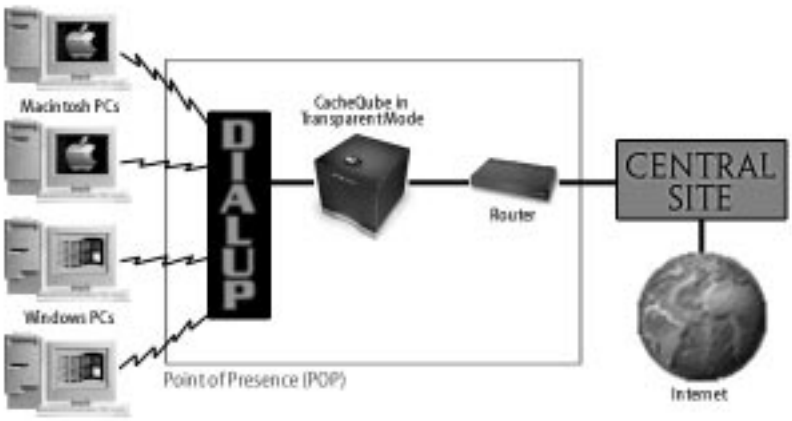
Installation Notes

- You can configure the Cobalt CacheQube for either Transparent mode or Traditional Proxy mode.
- Follow the instructions given in “Phase 1: Configuring the Network” in Chapter 2 to set up the mode you choose.

Advantage

You can separate network traffic into workgroups.

Cobalt CacheQube ISP Deployment



Installation Note

Configure the Cobalt CacheQube for Transparent mode.

Advantage

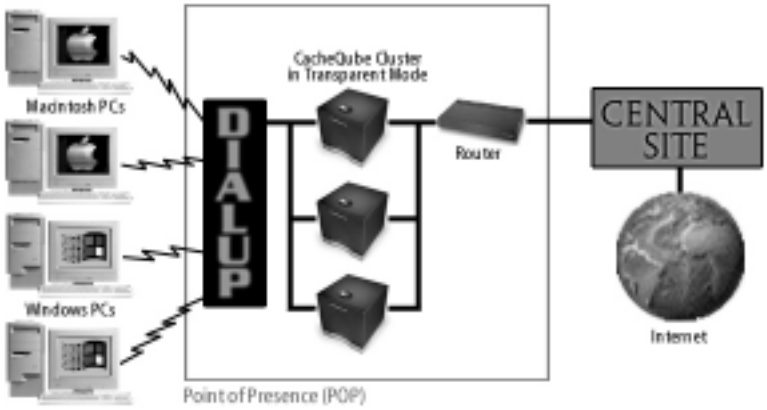
You can keep quick-to-access copies of remote documents, saving bandwidth and speeding up page access for users.

Disadvantage

For large ISPs, one Cobalt CacheQube may not be enough. (In this case, Clustered Cobalt CacheQubes can be used.)

Appendix C

Cobalt CacheQube ISP Cluster Deployment



Installation Notes

- Configure one Cobalt CacheQube as the Cluster Master, as explained in “Cache Setup” in Chapter 3.
- Configure the Cluster Master to operate in Transparent mode.
- The Cluster Slaves require no special configuration.

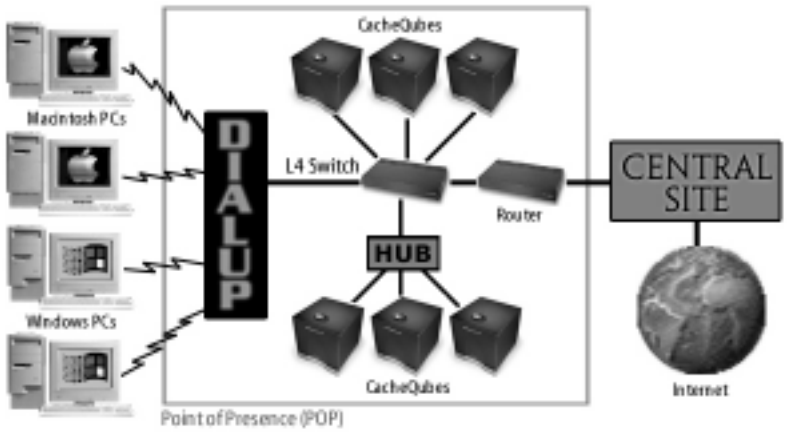
Advantages

- Clustered Cobalt CacheQubes provide high-availability and high-speed cache access and larger cache storage.
- This solution is scalable — you can add up to 5 Cluster Slaves.

Disadvantage

- You can’t have more than 5 Cluster Slaves; if you want more capacity, you can use the L4 switch solution (described on the next page).

Cobalt CacheQube ISP Cluster With L4 Switch



Installation Notes

- Configure the Cobalt CacheQubes for Transparent mode.
- No Cluster Master is needed (the L4 switch replaces the Cluster Master).
- Cobalt CacheQubes can be connected either directly to the L4 switch or via a hub.
- Refer to the L4 switch's manual for instructions on configuring the cache redirection.

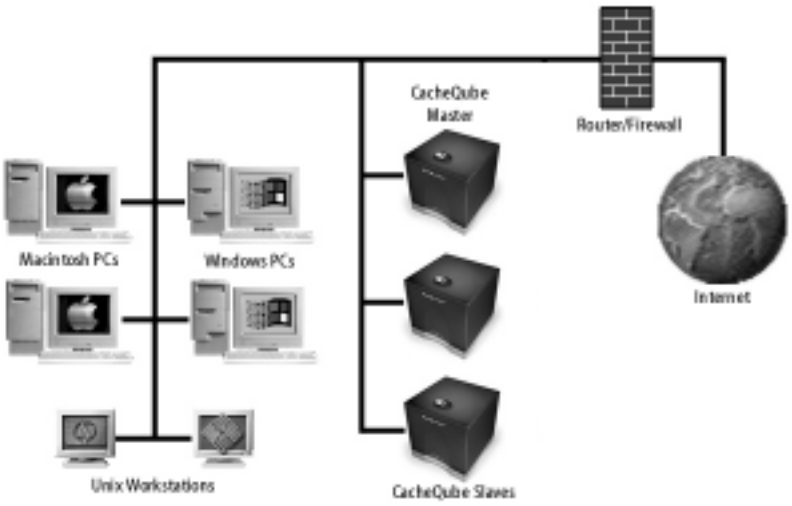
Advantages

- No Cluster Master is needed.
- This solution is scalable — you can have dozens of Cobalt CacheQubes per switch.
- This is the fastest caching solution.

Disadvantage

- The cost of the L4 switch.

Cobalt CacheQube Cluster in Traditional Mode



Installation Notes

- Configure one Cobalt CacheQube as the Cluster Master, as explained in “Cache Setup” in Chapter 3.
- No special configuration is necessary for the Cluster Slaves.

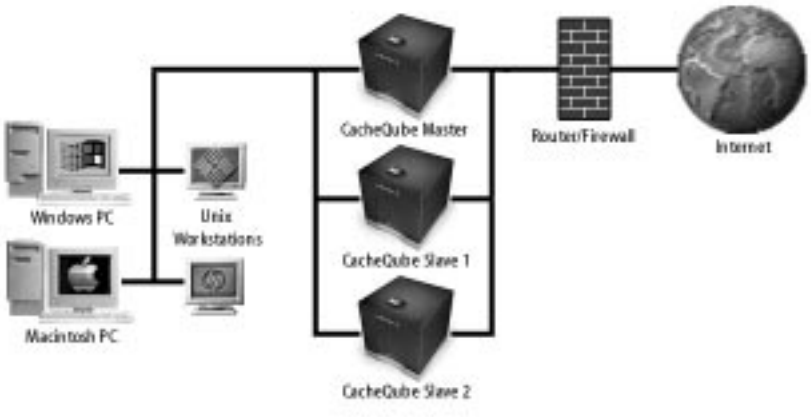
Advantages

- Distributed caching allows for faster response time and more storage space.
- Clustered Cobalt CacheQubes are scalable — you can add more Cluster Slaves as needed.

Disadvantage

- This solution requires modification to the client browser configuration

Cobalt CacheQube Cluster in Transparent Mode



Installation Notes

- Configure the Cluster Master for Transparent mode.
- Configure the Cluster Slaves for Traditional Proxy mode.
- Enter the Cluster Slave information into the Cluster Master configuration

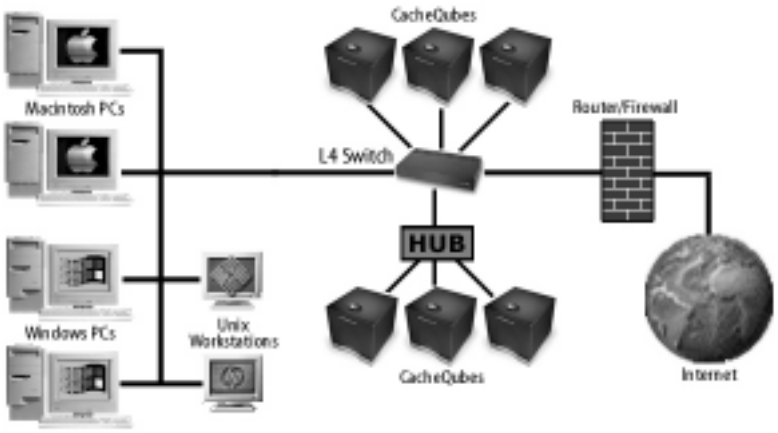
Advantage

No client-side configuration is necessary.

Disadvantage

If the Cluster Master fails, the clients cannot access the outside network until the Cluster Master comes back on-line.

Cobalt CacheQube Enterprise Cluster With L4 Switch



Installation Notes

- Configure the Cobalt CacheQubes for Transparent mode.
- Cobalt CacheQubes can be connected either directly to the L4 switch or via the hub.
- No Cluster Master is necessary (the L4 switch replaces the Cluster Master).
- Refer to the switch's manual for instructions on configuring the cache redirection.

Advantages

- This solution allows for high-speed clustering.
- It's fully scalable — you can add Cobalt CacheQubes as needed.
- It provides increased cache storage space.
- No Cluster Master is necessary.

Disadvantage

- The cost of the L4 switch.

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