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Sizing for Linux Apache Web Server on Compaq Servers

Abstract: This guide provides developers and system integrators with information on the development and usage of the sizer for Linux Apache Web Server on Compaq servers. Using this information, the customer can evaluate deployment plans for a Linux Apache Web Server solution and obtain initial server sizing recommendations.

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Sizing for Linux Apache Web Server on Compaq Servers
Technical Guide prepared by Internet and E-Commerce Solutions Business Unit

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Introduction

The sizer for the Linux Apache Web Server on Compaq servers (the sizer) is a tool that allows a user to obtain an estimate of the Compaq server hardware configuration needed to meet the requirements of a specific Web environment. Before using the sizer, the user should have a good understanding of the particular Web environment and the contents of this sizer companion document.

This document describes the information that the user must provide in order to size the Compaq server solution correctly.

Sizer Overview

The sizer is a Java applet available from the *Compaq ActiveAnswers* website at: www.compaq.com/activeanswers

The sizer interrogates the user to obtain specific information and preferences then provides an estimate of a Compaq server hardware configuration that should support the specific Web environment. The sizer provides a Bill of Materials (BOM) that can be printed and used for budgeting and ordering purposes.

Installation instructions are not included in this document but can be found on *ActiveAnswers* for Apache Web Server on Linux at www.compaq.com/activeanswers

The user should thoroughly understand this document before relying on any solution recommended by the sizer.

Target Audience

Compaq recommends that readers of this document should understand and have experience installing and operating the Linux operating system and the Apache Web Server on Linux. Compaq also recommends familiarity with the Ziff-Davis WebBench 2.0 (for analyzing performance capabilities), Hypertext Markup Language (HTML) static Web content, and Common Gateway Interface (CGI) active Web content.

Sizer Methodology

The purpose of the sizer is to provide a valid Compaq hardware solution based on information provided by the user to specify the potential work load of the particular Web environment and the user's preferences for server features.

The sizer selects a solution from several Compaq servers. Since Compaq testing indicated that server performance is not a key issue for maximizing the work load, the sizer differentiates the potential server solutions based on features and functions that include the amount of memory and internal disk storage that the server can support, and the form factor of the server. To allow the sizer to select the best server solution for a particular Web environment, the user must provide the sizer with an accurate content profile that specifies the type and size of the Web content. In addition, the user should determine the number of requests per second for Web content that the solution should support.

Compaq conducted extensive testing with various file store sizes and memory configurations to determine the maximum work load possible with three typical Web content profiles. For information on the conclusions drawn by Compaq and for tuning recommendations, refer¹ to *Performance Characterization and Tuning of Apache Web Server*.

When creating the sizer, Compaq made a number of assumptions. If these assumptions do not meet the requirements of the particular Web environment, the user can change these default values.

See the next section for more information on the questions asked by the server.

Using the Sizer

The sizer for the Linux Apache Web Server on Compaq servers (the sizer) is an interactive tool that recommends a single server solution based on input provided by the user. The sizer includes sections that address a number of individual but related options; the user must understand the sizer as a whole to obtain a suitable solution.

Where appropriate, the sizer displays a summary screen listing the user-selected options: the user can view or edit the selected options (see figure 1). On-line help is available with some sizer screens.

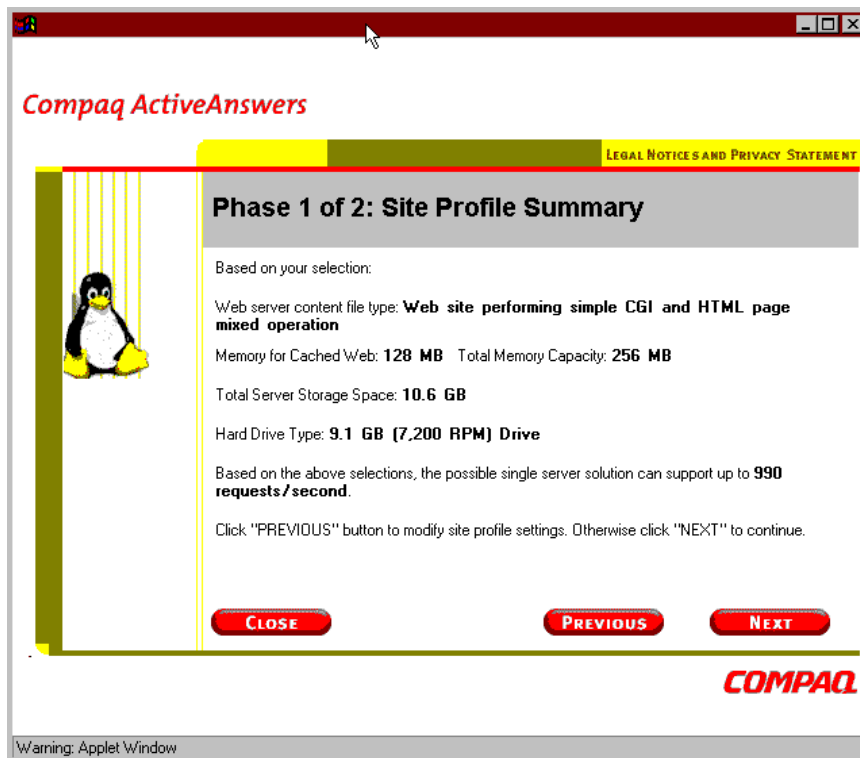


Figure 1. Summary screen showing options selected

See below for more information on the individual sizer sections.

¹ Available on *ActiveAnswers* for Apache Web Server on Linux at www.compaq.com/activeanswers

Compaq Legal License Agreement

This section provides the terms of the license agreement for the sizer. The user must agree to the terms of the agreement before proceeding.

Introduction

This section provides a brief overview² of the sizer.

Site Profile

This section allows the user to specify the site profile for the particular Web environment. The sizer uses this information to identify the amount of memory required to cache Web content based on the results of the Compaq performance testing (see figures 2 and 3).

Compaq tested various memory configurations with three different site profiles. The site profiles included file store sizes of 64MB, 256MB, and 512MB; Web content varied between 100% static files, 100% simple CGI files, and 100% moderate CGI files.

The file content mix included:

- **Static files:** This static-only mix consisted of the HTML file tree from the Web Bench 2.0 suite.
- **Simple CGI program mix:** Compaq invoked multiple copies of the `simcgi` program from the Web Bench 2.0 suite to echo CGI variables back to the Web client. Compaq deployed these program files in a dense file system tree that included many sub-directories each with a few copies of the program.
- **Moderate CGI program mix:** This mix echoed CGI variables back to the Web client and wrote the variables to the file system in a file whose name depended on the process ID of the CGI program. To test different workloads, Compaq made multiple copies of this file in a dense file system tree until the appropriate file store size (64MB, 256MB, or 512MB) was obtained.

The test results illustrated in figures 2 and 3 indicate that file store size has a significant impact on the number of requests per second that can be served.

² Less-detailed than this companion document.

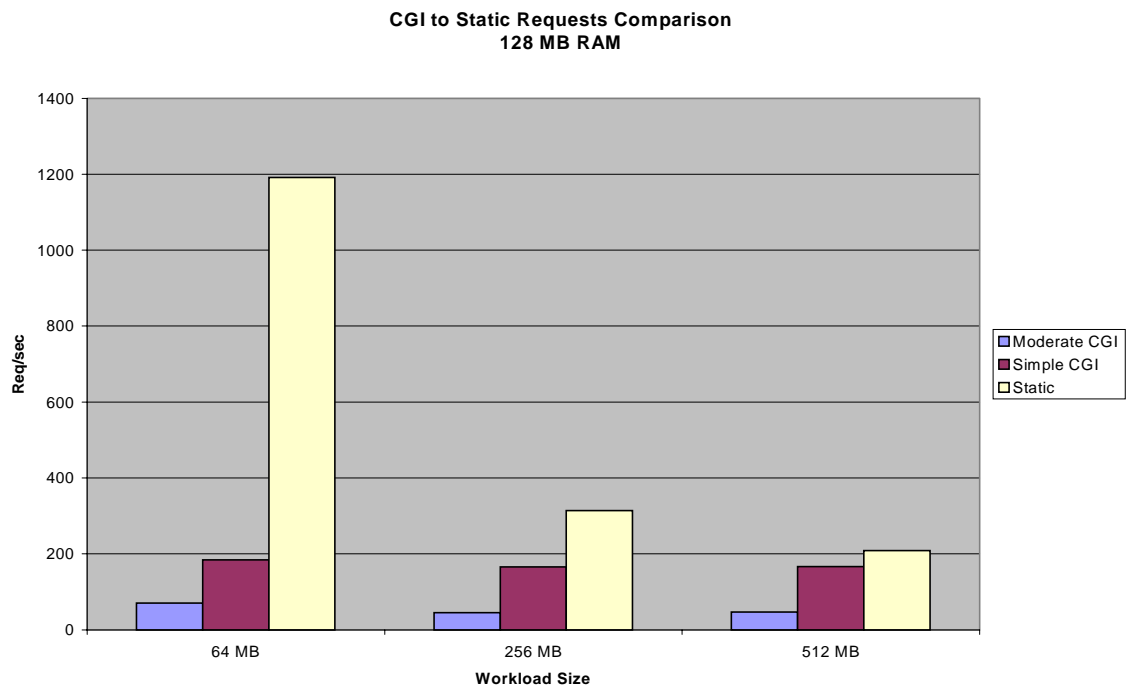


Figure 2. The number of requests per second with 128MB of memory configured

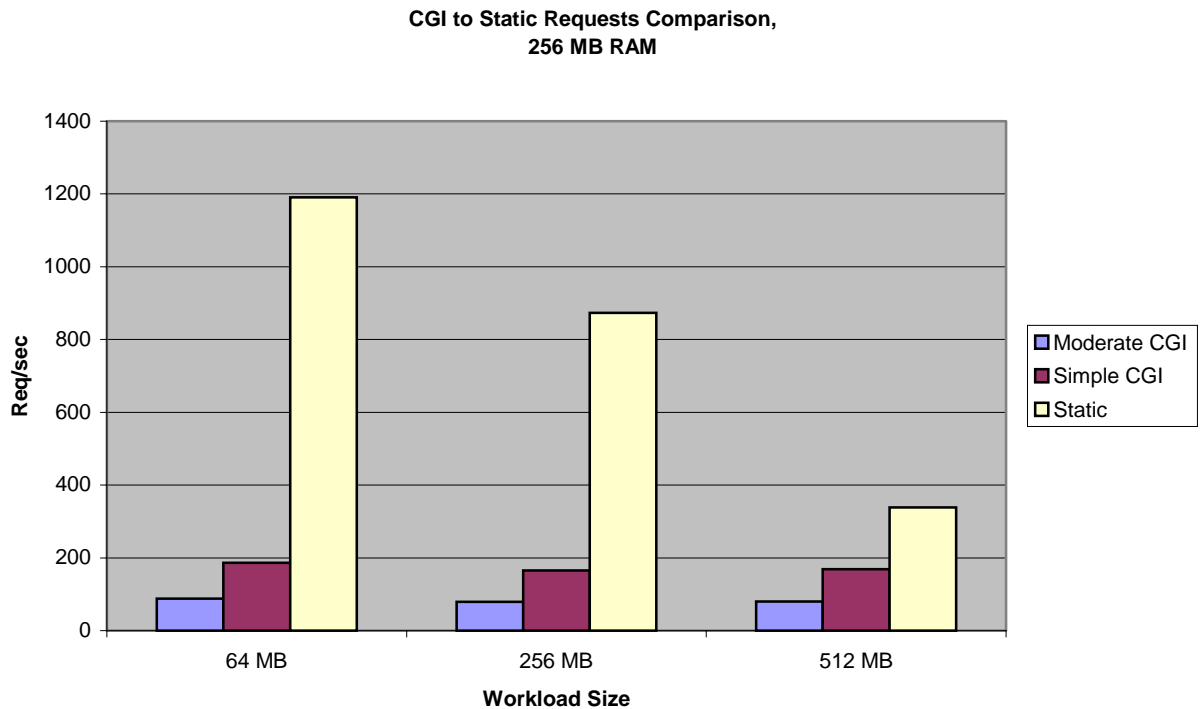


Figure 3. The number of requests per second with 256MB of memory configured

Compaq performance testing and research indicate that the capability to cache the entire file store would greatly improve server performance. However, in a typical Web environment, only a small subset of the file store accounts for 80% of the requests so it is not cost-effective to cache the entire file store. The user should determine the size of this small subset in the particular Web environment so that the sizer can configure the appropriate amount of memory to cache the subset.

The Site Profile section of the sizer displays the Compaq assumptions³ for the cached store size⁴, the static-to-CGI content mix, and the number of requests per second that this default profile can support. If the user's site profile does not match these assumed values, the user can change the cached store size and the static-to-CGI content mix.

IMPORTANT: The number of requests per second that the solution can support changes if the user changes the site profile. The sizer screen provides a dynamic display of the number of requests per second for the current profile.

The sizer's selection of a particular server solution can depend on the amount of memory configured.

³ Based on the results of the Compaq performance testing.

⁴ By default, the sizer configures this amount of memory.

Total Memory Capacity

This section requires the user to specify the total amount of memory to be configured and includes:

- **Basic memory:** This is the amount of memory required by the Linux kernel. The default value is 128MB.
- **Cached file store:** This is the amount of memory configured in the Site Profile section of the sizer. If required, the user can edit this value.
- **Additional memory:** This allows the user to add memory to that already specified.

IMPORTANT: The sizer displays the total amount of memory configured. The sizer will not configure more than 1GB of memory since this is the maximum that any of the server solutions can support

The sizer's selection of a particular server solution can depend on the amount of memory configured.

Total Server Storage Space

This section allows the user to specify the total amount of internal disk storage to configure and includes:

- **Linux operating system:** Compaq assumed a requirement of 0.5GB of disk space for the base Linux operating system. This does not include space for distribution utilities supplied with the operating system.
- **Total Web content:** This is the estimated total content size for the particular Web environment. The user should include space for future growth.
- **Other applications:** The user can configure space for other applications. The various Linux distributions require space for utilities and miscellaneous options.
- **Log storage:** To improve performance, Compaq recommends separating Linux logging from other I/O functions by adding an individual hard drive for log storage.

IMPORTANT: The user can omit the additional hard drive for log storage. However, since the configuration used for Compaq performance testing included the additional drive, omitting this drive will reduce the performance of the Web server.

The sizer allows the user to change the Compaq assumptions for server storage space and provides a dynamic display of the total space configured. The sizer automatically selects the appropriate hard drive type and size but allows the user to override this default if the user-specified disk can be supported by the server solution.

Server Preference

This allows the user to specify the form factor of the server solution:

- **Rack-mounted:** The user can select the type of rack to be configured and, if multiple server solutions meet the requirements of the particular Web environment, the user can select a particular solution from options listed by the sizer.
 - The *Compaq ProLiant* 1850R has a small form factor and limited internal storage capacity.
 - The *Compaq ProLiant* 1600R has a larger form factor and greater internal storage capacity.
- **Tower:** The sizer lists the tower solution(s) that meet the requirements of the particular Web environment. If only one server solution meets these requirements, the sizer advises the user that this is the only server that can be configured; if multiple server solutions meet these requirements, the user can specify whether cost or expandability is the key factor in the selection of a particular server.
 - The *Compaq Prosignia* 720 is a low cost solution with limited memory and disk storage capacity.
 - The *Compaq ProLiant* 1600 allows the user to expand memory, disk storage, and processor capabilities.

Additional Server Features

This section has no impact on the selection of a particular server solution but allows the user to specify certain preferences.

- **Redundant power supply:** If supported by the selected server solution, the user can add a redundant power supply to the configuration.
- **Monitor:** The user can add a monitor to the configuration from a list of supported devices.
- **Network Interface Card (NIC):** If multiple network connections are required, the user can add a NIC⁵ to the configuration.
- **Tape backup:** The user can add a Compaq SLR 4/8GB tape backup device to the configuration.

⁵ A Compaq Netelligent 10/100 TX PCI Intel UTP.

Summary

The sizer for the Linux Apache Web Server on Compaq servers (the sizer) configures a single server solution designed to support the work load of a particular Web environment and provide additional features specified by the user. The sizer is an interactive tool that interrogates the user to obtain specific site information then produces a Bill of Materials that can be used to obtain the recommended Compaq hardware.

Since the performance characteristics of the possible server solutions are similar, the sizer selects a particular server solution based on features and functions specified by the user.

The user can obtain additional information about individual sizer options from on-line help screens.