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February 10, 2015

My Server Performance Analysis

Abstract

Web Server Performance Analysis is crucial for students to understand the insides of web servers, and for professionals who utilize web servers for small, medium, and large companies. After coding My Server from scratch, its speed and performance was compared against the commercial web server Apache. Apache was chosen in order to have a reliable server as a standard to compare with My Server. There were twelve experiments, six for Apache and six for My Server. Each server sent 3 files of different sizes at 10 connections and 150 connections per test. The results showed that My Server and Apache actually perform very similarly, with the mean response times differing by only by a few seconds.

Introduction

There are many programmers who are what they say "good programmers". However, there is no guarantee that good programmers understand the insides of servers and protocols. Thus, computer scientists must know much more than just programming. They must know how things work at a very low level. My Server was coded from scratch using low level system calls in C language. Moreover, after coding My Sever, My Server and Apache were compared side by side when sending a .txt file, a small .gif image, and a big .jpg image.

Experimental Setup

This experiment was performed using two laptops running the Ubuntu Linux operating system. Apache and My Server were installed on one laptop. Apache listened on port 5001, and My Server listened on port 5002. The second laptop was used as a client. Httperf was installed as the workload generator. Three files were saved in both server's public_html folder. One file was a text file of 87 bytes. The second file was a gif image of size 12855 bytes, Finally, the third file was a very large jpg image of size 2936119 bytes.

Results

The resulting information is summarized by table 1.0

| General Info			Apache			My server with 10 threads		
File Type	File Size	Requests	Apache Response Time (seconds)	Response File Size	Apache Successful Responses	My Server Response Time (seconds)	Response File Size	My Server Successful Responses
jpg	2.9 MB	10	18.84	2936119	10	24.68	2936119	10
gif	12.9 kB	10	9.019	12855	10	9.031	12855	10
txt	87 bytes	10	9.015	87	10	9.018	87	10
jpg	2.9 MB	150	387.497	2936119	150	292.54	2936119	150
gif	12.9 kB	150	149.018	12855	150	149.042	12855	150
txt	87 bytes	150	149.015	87	150	149.019	87	150

Table 1.0 The raw data from the experiments results.
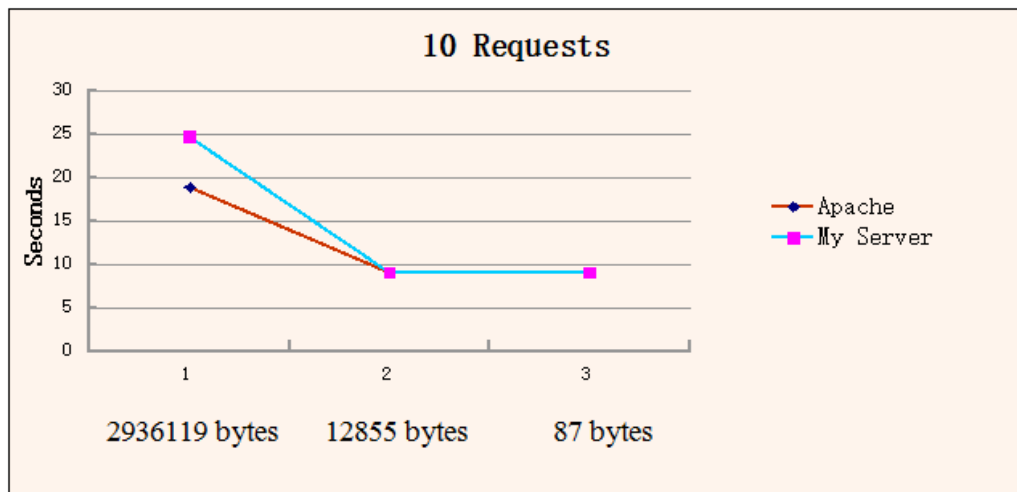
Image 1.0 Comparing Apache and My Server response times when sending 10 requests from httperf.

As shown in Image 1.0, both servers were tested by sending 10 requests from the client. In the image, it can be seen that for small files Apache, and My Server perform almost the same. However, Apache showed more speed when the test involved a larger file. Thus, under these circumstances, Apache displayed better performance when 10 requests were sent.

Surprisingly, when the requests went up to 150, My Server showed better performance than Apache. As displayed by Image 1.1, Apache and My Server did not show too much difference when sending small files. On the contrary, when the biggest file was sent, My Server was 80 seconds faster than Apache, which is very surprising. However, as a professional server, Apache spends time taking care of other security elements that My Server does not check, but it is still surprising that My Server sent files at a greater speed.
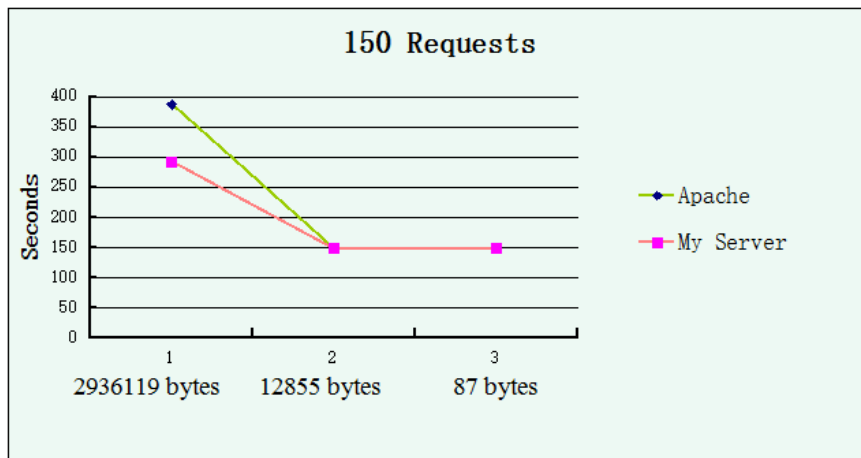
Image 1.1 Comparing Apache and My Server response times when sending 150 requests from httperf.

In addition, another piece of information that can be extracted from Table 1.0 is the failure rate of both servers, shown in Images 2.1 and 2.2. Amazingly, both servers performed really well because no record of failure was found on either server. When httperf sent 10 requests, Apache and My Server responded without failure. In the same way, when the number of requests increased to 150, the chances for both servers to crash increased too. However, both servers responded without any failures.
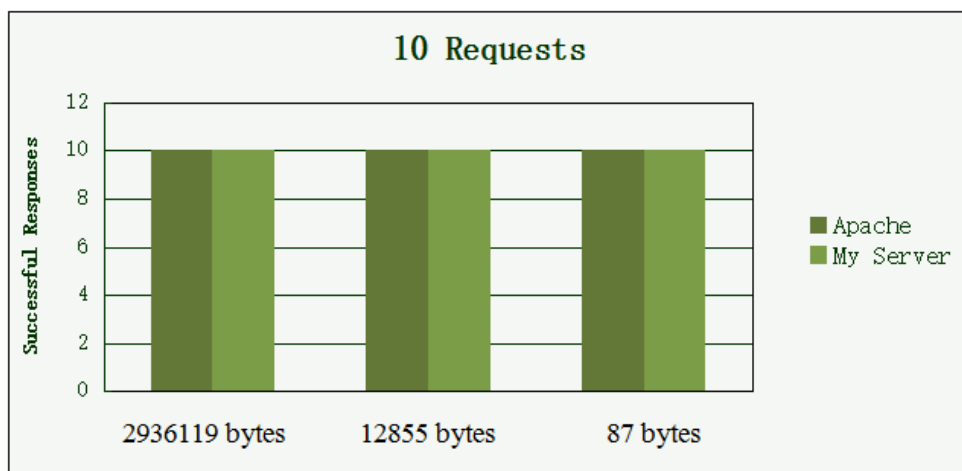

Image 2.1 Comparing successful Responses for Apache and My Server when Client sends 10 requests.
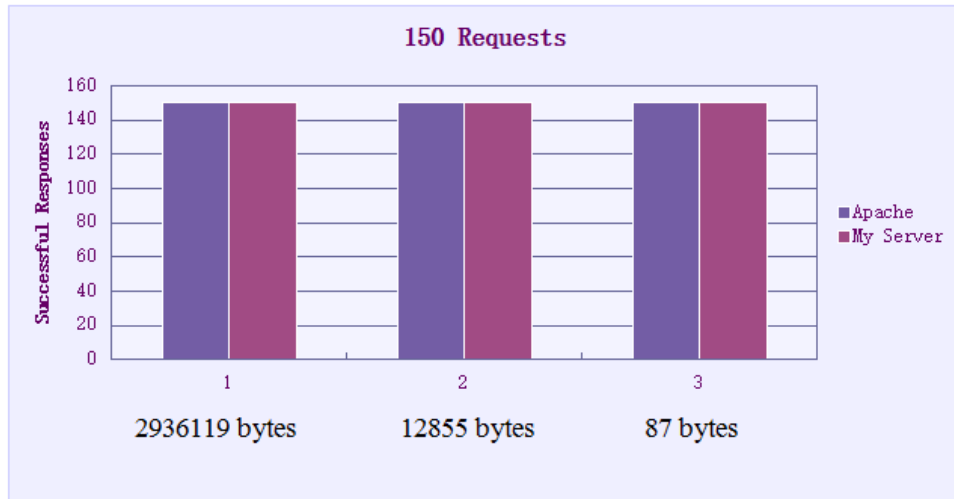
Image 2.2 Comparing successful Responses for Apache and My Server when Client sends 150 requests.

Conclusion

The performance of servers is an important field of study due to the great range of places that depend on web services. In addition, programmers need to understand the insides of a server, in order to see the big picture of internet, protocols, and machine communication at a low level. System calls and server internal structure were learned while coding My Server. In addition the performance test against Apache showed that response speed is very important for programmers, employers, and clients who depend on systems such as Apache and My Server.