[1250] Web Servers and Log Files

Most "real-world" programs don't run once and quit. Most useful real-world programs run as continuous background processes on servers that are, typically, connected to networks like the Internet. A common example is a web server.

Web servers are programs that listen to the network for "connections" and "requests." Connections happen whenever a different computer decides it needs to exchange data with a server. Before that data exchange can officially happen, a connection must be established between the requesting computer (also called the "client") and the server. The process of creating a connection may or may not involve exchanging credentials (User ID and password) as well as encryption keys. Much of the connection process is automatically handled by the system without application programmers (like us) needing to worry about it.

Once a connection is established, the client computer usually sends a "request" - a command asking for some data or for a file. For web servers, these commands are sent using a protocol called HTTP. Most HTTP requests are called "GET" requests because the client computer is trying to "get" a file from the server.

The most common web server program on the web is the Apache HTTPD server. Other popular webservers include Microsoft IIS, NGINX, and Java Tomcat.

Servers usually run without displaying any user interface. If you were just looking at the screen of a server, it would look like it wasn't doing anything. Servers usually just interact with the network and so they don't display anything on the console. Instead, servers usually record their activities in "Log Files" - continually appending their activity to the end of the file in case someone needs to review / analyze it later.

Log files are super important to understanding how servers are performing and whether or not there are bugs in their code. Because a server typically processes requests from clients in under a second, it isn't really possible to watch a server do its thing in real time. Instead, server programmers are always reviewing log files in an attempt to understand what happened AFTER THE FACT.

Sometimes, system administrators will "tail" a log file to get a sense of how quickly a server is processing requests and to see whether or not any error messages or exceptions are being generated. A log tail can look like this:

This is a "tail" of a busy Apache HTTPD server. You can see IP addresses, dates & times, the type of request ("GET") and the path of the request. You can also see the response code for the request

(usually 200) as well as other information about the request.

System administrators cannot typically watch tails of every server that they are in charge of. Instead, they may rely on monitoring programs that scan the logs and send out alerts if they see "unusual" activity. The monitoring programs may also generate and display summary statistics that may help the system administrators understand how busy their servers are.