

CS118 Project 1

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Server Design

The server is designed as a single-threaded, single process server. A TCP socket is opened when the server starts and all requests are handled through their own sockets using a blocking syscall to make the connection.

Each request is then read into a buffer and parsed for the requested file. The server determines the response content-type by reading the file name extension of the requested file. As only HTML, JPEG/JPG, and GIF files are supposed to be served, all other file type requests generate 403 Forbidden errors. If the requested file is not found, the 404 page is returned. Pages outside of the current working directory when the server is started are not served.

After the content to be returned is read into memory, the header is created and the header and content are streamed out using `write`.

Then, everything is cleaned up.

All of the response handling code happens in `Server::handleRequest()`.

Difficulties

- Using exceptions in C++ leads to memory issues, because calls to `delete` might not happen if anything between `new` and `delete` throws. I got around those difficulties by using RAII for memory and sockets. everything is cleaned up no matter what).
- I did most of my development with Clang 3.7, which has more C++11/14 support than GCC 4.6.1 (which is supplied on the test virtual machine). There were some bugs when I backported to GCC 4.6.1.

Compiling and Running

Please see `README.md` for compilation and running instructions.

HTTP Samples

Request

```
GET /test/test.gif HTTP/1.1
Host: localhost:5042
Connection: keep-alive
Accept: image/webp,image/*,*/*;q=0.8
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_2) AppleWebKit/537.36
          (KHTML, like Gecko) Chrome/47.0.2526.111 Safari/537.36
Referer: http://localhost:5042/test/test.html
Accept-Encoding: gzip, deflate, sdch
Accept-Language: en-US,en;q=0.8
```

- **GET:** This line has the HTTP request type (GET, POST, etc.), the path to return and the protocol type and version
- **Host:** This is the hostname of the server
- **Connection:** Specify the requested lifetime of the connection
- **User-Agent:** The client application's type (for handling different browsers different, for example)
- **Accept:** The media type the client accepts
- **Referer:** The page that linked to this page
- **Accept-Encoding:** The accepted encodings for the returned media
- **Accept-Language:** The accepted languages for the returned media (human languages)

Response

```
HTTP/1.1 200 OK
Date: Sat, 23 Jan 2016 20:55:31
Server: CS118 Project 1
Last-Modified: Tue, 19 Jan 2016 01:31:02
Content-Type: text/html
```

- **HTTP/1.1:** The protocol type and version, along with the response code
- **Date:** The time and date the HTTP message was sent
- **Server:** Information about the server that generated the response (usually name, version, etc)
- **Last-Modified:** The last-modified time of the file serverd, used for cache invalidation
- **Content-Type:** The type of the file being returned