



HTTP in Action

Some experiments using HTTP

What is my browser sending?

Start a dumb TCP server listening on port 80

```
nc -l 80
```

- Note that you must be root (admin) to use port 80. Why? You can use a different port (try 8080).
- "nc" ([netcat](#)) is a Linux (and Unix) command. There is a version for Windows. Or use "[ncat](#)" (newer).
- If you want to send request from a **different** host, then you need this host's IP address (`ifconfig`) and make sure there is no firewall blocking tcp port 80.

What is my browser sending?

Now, open a web browser and send any request:

`http://localhost/make-my-day`

or:

`http://localhost:8080/make-my-day`

if using port 8080.

What did the server receive?

The "nc" console should print something like this:

GET /make-my-day HTTP/1.1

Host: localhost

Connection: keep-alive

Upgrade-Insecure-Requests: 1

User-Agent: Mozilla/5.0 (X11; Linux x86_64)

AppleWebKit/537.36 (KHTML, like Gecko)

Chrome/69.0.3497.81 Safari/537.36

Accept:

text/html,application/xhtml+xml,application/xml;

q=0.9,image/webp,image/apng,*/*;q=0.8

Accept-Encoding: gzip, deflate, br

Accept-Language: en-US,en;q=0.9,th;q=0.8

The Browser is Waiting for a Reply

You can see the browser is waiting for a reply.

Use "nc" to send a reply.

We are a human web server!

Send HTML Reply from "nc"

In the "nc" window, send a reply to the browser.

You can send **plain text (no headers)**, but we will send HTML in order to show what the data format is. Type:

```
HTTP/1.1 200 OK
```

```
Content-type: text/html
```

```
(blank line)
```

```
<h1>Hello, Nerd</h1>
```

(you can type more stuff and it will be appended to the browser page. Text really should start with `<html>`.)

What does a real web server send?

Now we know what a request from a web browser looks like.

What does a *real* reply from a *real* web server look like?

View Reply from a Web Server

Send an http request for `http://www.yahoo.com/news/`

```
> nc www.yahoo.com 80    (or telnet or ncat)
GET /news/ HTTP/1.1
Host: www.yahoo.com

(a blank line)
```

- Another way: **curl -v http://www.yahoo.com/news/**,
curl can also use [https](#). "ncat" or "telnet" will also work.
- There are lots of tools to view HTTP in detail.
 - Chrome/Firefox "Developer Tools"
 - browser plugin, e.g. "REST Console"

Redirect!

The Web is switching to **https** everywhere(*).

Yahoo sends back:

```
HTTP/1.1 301 Moved Permanently
Location: https://www.yahoo.com/news/
Content-Type: text/html
(more header lines)
```

- 301 is an HTTP Status Code.
- 3xx codes mean "moved" or "redirect".
- Most browsers will automatically go to new URL.

Can We Redirect a Browser?

1. First note your host's IP address (ifconfig or ipconfig)
2. Start "nc" and wait for connection:

```
nc -l 80
```

3. Someone else connects to your server using browser:

```
http://158.108.216.99
```

4. On "nc" console, tell the browser to go away:

```
HTTP/1.1 301 Don't Bother Me, dude
```

```
Location: http://www.ku.ac.th
```

```
(blank line)
```

```
(may also need EOF, Ctrl-D)
```

Did the Browser go to www.ku.ac.th?

It should follow 301 Redirect to new Location.

On some servers, you can also send a message in the response body. In case browser doesn't follow redirect.

```
HTTP/1.1 301 Sorry, we don't serve humans
Location: https://www.facebook.com
Content-type: text/plain
```

Only web services allowed here.
Try Facebook instead. :-)

Redirect inside a Web Page?

In some situations you may want to use redirect inside a web page.

You can also add a **delay** and display a **text message**:

```
<html>
<head>
<meta http-equiv="refresh"
      content="5; URL='https://web.facebook.com'" />
</head>
<h2>You will be redirected in 5 seconds.</h2>
</html>
```

HTTP is Request/Reply Protocol

How many HTTP requests needed to fetch this page?

```
<HTML>
<link rel="stylesheet" href="stylesheet.css">
<!-- Bootstrap makes my page look cool. -->
<link rel="stylesheet"
  href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.c
  ss">
<BODY>
<h1>My vacation</h1>
<p>
For vacation we went to <a
  href="http://www.unseen.com/bangkok">Bangkok</a>.
We visited <em>Wat Phra Kaeo</em>, and took this photo:
<br/>
<IMG src="images/watprakaew.jpeg" alt="Wat Phra Keao"/>
```

How Many Requests to Load Yahoo.com?

Use browser developer tools to count requests.

Chrome -> More Tools -> Developer Tools -> Network

Use *Incognito* or *Private Browsing* window to avoid caching. Also disable request filtering (UBlock Origin).

Goto `https://www.yahoo.com`

How many requests? How many seconds?

For Just one web page!

Why Care?

Not important for now.

For professional web development, performance matters.

Tools help you locate bottlenecks.