# Background

(Essay)

HTTP, or HyperText Transfer Protocol, is the cornerstone of the World Wide Web. Residing in the application layer of the Internet Protocol Suite (TODO: (3): Internet protocol suite ), it provides web pages a mean of linking to other pages–thus creating a “web” of pages.

To enable a web browser to communicate with a server, HTTP uses a request/response pattern (TODO: (4): http 1.1), where the client (browser) makes a request to the server which sends a response back. Underneath this some sort of network layer protocol must be utilized. Most common is the Transmission Control Protocol (*TCP*)(TODO: (5): tcp wiki), but others like (*UDP)* may also be used (TODO: (4): http 1.1).

## HTTP/1.0

Version 1.0 of HTTP was created in the World Wide Web's childhood (TODO: (6): http 1.0). Back then, web pages consisted mostly of text and maybe a few embedded objects[[1]](#footnote-1). But as the Internet grew, and other people than scientists started using it, the need for more vivid content soon became very clear.

At this time, around the mid 90s, CSS too was in its childhood (TODO: (7): Css saga). However, it soon caught people's attention and more and more browsers started to support it (more or less). Embedding a style sheet in a HTML-file adds another object that the client has to download. This is no problem today, but with the HTTP 1.0 protocol it required quite a lot of unnecessary work for both the client and server.

Downloading one element in a HTML-file, or even the HTML-file itself from the server required one TCP request (TODO: figure (2.1)). The server then replied and closed the connection. Getting a HTML-file with a style sheet and three images then required five requests in total, which is obviously inefficient. To circumvent this, some early web applications used several TCP connections at the same time (TODO: (8): Network performance http 1.1). Bear in mind that this was during the old days when download speeds was far from the megabit range.

## HTTP/1.1

Increasing amounts of embedded objects in web pages lead to the creation of HTTP/1.1, which made several vital improvements. One of these was persistent connections. This allowed several request to made over the same TCP connection (TODO: (8): Network performance http 1.1)., and it was a dramatic change at the time, as it gave allowed clients to get several objects in one request.

Another radical improvement was the ability for a browser to cache parts of an object. If the connection to the server was lost half way through the transmission of that particular object, it could later be resumed by using the cached data instead of starting all over. Web applications were also given the possibility of sending chunked data (TODO: (4): http 1.1), letting servers start sending a response without knowing how long it was. In theory, it could be infinite as we shall see in section (TODO: crossref (3.3)).

The authors of the protocol showed great foresight when they made sure that future protocols easily could be made backwards compatible with HTTP 1.1. The *upgrade* request-header (TODO: (9): Key differences) makes it possible for a client to request that another protocol should be used if the server supports it.

Updating from version 1.0 to 1.1 may not seem like a giant leap, but it actually was. Looking at the lengths of the different protocol specifications is an indication of just how much more detailed the 1.1 protocol is[[2]](#footnote-2). Regardless of the advance HTTP 1.1 was, the next step in internet evolution may prove to be even bigger.

## Real-time applications

As mentioned in (TODO: crossref introduction), one of the newest additions to the World Wide Web is real-time applications. There are varying degrees of real-time content provided by such an application. At the lower end of the scale, there are for example online comment sections that automatically update whenever someone posts a comment. An example of an application with more real time content is Facebook, where notifications[[3]](#footnote-3) and your friends’ activities are displayed to you as soon as it happens (TODO: figure (2.2)).

“As soon as it happens” is exactly what real-time is: providing updates for the client immediately, without the need for refreshing the page on the client side. And as the examples above show, the real-time aspect of an application can be either a small feature, or the core concept of the application.

1. Embedded objects consisted mostly of images, but also some early forms of style sheets. [↑](#footnote-ref-1)
2. 56 vs. 162 pages when copied as they are from [http://www.ietf.org](http://www.ietf.org/) into Microsoft Word. [↑](#footnote-ref-2)
3. You receive a notification whenever someone likes or comment on an item that is somehow related to your profile (tags, mentioning your name, etc.). See [www.facebook.com](http://www.facebook.com). [↑](#footnote-ref-3)