

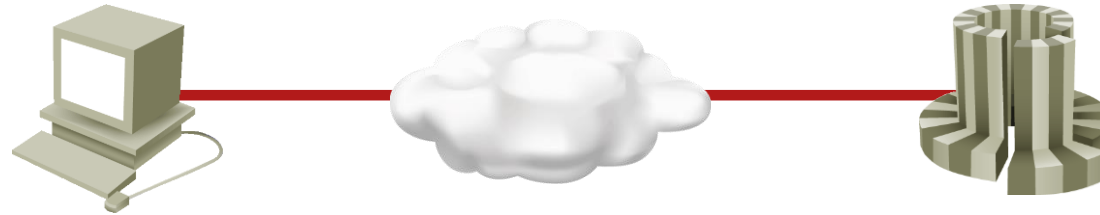
Building Fast(er) Web Sites

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The logo for ipSpace, featuring the text "ipSpace" in a white, cursive script font. The logo is positioned in the lower right quadrant of the slide, overlaid on a background of diagonal stripes in various shades of orange, yellow, and brown.

The Big Picture



We have to optimize all elements in the system

- Understand how all elements work
- Identify the major roadblocks
- Remove the biggest choke point
- Repeat ...

Why Do We Care?

We are impatient and forgetful:

- < 0.1sec Instantaneous response (Nielsen, 1993)
- 1 sec User's flow of thoughts is interrupted
- 2 sec Interference with short-term memory
- 10 sec User is no longer focused on dialog

Some other numbers:

- Users abandon non-working web page in 3-4 seconds
- Half a second delay caused 20% drop in traffic (Google, 2006)
- Ultimate goal: 100 msec load time

Sources:

<http://csi.ufs.ac.za/resres/files/Nah.pdf>

<http://www.strangeloopnetworks.com/web-performance-optimization-hub/topics/psychology-and-human-factors/>

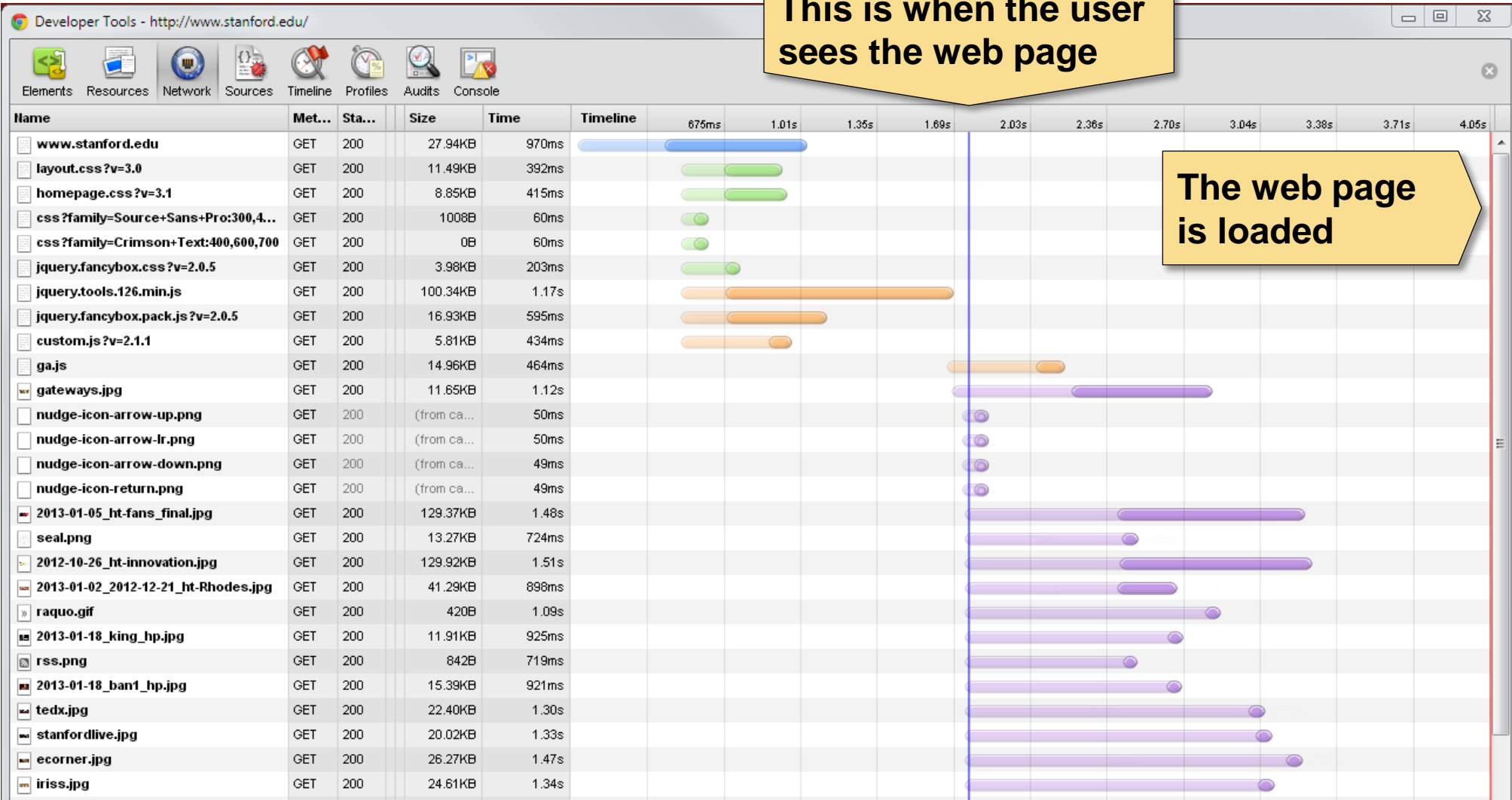
<http://www.webperformancetoday.com/category/human-factors/>

<http://www.websiteoptimization.com/speed/tweak/psychology-web-performance/>

Behind the Scenes – Tens of HTTP Requests

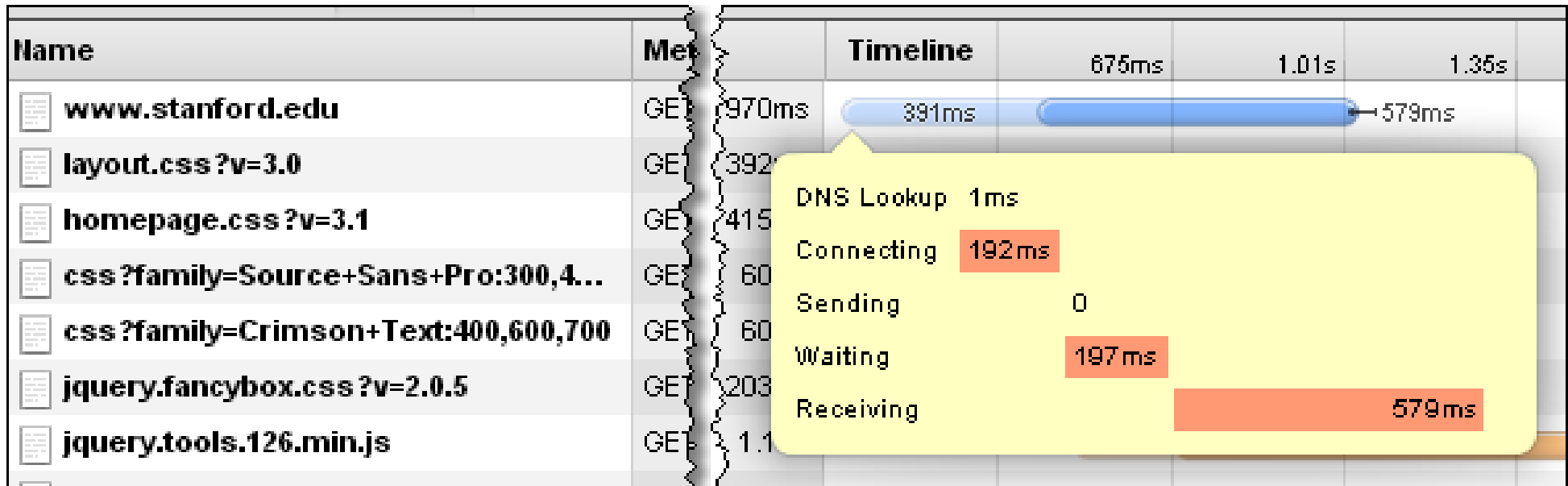
This is when the user sees the web page

The web page is loaded



What's going on?

The Problem – Details



- Most web pages have tens (or more) elements
- HTTP request sent for each element
- Some elements might block other elements (CSS, SCRIPT)

Major choke points:

- Slow web servers
- Transmission delays
- Overloaded web browsers (mobile)

Usually we have to optimize every choke point

Focal Points

Markup & Content

- Make fewer HTTP requests
- Optimize CSS and scripts
- Simplify CSS selectors
- Use sprites
- Use ETags properly
- Minimize cookies
- Split initial payload

Browser

- Use progressive enhancement
- Load scripts without blocking
- Use AJAX and deferred scripts

Network

- Use caching and compression
- Flushing and chunking
- Use Content Delivery Network
- Reduce DNS lookups
- Avoid redirects
- Domain sharding

Server

- Load balancing
- Back-end server scripts
- Message queues
- Optimized databases

A young child stands in the center of a room with a large map of Europe on the floor. The map is drawn in grey on a light-colored tiled floor and includes labels for 'Paris', 'London', and 'Brusset'. Three black network devices, possibly routers or switches, are placed on the floor, connected by a complex network of colorful cables (red, yellow, green, blue, black). The child is wearing a white t-shirt with red sleeves and dark pants. The overall scene suggests a hands-on learning activity about network infrastructure.

Questions?

Send them to ip@ipSpace.net or [@ioshints](https://twitter.com/ioshints)