



AJAX@localhost

Barcamp ZH 2006
<http://barcamp.ch>
Harry Fuecks



Where I've come from...

- JPSpan: <http://sourceforge.net/projects/jpspan>
 - Started before "AJAX"
 - ~1yr – started
 - "Atlas" for PHP
 - XML-RPC / SOAP inspired:
 - RPC over HTTP
 - Mistakes and lessons
- AJAX: Emperor's nice bikini

See also: "AJAX Reality Check" <http://www.sitepoint.com/forums/showthread.php?t=303936>



What is AJAX?

- Assume you know...

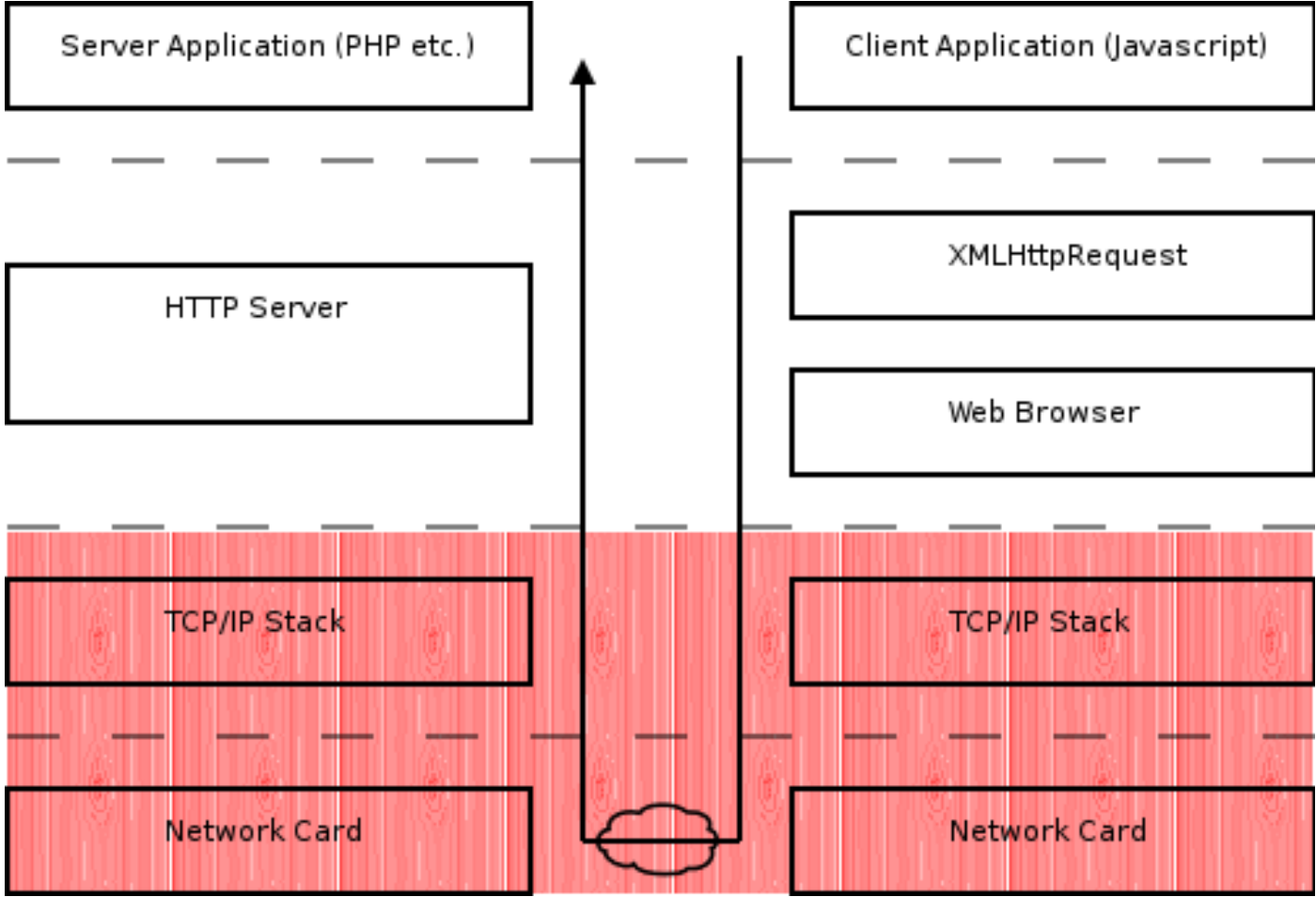
AJAX@localhost

bottom of the stack





AJAX “Stack”





Consumer Guide to Networks

- Two important dimensions:
 - Bandwidth
 - Volume of data at a single instance in time
 - Latency
 - Time delay from A to D (via B and C)
- Service providers don't sell latency ...and can only sell bandwidth they control
- "It's the latency stupid"

<http://rescomp.stanford.edu/~cheshire/rants/Latency.html>



Network Latency

- Latency not a constant - **varies over time!**

```
$ tcptraceroute www.php.net
Selected device wlan0, address 192.168.0.166, port 32776 for outgoing packets
Tracing the path to www.php.net (64.246.30.37) on TCP port 80 (www), 30 hops max
 1  192.168.0.1  9.650 ms  10.175 ms  1.950 ms
 2  10.190.96.1  7.959 ms  26.580 ms  10.146 ms
 3  * tengig-11-0.blxOTF001.gw.cablecom.net  9.314 ms  9.097 ms
 4  tengig-11-0.blxOTF001.gw.cablecom.net  8.434 ms  9.484 ms  9.629 ms
 5  pos-0-0.blxZH002.bb.cablecom.net  17.704 ms  10.388 ms  9.783 ms
 6  fast0-0.iix-igr01.nycl.twtelecom.net  99.681 ms  100.293 ms  99.039 ms
 7  core-01-so-1-0-0-0.nycl.twtelecom.net  100.207 ms  99.269 ms  98.446 ms
 8  dist-01-so-1-0-0-0.hsto.twtelecom.net  153.200 ms  145.780 ms  169.293 ms
 9  hagg-02-ge-2-3-0-506.hsto.twtelecom.net  144.844 ms  143.550 ms  143.198 ms
10  216-54-253-2.gen.twtelecom.net  177.272 ms  158.129 ms  159.765 ms
11  ivhou-207-218-245-29.ev1.net  152.826 ms  152.050 ms  152.501 ms
12  ivhou-207-218-223-119.ev1.net  151.677 ms  153.216 ms  153.481 ms
13  rsl.php.net  162.985 ms  154.419 ms  157.232 ms
```

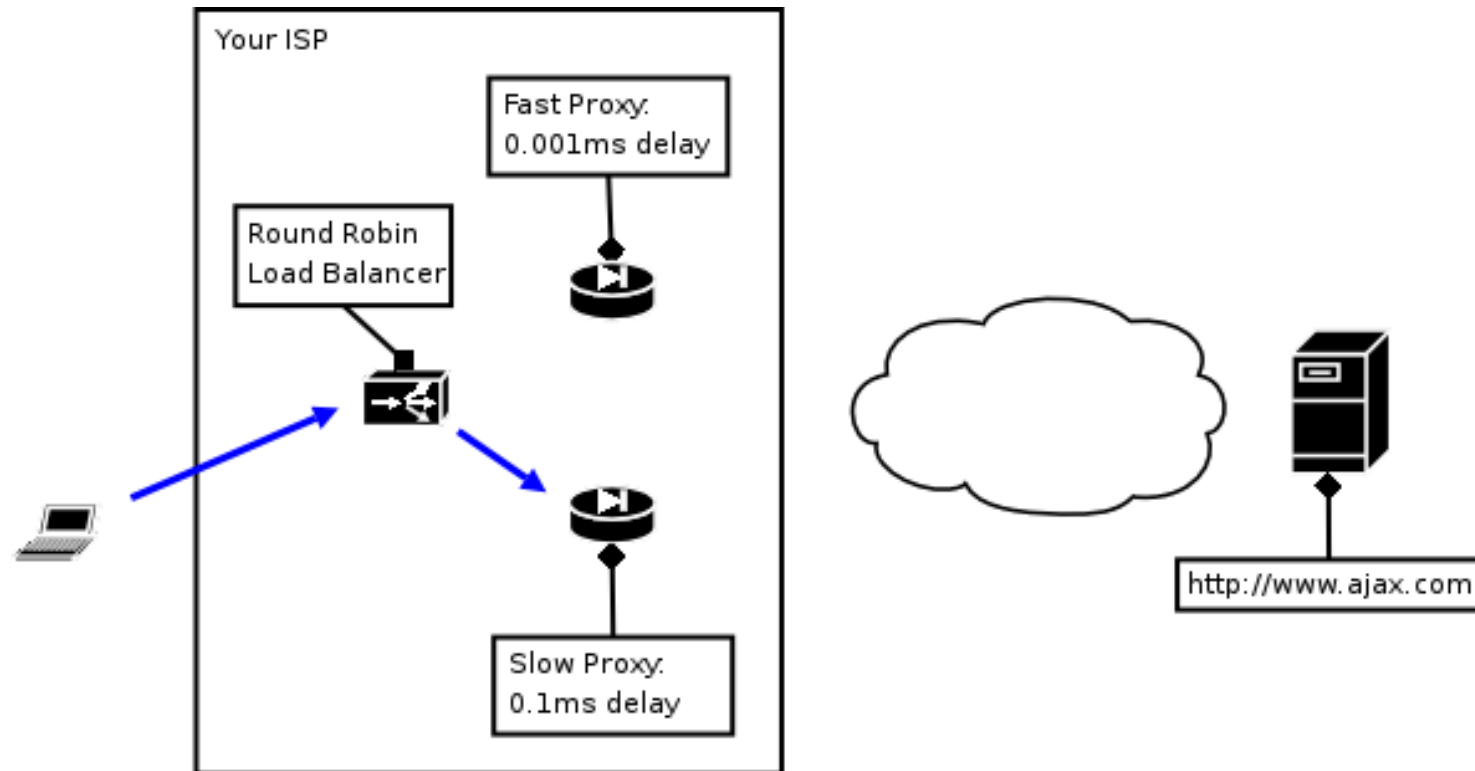


Server Latency

- Processor load, available child processes, disk I/O etc.
- Different “operations” in your code may be relatively faster or slow
- Typically bigger problem than network



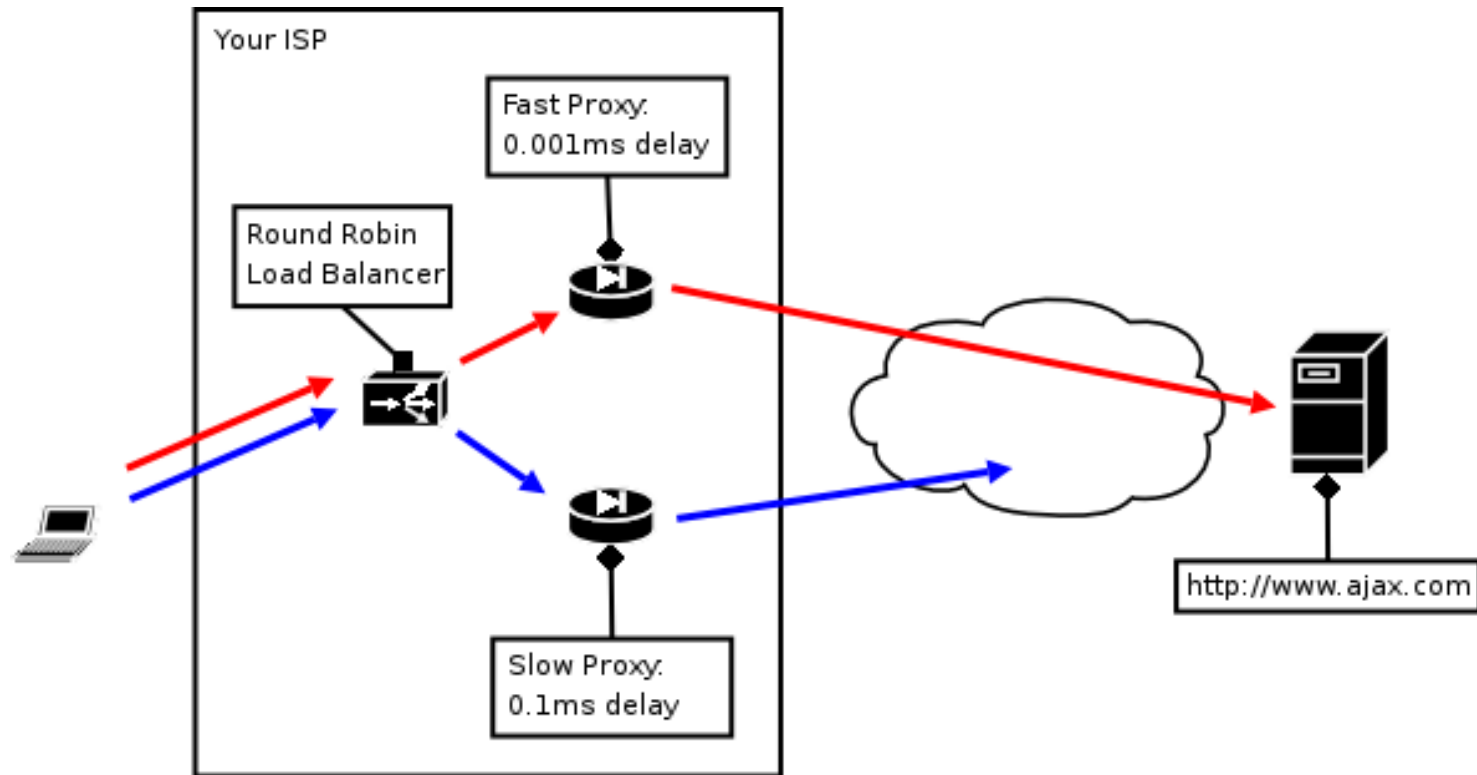
Just one of many delay scenarios...



First HTTP Request Issued
- routed through slow proxy



Just one of many delay scenarios...



Second Request Issued 0.01ms later
- routed through fast proxy
- reaches web server *before* first



AJAX Proxy

Download: <http://sourceforge.net/projects/jpspan>

- HTTP proxy for AJAX@localhost
 - Debugging - see HTTP request / response
 - Simulate network latency / failure
 - Simple mini language for scripting problems
- Hacked together in python
 - Has bugs
- Alternatives
 - Fiddler Proxy <https://www.fiddlertool.com/fiddler/> - Win32, scriptable, needs doing
 - TamperData? <http://tamperdata.mozdev.org/>



script.aculo.us reverse autocomplete

<http://demo.script.aculo.us/ajax/autocomplete/>

Demo:<http://www.phppatterns.com/stuff/latency.html>

```
# AJAX Proxy instructions
#Request      Response
wait:10       wait:0
wait:8        wait:0
wait:6        wait:0
wait:4        wait:0
wait:2        wait:0
wait:0        wait:0
```

Response to first request arrives la

Interesting security implication:

control over latency (e.g. DOS) == control over client

Same mistake: <http://jpspan.sourceforge.net/examples/autocomplete.php>



The Starbucks Factor

- “Starbucks Does Not Use Two-Phase Commit”

http://www.eaipatterns.com/ramblings/18_starbucks.html

“When you place your order the cashier marks a coffee cup with your order and places it into the queue.

[...]

Drinks are delivered out of sequence and need to be matched up to the correct customer.”



More on latency...

- “AJAX Latency problems: myth or reality?”

<http://richui.blogspot.com/2005/09/ajax-latency-problems-myth-or-reality.ht>

- “AJAX: reducing latency with a CDN”

<http://richui.blogspot.com/2005/09/ajax-reducing-latency-with-cdn.html>

- but remember **latency varies over time!**

- “Rapid Ajax requests out of order”

<http://wrath.rubyonrails.org/pipermail/rails-spinoffs/2005-November/001334.html>

- “I'm trying to write an ajax chat. I'm noticing that when ajax requests are fired off in rapid succession, they often will arrive out of order to the server.”

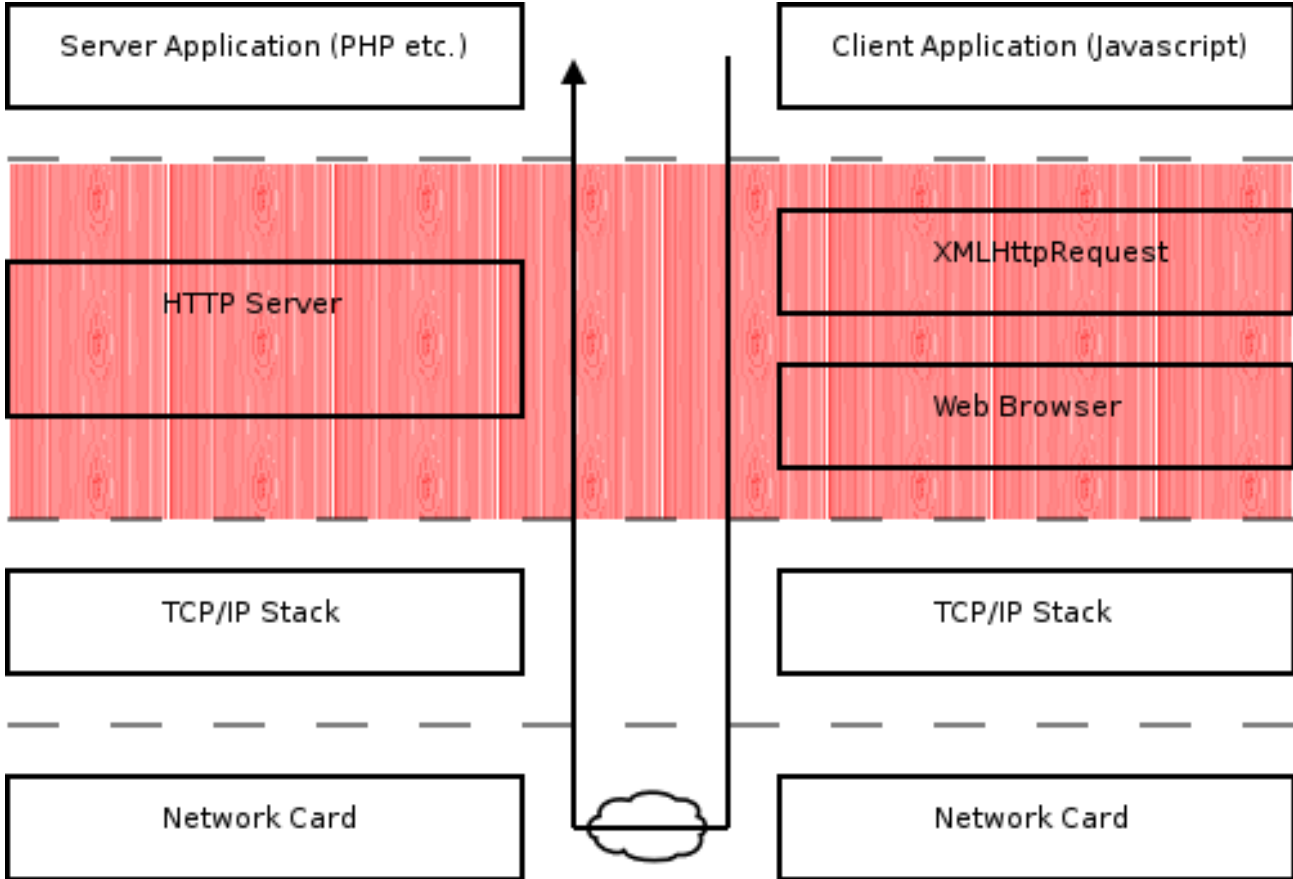


AJAX@localhost

around the middle



AJAX “Stack”





Choices

- XMLHttpRequest vs. “Remote Scripting”
- Wire formats
 - JSON (or just eval()able Javascript)
 - Micro-content
 - Plain text
 - Some flavour of XML (unpopular)
 - Etc.
- See “AJAX transport layer alternatives”

<http://www.ashleyit.com/ajax/AjaxExperience.htm>



XMLHttpRequest Limitations

- Browser implementations vary
- Browser has final say
 - no cross domain requests (security)
 - limited control over caching (security)
 - concurrent connection restrictions (RFC2616)
<http://kb.mozillazine.org/Network.http.max-connections>
<http://blogs.msdn.com/ie/archive/2005/04/11/407189.aspx>
- Doesn't offer enough
 - e.g. no timeouts – roll your own
<http://ajaxblog.com/archives/2005/06/01/async-requests-over-an>
- Varying degrees of HTTP support
 - XMLHttpRequest Tests:
<http://www.mnot.net/javascript/xmlhttprequest/>



AJAX in 30 Seconds

The fun starts with a synchronous request...

```
function createRequestObject() {
    var ro;
    var browser = navigator.appName;
    if(browser == "Microsoft Internet Explorer"){
        ro = new ActiveXObject("Microsoft.XMLHTTP");
    }else{
        ro = new XMLHttpRequest();
    }
    return ro;
}

var http = createRequestObject();

function sndReq(action) {
    http.open('get', 'rpc.php?action='+action);
    http.onreadystatechange = handleResponse;
    http.send(null);
}

function handleResponse() {
    if(http.readyState == 4){
        var response = http.responseText;
        var update = new Array();

        if(response.indexOf('|' != -1)) {
            update = response.split('|');
            document.getElementById(update[0]).innerHTML = update[1];
        }
    }
}
```

Thanks Rasmus: <http://marc.theaimsgroup.com/?l=php-general&m=112198633625636&w>



Synchronous Requests == BAD

- <http://ajaxblog.com/archives/2005/05/25/synchronous-requests-bad>
 - Demo: <http://www.phppatterns.com/stuff/sync.html>
- "Making callbacks synchronous, or how to shoot yourself in the foot"
<http://weblogs.asp.net/bleroy/archive/2005/12/15/433278.aspx>

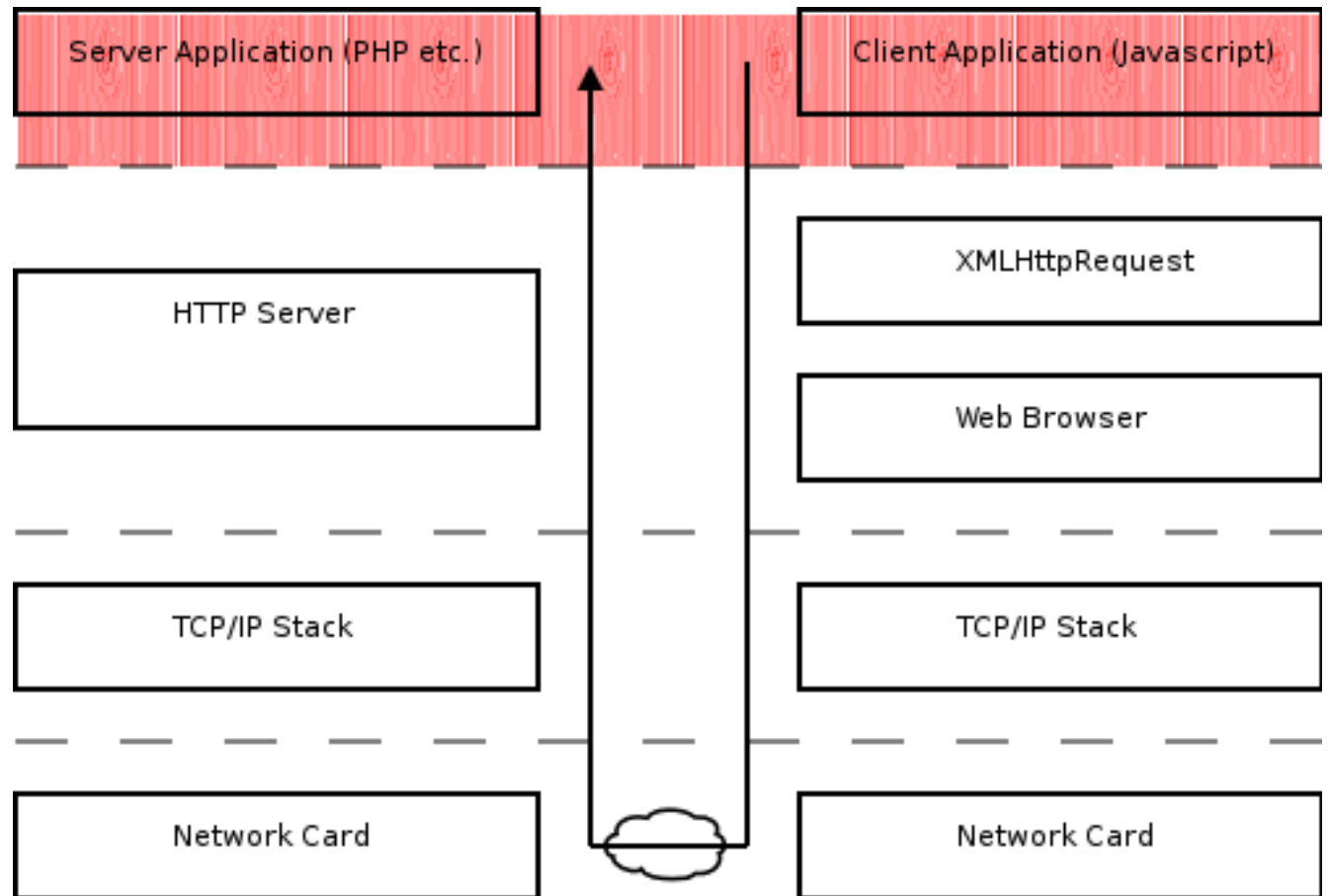


AJAX@localhost

top of the stack



AJAX Stack





Error Handling not included



The connection has timed out

The server at ch2.php.net is taking too long to respond.

- The site could be temporarily unavailable or too busy. Try again in a few moments.
- If you are unable to load any pages, check your computer's network connection.
- If your computer or network is protected by a firewall or proxy, make sure that Firefox is permitted to access the Web.

Try Again



Some angst with that doubt, Sir?

- What's a session with AJAX?
<http://ajaxblog.com/archives/2005/05/27/ajax-whats-a-session>
- Javascript as a runtime
 - memory "leaks": simplistic garbage collection (excepting Spidermonkey)
 - it just sucks:
<http://bob.pythonmac.org/archives/2005/06/02/javascript-sucks-volume-1>
 - "Thin to My Chagrin"
<http://blogs.msdn.com/ericlippert/archive/2003/11/18/53388.aspx>
"JScript was designed for simple scripts on simple web pages, not large-scale software"



AJAX@localhost

developers guide



The APIs don't work

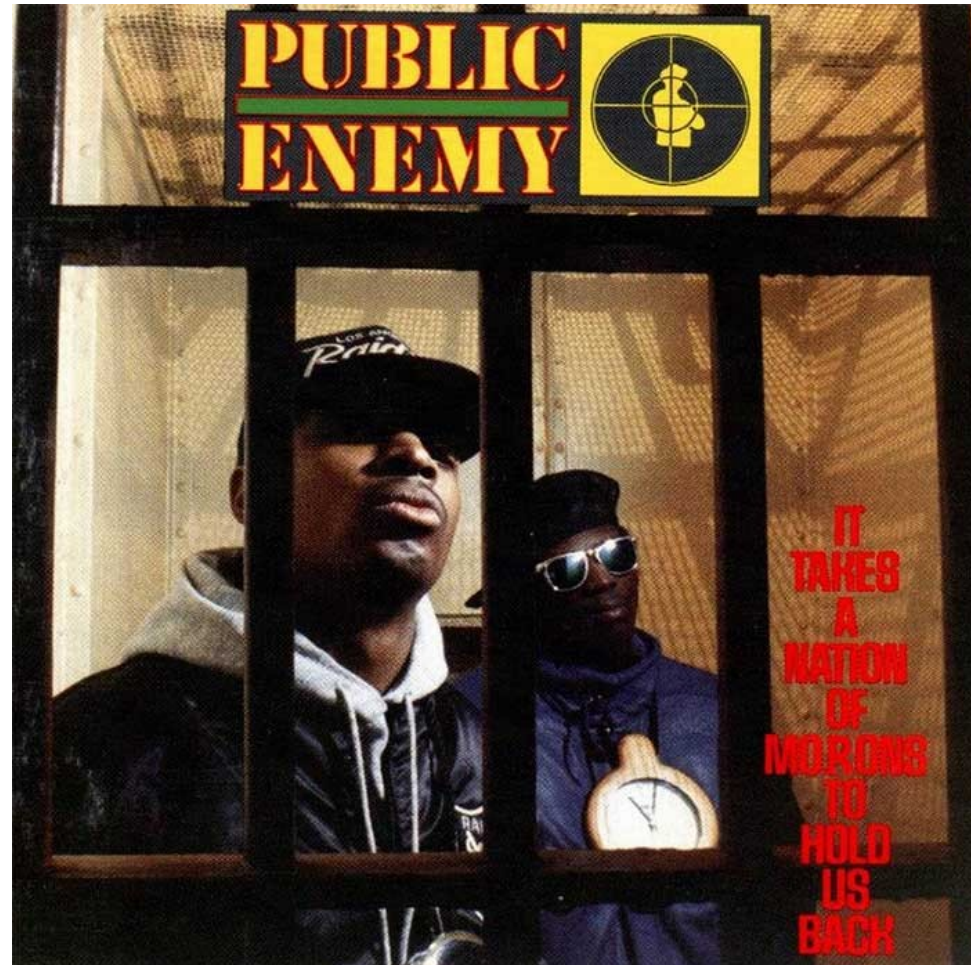
- Very hard to AJAX abstract well
 - “Not Invented Here” makes good sense this time
 - Watch out for HTTP abuse
 - http://bitworking.org/news/i_m_sorry_i_can_t_kiss_it_and_make_it_better
- Every application is unique
 - In depth developer attention
 - Enjoy debugging ;)



AJAX@localhost

buyers guide to ajax

Don't believe the hype





The 5 second AJAX test

- Pull out your network cable
 - Warnings?
 - Data loss?
 - Recovery?



The 5 minute AJAX test

- Simulate with AJAX proxy (or similar)
 - Insert delays
 - Insert varying delays
 - Drop connections
 - Still smiling?



AJAX@localhost

