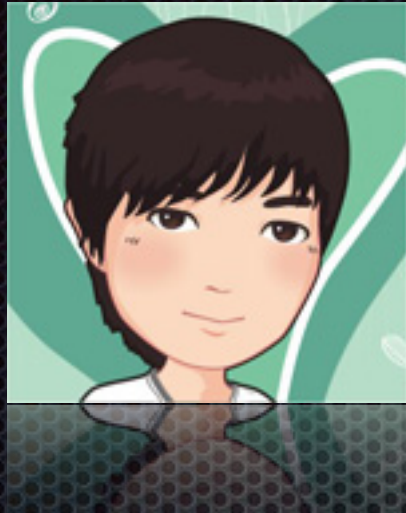


HTTP 初探



屈光宇

2008 - 2011, @ Baidu
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WEB平台部 - 奇舞团

<http://www.imququ.com>

开始前的小讨论

大家对前端的认识？

不同的角色

设计

后端

运营

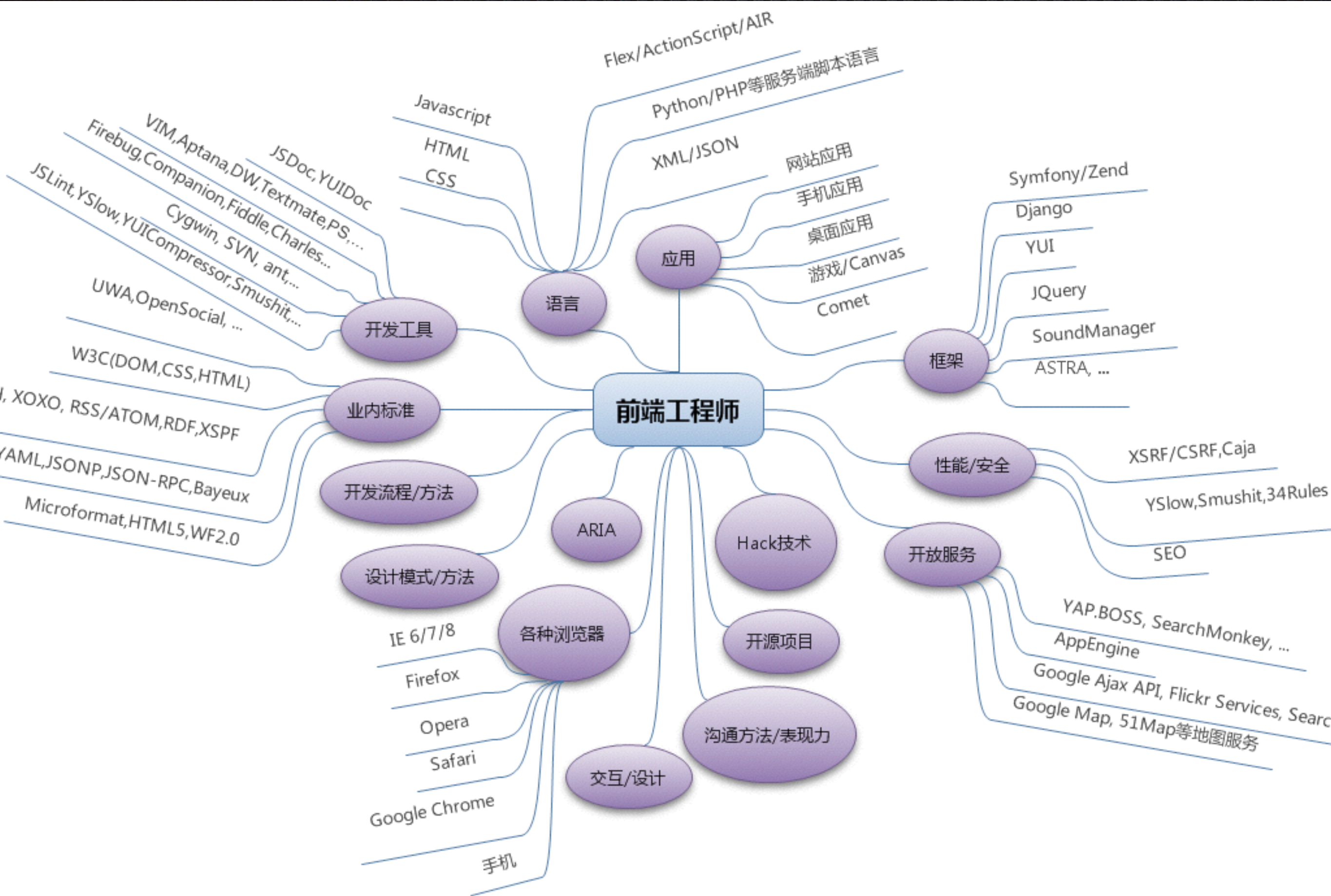
前端

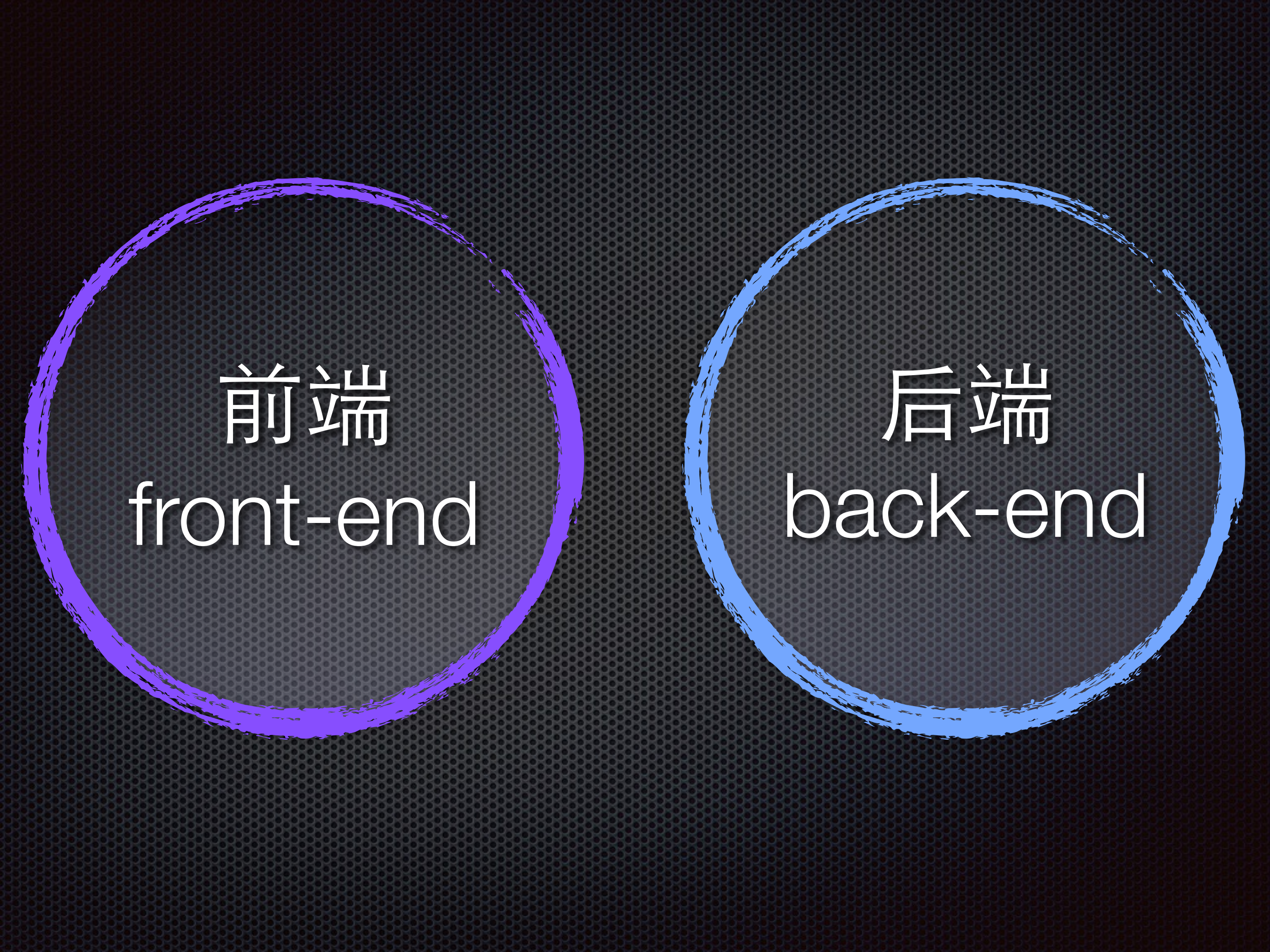
产品

老板

测试

运维





前端

front-end

后端

back-end

前端
front-end

终端技术

HTTP

服务端技术

后端
back-end

HTTP

HTTP是应用层协议；
联网细节交给了通用的、可靠的因特网传输
协议：TCP/IP；



最简单的HTTP服务

```
python -m SimpleHTTPServer
```



演示

请求/响应报文

<method> <request-URL> <version>
<headers>

<entity-body>

<version> <status> <respon-phrase>
<headers>

<entity-body>

URL

<scheme>://<user>:<password>@<host>:<port>/
<path>;<params>?<query>#<frag>

http://<host>:<port>/<path>?<query>#<frag>

ftp://<user>:<password>@<host>:<port>/
<path>;<params>

受限字符： %/ . # ? ; : \$ + @ & = 以及非US-ASCII字符集字符

常见的 HTTP 状态码

- 200 OK *
- 301 Moved Permanently
- 302 Found
- 304 Not Modified *
- 401 Unauthorized
- 403 Forbidden
- 404 Not Found *
- 500 Internal Server Error
- 501 Not Implemented
- 502 Bad Gateway *

Header 分类

通用

- Date: Tue, 3 Oct 1974 02:16:00 GMT
- Connection: close

请求

- User-Agent: Mozilla/5.0 (Linux; U; Android 4.0.2; en-us; Galaxy Nexus Build/ICL53F) AppleWebKit/534.30 (KHTML, like Gecko) Version/4.0 Mobile Safari/534.30
- Accept: */*

Header 分类

响应

- Server: Nginx
- Last-Modified: Thu, 16 Oct 2014 10:15:16 GMT

实体

- Content-Type: text/html; charset=utf-8
- Content-Length: 100

扩展（自定义）

- X-Powered-By: thinkjs-1.0.4 / X-Cache: hit

连接过程

1. 浏览器从URL中解析出服务器的主机名;
2. 浏览器将主机名转换成服务器的IP地址;
3. 浏览器从URL中解析出端口号, 默认80;
4. 浏览器建立一条与服务器的TCP连接;
5. 浏览器向服务器发送一条HTTP请求报文;
6. 服务器向浏览器返回一条HTTP响应报文;
7. 关闭连接, 浏览器显示文档;

来看个实例

```
telnet www.so.com 80
```

```
GET / HTTP/1.1
```

```
Host: www.so.com
```



演示

HTTP抓包工具

- Wireshark
- Fiddler
- Firebug for Firefox
- Chrome开发者工具
- IE8+自带的开发者工具

发送HTTP请求的工具

- telnet / curl
- Fiddler *
- Tamper for Firefox
- Postman for Chrome *

HTTP实践

- GET / POST
- Cookie
- Accept-Encoding / Content-Encoding
- Keep-Alive
- Transfer-Encoding
- 缓存

GET/POST

GET /search.html?s=hello HTTP/1.1

Host: www.imququ.com

User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.9; rv:23.0) Gecko/20100101 Firefox/23.0

POST /admin/ HTTP/1.1

Host: www.imququ.com

User-Agent: Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.1; SV1; .NET CLR 2.0.50727; .NET CLR 3.0.4506.2152; .NET CLR 3.5.30729)

Content-Length: 27

username=user&password=pass

GET/POST

- PHP 中如何处理 GET
- PHP 中如何处理 POST
- 语法糖
- 如何处理原始 POST 数据
- 理解 \$_GET、\$_POST 的本质

扩展阅读：[四种常见的 POST 提交数据方式](#)

Cookie/Session

GET / HTTP/1.1

Host: m.so.com

Connection: keep-alive

Cookie: mso_index_mode=xuancal;

__guid=34870781.3073803881376862000.1412747925616.8699

HTTP/1.1 200 OK

Server: nginx/1.2.9

Date: Wed, 08 Oct 2014 05:59:59 GMT

Connection: keep-alive

Set-Cookie: PHPSESSID=s4mhqotbdbg9uh917lu8d5bub5;
path=/
Content-Encoding: gzip

Cookie

```
<?php
$times = 1;
if(empty($_COOKIE['times'])) {
    setCookie('times', $times);
} else {
    $times = intval($_COOKIE['times']) + 1;
    setCookie('times', $times);
}

echo '第 ' . $times . ' 次访问';
?>
```

Cookie

首次访问

▼ Request Headers [view parsed](#)

```
GET /test/cookie.php HTTP/1.1
Host: test:8080
Connection: keep-alive
Cache-Control: max-age=0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
User-Agent: Mozilla/5.0 (Linux; U; Android 4.0.2; en-us; Galaxy Nexus Build/ICL53F) AppleWebKit/534.30 (KHTML, like Gecko) Version/4.0 Mobile Safari/534.30
DNT: 1
Accept-Encoding: gzip,deflate,sdch
Accept-Language: zh-CN,zh;q=0.8,en-US;q=0.6,en;q=0.4,ja;q=0.2,de;q=0.2,zh-TW;q=0.2,cs;q=0.2,pt;q=0.2
```

▼ Response Headers [view parsed](#)

```
HTTP/1.1 200 OK
Server: openresty/1.7.2.1
Date: Mon, 03 Nov 2014 14:28:40 GMT
Content-Type: text/html
Connection: close
Vary: Accept-Encoding
X-Powered-By: PHP/5.5.16
Set-Cookie: times=1
Expires: Sun, 02 Nov 2014 14:28:40 GMT
Cache-Control: no-cache
```

Cookie

再次访问

▼ Request Headers [view parsed](#)

```
GET /test/cookie.php HTTP/1.1
Host: test:8080
Connection: keep-alive
Cache-Control: max-age=0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
User-Agent: Mozilla/5.0 (Linux; U; Android 4.0.2; en-us; Galaxy Nexus Build/ICL53F) AppleWebKit/534.30 (KHTML, like Gecko) Version/4.0 Mobile Safari/534.30
DNT: 1
Accept-Encoding: gzip,deflate,sdch
Accept-Language: zh-CN,zh;q=0.8,en-US;q=0.6,en;q=0.4,ja;q=0.2,de;q=0.2,zh-TW;q=0.2,cs;q=0.2,pt;q=0.2
Cookie: times=1
```

▼ Response Headers [view parsed](#)

```
HTTP/1.1 200 OK
Server: openresty/1.7.2.1
Date: Mon, 03 Nov 2014 14:28:45 GMT
Content-Type: text/html
Connection: close
Vary: Accept-Encoding
X-Powered-By: PHP/5.5.16
Set-Cookie: times=2
Expires: Sun, 02 Nov 2014 14:28:45 GMT
```

Cookie

▼ Request Headers [view parsed](#)

```
GET / HTTP/1.1
Host: m.so.com
Connection: keep-alive
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_0) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/38.0.2125.111 Safari/537.36
DNT: 1
Accept-Encoding: gzip, deflate, sdch
Accept-Language: zh-CN,zh;q=0.8,en-US;q=0.6,en;q=0.4,ja;q=0.2,de;q=0.2,zh-TW;q=0.2,cs;q=0.2,pt;q=0.2
Cookie: __guid=122822935.4342501537436183600.1414647687246.2825; stc_mso_home=c99216b6bc2d; stc_result=126b1e5815ab; stc_sim=112ffb4f8e73; stc_sim_result=00594ef99323; mso_map_xyt=12967728_4863452_1414742190833; stc_sim_home=ae1e87d7ec39; crypt_code=EnYS58WDBBknaN4yS1DbqliP3JXrqScp3S%252BTCnoS7xr2ZFy7PrHFoYvGV%252F010eli
```

Cookie 越来越大，怎么办？

Session

```
<?php
session_start();

if(empty($_SESSION['times'])) {
    $_SESSION['times'] = 1;
} else {
    $_SESSION['times'] = $_SESSION['times'] + 1;
}

echo '第 ' . $_SESSION['times'] . ' 次访问';
?>
```

Session

▼ Request Headers [view parsed](#)

GET /test/session.php HTTP/1.1
Host: test:8080
Connection: keep-alive
Cache-Control: max-age=0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_0) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/38.0.2125.111 Safari/537.36
DNT: 1
Accept-Encoding: gzip, deflate, sdch
Accept-Language: zh-CN,zh;q=0.8,en-US;q=0.6,en;q=0.4,ja;q=0.2,de;q=0.2,zh-TW;q=0.2,cs;q=0.2,pt;q=0.2

▼ Response Headers [view parsed](#)

HTTP/1.1 200 OK
Server: openresty/1.7.2.1
Date: Mon, 03 Nov 2014 14:34:29 GMT
Content-Type: text/html
Connection: close
Vary: Accept-Encoding
X-Powered-By: PHP/5.5.16
Set-Cookie: PHPSESSID=ph0v6filums4t93cuhqi2a11q7; path=/
Expires: Sun, 02 Nov 2014 14:34:29 GMT
Cache-Control: no-cache
Pragma: no-cache
Content-Encoding: gzip

Cookie

- path
- domain (hostonly*)
- expires (max-age)
- secure
- httponly

扩展阅读: [你所不知道的HostOnly Cookie](#)

Accept-Encoding Content-Encoding

减小网络传输大小

AE / CE

▼ Request Headers [view parsed](#)

GET /static/5d0cb4bd42d5cb6e/zepto_1.1.2.js HTTP/1.1
Host: s9.qhimg.com
Connection: keep-alive
Pragma: no-cache
Cache-Control: no-cache
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_10_0) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/38.0.2125.111 Safari/537.36
DNT: 1
Accept-Encoding: gzip, deflate, sdch
Accept-Language: zh-CN,zh;q=0.8,en-US;q=0.6,en;q=0.4,ja;q=0.2,de;q=0.2,zh-TW;q=0.2,cs;q=0.2,pt;q=0.2

▼ Response Headers [view parsed](#)

HTTP/1.1 200 OK
Expires: Sat, 12 Oct 2024 23:52:15 GMT
Date: Wed, 15 Oct 2014 23:52:15 GMT
Server: nginx
Content-Type: application/x-javascript
Content-Length: 10158
Last-Modified: Fri, 12 Sep 2014 12:48:44 GMT
ETag: "5412ebac-27ae"
Cache-Control: max-age=315360000
Content-Encoding: gzip

AE / CE

Name Path	Method	Type	Size Content ▼
 s?q=%E5%BC%B9%E5%B0%84%E7%89%88%E6%...	GET	text/html	14.8 KB 48.5 KB
 zepto_1.1.2.js s9.qhimg.com/static/5d0cb4bd42d5cb6e	GET	application/x-javascript	10.4 KB 27.5 KB
 t014ca8e8722cfe1eb8.jpg p0.qhimg.com/dmsmt/240_168_80	GET	image/jpeg	5.4 KB 4.8 KB
 t01adbffcf2b6b1929f.jpg p4.qhimg.com/dmsmt/240_168_80	GET	image/jpeg	5.1 KB 4.6 KB

Size > Content or Content > Size ?

Keep-Alive

减少 TCP 连接开销

Keep-Alive

```
~ : $telnet 127.0.0.1 8080
```

```
Trying 127.0.0.1...
```

```
Connected to localhost.
```

```
Escape character is '^['
```

```
GET /test/index.js HTTP/1.1
```

```
Host: test
```

```
HTTP/1.1 200 OK
```

```
Server: openresty/1.7.2.1
```

```
Date: Mon, 03 Nov 2014 15:02:15 GMT
```

```
Content-Type: application/javascript
```

```
Content-Length: 10
```

```
Last-Modified: Mon, 03 Nov 2014 15:02:01 GMT
```

```
Connection: keep-alive
```

```
Etag: "545798e9-a"
```

```
Expires: Sun, 02 Nov 2014 15:02:15 GMT
```

```
Cache-Control: no-cache
```

```
Accept-Ranges: bytes
```

```
var a = 1;
```

```
GET /test/index.js HTTP/1.1
```

```
Host: test
```

```
Connection: close
```

```
HTTP/1.1 200 OK
```

```
Server: openresty/1.7.2.1
```

```
Date: Mon, 03 Nov 2014 15:02:37 GMT
```

```
Content-Type: application/javascript
```

```
Content-Length: 10
```

```
Last-Modified: Mon, 03 Nov 2014 15:02:01 GMT
```

```
Connection: close
```

```
Etag: "545798e9-a"
```

```
Expires: Sun, 02 Nov 2014 15:02:37 GMT
```

```
Cache-Control: no-cache
```

```
Accept-Ranges: bytes
```

```
var a = 1;Connection closed by foreign host.
```

Keep-Alive

对于复用 TCP 的多次请求，
客户端如何知道每个文件大小？

```
~ : $telnet 127.0.0.1 8080
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
GET /test/index.js HTTP/1.1
Host: test

HTTP/1.1 200 OK
Server: openresty/1.7.2.1
Date: Mon, 03 Nov 2014 15:02:15 GMT
Content-Type: application/javascript
Content-Length: 10
Last-Modified: Mon, 03 Nov 2014 15:02:01 GMT
Connection: keep-alive
```

Keep-Alive

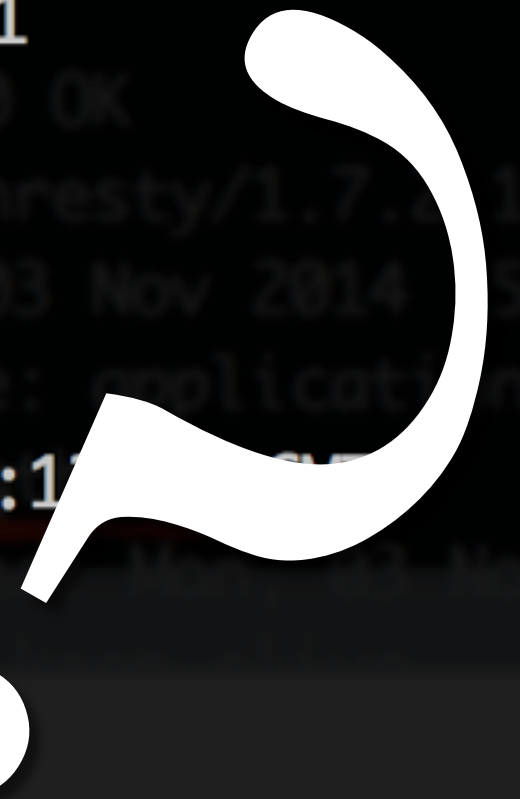
来看一个类似的例子

```
~ : $telnet 127.0.0.1 8080
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
GET /test/index.js HTTP/1.1
Host: test
```

```
HTTP/1.1 200 OK
Server: openresty/1.7.2.1
Date: Mon, 03 Nov 2014 15:02
Content-Type: application/javascript
Content-Length: 10
Last-Modified: Mon, 03 Nov 2014 15:02
Connection: keep-alive
```

```
~ : $telnet 127.0.0.1 8080 localhost.
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
GET /test/get.php HTTP/1.1
Host: test
```

```
HTTP/1.1 200 OK
Server: openresty/1.7.2.1
Date: Mon, 03 Nov 2014 15:17
Content-Type: text/html
Connection: close
Vary: Accept-Encoding
X-Powered-By: PHP/5.5.16
```



Transfer-Encoding

让用户更快看到内容

Transfer-Encoding

```
GET /test/index.php HTTP/1.1
```

```
Host: test
```

```
HTTP/1.1 200 OK
```

```
Server: openresty/1.7.2.1
```

```
Date: Mon, 03 Nov 2014 15:25:01 GMT
```

```
Content-Type: text/html
```

```
Transfer-Encoding: chunked
```

```
Connection: keep-alive
```

```
Vary: Accept-Encoding
```

```
X-Powered-By: PHP/5.5.16
```

```
Expires: Sun, 02 Nov 2014 15:25:01 GMT
```

```
Cache-Control: no-cache
```

```
9
```

```
test test
```

```
0
```

```
chunked_transfer_encoding on;
```

缓存

减小传输体积，极限是零传输

首次请求与第二次请求

#	Result	Protocol	Host	URL
 1	200	HTTP	www.baidu.com	/
 2	200	HTTP	www.baidu.com	/img/baidu_sylogo1.gif
 3	200	HTTP	www.baidu.com	/img/i2.png
 4	200	HTTP	www.baidu.com	/js/bdsug.js?v=1.0.3.0
 5	200	HTTP	gimg.baidu.com	/img/gs.gif
 6	200	HTTP	www.baidu.com	/cache/hps/js/hps-1.0.js
 7	200	HTTP	www.baidu.com	/img/arr.gif

Web Sessions				
#	Result	Protocol	Host	URL
 1	200	HTTP	www.baidu.com	/
 2	304	HTTP	www.baidu.com	/js/bdsug.js?v=1.0.3.0

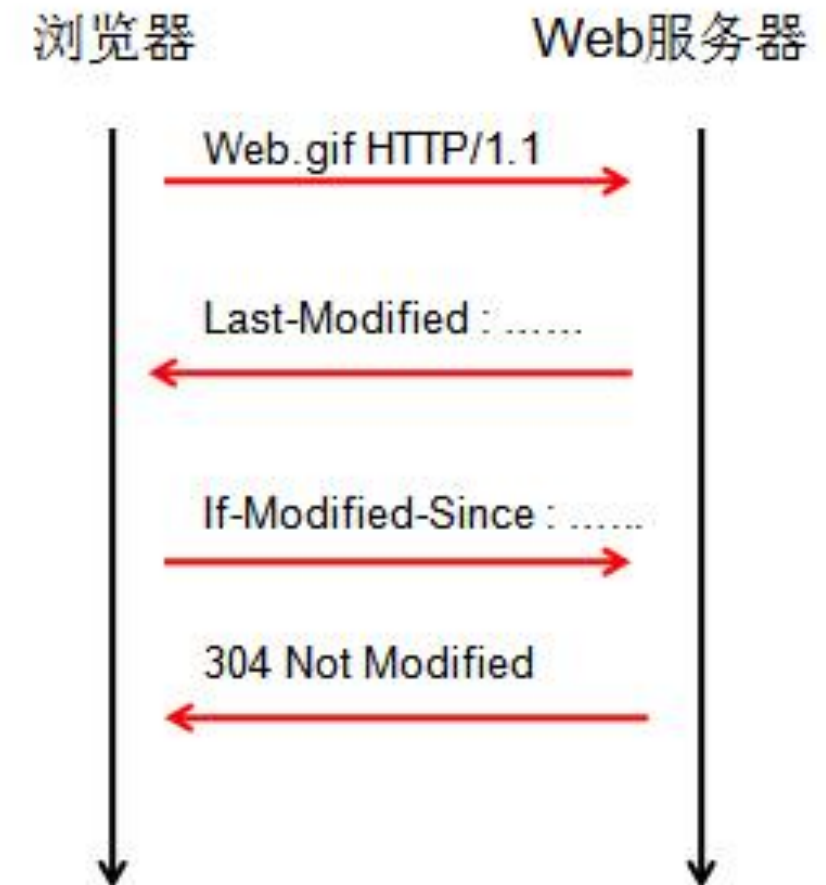
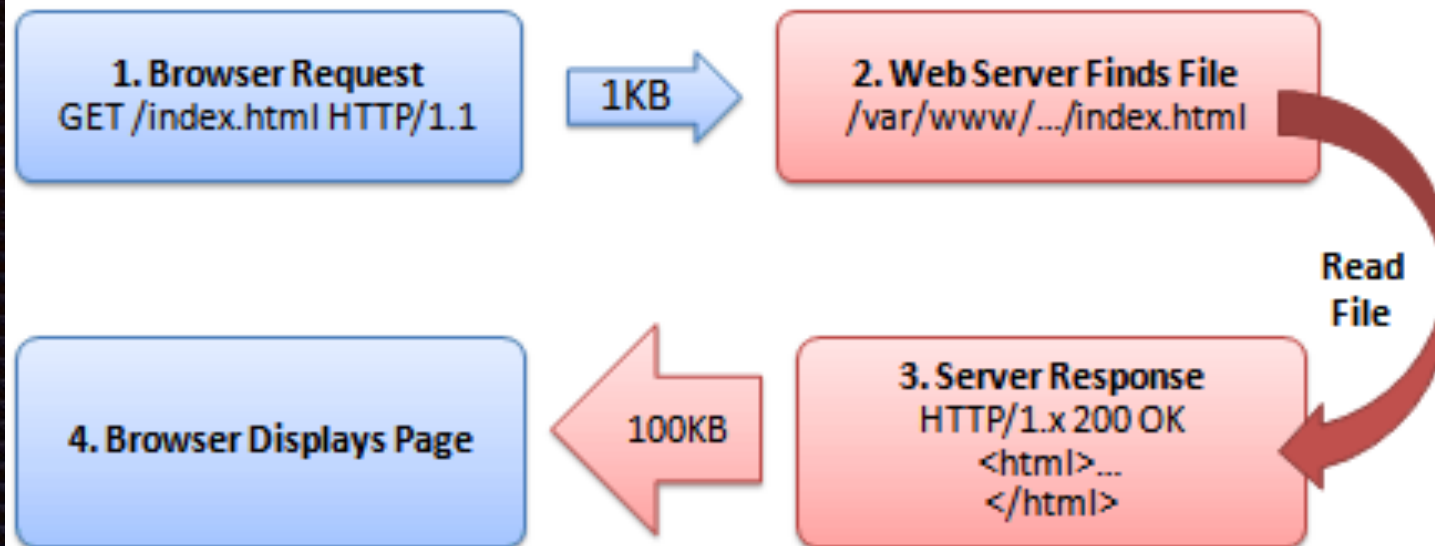
F5请求与Ctrl+F5请求

#	Result	Protocol	Host	URL
 1	200	HTTP	www.baidu.com	/
 2	304	HTTP	www.baidu.com	/img/baidu_sylogo1.gif
 3	304	HTTP	www.baidu.com	/img/i2.png
 4	304	HTTP	gimg.baidu.com	/img/gs.gif
 5	304	HTTP	www.baidu.com	/js/bdsug.js?v=1.0.3.0
 6	304	HTTP	www.baidu.com	/img/arr.gif
 7	304	HTTP	www.baidu.com	/cache/hps/js/hps-1.0.js

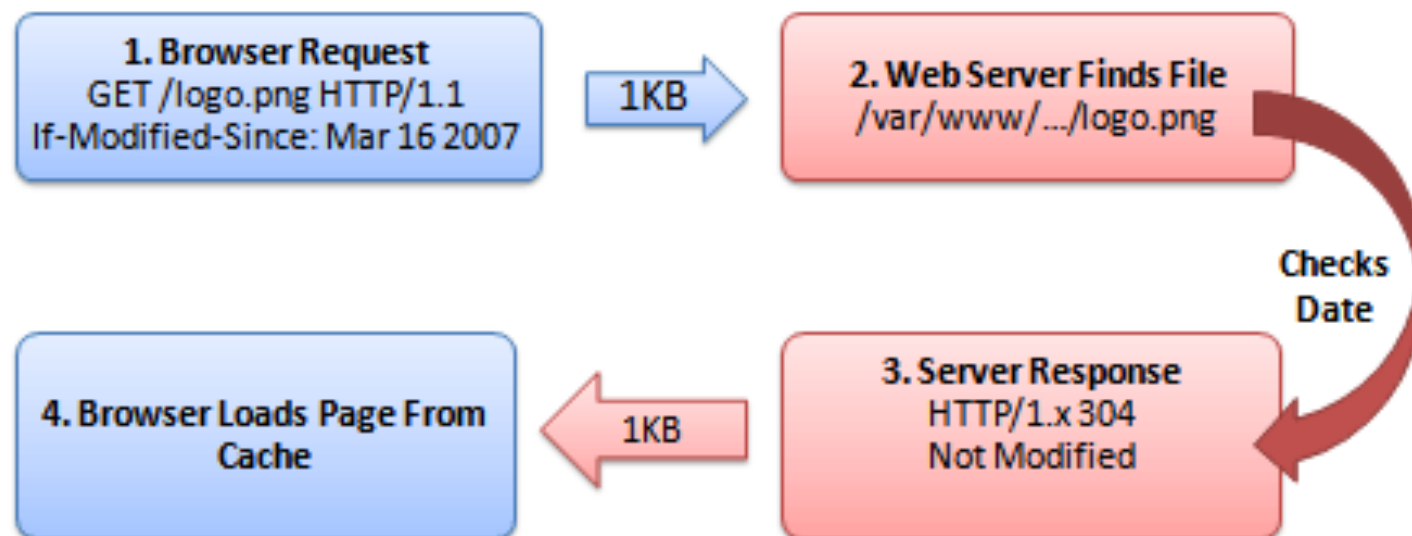
#	Result	Protocol	Host	URL
 1	200	HTTP	www.baidu.com	/
 2	200	HTTP	www.baidu.com	/img/baidu_sylogo1.gif
 3	200	HTTP	www.baidu.com	/img/i2.png
 4	200	HTTP	gimg.baidu.com	/img/gs.gif
 5	200	HTTP	www.baidu.com	/img/arr.gif
 6	200	HTTP	www.baidu.com	/js/bdsug.js?v=1.0.3.0
 7	200	HTTP	www.baidu.com	/cache/hps/js/hps-1.0.js

Last-Modified

HTTP Request and Response

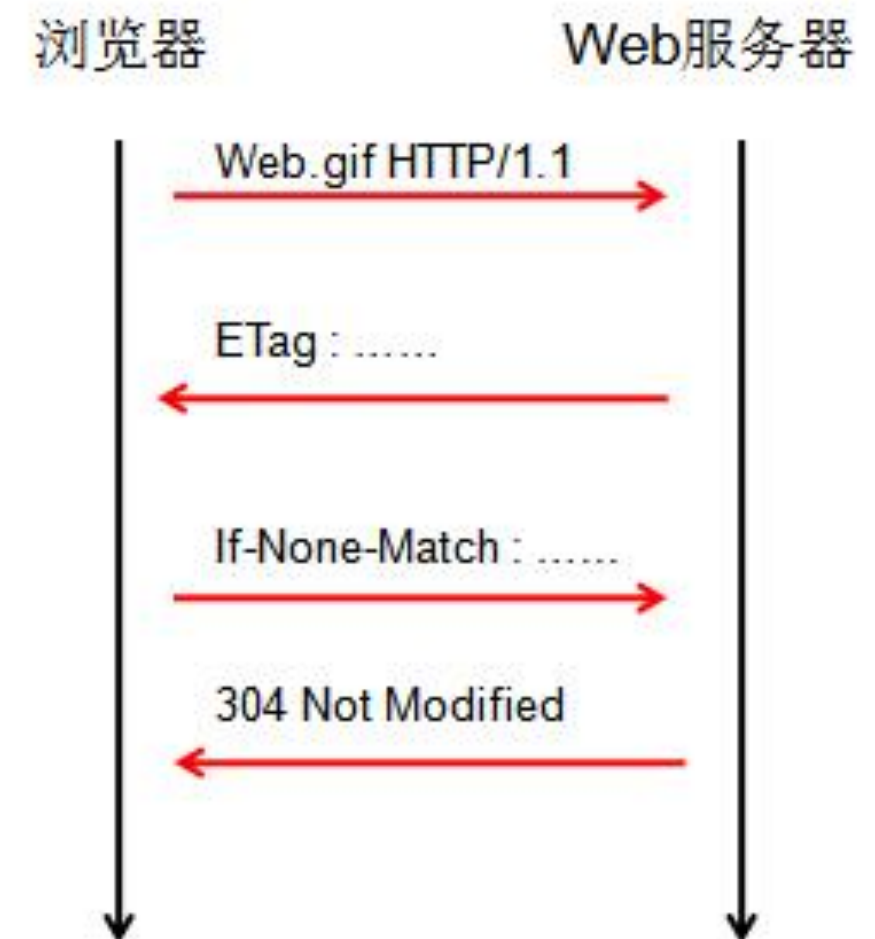
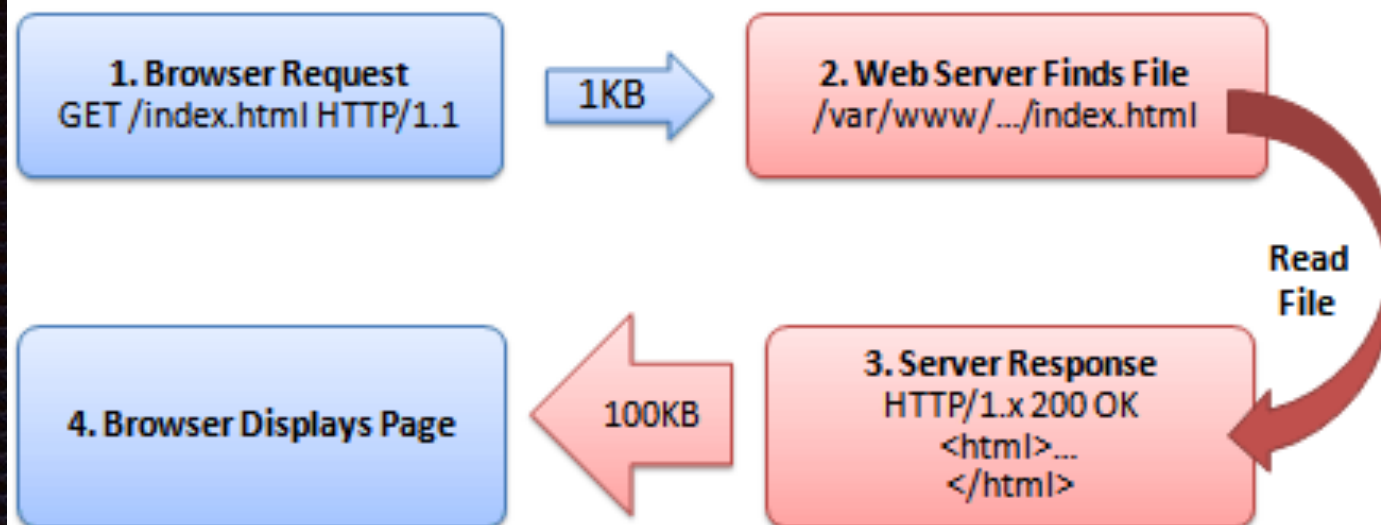


HTTP Cache: Last-Modified

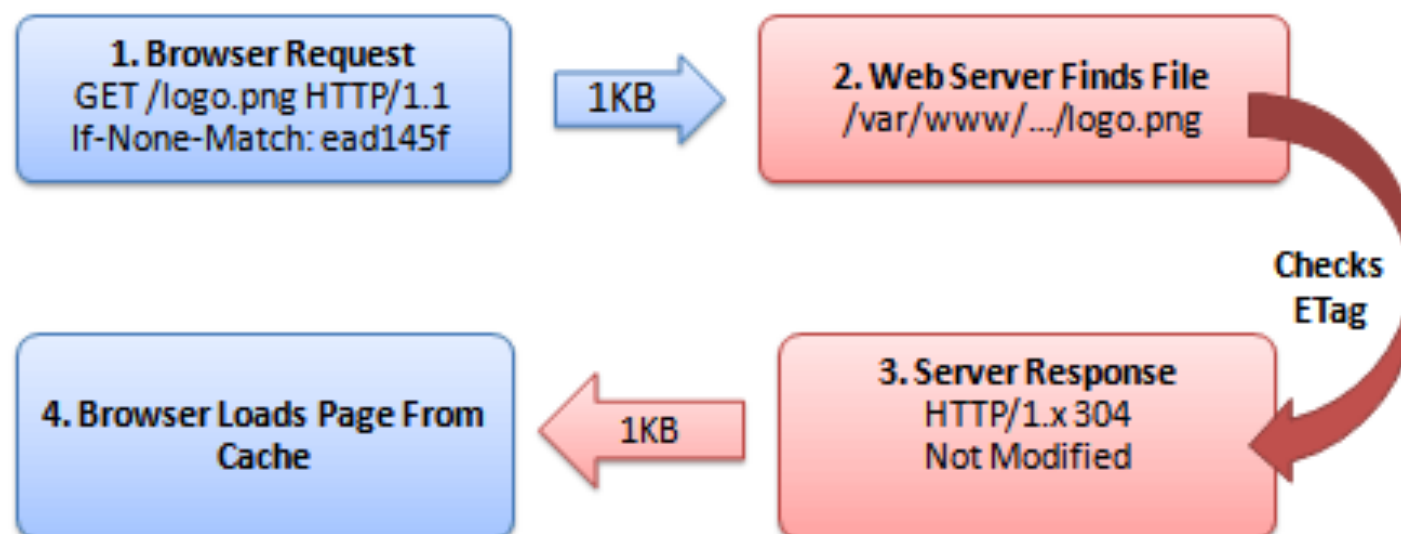


ETag

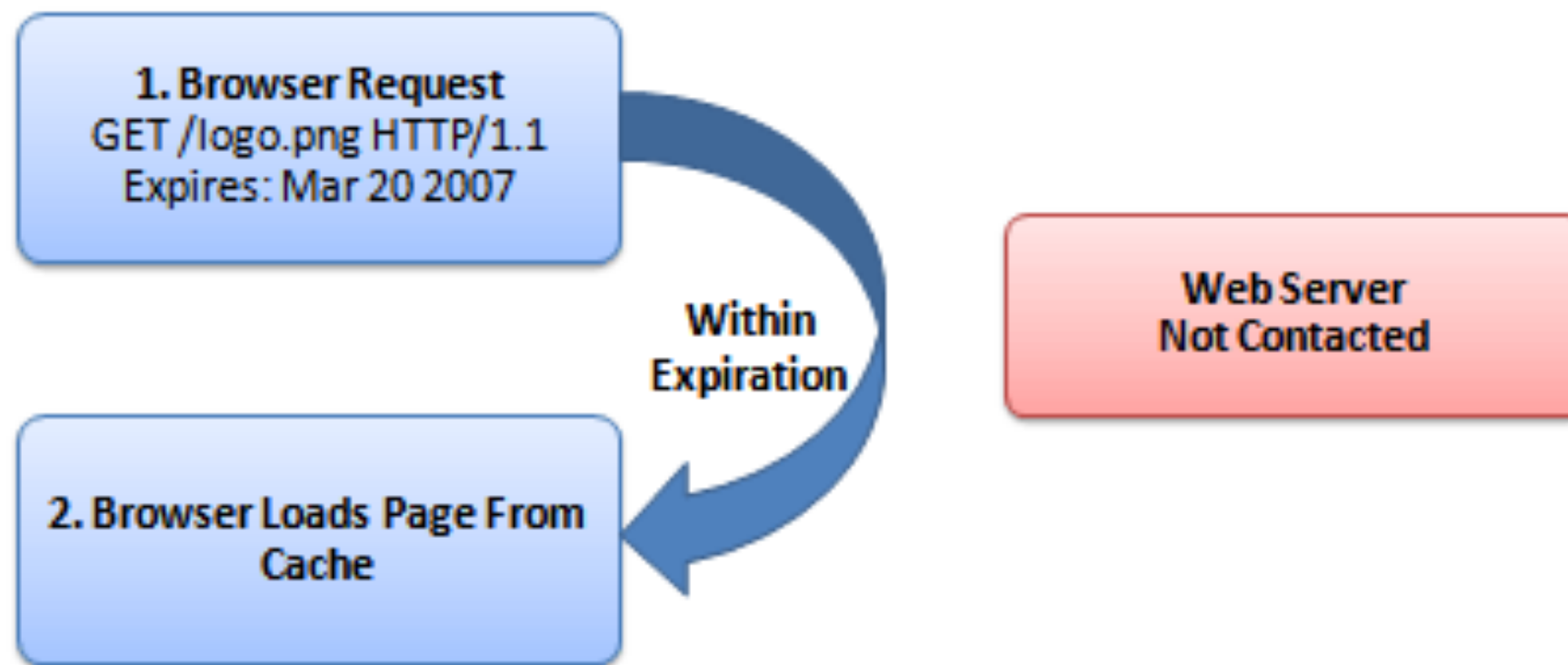
HTTP Request and Response



HTTP Cache: If-None-Match



HTTP Cache: Expires



Cache-Control

指 令

目 的

Cache-Control: max-stale
Cache-Control: max-stale =
<s>

缓存可以随意提供过期的文件。如果指定了参数 <s>，在这段时间内，文档就不能过期。这条指令放松了缓存的规则

Cache-Control: min-fresh=
<s>

至少在未来 <s> 秒内文档要保持新鲜。这就使缓存规则更加严格了

Cache-Control: max-age =
<s>

缓存无法返回缓存时间长于 <s> 秒的文档。这条指令会使缓存规则更加严格，除非同时还发送了 max-stale 指令，在这种情况下，使用期可能会超过其过期时间

Cache-Control: no-cache
Pragma: no-cache

除非资源进行了再验证，否则这个客户端不会接受已缓存的资源

Cache-Control: no-store

缓存应该尽快从存储器中删除文档的所有痕迹，因为其中可能会包含敏感信息

Cache-Control: only-if-
cached

只有当缓存中有副本存在时，客户端才会获取一份副本

浏览器请求三种方式

- Ctrl+F5: 这种方式叫强制刷新, 它使得网页以及其中的所有组件都直接向Web服务器发送请求, 并且不使用缓存协商, 这样的目的是获取所有页面内容的最新版本。
- F5: 这种方式便是一般的刷新, 我们经常使用, 它等同于单击浏览器的刷新按钮。它允许浏览器在请求中附加必要的缓存协商, 但不允许浏览器直接使用本地缓存, 也就是说, 它能够让 Last-Modified 发挥效果, 但是会无视 Expires。
- 单击浏览器地址栏的“转到”按钮、回车、通过超链接打开网页: 这种方式允许浏览器以最少的请求来获取网页的数据, 浏览器会对所有没有过期的内容直接使用本地缓存, 所以, Expires 标记只对这种方式有效。

我的问题

- 可以针对 HTTP 应用伪造 IP 么？
- POST 请求真的安全么？
- HTTP/1.1 有哪些弊端？如何优化？

你的问题

谢谢聆听

进阶

- 熟练掌握 HTTP 中常见的请求/响应头；
- 了解 HTTP/1.0 与 HTTP/1.1 的区别；
- 编写一个 HTTP Client，如下载器；
- 学习 SPDY (HTTP/2.0) ；

推荐书籍

