The HTTP Protocol

- HTTP
-

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HTTP

Client

http://host:port/path?query

URI

An HTTP request from a client to a server is simply sent using TCP

```
GET   /index.html   HTTP/1.1
Host: www.example.com
User-Agent:
Accept:
Accept-Language:
Accept-Encoding:
Accept-Charset:
Keep-Alive:
Connection:
Referer:
```

HTTP Req **Header**

HTTP Req

HTTP Rsp

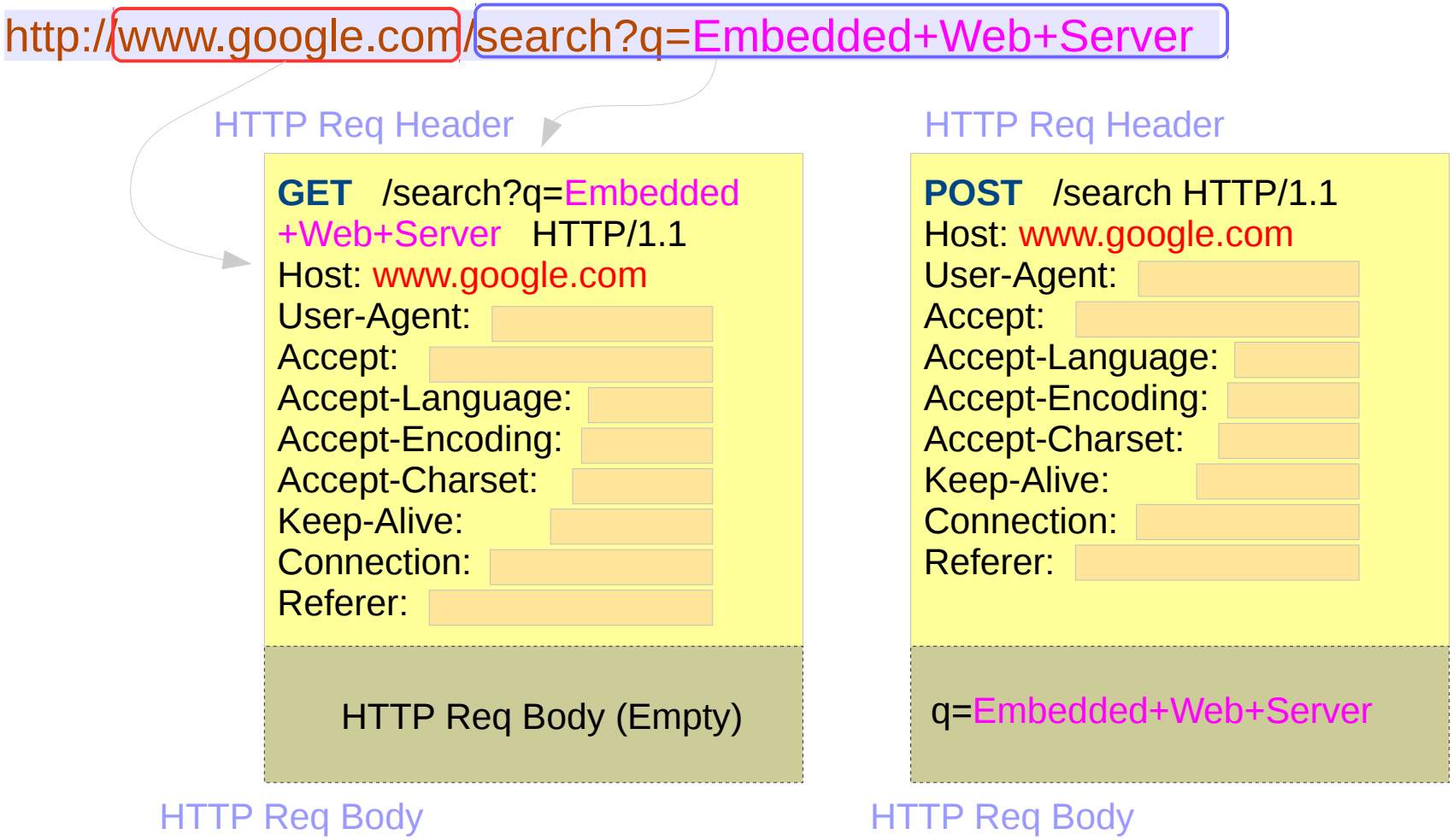
Server

HTML

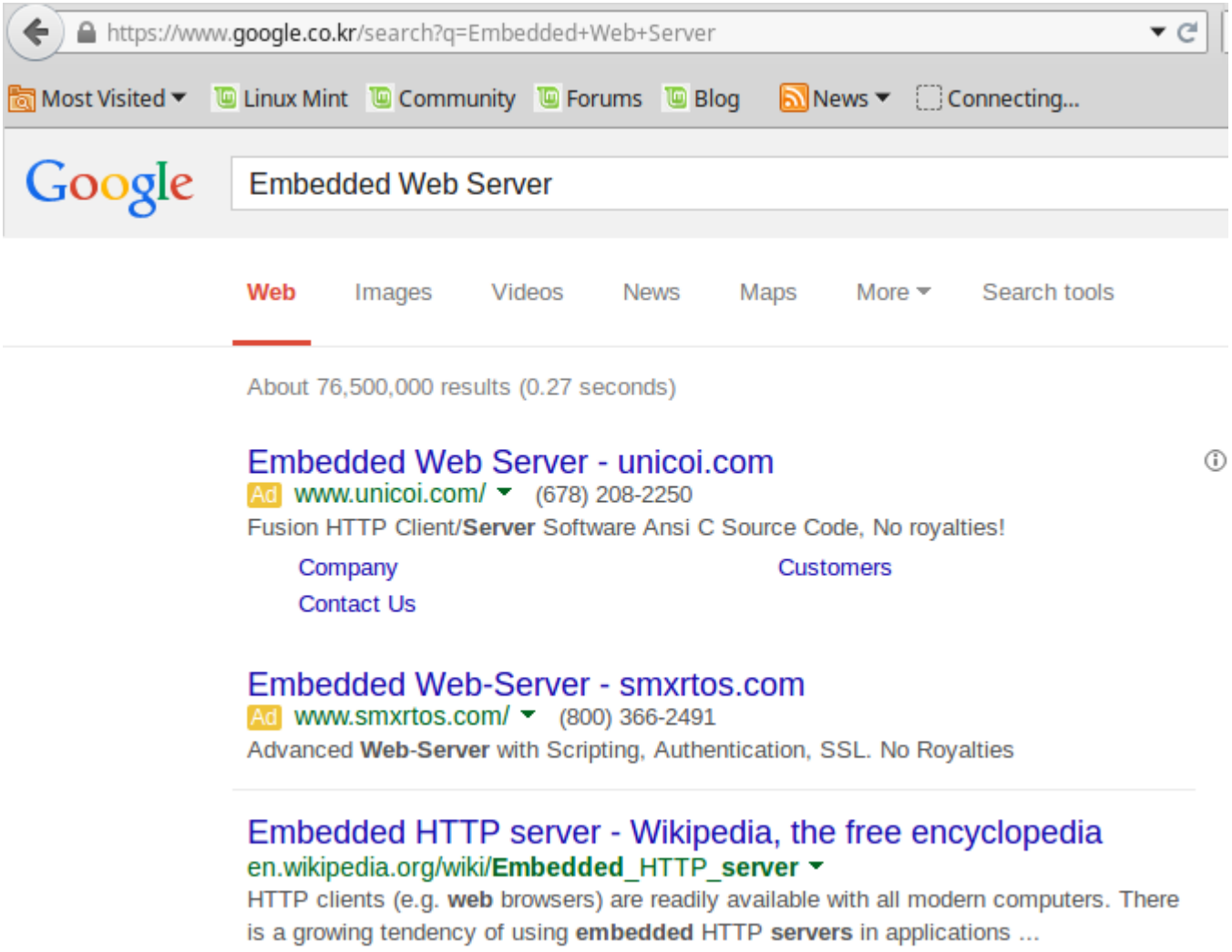
HTTP Rsp **Header**

```
HTTP/1.1 200 OK
Date:
Server:
Last-Modified:
Etag:
Accept-Ranges:
Content-Length:
Connection:
Content-Type:
```

From URI to HTTP Req



HTTP Rsp Result Display



http://www.google.com/search?q=Embedded+Web+Server

HTTP Rsp

HTTP Rsp Header

HTTP/1.1 200 OK
Date:
Server:
Last-Modified:
Etag:
Accept-Ranges:
Content-Length:
Connection:
Content-Type:

HTTP Rsp Body
(HTML contents)

HTTP Rsp Body

```
<!DOCTYPE html>
<html itemscope="" itemtype="http://schema.org/SearchResultsPage"
lang="en-KR"><head>
<meta http-equiv="content-type" content="text/html;
charset=UTF-8"><meta content="/images/google_favicon_128.png"
itemprop="image"><title>Embedded Web Server - Google Search</title>
<script>(function(){window.google=
{kEI:'HY_uVNHYMMa7mgWR4oLYCg',kEXPI:'3700279,3700362,4011550,4011552,401
{en:0,bv:20,pm:'i',u:'c9c918f0',qbp:0,rre:false},kSID:'HY_uVNHYMMa7mgWR4
KR';})();(function(){google.lc=[];google.li=0;google.getEI=function(a)
{for(var b;a&&(!a.getAttribute||!(b=a.getAttribute
("eid")));)a=a.parentNode;return b||google.kEI};google.getLEI=function
(a){for(var b=null;a&&(!a.getAttribute||!(b=a.getAttribute
("leid")));)a=a.parentNode;return b};google.https=function()
{return"https:"==window.location.protocol};google.ml=function()
{};google.time=function(){return(new Date).getTime
()};google.log=function(a,b,e,f,l){var d=new
Image,h=google.lc,g=google.li,c="",m=google.ls||"";d.onerror=d.onload=d.
(){delete h[g]};h[g]=d;if(!e&&-1==b.search("&ei=")){var k=google.getEI
(f),c="&ei="+k;-1==b.search("&lei=")&&((f=google.getLEI(f))?c
+="&lei="+f:k!=google.kEI&&(c+="&lei="+google.kEI))}
a=e||"/"+(l||"gen_204")+"?atyp=i&ct="+a+"&cad="+b+c+m
+"&zx="+google.time();/^http:/i.test(a)&&google.https()?(google.ml
(Error("a"),!1,{src:a,glmm:1}),delete h[g]):(d.src=a,google.li=g
```

HTTP Request

http://host:port/path?query

GET /index.html HTTP/1.1
Host: www.example.com

GET method

field: value

field:

Host:
User-Agent:
Refer:

Accept:
Accept-Language:
Accept-Encoding:
Accept-Charset:

Response (1)

Status codes

HTTP/1.1 200 OK
Date: Mon, 23 May 2005 22:38:34 GMT
Server: Apache/1.3.3.7 (Unix) (Red-Hat/Linux)
Last-Modified: Wed, 08 Jan 2003 23:11:55 GMT
ETag: "3f80f-1b6-3e1cb03b"
Accept-Ranges: none
Content-Length: 438
Connection: close
Content-Type: text/html; charset=UTF-8

1xx: Informational
2xx: Success
3xx: Redirection
4xx: Client Error
5xx: Service Error

1xx: Informational
2xx: Success
- 200 OK:
- 206 Partial Content:

3xx: Redirection
- 301 Moved Permanently
- 304 Not Modified:
- 307 Temporary Redirect

4xx: Client Error
- 400 Bad Request
- 401 Unauthroized
- 404 Not Found
- 406 Not Acceptable
- 415 Unsupported Media Type

5xx: Service Error
- 500 Internal Server Error
- 501 Not Implemented
- 503 Service Unavailable

Response (2)

Field: value

```
HTTP/1.1 200 OK
Date: Mon, 23 May 2005 22:38:34 GMT
Server: Apache/1.3.3.7 (Unix) (Red-Hat/Linux)
Last-Modified: Wed, 08 Jan 2003 23:11:55 GMT
ETag: "3f80f-1b6-3e1cb03b"
Accept-Ranges:  none
Content-Length: 438
Connection: close
Content-Type: text/html; charset=UTF-8
```

Date:
Server:
Etag:
Content-Length:
Content-Type:
Content-Encoding:
Location:

HTML Forms

Form Handling
Client side languages: Javascript
Server side languages: PHP, JSP

form.html

```
<html>
<body>
 <form action="form_handler.php" method="GET">
   User Name: <input name="user" type="text" />
   <input type="submit" />
 </form>
</body>
</html>
```

form_handler.php

```
<html>
<body>
<?php
 // This will print whatever the user put
 $name = $_GET['user'];
 echo "Hello, ". $name ."!";
?>
</body>
</html>
```

HTTP Request Methods

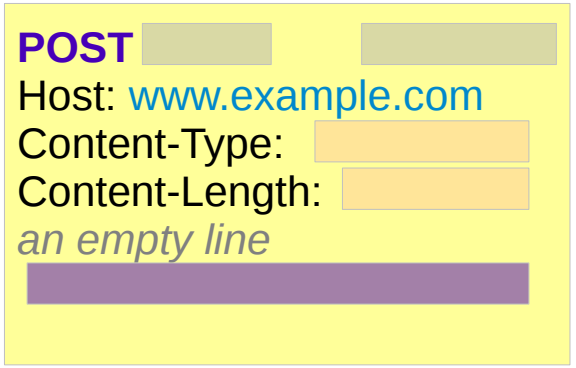
Form Handling
Client side languages: Javascript
Server side languages: PHP, JSP

GET Method

Requests a representation of the specified resource.
Requests using GET should only retrieve data and should have no other effect.
Query string is in the URI

POST Method

The POST request method is designed to request that a web server accepts the data enclosed in the request message's body for storage.
Query string will be placed in the body of the HTTP request



URL Encoding

key value pairs

Name: Jonathan Doe
Age: 23
Formula: a + b == 13%!

application/x-www-form-urlencoded

Name=Jonathan+Doe&Age=23&Formula=a+%2B+b+%3D%3D+13%25%21

GET Method

http://host:port/path?Name=Jonathan+Doe**&**Age=23**&**Formula**=**a+%2B+b+%3D%3D+13%25%21

GET Method

GET /path?Name=Jonathan+Doe**&**Age=23**&**Formula**=**a+%2B+b+%3D%3D+13%25%21 **HTTP/1.1**

the HTTP GET request method is designed to retrieve information from the server.
As part of a GET request, some data can be passed within the URI's query string, specifying for example search terms, date ranges, or other information that defines the query.

GET
Host: www.example.com

POST Method

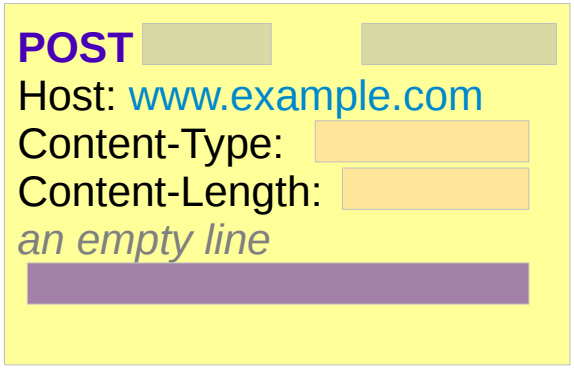
http://host:port/path?Name=Jonathan+Doe**&**Age=23**&**Formula**=**a+%2B+b+%3D%3D+13%25%21

POST Method

POST /path HTTP/1.1
HOST: ...
Content-Type: application/X-www-form-urlencoded
Content-Length: ...
Empty line

Name=Jonathan+Doe&Age=23&Formula=a+%2B+b+%3D%3D+13%25%21

The POST request method is designed
to request that a web server accept the data enclosed
in the request message's body for storage.
It is often used when uploading a file or submitting a
completed web form.



Authentication

IP-address-based
Form-based
HTTP Basic
HTTP Digest

Sessions

Hidden Form Fields
Cookies

SSL and TLS

Secure Sockets Layer (SSL)
Transport Layer Security (TLS)

Client and Server

HTTP architectures

Proxy

Gateway

Tunnel

Tunnel

Intermediate Nodes

A chain of intermediate systems

Gnuplot and Canvas

In **Gnuplot**,

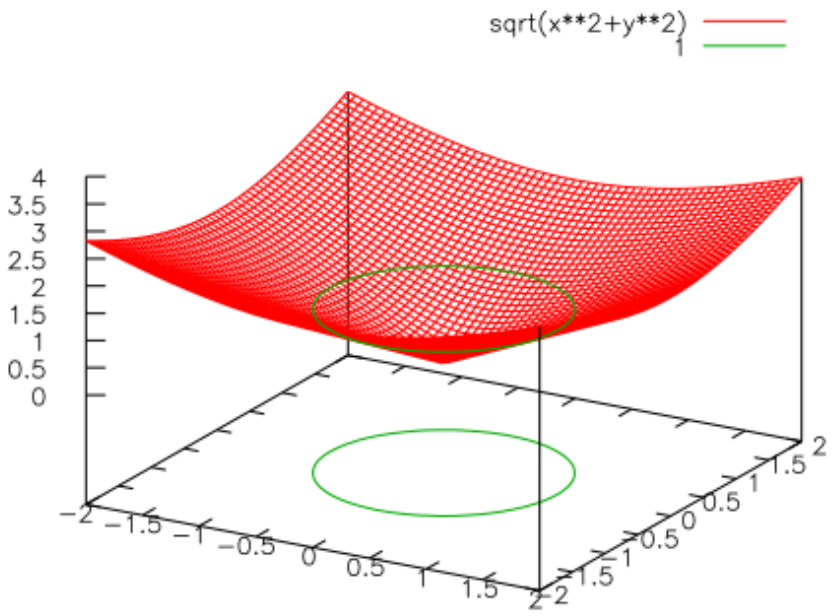
file:///home/young/myplot.html

```
set terminal 'canvas'
set output 'myplot.html'

set view 60, 30, 0.85, 1.1
set samples 60, 60
set isosamples 61, 61

set contour both
set cntrparam levels discrete
1, 4

set xrange [-2: 2]
set yrange [-2: 2]
set zrange [0: 4]
splot sqrt(x**2+y**2)
```



Reference

References

[1] http://en.wikipedia.org/
[2] http://www.w3schools.com/
[3] K.H. Koh, HTML, CSS, Javascript (in Korean)
[4] Gnuplot manual