Course:
PHP from scratch

by Sergey Podgornyy

Introduction and basics of networking

WEB ACADEMY
PROGRAMMING COURSES

About me

Sergey Podgornyy

Full-Stack Web Developer

WebbyLab

and

ignite
software outsourcing

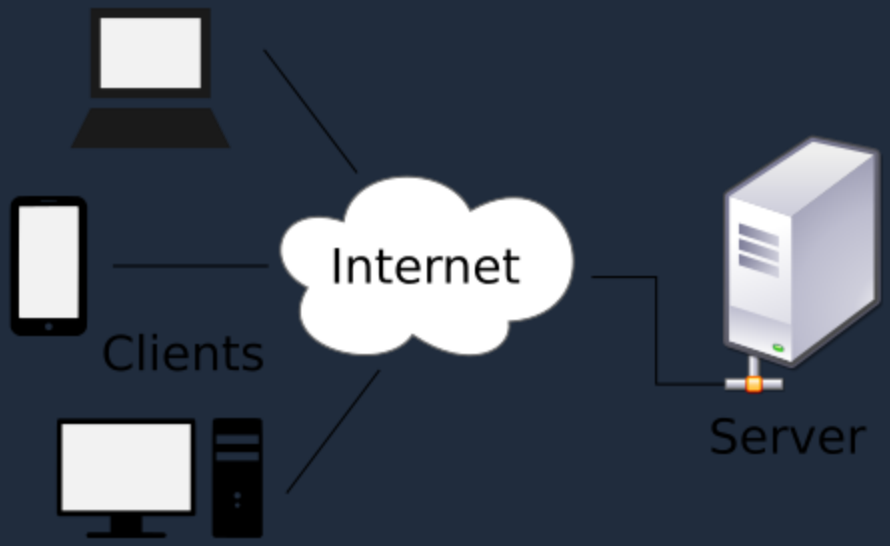
zend CERTIFIED PHP ENGINEER

Linux Professional Institute LPIC-1

Agenda

1. Internet, network basics. How web browsers work?
2. Client-Server Architecture. Local and remote servers
3. DNS, IP, ports and Sockets
4. Hostings
5. Useful utilities: `ipconfig`, `ping`, `tracert`, `netstat`
6. HTTP basics. Headers, methods, responses. Most common response statuses
7. What do we need for work?

Client–Server model



The *Client-Server* characteristic describes the relationship of cooperating programs in an application. The server component provides a function or service to one or many clients, which initiate requests for such services

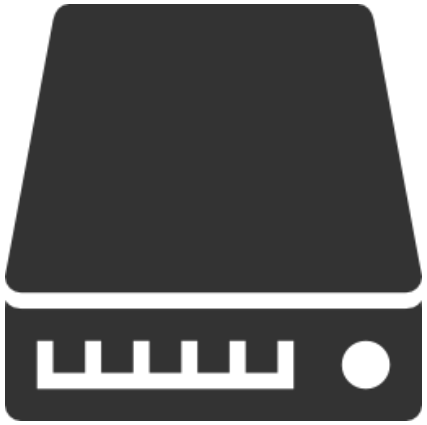
OSI model

SOFTWARE	LAYER 7	Application	Highlevel APIs, HTTP, FTP, SMTP
	LAYER 6	Presentation	Encryption / decryption compression Context for communication between layers
	LAYER 5	Session	Controls dialogue between computers Controls termination and restarts
	LAYER 4	Transport	Enables transfer of data TCP/UDP End to end connections
	LAYER 3	Network	Connects hosts on different networks IPV4 + IPV6 Routing of data packets
HARDWARE	LAYER 2	Data Link	Provides connections between hosts on the same network (Ethernet MAC addresses)
	LAYER 1	Physical	Electrical + physical specifications for devices Cables + Connectors Data in bits (1's and 0's)

MAIDSAFE COMPLIMENTS

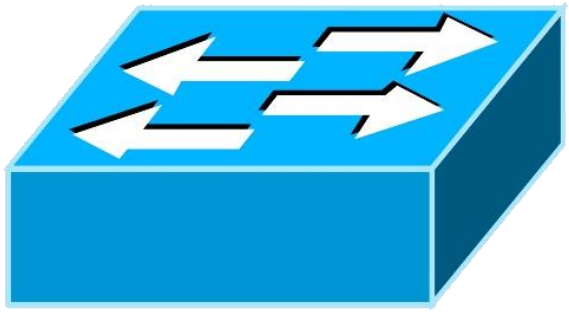
Low Level of OSI model

Hub



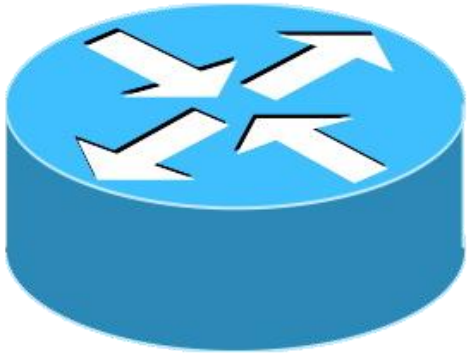
physical layer

Switcher



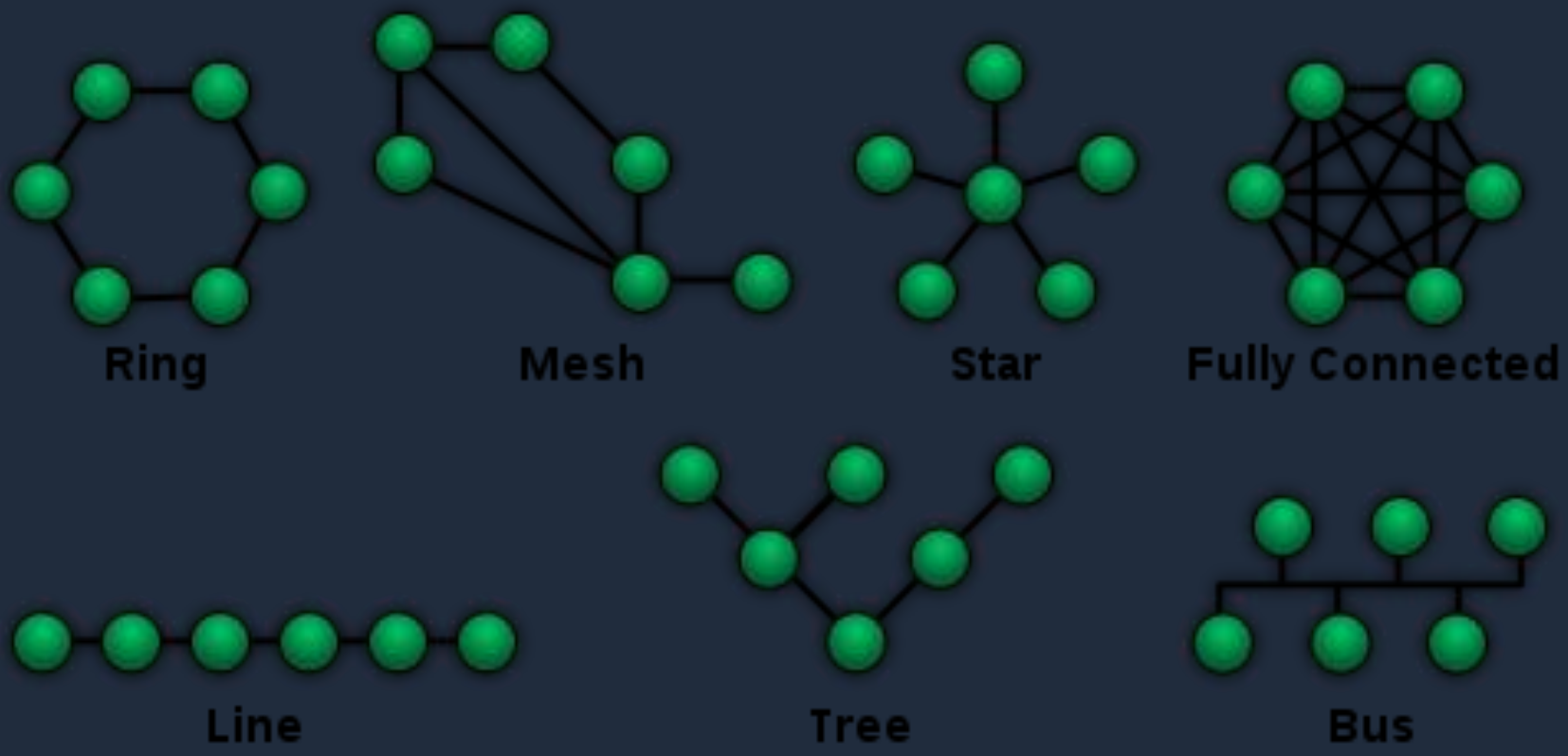
data link layer

Router

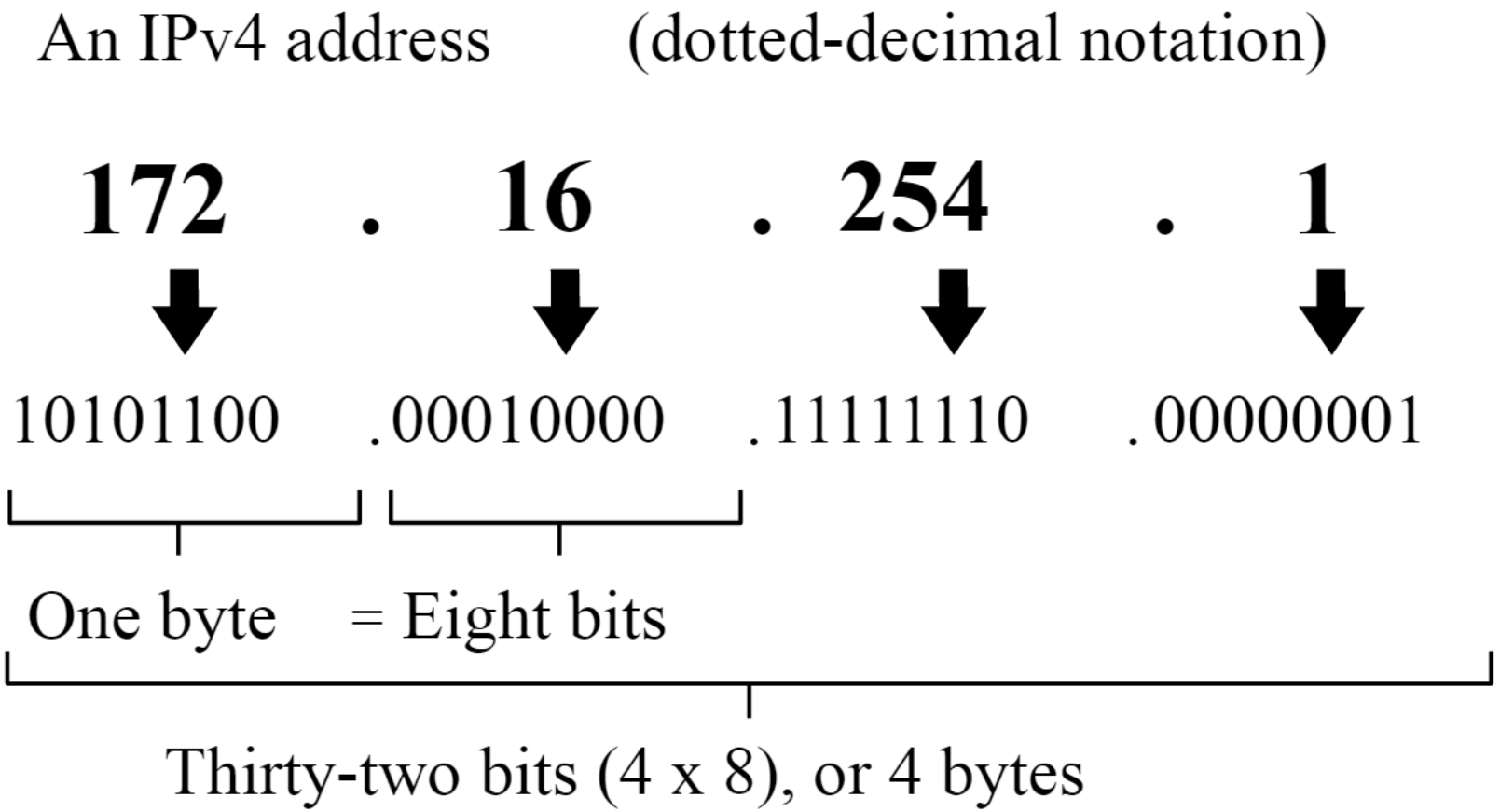


network layer

Network topologies



IP (IPv4)


An IPv4 address (dotted-decimal notation)
172 . 16 . 254 . 1
10101100 .00010000 .11111110 .00000001
One byte = Eight bits
Thirty-two bits (4 x 8), or 4 bytes

Subnet mask

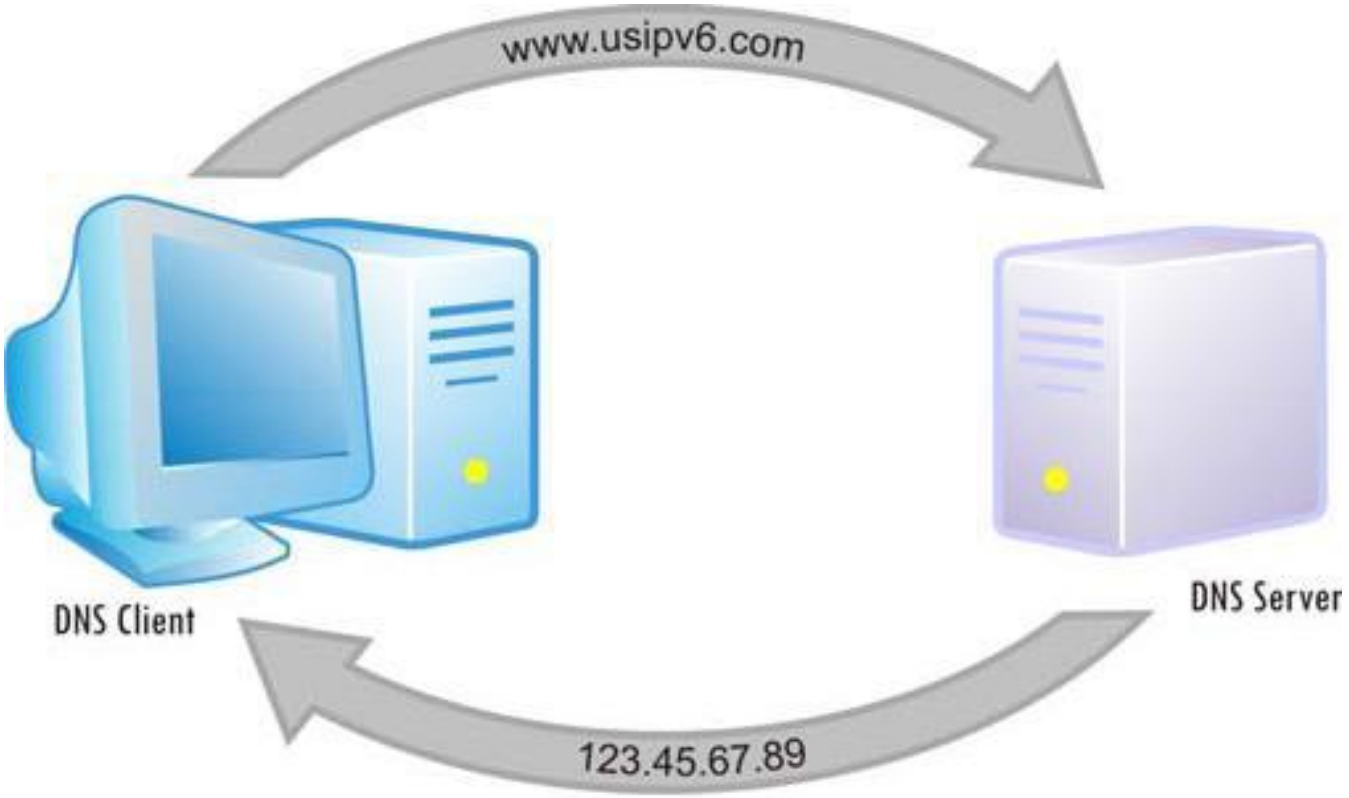
```
IP address          11000000 10101000 00000001 00000010  (192.168.1.2)
Subnet mask         11111111 11111111 11111110 00000000  (255.255.254.0)
Network address     11000000 10101000 00000000 00000000  (192.168.0.0)
```

Private network

RFC1918 name	IP address range	number of addresses	largest CIDR block (subnet mask)	host id size	mask bits
24-bit block	10.0.0.0 - 10.255.255.255	16,777,216	10.0.0.0/8 (255.0.0.0)	24 bits	8 bits
20-bit block	172.16.0.0 - 172.31.255.255	1,048,576	172.16.0.0/12 (255.240.0.0)	20 bits	12 bits
16-bit block	192.168.0.0 - 192.168.255.255	65,536	192.168.0.0/16 (255.255.0.0)	16 bits	16 bits

DNS

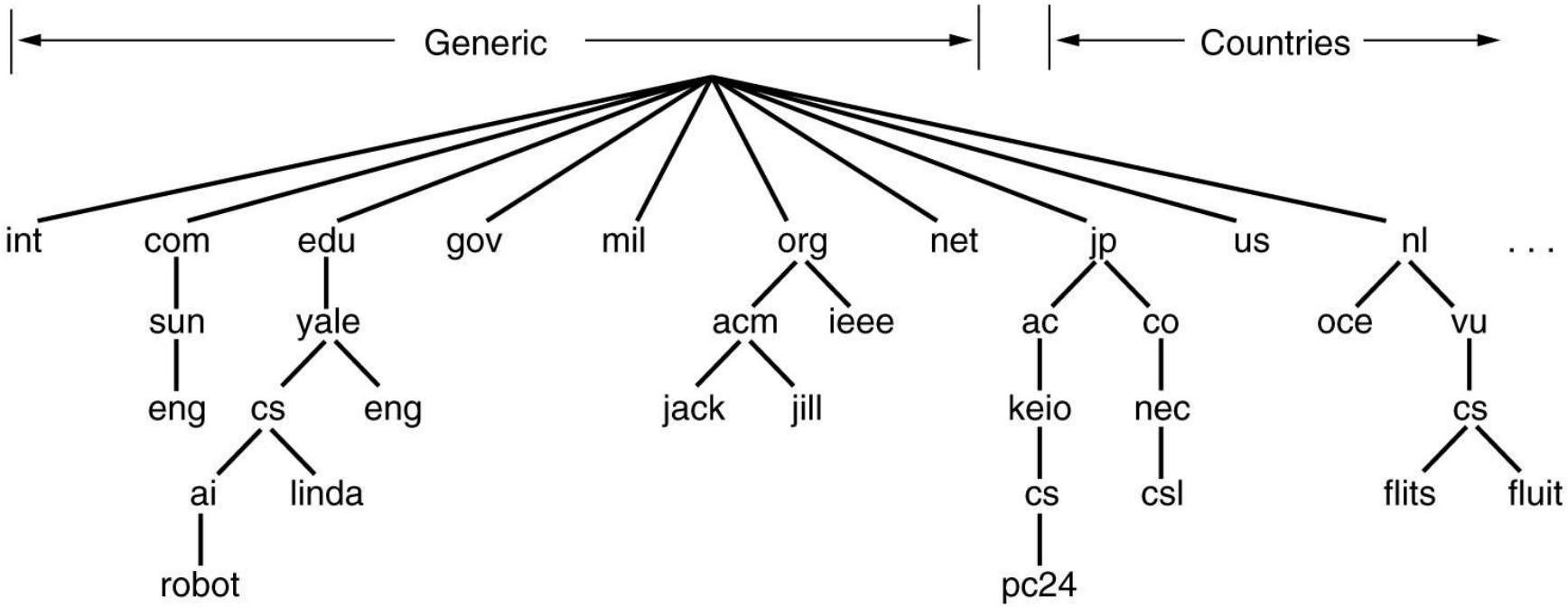
Domain Name System



Protocols

- **HTTP** – Hyper Text Transfer Protocol
- **TCP** - Transmission Control Protocol
- **UDP** - User Datagram Protocol
- **IP** - Internet Protocol

Domains


Generic
Countries
int
com
edu
gov
mil
org
net
jp
us
nl
. . .
sun
yale
acm
ieee
ac
co
oce
vu
eng
cs
eng
jack
jill
keio
nec
cs
ai
linda
cs
csl
flits
fluit
robot
pc24

Host & Hosting

HostGator

HETZNER ONLINE

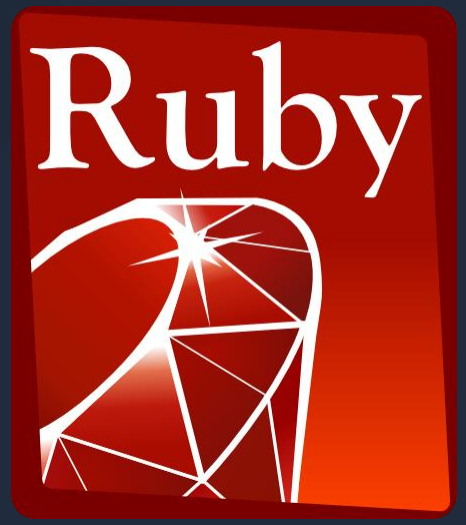
amazon web services™

DigitalOcean

Web Server

A web server is a computer system that processes requests via **HTTP**, the basic **network protocol** used to distribute information on the **World Wide Web**

Server-Side languages



python

Utilities

- **`ipconfig`**

console application that displays all current TCP/IP network configuration values

- **`ping`**

utility used to test the reachability of a host on an Internet Protocol (IP) network

- **`tracert (traceroute)`**

tool for displaying the route (path) and measuring transit delays of packets across an Internet Protocol (IP) network

- **`netstat`**

network utility tool that displays network connections for the TCP, routing tables, and a number of network interface and network protocol statistics

HTTP Request

Every HTTP Request consist:

- Request string with method and HTTP version specified
- Request Headers
- An empty line
- Request Body

<Method> <URI> HTTP / <version>

GET http://example.com/index.html HTTP/1.1

Request methods

HTTP defines methods to indicate the desired action to be performed on the identified resource

- **GET**
- **HEAD**
- **POST**
- **PUT**
- **DELETE**
- **TRACE**
- **OPTIONS**
- **CONNECT**
- **PATCH**

Request

```
GET /wiki/HTTP HTTP/1.1
Host: uk.wikipedia.org
User-Agent: firefox/5.0 (Linux; Debian 5.0.8;
en-US; rv:1.8.1.7) Gecko/20070914
Firefox/2.0.0.7
Connection: close

Request body
```

Response statuses

- **1xx** Informational
- **2xx** Success
- **3xx** Redirection
- **4xx** Client Error
- **5xx** Server Error

Most popular statuses

- 200 OK
- 301 Moved Permanently
- 400 Bad Request
- 401 Unauthorized
- 403 Forbidden
- 404 Not Found
- 405 Method Not Allowed
- 408 Request Timeout
- 500 Internal Server Error
- 502 Bad Gateway
- 504 Gateway Timeout

HTTP Response

The response message consists of the following:

- A status line which includes the status code and reason message
- Response header fields
- An empty line
- An optional message body

Most common Response fields

- **Server** - A name for the server

```
Server: Apache/2.4.1 (Unix)
```

- **Last-Modified** - The last modified date for the requested object

```
Last-Modified: Tue, 15 Nov 1994 12:45:26 GMT
```

- **Content-Length** - The length of the response body in octets

```
Content-Length: 348
```

- **Content-Type** - The MIME type of this content

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

- **Date** - The date and time that the message was sent

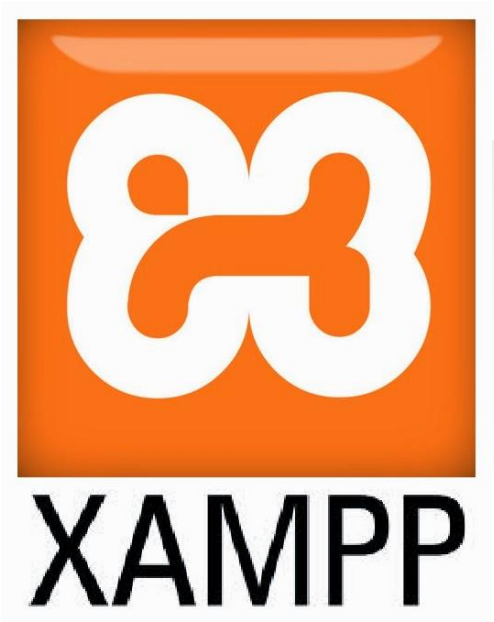
```
Date: Tue, 15 Nov 1994 08:12:31 GMT
```

Start built-in server

```
php -S  localhost:8000 [ -t public/ ]
```

IDE vs text editor

Development environment



Highly not recommended

Useful resources

- Network basics (RU)
- OSI model
- Hypertext Transfer Protocol
- List of HTTP status codes
- HTTP Request and Response Headers

Thanks for your attention

Q & A