

The Internet



TCP/IP

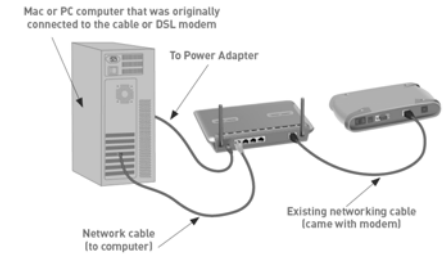


Image from <http://www.belkin.com/support/download/files/F507231-4.pdf>.

HTTP



Image from <http://computer.howstuffworks.com/web-server1.htm>.

Domain Names



Top-Level Domains (TLDs)

- :: .biz
- :: .com
- :: .edu
- :: .gov
- :: .info
- :: .int
- :: .mil
- :: .name
- :: .net
- :: .org
- :: .aero
- :: .asia
- :: .cat
- :: .coop
- :: .jobs
- :: .mobi
- :: .museum
- :: .pro
- :: .tel
- :: .travel
- :: .us
- :: ...

DNS Records

- :: A
- :: CNAME
- :: MX
- :: NS
- :: ...

Image from <http://computer.howstuffworks.com/web-server1.htm>.

DNS Records

| Name | Type | Value | Select |
|-----------------|-------|--------------------------------------|--------------------------|
| mail | A | 64.131.79.130 | <input type="checkbox"/> |
| malanrouge.com. | A | 64.131.79.130 | <input type="checkbox"/> |
| www | A | 64.131.79.130 | <input type="checkbox"/> |
| malanrouge.com. | NS | ns1.cs75.net. | <input type="checkbox"/> |
| malanrouge.com. | NS | ns2.cs75.net. | <input type="checkbox"/> |
| mail | MX | 10 | <input type="checkbox"/> |
| supernews | CNAME | cnm.com. | <input type="checkbox"/> |
| malanrouge.com. | TXT | "v=spf1 a mx ip4:64.131.79.130 ?all" | <input type="checkbox"/> |

Image from <http://computer.howstuffworks.com/web-server1.htm>.

DNS Records

```

STTL 14400
@ IN SOA ns1.cs75.net. root.malanrouge.com. (
    2008020202
    14400
    3600
    1209600
    86400 )

malanrouge.com. 14400 IN NS ns1.cs75.net.
malanrouge.com. 14400 IN NS ns2.cs75.net.

mail 14400 IN A 64.131.79.130
malanrouge.com. 14400 IN A 64.131.79.130
www 14400 IN A 64.131.79.130

malanrouge.com. 14400 IN MX 10 mail

supernews 14400 IN CNAME cnm.com.

malanrouge.com. 14400 IN TXT "v=spf1 a mx ip4:64.131.79.130 ?all"
    
```

Image from <http://computer.howstuffworks.com/web-server1.htm>.

DNS Lookups

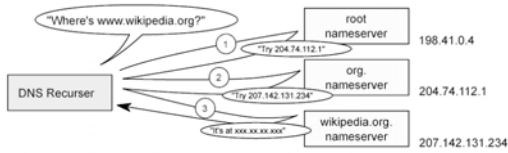


Image from <http://computer.howstuffworks.com/web-server1.htm>

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Web Hosting



...



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Web Panels



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XHTML

```
<!DOCTYPE html
PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>hello, world</title>
</head>
<body>
hello, world
</body>
</html>
```

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XHTML

```
<element
attribute="value"></ele
ment>
```

```
<element
attribute="value" />
```

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chmod

- :: PHP files
- :: 600
- :: Directories
- :: 711 (to access contents)
- :: 755 (to see contents)
- :: Everything Else (XHTML, CSS, GIF, JS, JPEG, ...)
- :: 644

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CSS

```
<!DOCTYPE html
PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<style type="text/css">
<!--

-->
</style>
<title>hello, world</title>
</head>
<body>
hello, world
</body>
</html>
```

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CSS

```
element
{
property: value;
property: value;
}

#id
{
property: value;
property: value;
}

.class
{
property: value;
property: value;
}
```

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CSS

```
<!DOCTYPE html
PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<link href="styles.css" rel="stylesheet" type="text/css" />
<title>hello, world</title>
</head>
<body>
hello, world
</body>
</html>
```

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Cross-Browser Issues

- :: Chrome
- :: Firefox
- :: Internet Explorer
- :: Opera
- :: Safari
- :: ...

<http://browsershots.org/>

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Validation

<http://validator.w3.org/>



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Forms



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Forms

```
:: Text Fields
<input name="email" type="text" />
:: Text Areas
<textarea name="comments" rows="24" cols="80"></textarea>
:: Password Fields
<input name="password" type="password" />
:: Checkboxes
<input name="save" type="checkbox" />
:: Radio Buttons
<input name="gender" type="radio" value="F" />
<input name="gender" type="radio" value="M" />
:: Drop-Down Menus
<select name="dorm">
  <option value=""></option>
  <option value="Matthews"></option>
  <option value="Weld"></option>
</select>
```

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PHP

<http://us3.php.net/manual/en/>



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Variables

```
:: boolean
:: integer
:: float
:: string

:: array
:: object

:: resource
:: NULL

:: mixed
:: number
:: callback
```

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Superglobals

```
:: $_COOKIE
:: $_ENV
:: $_FILES
:: $_GET
:: $_POST
:: $_REQUEST
:: $_SERVER
:: $_SESSION
```

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Arrays

<http://us2.php.net/array>

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Loops

```
:: for
:: while
:: do ... while
:: foreach
```

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Regular Expressions

<http://us3.php.net/pcr>

| Regular Expression | Will match... |
|---------------------|---|
| foo | The string "foo" |
| ^foo | "foo" at the start of a string |
| foo\$ | "foo" at the end of a string |
| ^foo\$ | "foo" when it is alone on a string |
| [abc] | a, b, or c |
| [a-z] | Any lowercase letter |
| [^A-Z] | Any character that is not an uppercase letter |
| (p j q) | Matches either "p" or "j" or "q" |
| [a-z]+ | One or more lowercase letters |
| [0-9\.-] | Any number, dot, or minus sign |
| ^[a-zA-Z0-9_]{1,}\$ | Any word of at least one letter, number or _ |
| ([wz]{1,2}) | wy, wz, xy, or xz |
| [^a-zA-z0-9] | Any symbol (not a number or a letter) |
| ([A-Z]{3}){0-9}{4} | Matches three letters or four numbers |

Table adapted from http://www.webcheatsheet.com/php/regular_expressions.php

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Language Reference

<http://us2.php.net/manual/en/langref.php>

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Mispellings

```
$dictionary[$word] = 1;
```

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Cookies



Image from sgc.ca

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Sessions



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SQL

```
:: CREATE TABLE  
:: DROP TABLE  
:: ...
```

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MySQL Types

```
:: CHAR  
:: VARCHAR  
:: TEXT  
:: TINYTEXT  
:: MEDIUMTEXT  
:: LONGTEXT  
  
:: DATE  
:: DATETIME  
:: YEAR  
:: TIME  
:: TIMESTAMP  
  
:: TINYINT  
:: SMALLINT  
:: MEDIUMINT  
:: INT  
:: BIGINT  
  
:: FLOAT  
:: DOUBLE  
:: DECIMAL  
  
:: TINYBLOB  
:: BLOB  
:: MEDIUMBLOB  
:: LONGBLOB  
  
:: BINARY  
:: VARBINARY  
:: ENUM  
:: SET
```

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Indexes, Constraints

```
:: PRIMARY KEY  
:: INDEX  
:: UNIQUE  
:: FULLTEXT
```

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SQL

```
:: SELECT  
:: INSERT  
:: UPDATE  
:: DELETE  
:: ...
```

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MySQL Functions

<http://dev.mysql.com/doc/refman/5.0/en/functions.html>

```

:: AES_ENCRYPT(key,key_str)

:: DATE_FORMAT(date,format)
    http://dev.mysql.com/doc/refman/5.0/en/date-and-time-functions.html#function_date-format

:: TIME_FORMAT(time,format)
    http://dev.mysql.com/doc/refman/5.0/en/date-and-time-functions.html#function_time-format

:: ...
    
```

JOIN

Employees:

| Employee_ID | Name |
|-------------|-------------------|
| 01 | Hansen, Ola |
| 02 | Svendson, Torv |
| 03 | Svendson, Stephen |
| 04 | Pedersen, Kim |

Orders:

| Prod_ID | Product | Employee_ID |
|---------|---------|-------------|
| 234 | Printer | 01 |
| 457 | Table | 03 |
| 865 | Chair | 03 |

```

SELECT Employees.Name, Orders.Product
FROM Employees, Orders
WHERE Employees.Employee_ID=Orders.Employee_ID
    
```

JOIN

Employees:

| Employee_ID | Name |
|-------------|-------------------|
| 01 | Hansen, Ola |
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```

| Name | Product |
|-------------------|---------|
| Hansen, Ola | Printer |
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JOIN

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```

SELECT Employees.Name, Orders.Product
FROM Employees
JOIN Orders ON Employees.Employee_ID=Orders.Employee_ID
    
```

| Name | Product |
|-------------------|---------|
| Hansen, Ola | Printer |
| Svendson, Stephen | Table |
| Svendson, Stephen | Chair |

Race Conditions



Atomic Queries

```

INSERT INTO table (a,b,c) VALUES (1,2,3)
ON DUPLICATE KEY UPDATE c=c+1;

UPDATE table SET c=c+1 WHERE a=1;
    
```

Transactions (InnoDB)

```

START TRANSACTION;
UPDATE account SET balance = balance - 1000 WHERE number = 2;
UPDATE account SET balance = balance + 1000 WHERE number = 1;
COMMIT;
    
```

Transactions (InnoDB)

```

START TRANSACTION;
UPDATE account SET balance = balance - 1000 WHERE number = 2;
UPDATE account SET balance = balance + 1000 WHERE number = 1;
SELECT balance FROM account WHERE number = 2;
# select tells us that account #2 has a negative balance!
# we'd better abort
ROLLBACK;
    
```

Transactions (InnoDB)

- 1) Log In
- 2) Register
- 3) Get Quotes
- 4) Sell Stocks
- 5) Buy Stocks
- 6) History
- 7) ...

C\$50 Finance

- 1) Log In
- 2) Register
- 3) Get Quotes
- 4) Sell Stocks
- 5) Buy Stocks
- 6) History
- 7) ...

Image from dev.mysql.com.

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CSV



Image from finance.yahoo.com.

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“RTFM”

- :: **PHP Manual**
<http://us.php.net/manual/en/>
- :: **MySQL 5.0 Reference Manual**
<http://dev.mysql.com/doc/refman/5.0/en/>

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Recommended Reading

- :: **TCP/IP Tutorial**
<http://www.w3schools.com/tcpip/>
- :: **How Web Servers Work**
<http://computer.howstuffworks.com/web-server.htm>
- :: **XHTML Tutorial**
<http://www.w3schools.com/xhtml/>
- :: **CSS Tutorial**
<http://www.w3schools.com/css/>
- :: **PHP Tutorial**
<http://www.w3schools.com/php/>
- :: **SQL Tutorial**
<http://www.w3schools.com/sql/>

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Good Luck!



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Computer Science 50 Introduction to Computer Science I

Harvard College

Week 8

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