

Web Design Principles

Author : Chamodi Indrejith

Web design principles

The rules that a designer must follow to create an effective and attractive composition.

Basic Elements of Web Design

1. Content
2. Usability
3. Aesthetics
4. Visibility
5. Interaction

Content

- For Search Engine Optimization(SEO), content plays a huge role.
- Is one of the main reason why people visit your website.
- Include - videos, relevant news/information, high-resolution images.

Usability

- Must be easily navigable, intuitive, accessible and mobile friendly.
- Should be able to access any page that they need.
- Should fulfil visitor's needs.

Aesthetics

- Visually impressive website across all devices.
- Maintain your brand image.
- Visually connect with the audience.

Visibility

- Easy to be found, what platforms to target and how to utilize the content.

Interaction

- Must engage with your audience.
- Hold visitors attention.
- Direct them through stages and finally encourage them to contact you.
- Ensures that it engage with the visitors in a correct way.

Web Design Characteristics

► Core purposes of websites

- Describing Expertise
- Building Your Reputation
- Generating Leads
- Sales and After Care

► Simplicity

Best way to go when considering the user experience and usability.

Ways to Achieve

- Color
- Type
- Imagery

► Grid Based Layout

- Help to structure your design and keep your content organized.
- Arrange the content into a clean rigid grid structure with columns.

► Load Time

- Waiting will lose visitors.
- Half of the web visitors expect a site to load in 2 seconds or less.

► Mobile Friendly

Build website with a responsive layout where it can adjust to different screens.

Anatomy of Webpage

- The Header
- The Menu
- The Content Area
- The Sidebar
- The Footer

Header

- At the top of the page.
- Include name, tagline, logo

Menu

- Like a word map
- Can use drop downs

Content

- The body.
- Include content, video, audio or images

Sidebar

- Column that runs along the right or left side of the page.
- Contain items to display on every page.
- Advertising, Extra navigation, subscription form is displayed commonly.

Footer

- Footer at the bottom.
- Contain items to display on every page.
- Good place to display Contact Information.

Page Title

Only web page element within the head section of the web page the visitor will see.

The Feature Image

Image that you see at the top of a webpage.

The Slider

Used to display pictures like a slide show where the images slide from right to left or left to right

WWW+URL+DNS

World Wide Web

- Information space.
- Identified by URIs.
- Accessed via internet.
- Hypertext documents are called web pages.
- Webpages links, images, videos and software components that are rendered to users.
- Embedded hyperlinks permit users to navigate between web pages.
- Web site - Multiple web pages which are under common theme within a common domain name.
- Tim Berners-Lee invented WWW.

Evolution of the Web

Web 1.0 - Read Only

- No post reviews, comments and feedback.

Era of Static Web Pages.

Web 2.0 - Read and Write Only

- Allows to interact more freely with each other.
- Encourages participation, collaboration, and information sharing.
- YT, FB, Wiki

Web 3.0 - Semantic Web

- Open, Intelligent with semantic web technologies, distributed
- data sources, natural language processing, machine learning.
- Technologies – RDF, XML, URI, API

Web 4.0 - Semantic Web

- Intelligent learning
- Self-learning
- Self-organizing

Web 5.0

- Emotionally connection web between humans and computers.

Web Browser

- Application used to access and view websites.
- Communicates with web servers using HTTP.
- Have the ability to display other protocols
 - HTTPS
 - FTP
 - mailto:
 - file:
- Examples
 - Internet Explorer, Google Chrome, Opera

Uniform Resource Locator(URL)

scheme://host:port/path?query-string#fragment-id

URL Elements

- Scheme name (<http://>, <https://>, <ftp://>, and <mailto://>)
- Host name (www.facebook.com)
- Port Number (HTTP - port 80, HTTPS - port 443)
- Path (<http://www.ce.pdn.ac.lk/research/embedded-systems/>)
- Query String
- Fragment identifier

Domain Name System

“**DOMAIN NAME SYSTEM** is a collection of the databases that contain information about domain names and their corresponding IP address.”

Purpose

- Used to locate objects.
- DNS provides a mapping from names to resources of several types.

www.example.com

Host name Domain name

Domain Name

- Way to identify and locate computers connected to internet.
- Consists of two or more components separated by dots.
- Subdomains can be created within the domain.

Domain Delegation

Gives an organization authority for a domain.

Organization's Network Administrator

- Have the authority for a domain.
- Responsible for maintaining the DNS database and hostname and addresses.

Zone

- A group of domains and subdomains for which an organization has authority.
- All host information for a zone is maintained in a single, authoritative database.

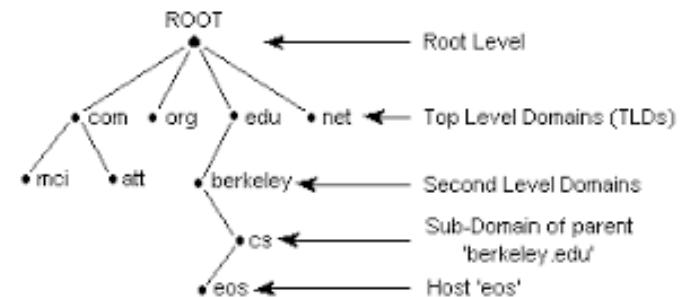
DNS Hierarchy

Also called as Domain Name Space

Elements

1. Root Level
2. Top Level Domains
3. Second Level Domains
4. Sub-Domain
5. Host

DNS Hierarchy



Fully Qualified Domain Name (FQDN)

- The most complete domain name which specifies all domain levels, including the Top-Level Domain and the Root Level.

A Partially Qualified Domain Name (PQDN)

- Used to specify a portion of a domain name, normally the host portion of it.
- Starts with a host name, but it may not reach up to the root.

DNS and Security

Reverse Domains

- A special domain name **in-addr.arpa** that is used to translate the IP address to fully qualified domain name.

Forward DNS

Domain Name-> IP Address

Reverse DNS

IP Address-> Domain Name

Features of DNS

- Global Distribution
- Scalability
- Dynamicity
- Reliability
- Loose Coherency

Global Distribution

- Data is maintained locally, but retrievable globally
- No single computer has all DNS data
- DNS lookups can be performed by any device

Scalability

- No limit to the size of the database
- No limit to the number of queries
- 24,000 queries per second handled easily
- Queries distributed among masters, slaves, and caches

Dynamicity

- Database can be updated dynamically
- Modification of the master database triggers replication

Reliability

- Data is replicated
- Data from master is copied to multiple slaves
- Clients can query
- Master server
- Any of the copies at slave servers
- Clients will typically query local caches

Loose Coherence

- The database is always internally consistent.
- Each version of a subset of the database (a zone) has a serial number.
- The serial number is incremented on each database change.
- Changes to the master copy of the database are replicated according to timing set by the zone administrator.
- Cached data expires according to timeout set by zone administrator.

DNS resolving process

- The user enters a domain name, such as www.example.com, into their web browser.
- The browser sends a request to a DNS resolver to find the IP address of the domain name.
- The DNS resolver looks up the IP address in a database of domain names and IP addresses.
- The DNS resolver returns the IP address to the browser.
- The browser sends a request to the web server at the IP address.
- The web server returns the web page to the browser.

Computer security

The protection of computing system and the data that they store or access.

Primary reasons to secure a computer

Prevent

- theft or damage to the hardware
- theft or damage to information
- disruption of service

Key areas of concern

- Confidentiality** : Only authorized users can access the data resources and information.
- Integrity** : Only authorized users should be able to modify the data when needed.
- Availability** : Data should be available to users when needed.
- Authentication** : the computer system should be able to verify the identity of a user.

Consequences of ignoring

- Loss of confidential data
- Unavailability of access to data or computer network
- Loss in productivity
- Compromised data integrity
- Lawsuits and judicial actions

Cyber Attacks

- Malware** - Worms, Virus, Trojan, Adware, Spyware, BOTS, Spam
- Phishing** - Stealing personal information
- DNS Spoofing** - attacker redirects your DNS traffic to a malicious website.
- Denial of Service** - an attempt to make a website or online service unavailable to its intended users by flooding it with traffic.
- Man in the middle** - a type of attack where an attacker intercepts your communication with a website or online service and impersonates one of the parties involved.
- Crypto jacking** - an attacker uses your computer to mine cryptocurrency without your permission.
- SQL injection** - an attacker injects malicious SQL code into a website in order to gain unauthorized access to data or to take control of the website or service.
- Zero-day exploits** - an attack that exploits a vulnerability in a software program that the software vendor is not aware of.

Ways to Prevent Cyber Attack

- Train employees in cyber security principles.
- Install and update antivirus and antispyware software on all devices.
- Use a firewall to protect your network.
- Keep software up to date.
- Back up important data regularly.
- Control access to computers and networks.
- Secure your Wi-Fi networks.
- Use individual user accounts and limit access to data.
- Change passwords regularly.

CONTENT MANAGEMENT SYSTEM (CMS)

Content

Essence or unit of digital information.

Management

Refers to the process of creating, storing, editing publishing and distributing structured content via rules and process.

System

A software tool, or combination of software tools that facilitate the efficient and effective management of the content so as to achieve the desired 'output'.

CMS / Web Content Management (WCM)

Simply a software tool that enables to store, create, edit manage and publish a variety of digital content.

Covers a complete lifecycle of pages on website.

No technical skill or knowledge needed.

Functionality

- Content creation
- Content storage
- Workflow management
- Publishing

Why CMS is good?

- User-friendliness
- Flexibility and customization
- Security
- Multi-platform integration
- Don't have to be an expertise
- Structured content and content reuse.
- Saves money and time
- Large scale changes can be made much easily

Elements of CMS

1. Content management application
2. Content delivery application

Content management application

Administrative part that editors use to create, edit and publish content without messing with the code or user interface options.

Content delivery application

Actual backend of the website, which has the tools to control the logic and coding which is required to transform the content into a visible interface for the end user.

Disadvantages

Limited functionalities. Stick to layouts

Need of expertise and trained content authors

Popular CMS

Joomla, Drupal, WordPress, CakePHP, Mambo,
Bootstrap, Zen cart