CA308: Introduction to open Source Technology

Unit 1: Introduction

Introduction to open Source Technology

- Open source software is usually a free software product, where developers have access to the source code. They can enhance the program's performance, add some features, and fix errors.

- _Open source code is written by developers and for developers._

- The term Open-source is closely related to Open-source software (OSS). Open-source software is a type of computer software that is released under a license, but the source code is made available to all the users.

- Open-source software (OSS) is any computer software that's distributed with its source code available for modification. That means it usually includes a license for programmers to change the software in any way they choose: They can fix bugs, improve functions, or adapt the software to suit their own needs.

- Open source code is typically created as a collaborative effort in which programmers improve upon the code and share the changes within the community.

Widely used open Source Technology

Development Philosophy of open Source Technology

- According to "The Cathedral and Bazaar Model" the Open Source Software are being developed which has following pattern.
  - **Users should be treated as co-developers:**
    - Users should have access to source code
    - Users are encouraged to submit additions to s/w, code fixes for the s/w, report bugs and documentation.
    - More no. of co-developers help in building s/w faster.
    - Linus's law says :" Given enough eyeballs all bugs are shallow." – Many users view same source code then they find all bugs and ways to solve them.
  - **Early Releases:**
    - First version of software should be released as soon as possible to find co-developers earlier.
  - **Frequent Integration**
    - Code changes should be integrated as frequently as possible to avoid integration at the end of the project life-cycle.

Development Philosophy of open Source Technology

- **Several versions :**
    - There should be at least 2 versions of software:
        1. Development version with more no. of features.
        2. Stable version with fewer number of features.
    - Development version should be used by the developer willing to take risk of the code which is still not developed completely and want to use the latest features.
    - Such user can act as a co-developer and help in reporting bugs as well as providing fixes to those bugs.
- **High modularization:**
    - The general structure of the software should be modular allowing for parallel development on independent components.
- **Dynamic Decision-Making Structure**
    - There is a need for a decision making structure, whether formal or informal, that makes strategic decisions depending on changing user requirements and other factors.

Pros and cons of open Source Technology

php

- **Pros or advantages of open source technology**
  - **Cost Effective**
    - Generally an open source software is free to use. The users does not require to pay for the usage. It can be installed free of cost without any upfront expenses. Nevertheless the quality is not compromised. Especially for businesses with tight budget, using open source software can lead to significant amount of cost savings.
  - **Reliability**
    - High reliability can be ensured when using an open source software. The open source software is created by expert developers and guided by them. Therefore, there is very less chance that someone will identify flaws in the software. In addition to that, the software is monitored by a set of experts who is able to fix faults in a lesser time duration.
  - **Flexibility**
    - Unlike in proprietary software, users in open source software does not experience vendor lock-ins. Even if there are irrelevant features, the users can effectively remove them. This is because the source code is free to modify. Users do not need to stick to the provider's requirements.

Pros and cons of open Source Technology

php

- **Pros or advantages of open source technology**

  - **Scalability**

    - Similar to a Linux operating system, an open source software can also be scaled easily. According to the needs, an open source software can be scaled up and down so that businesses could achieve their desired results.

  - **Licensing**

    - Open source software offers convenient license schemes. Thus, the users do not need to worry about monitoring and tracking. And regardless of the location, an open source software could also be used. Moreover, it does not pose any restrictions on the number of times it can be installed.

  - **Error Free**

    - The number of people involve in maintaining an open source software is more in hundreds and thousands. Usually they are present as a community. These people make sure that the software is error free of bugs.

    - Once a user identifies a bug, they could report it to the community so that the community could fix it as soon as possible. Releasing a patch will not take longer time since the source code is available to everyone.

Pros and cons of open Source Technology

php

- **Cons or disadvantages of open source technology**

  - **User Friendly**

    - Not all the open source applications are easy to use. The Graphical User Interface may not be user friendly for the users to understand. Only tech savvy people will be able to understand this interface.

    - If used in an organization, the employees must be trained accordingly to operate it. For this the companies need to hire trainers all which can cause additional expenses.

  - **Security**

    - As mentioned earlier, the source code present in an open source software is free to edit. The problem comes when someone misuses the code for their own benefits. While many of them use it for improving the software, others could invite vulnerabilities such as identity theft and malicious transfers.

  - **Compatibility**

    - Some applications cannot support both open source software and proprietary software. If proprietary hardware needs to run on an open source machine, it requires third party drivers. However, that cannot guarantee that the hardware will work on the host machine. Therefore, before purchasing a hardware it is recommended to check it is supported by the open source application.

Pros and cons of open Source Technology

php

- **Cons or disadvantages of open source technology**

  - **Maintenance**

    - Even though an open source software does not contain any upfront costs, still it is equipped with some hidden costs. Especially with maintenance. If you face any problems in the implementation process, a third party support may be needed which could charge additionally. This is a problem for businesses that is unaware of the hidden costs.

  - **Drivers**

    - Finding required drivers for hardware components is not an easy task because the respective driver must be supporting the current operating system you use. Hence, a new hardware component that is installed could fain to provide its functionalities.

  - **Support**

    - When using an open source software, it is common to experience technical issues. Unlike a proprietary software, an open source software does not offer extensive support. For fixing this people look for support services online. Since an open source software is created by numerous developers, there is not just one person liable for an error. The only option available is to contact the provider or rely on third party support services

Open source vs. Close source software

php

Parameters	Open Source Software	Closed Source Software
Short-form	Also generally referred to as OSS.	Also generally referred to as CSS.
Basics	These refer to that computer software in which the source remains open. Thus, the general public is able to access it easily and use it.	These refer to that computer software in which the source code remains closed. Thus, the general public has no access to it.
Source Code	It is open source and public.	It is closed source and protected from all.
Modification of Software	Any user or organization can easily change this code since it is available as an open-source for any person to take a look at.	Only the organization or individual that created it has access to the code. Only they can modify it.
Price	It is comparatively cheaper and more cost-effective.	It is comparatively expensive and less cost-effective.
Restrictions	Users have no restrictions on the modification or usability of the software.	Users are very restricted on the modification or usability of the software.

Open source vs. Close source software

Parameters	Open Source Software	Closed Source Software
Programmer Feedback	All programmers are free to provide improvement strategies, and they get incorporated if they get accepted by the software developers.	The software organization/firm hires programmers to provide an improvement on their software.
Team Strength	A large OSS may include a large number of programmers for completing their projects in teams.	The number of programmers who might team up and work on a CSS project is always limited.
Software Responsibility	No one is explicitly responsible for an OSS.	The vendor is responsible for anything that might happen to a CSS.
Examples	Firefox, OpenOffice, Android,, MySQL, Moodle, Perl, PHP, and many more.	Google Earth, Skype, Java, Adobe Reader, Virtual Box, WinRAR, Microsoft Windows, Microsoft Office, Mac OS, and many more.

php

Introduction to Webpage and Website

- **Web Page**
    - web page is a document available on world wide web. Web Pages are stored on web server and can be viewed using a web browser.
    - A web page can contain huge information including text, graphics, audio, video and hyper links. These hyper links are the link to other web pages.
- **Web Site**
    - Collection of linked web pages on a web server is known as website. There is unique Uniform Resource Locator (URL) is associated with each web page.
- **Web Server**
    - A web server is a computer hosting one or more websites. "Hosting" means that all the web pages and their supporting files are available on that computer.
- **Web Browser**
    - The software is used for browsing and exhibiting web pages that are spread all across the internet.
    - It is a form of application software developed for retrieving and viewing information and content from web pages of HTML files stored in web servers.

php

- **Static Website**

  - A static website is made up of webpages created using HTML, CSS and Javascript etc.

  - Each page on a static website is stored as a single HTML file , which is delivered directly from the server to the webpage exactly as is.

  - This content essentially becomes a part of the design on your page, and won't change unless the original HTML file is edited at a code level.

  - Changes to a static website can be done manually, and will only be made page by page, HTML file by HTML file. For example, edits made to the HTML file of a homepage will only be reflected on the homepage.

  - One of the most characteristic aspects of a static site is that every user receives and views the exact same content. Because of this, static websites work best for sites with fewer pages that don't require frequent updates or changes.

- **Dynamic Website**

  - Built using server side language and technology, dynamic websites allow for the content of each page to be delivered and displayed dynamically, or on-the-fly, according to user behavior or from user-generated content.

  - With a dynamic website all of your data and content are organized in a database or backend Content Management System (CMS), which connects to your website pages. The way this information is arranged and connected to your site's design controls how and when its content is revealed on a page.

  - Dynamic websites enable you to choose which information is displayed to a user based on their location. You can also deliver content to users based on their current or past actions on your site, which essentially means each visitor sees a different view of the content on a page.

  - Dynamic websites are those which are content heavy and user-driven.

Static Website and Dynamic Website

The main differences between a static vs dynamic website

Content on a static website is stable and doesn't change. Content on a dynamic website can change according to how you want it to behave and what you want specific users to see.
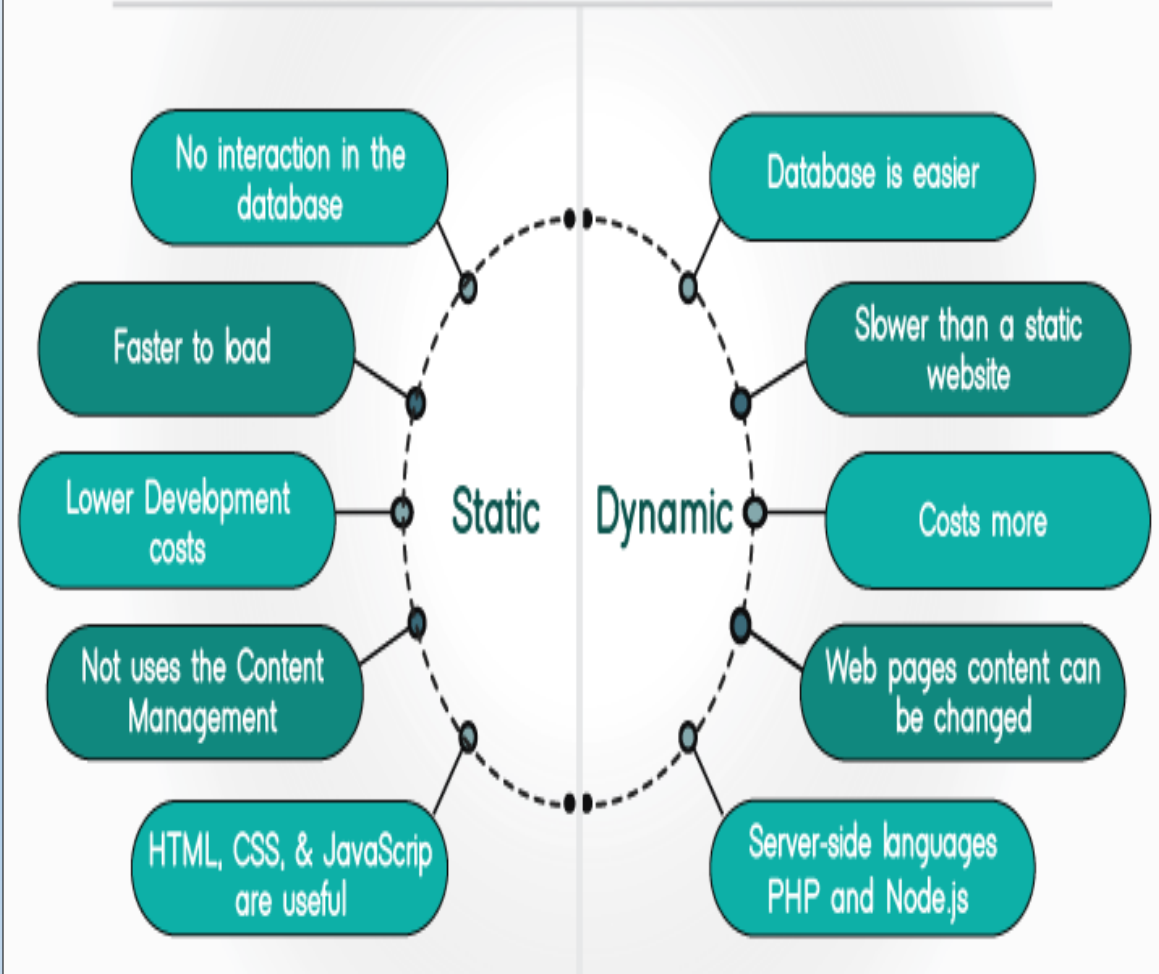
Content on a static website is stored directly on the server and pulled as is. Content on a dynamic website is stored in a database or collection and delivered according to how it is organized or filtered.

Content changes on a static website need to be made page by page, on a dynamic website they can be made across hundreds of pages automatically.

A dynamic site can have its content displayed according to how a user interacts with the site, it can also have input from a user. This functionality is more limited with a static website.

Dynamic websites may take longer to initially setup but long term they can be more efficient to manage. Static websites conversely can be created fast but as they grow will require more intensive content management.
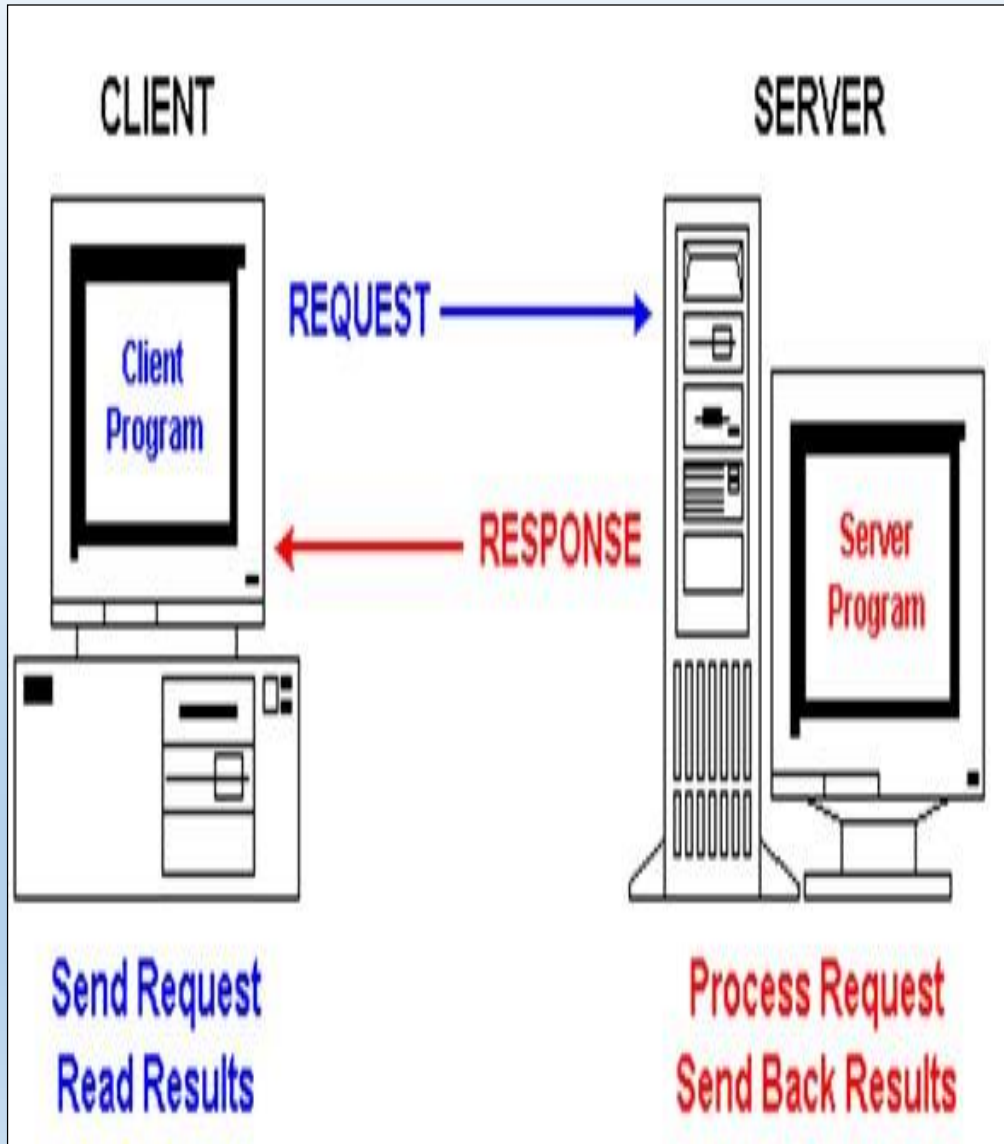
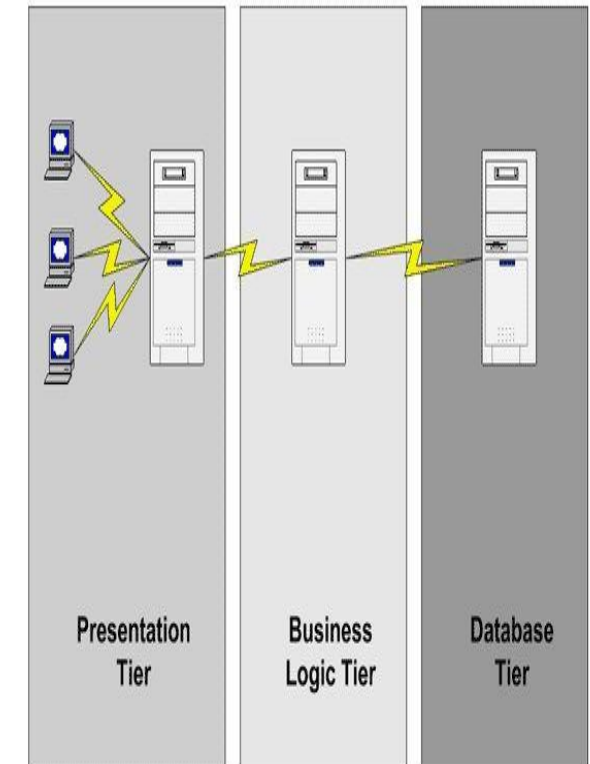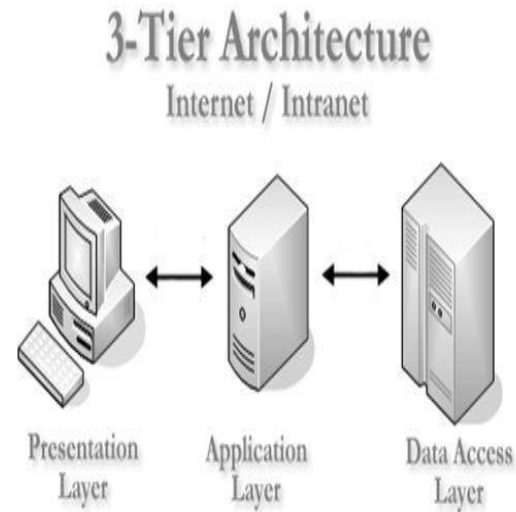## Comparison of The Static & Dynamic Website

Static

- No interaction in the database
- Faster to load
- Lower Development costs
- Not uses the Content Management
- HTML, CSS, & JavaScrip are useful

Dynamic

- Database is easier
- Slower than a static website
- Costs more
- Web pages content can be changed
- Server-side languages PHP and Node.js

php

- In 3-tier architecture, an application is virtually split into three separate logical layers

3-Tier Architecture
Internet / Intranet

Presentation Layer ↔ Application Layer ↔ Data Access Layer

Presentation Tier | Business Logic Tier | Database Tier

- Scripting languages are like programming languages that allow us to write programs in form of script.

- These scripts are interpreted not compiled and executed line by line.

- Scripting language is used to create dynamic web pages.

- Scripting languages are used in web applications.

- It is used in server side as well as client side.

- Server side scripting languages are: PHP, Perl etc. and client side scripting languages are: JavaScript, AJAX, jQuery etc.

- **Client-side Scripting**

  - Client-side scripting refers to the programs that are executed on client-side.

  - Client-side scripts contains the instruction for the browser to be executed in response to certain user's action.

  - Client-side scripting programs can be embedded into HTML files or also can be kept as separate files.

- **Server-side Scripting**

  - Sever-side scripting acts as an interface for the client and also limit the user access the resources on web server.

  - It can also collects the user's characteristics in order to customize response.

- Makes interactive web pages

- Make stuffs work dynamically

- Interact with temporary storage

- Works as an interface between user and server

- Sends requests to the server

- Retrieval of data from Server

- Interact with local storage

- Provides remote access for client server program

- There are many client-side scripting languages too. For example JavaScript, VBScript, HTML (Structure), CSS (Designing), AJAX, jQuery etc.

php

- It processes the user input

- Displays the requested pages

- Structure web applications

- Interaction with servers/storages

- Interaction with databases

- Querying the database

- Encoding of data into HTML

- Operations over databases like delete, update.

- There are several languages that can be used for server-side programming: for example PHP, ASP.NET (C# OR Visual Basic), C++, Java and JSP, Python, Ruby on Rails and so on.

- Server-side code can be written in any number of programming languages — examples of popular server-side web languages include PHP, Python, Ruby, C#, and JavaScript (NodeJS).

Learning is never done without errors...!!!