CSE 3421

Current Trends in Software Engineering

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Why This Lesson?

To get up-to-date with the current demands and trends in the software engineering field

Major development fields

- Web application development
- Mobile application development
- Desktop Application development
- System application development
- Firmware development

Web Application development

- Front-end development
- Back-end development
- Full-stack development

Languages

Front-end/ Client-side:

- HTML
- CSS
- JavaScript

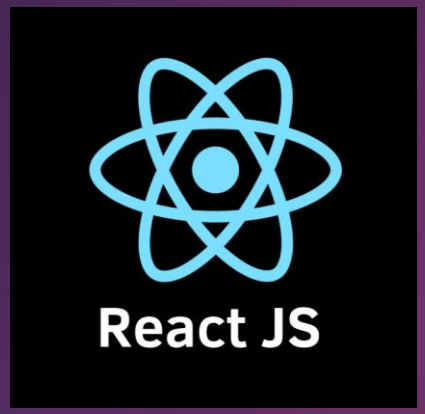
Back-end/ Server-side:

- PHP
- Java
- Python

Database

- Oracle
- MySQL
- Microsoft SQL
- MongoDB
- Firebase

Frameworks



IDEs and development tools

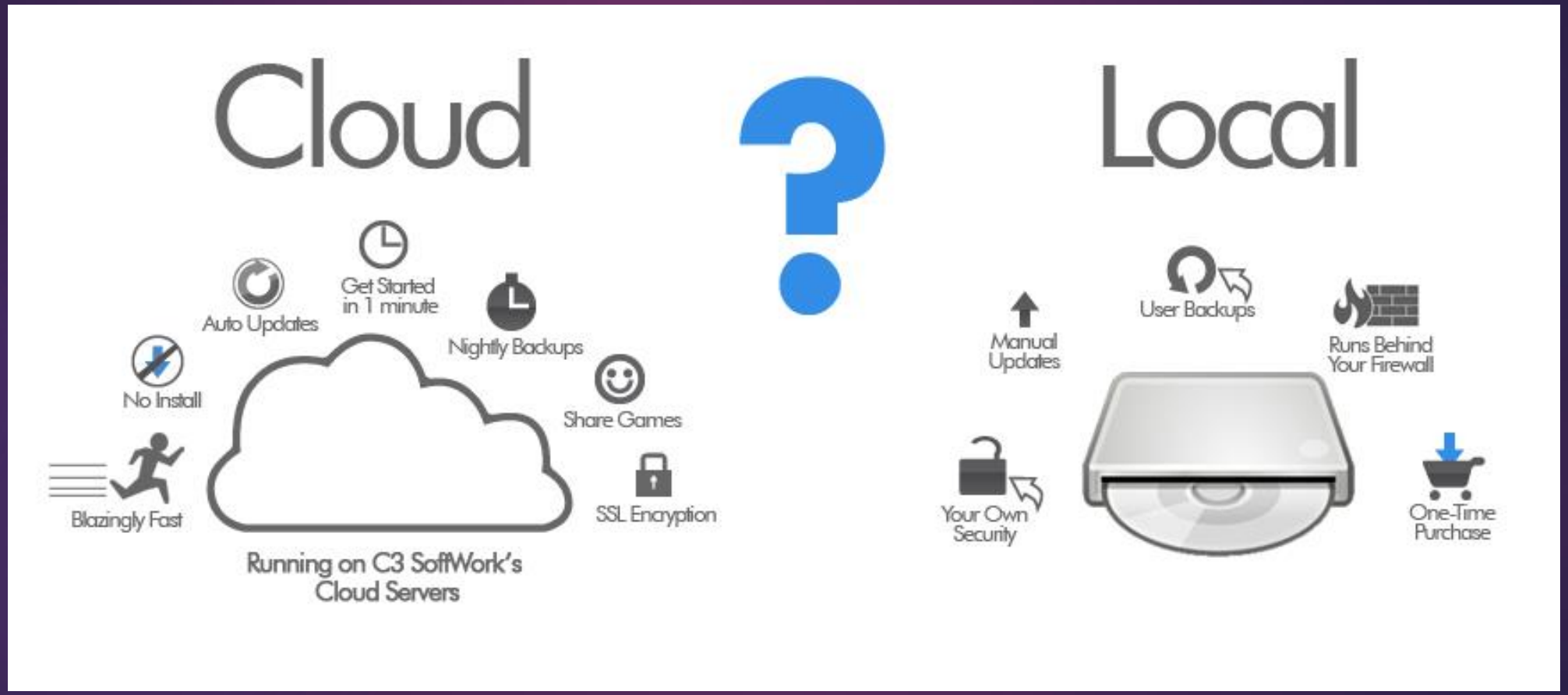
Content Management System(CMS)


What is a CMS Website?
1
No Coding knowledge required
2
Simplifies the redesigning of the website
3
Provides an all-inclusive internet marketing strategy
4
Multiple Access and Collaboration
5
Website Security
6
Affordable and Time saving Maintenance

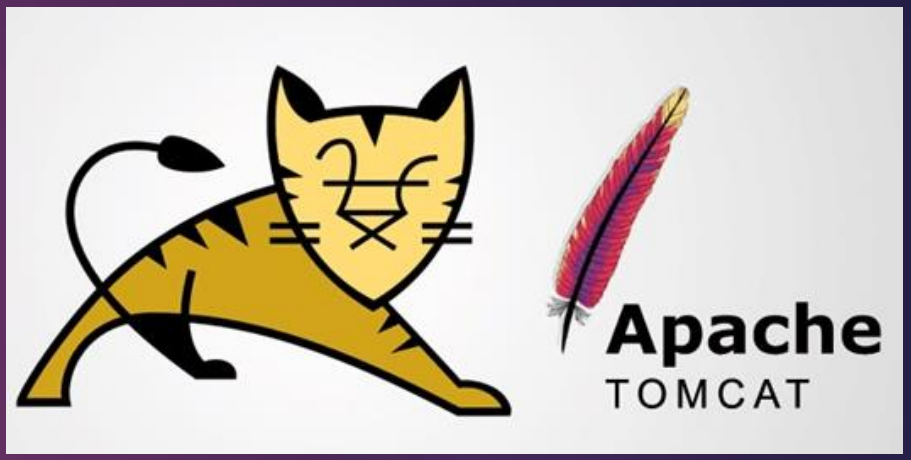
Developer to Production Environment

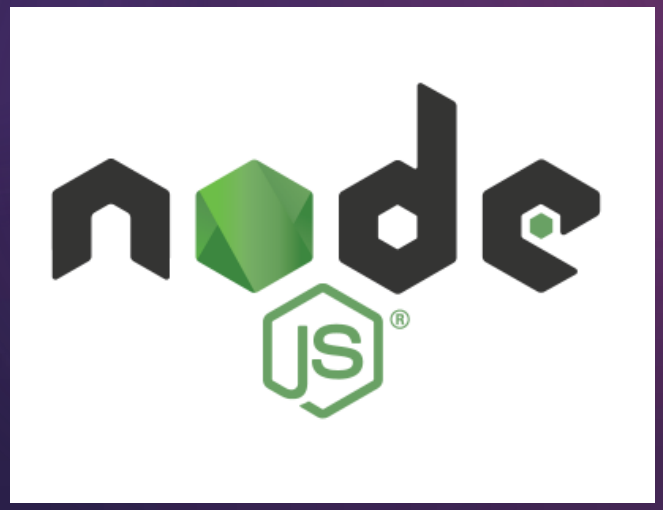
Development	✓ Used by dev team for feature preview and collaboration ✓ No client data **Also called Sandbox/ playground**
Testing	✓ Used by project team for acceptance testing with test data ✓ No client data
Staging	✓ Pre-production used for final acceptance based on production size data set ✓ Limited production data
Production	✓ Used by clients (live) ✓ Full production data **Also called live/ commercial**

Cloud vs Local server



How to turn your machine into web server?





Build Tools

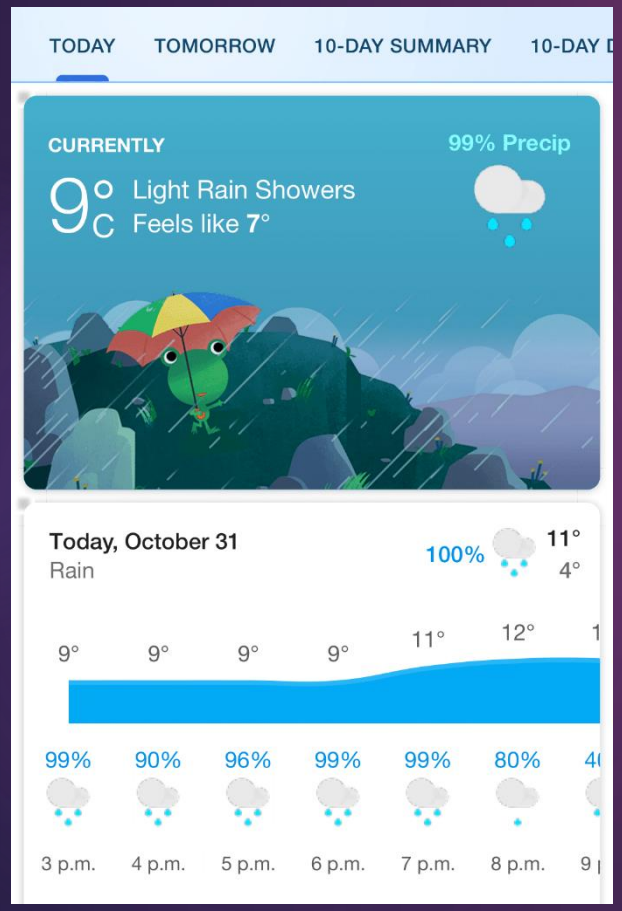
They help **installation** and **doing** error prone tasks

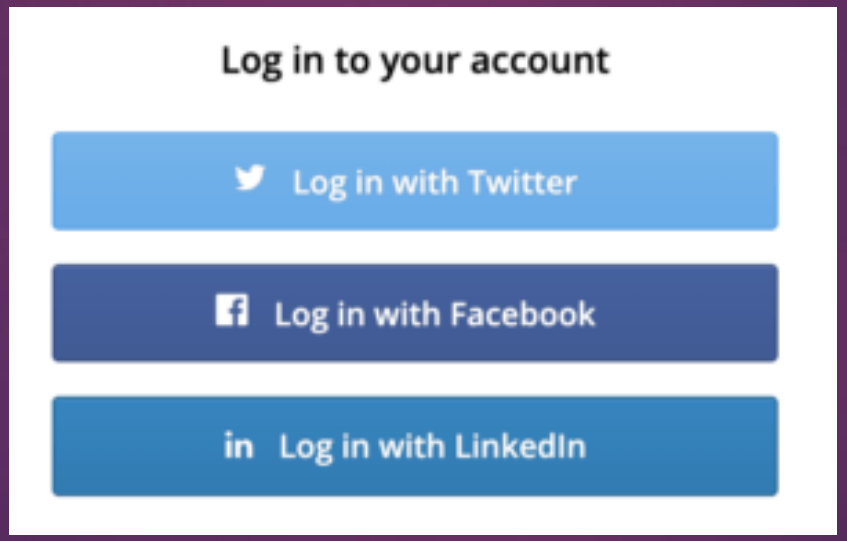
Also called package manager

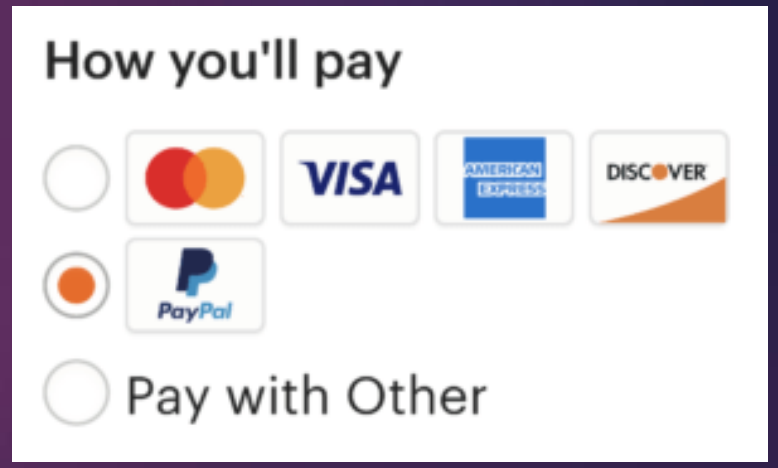
Also called Bundler

Application Programming Interface (API)

API is an intermediary that allows two applications to talk to each other.







Application Programming Interface (API)

- API defines endpoints, and valid request and response formats.
- Different request methods: get, post, put, delete
- Response formats include JSON, XML
- Sample API example: https://jsonplaceholder.typicode.com/

Types of API

- **Open APIs:** also known as external or public APIs, are available to developers and other users with minimal restrictions.
- **Internal APIs:** They are designed to be hidden from external users. They are used within different teams of a company to share resources.
- **Partner APIs:** Partner APIs are technically similar to open APIs, but they feature restricted access, often controlled through a third-party API gateway.
- **Composite APIs:** Composite APIs allow developers to access several endpoints in one call. These could be different endpoints of a single API, or they could be multiple services or data sources.

API Protocols

- **REST (representational state transfer):** a web service can only be treated as a RESTful service if it follows the constraints of being
  1. Client Server
  2. Stateless
  3. Cacheable
  4. Layered System
  5. Uniform Interface

  REST requires low bandwidth, and response format can be plain text, HTML, XML, JSON, etc.

- **SOAP (simple object access protocol):** It requires high bandwidth and can only work with XML format

https://www.redhat.com/en/topics/integration/whats-the-difference-between-soap-rest

JavaScript Object Notation (JSON)

- It is a lightweight text-based open standard designed for human-readable data interchange.
- Conventions used by JSON are known to programmers, which include C, C++, Java, Python, etc.
- It is used for **serializing** and transmitting data over network connection.
- Web services and APIs use JSON format to provide public data.
- It can be used with modern programming languages

Syntax of JSON

- Data is represented in name-value pairs.
- Supported data types:
  - Number
  - String
  - Boolean
  - Object
  - Array
  - Null
- But the building unit is object. All other data reside in a parent object.

Number

{"marks": 97}

String

{"name": "Hassan"}

Boolean

{"distinction": true}

Object

{"name": "Hassan", "marks": 97, "distinction": true}

Array

{ "fruits" : ["Mango", "Grape", "Apple"] }

Array of Object

```
{
    "book": [
    {
       "id":"01",
       "language": "Java",
       "edition": "third",
       "author": "Herbert Schildt"
    },
    {
       "id":"07",
       "language": "C++",
       "edition": "second"
       "author": "E.Balagurusamy"
    }]
}
```

JSON Nested Object


```
"data": {
  "categoryName": "Furniture",
  "categoryTypeId": "",
  "subCategoryNames": [
    {
      "subCategoryName": "Chair",
      "subCategoryId": "a14c1344-2fb8-481a-8251-385f9c6805fb",
      "createdAt": "2017-07-23T09:28:43.000Z",
      "updatedAt": "2017-07-23T09:28:43.000Z",
      "fk_categoryId": "3080854a-13d9-4e38-ab96-358aa6405a2c"
    },
    {
      "subCategoryName": "Sofa",
```

Mobile Application development

Types of mobile app

- **Native app:** Native apps are built specifically for a mobile device's operating system, whether it's Apple iOS, Google's Android, or Windows Phone.

- **Web app:** Web apps are accessed via a web browser on your mobile device. They're not standalone apps in the sense of having to download and install.

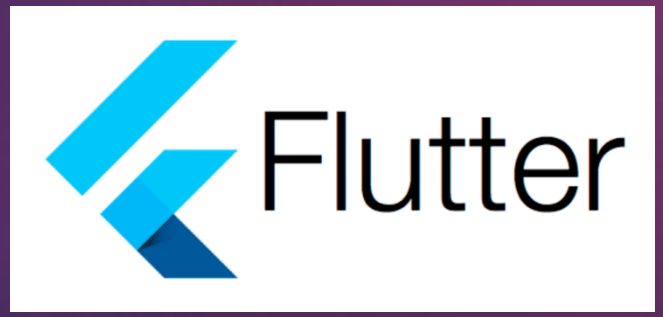
- **Hybrid app:** These are web apps that look and feel like native apps.

Languages

- Java
- Swift
- Kotlin
- C#
- JavaScript

IDEs and development tools

Frameworks



App builder

Software development Kit (SDK)

- It's a set of software tools and programs used by developers to create applications for specific platforms.
- The Android SDK includes:
  - Required libraries.
  - Debugger.
  - An emulator.
  - Relevant documentation for the Android APIs.
  - Sample source code.
  - Tutorials for the Android OS.

Every time Google releases a new version of Android, a corresponding SDK is also released. To be able to write programs with the latest features, developers must download and install each version's SDK

Thank You