

CSCI 241

**Database-Driven
Web Application Platform
(PHP and MySQL)**

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The Web in static

- The Web is a **Client-Server architecture** in which Clients and the Server are communicated through **HTTP** protocol that is built on the **TCP** protocol
- A Web client (browser) starts a **connection** by sending a **request** to the Web server
- The server sends a **response** to the Web browser based on the request information
- Initially, the Web only allows us to request **static** documents from the server

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The Web in static

- The static documents are stored as separate HTML files on the server
- A Client-Server architecture is also called a **two-tier** architecture

```

    graph LR
      subgraph Client_Tier [Client Tier]
        WC[Web Client (Browser)]
      end
      subgraph Server_Tier [Server Tier]
        WS[Web Server (Apache)]
      end
      WC -- Request (HTTP) --> WS
      WS -- Response --> WC
  
```

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The Web in dynamic

- Sometimes, a Web client wants to get **dynamic** response from the server by requesting the same document (program) with different query information
- A this time, the server is required to have the ability to generate the dynamic response based on the received query information from the client
- To create dynamic response, we need to have programming on the server side
- There are many technologies to allow us do this, such as CGI, Perl, **PHP**, ASP/ASP.NET, JSP, Ruby, etc.

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The Web in dynamic

- In this class, we are going to introduce how to use **PHP** to do programming at the server side
- PHP is a scripting language embedded in (X)HTML code and running at the **server side**
- The software that can interpret PHP code is called **PHP engine**
- PHP engine was initially developed for Apache web server, but now it can be integrated with other web servers
- PHP engine is open source, and the current release is **PHP 5.3.8**

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The Web in dynamic

- A Web server integrated with PHP engine is still a **two-tier** architecture
- A requested document with embedded PHP code will be run by the PHP engine at server side first

```

    graph LR
      subgraph Client_Tier [Client Tier]
        WC[Web Client (Browser)]
      end
      subgraph Server_Tier [Server Tier]
        WS[Web Server (Apache)]
        subgraph PHP_Engine [PHP]
          P[PHP]
        end
        WS --- P
      end
      WC -- Request (HTTP) --> WS
      WS -- Response --> WC
  
```

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Three-Tier Architecture

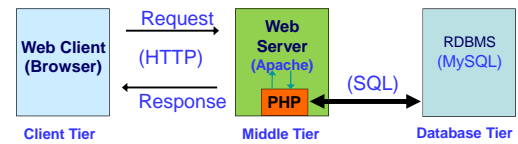
- PHP allows us to access data files at the server side
- Creating and managing a file-based database system is not convenient and efficient when the data becomes huge and complex
- We usually employ a Relational Database Management System (RDBMS) to manage data at the server side
- PHP also allows to access many RDBMS systems, such as MySQL, Oracle, MS SQL Server, etc.

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Three-Tier Architecture

- A Web environment integrated with database server creates a **Three-Tier** architecture
- In this architecture, the Web server is usually called **Middle Tier**, and the RDBMS is called **Database Tier**



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Three-Tier Architecture

- In this Three-Tier system, we can access the database server through PHP
- An RDBMS uses SQL (Structured Query Language) to manipulate the data stored in database
- In PHP script code, we can connect to an RDBMS, and use SQL to manipulate (insert, delete, update and select) the data
- An application built on the Web and supported by an RDBMS server is called a **Web Database Application**

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The MySQL Database Server

- In this class, we will use MySQL as the database server
- MySQL has most of the features of high-end commercial database servers, including the ability to manage very large quantities of data
- Its design is ideally suited to manage databases that are typical of most Web Database Applications
- MySQL is also open source
- The current release is **MySQL 5.5**

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