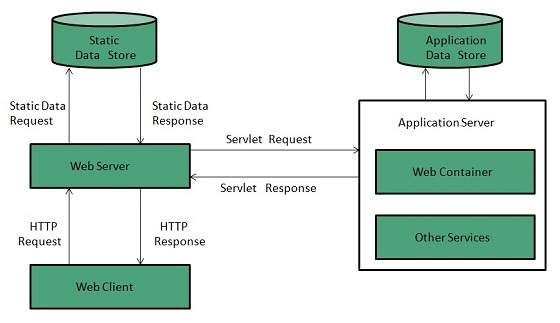
**Web Server**

**Web server** is a computer where the web content is stored. Basically web server is used to host the web sites but there exists other web servers also such as gaming, storage, FTP, email etc.

*Web site is collection of web pages whileweb server is a software that respond to the request for web resources.*

Web server respond to the client request in either of the following two ways:

* Sending the file to the client associated with the requested URL.
* Generating response by invoking a script and communicating with database



* When client sends request for a web page, the web server search for the requested page if requested page is found then it will send it to client with an HTTP response.
* If the requested web page is not found, web server will the send an **HTTP response:Error 404 Not found.**
* If client has requested for some other resources then the web server will contact to the application server and data store to construct the HTTP response.

## **Architecture**

Web Server Architecture follows the following two approaches:

1. Concurrent Approach
2. Single-Process-Event-Driven Approach.

### **Concurrent Approach**

Concurrent approach allows the web server to handle multiple client requests at the same time. It can be achieved by following methods:

* Multi-process
* Multi-threaded
* Hybrid method.

### **Multi-processing**

In this a single process (parent process) initiates several single-threaded child processes and distribute incoming requests to these child processes. Each of the child processes are responsible for handling single request.

It is the responsibility of parent process to monitor the load and decide if processes should be killed or forked.

### **Multi-threaded**

Unlike Multi-process, it creates multiple single-threaded process.

### **Hybrid**

It is combination of above two approaches. In this approach multiple process are created and each process initiates multiple threads. Each of the threads handles one connection. Using multiple threads in single process results in less load on system resources.

**Example of server:**

**Apache HTTP Server**  
This is the most popular web server in the world developed by the Apache Software Foundation. Apache web server is an open source software and can be installed on almost all operating systems including Linux, UNIX, Windows, FreeBSD, Mac OS X and more. About 60% of the web server machines run the Apache Web Server.

# Dynamic content

Dynamic content (aka adaptive content) refers to web content that changes based on the [behavior](https://www.omniconvert.com/what-is/behaviour-segmentation/), preferences, and interests of the user. It refers to websites as well as e-mail content and is generated at the moment a user requests a page. Dynamic content is personalized and adapts based on the data you have about the user and on the access time, its goal being to deliver an engaging and satisfying online experience for the visitor.

Generally powered by applications and scripts, dynamic content works in tandem with static content. A classical example is the HTML content of a [landing page](https://www.omniconvert.com/what-is/landing-page/) or of an e-mail that changes to display information that is relevant for the viewer based on location or previous interactions with the website. An e-mail where the user’s name is retrieved from the database and inserted automatically via HTML text is another example of dynamic content.

Database normalization is the process of organizing data into tables in such a way that the results of using the [database](https://searchsqlserver.techtarget.com/definition/database) are always unambiguous and as intended. Such normalization is intrinsic to [relational database](https://www.techtarget.com/searchdatamanagement/definition/relational-database) theory. It may have the effect of duplicating data within the database and often results in the creation of additional tables.

The concept of database normalization is generally traced back to E.F. Codd, an IBM researcher who, in 1970, published a paper describing the relational database model. What Codd described as "a normal form for database relations" was an essential element of the relational technique. Such data normalization found a ready audience in the 1970s and 1980s -- a time when disk drives were quite expensive and a highly efficient means for data storage was very necessary. Since that time, other techniques, including [denormalization](https://www.techtarget.com/searchdatamanagement/definition/denormalization), have also found favor.

## Data normalization rules

While data normalization rules tend to increase the duplication of data, it does not introduce data [redundancy](https://www.techtarget.com/whatis/definition/redundancy), which is unnecessary duplication. Database normalization is typically a refinement process after the initial exercise of identifying the data objects that should be in the relational database, identifying their relationships and defining the tables required and the columns within each table.

## Data normalization example

|  |  |  |
| --- | --- | --- |
| **Customer** | **Item purchased** | **Purchase price** |
| Thomas | Shirt | $40 |
| Maria | Tennis shoes | $35 |
| Evelyn | Shirt | $40 |
| Pajaro | Trousers | $25 |

If this table is used for the purpose of keeping track of the price of items and the user want to delete one of the customers, he or she will also delete the price. Normalizing the data would mean understanding this and solving the problem by dividing this table into two tables, one with information about each customer and the product they bought and the second with each product and its price. Making additions or deletions to either table would not affect the other.

Normalization degrees of relational database tables have been defined and include:

**First normal form (1NF).** This is the "basic" level of database normalization, and it generally corresponds to the definition of any database, namely:

* It contains two-dimensional tables with rows and columns.
* Each column corresponds to a subobject or an [attribute](https://www.techtarget.com/whatis/definition/attribute)of the object represented by the entire table.
* Each row represents a unique instance of that subobject or attribute and must be different in some way from any other row (that is, no duplicate rows are possible).
* All entries in any column must be of the same kind. For example, in the column labeled "Customer," only customer names or numbers are permitted.

**Second normal form (2NF).** At this level of normalization, each column in a table that is not a determiner of the contents of another column must itself be a function of the other columns in the table. For example, in a table with three columns containing the customer ID, the product sold and the price of the product when sold, the price would be a function of the customer ID (entitled to a discount) and the specific product. In this instance the data in the third column is said to be dependent upon the data in the first and second columns. This dependency does not occur in the 1NF case.

The column labeled customer ID is considered a [*primary key*](https://searchsqlserver.techtarget.com/definition/primary-key) because it is a column that uniquely identifies the rows in that table, and it meets the other accepted requirements in standard database management schema: It does not have NULL values and its values won't change over time.

In the example above, the other column headers are considered candidate keys. The attributes of those candidate keys that make them unique are called prime attributes.

**Third normal form (3NF).** At the second normal form, modifications are still possible because a change to one row in a table may affect data that refers to this information from another table. For example, using the customer table just cited, removing a row describing a customer purchase (because of a return, perhaps) will also remove the fact that the product has a certain price. In the third normal form, these tables would be divided into two tables so that product pricing would be tracked separately.