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Client Server Architectural Pattern

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1. INTRODUCTION: -

There are different types of architectural patterns, but in this following report information about the Client Server Architecture will be provided. This report will answer questions regarding what is a Client Server Architecture? What is the purpose behind using Client Server Architecture? And what are the possible disadvantages in the architectural model. Some examples were mentioned to help understand where this architectural pattern can be found. were mentioned to help understand where this architectural pattern can be found. A diagram is provided to help show the structure behind the model. And an example on how the Client Server Architecture can help solve a possible occurring problem with the possible benefits of using Client Server Architecture.

2. DESCRIPTION: -

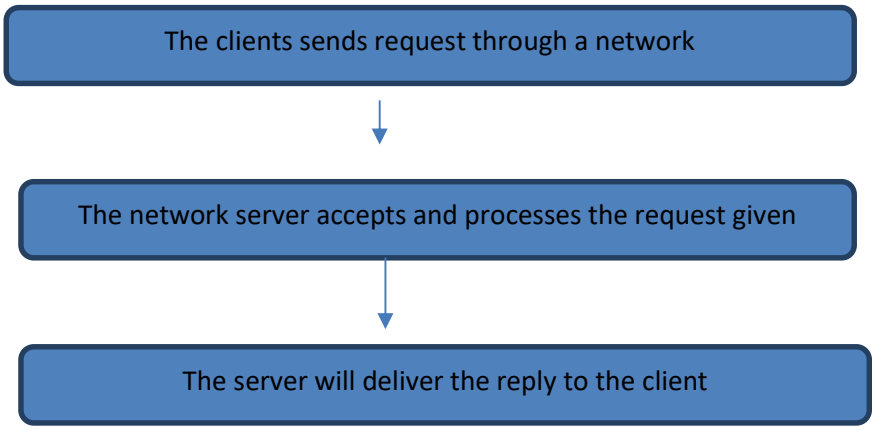
2.1 What is a Client Server Architecture?

Client: A client is considered to be any computer that requests access to a service from the server.

Server: the server is the type of computer that is designed to serve the requests coming from the client.

Client Server Architecture: An application network that separates tasks between clients and servers that could be in the same system or in need to communicate over a network. It also refers to a system that hosts, delivers, and manages most of the resources and services that the client requests.

2.2 How is Client Server Architecture used?



2.3 What is the Purpose of Using Client Server Architecture?

In this day of age, technology is constantly evolving and changing rapidly. As the use of technology tends to grow in different departments, so is or dependency on technology.

This results in the need of a system that will make it much easier to collect and process and act on data. This type of model will not only ensure efficiency and needed effectiveness but is also exactly what today's organization need. Managing a large organization will definitely need the insurance of data safety, and with the use of the client server model it will make it easier to protect data with the ability to access controls.

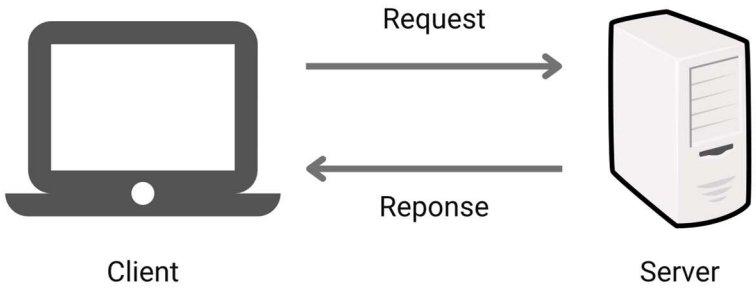
An example would be the use of email. An email is delivered using client/server architecture. Whenever a new message is created using the mail client program. The program will carry on by sending the message to the server. The server will receive the message and proceeds to forwarding the message to the recipient's email server. The final step will be that the message is then supplied to the recipient's email client.

2.4 What are the Characteristics of Client-Server Architecture?

- Client server typically requires different hardware and software resources that come from different vendors
- The network has horizontal scalability, which results in the increase in the number of client machines and also vertical scalability. Which moves the entire process to more powerful servers.
- One computer server is able to provide multiple services simultaneously. But each service will require a separate server program.
- Interacts directly with a Transport Layer protocol.

3. PROBLEM EXEMPLAR: AUTHENTICATION AND AUTHORIZATION IN USER LOGIN SYSTEM BY CLIENT SERVER ARCHITECTURAL PATTERN

3.1 DIAGRAM



1. The client computer sends a request for data to the server through the internet.
2. The server accepts the requested process.
3. The corresponding data packets from the server is delivered to the client.

3.2 USER LOGIN SYSTEM

In computer security, logging in is the process by which a user gains access to their account by the means of authentication and authorization. The user login system is based on the client server architecture.

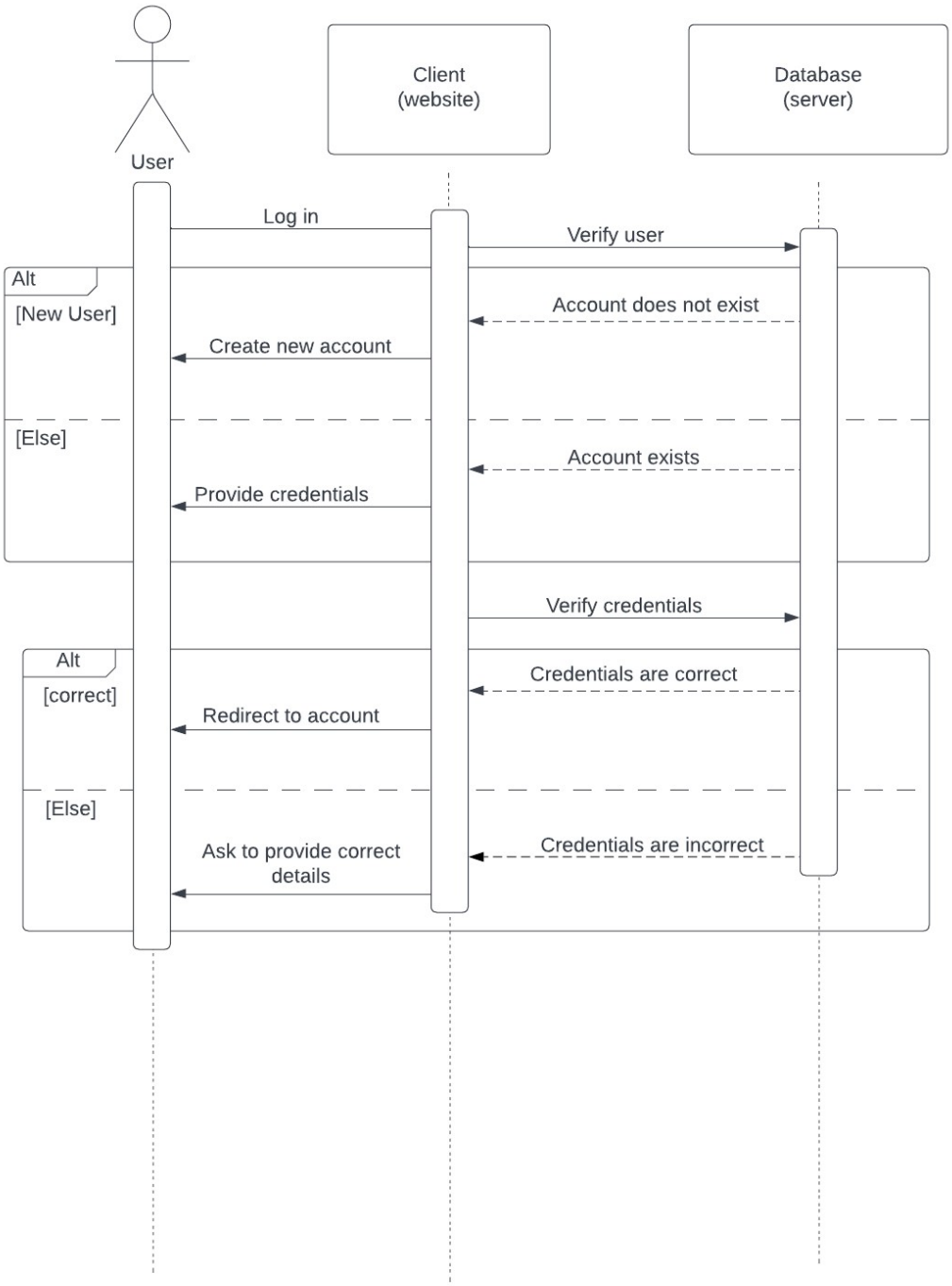
In the past, most computers and websites did not have a login system in place. So whatever content it had was catered generally to all users. This is a disadvantage as different users have different needs and hence the system must be catered to them personally.

This is where the client-server architecture comes to the rescue. The client(computer/website) asks the user for their credentials (username and password) and verifies it with the server (database). The client-server model makes sure that the credentials entered are correct and if the website is the user's themselves and not of a different user.

3.3 UML DIAGRAM AND ITS INTERACTIONS

The steps that take place in the user login system are:

1. The user tries to log in to the website.
2. The website asks the server to verify if the user is a new user or an existing user.
3. If the user is a new user, it sends a reply back to the user to sign up for a new account.
4. If the user is an existing user, they are asked to provide the necessary details.
5. The website asks the server to authenticate the details.
6. If the details are correct, the user is directed to their account.
7. If the details are incorrect, the user is asked to re enter the correct details.


User
Client
(website)
Database
(server)
Log in
Verify user
Alt
[New User]
Account does not exist
Create new account
[Else]
Account exists
Provide credentials
Verify credentials
Alt
[correct]
Credentials are correct
Redirect to account
[Else]
Credentials are incorrect
Ask to provide correct
details

4. ADVANTAGES AND DISADVANTAGES: -

4.1 ADVANTAGES

The data is centralized, which means that it is in one place and there are fewer redundancies, and it reduces the chances of errors. Having data in one place makes accessing the data then delivering it to the client easier. The cost of managing and maintaining multiple databases can be high, centralizing the data can reduce this cost. Centralization can also have security benefits, it makes it easier to monitor data requests, and only gives access to people who are authorized to do so. When the data is centralized, protocols and procedures can be created to control data access.

Multiple client types can interact with the one server, making the software more usable. For example, email can be accessed through phone, laptop, PC etc.

Capacity of server or client can be updated separately. If we have a website for a restaurant, changing the menu updates the server, the client can still make requests to the server just like before.

4.2 DISADVANTAGES

Traffic Congestion: if too many clients make a request from the same server, this will result in a crash or slowing down the connection.

Maintenance: because the server would be working non-stop, it means that any problem occurring needs to be resolved immediately to reduce the delay.

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