Foundations of Computer Networks

PROJECT 1

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WEB SERVER

AIM:
To develop a web server that is capable of processing client request.

OVERVIEW:
In this Project a simple Web server is developed using Python. This web server implements a HTTP protocol and is capable of processing only one client request as per the required specifications.
At the server (Web server) side: Server sends the objects in response to requests from Client using the HTTP protocol.
At the Client side: Client sends requests, receives response to those requests and displays object using the HTTP protocol.
The Client requests for a file from the server, filename is provided through a request to the server by encoding the string to a byte format, this is later converted back to string by using decode() at the server.
The filename provided is checked for in the server system, and an error message is returned if it doesn't exist. The size of the file is calculated if the file is found and the size is sent to the client and client is asked whether it wants to download the file or not.
Action is taken according to the client's decision that is sent to the server, server then responds appropriately according to the client's choice.
After this the server waits to see that if the user has any more requests. Thus, processing multiple requests and allowing multiple objects to be transferred over a single TCP connection (persistent HTTP).
This feature is implemented by using a while true loop after establishing a connection with a client. The execution of this while true loop is only broken when the client does not have any more requests to make.
The files are read and written in binary mode. The sockets are closed if they are no longer required. Host name should be IP address of the server. Connection is only possible with a server if both client and server are using the same port number. In our program, at a given point of time only one client can be connected to the server.
The existence of file is searched in the server using the function os.path.isfile(file_name) which returns either True or False, and the function os.path.getsize(file_name) is used to get the size of the file that we have searched in the sever, for using these inbuilt functions we have to import os.

PROCEDURE:
The following steps were carried out in the project:

1. Socket at the Client(clientSocket) is created and a TCP connection request is sent to the server.
   Connection socket(serverSocket) is created at the Server and when contacted by a client and we bind it to the host IP and a port number. Value of serverSocket.listen is set to 1 so that only one client request is processed.

2. Server receives the TCP connection request from the client and accepts it, after this no more requests will be accepted from any other client as only one client request can be processed in our program.
3. After the connection is established, the client provides the name of the file that it wishes to search in the Server. This filename is sent to the server by parsing it in a request.
4. The requested file is searched in the server's system. If the file is not found, then the error message is sent over the TCP connection. If the file is available, then its size is calculated, and this size is parsed with the message and sent over the connection to the client.
5. The client then chooses if it wants to download the file and sends the response to the server. The server on receiving reply from the client decides what action to take and sends the response to client.
6. The server further asks the client whether it wants to access more objects from the server side, thus implementing a persistent HTTP connection (where multiple objects can be sent over a TCP connection between client, server). And all the above steps are repeated until the client no longer has any request for the server.

CONCLUSION:

Thus, a Web Server that is capable of processing Client requests is successfully implemented. Any types of files that are requested by the client can be downloaded if they exist in the server.