CHAPTER 7

PROPOSED MULTI MECHANISM HYBRID MODEL IN
CLIENT SERVER ENVIRONMENT

7.1 INTRODUCTION

A network which shares the data among computer systems contains a mix of both wired and wireless interface devices. These devices play a major role in routing and switching the data packets in the network. Wired devices generally connect with Ethernet cables and switches, while wireless devices normally use Bluetooth, Wi-Fi or Wimax technology. All these devices possess the properties of sharing the behavior of computer systems. Such shared data storage mechanism was later enhanced with a method of centralized database storage called a server system. Thus all the client requests are properly responded from the server.

This standard client server architecture has been analyzed with various network devices. This part of the research work is an implementation of a multi mechanism hybrid model for effective and secured data transmission.

7.1.1 Hybrid Server

A hybrid server is one which accesses multiple servers with many different features to serve different applications. Figure 7.1 shows a typical hybrid model which already exists, where all the applications depend on sub servers which are targeted to a main server with bulk data storage. In this existing mechanism traffic congestion slows down the process and reduces the efficiency. A strong security mechanism is also needed to ensure the data transfer efficiently.
7.1.2 Hybrid Mechanism using Inheritance

Inheritance is a way to reuse the characteristics of existing server, to establish a sub server (Virtual or Proxy), based on the network support. In inheritance method the sub servers inherit attributes and behavior from pre-existing server called dedicated main server or parent. The new servers are known as derived servers or sub server or child.

7.2 DIFFERENT KINDS OF SERVERS SUPPORTING CLIENT SERVER MODEL

7.2.1 Proxy Server

In computer networks, a proxy server (a computer system or an application) that acts as an intermediary for requests from clients seeking resources from other servers. A client connects to the proxy server, requesting some service, such as a file, connection, web page, or other resource available from a different server. The proxy server evaluates the request according to its filtering rules. For example, it may filter traffic by IP address or protocol. If the request is validated by the filter, the proxy provides the resource by connecting to the relevant server and requesting
the service on behalf of the client. A proxy server may optionally alter the client's request or the server's response, and sometimes it may serve the request without contacting the specified server. In this case, it 'caches' responses from the remote server, and returns subsequent requests for the same content directly.

The proxy concept was invented in the early days of distributed systems as a way to simplify and control their complexity. Today, more proxies are web proxies, facilitating access to content on the World Wide Web.

### 7.2.2 Virtual Private Server

VPS shares computer resources with other sub servers and main server. It simply means that it is not a dedicated server. Virtual server provides low-cost data sharing services. Instead of requiring a separate computer for each server, more virtual servers can co-reside on the same network. In most cases, performance is not affected and each node behaves as if it is being served by a dedicated server. However, if too many virtual servers reside on the same network, or if one virtual server starts hogging resources, network data will be delivered more slowly.

In addition to reducing hardware and power expenses, virtualization allows businesses to run their legacy applications on older versions of an operating system on the same server as newer applications. Each virtual server can run its own full-fledged operating system and can be independently rebooted.

### 7.2.3 Web Server

Web server can refer to either the hardware (the computer) or the software (the computer application) that helps to deliver content that can be accessed through the Internet.
The most common use of web server is to host websites, but there are other uses such as gaming, data storage or running enterprise applications.

7.3 PROPOSED METHODOLOGY

In the proposed model a multi mechanism hybrid client server model with a novel security mechanism is developed. This model has been suggested to save the client waiting time in the queue in both wired and wireless technology. This hybrid model has four levels of processes between a client and server which provides the best performance when compared to existing topology. This model can be used for building distributed computing system in any corporate network where tasks such as sending packets through the devices can be done in efficient manner.

7.3.1 The levels of proposed hybrid model

The proposed hybrid model possesses four levels (Figure 7.2) of independent components in each level, the data is passed and an efficient communication is established.

| Data and Device Analysis with Markovian Model | Various data and network devices are organized on the basis of their performance |
| Effective Queuing Network with Job Scheduling Schemes | To avoid the network congestion and data wait time |
| Effective Queuing Petri net with Job Scheduling Schemes | To enable the client request to completely process without any pending |
| A Novel Security Mechanism | To avoid data loss in between the communication |

Fig. 7.2 Levels of proposed hybrid model
Network Devices Organization using Markovian model

In the first level, the Inter-Arrival time and Service Time of the data transaction between client-server in hybrid model is made very efficient with the implementation of Markovian model using M/M(a,b)/1 bulk service.

The data transfer between the server and client with the help of various network devices are analyzed. These devices are categorized based on wired and wireless technique and the performance measures are calculated.

Reducing network congestion in Queuing Network using Job Scheduling Schemes

The bulk data transfer is organized using a novel mechanism using queuing network. The CPU Job scheduling schemes like FCFS, SJF Round Robin and Priority scheduling are implemented in this queuing model, to organize the data transfer in more efficient manner without network congestion. As a part of the research work, the scheduling schemes are additionally added with the existing network program which is the key tool to establish the connection between client and server. This proposed mechanism will organize the network devices by choosing appropriate interface devices based on various application.

Queuing Petri Net with Job Scheduling Schemes

Usually the application users expect the server to respond all the requests to be processed without any drop-outs. Such process could be made efficient if proper queuing model is implemented based on the scheduling and organizing the tasks. Queuing Petri Net mechanism mainly deals with organizing the processes in a queue by distribution of token. The major limitation of this model is that if the tokens are insufficient in the last iteration, the process may be dropped. The implementation job schedules algorithms in petri net shows remarkable results, to overcome the drop outs.
Novel Security Mechanism

The data transfer in this network model is made more effective with the above said level of various novel mechanisms. Furthermore, the guarantee of the data is not assured. Hence, a novel security mechanism has been developed. This mechanism is based on encryption and decryption. The transferred data is made hidden in a format of image so that it is free from hackers. This security model does not require an external key.

7.4 IMPLEMENTATION

The hybrid model with all the above said work can be implemented in any corporate network where different applications and different clients communicate in bulk data network. The use of various wired and wireless devices is made more effective in the place of their appropriate use.
The multi mechanism hybrid model is shown in figure 7.3. The high capacity main server serves the entire client’s needs and requests. Different application uses different kind of data access mechanism. This mechanism tends to appropriate interface devices. Each time, when a client application requests the server for service, the entire server is scanned. The server response time reduces when number of client application requests increases.

Sub server is created to balance the load to response the requests from the client. These sub servers play the role of a proxy server or virtual server. The main aim of such hybrid mechanism is to inherit the data from the main server.

Application-1 can search subserver-1 alone and not any other servers. So, the subserver-1 will inherit the required data from the main server and reduces the load.

In this research work, more care has been taken for data transfer between these sub servers and various applications.