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Improved storage area network method for backup approach

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Article Info	ABSTRACT
	Storage Area Network (SAN) could be a dedicated storage network which carries the info between servers and storage devices. SAN offers flexibility to implement and share data between servers and remote devices instead of the traditional method that reduced the performance of service. This paper improves SAN backup method to increase the CPU utilization and reduce the load on the link; the result shows that the improved method is better than of traditional in terms of response time in FTP about 36% while the traffic data is about 3%.

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1. INTRODUCTION

Computing relies on the data that is the underlying resource on that all computing processes are based mostly. Data places away on capability media and is gotten by platforms performing on a server. Frequently the data is a one of a kind organization resource. Data is made and gained each second of consistently. Data is the money of commercial, which makes certain any business supplies the anticipated consequences. Enterprise protection and management are important as properly [1].

The Network Storage is turning into a standard method to combat this drawback. A network storage system helps organize and store important data made on a computer in an economical and available [2]. Organizations throughout all industries are launching new enterprise vital applications, which include CRM, BI, ERP, and SCM converting data into corporate strategic assets [3].

To maintain accomplishment in such a dynamic market, companies are looking for reliable storage systems that can manage well and defend important data of the business. These systems can evolve rapidly to control the expected information, which increases a complex for many conventional systems [4]. The corporations at the moment are gaining access to and dealing with the ever-increasing quantity of business enterprise records through modern storage networks.

There is a different technology of the Network Storage were that are Network Attached Storage, Direct Attached Storage and Storage Area Networks, which are called Network Arae Storage (NAS), Direct Attached Storage (DAS) and Storage Area Network (SAN), respectively [5, 6].

The DAS method consists of the inner server storage for each PC, as shown in Figure 1. It has some problem such as, it requires more storage administration, and if the server is down for any problem, it is no method to access data through the storage device.

Solve these problems by the NAS technology [7, 8]; The NAS also is a method for the data storage, which uses particular devices linked immediately to the network device as presented in Figure 2. those

devices are allocated an internet address then be accessed using customers thru a server that acts as a gateway to the statistics or in some instances lets in the tool to be accessed directly by way of the clients without an intermediary [9].
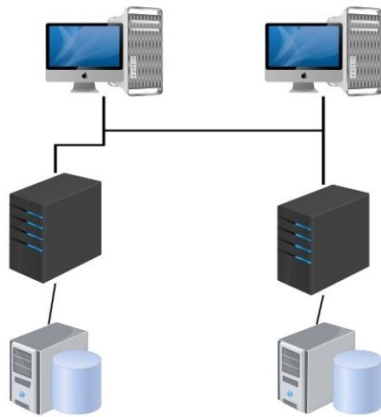

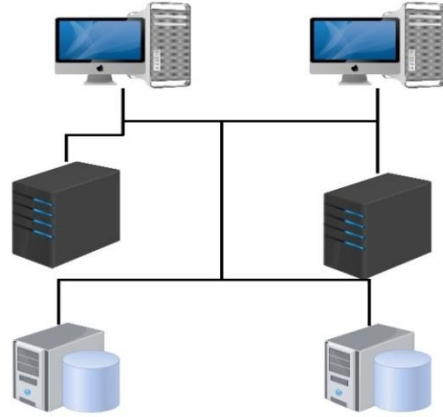Figure 1. The architecture of the DAS network

Figure 2. The architecture of the NAS network

Storage area network(SAN) enhances the connotation of data distribution [10, 11]. While a typical local area network(LAN) enables users and software to gain data held in a storage center, it transfers the data very quickly [12]. SAN system lets a couple of computer systems to transfer huge files simultaneously at fees similar to regionally linked disk devices over the system without affecting on the local networks [13, 14], as presented in Figure 3.
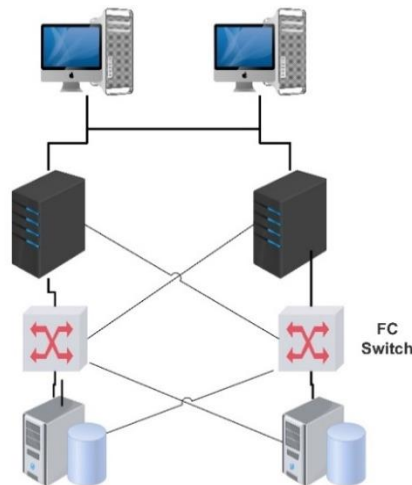

Figure 3. The construction of the SAN network

Many researchers have observed the SANs simulation: Authors investigates the SAN advanced by using the special simulation tool. The tool can be able to simulate the switch of the FC device and implements input and output links between storage and server devices [15]. The paper [16] encompasses the ability of [15] additional, which simulates many FC devices in a two-phase network structure. The research offered the tools to simulate the system, which is called a SANSim [17], the tool used for the arbitrated loop in the FC device with SAN system.

This paper proposes the SAN backup structure to increase the performance of the web page response time and traffic data by using OPNET simulator, which implements the network to evaluate the performance.

2.　OVERVIEW OF THE SAN SYSTEM

The SAN purpose is to move the information between PC systems and storage device [18, 19]. Communication structure in the SAN system contains a physical connection; PC and a layer of management , which arranges these links, devices to move data as a strong and safe [20].

Storage area networks (SAN) based on the fiber channel (FC), to provide a high transfer speed rate of the data [21, 22]. A SAN reduced the data islands due to the previous system (DAS).

SANs uses to attach storage server devices as a cluster for In the case of a failure of the main storage disk or the connections distributed between the servers and customers and generate alternate paths of data for high-performance computing surroundings [23, 24].

The first generation(1G) SAN offers 1Gb/s for half-duplex whereas the SAN in 2G provides double rates of data up to 1Gb/s for half-duplex and 2Gb/s for a full-duplex [4, 22]. The FC device requirement is a group of standards being advanced via ANSI and is good for storage multimedia and a huge of records.

The main objectives that made the SAN system important are the optimal consumption of the disks, which reduces the loss of storage spaces and the availability of disaster backup data, and it is advantageous because it is economical because it has few servers compared to other methods as presented in Figure 4 [25]. The storage area uses fibrous channels for its high speed of up to 200 Mbps and for packing purposes is 5% of general packing. This network is used to transmit data for a distance of 100 km.

The fiber channel uses the SCSI protocol, which is used to transmit data with a high bandwidth of up to 1 GB. This protocol became a standard by the American National Standard and Institute International Committee of Information Technology Standard. The invention of FC was primarily for use in a manufacturing environment. FC consist of two parts and seven layers, each of which has its functions, as shown in Figure 5 [25].
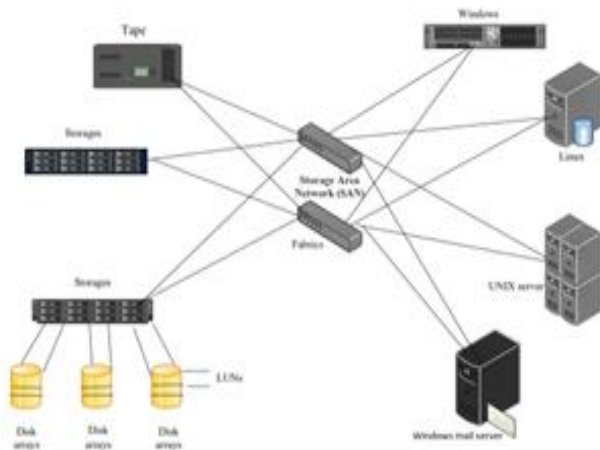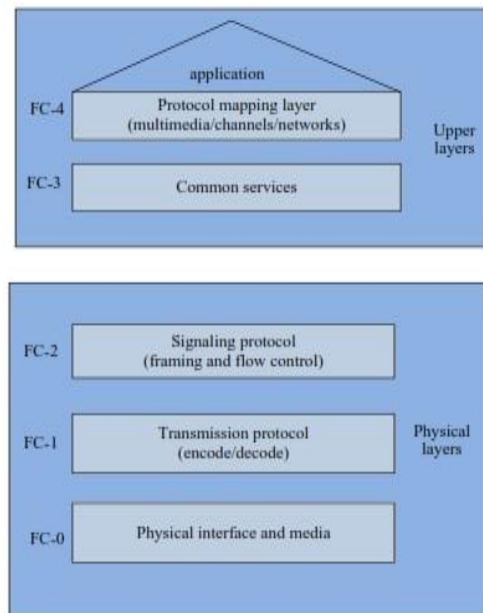

Figure 4. Component of SAN system　　　　Figure 5. The architecture of the FC protocol

3.　SIMULATION OF THE PROPOSED METHOD

The proposed method has been used the backup server and backup storage which is connected to the FC switch to add flexible in backup case. The data is not transferred by the Ethernet links. In the san network, the data stream is traveled to the backup server over the LAN network, the FC is used only to transfer the backup data from server to storage. The new design in the proposed network offers a higher response time than the SAN network. OPNET 14.5 tool has been used to implement the traditional SAN networks and the proposed network, as shown in Figure 6 and Figure 7, respectively, the internet service applications such as (FTP and HTTP) were used to evaluate network performance,
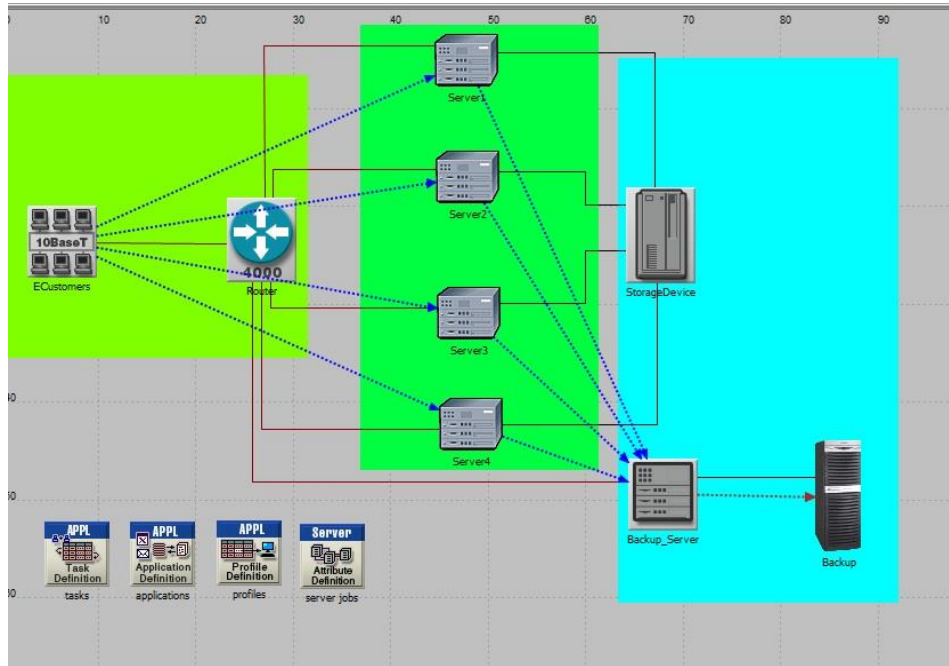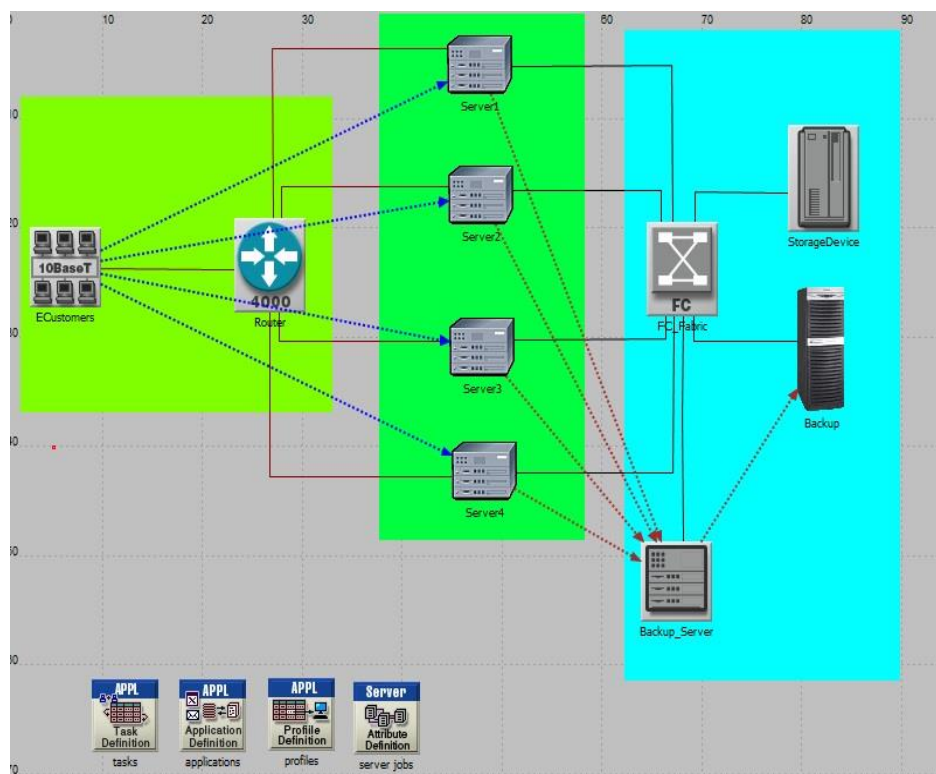
Figure 6. The SAN traditional

Figure 7. The SAN proposed

4.   RESULT

Figure 8 shows the FTP traffic received between the SAN network and the proposed network. The traffic received of the proposed network pro is higher data rate than of the SAN network, the proposed network is around 141 bytes/sec on this as opposed to around 136 bytes/sec in the SAN networks.

Figure 9 illustrates the download response time in FTP between the SAN network and the proposed network. The response time of the proposed network pro is lower response time than of the SAN network; the proposed network is around 0.013sec on this as opposed to around 0.021 sec in the SAN networks.

Figure 10 presents the page response time in HTTP between the SAN network and the proposed network. The response time of the proposed network pro is lower response time than of the SAN network; the proposed network is around 0.018 sec on this as opposed to around 0.03 sec in the SAN networks.
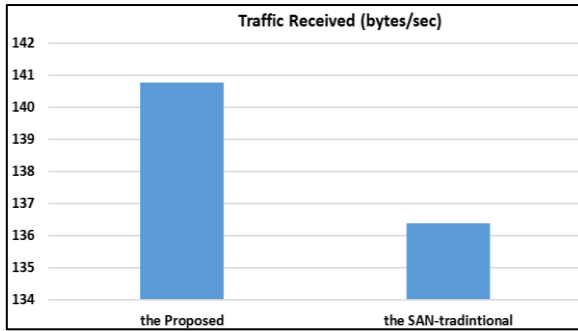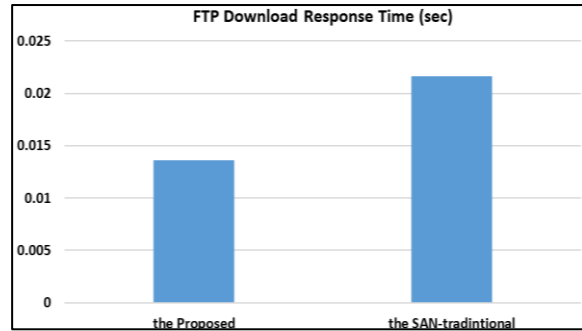

Figure 8. FTP traffic received
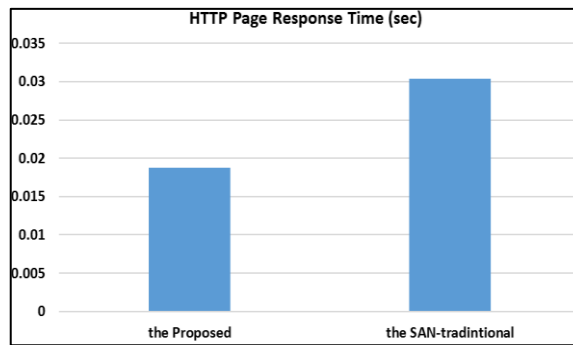

Figure 9. FTP download response time

Figure 10. HTTP page response time

5. CONCLUSION

The paper has improved the SAN network; the OPNET tool is used to simulate the proposed network by using a difference of application such as FTP and HTTP, the proposed network is used FC switch to improve the performance. The comparison of the evaluation is traffic received and response time parameters. The result is shown the proposed network is better than the SAN network is about 36 % gain in response time while the traffic data is increased by about 3%.

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