ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

An ISO 3297: 2007 Certified Organization Vol.3, Special Issue 1, February 2015

National Conference on Computing and Communication (NC[3] 2K15)

Organized by

Dept. of CSE, CARE Group of Institutions, Tiruchirapalli-620009, India on 27th February 2015

Network Attached Storage for Data Back Up Over a Local Area Network

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ABSTRACT: The Paper was envisioned to provide a reliable data backup for a critical data. The data stored in a computer may be lost because of user error, data corruption, hardware failure. The heavy dependence on computers as data storage mechanisms could be justified only if proper backup facilities are available to accommodate critical failures. The usual backup strategies heavily depend on backing data to a single disk or tape attached directly to server. This approach has many significant drawbacks. This project develops a system in which the critical data to be backed up is stored in the form of distributed backup mechanism using LAN, extending this backup to provide a more reliable storage through an external storage device and to develop a protocol for the backup of the data over the intranet through the introduction of the external storage device.

KEYWORDS: Distributed Data Backup,LAN, NAS

I. INTRODUCTION

As the computer system has developed much in this highly information-oriented society, database security has become a very important problem and its backup strategies need to be made more efficiently and safety. The data stored in a computer may be lost because of user error, data corruption, hardware failure or because of disaster. In order to save data from data losses many methods have been adopted by industries and educational institutions. The most common methods of backup are disk to tape backups like Direct Attached Backups, Centralized LAN backups, LAN free backups etc. and disk to disk backups. In Direct attached backup strategy we backup servers by directly attaching at tape backup unit to each server and to backup stored data. In a centralized backup server strategy a designated server known as backup server is used. The backup server manages backup of all data associated inall servers to a tape attached directly to a backup server. In LAN free backups, in most of the cases we make use of Storage area networks (SAN). Storage area networks are dedicated high speed networks containing a large number of storage elements and a number of servers manage the backup of data to these storage elements. NAS servers are dedicated file servers that function to store and retrieve files for other general purpose servers and computers.Whereas general-purpose production servers are loaded with applications that consume storage, NAS servers are stripped of unnecessary hardware (there is no monitor, keyboard or mouse) and software applications, and use only those components of the operating system required for file serving, thus maximizing the disk space available for storage. Network-attached storage(NAS) is file-level computer data storage connected to a computer network providing data access to heterogeneous group of clients.NAS is a specialized computer built from the ground up for storing and serving files. Finally we have to develop an intranet sharing protocol in which we develop a protocol to backup the most critical data in another LAN.

II. SYTEM DESIGN

DISTRIBUTED DATA BACKUP

Distributed data backup allows us to backup the critical files over the LAN. Initially, LAN based protocol provides the data storage over the set of nodes. The system is designed in such a way that it is scalable and adaptable with

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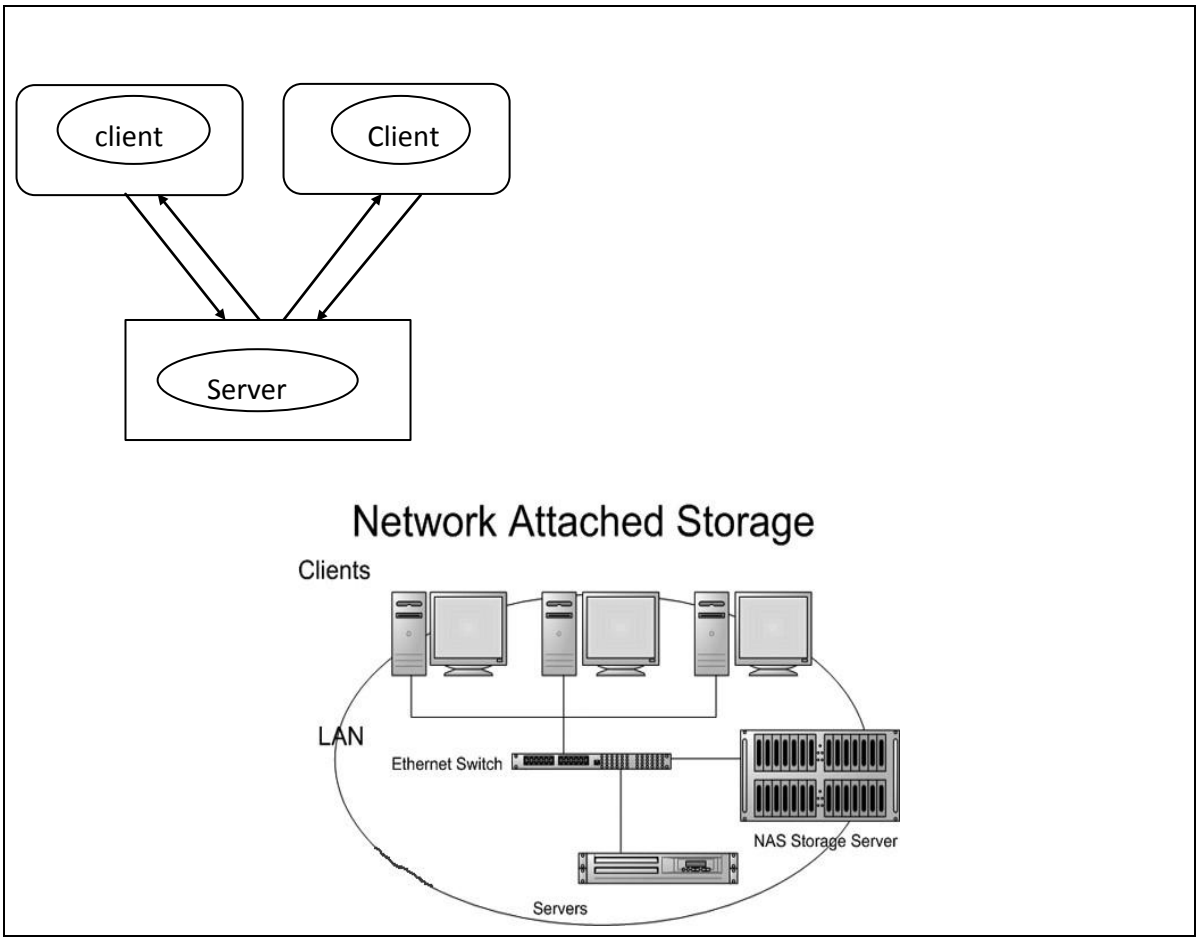
succeeding phases. It is based upon the client-server model which maintains a server to monitor the whole transactions and client details and it does not store that critical data. It will only manage the transactions. Hence the failure of server does not affect the backed up data.

NETWORK ATTACHED STORAGE

NAS servers are dedicated file servers that function to store and retrieve files for production servers. NAS technology fundamentally changes the existing model by removing storage from the production servers and placing it on separate devices that directly attach to the Ethernet LAN. The server can freely write to or read from the NAS. A program is developed through which one could write, retrieve and delete files in the NAS. This gives the user an additional option to save a copy of his critical data to the NAS also.



III.PROPOSED ALGORITHM

Client and Server Side Implementation This phase was implemented in a Linux environment. The central server which decides upon data backup over different clients belonging to the group in a lightly loaded node manner. The implementation of client side requires two processes to run continuously once the client has joined the group.

i. Client listens predifned message from serverie "ARE_YOU_UP".

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ii. If any client is alive, it sends back a message "AYU_Answer" to the server. This is used up by the server to determine which all nodes in the group are currently up in the network. Client will also always listens through a predefined port using TCP for any user initiated message from the server. The process may receive three kinds of messages from the server.

1.SAVE : It is to save a remote file in the node. The user specifies the filename to be saved. After that a message is sent to the server to save the file. After this file is opened and sent to the server for backing up. Server sends back the target node and target filename in which the file is backed up.

Message format Client to Server:

SAVE: FILENAME:FILESIZE:END Server to target node: SAVE: SOURCE NODE: SOURCEFILE:FILESIZE:END Target node to server: SAVED: TARGET FILENAME:END Server to client: SAVED:TARGETNODE:TARGETFILE NAME:TIME:END

2. RETRIVE: RETRIEVE A FILE

When the user specifies the filename to be retrieved, after performing some initial error checking, client sends a retrieval message to the server. The retrieved file will be saved in the folder „retrieved".

Message format Client to server:

RETRIEVE:FILENAME:END. Server to target node: RETRIEVE:TARGETFILENAME: FILESIZE:END

3.DELETE: DELETE A FILE

When the user specifies the filename to be deleted, after performing some error checking like checking whether the file was saved or not, client sends a deletion message to the server specifying the filename to be deleted.

Message format Client to server:

DELETE:FILENAME:END server to target node: DELETE:TARGETFILENAME:END

Client and Server will also passes the messages like join, unjoin, view saved files inorder to add to the group, leave the group and to view the critical with saved name done by the client.

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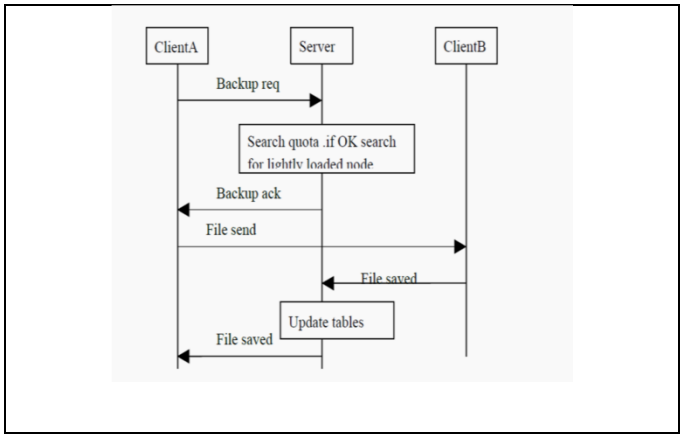
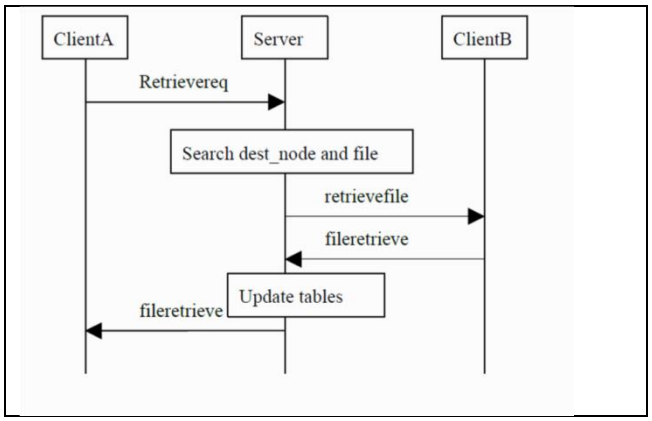
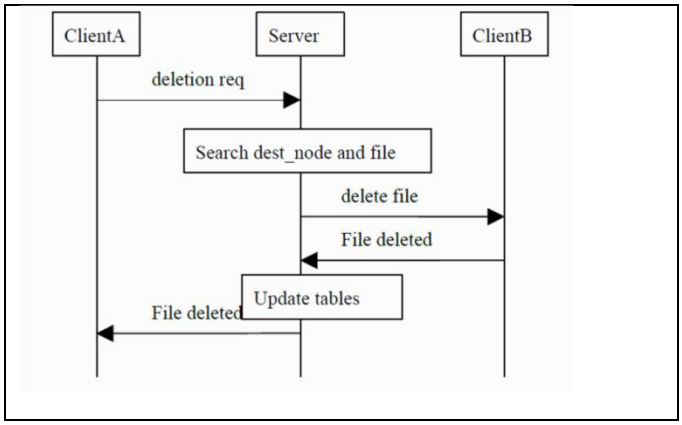
JOIN PROCEDURE:



RETRIVE PROCEDURE:



DELETE PROCEDURE:



NAS Implementation

The second phase of the project, an external storage medium, an Iomega NAS, was purchased and configured for using in the software lab. We configured NAS as a network hard drive. It is configured with the static IP address and a unique

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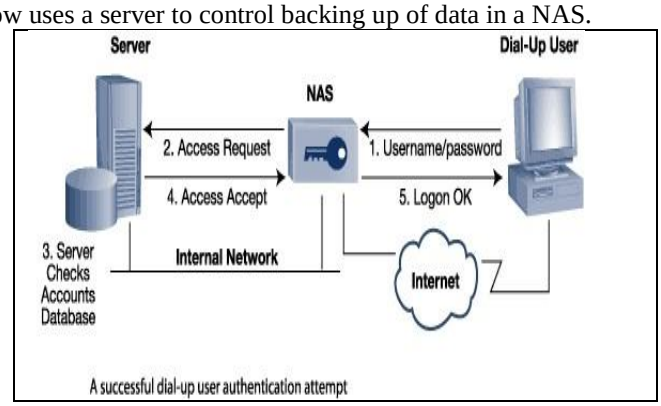
name. The NAS was configured at the site using its IP address. The NAS was configured so that user logins can be created and quotas can beprovided. NAS will be accessible only to those users who are in the samework group of the NAS. The NAS can also be remotely mount to a machine by usingcommand 'mount -t smbfs -o username= (user), password= (pass) software lab/ /path/to/mountpoint'. All the sharing, user creation, maintenance, quota setting etc. can be configured at the site by administrator and the critical data is stored in NAS also. Thus, critical data to an external storage device, a NAS, in addition to store it on a remote node. This increases reliability and availability of the backed up data. Design shown below uses a server to control backing up of data in a NAS.



IV.TESTING AND VERIFICATION

The testing and verification of the project was done on an incremental basis. The programs for performing broadcast in the LAN are developed and tested first. The programs are tested in the Linux machines of the software lab. Next server and client programs are developed and deployed in the Linux machines of the software lab. Testing and verification of each program is done separately. All the programs are then integrated and tested together using GUI and verified.

V.CONCLUSION

Software for the critical data in a LAN was developed. The software could perform backing up of files in remote nodes, deletion of files from remote node, retrieve files from remote node, join the group and unsubscribe from the group. The software is also provided with an easy to use graphical user interface. A program was developed through which one could write, delete, and retrieve files to the external storage medium NAS which provides an additional reliability for data storage.

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