

## File Sharing System Using Samba For Mathematics Laboratory

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### ABSTRACT

In the computer laboratory of Mathematics Department previously installed in the network of Novell Netware 5 operating system. But file sharing problem is when client upgrades the operating system. The server can not be accessed from the client. So finally the data management was decided not to go through the server. Another constraint is not being able to update regularly, so it certainly will be vulnerable to viruses. Within 1 month required to re-install twice because of virus attacks, malware, and others. The idea is to build a network which is server-based integrated, and make improvements on the server side system more effective and efficient, and safe from hackers or viruses. This research also contributes to the realization of green computing that supports the commitment of college conservation.

Keywords: file sharing, server, conservation

### 1. Introduction

The development of technology is developing all the time. This affects the complexity of the development of computer laboratories in an educational institution. In this case is a computer laboratory at the Department of Mathematics at Unnes. The main problem is file sharing. File sharing is a system where users can share files and storage sources with a client-server concept run over the network [6]. File sharing issues occur when the client upgrades the operating system, the server is inaccessible from the client. Previously, in the computer laboratory at the Department of Mathematics installed Novell Netware 5 operating system on the network. Novell is an operating system like Dos, Unix, and Windows operating systems that are installed on a network in a laboratory or organization [1]. This is the first value provided by a security on a computer network [7]. Based on the above problems, then an idea that arises is to form an integrated server-based network. In addition, it is also necessary to make system improvements on the server side more effective and efficient. Then the expected network server is more secure than hackers or viruses. Development of an integrated network server is intended to make use of resources in terms of both hardware (hardware) and the software (software) efficiently [4].

Possible solutions are Green Computing data centers, ease of working and tidy data storage. Also with data center technology, all data will be centralized in a computer server. Then grant permissions to the client, so unauthenticated users can not access the data contained on the server [3]. This solution also considers the vision of Semarang State University as a conservation college, which has a policy of developing information technology and upgrading supporting

facilities. Samba is chosen because Samba is a software that works on Linux, Unix, and Windows operating systems that use SMB (Server Message Block) Protocol Network. Samba is a data communication protocol that is also used by Microsoft and OS / 2 to display Client-Server networking functions that provide file and printer sharing as well as other related tasks [2]. In the previous research explained that the utilization of Samba Server technology makes the performance at Fasilkom University Mercubuana Laboratory more efficient because it no longer uses external hard drive, but simply by opening Samba Server through Windows Explorer [3]. While research conducted by [4], proves that the use of an integrated server can save resources about 25%, both fund and hardware. This is because the new server does not use the local server in each class.

In this research, the method used is PPDIOO (Prepare, Plan, Design, Implement, Operating, Optimize) developed by CISCO. This method is used in the design of network systems because in this research carried out the implementation of server development as an online storage infrastructure [5].

## 2. Research Method

The research method used is PPDIOO. The existing phases in the PPDIOO method are prepare, plan, design, implement, operate, and, optimize. Figure 1 below shows the PPDIOO scheme.

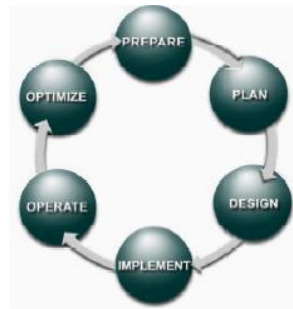


Figure 1. PPDIOO Method Scheme

The first stage in this research is *preparing* the stage of work planning in terms of technology needed to build server automation in the form of providing online storage for the Mathematics Laboratory UNNES. Things that should be done include preparing the appropriate technology to the needs, design, and implementation process. The next stage is the *plan* stage, where the analysis is done in accordance with the needs that serve as a parameter before designing a network system. This process is to analyze the network topology previously used. In this stage you need to do is to analyze the needs and problems. For requirements analysis, laboratory administrators often find it difficult to install the client. This is because the installation should be done twice in a month, and certainly require more time and effort. Therefore, it takes automation for the server.

The next stage is the *design* stage which describes the process of the user that will be implemented on the service Infrastructure as a Service. There are two users contained in this system, the admin and client. The administrator works to create a new user, supervise the server, and remote access management of all clients. The second user is the client as user service, which has the function of creating and accessing files stored on storage. The next stage is *implementation*, where is everything that has been planned and designed is expected to be precise with the analysis. The implementation phase is the stage that determine success or failure of the system to be built. This stage starts from Ubuntu Linux installation, static IP settings, create infrastructure of Active Directory with Samba 4 in Ubuntu, until the join domain testing process. The results will be described more deeply in the next discussion.

The next stage is the *operate*, which is the phase of system and server testing is running in real time. One of the processes in this phase is to manage the Samba 4 Active Directory infrastructure

from Windows 10 via RSAT. Once the server is installed and configured, it takes a tool for management to simplify administrative activities. The tool used is RSAT (Remote Server Administration Tools), which is a Windows Server component that serves to manage other computers that are in the network (as a client). Currently, Ubuntu based server have been configured to play a role to Active Directory. However, Ubuntu server basically does not use GUI, and the management of AD-DC (Active Directory Domain Control) based text. Certainly need to work harder in terms of user administration management, then facilitated by RSAT to manage the server. Another process that is carried out in this stage is create user home directory automatically, put the home folder to the user and mapping network drives with Active Directory Group Policy. Next is the *optimization* stage. Maintenance system will be do for a more optimal system performance. Testing is doing by monitoring and analysis on system which have been built and operated. If there is a shortage of the system and become less efficient, then maintenance will be do.

### 3. Results and Analysis

In this section, it is explained about results of research. The initial phase is to analyze the needs and analysis of emerging issues. From needs analysis, laboratory administrators often have trouble when the client installation. This is because the installation should be done twice in a month, and certainly require more time and effort. Therefore, server automation is needed. The next process is to install Ubuntu Linux, set up the server name, set the static IP, and set up the domain name. Here is the process of activities that have been done.

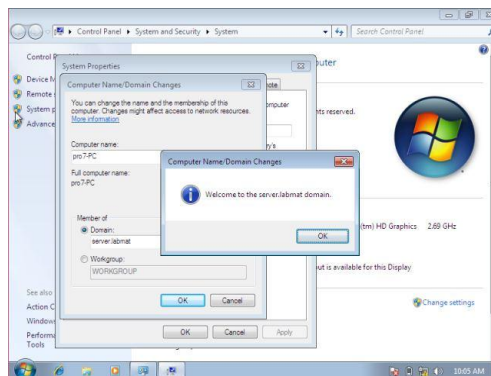


Figure 2. The Process of Setting Up a Domain Name

Then the next step is to make sure to connect to the internet, make sure the server can be Ping from the client, and create an Active Directory infrastructure with Samba 4 in Ubuntu. In this case, the technology used is Active Directory Domain Control using Samba 4. Samba is an application from UNIX and LINUX, known as SMB protocol (Service Message Block). Active Directory is a directory service owned by Windows Server, a network operating system from Microsoft. The database contained in Active Directory stores all the resources contained in the network, as well as computers that have been joined to a domain, a list of user accounts and user groups, shared folders, and more. Meanwhile, its directory services make information stored in the database accessible to users and apps. Actually the Active Directory is an implementation of the Lightweight Directory Access Protocol (LDAP) protocol.

In the Active Directory infrastructure creation process, some of the processes are configuration initialisation for Samba 4, install packages for Samba AD DC, provision of Samba 4 AD DC for domains, and Samba configuration. Samba is an application created in solving a problem related to Windows and Linux. Because both operating systems have a different environment. Samba is an open source application that is used to perform data sharing. Samba is an open source application that is used to perform data sharing. The advantage of using Samba is only one data access authority, so it can use the authority has been created in Linux to access data from Windows. In addition, file sharing can be done from Windows as well as Linux flexibly. Samba 4

is used because it can utilize the necessary technology at an affordable price. System servers also become quite safe by minimizing the vulnerability of Microsoft's operating system against viruses. Samba 4 can be used as an alternative Domain Controller with open source applications. Of course, to do this not only know a bit about Linux, but also know about Active Directory Domain Control, especially in the user management section.

The next process is to backup client computer, create windows in VirtualBox, test the result of Linux installation via virtualbox host, testing join domain, and manage Samba 4 Active Directory infrastructure from Windows 10 through RSAT. First, it is necessary RSAT tools folder in the companion has been prepared RSAT-7 for Windows 7 and RSAT-10 for Windows-10. Inside each folder there are versions 64 and 32, the steps to install these tools are more or less as follows :

- Install .NetFramework 4 first (prepared NDP462-KB3151800-x86-x64-AllOS-ENU.exe).
- DNS The client computer must use the AD server time (the AD server is used as the default DNS for the client).
- Time on the client compared to the time on the server must be the same, use AD as the time server.
- Computer on the client must join the domain.

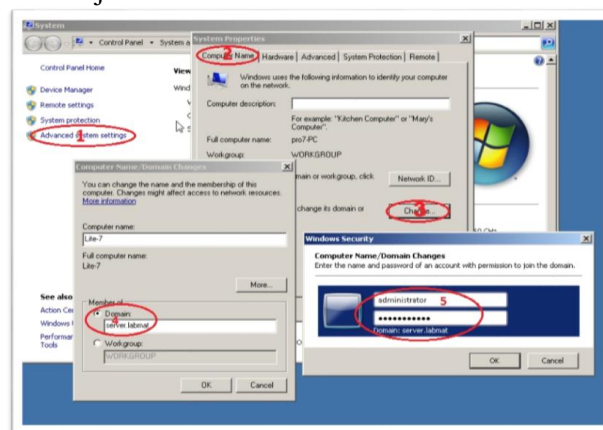


Figure 3. Join Domain Activity

- Restart the client and use the admin user (user who becomes the AD admin domain) to login to the computer.
- Installing RSAT, by downloading RSAT installer first.
- After the download and installation is complete, reboot the computer to install windows update.
- After reboot, open Control Panel -> Programs (Uninstall a Program) -> "Turn Windows features on or for" then check all Remote Server Administration Tools.

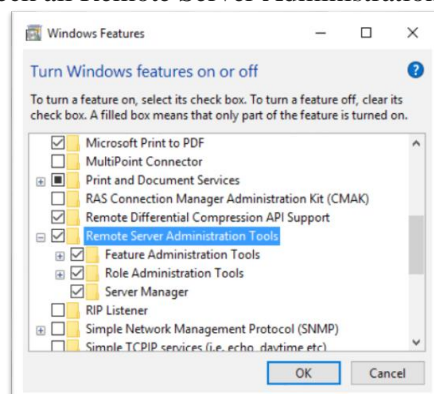


Figure 4. Check the Remote Server Administration Tools

Then the most important thing in automation is to create user home directory automatically. Be sure to install .net framework 4 and Office 2007 or later (to read .xlsx files). Then open Active Directory Users And Computers. Then create OU (Organizational Unit) Student to accommodate student user in the way as in following picture.

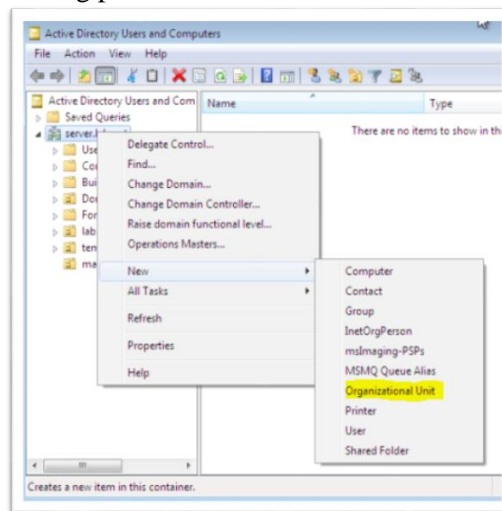


Figure 5. Create the Organizational Unit Activity

Next in the tools folder, open the folder ADBulkAdmin, and data can be loaded as needed. In AD Bulk Admin, click Settings, then fill in the required form to test the connection like the following picture, then test for the connection.

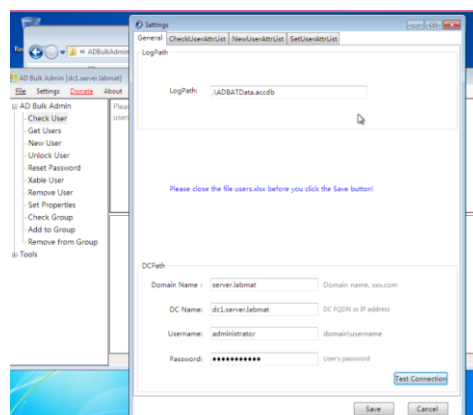


Figure 6. Test Connection Activity

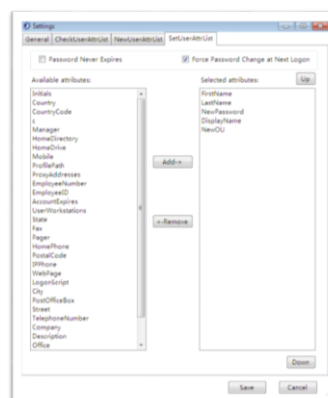


Figure 7. Content Customization Activity on the SetUserAttrList Tab



Figure 8. Appearance of Matched Content

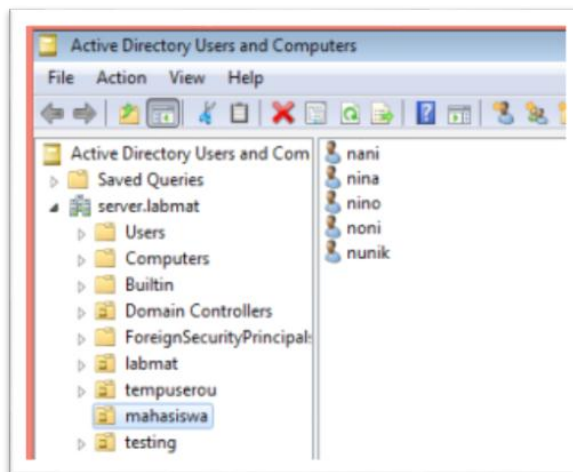


Figure 9. Display of Student OU after successful notification

When it comes to this stage, then all data can be registered to the server easily with a password that has been determined. But to create the Home directory of each user on the server, then the next step is necessary. The next step is to put the home folder into the user and mapping the network drive with Active Directory Group Policy. To create drive map can use the GPO (Group Police Management)

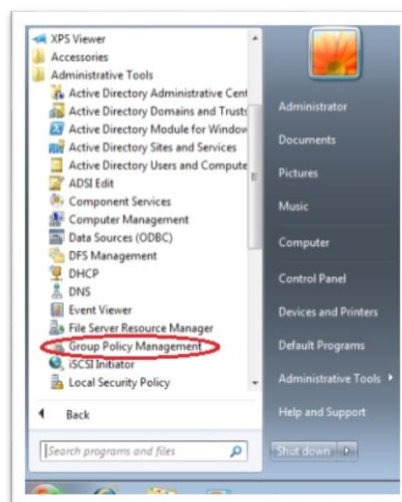


Figure 10. Create Map Drive Using GPO

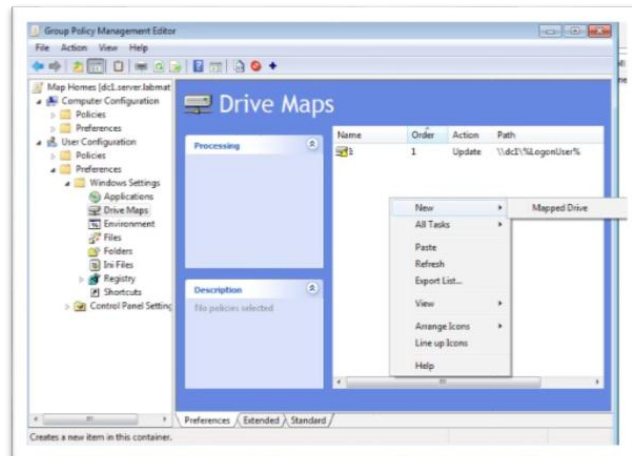


Figure 11. Group Policy Management Editor

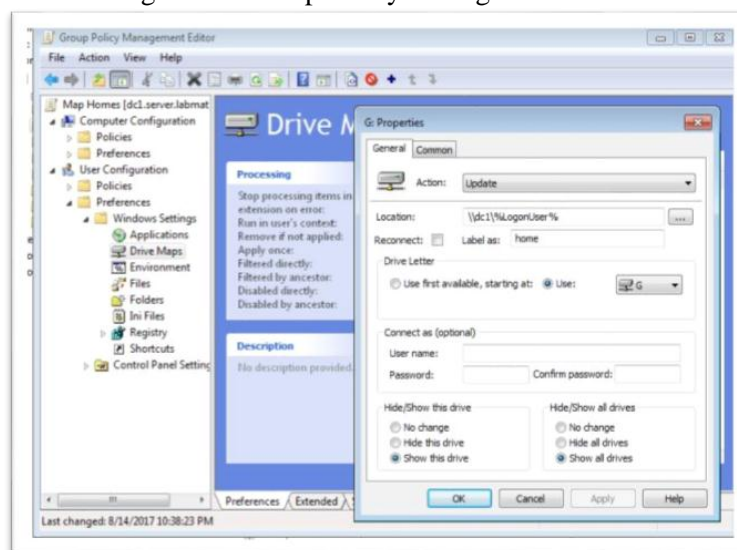


Figure 12. Mapped Drive Activity

#### 4. Conclusion

The conclusion that can be drawn from this research is a network based server integrated more secure than viruses or intruders. In addition, server side system improvements will be more effective and efficient. This research also contributes to the realization of green computing that supports the conservation vision of university, which one of its policies is the utilization of information technology by doing system development and improvement of supporting facilities.

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