

# Effectiveness of the Application Clonezilla to Clone Image with Ubuntu Server 12.04 and Samba Server

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**Abstract-** The computers owned by Fasilkom more than 30-45 computers are available in six classes. It is considered to be less effective considering by Fasilkom laboratory staff and must clone around 208 computers. So from the results of the analysis, a method was made to measure the effectiveness of installing a computer using a computer network with the Clonezilla application, Ubuntu 12.04, and the samba server. The standard parameters of ISO 9126 namely time, number of computers, costs, laboratory performance, and utilization. The process of resizing the master clone image still has a disadvantage in terms of the transfer rate were to restore the image clone will take four hours to ten computers, but from the work side during the process carried out the laboratory staff can still do other work without having to wait for the cloning process to finish.

**Keywords-** Samba Server, Clone, master clone, Computer.

## I. INTRODUCTION

In LAB Fasilkom to install operating systems and applications on each computer, it is usually carried out by a laboratory team with only two members. The LAB Fasilkom laboratory in installing computers must first create a master computer, where the main computer will be used to clone after one computer is used as a cloning master to install the operating system or application needed at the LAB facility. Moreover, the computer will be cloned to the external hard drive and master clone and will be created using the Clonezilla application. After that, the finished cloning master will be used to restore the hard drive to each computer that will be installed on each computer in the Fasilkom LAB room.

The problem faced was the number of external hard drives owned by Fasilkom LAB, only two, two external hard disks were used to install around 30-45 computers for each Fasilkom LAB room consisting of six Fasilkom LAB classes. This problem happened because to install one computer, it takes at least 40-50 minutes to complete it, and the two workers must keep guard in the class and wait until the cloning process is complete. When finished, the laboratory will remove the external hard drive containing the cloning master to be transferred to another computer that will restore the hard drive. In this study, this will produce how efficiently computers are installed through networks. In this research, an analysis of the quality of the effectiveness of performance in installing computers using a network will be analyzed [1].

To be able to avoid problems that occur can use technology to install computers with network media; the need for external hard drives to store cloned masters is no longer needed. To be able to use the cloned technology in the network that is needed is a Linux server with the samba server application is an application that is used as a bridge to connect directories to the Linux and Windows operating systems [2][3]. It can be avoided by network installation technology using the Clonezilla application, and the need for external hard drives as a place to store master clones is no longer needed. It is because when using the network cloning technology needed is a Linux server with the Samba and Clonezilla application as a server application to create master clones and restore clone the hard disk to the client computer [4].

## II. RELATED WORK

### 2.1 Clonezilla

Clonezilla is an application that is used to clone a hard drive and restore result clone to the computer that will be a clone. This Clonezilla application has features, among others [5]:

1. Partition Imaging (disk imaging)[6].
2. Cloning tools which similar with Norton ghost.
3. Mengkompres image cloning.

Transfer cloned images using Samba, SSH, NFS Server, external hard disk, and USB flash drive.

The working principle of Clonezilla is to create a master clone from a computer that has an operating system installed and the required application, then Clonezilla will create an image file that will be used to restore the operating system and applications that make images into operating systems and applications that can be used on cloned computers [7]. Fig 1 is a general description of all Clonezilla applications that run on bash shell scripts. Clonezilla is an application that runs without booting from the hard drive but from Universal Serial Bus (USB) with Linux booting in it [8]. Components included in Clonezilla include the following modules :

1. pre-processing
2. partition table processing
3. partition image processing
4. post-processing

## 2.2 ISO 9126

In 1991, ISO was introduced in an international consensus to see the characteristics of a software product that was produced based on the evolution of the years. ISO

9126 is a model provided to see the quality of a software comprehensively [9]. ISO 9126 has two crucial things, including (1) understanding the quality attributes seen from internal and external, (2) See the quality of the attributes used [10].

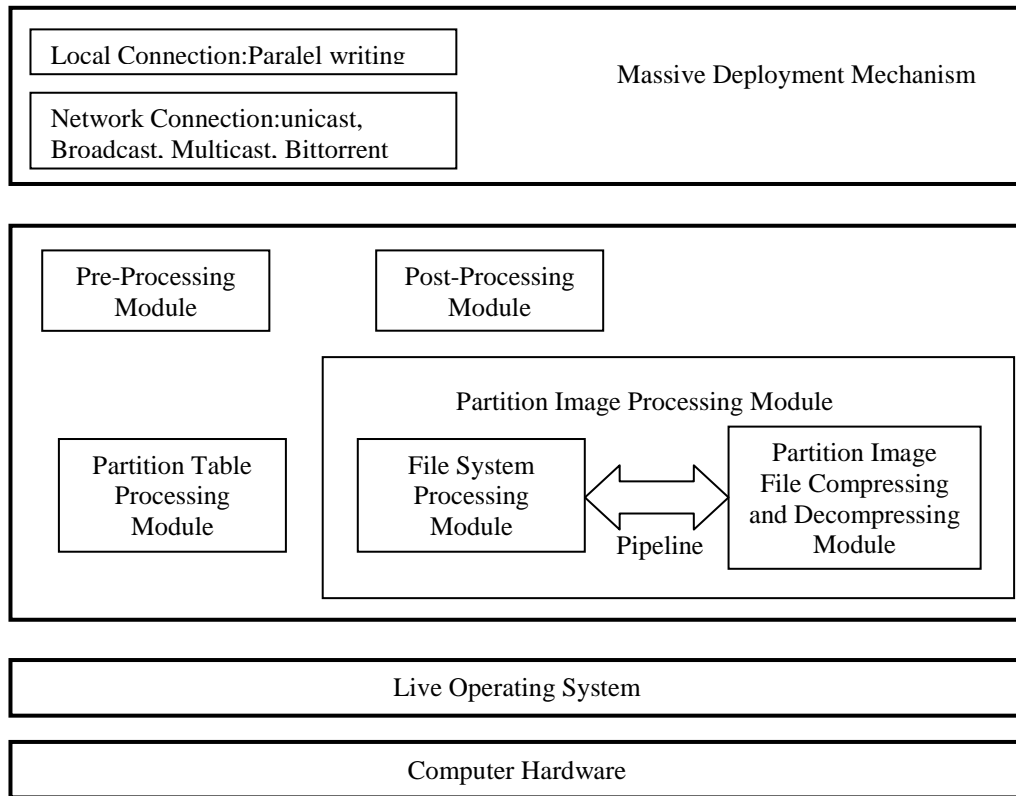


Fig 1. The proposed system architecture for system deployment [4]

ISO-9126 has been used as the basis for the Quality Model that has been adjusted to the problem conditions that exist in the organization. One of the features is that the terminology regarding software quality has become standard.

In figure 3, it is clear that the model of quality in use has the characteristics used by each software. The following are the advantages of using ISO 9126, among others [11]:

1. We can unite and take measurements from various perspectives to achieve software quality requirements.
2. Have a standard model so that if need to make a comparison with other software products, it is quite easy.
3. All characteristics that exist at ISO 9126 can be implemented in all existing software.
4. ISO 9126 includes all the characteristics contained in software such as hierarchical structures; evaluation criteria; whole phrases and terms; accurate and straightforward definition; and many relationships between the various layers of the model.
5. ISO 9126 has supported the strategic decision-making process to avoid costly spending on software developers.

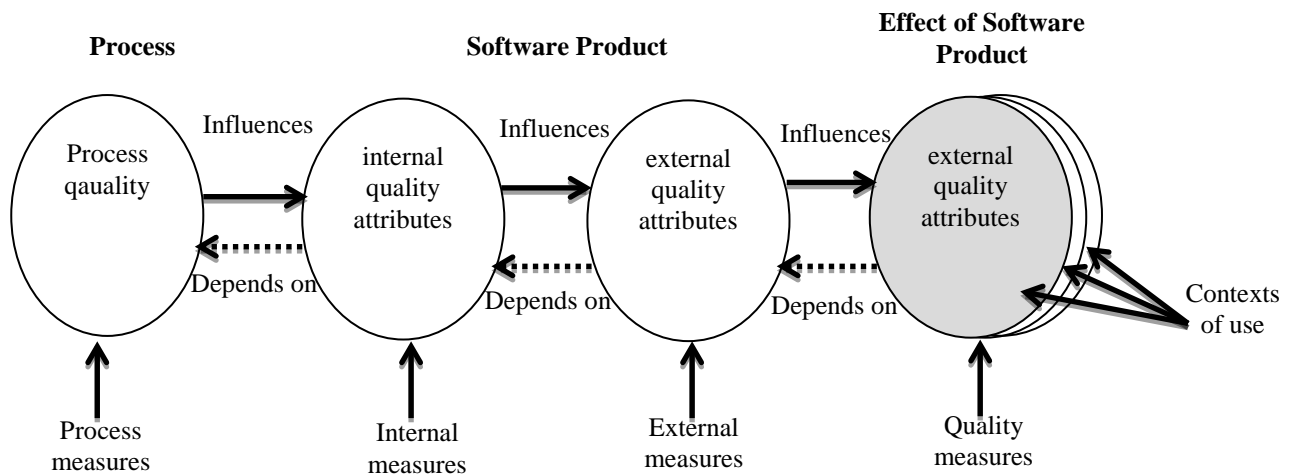


Fig 2. Quality Software Development Cycle [10]

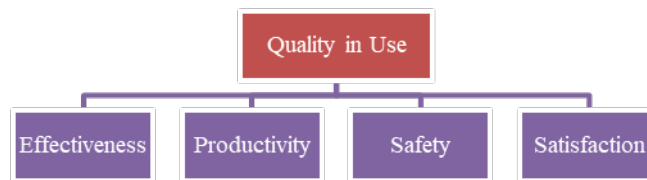


Fig 3. ISO 9126 Quality In Use [10]

ISO 9126 – Fig 3 Technically regarding the steps that the ISO quality model has is used to describe several metrology - problems that have occurred from ISO 9126 in the late 2000s. There are so many problems in choosing the

right measurement software, but there have been very significant changes so far there are four characteristics in ISO 9126 [9].

Table 1 Quality in Use [9]

Quality Characteristic	Derived Measures
<b>Effectiveness</b>	<ul style="list-style-type: none"> <li>– Task Effectiveness</li> <li>– Task Completion</li> <li>– Error frequency</li> </ul>
<b>Productivity</b>	<ul style="list-style-type: none"> <li>– Task time</li> <li>– Task efficiency</li> <li>– Economic productivity</li> <li>– Productive proportion</li> </ul>
<b>Safety</b>	<ul style="list-style-type: none"> <li>– User-health and safety</li> <li>– Safety of people affected by the use of the system</li> <li>– Economic damage</li> <li>– Software damage</li> </ul>
<b>Satisfaction</b>	<ul style="list-style-type: none"> <li>– Satisfaction scale</li> <li>– Satisfaction questionnaire</li> <li>– Discretionary usage</li> </ul>

### III. METHODOLOGY

The methodology has been used has two phases, namely exploring the concept and analysis phase. In the exploration phase, the concept discusses the problems faced and looks for literature studies related to the existing problems, namely

about ISO 9126 regarding internal and external measurements of Clonezilla software and samba server. Then in the analysis phase will display a statement received directly from the Fasilkom Lab laboratory team regarding the

advantages and disadvantages of the Clonezilla application and the samba server compared to using an external hard disk to clone the image more fully can be seen in Figure 4.

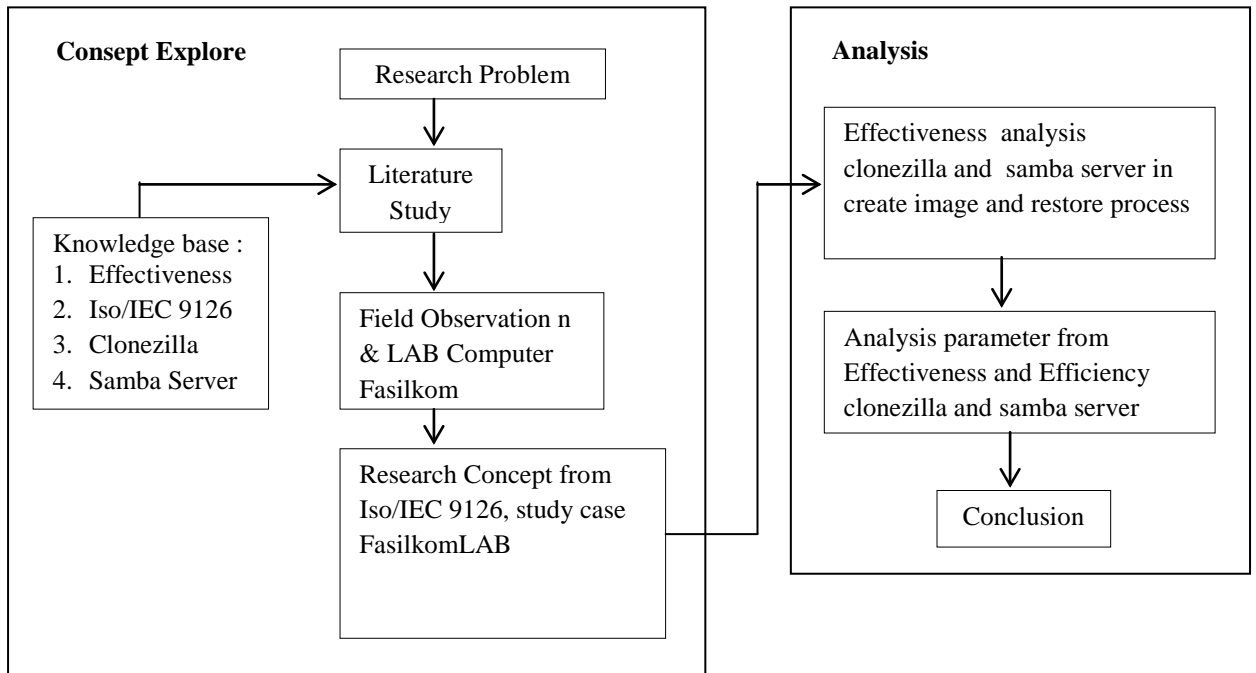


Fig 4. Research Methodology

This research has three critical stages in its implementation, including the following :

### 3.1 Concept Exploration

In the first stage, exploration of the concepts from the formulation of problems that were previously known will be carried out, then look for literature studies on the concept of efficiency. Clonezilla and samba server, after knowing the concept of intent and purpose, then making observations to the field in the case here conducted field observations in the Fasilkom LAB room and made sure all computers in the lab room were connected to the infrastructure network. The results of field observations will produce a concept and information that can be used in the process of installing computers through networks and as a basis for making an analysis.

### 3.2 Analysis

In this analysis phase, the effectiveness of the parameters of using the network infrastructure as a substitute for an external hard drive will be seen whether it can be used to replace an external hard drive. Then seen from the efficiency, it will be seen how long the process carried out using an external hard drive compared to using a network other than the time which is a parameter of the efficiency of the number of computers is also a success factor. Samba server that is used in the process of storing image files which will later be used as a server to restore data throughout the computer that is in the LAB Fasilkom.

### 3.3 Conclusion

In this conclusion, it will be known how much effort is given from Clonezilla and the Samba server to replace the use of an external hard drive to install the computer.

## IV. RESULT

Analysis of the effectiveness using *framework* ISO/IEC 9126 about the quality of using the software as shown in Figure 3.

### 4.1 Quality in use

The quality of this Clonezilla third-party application can be guaranteed to be 100% successful in creating an image and restore images. So that the process of cloning the hard disk on a computer can run entirely without any damaged data caused by the Clonezilla application.

### 4.2 Effectiveness

The effectiveness of the Clonezilla application and the samba server can be seen from how many flash disks it has. The assumption is for one computer to have one Clonezilla flash disk boot, the flash disk will be used to boot to the Clonezilla application, then after entering the Clonezilla application, the next step is to create the image and restore image process. What makes Clonezilla and samba server applications more effective than using external hard drives are that image storage is that external hard drives can only be used as much as possible external hard drives, in this case, Fasilkom LAB only has two

external hard drives that must be used interchangeably. By waiting for the cloning process to finish, the next process can be done to clone the next computer, and so on, the process must be awaited by the laboratory team, and during the process, the team cannot do other work. After completing the image recovery process, the external hard disk must be revoked. Thus the process must be carried out continuously until the computer to be cloned complete. The condition of the current number of computers in the Fasilkom LAB classrooms is as follows :

Table 2 Condition of The Fasilkom Lab

NO	LAB	Number of Computer
1	C-113	35
2	C-114	33
3	D-203	32
4	D-204	33
5	D-205	34
6	D-206	41
<b>TOTAL</b>		<b>208</b>

From table 2, it can be seen the number of computers for each lab and can be ascertained if the computer installation process using only two external hard drives will certainly require time, and also many other jobs are ignored because the laboratory team must remain standby in the lab space when restoring image cloning. However, it is different if the image recovery process is done without using an external hard drive but instead uses the network as a media and the samba server as a storage place for image cloning files. By using the Samba server, the computer installation process is done only by connecting all computers to the Fasilkom LAB network and ensuring that the network in the Fasilkom Lab can be connected to the Samba server so that the recovery process can be done. After making sure the network is connected to all computers the next step is to prepare the flash disk to boot into the Clonezilla application after which the recovery process will occur to all computers connected to the Fasilkom LAB network. This makes the laboratory team unnecessary to wait for the recovery process to be completed so that the laboratory staff can leave the lab room. Other jobs can be done without having to worry about the process being stopped or error because this can happen only if the network is lost or the computer server suddenly dies. Because of this process, the Clonezilla application with the samba server is more effective than using an external hard drive where the laboratory team cannot leave the lab room and cannot do other work before the entire image restore process is complete.

#### 4.3 Productivity

When viewed from the productivity of third-party applications, this Clonezilla is near perfect, but in utilizing network resources, RAM and processors require

considerable resources. The Clonezilla application is still considered inadequate because this application still does not pay attention to the transfer rate that is owned by the samba server, although the bandwidth, RAM and server processor are enlarged. The transfer speed is still small, different from the transfer rate used on external hard drives, For external hard drives the transfer rate can reach 500 Kbps / 1MB of data, different from the use of a samba server with CPU processor Core 2 Duo E6650 @ 2.33 GHz, 2 Cores, 2 GB RAM and 60 GB hard drive capacity only get data transfer speeds of less than 100Kbps / 1MB of data. for core 2 duo processors and with 2GB of RAM and 60GB of hard disk capacity are computer specs that are sufficient to accommodate computers owned by Fasilkom LAB. But there are some that must be considered, namely the speed of transfer of hard disk and also computer network bandwidth provided by network administrators in Fasilkom LAB. It can be seen that in Figure 5 that installing computers using an external hard drive is faster than using a network.

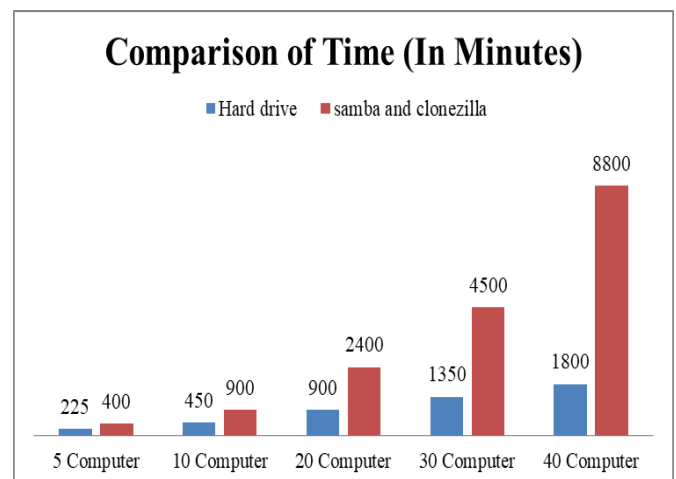


Fig 5. Comparison transfer rate image clone

From figure 5, it is known that the fastest transfer rate is to use an external hard drive, why because the speed of the external hard drive uses the speed of the RPM from the hard disk. For installing a computer using samba and clonezilla, using two things, namely the hard disk transfer rate and local network bandwidth, this causes the slower image image to be seen in both cases. Although the hard disk that is owned by the server has been replaced it is still the same, because the process must go through the hard disk speed and bandwidth on the network.

#### 4.4 Safety

The security of installing a computer through this network is safer and more secure than a team of laboratories that install computers through an external hard drive and return images to the computer one by one. This tendency allows the entry of viruses into external hard drives given that the Fasilkom LAB external hard drive not only stores cloned

images but also applications needed by computers in the Fasilkom LAB. It is different if using image cloning with a network, which is restored according to the cloning images that are on the Samba server without any viruses that infect the server. If the external hard drive is exposed to a virus, it is possible that restore images will be contaminated with viruses. But different when using the Clonezilla application and the Samba server, the Samba server is only used to store image cloning of the Fasilkom lab computer besides that the Samba server also uses the Ubuntu 12.04 Linux server which has been proven to be compatible with the Linux operating system variants that are minimal with virus attacks and high network security.

#### 4.5 Satisfaction

The satisfaction level of the Clonezilla application and the samba server is satisfying for the LAB Fasilkom laboratory team where the team's work is no longer focused on the process of restoring the image to the computer. However, when the image restores process occurs, the laboratory team can do other work without waiting for the image restore process to finish. Analysis Parameters of effectiveness on clonezilla and samba server can be seen from several parameters as in Table 3:

Table 3 Effectiveness Of Samba Server And Clonezilla

NO	PARAMETER	Effectiveness
1	Time	<ul style="list-style-type: none"> <li>➤ Still the same as using an external hard drive</li> <li>➤ Can do other work at the same time when restoring an image</li> </ul>
2	Number of computers	More computers are completed to install compared to external harddisks
3	Cost	Save on the costs involved in buying expensive external hard drives
4	Laboratory Team Performance	The Fasilkom LAB laboratory team can do other work while the restore image process is running
5	Utilization of campus facilities	Maximizing the use of the network in the Fasilkom lab to support the work process of the Fasilkom lab laboratory team by paying attention to the rules that exist in the Fasilkom LAB.

#### V. CONCLUSION

Based on the research that has been done at the Fasilkom LAB, it can be concluded that In the process of restoring an image using the Samba server and Clonezilla, it has a shortage of transfer rates which in the restore process for 10 computers takes 4 hours until the restore process is complete. But when viewed from the time of

restore image using a network, it takes longer than an external hard drive. The Fasilkom LAB team can still do other work in conjunction with the ongoing image restore process in the Fasilkom lab, without interfering with other work processes and even the laboratory team can do other work. The use of an external hard drive is still used for restore image with a number of computers that are not too large in the range of 1-5 computers, if more than that number it is more effective to use restore image with samba server and network servers. For the future it is better to install through the network by paying attention to the scope in the local network and not using routing on networks outside the network subnet.

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