

# NET.OS : Network Server Operating Systems Based on Open Source

Evan Enza Rizqi  
Teknik Informatika Politeknik Negeri  
Semarang Semarang, Indonesia  
evan\_enza@yahoo.com

Idhawati Hestingsih  
Teknik Informatika Politeknik Negeri  
Semarang  
Semarang, Indonesia  
hestidha@gmail.com

Mardiyono  
Teknik Informatika Politeknik Negeri  
Semarang  
Semarang, Indonesia  
m4rdiyono@yahoo.com

**Abstract**-Open source server operating system mostly still uses text-based user interface and it makes hard to learn to new user in Vocational High School of Computer Network Department. This problem will be dealt by providing Graphical User Interface (GUI) in the server operating system accompany Command Line Interface feature. This paper describes the development of open source server operating system which provides server configuration in text mode and graphics mode. This research method involves the study of literature and the development of operating systems with remastering concept including selecting features, selecting graphics display, selecting the basic system, remastering, and testing to the Server PC. Research product called Net.OS (Network Technology Server OS) was tested in computer networks to validate the server functions. The results show that all functions can work successfully. Net.OS implementation can provide a user friendly to configure the server in a web-based graphical mode, text mode, moreover it becomes a bridge of Linux newbie to learn the server configuration using GUI.

**Keywords:** operating systems, servers, computer networks, software piracy, web based GUI, remastering, open source.

## Introduction

The building of server technology systems requires hardware and software. The software used in server technology is a server operating system that serves each client computer to access network resources such as HTTP Server, FTP Server, DNS Server, File and printer sharing, etc. The operating system has two types, namely proprietary and open source software. The first type has a benefit that the user can configure server operating system in a user friendly environment, however the license must be paid very expensive, so a lot of users who commit acts of software piracy [1]. Based on a survey by International Data Corporation (IDC) in 2007, Indonesia was ranked 12 of 108 countries with the number of using illegal software was 84% [2]. Whereas the open source license does not be paid, but users feel difficulty in server configuration with the text mode. Therefore, we need an open source operating system that is capable of providing a graphical display (Graphical User Interface) that can provide convenience for the user to perform server administration in web based.

Some researches related to the development of open source server operating system with the use of graphics mode

has been done by Muslim (2006)[3], Amunawar (2010) [4], and Antoni and Sukoco (2013)[5]. Muslim (2006) has developed an operating system distributions Semutireng for Game Center app developed from Ubuntu distro. Its graphical display is provided by Semutireng distro, but it does not provide the functions of server operating systems [3]. On the other hand, Andros distro developed by Amunawar (2010) is used for programming including Java JDK, NetBeans, Kompozer, Lazarus, Anjuta, Bluefish, KDevelop, and Quanta plus[4]. Furthermore ILOS distribution provides programming software package, database, office, multimedia, and CAD. However, this ILOS only enabled on the desktop user mode[5].

Based on the description above, there is a problem of how to make a server operating system that is user friendly with a graphical display (Graphical User Interface) and text-based (Command Line Interface) with an Open Source license. This made it easier for novice users to learn to configure the server. In addition, the open source operating system can make a solution to reduce the rate of software piracy. The objective of this research is to build a Server Operating System named Net.OS (Networking Technology Server Operating System) which is user friendly with web based GUI (Graphical User Interface) and CLI (Command Line Interface) in Open Source License.

## Research Methodology

The method used to carry out the building system of Net.OS server operating system is described as a flowchart in Figure 1.

The method used for the construction of this system begins with a literature study by choosing the material that will be made the basis for the development of the operating system, along with the literature on the comparison of existing operating systems, such as Microsoft Windows Server, Linux distributions, Debian, Ubuntu Server, and other linux distros. The selection of these materials is very important to find a foundation base platform of the operating system that will be built along with the compatibility of the hardware.

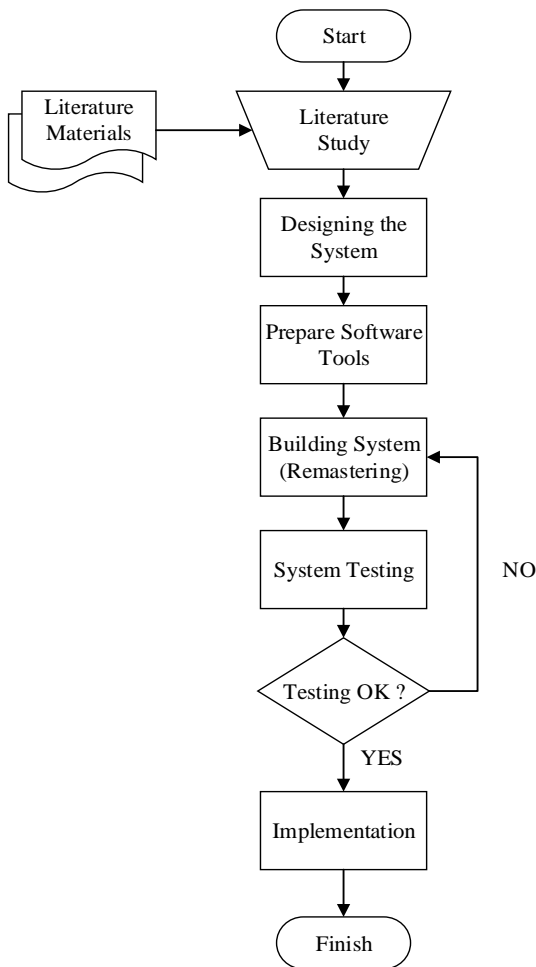


Figure 1. Flowchart of building system Net.OS server operating system.

After the study of literature that can be used as a reference for the building system, the next process is designing the system, which consists of:

- Selecting features: it determines the features needed in a system of GUI mode and CLI. moreover, it is needed the packets of network server administration such as HTTP Server, Proxy Server, FTP Server, SSH, SAMBA (File and Printer Sharing), Mail Server, and services supported network server.
- Selecting Graphics Display: it determines the effectiveness of using the menu layout for the Graphical User Interface on the desktop. The layout of this menu, includes the position of start menu button and icon of each application packet to be user friendly.
- Selecting the Basic System, which determines the basis of the system to be built based on kernel system or package system. So that the system can be built with the compatible platform and can work for user desktop and server systems management.

The next process is preparation of software tools for building the package. It uses the Remastersys software which can collect various features in one package (remastering) [6].

In the remastering process is performed by collecting and packaging the features such as a graphics package desktop environment and application server packages [7]. Furthermore, the package is tested by installing to the PC Server and test the performance by checking function of system. The testing parameter includes testing each feature of application package and hardware platforms compatibility. The results show that the function of the system can work properly or not. If it does not work, it is necessary to remastering process, otherwise it can be implemented on the computer network system as shown in Figure 2.

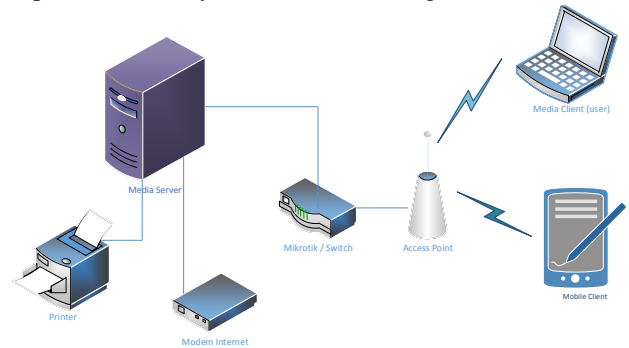


Figure 2. implementation design on a computer network system

## RESULT AND DISCUSSION

This research carries out the server operating system package (Net.OS) including the main system (kernel), a graphical user interface (view), supporting components and other application server. It has been implemented in a PC Server show in Figure 3.



Figure 3. Desktop display on NET.OS

Net.OS desktop display is made from GNOME environmet that supports the use of "Gnomenu", Dockbar, as well as the transparency of the taskbar. Display of Graphical User Interface (GUI) on Net.OS utilizes compiz fusion that can set all components of the existing graphical display and easy to be customized. This display is designed based on the determination of the layout of the system menu to be user friendly. In addition, for a server configuration mode by GUI (Graphical User Interface) mode can be seen in Figure 4.



Figure 4. Display the configuration of the server with GUI

Figure 4 shows some server services which consist of the HTTP Server, Proxy Server, FTP Server, SSH, SAMBA, Mail Server, Firewall, and Routing in Graphical User Interface (GUI). The GUI mode provides convenience for the user to configure the server services by providing the input component. Figure 5 shows the display of DHCP Server configuration with Graphical User Interface (GUI).

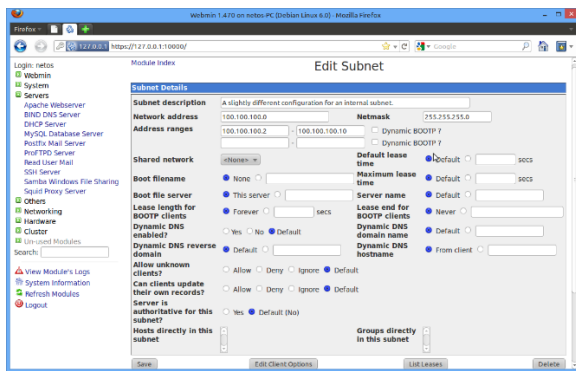


Figure 5. DHCP Server Configuration with GUI Mode

DHCP server GUI allows the user to type DHCP configuration including Network Address, Netmask, and Number of DHCP user. It is easier than using a text mode configuration. In the text mode, user must type all of configuration scripts. However, for users who want to configure the text mode on Net.OS can be configured with the Command Line Interface (CLI) as shown in Figure 6.

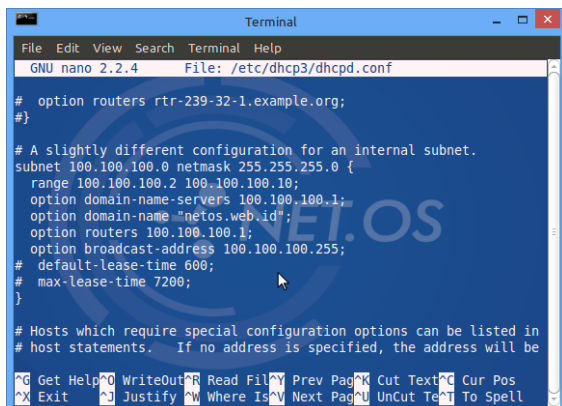


Figure 6. DHCP Server Configuration with Text Mode

Testing result of Net.OS system functionality using the graphical mode and text mode can be shown in Table 1.

Table 1. Server Functionality Testing

No.	Server Service Function	Result
1	HTTP Server	√ (OK)
2	Proxy Server	√ (OK)
3	FTP Server	√ (OK)
4	SSH (remoting server)	√ (OK)
5	SAMBA (Sharing File & Printer)	√ (OK)
6	Mail Server	√ (OK)
7	Firewall	√ (OK)
8	Routing	√ (OK)

The results show that the function of the server application package Net.OS with GUI (Graphical User Interface) and CLI (Command Line Interface) mode can perform successfully in accordance with its design.

The next testing is implementation of the Net.OS system to the computer network topology. The description of the system on a computer network topology is shown in Figure 7.

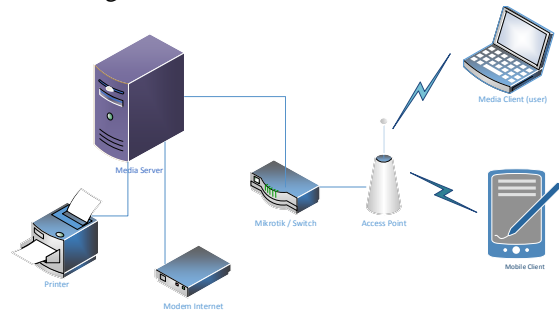


Figure 7. Net.OS implementation on computer network system.

The results of connectivity testing with TCP/IP network can be described in Table 2.

Table 2. Connectivity testing

No.	Media are connected	Result
1	Modem	Reply... (connected)
2	Switch	Reply... (connected)
3	Access Point	Reply... (connected)
4	PC Laptop	Reply... (connected)
5	Mobile Device	Reply... (connected)

Table 2 explains that all media involving modem, switch, access point, PC Laptop, and mobile devices can connect to the computer network successfully. Furthermore,

the comparison between Net.OS and other operating system mentioned above can be illustrated in Table 3.

**Table 3.** Comparison of Existing Operating System with Net.OS

	Windows Server	Windows 7	Ubuntu Server	ILOS	Andros	Semut Ireng	Net.OS
Graphical User Interface	YES	YES	NO	YES	YES	YES	YES
Command Line Interface	YES	YES	YES	YES	YES	YES	YES
License	Proprietary	Proprietary	Open Source	Open Source	Open Source	Open Source	Open Source
Server Service	Can be used	Can't be used	Can be used	Can't be used	Can't be used	Can't be used	Can be used
Interactive User	Good	Good	Not Good	Good	Good	Good	Good
Hardware Specification	High-End	Low-End	Low-End	Low-End	Low-End	High-End	Low-End

Table 3 describes that Net.OS has all of the features and functionality of the system such as GUI, CLI, License, Server Service, Good Interactive User, and Low Hardware Specification. Net.OS server operating system could be the solution of open source software to reduce the use of illegal software and the operating system is able to replace the existing server with a GUI and CLI display.

**CONCLUSIONS**

This paper has explored the development of Net.OS open source server operating system. It has been tested on computer network and all of the features can work successfully including the server function, device connectivity, and graphical or text environment. Based on the comparison with other operating system, Net.OS provide more complete future than other such as Windows Server, Windows 7, Ubuntu Server, ILOS, Andros, and Semut Ireng. Implementation of Net.OS allows user to configure server more easily and hopefully it can make a solution to reduce the rampant piracy of legal software with GPL (General Public License) of GNU / Linux Open Source. The next development is to enhance Net.OS for server learning media using GUI and CLI mode equipped with a simulation in e-learning model. This operating system has been performed on the testing process and implemented a computer network system to the user directly to the acquisition of 84% satisfaction rate, which means that the operating system Net.OS has been able to give satisfaction to the users and meet the expected goals with a model system that is user friendly.

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