

## A Network Administration on Windows Server 2016 at Aman Sari Village Office

**Farida Gultom**

Informatics Engineering Study Program, Efarina University, Indonesia

### ARTICLE INFO

#### *Article history:*

Received April 12, 2022

Revised April 25, 2022

Accepted May 07, 2022

#### *Keywords:*

Computer Network, Network Administration, Windows Server, DNS Server, DHCP Server, IP Address Configuration

### ABSTRACT

In today's era, technological developments are very influential for offices, schools, and companies. Now technology has been widely used especially in the world of communication and information that already uses computer networks to accelerate fast and efficient data transmission. All components incorporated in a computer network must support each other to produce a good and easy system to serve customers. Network is always useful and helps in increasing the effectiveness and efficiency.

*This is an open access article under the CC BY-NC license.*



#### *Corresponding Author:*

Farida Gultom,  
Informatics Engineering Study Program, Efarina University, Indonesia  
Griya Hapoltakan Kav. 1-10, Sutomo Street, Pematang Raya, Bahapal Raya, Kec. Raya  
Simalungun Regency, North Sumatra 21162  
Email: [faridagultom@gmail.com](mailto:faridagultom@gmail.com)

## 1. INTRODUCTION

The development of computer technology is increasing rapidly this can be seen in the era of the 80s computer networks are still a puzzle that academics want to answer, and in 1988 computer networks began to be used in universities, companies, now entering the millennium era. this is especially the world.

Today, the benefits of computer networks have been widely felt and used. Moreover, in today's fast-paced and efficient world of communication, computer networks play an active role in the fast and efficient distribution of data and information communications. All components incorporated in a network must support each other to produce a solid and reliable system to serve a user.

DNS ( *Domain Name System* ) is an application service on the internet that translates a domain name to an IP address and is a type of system that serves IP address mapping requests to FQDN ( *Fany Qualified Domain Name* ) and from FQDN to IP addresses . DNS is usually used in Internet-related applications such as Web browsers or e-mail. Where DNS helps map the *Host Name* of a computer to an IP address . Besides being used on the internet, DNS can also be implemented on a *Private Network* or the internet.

DHCP ( *Dynamic Host Configuration Protocol* ) is a service that automatically assigns IP addresses to computers that request them. The computer that provides the IP address is called the DHCP server , while the computer that requests the IP address is called the DHCP client . Thus, administrators no longer need to manually assign an IP address during TCP/IP configuration, but simply provide a reference to the DHCP server . When both DHCP clients are turned on, the computer makes a request to the DHCP server to get an

IP address. DHCP responds by providing an IP address in the DHCP database. DHCP *server* after assigning an IP address, the *server* borrows (*leases*) the existing IP address to the DHCP *client* and removes the IP address from the pool list. The IP address is provided along with the *subnet mask* and *default gateway*. If no more IP addresses can be assigned, then the *client* cannot initialize TCP/IP, and by itself cannot connect to the network.

### 1.1 Understanding Computer Networks

A computer network is a telecommunications network that allows computers to communicate with each other by exchanging data. Each endpoint in a network has an identifier, which is commonly referred to as an IP address or *media access control address*. Endpoints can include servers, computers, telephones, and other network *hardware*. Networks can be private or public. In the use of a private network, it usually requires user access to enter credentials in the form of a password that is entered manually by the user. For the use of public networks such as the internet, it does not limit access.

According to Tamsir Ariyadi, (2017), a computer network is an autonomous group that is interconnected with one another using communication protocols through communication media so that they can share information, programs, share hardware such as printers, hard drives, and so on. In addition, a computer network can be interpreted as a collection of a number of communication terminals located in various locations consisting of more than one computer that is interconnected

### 1.2 Understanding DNS

The Domain Name System ( *DNS* ) is a translation system that converts Internet hostnames (domain names) to a unique series of numbers that constitute an Internet Protocol (IP) address for each specific domain name. Similar to telephone numbers, IP addresses are required to route packets and coordinate throughout the Internet system (Fijianto, Ahmat et al, 2016)

Domain Name System ( *DNS* ) is a system that stores information about host names or domain names in the form of a distributed database on a computer network, for example: the Internet. DNS provides an IP address for each hostname and lists each mail exchange server that receives ( *email* ) for each domain. According to the Google Chrome browser, DNS is a network service that translates website names into internet addresses

### 1.3 Definition DHCP

*DHCP (Dynamic Host Configuration Protocol)* is a protocol based on client/server architecture that is used to facilitate the allocation of IP addresses in a network. A local network that does not use DHCP must manually assign IP addresses to all computers. If DHCP is installed on the local network, then all computers connected on the network will get an IP address automatically from the DHCP server. In addition to the IP address, many network parameters can be provided by DHCP, such as the default gateway and DNS server.

### 1.4 Network Type

#### 1.4.1 LAN network (local area network)

This network is used to connect personal computers and workstations in a company that uses equipment together and exchanges information, referred to as a Local Network / Local Area Network. This network is used to connect nodes that are not too far away such as in a building or a building with a maximum distance of 10 Kilometers, the data transmission speed is relatively high, namely 10 to 100 Mbps. (Anonymous, 2003). LAN is designed to allow sharing or shared use of resources (printers, applications and data) between PCs or workstations in it. (Tampi, Stefanus et al, 2019)

### 1.5 Network Topology

Network topology is a way to make a number of computers interconnected with each other, either using wired or wireless. the purpose of the network topology is for the convenience of exchanging information.

Network topology is often used by a company, institution, or institutional body so that members can communicate with each other quickly and safely.

## 2. RESEARCH METHOD

### 2.1 Network Analysis

From the results of the analysis that has been done by the author, it can be concluded that the Office of the Village Head of Aman Sari Kab. Simalungun uses a LAN network with a *stars topology*. The LAN network at the Aman Sari Subdistrict Head Office, Simalungun Regency provides *client-server services*, where *the server* only acts as a service provider for all *users*. In addition to using a CAT SE 5E UTP cable to connect all network devices. A network topology that works well, with a cable connection, also uses an *Access Point* to provide services wirelessly such as for connection with a laptop. IP Address Management for each *client computer* is done manually. For security itself, use the default OS itself Example: Windows Firewall

In essence, this LAN network was created to facilitate data collection, data sharing, and data back-up as well as the efficiency of all resources including internet usage in accelerating service work.

### 2.2 Network schema

Below is a picture of the circuit used by the Office of the Village Head of Aman Sari Kab. Simalungun which is the author's analysis material in making this thesis. They use a star topology to speed up communication and provide more benefits in a single network

The topology used at the Aman Sari Sub-District Head Office Simalungun is a star topology, because all activities are controlled by *the server*. To facilitate the distribution of IP clients on this network system, the company uses an IP DHCP server. For example, the DHCP Server IP 192.168.0.5 then the first IP Client gets the IP 192.168.88.1 and it is done so on until the IP Client we need is fulfilled, because here it only uses 12 Clients, then the Client IP reaches 192.168.88.21 While the Subnet Mask is used class C, namely 255.255.255.0.

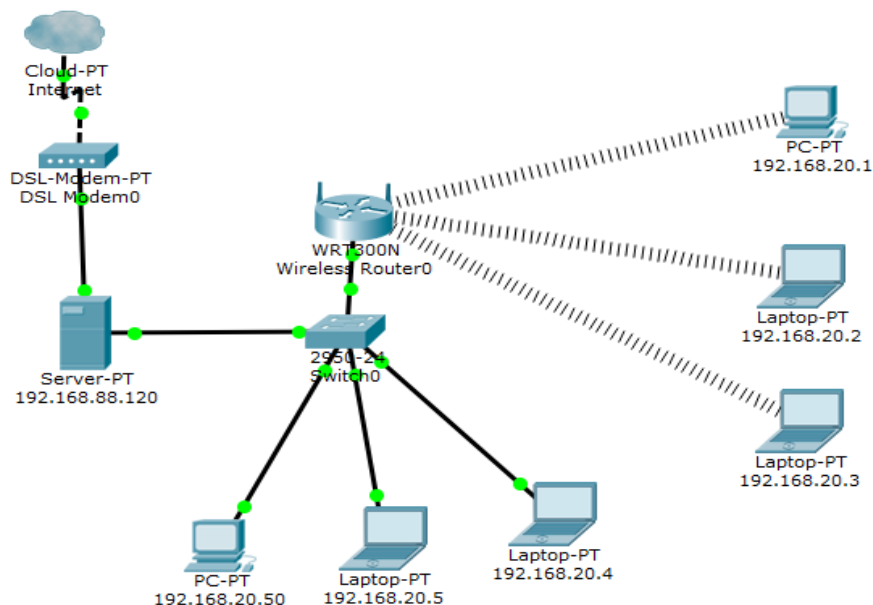


Figure 1. Network scheme at the Aman Sari Head Office, Simalungun Regency

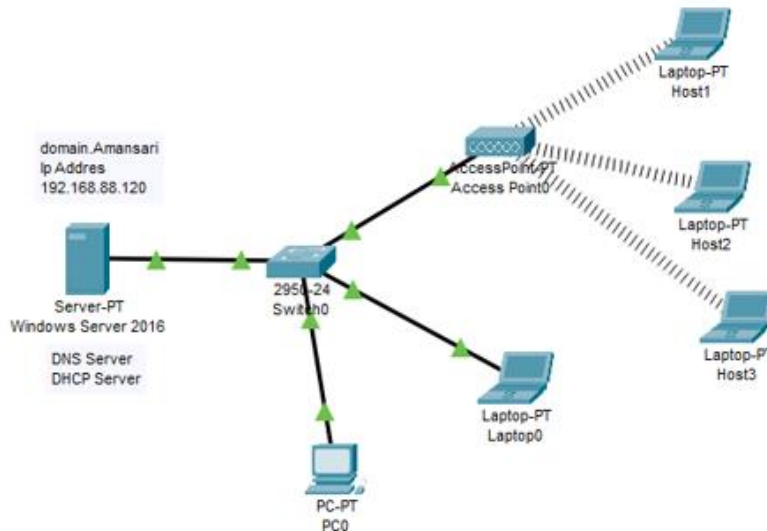


Figure 2. Aman Sari Village Head Office Block Diagram Simalungun Regency  
 Source: Aman Sari Village Head Office Simalungun Regency

Table 1. IP Address of the Office of the Head of the Aman Sari Sub-District, Simalungun Regency

Hardware	IP Address	Subnet Mask	Default Gateway	DNS
Modem	192.168.0.1	255.255.255.0		
Firewall	192.168.0.2	255.255.255.0		
	192.168.88.1	255.255.255.0		192.168.88.120
Servers	192.168.88.2	255.255.255.0		192.168.88.120
PC 1	192.168.88.3	255.255.255.0	192.168.88.1	192.168.88.120
PC 2	192.168.88.4	255.255.255.0		192.168.88.120
PC 3	192.168.88.5	255.255.255.0	192.168.88.1	192.168.88.120

Source: Aman Sari Village Head Office Simalungun Regency

### 3. RESULTS AND DISCUSSIONS

#### 3.1 DNS Testing

DNS testing is done so that the server that we create is well connected with the server system. This research will be tested based on the domain listed in 3.3 . To test DNS Open CMD then open powershell then type nslookup. Then it will look like this. We can see that on the default server the domain name that we created earlier along with the IP address will appear. Terms of use powershell only done if connected to the internet

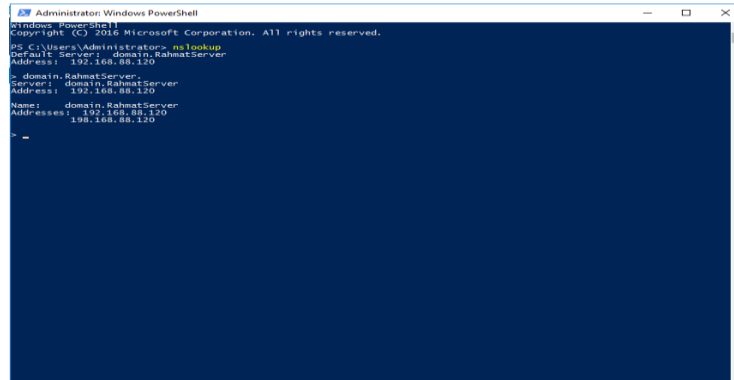


Figure 3. Dns Test Display With CMD

Make sure the PC is connected, so that it can view or ping the domain that has been created. If the reply is like this, the domain will be successfully connected to the server that was created.

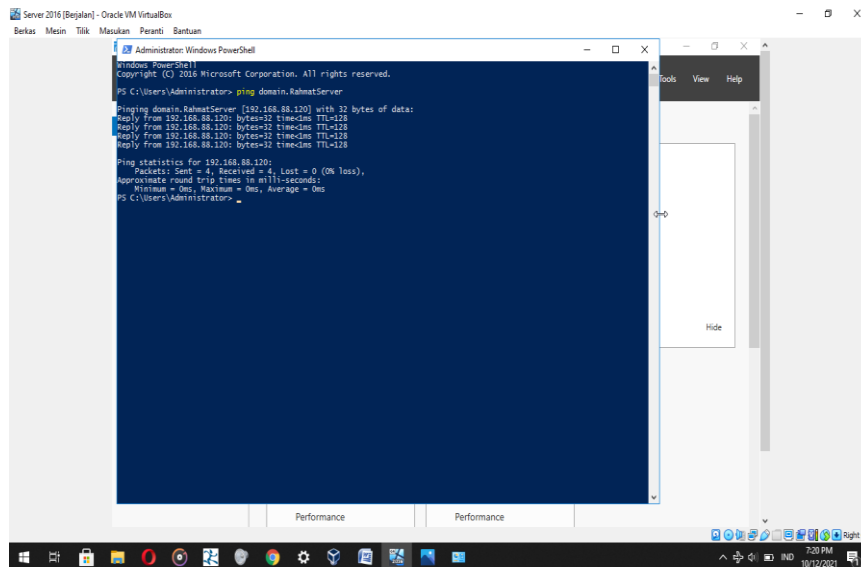


Figure 4. Ping

Figure 4. above is an example image that the domain has been connected to the server that has been created. With the domain that has been pinged we can see or immediately try to do a test with the Domain IP or by using the Domain name . And if the domain has been created, the results will be tested with the domain IP and domain name, the display that appears or the display that is called will be the same. After DNS testing will be carried out. The domain check stage by using an existing IP address will be shown in the image below that we have created or we have done previously. In this test we will call the default display with IP using the IP domain.

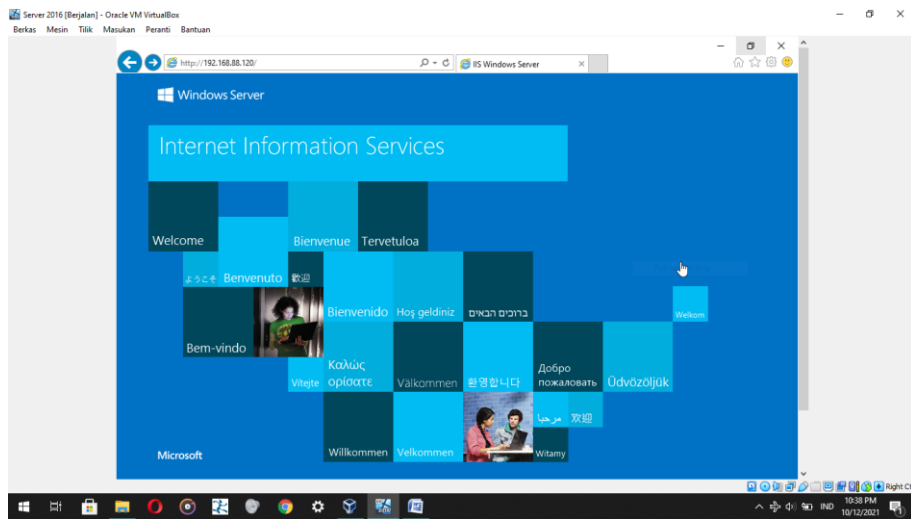


Figure 5. Testing Domain Display with IP

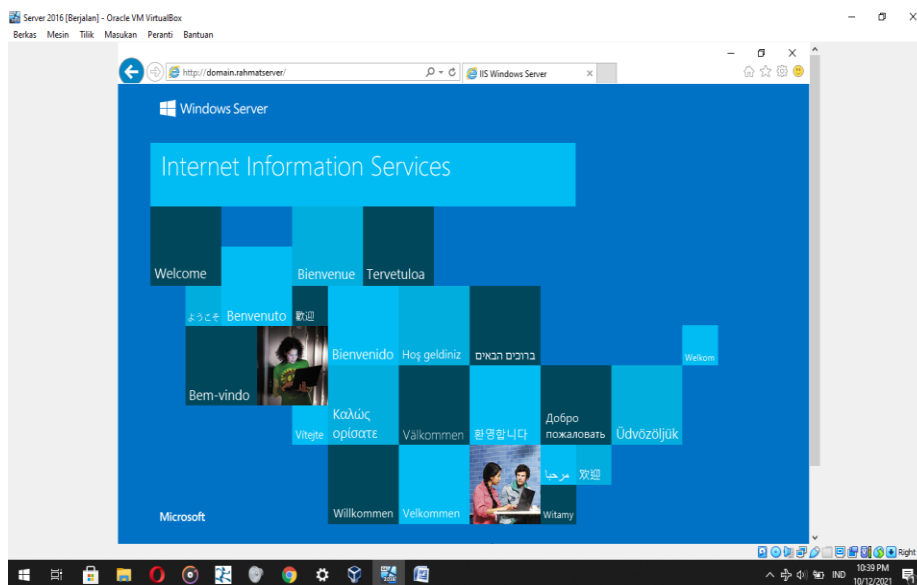


Figure 6. Domain Testing Display with Domain name

### 3.2 DHCP Test

1. In this case the author connects 2 clients namely windows 10 and linux (kubuntu). From here we can see that the linux client is already connected to the server.

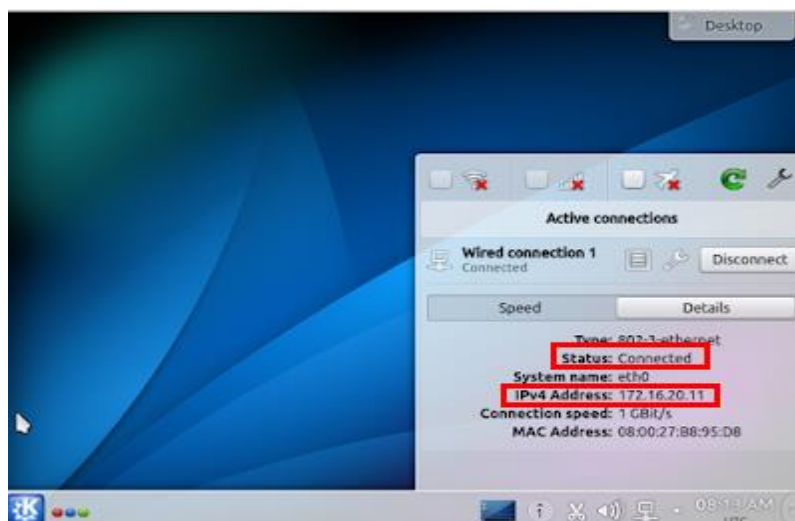


Figure 7. DHCP Testing

2. On windows we can look at the obtain network adapter and then look for properties. From here we see that the Windows 10 client is also connected

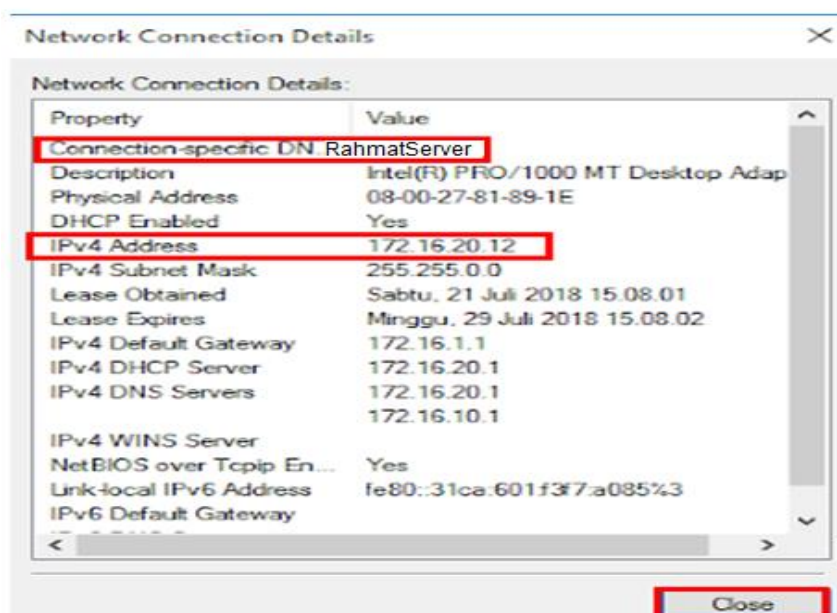


Figure 8. Network Adapter

#### 4. CONCLUSION

At the end of this thesis, the author will describe some conclusions that can be drawn and suggestions based on the research findings. Based on the results of data processing and analysis the authors draw the following conclusions:

1. Fulfillment of satisfaction that arises because of several needs that have been achieved in making the server.
2. In this research, it must be done based on existing needs because the costs incurred will be large.
3. Construction of DNS Server and DHCP Server Using Windows Server 2016 is very easy to configure.

## ACKNOWLEDGEMENTS

Thank you to all those who have helped research and write this article

## REFERENCES

- Arief, A. (2015). "Wireless Network Security Analysis using Radius Server on Mikrotik". Thesis. Informatics Engineering Study Program, Gadjah Mada University. Yogyakarta.
- Ahmad Fujianto, Indra Waspada, 2016, "Design of a centralized DNS management information system (case study of CV. Surya Putra Perkasa) " INFOKAM NUMBER I th. XII/March/2016
- Esabella, S. (2016). Computer Network Infrastructure Design to Support Information System Implementation at Sumbawa University of Technology, JurnalMatrik, vol. 16, no.1, pp. 1-2..
- Rainer Jr., R. Kelly & Casey G. Cegielski. (2013). Introduction to Information Systems- fourth edition. Singapore: John Wiley and Sons Singapore pte.ltd.
- Stefanus Samuel Tampi, Suwanto Raharjo, Muhammad Sholeh, (2019) "Computer Network Design at Soedarsono Darmosoewito Hospital in BATAM", JARKOM Journal Vol. 7 No. 1 July 2019 E-ISSN: 2338-6304
- Siti nur repertoire, 2016 "Network Security With Packet Filtering firewall (CASE STUDY: PT. SUKSES BERKAT MANDIRI JAKARTA)", Journal of Khatulistiwa Informatika, vol. iv , no. December 2, 2016.
- Sukaridhoto, Sritrusta. (2014). Computer networks, first edition. Surabaya: Surabaya State Electronics Polytechnic.
- Tamsir Ariyadi, 2017, "Dhcp Snooping Security Design To Reduce Local Area Network(Lan) Attacks " , JUSIKOM, Vol 2, No. 1, June 2017 .
- Tengku Mohd Diansyah, 2016 Method of Acl (Access Control List) Using Frame Relay on WAN ( *Wide Area Network* )", Jurnal Warta Edition : 49 July 2016 | ISSN : 1829 - 7463