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Design of a VLAN-Based Wireless Network Based on IEEE 802.11 Employing OSPF (Open Shortes Path First) at PT. Sepatu Bata (Tbk)

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Abstract−Wireless network is a technology that uses two devices to exchange data without the need for cables to transmit data, so this wireless network technology very popular nowadays both in personal use and in industrial use. This design is based on the increasing demand for data and technology. Therefore PT. Sepatu Bata (Tbk), requires the development of a computer network that can be developed easily and flexibly. Design and design of VLAN network technology using OSPF Routing Protocol at PT. Bata TBK shoes use a packet tracer. One alternative that can be used is an attempt to use Virtual Local Zone Network technology (VLAN), with the hope of sharing better results than LAN. VLAN a logical function of the switch, which is a special function configured for use software features. This function will divide the network into virtual networks that physically still connected to the same switch. With this function, computer technology can be made without depending on physical location, but based on needs and uses. VLANs can be used make flexible network arrangements with ministry segmentation match industry and can only broadcast to certain groups without relying on workstation position, besides the purpose of this study is to design a new network that more optimally by using a VLAN network with the OSPF routing protocol.

Keywords: LAN; VLAN; Network Performance; OSPF Routing Protocol

1. INTRODUCTION

PT. Bata Shoes TBK is a footwear manufacturer and member of the Bata Shoe Organization (BSO).The Company produces various kinds of footwear, namely leather shoes and sandals, shoes made ofcanvas and sports shoes. The Company has registered trademarks, in addition toOur main character is Bata, including North Star, Bubblegummers, Marie Claire andWeinbrenner is also Bata Indutrials. Along with the increasing need for information and technology,This company needs the development of a computer network that can be expandedeasily and flexibly. The development of the network can be used in the processdata transmission and administrative processes. Implementation is carried out by means ofconnect one computer to another computer by using several network to form a local network called a Local Area Network (LAN)[1].

The use of many computers and connected to each other in the network but no management a good network will result in a decline in the network, as well as a bad security side. The developed network is expected to be organized and developed in accordance with its functions and functions needs flexibly. This research develops a design simulation and implementation of a VLAN-based network using OSPF at PT. Sepatu Bata (Tbk) using packet tracer software. Employees of PT. Sepatu Bata (Tbk) have difficulties in the process of sending data and there is always a process of decreasing work performance, due to the broadcast domain which is used to recognize the interface by broadcasting to all users LAN. Efforts to overcome these problems continue to be made by many parties [2].

One of alternative efforts that can be used are the use of Virtual Local Area Technology Network (VLAN) using OSPF, in the hope that it will provide better results better compared to LAN.VLAN is a logical function of the switch, that is, a function that is configured specifically using software. this function will divide the network into several networks virtual devices that are physically still connected to the same switch [3]. With this function, network computers can be made independent of their physical location, but based on their needs and requirements existing function. Based on the background of the problems above, the authors are interested in discussing this problem becomes a case study to complete the final project.

2. RESEARCH METHODOLOGY

2.1 OSPF (Open Shortest Path First)

Open Shortest Path First (OSPF) was developed to replace the RIP (RoutingInformation Protocol). OSPF is a routing protocol Link State (LS) which is open-standard (non-proprietary) and has been published in the RFC 2328 document. OSPF isdeveloped using Dijkstra's Shortest Path First (SPF) algorithm . OSPF morecomplex compared to EIGRP [4].

2.2 Data Collection

In this study using several methods of data collection, namely:

1. *Field research (Field research),*

That is data collection by way of research directly to the field for data and clear and detailed information. In this case direct data collection carried out at PT. Sepatu Bata (Tbk) in the form of:

a. Interview
   To get accurate information, the author collects data machine with the interview method, namely direct question and answer with the head of the part of the company who really knows the process and system which is currently running at PT. Sepatu Bata (tbk).
b. Observation
   Physical observations/observations that the author did, namely making observations directly carried out at PT. Sepatu Bata (tbk) and directly collect data machine, come directly to *the* campus *server* and find out what the problem is often happens to the company, in order to find out the system or network what can be designed to deal with problems that often occur at PT. Sepatu Bata (tbk).

2. *Library research (Library research)*

Collection of data from books as relevant references to produce information. The purpose of this library research is to help get secondary data used in the theoretical basis and as a support knowledge and scientific basis in the following discussion [5].

2.3 Data Collection Tool

In PT. Sepatu Bata (Tbk) is still using a LAN (Local Area) network Networks). The topology used is a *star* topology. Which is used for sharing printers and data to computers to each division. Example of a LAN (See Figure 3.1) [6].

Figure 1. *Local Area Network*

1. Weaknesses on current devices as are:

a. Always occur *Broadcast domain* (See figure 2)

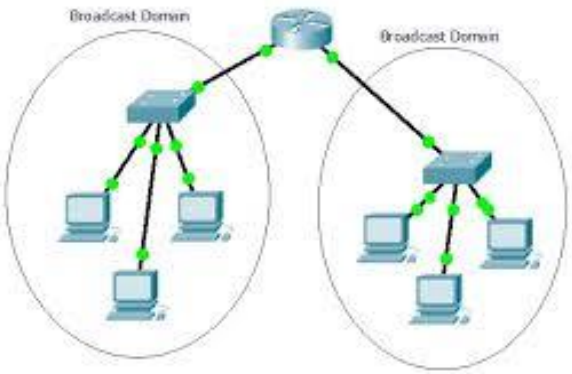

Figure 2. *Broadcast Domain*

A computer sends data to another computer in a network through the *hub/switch*, and other computers send data to other computers in the network, it's just a different purpose. Here the *hub* will send data packets to all computers connected to it connected to the *hub* / *switch* (broadcast *domain*). Therefore, data *collision* will occur because the *hub/switch* only makes one path delivery for all *clients* [7].

b. Modem speed is slow, the more PCs the slower the connection /the internet.

3. RESULT AND DISCUSSION

3.1 Simulation of VLAN Network

This network simulation will use the help of a tool called Cisco PacketTracer as simulation software for network construction, in trial simulationThis is the ip-address that will be used differently at the time of implementation, so it can bevaried in ip-address addressing as well as the class used in the trial timesHere, the stages are:

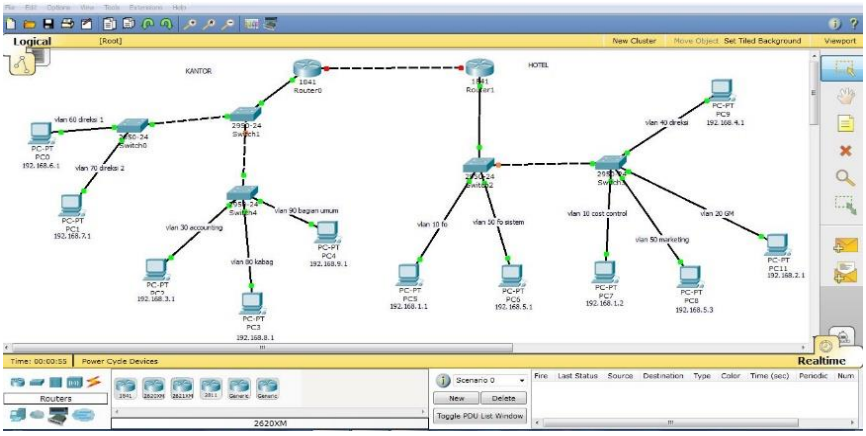

Figure 3. Network Simulation

IP Configuration Stage, Subnet Mask and Default Gateway

This stage will explain the configurations carried out on the computer *user* , along with its *subnet mask* and *Default Gateway* .

1. FO Computer

The following is a display of Front Office IP configuration settings in accordance with the order of 192.168.1.1 IP Addressing.

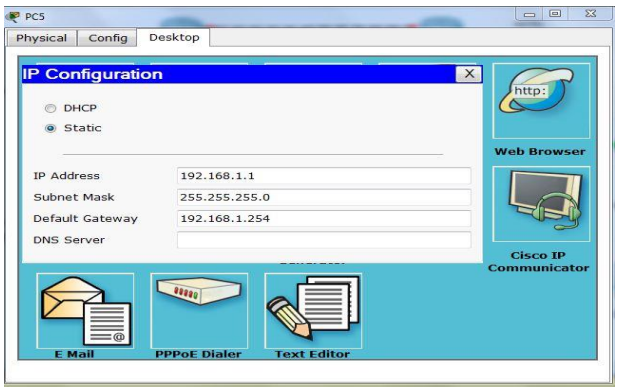

Figure 4. *FO.* Computer Configuration

2. Computer Cost Control

In Figure 5 this is the display of the Cost Control Computer IP configuration settings in the order of IP Addressing 192.168.1.2

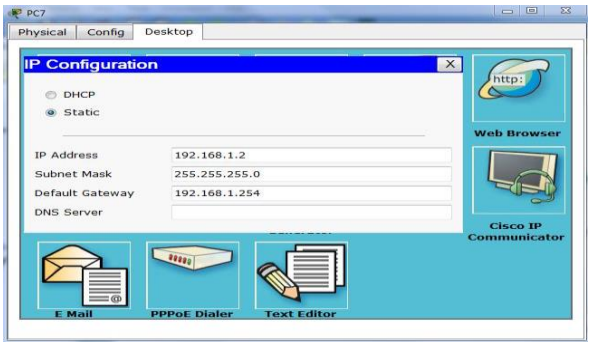

Figure 5. *Cost Control* Computer Configuration

3. GM Computer

In Figure 6 this is the display of the General Manager Computer IP configuration settings according to the order of IP Addressing 192.168.2.1

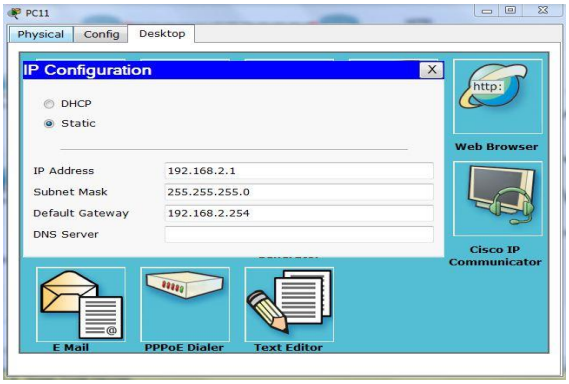

Figure 6. GM Computer Configuration

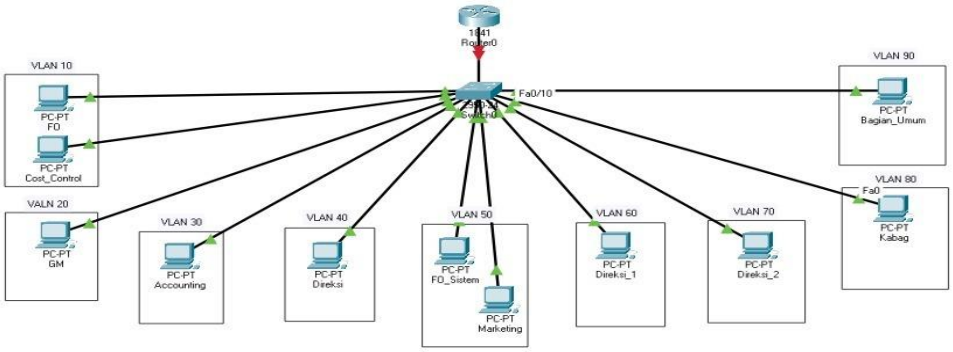

Figure 6. VLAN OSPF

In Figure 6 this is the result of a VLAN network using OSPF at PT. Sepatu Bata (Tbk).

4. CONCLUSION

After analyzing the material in the making of this final project simulation, several conclusions can be drawn, namely Implementation of VLAN network with OSPF Routing protocol can improve service quality to users (Guests, Customers, Employees), improve network performance, simplify the management of user access rights connected to the network, and is relatively more secure. The application of VLAN networks can reduce network development costs by utilizing the remaining ports on the switch, reducing data collisions (collision), and not being limited to workstation locations. Based on the conclusion of the research on Cisco simulation and configuration at PT. Sepatu Bata (Tbk), the authors can recommend in the future to be able to develop simulations with the hope that Future research is expected to discuss more about how the distribution of bandwidth on the network.

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