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## Ethernet switched LaNs: The Accounting information system perspective

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### Abstract

The development of information technology is currently growing rapidly, moreover the formation of integrated economic zones in the Southeast Asia region or what is called the ASEAN Economic Community (MEA) in 2015. The development of information and communication technology now has a positive influence on society, especially business actors carry out business activities in various fields. The aim of this paper is to find out what is ethernet switched LANs

from accounting information system perspective itself. This paper used literature study method as its research method that examine the previous literatures to complete this paper. The result showed that ethernet has advantages as well as disadvantages to accounting information system. Ethernet also has some issues about security that some attacker might leaked some important information, but the issue can be solved by using a central authentication server.

**Keywords:** network, ethernet, accounting information system, LAN

### 1. Introduction

The presence of the internet without being limited by space and time makes the chances of success for business people more wide open. Because the internet as one of the conditions to create a computer network allows users to exchange information in seconds so that data and information can be directly received, processed and processed into a valuable source of information. Nowadays, computers are an absolute necessity for government or private institutions. The presence of computers is expected to help various aspects of life and work. At first, the computer only stands alone without connecting with each other (stand alone). But nowadays, computers can connect with each other and can communicate with other information and communication technology devices. The ability of technology to be able to collaborate shows the convergence of technology. We can conduct inter-departmental transactions easily and more efficiently with less risk of errors. With the technology everything does feel more facilitated.

Alocal Area Network can be defined as a group of users or workstations that are located in the same physical area and has the same broadcasting domain. Ethernet networks have been widely used in the past 15 years. Layer 2 switch depends on IEEE802.3 Ethernet protocol that retransmits broadcast packets, multicast packets and unknown unicast IP packets to the all ports. Broadcasts reach all workstations without need to send to the gateway (Al-Khaffaf, 2018) <sup>[1]</sup>

Several network technologies and standards are deployed in order to solve industrial application. To date, no single technology has been suitable for the diversity of application requirements. This goal of this paper is to to find out how ethernet switched LANs goes by seeing from accounting information system perspective.

### 2. Literature review

#### 2.1 Network

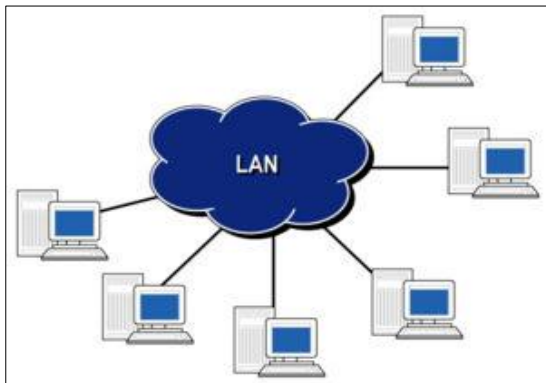
Computer networks are a collection of several computers and other supporting equipment connected in one unity and connected to each other (Madcoms, 2010) <sup>[6]</sup>.

The development of internet technology today makes it easier for various people to interact with each other or exchange information up to billions of data and a myriad of other benefits in a computer network or more. In general, there are four types of computer networks, there are PAN (Personal Area Network), LAN (Local Area Network), MAN (Metropolitan Area Network) and WAN (Wide Area Network) (Rahadjeng and Ritapuspitarsari, 2018) <sup>[8]</sup>.

#### 2.2 LAN, MAN, WAN

LAN (Local Area Network) is a computer network whose network only covers small areas such as campus computer networks, buildings, offices, indoors, schools or smaller ones. Currently, most LAN is based on IEEE 802.3 Ethernet technology using

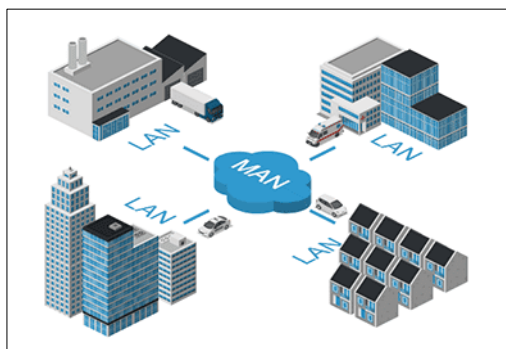
deviceswitch, which has a data transfer speed of 10,100, or 100 Mbit/s. In addition to Ethernet technology, nowadays 802. 11b technology (or commonly called Wi-fi) is also often used to form a LAN. Places that provide LAN connection withWi-fi technology can be called hostpots (Sitanggang, 2019) <sup>[10]</sup>.



**Fig 1:** LAN (Local Area Network)

(Adapted from “Analysis of Local Area Network (LAN) in PT. Mustika Ratu Tbk East Jakarta”, by Indra Riana Rahadjeng and Ritapuspitarsari, 2018) <sup>[8]</sup>

MAN (Metropolitan Area Network) a network within a city with high-speed data transfer, which connects various locations such as campuses, offices, government, and so on. The MAN network is a combination of several LAN's. The range of man is between 10 to 50 km, MAN is the right network on Metropolitan Area Network.



**Fig 2:** MAN (Metropolitan Area Network)

(Adapted from “Analysis of Local Area Network (LAN) in PT. Mustika Ratu Tbk East Jakarta”, by Indra Riana Rahadjeng and Ritapuspitarsari, 2018) <sup>[8]</sup>

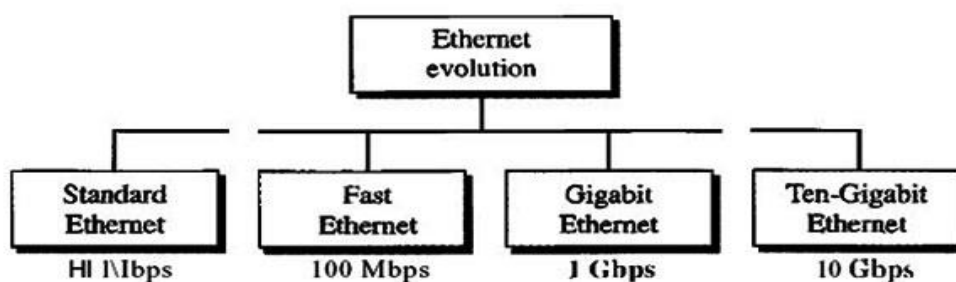
There are actually 2 types of connections that are usually used, the first is a connection that uses carawireless and the second is a connection that uses fiberoptic cable. For example, the network contained in the Bank. Each bank of course has its head office and branch office. From each office, either the head office or branch office of course has a LAN network (Local Area Network) where the merging of the LAN network in each office will form a MAN network. MAN network is usually able to support data either text or voice. It can even be related to radio waves or cable television networks. Wireless MAN can usually play at several frequencies, including 900 MHz, 1.5 GHz,2 GHz, 2.5 GHz, 3.3 GHz, and 5.8 Ghz. And the frequency currently permitted by the Government of Indonesia for general use is at a frequency of 2.4 GHz.The function of the MAN network itself is to build and implement a network system that combines between servers with the aim of being able to meet all the internal needs of the company and government in communicating a network used so that it can perform various activities such as chat, messenger, and others by using local bandwidth.

WAN (Wide Area Network) is a network used to create interconnection between local computer networks that are physically not close to each other, which can be physically separated from cities, provinces or even across geography boundaries -- across countries and continents.

**2.3 Ethernet**

The origin of the ethernet began with the development of WAN at the University of Hawaii in 1960 known as "ALOHA". The university has a large geographical area and wants to connect the computers scattered in the campus into a campus computer network. An early version of Ethernet was released in 1975 and was designed to connect 100 computers at a speed of 2.94 Mbps via a 1-kilometer cable. The standardization process of ethernet technology was approved by IEEE in 1985 with a standard known as project 802. this standard was later adopted by the International Organisation for Standardization (ISO) making it an international and worldwide standard aimed at establishing a computer network.

The original Ethernet was created in 1976 at Xerox's Palo Alto Research Center (PARC). Since then, it has gone through four generations: standard Ethernet (10 Mbps), Fast Ethernet (100 Mbps), Gigabit Ethernet (1 Gbps), and ten-Gigabit Ethernet (10 Gbps), as seen in figure 2.3.



**Fig 3:** Ethernet Speed Evolution

(Adapted from “Analysis of Local Area Network (LAN) in PT. Mustika Ratu Tbk East Jakarta”, by Indra Riana Rahadjeng and Ritapuspitarsari, 2018) <sup>[8]</sup>

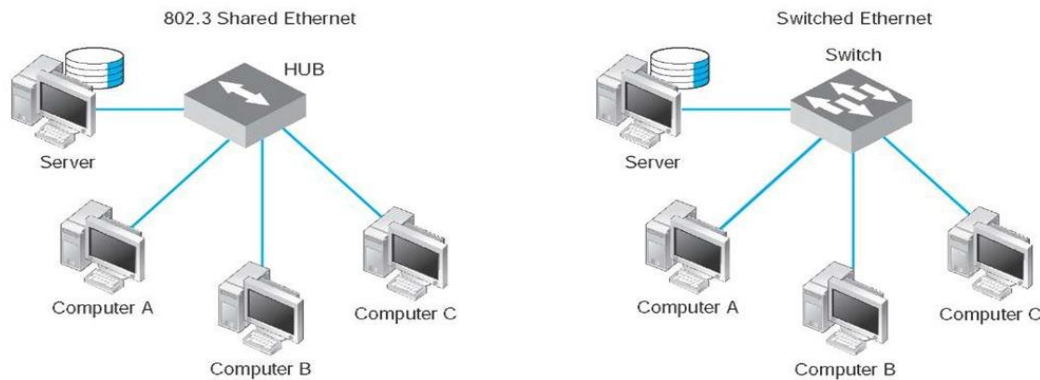
## 2.4 Switched Ethernet

An Ethernet LAN that uses switches to connect individual hosts or segments. In the case of individual hosts, the switch replaces the repeater and effectively gives the device full 10 Mbps bandwidth (or 100 Mbps for Fast Ethernet) to the rest of the network. This type of network is sometimes called a *desktop switched Ethernet*. In the case of segments, the hub is replaced with a switching hub.

Traditional Ethernets, in which all hosts compete for the same bandwidth, are called *shared Ethernets*. Switched Ethernets are becoming very popular because they are an effective and

convenient way to extend the bandwidth of existing Ethernets.

**Switched Ethernet is identical to traditional Ethernet**, except that a switch replaces the hub (Image 2.4). In traditional shared Ethernet, all devices share the same multipoint circuit and must take turns using it. When a frame is sent from one computer to another, it enters the hub, and the hub retransmits it to all the computers attached to the hub (Figure 2.4).



**Fig 4:** Shared Ethernet and Switched Ethernet

(Adapted from “Analysis of Local Area Network (LAN) in PT. Mustika Ratu Tbk East Jakarta”, by Indra Riana Rahadjeng and Ritapuspitasari, 2018) <sup>[8]</sup>

Each computer looks at the Ethernet address on incoming frames, and if the address on the packet does not match its address, it discards the packet. This process ensures that no two computers transmit at the same time, because they are always listening and do not transmit when they are receiving a frame, even if the frame is not addressed to them. If the hub did not send the frame to all computers, a computer could begin transmitting at the same time as another computer and never be aware of it.

## 2.5 Accounting Information System

Accounting Information System is a group or group of any sub-system/part/component either physical or non-physical that is interconnected with each other and cooperate harmoniously to process transaction data related to financial problems into financial information (Darwis *et al*, 2019) <sup>[3]</sup>. Accounting information systems are organizations, forms, records and reports that are coordinated in such a way as to provide financial information needed by management to facilitate the management of the company. Accounting information system is also a system that processes data and transactions to produce useful information to plan, control and operate businesses (Effendi and Baru, 2019) <sup>[4]</sup>

## 3. Research Method

The descriptive approach was adopted in this study through the collection of previous literature on Ethernet Switched LANs and the Accounting Information System. Based from what the literature review explained, this research try to find out how ethernet switched LANs goes by seeing from accounting information system perspective. The aim of this paper is to show the reader what is ethernet switched LANs from accounting information system perspective itself. The previous literatures were examined to complete this paper are journals that published around 2018 to 2019.

## 4. Result and discussion

### 4.1 Result

Ethernet is a distributed network type, created when one or more related computers are grouped within a limited geographical region. This local area could be a building, a group of buildings or a department within a company.

Managers and employees use microcomputers and terminals to carry out their daily duties. The LAN can be connected to another LAN or to a WAN through hardware equipment known as a Gateway or Bridge.

#### A. Advantages of Ethernet Switch LAN's

1. LAN is an effective way for various users to communicate or share information technology resources.
2. Cheaper than computers that are not connected in the network (self-working / standalone computer).
3. A well-designed LAN will usually be able to increase employee productivity because it allows employees and managers to communicate easily.
4. LAN is very flexible because workstations can be easily added or reduced.
5. Have more security guarantee because of its facility in using local IP network only with switch then router
6. Able to use shared resources
7. Transferring files through a data in and out management server is possible
8. Can create a network of relationships between systems and various brands
9. Because many systems are connected then with LAN network computers can be connected with several including fiber optics, cable pairs, infrared light, radio signals and cable pairs. These relationships are topology whose function is to perform tasks on messages from one computer to another

**B. Disadvantages of Ethernet Switch LAN's**

1. The use of many computers / PCs in the LAN net even makes the internet connection very slow
2. Software used needs to be controlled and when using multiuser software must be designed first
3. LAN is so slow in the speed of the modem
4. Because all computers /PCs are connected in one network or topology then when one of them is infected with a virus, the other computer will also have a virus
5. System 1 network then the possibility of password can be penetrated
6. Regarding lan locations can only be connected between computers in one building for example in a campus, in one room by connecting a minicomputer. Actually LAN is capable of more than one building but the network relationship is quite inadequate
7. Because LAN is the same as a distributed network, adequate control and security is difficult to do, especially in peer-to-peer networks.
8. Some application software for workstations does not exist and is inadequate
9. Protocols and equipment have not been standardized.

Information systems are one of the company's most valuable assets. A good system will further improve productivity, efficiency, and improve customer service, as well as make it easier in terms of decision making for management. It is also continuously supported by increasing awareness of how important it is to control information systems in company management. Entrepreneurs usually implement an accounting information system in managing their accounts more adequately, quickly, and appropriately. And basically the accounting information system also provides tools that will be used to track financial records. So that the financial status of a company will also be known more accurately and management will be able to immediately make the right decisions and quickly.

**1. Some other advantages if using computer technology include**

1. Process transactions and other data faster
2. More accurate in data calculation and comparison.
3. The cost of processing each transaction is lower.
4. Be faster in preparing reports and other results.
5. It's more compact in storage, but it's well accessible when needed.

**2. The Role of Network Technology to Accountant**

1. Network is an integrated part of SIA because the network serves to move data and information. Network technology helps accountants to prepare and move reports quickly.
2. The network is at such high risk that it requires special controls to prevent loss of useful accounting records and information stored in SIA
3. The network can provide useful information for various users of the information.
4. Accountants must be actively involved in using and evaluating computer networks.

**3. The Influence of Information Technology on Accounting Information Systems**

1. Processing of transactions and other data can be done quickly

2. Better accuracy of calculations and data comparison.
3. Lower transaction processing costs.
4. More timely preparation of reports and other outputs
5. Better data storage and better access when data is needed.
6. Option to enter more data and output setup.
7. Higher productivity of employees and managers.

**4.2 Discussion**

Until recently, few organizations worried about the security of their wired Ethernet networks. Only someone within the site could get access to the LAN, and this seemed unlikely. Unfortunately, experience has shown that attackers can *usually* get into sites, especially if a site has public areas. Once into the site network, the attacker can plug into any wall jack. This bypasses the border firewall. While site networks are hard and crunchy to outside attackers, they tend to be soft and chewy to people on the inside.

To thwart the ability of attackers to simply plug into the internal network, companies can implement 802.1X, which is a standard for Port-Based Access Control on the workgroup switches that give users access to the network. With 802.1X, whenever a host connects to the network, its user must prove his or her identity before the workgroup switch will pass further traffic.

In some cases There will be a supplicant called the peer. The workgroup switch is called the authenticator. It gets this name because the workgroup switch provides authentication service to the supplicant computer. The 802.1X standard also uses a central authentication server to do the actual supplicant credentials checking.

When the supplicant host (peer) transmits its authentication credentials (password, etc.), the authenticator passes these credentials on to the authentication server. The authentication server checks these credentials against its authentication database. If the authentication server authenticates the credentials, it sends back a confirmation to the workgroup switch. The workgroup switch then allows the supplicant PC to send frames to other devices in the network.

Using a central authentication server provides four benefits.

1. **Switch Cost:** First, having the central authentication server check credentials instead of having the switch doing this minimizes the processing power needed in the workgroup switch. Given the large number of workgroup switches in firms, this reduces overall cost.
2. **Consistency:** Second, having all credentials on the authentication server gives consistency in authentication. An attacker cannot try many different workgroup switches until he or she finds one that is misconfigured and gives the attacker access.
3. **Reduced Management Cost:** Third, management cost is reduced because credentials only need to be changed on the central authentication server when a user joins the firm, leaves the firm, or needs other credential changes. Making all these changes on workgroup switches would be prohibitively expensive.
4. **Rapid Changes:** Fourth, the credentials of individuals who are fired or suspended can be invalidated in seconds, removing access to all workgroup switches.

**5. Conclusion**

In this research, we looked at Ethernet switched wired LANs. In contrast to wide area networks (WANs), LANs are

inexpensive per bit transmitted, so organizations can afford to provide extremely high-speed LAN service. There once were several switched wired LAN technologies, but Ethernet, which is standardized by the IEEE 802 Committee's 802.3 Working Group, is the only significant switched wired LAN technology.

Nowadays, many companies are starting to realize the importance of using Ethernet LAN (Local Area Network) in controlling information systems. In the current condition, the role of accountants is better when supported by expertise in the field of information technology systems, so it is necessary to understand actively in using and evaluating computer networks. Therefore accountants must also understand well the information technology (IT), including its capabilities and risks. This kind of understanding will help improve the expertise of the use of information technology to achieve surveillance objectives within the organization. Safeguarding and controlling the source of information must be a top priority for management.

Ethernet security itself has not been seen as a major issue in most firms. However, we reviewed the 802.1X standard that requires a host to authenticate itself to a switch port before it is allowed to use the network. This prevents attackers from walking into a firm and simply plugging into any Ethernet wall jack. In 802.1X, the host is called a peer, the switch is the authenticator, and there is a back-end authentication server that actually checks authentication credentials. Having a central authentication server that keeps authentication data and makes authentication decisions reduces the work that must be done by the switch. This minimizes switch cost. Centralizing authentication data and decisions on the authentication server also brings consistency to authentication, reduces switch and management cost, and allows the status of individual users to be changed instantly. Note that this security standard comes from the 802.1 Working Group, not the 802.3 Working Group.

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