

INTRODUCTION TO COMPUTER NETWORK AND DATA COMMUNICATION

Edi Surya Negara, M.Kom.

Postgraduate Program, Informatics Engineering (S2)

November 14, 2016

References :

- Computer Networks - A Tanenbaum - 5th edition (2011)
- Data Communications and Networking - Behrouz A.Forouzan - 4th edition (2007)
- Cisco System Inc - 2011 - Cisco Configuration Profesional User Guide.

Chapter 1: Objectives

After completing this chapter, students will be able to:

- Explain how multiple networks are used in everyday life.
- Explain the topologies and devices used in a small- to medium-sized business network.
- Explain the basic characteristics of a network that supports communication in a small- to medium-sized business.
- Explain trends in networking that will affect the use of networks in small to medium-sized businesses.

Chapter 1:

- 1.1 Globally Connected
- 1.2 LANs, WANs, and the Internet
- 1.3 The Network as a Platform
- 1.4 The Changing Network Environment

1.1 Globally Connected



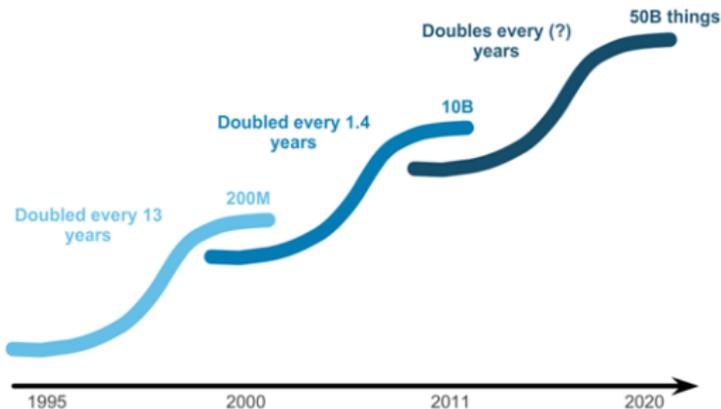
Networks in Our Past and Daily Lives

"Fixed" Computing
(You go to the
device)

Mobility/BYOD
(The device goes
with you)

Internet of Things
(Age of Devices)

Internet of
Everything
(People, Process,
Data, Things)



Internet of Things

- The Internet of things (stylised Internet of Things or IoT) is the internetworking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings and other itemembedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data.[1][2][3]

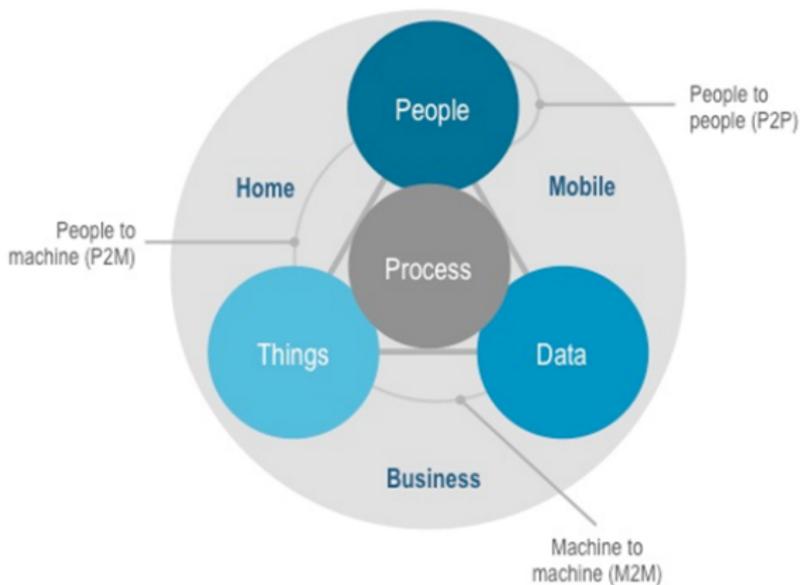
Internet of Things



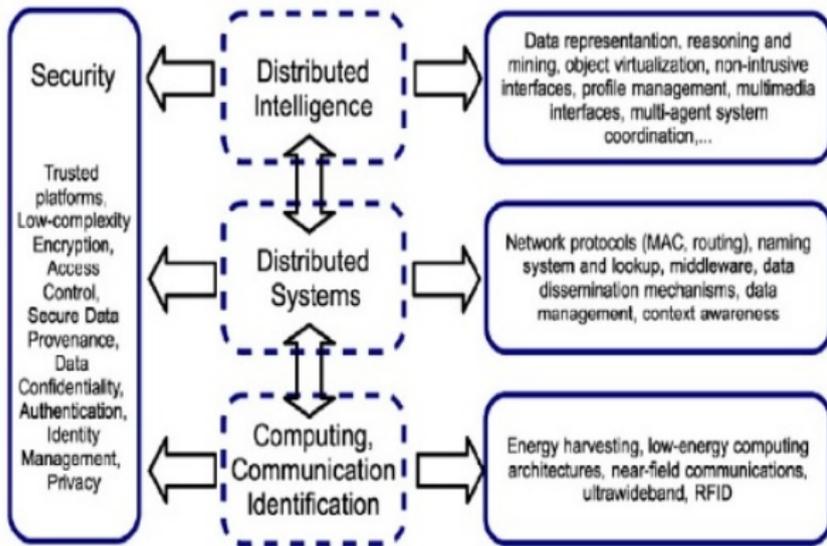
Internet of Everythings

- The Internet of Everything (IoE) brings together people, process, data, and things to make networked connections more relevant and valuable than ever before—turning information into actions that create new capabilities, richer experiences, and unprecedented economic opportunity for businesses, individuals, and countries.

Internet of Everythings



Taxonomy of Research Area to IOT



Networking Impacts in Our Daily Lives

- Networks support the way we learn.
- Networks support the way we communicate.
- Networks support the way we work.
- Networks support the way we play.

The Global Community



Networks of Many Sizes



Small Home Networks



Small Office/Home Office
Networks

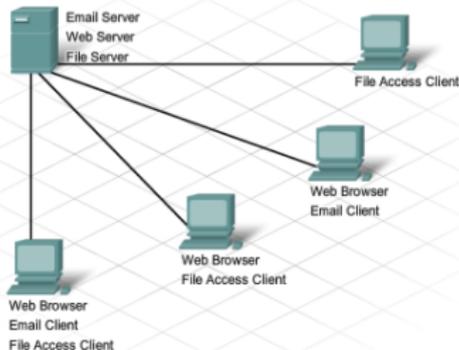
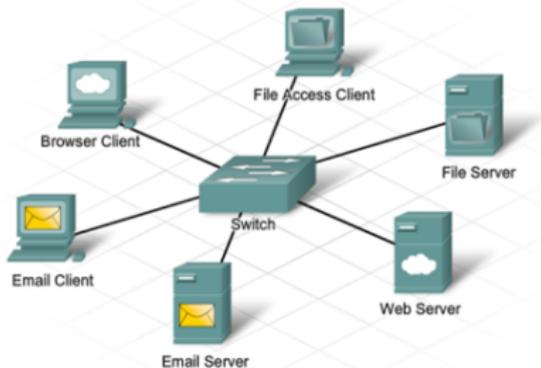


Medium to Large Networks



World Wide Networks

Providing Resources in a Network Clients and Servers

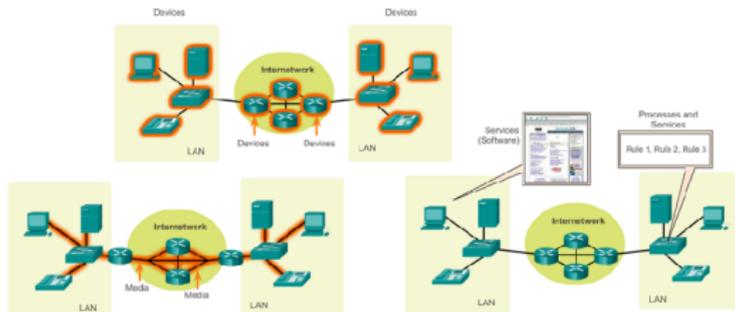


1.2 LANs, WANs, and the Internet

Components of a Network

There are three categories of network components:

- Devices
- Media
- Services



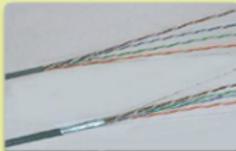
Network Infrastructure Devices

Examples of intermediary network devices are:

- Network Access Devices (switches, and wireless access points)
- Internetworking Devices (routers)
- Security Devices (firewalls)

Network Media

Copper



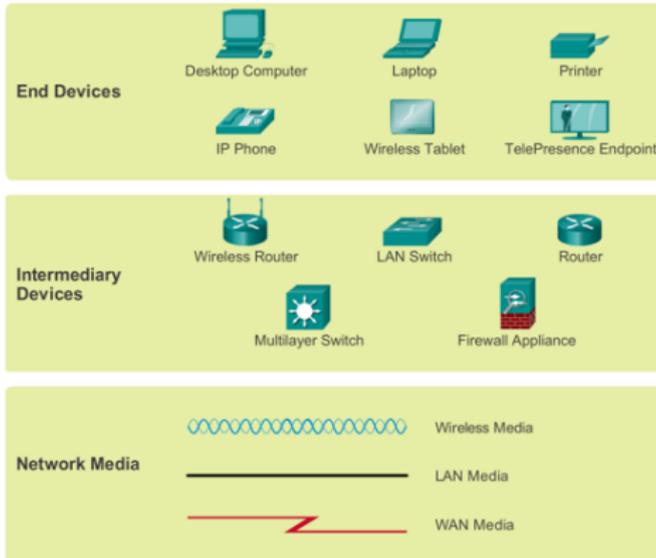
Fiber Optic



Wireless

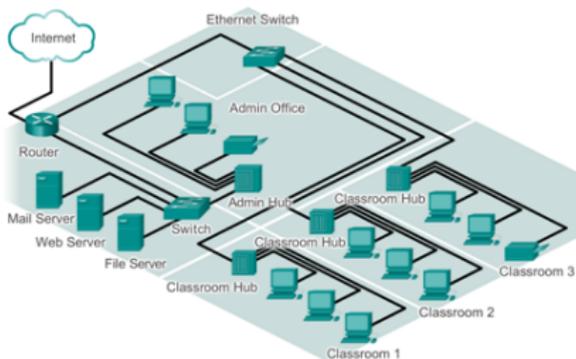


Network Representations

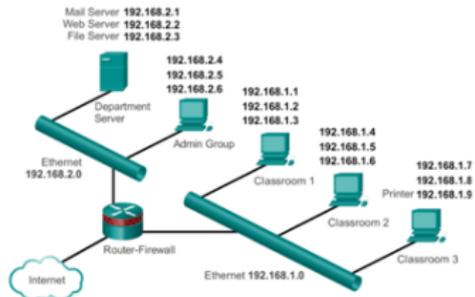


Topology Diagrams

Physical Topology



Logical Topology



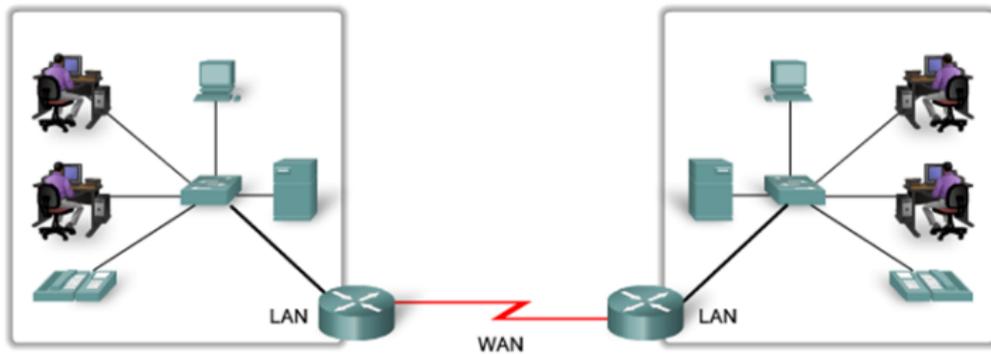
Types of Networks

The two most common types of network infrastructures are:

- Local Area Network (LAN)
- Wide Area Network (WAN)
- Metropolitan Area Network (MAN)
- Wireless LAN (WLAN)
- Storage Area Network (SAN)

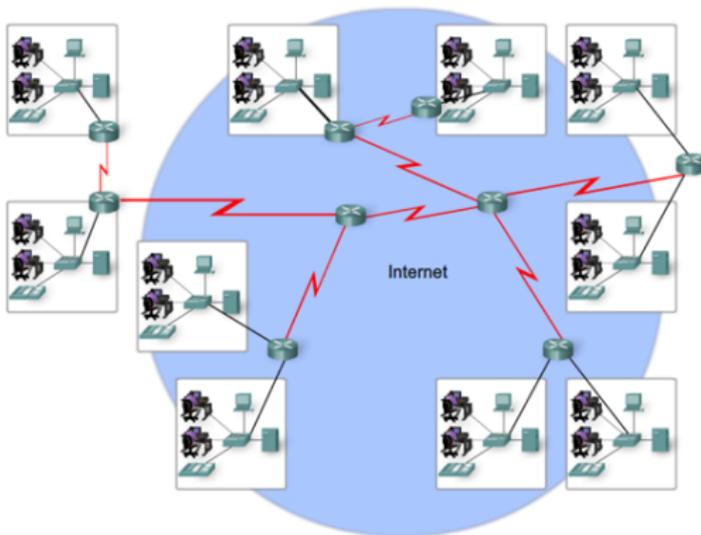
LANs and WANs

LANs separated by geographic distance are connected by a network known as a Wide Area Network (WAN).



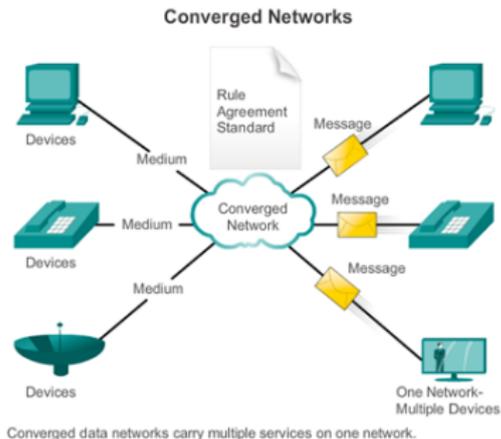
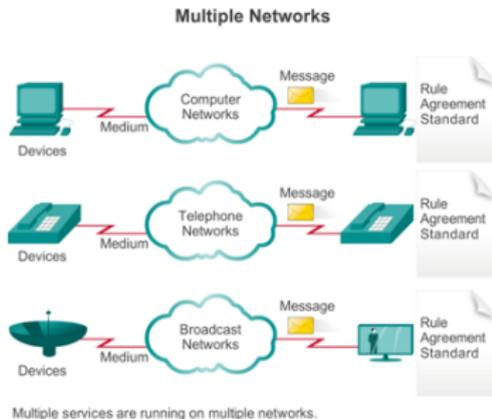
The Internet

LANs and WANs may be connected into internetworks.



1.3 The Network as a Platform

The Converging Network

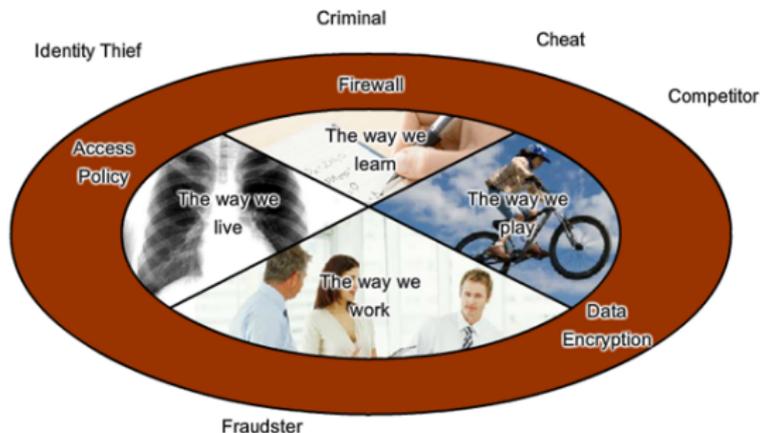


Supporting Network Architecture

As networks evolve, we are discovering that there are four basic characteristics that the underlying architectures need to address in order to meet user expectations:

- Fault Tolerance
- Scalability
- Quality of Service (QoS)
- Security

Providing Network Security



The communication and information that we would like to be private is protected from those who would make unauthorized use of it.

1.4 The Changing Network Environment

Network Trends

Some of the top trends include:

- Bring Your Own Device (BYOD)
- Online collaboration
- Video
- Cloud computing

References

- 1 Brown, Eric (13 September 2016). "Who Needs the Internet of Things?". Linux.com. Retrieved 23 October 2016.
- 2 Brown, Eric (20 September 2016). "21 Open Source Projects for IoT". Linux.com. Retrieved 23 October 2016.
- 3 "Internet of Things Global Standards Initiative". ITU. Retrieved 26 June 2015.

**Terima
kasih!**