

# Quản trị Mạng Network management *20192*

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TS. NGUYỄN ĐỨC TOÀN

BỘ MÔN TRUYỀN THÔNG & MẠNG THÔNG TIN

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# Content

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## ➤ Overview

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➤ Objectives

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# Overview

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- ◆ **Network management** is the process of controlling a complex data network to **maximize** its efficiency and productivity
- ◆ Network manager's job includes
  - Installation: attach PCs, printers, etc. to LAN
  - Configuration: NICs, protocol stack, user app's shared printers, etc.
  - Testing: Ping was sufficient to "manage" network
  - More devices: bridge, router

# In the early days

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- Network manager's job includes
  - Installation: attach PCs, printers, etc. to LAN
  - Configuration: NICs, protocol stack, user app's shared printers, etc.
  - Testing: Ping was sufficient to “manage” network
  - More devices: bridge, router
- Above only deals with **configuration**

# Maintenance issues

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- How to optimize **performance**?
- How to handle **failures** and network changes?
- How to extend network **capacity**?
- How to **account** for network usages?
- How to solve network **security** issues?

# Network manager responsibility

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- In the past, the network manager might take all the responsibilities
- Today the task has divided into specialties:
  - Server admin System admin
  - Network admin Security
  - specialist
- Different certifications for these
  - Cisco, Novell, Microsoft, Sun, etc.

# Demands on network manager

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- Today, networks are larger and more complicated  
→ How to **monitor** and **control** the network effectively and timely?
  - Management tools are needed
- Network-based management tools: use the network to manage the network (remotely)
  - To control
    - Simple Network Management Protocol (SNMP)
    - Management Information Base (MIB)
    - Network Management System (NMS)
  - To monitor
    - Remote Monitor (RMON1)



# What is network management?

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“Network management includes the deployment, integration and coordination of the hardware, software, and human elements to monitor, test, poll, configure, analyze, evaluate, and control the network and element resources to meet the real-time, operational performance, and Quality of Service requirements at a reasonable cost.”

Saydam, Journal of Networks and System Management, Dec. 1996

## In brief:

Network management is mostly a combination of local and remote configuration and management with software.

Remote network management is accomplished when one computer is used to monitor, access, and control the configuration of other devices on the network.

# Course content

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1. Network management concepts
2. OSI, TCP/IP model and network design
3. Network management protocols and application
  1. SNMP, MIB
  2. RMON (Remote Networking Monitoring)
  3. DNS and DNS Server
  4. Web, FTP and Mail Server
  5. Firewall & IDS.
4. Software Defined Networking

# References

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1. Subramanian, M. (2010). *Network management: principles and practice*. Pearson Education India.
2. Hass, G. (2003). Configuration management principles and practice. Addison-Wesley Longman Publishing Co., Inc.
3. Morris, S. (2003). MPLS, MIBs and Network Management: Principles, Design and Implementation.
4. Ding, J. (2016). *Advances in network management*. Auerbach Publications.

# Evaluation

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## ◆ Mid term: 30%

- ✓ Quiz on LMS: 10%
- ✓ Actively ask and answer during offline classes: 20%
- ✓ Install and deploy open source network management software:
  - ✓ Cacti, Nagios, Icinga, Zabbix, Prometheus, OpenNMS, NetXMS
  - ✓ Mininet + (Onos / OpenDayLight / Beacon / Pox / Nox)

## ◆ Final-exam: 70%

- ✓ Multiple-choice questions
- ✓ Constructed-response test

# Objectives

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- ◆ Understand the concept of network management.
- ◆ Be able to manage network devices.
- ◆ Understand the details of SNMP & MIB, RMON, OpenFlow.
- ◆ Install and be familiar with network management tools.
- ◆ Collect and summary content from references.
- ◆ Present your work.