Mastering TCP/IP

§ 1. Basic Knowledge of the Internet
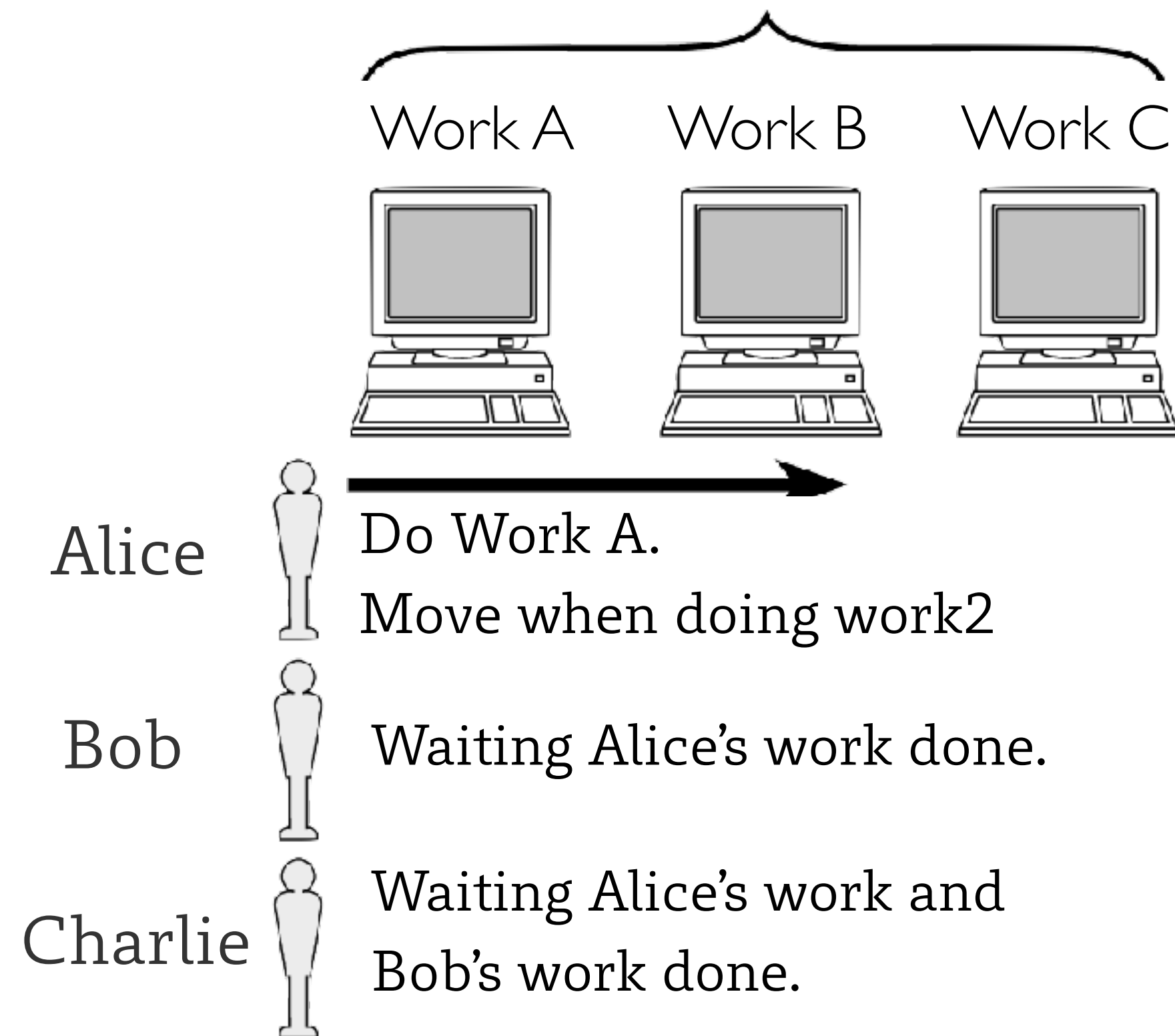
KUMO B4 shuya
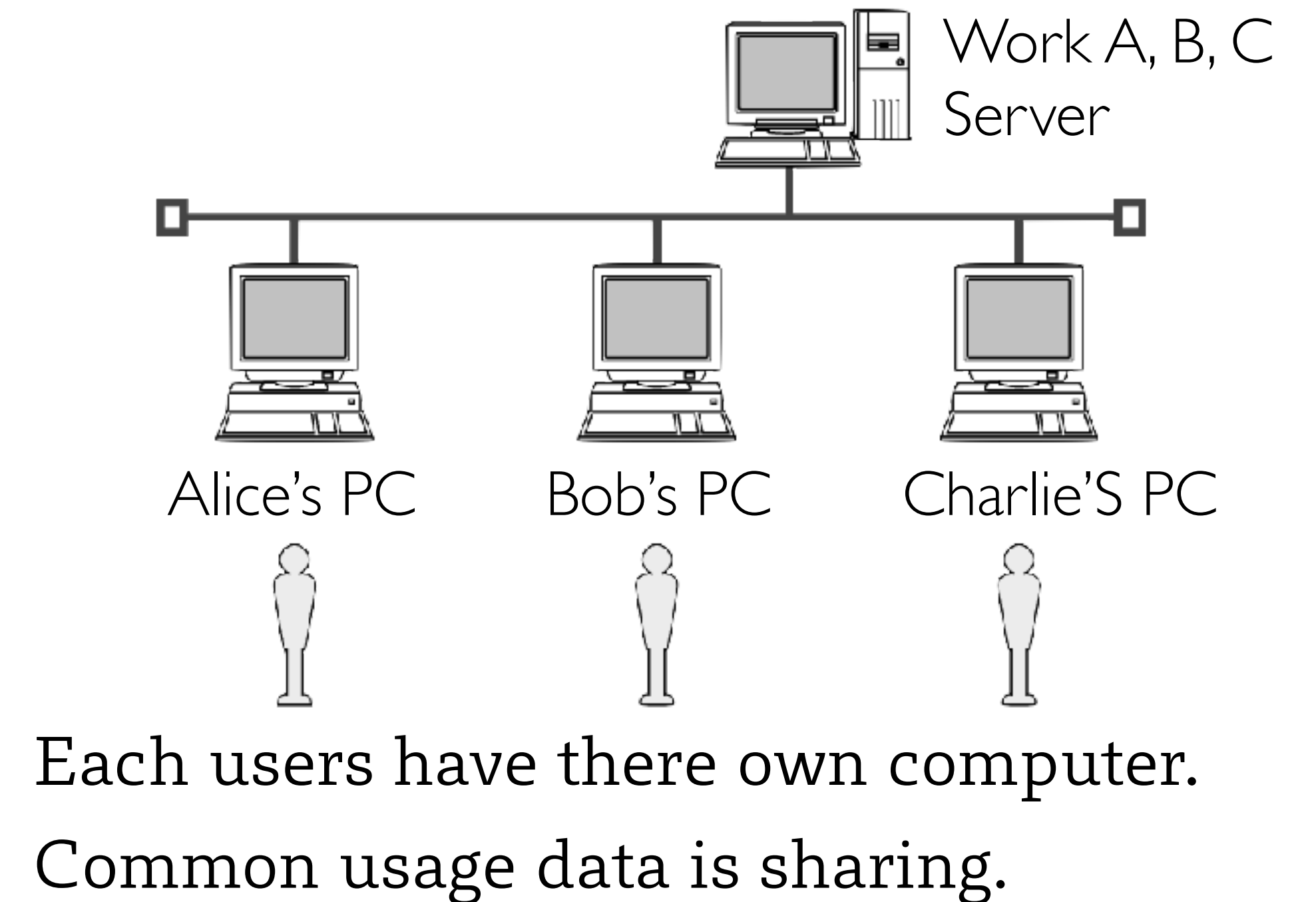
Standalone to Computer Networks

Standalone

These Computers are **isolated**.
Data is not shared.

Work A   Work B   Work C

Alice   Do Work A.
Move when doing work2

Bob   Waiting Alice's work done.

Charlie   Waiting Alice's work and
Bob's work done.

Use Network

Work A, B, C
Server

Alice's PC   Bob's PC   Charlie'S PC

Each users have there own computer.

Common usage data is sharing.
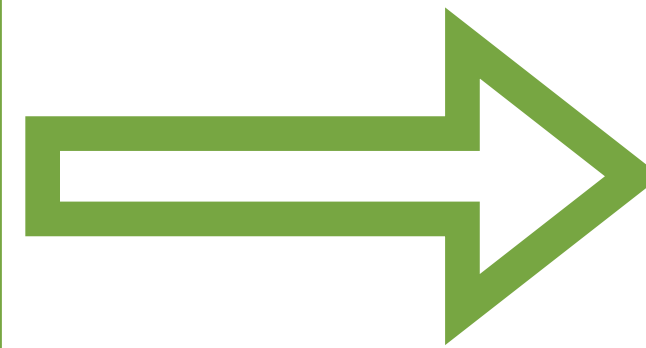
出典 : マスタリングTCP/IP 入門編 第５版

Batch Processing

- Executing a series of jobs all at one time.
- When this time Computer is very huge and expensive, difficult to handle.
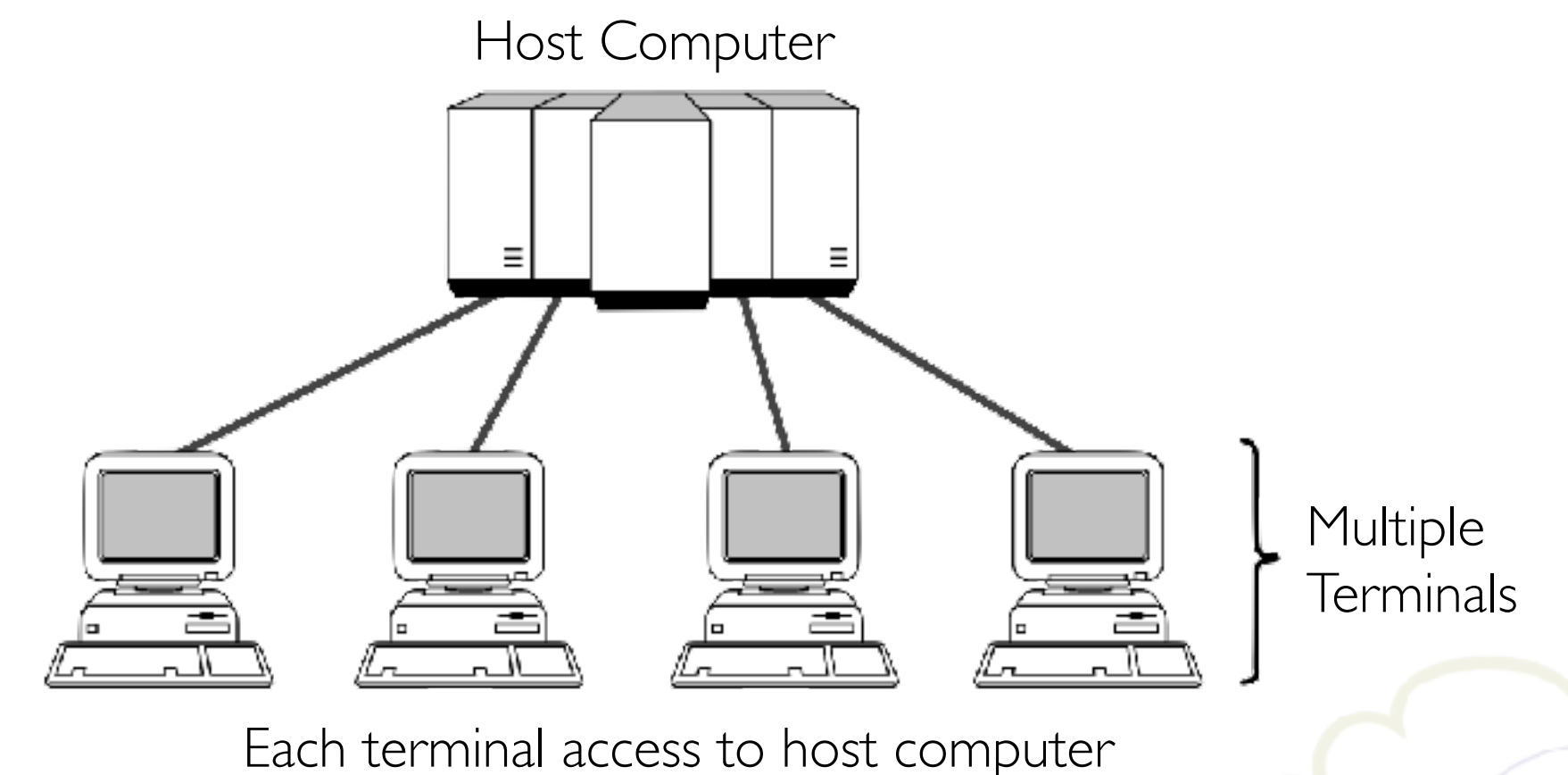

Program (card)

Computer

Card reader
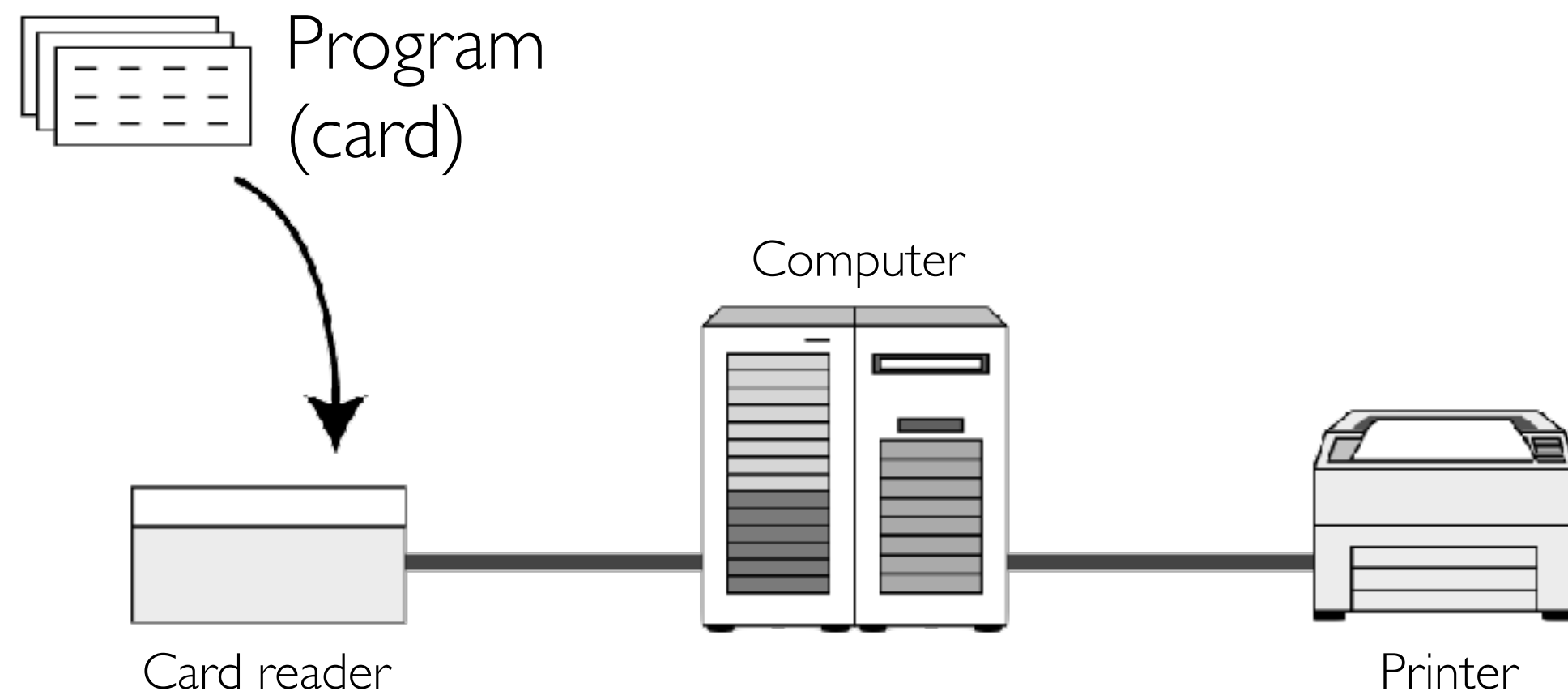
Printer

Program written in card output from card reader. After computer processing, results can get from printer.

TSS（Time Sharing System）

- Sharing of a computing resource among many users at same time.
- It enables to interactive use of computers.
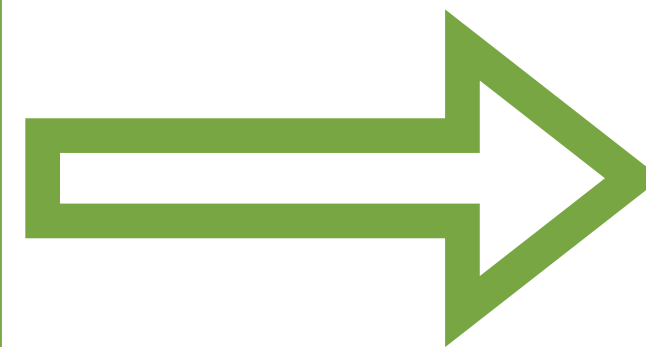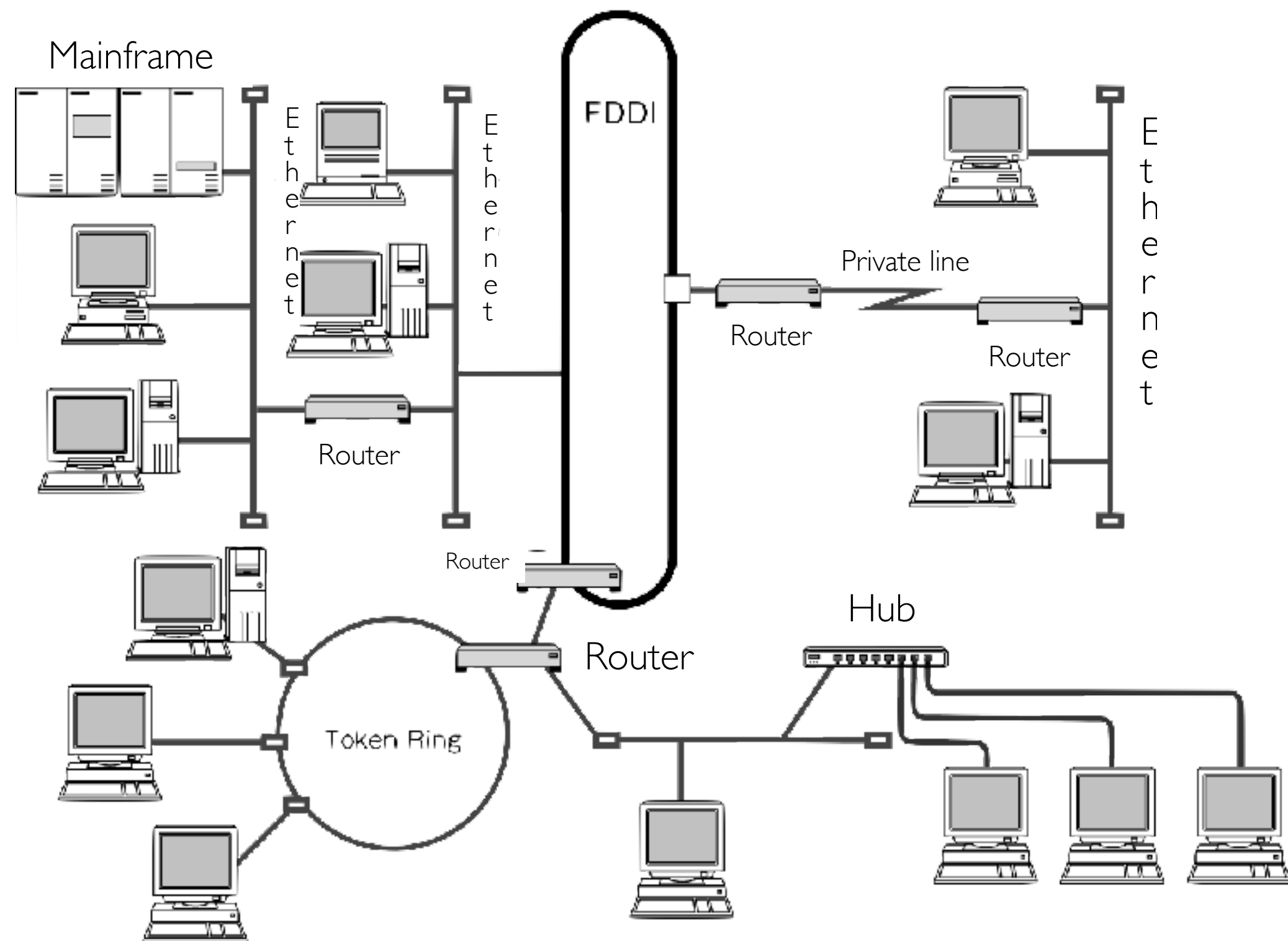- In TSS, Computers are linked by star network.

Host Computer

Multiple Terminals

Each terminal access to host computer

出典 : マスタリングTCP/IP 入門編 第５版

Computer Network

- Connect computer to computer.
- Before that time, data was sent in physical.

the Internet

- the Internet enables to connect among multi vender.
- At same time, E-mail and WWW was popular.
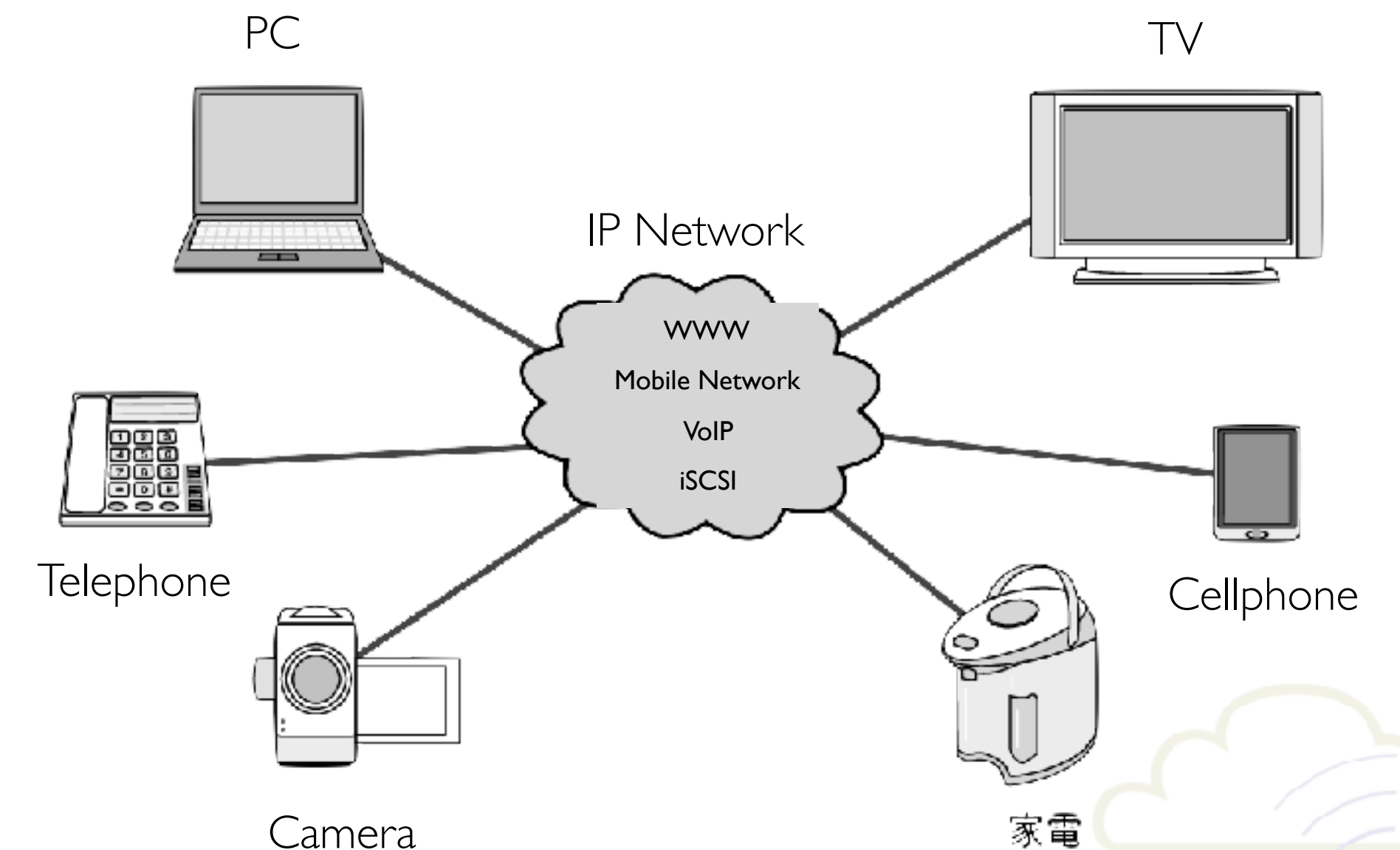

出典：マスタリングTCP/IP 入門編 第５版

Computer Network

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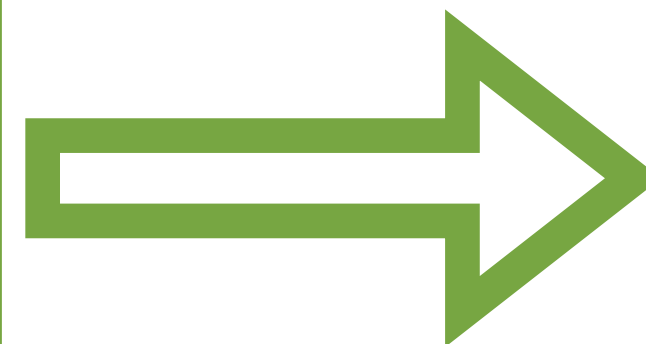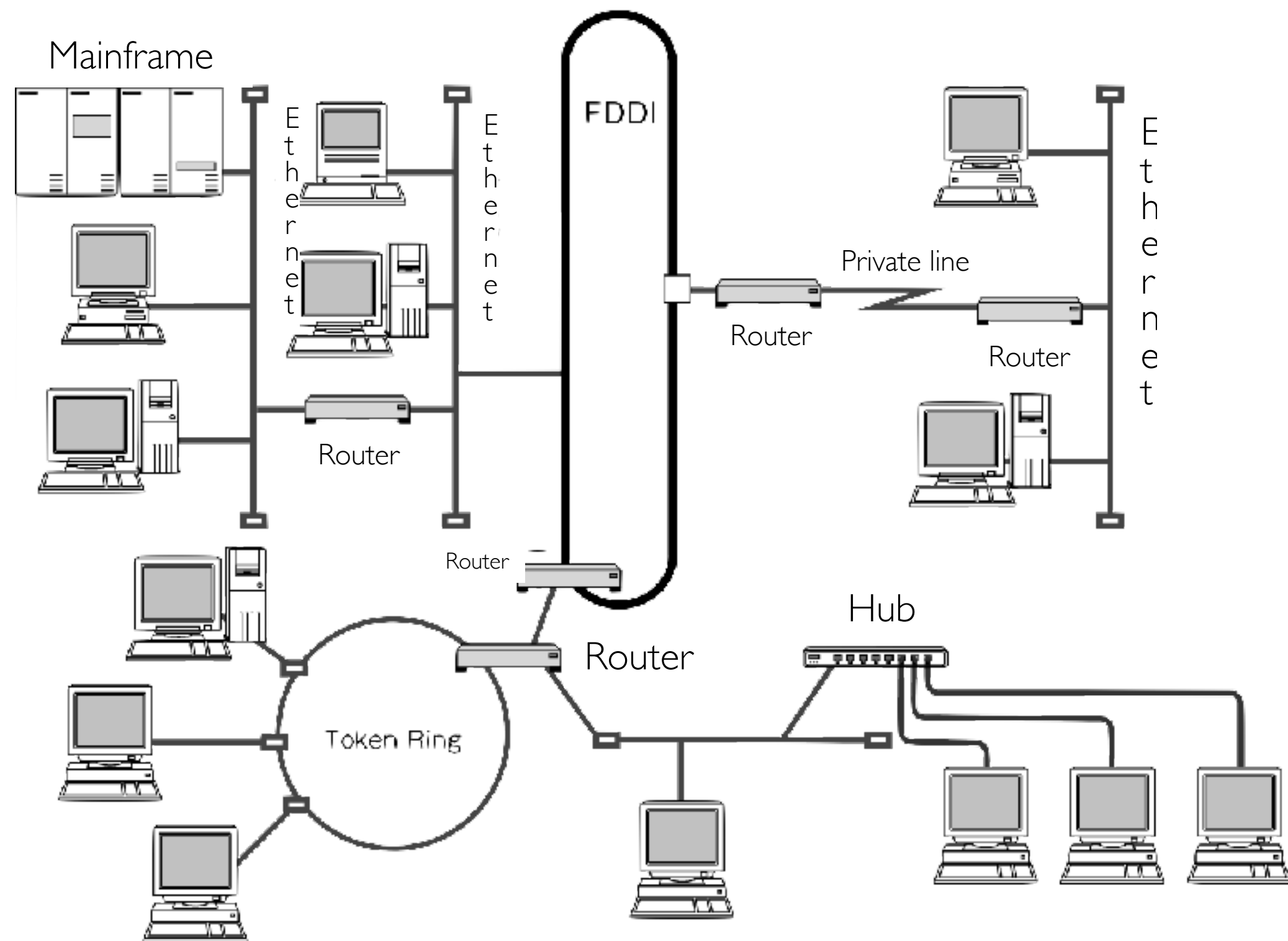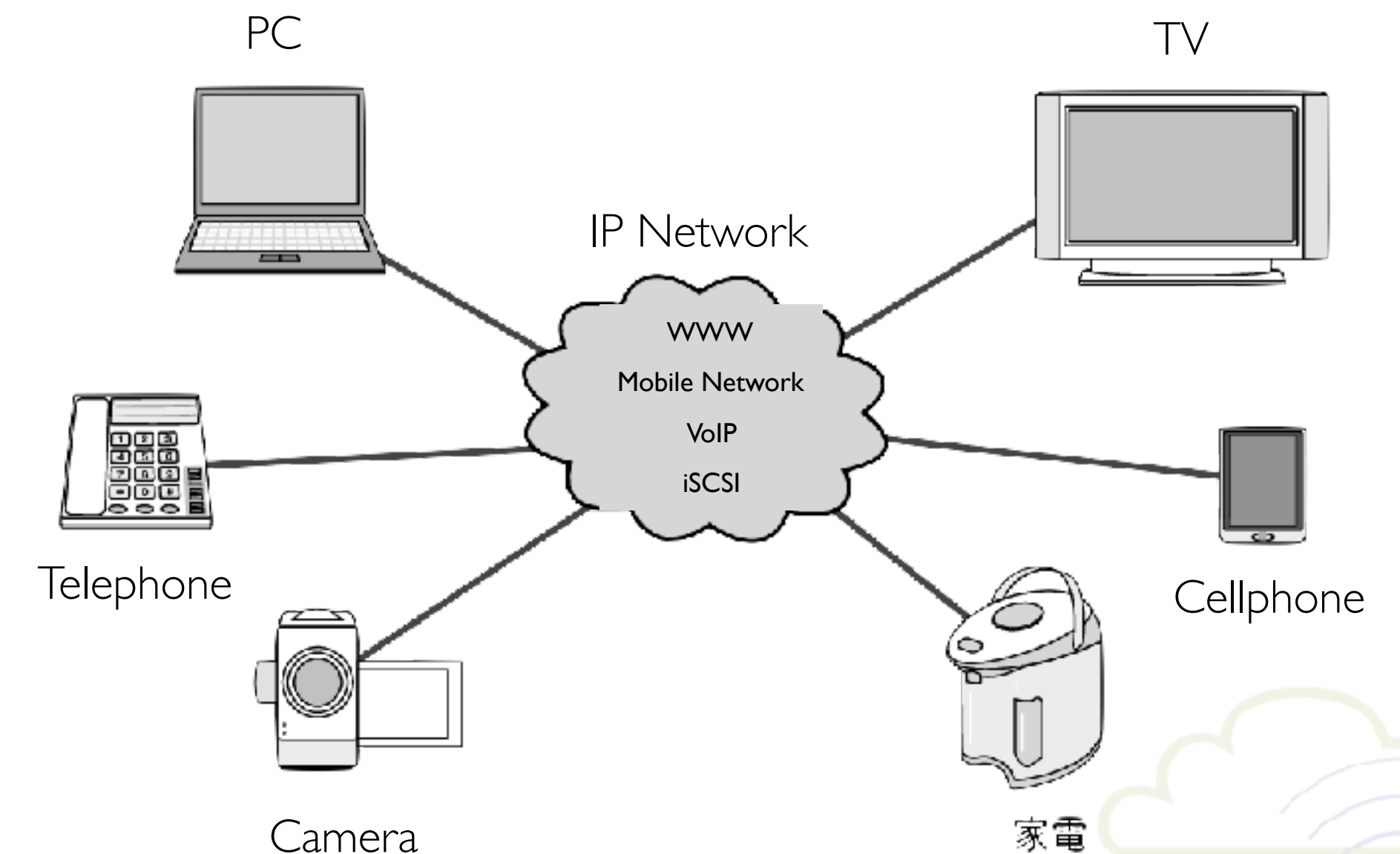- At same time, E-mail and WWW was popular.

出典：マスタリングTCP/IP 入門編 第５版

What is Protocol ??

- Protocol means rules.

- Systematically summarization of protocol is called "**Network Architecture**".

- If we use different protocol each by each, we can't communicate with other.

Who dose decide Protocol ??

- Standardize organization decide (standardize) protocol.

- Ex …

Internet Engineering Task Force

International Organization for Standardization

International Telecommunication Union
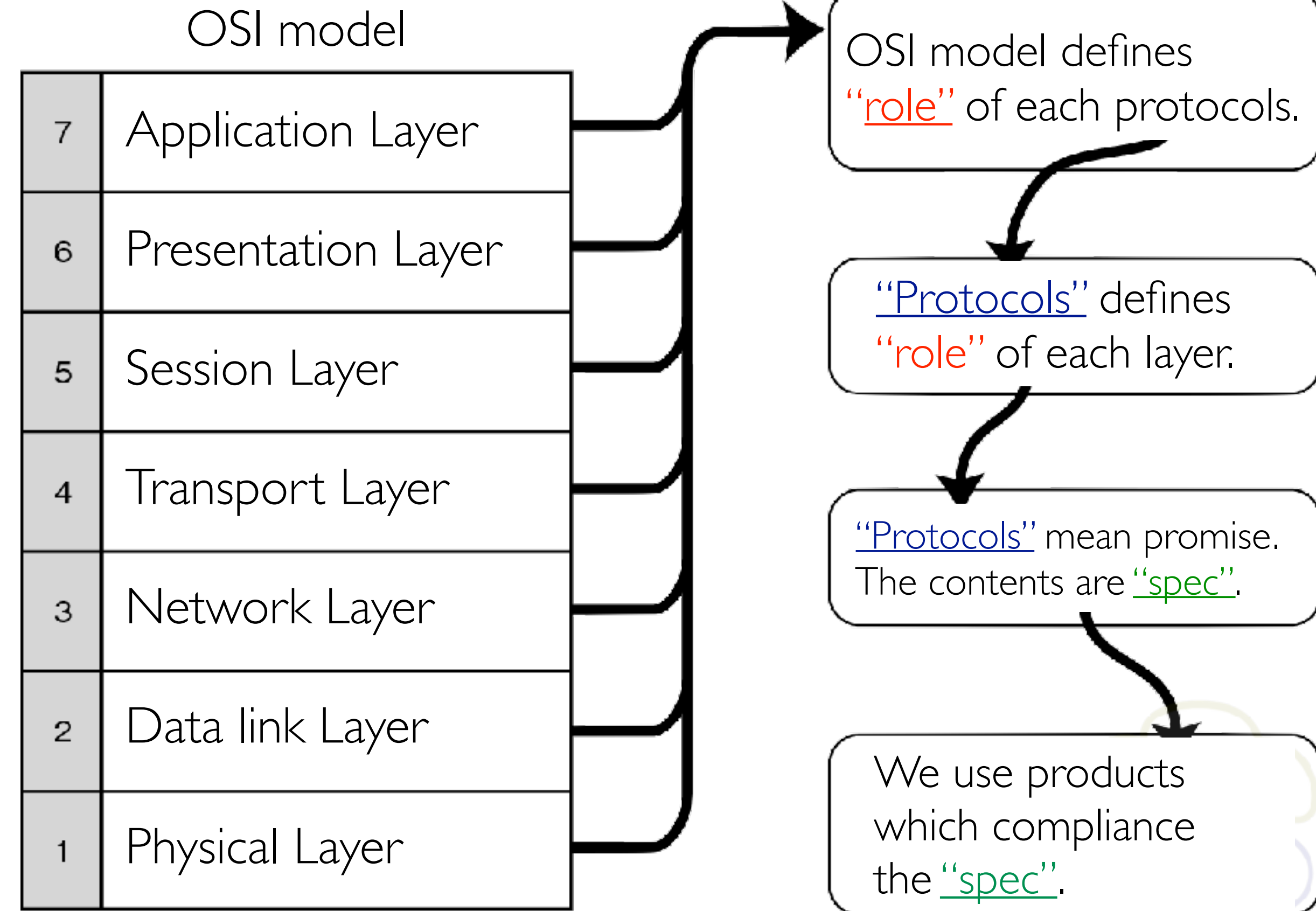
American National Standards Institute

Hierarchical protocol

- Hierarchical protocol is similar to modularization.

- Dividing each functions make simplification network protocols.

OSI model

- OSI model is one of the most famous layering model in computer network.
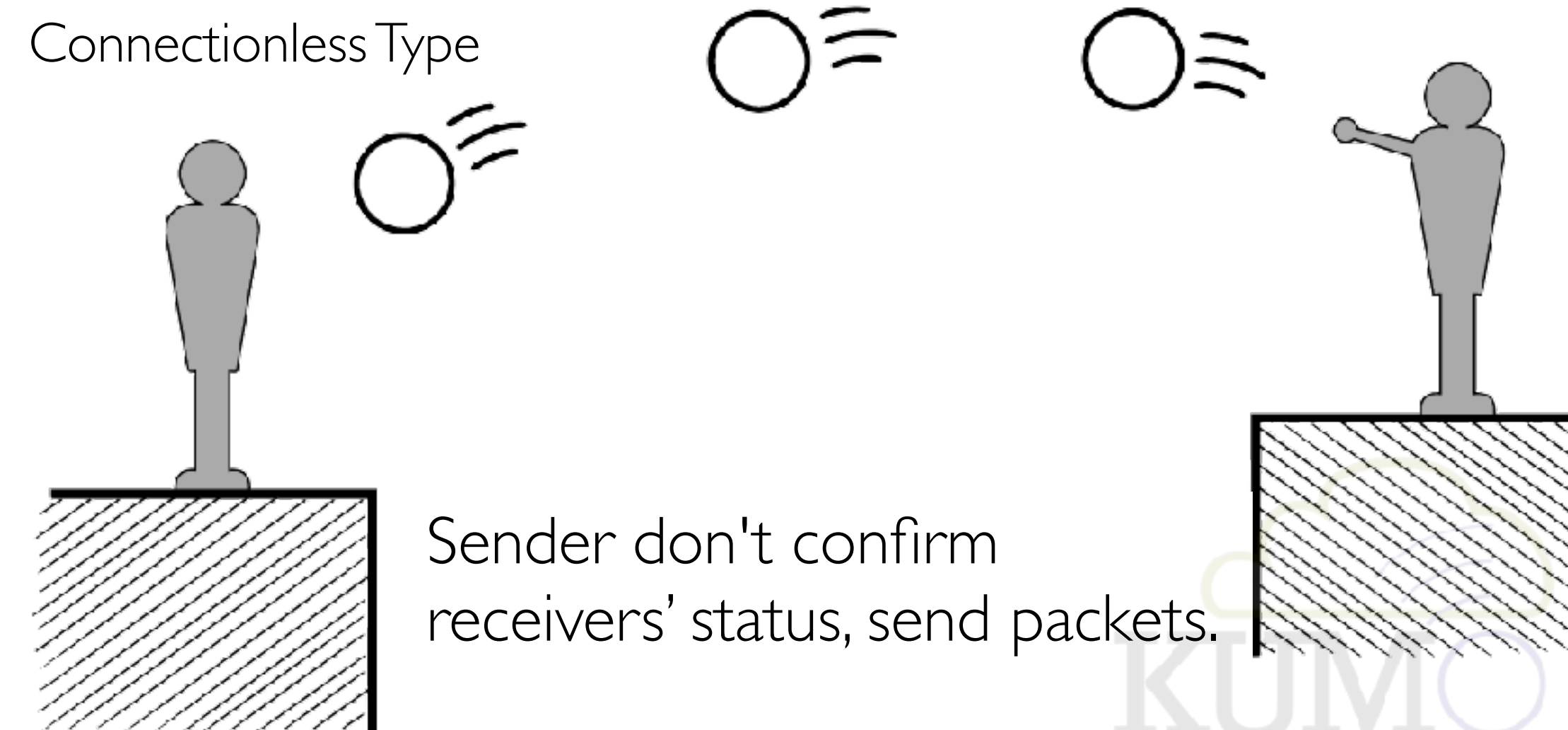
OSI model

7	Application Layer
6	Presentation Layer
5	Session Layer
4	Transport Layer
3	Network Layer
2	Data link Layer
1	Physical Layer

OSI model defines "role" of each protocols.

"Protocols" defines "role" of each layer.

"Protocols" mean promise. The contents are "spec".

We use products which compliance the "spec".

出典 : マスタリングTCP/IP 入門編 第５版
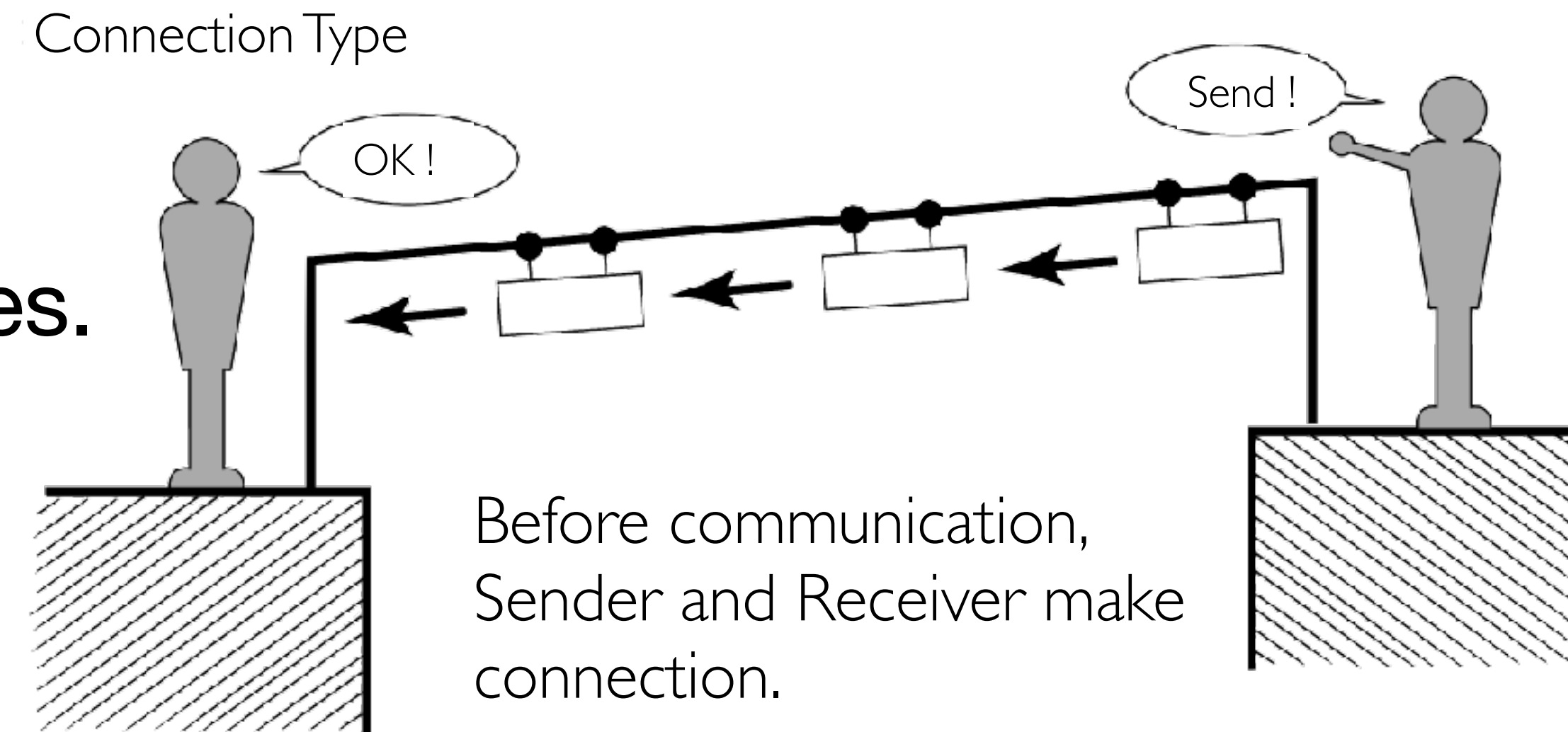
Type of data delivery

- Method of data delivery is separated to 2 types.

  - **Connection Type**
  - **Connectionless Type**

Connection Type

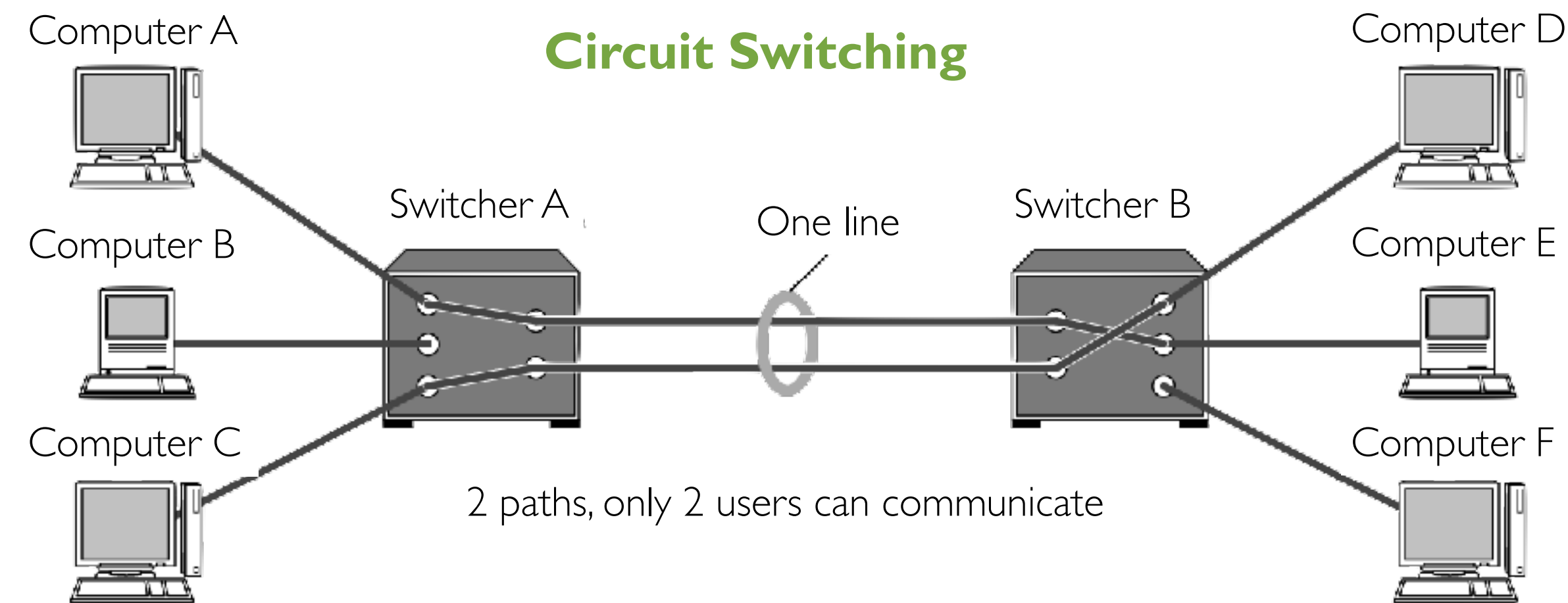Send !

OK !

Before communication, Sender and Receiver make connection.

Connectionless Type

Sender don't confirm receivers' status, send packets.
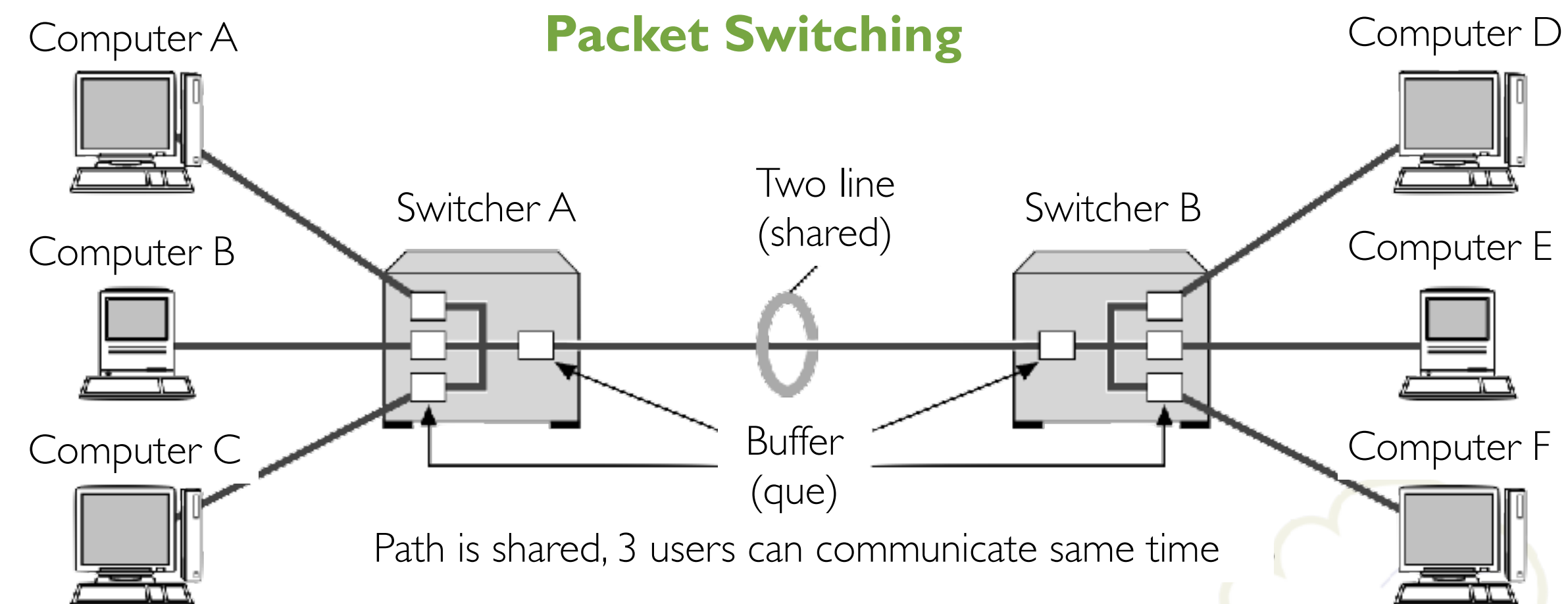
Type of transfer method

- ### Circuit switching

  - To occupy connection path.
  - Line is limited by number of switcher.

- ### Packet switching

  - Connection path is shared.
  - Multiple users can use same path.
  - Data is split to **packet** and send.

Circuit Switching

Computer A
Computer B
Computer C
Switcher A
One line
Switcher B
Computer D
Computer E
Computer F

2 paths, only 2 users can communicate

Packet Switching

Computer A
Computer B
Computer C
Switcher A
Two line (shared)
Switcher B
Computer D
Computer E
Computer F
Buffer (que)

Path is shared, 3 users can communicate same time

出典：マスタリングTCP/IP 入門編 第５版

Classification of communication method

- **Unicast**

  - Sending messages to single network.

- **Broadcast**

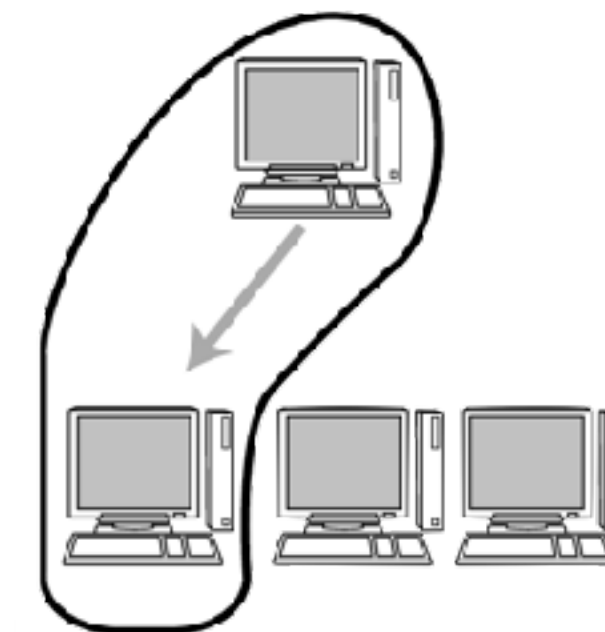 - Sending messages to all network.

- **Multicast**

  - Sending messages to specific group.

- **Anycast**

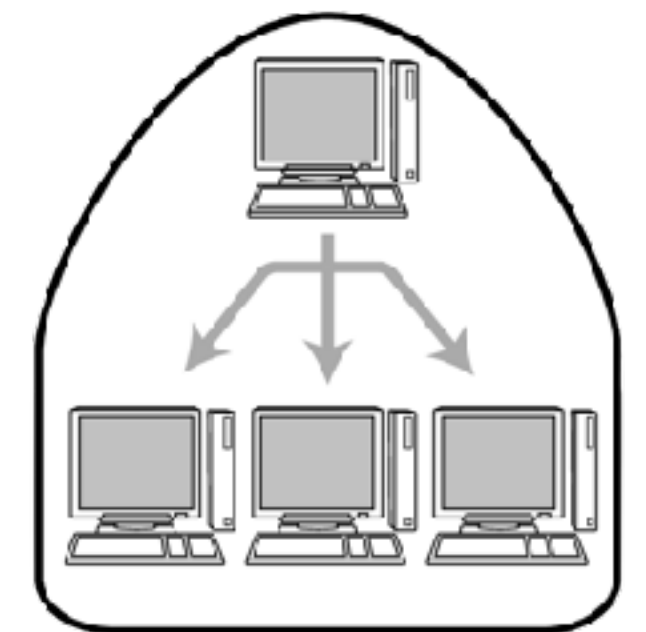 - Sending messages to specific one host (not intend).

Unicast
One to one communication

Broadcast
All computer (same datalink)

生徒と先生や、生徒同士での、
1対1の会話と考えてもよい。

全校朝礼での校長先生のお話と
考えてもよい。

Multicast
Communicate in specific group

Anycast
Communicate to specific one
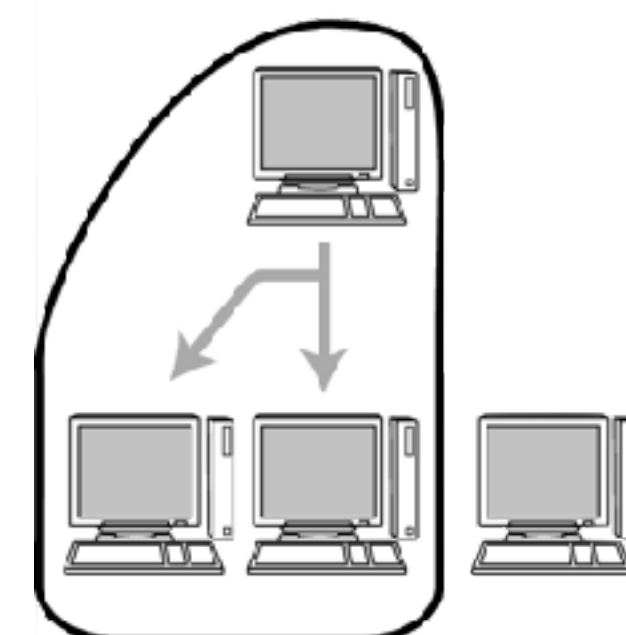
全校のうちで1年1組にだけ向けた案内や、
各委員会に向けた案内だと考えてもよい。
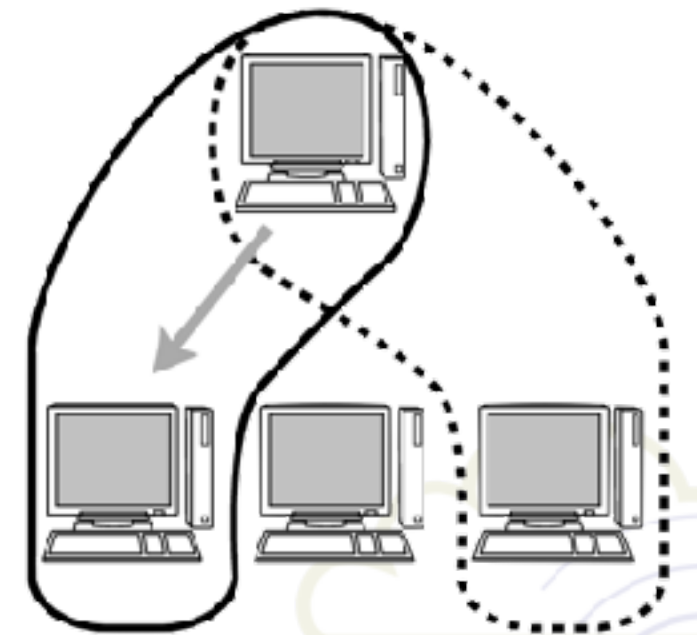
先生が1年1組の誰かに資料の配布を
手伝ってほしいと呼びかけ、生徒の
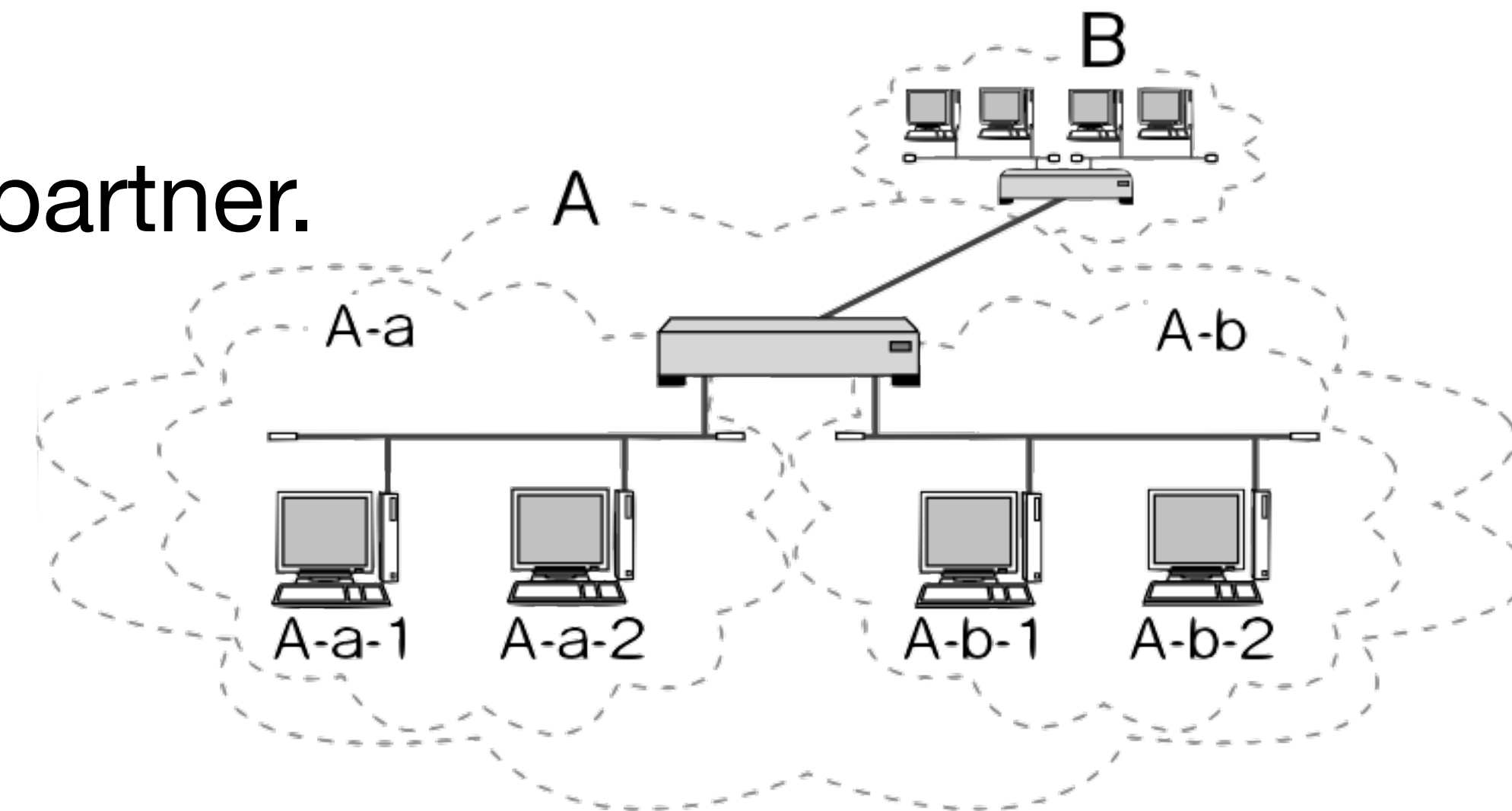うち1人が行動すると考えてもよい。

出典：マスタリングTCP/IP 入門編 第5版

Address uniquely identify opponent.

Uniqueness of Address

- Role of address is to identify the communication partner.

- This uniqueness is called "unique"

Address hierarchy

- Address hierarchy is need when address space is huge.

- Address hierarchy is only in IP address (MAC address don't have it)

Hierarchal Network

出典：マスタリングTCP/IP 入門編 第５版