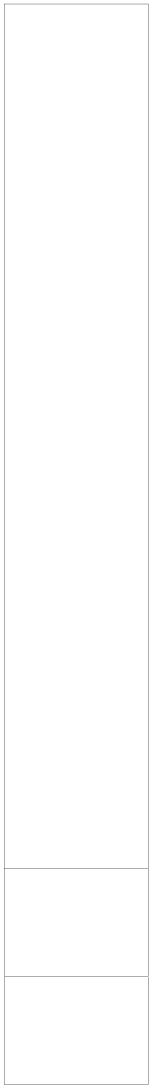
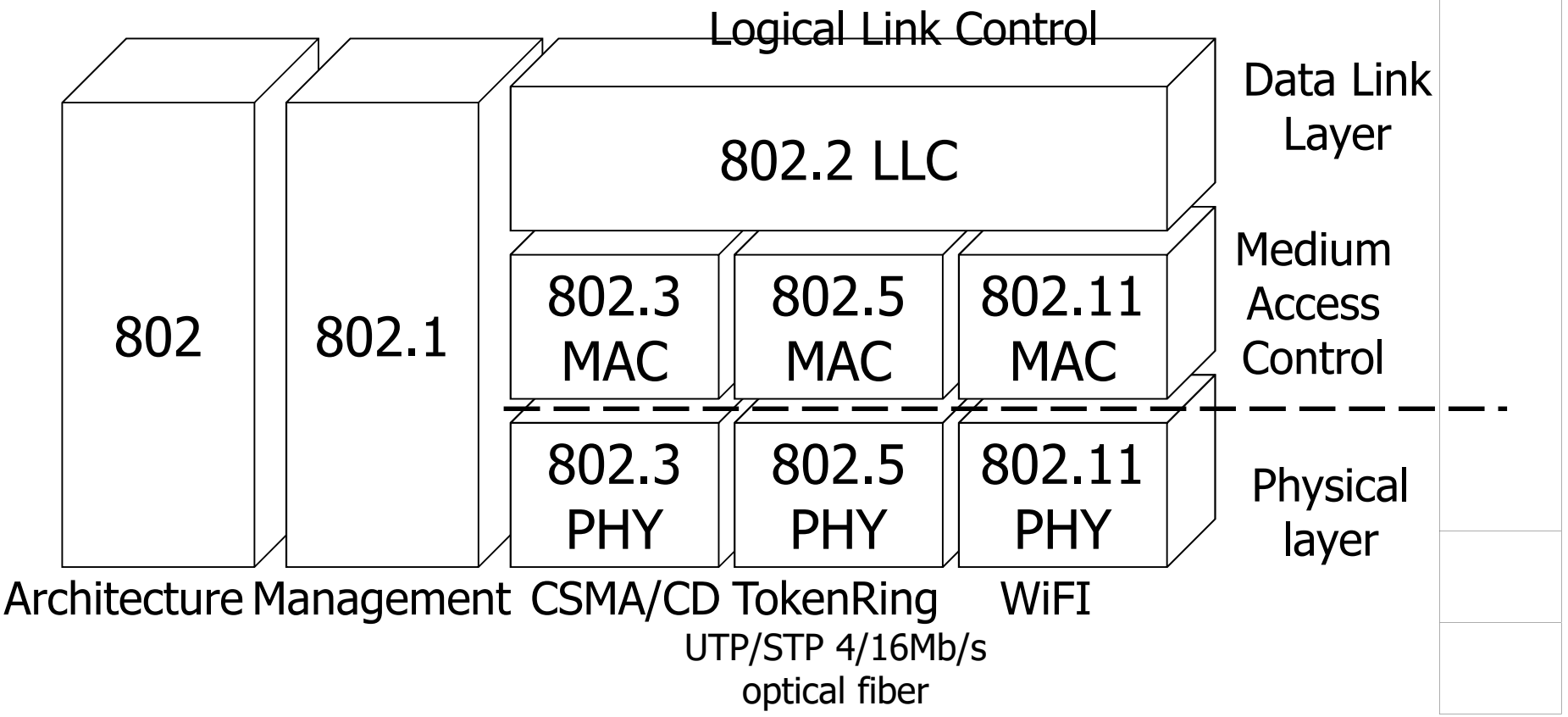
LAN standards selection

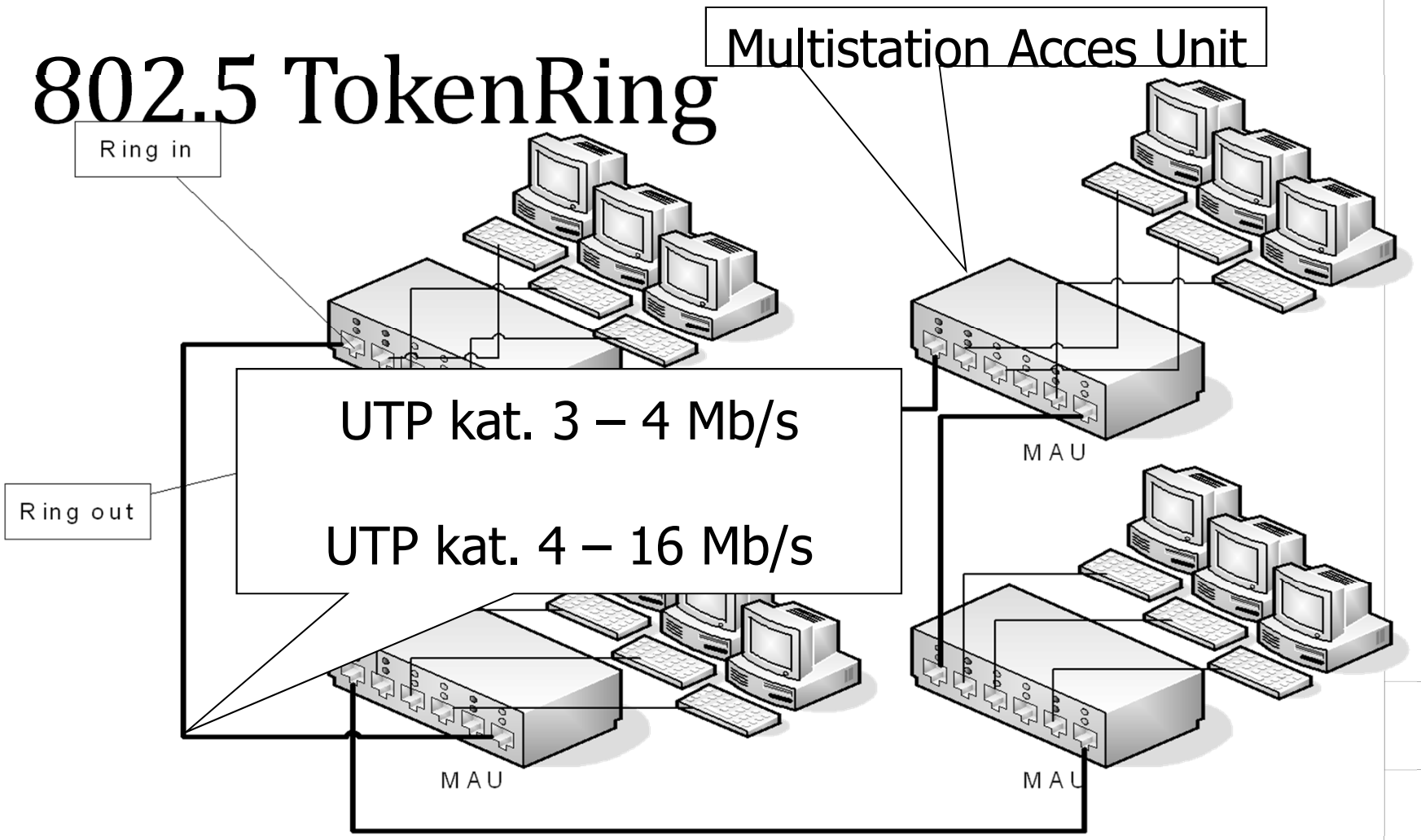
Foundations of computer networks



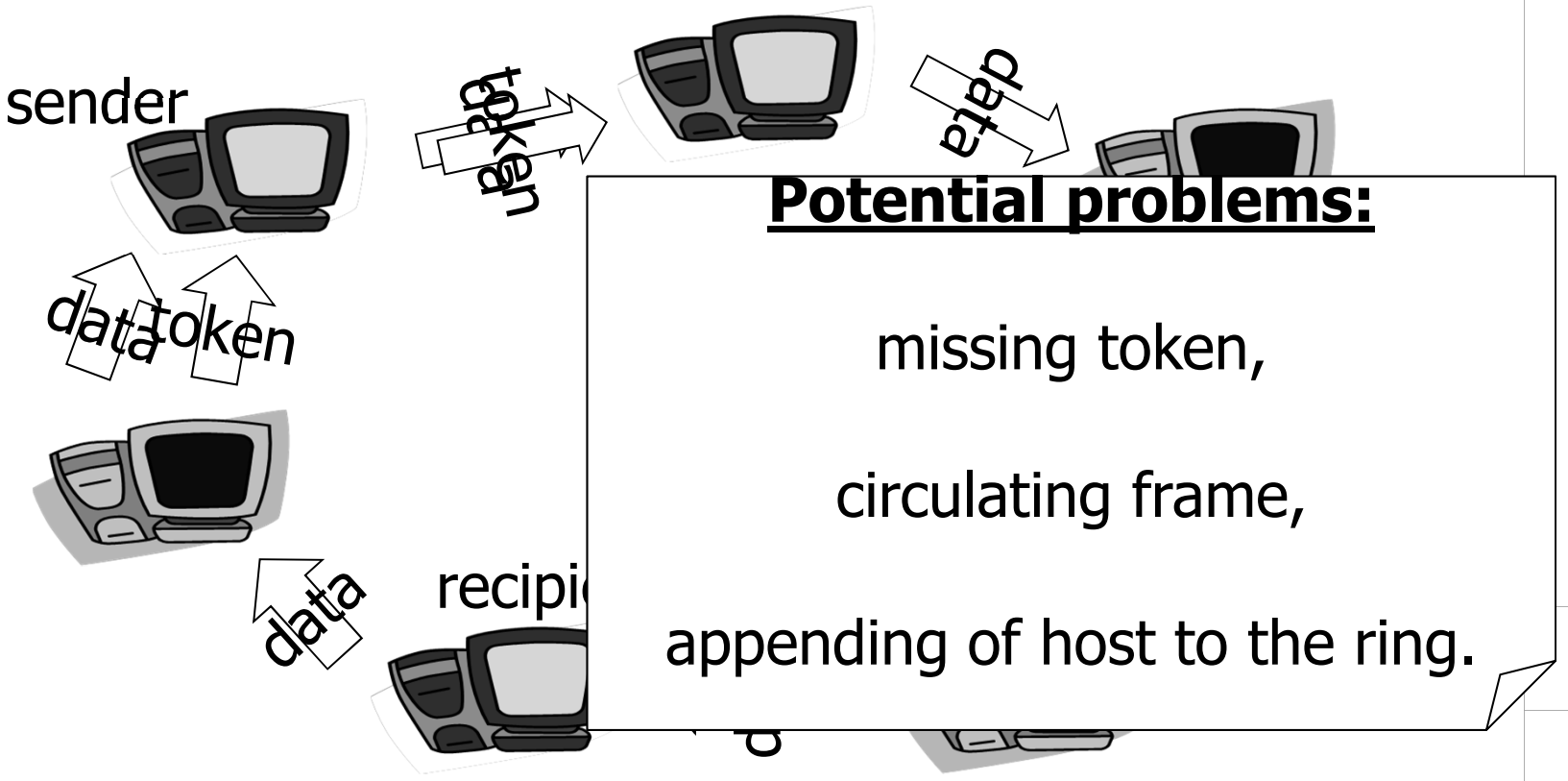
IEEE 802


Logical Link Control
802.2 LLC
Data Link Layer
802
802.1
802.3 MAC
802.5 MAC
802.11 MAC
Medium Access Control
802.3 PHY
802.5 PHY
802.11 PHY
Physical layer
Architecture
Management
CSMA/CD
TokenRing
WiFI
UTP/STP 4/16Mb/s
optical fiber

802.5 TokenRing



TokenRing in operation



Potential problems:

missing token,

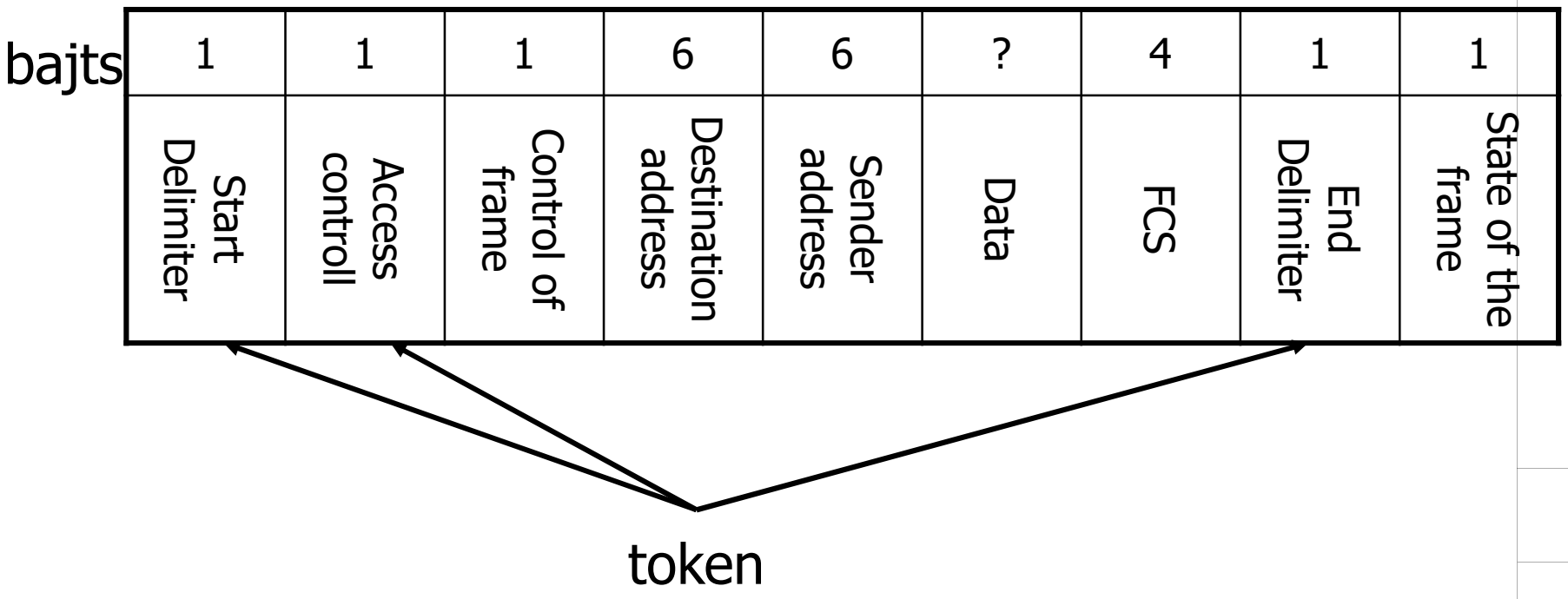
circulating frame,

appending of host to the ring.

Monitors and their tasks

- Monitor of activity
  - synchronisation
  - cleaning of the ring
    - missing frame
    - missing token
- Monitor of presence
  - presence of activity monitor

Frame ofTokenRing



Ethernet

- IEEE 802.3 – 10 Mb/s
- FastEthernet – 100 Mb/s (802.3u)
- GigabitEthernet – 1000 Mb/s (802.3z)

- 10GbEthernet – 10000 Mb/s
- 40GbEthernet – 40000 Mb/s
- 100GbEthernet – 100000 Mb/s

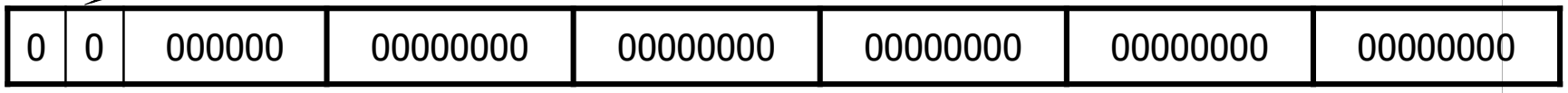
Frame of Ethernet

7	1	6	6	2	46 - 1500	4
Preamble 10101010 (AA)	SOF 10101011	Destination address	Sender address	Type / Length	Data/ 802.2	FCS

Addressing in Ethernet (MAC)

I/G
0 – indywidual address
1 – group address

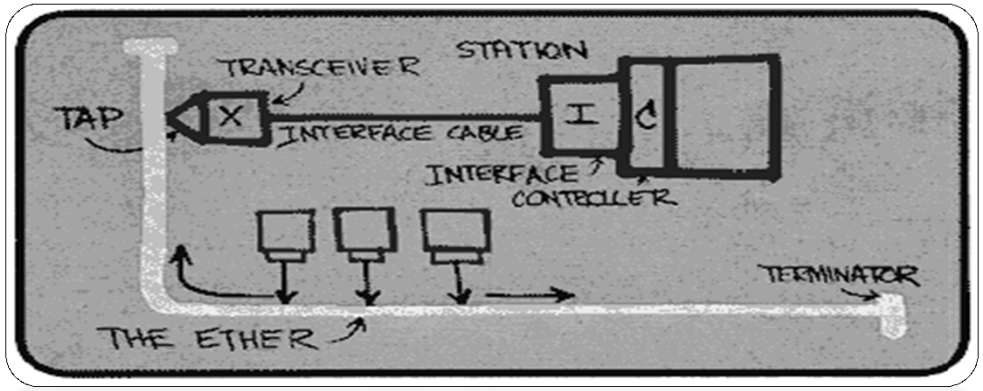
U/L
0 – global administration
1 – lokal administration

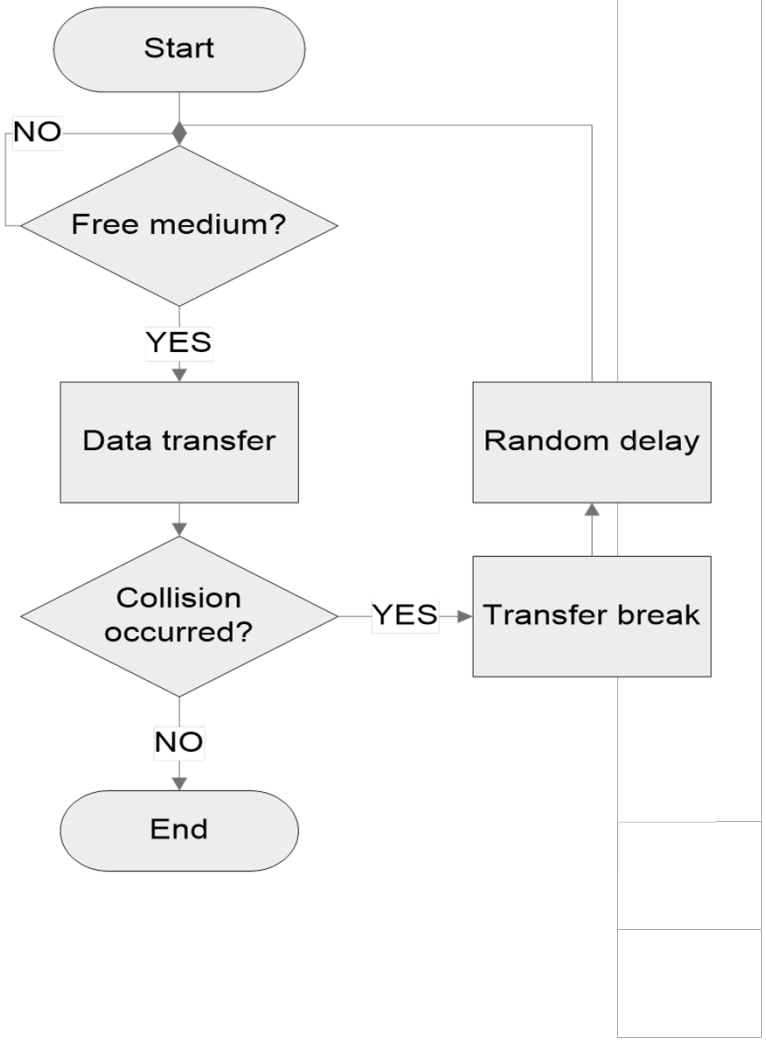


Burned in Address/
Organizationally Unique Identifier

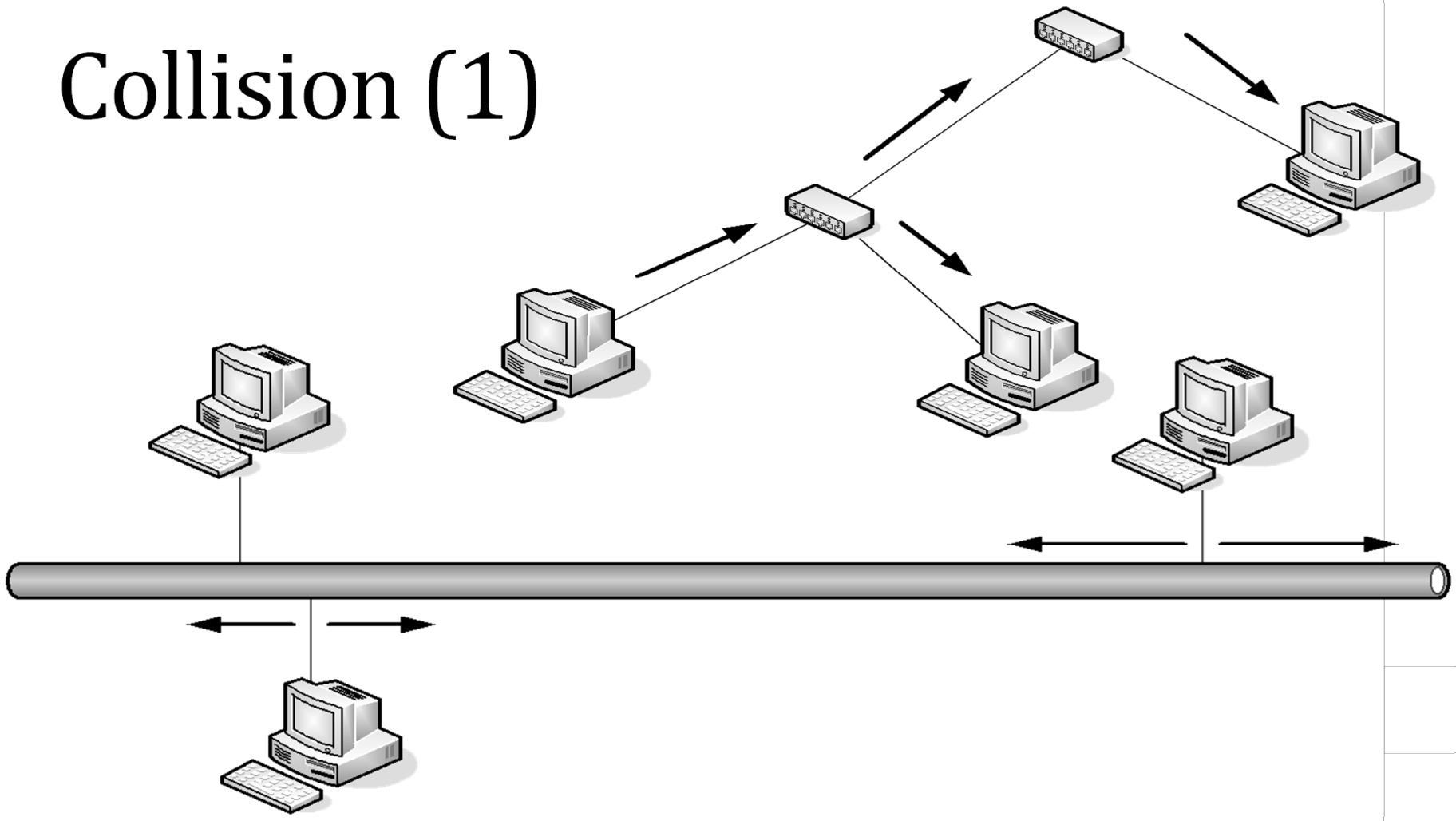
CSMA/CD

Draft of Ethernet network by Robert Metcalf - 1976

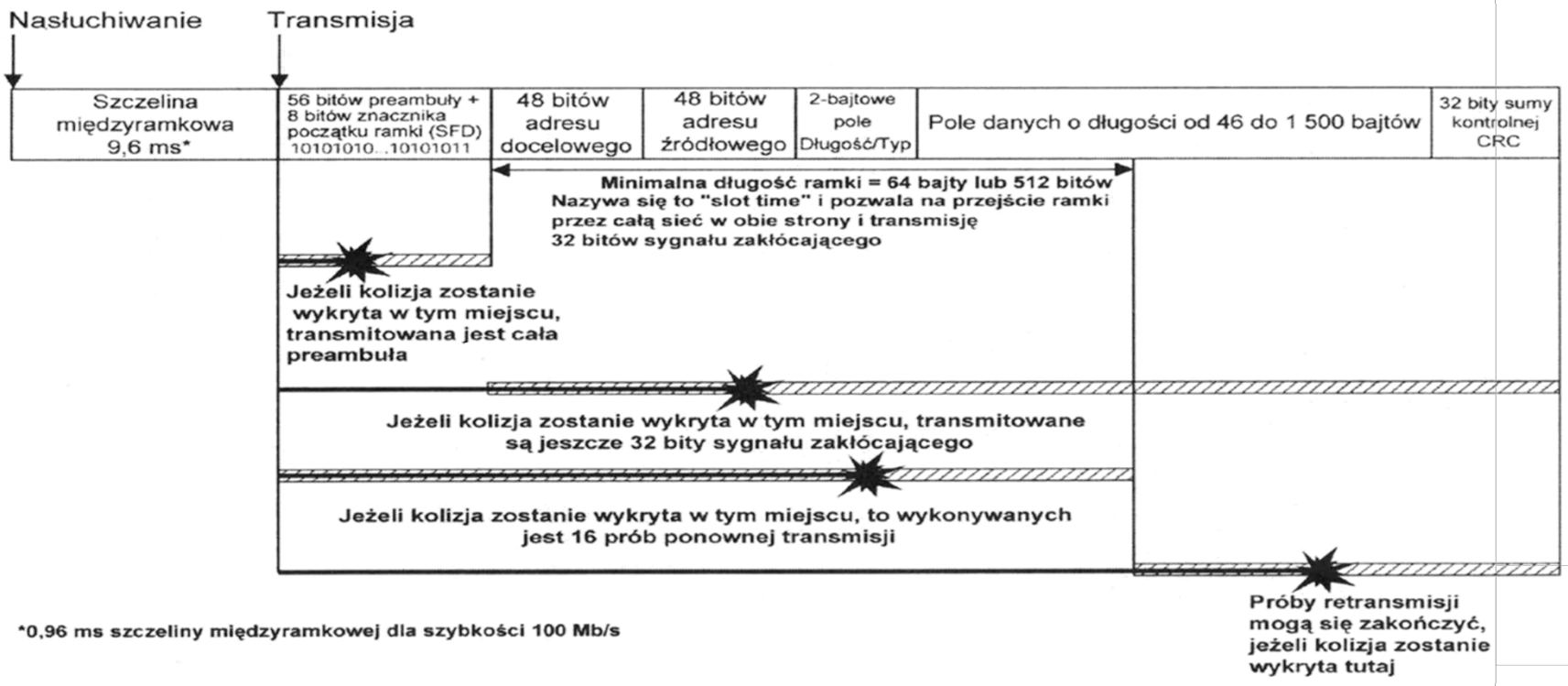




Collision (1)

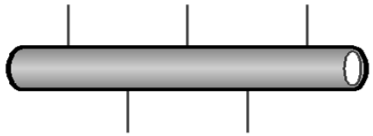


Collision (2)



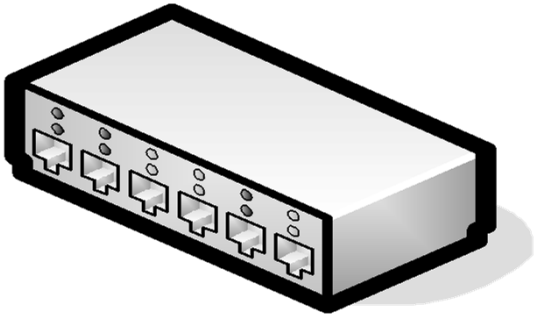
źródło: J. Scott Haugdahl. *Diagnozowanie i utrzymanie sieci. Księga eksperta.*

Time in Ethernecie



0,6 μs/100m

- Size of frame
  - 64 – 1518 bajts
  - 512 – 1518 bajts(1 Gb/s)
- Minimal time of transmission
  - 51,2 μs (10 Mb/s)
  - 5,12 μs (100 Mb/s)
  - 0,512 μs (1 Gb/s)
- time needed to collision detection
  - ½ of the above



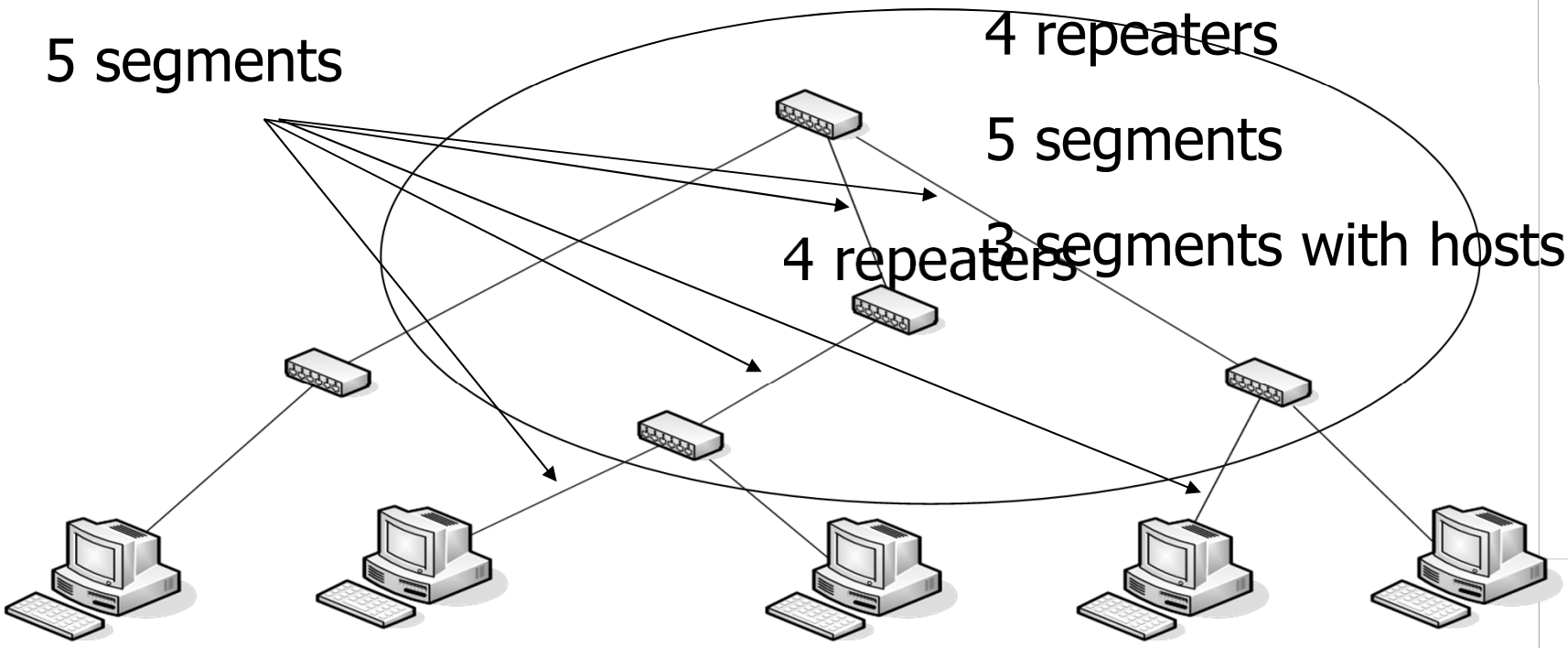
klass I: 0,7 μs

klass II: 0,46 μs

Frame in1GbEthernet

7	1	6	6	2	46 - 1500	4	0 - 448
Preambuła 10101010 (AA)	SOF 10101011	Adres stacji odbiorczej	Adres stacji nadawczej	Typ / Długość	Dane / 802.2	FCS	Carrier Extension

Maximal size of 10 Mb/s network



Range of Ethernet networks

- 10 Mb/s
  - 5*500m 10-Base-5
  - 5*185m 10-Base-2
  - 5*100m 10-Base-T
- 100 Mb/s
  - 2*100m+5 – 100-Base-T (2 repeaters)
- 1 Gb/s
  - 2*100m (1 repeater)