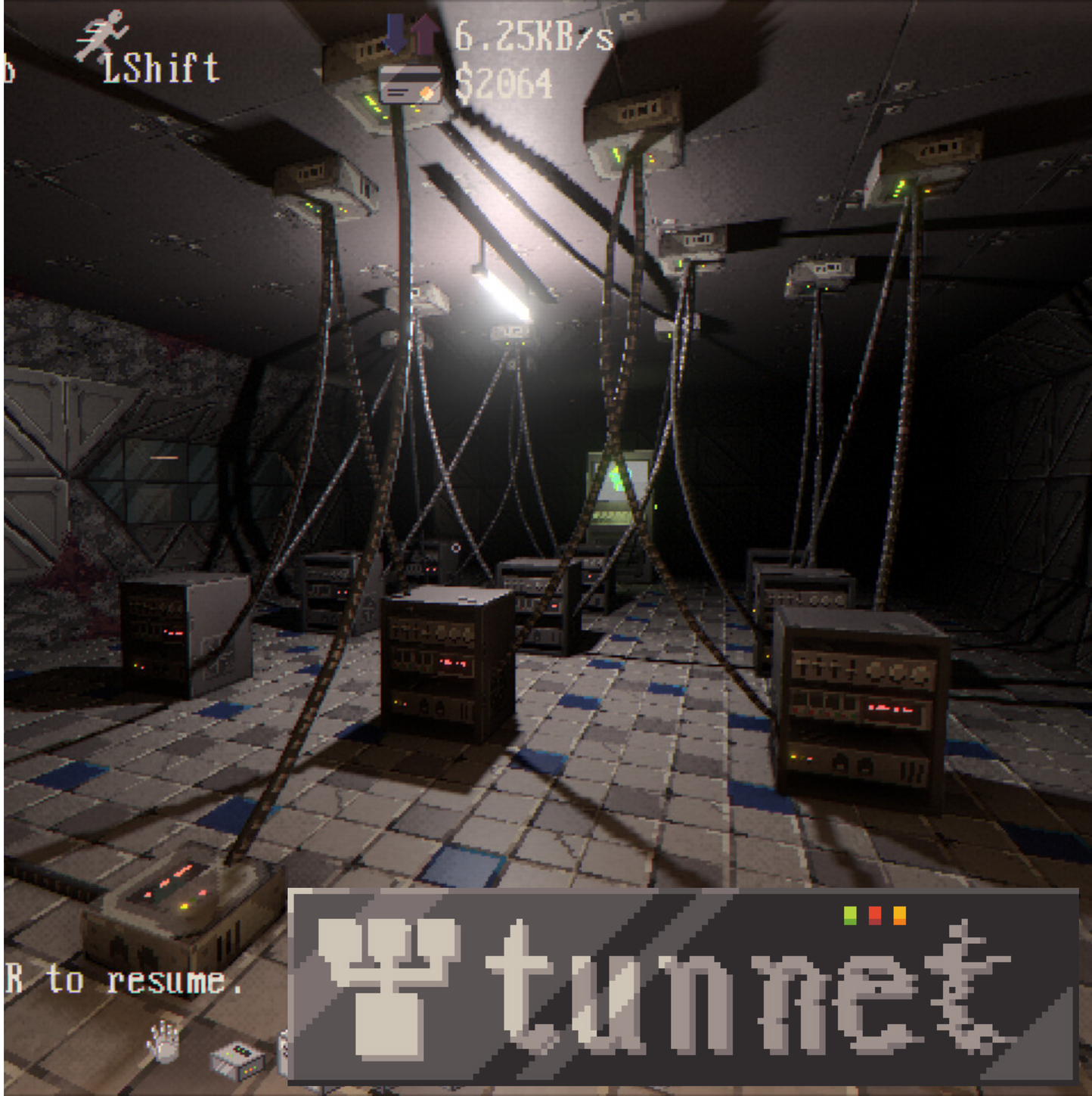
Tunnet

Network Game

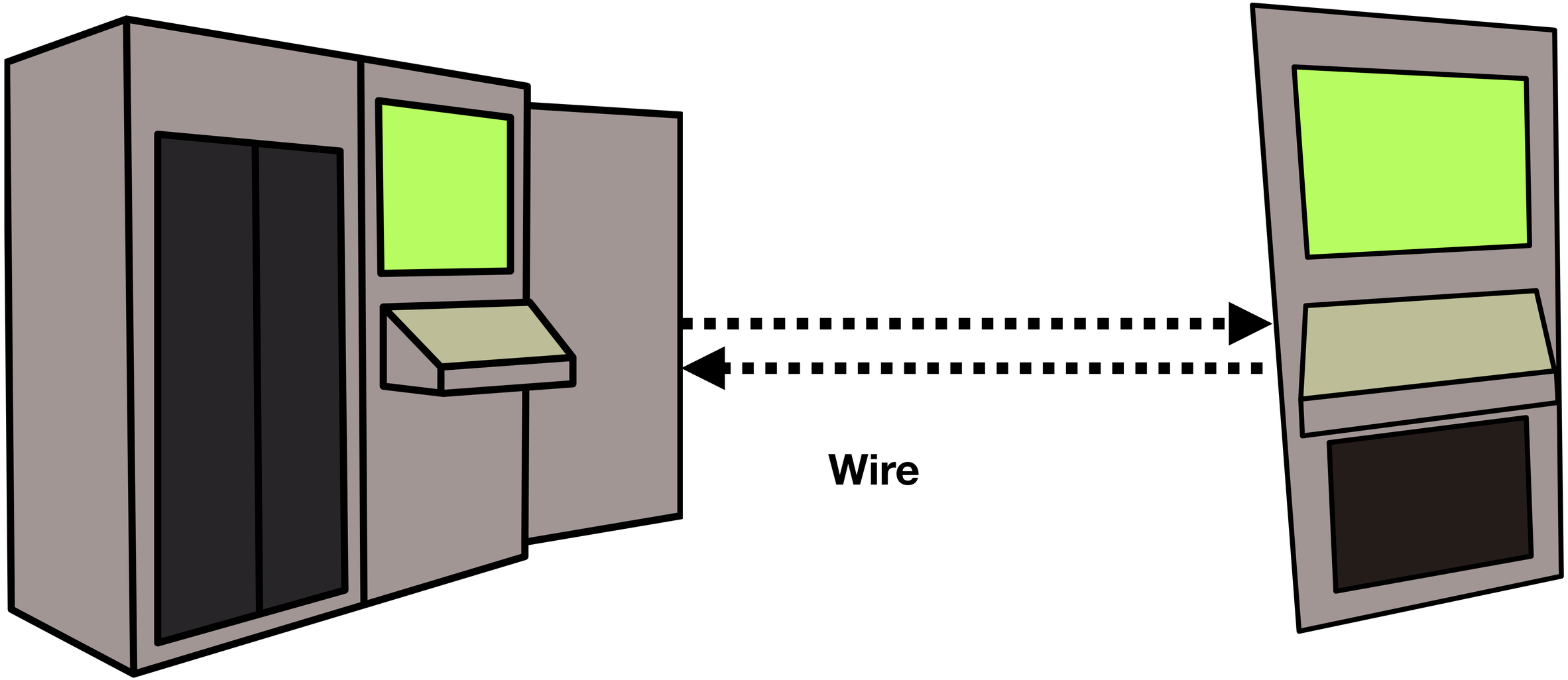
Trix Taiclet
RIPE NCC
17 December 2025



Mainframe
Main computer

Wire

Endpoints
Small computers

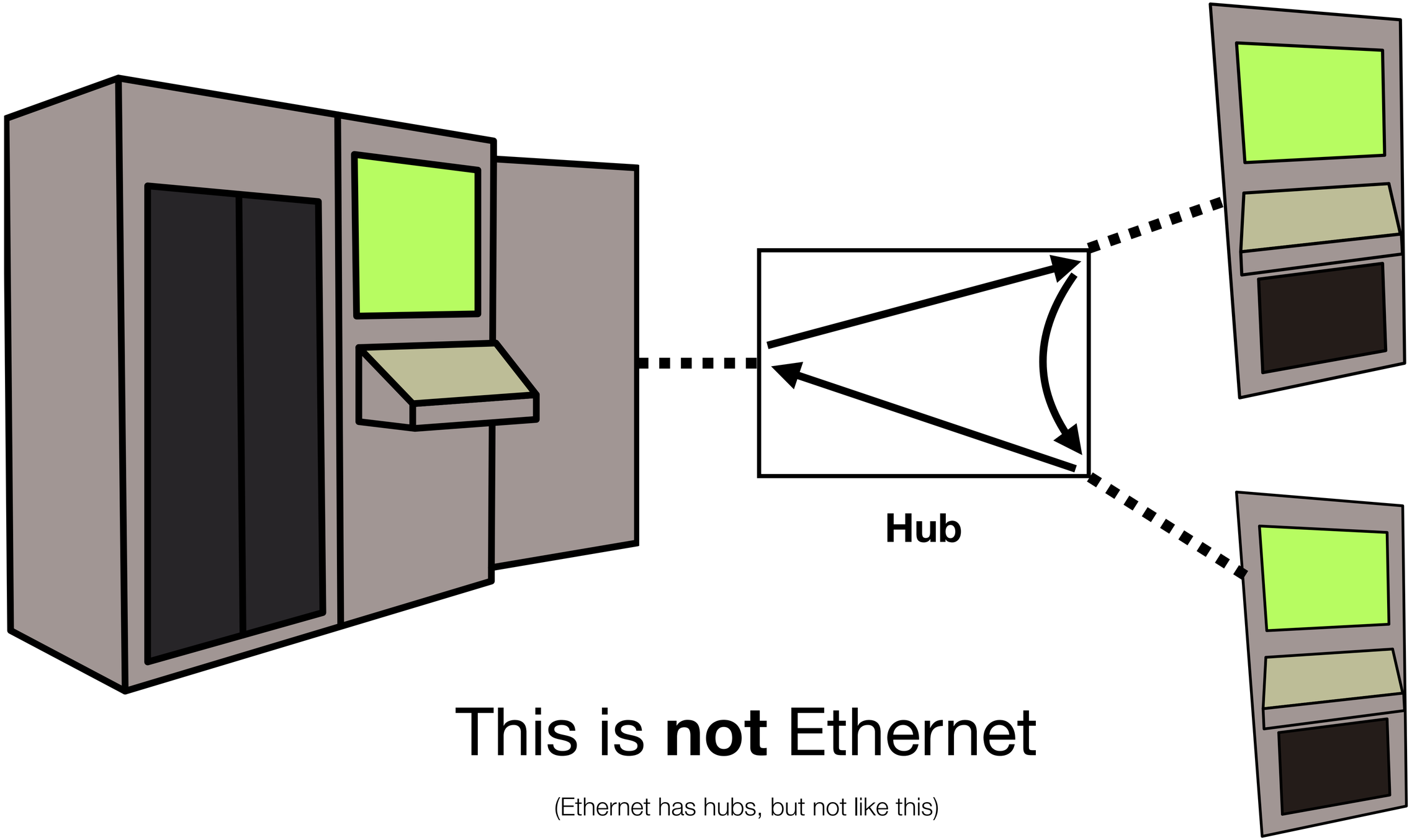


Wire

Each computer only has 1 port

Mainframe
Main computer

Endpoint
Small computer



This is **not** Ethernet

(Ethernet has hubs, but not like this)

What is Ethernet?

- Classic Ethernet

- Switched Ethernet (what you know from today)

Classic Ethernet

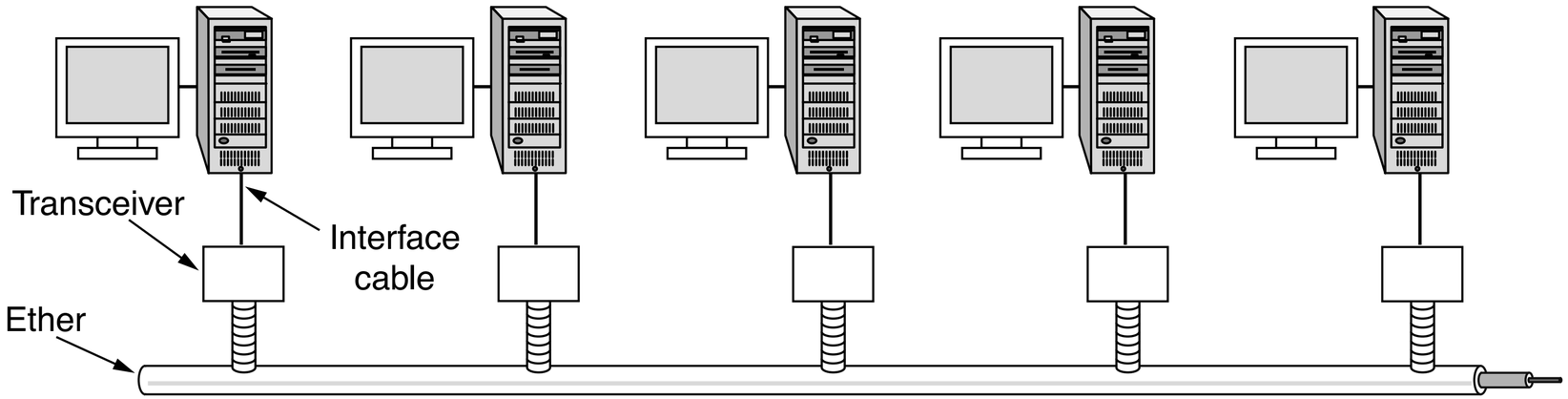


Figure 4-13. Architecture of classic Ethernet.

Tanenbaum, A. S. (2021). Computer Networks (6th ed.)

The **same wire** for every machine
-> **collision problems**

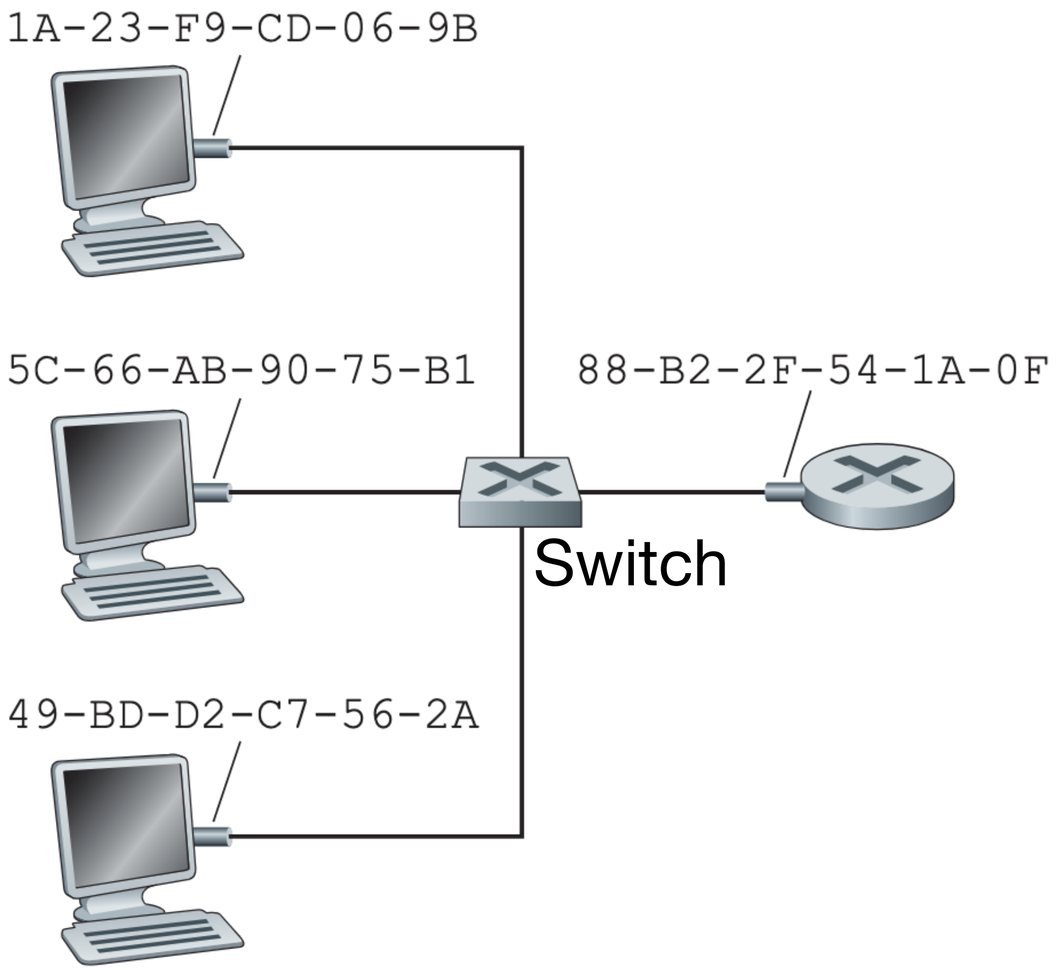
Technically there's hubs, but they just connect the wires together

Collision

If you're **transmitting**, can you hear what's going on?

No

Switched Ethernet



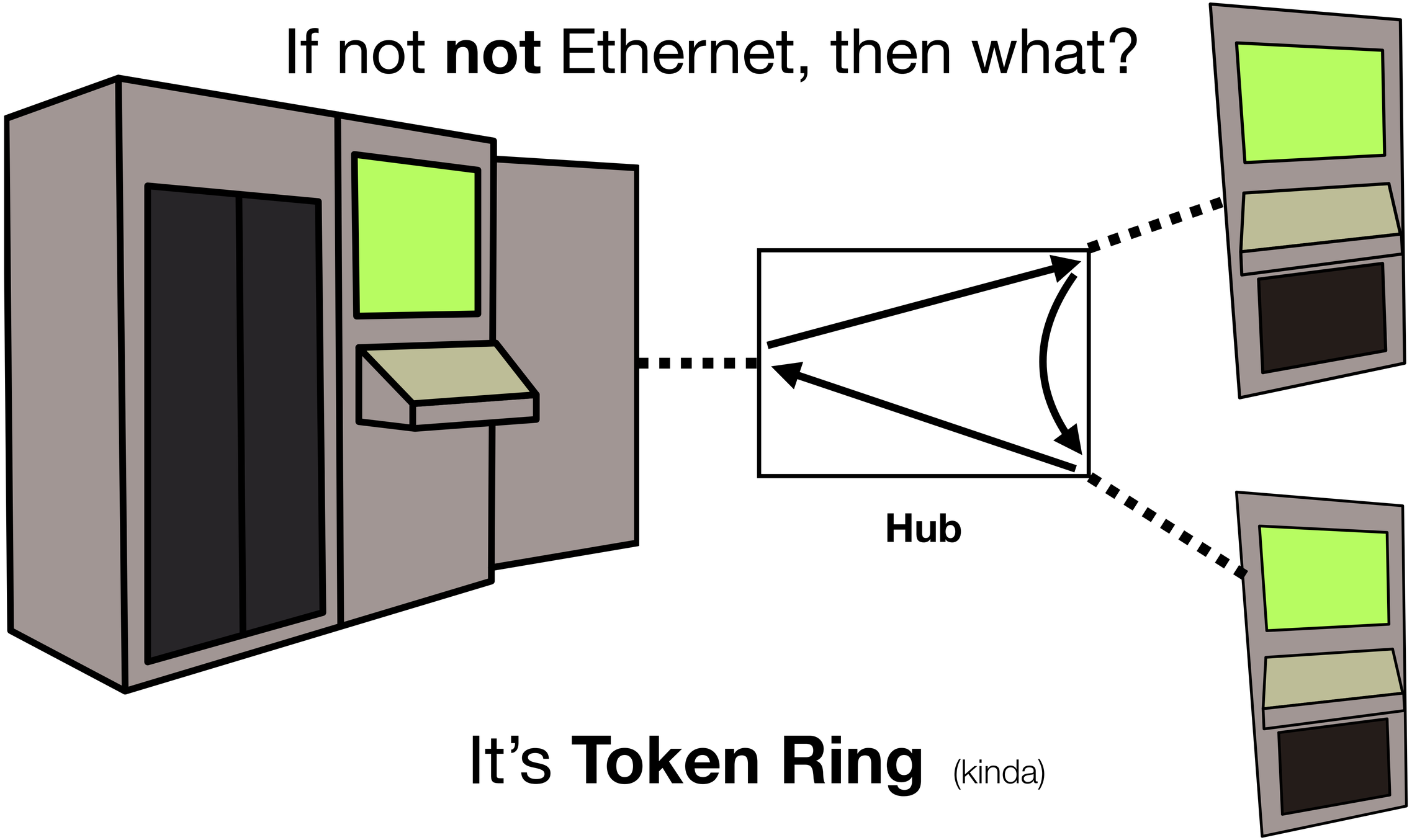
Instead of a single wire

-> **switch** remembers the **MAC address** on each port

-> collisions (at switch) handled through **buffering**

Kurose, J. (2021). Computer networking: A top-down approach (8th ed.)

If not **not** Ethernet, then what?



It’s **Token Ring** (kinda)

Tunnet

~~Network Game~~
Token Ring in 2025

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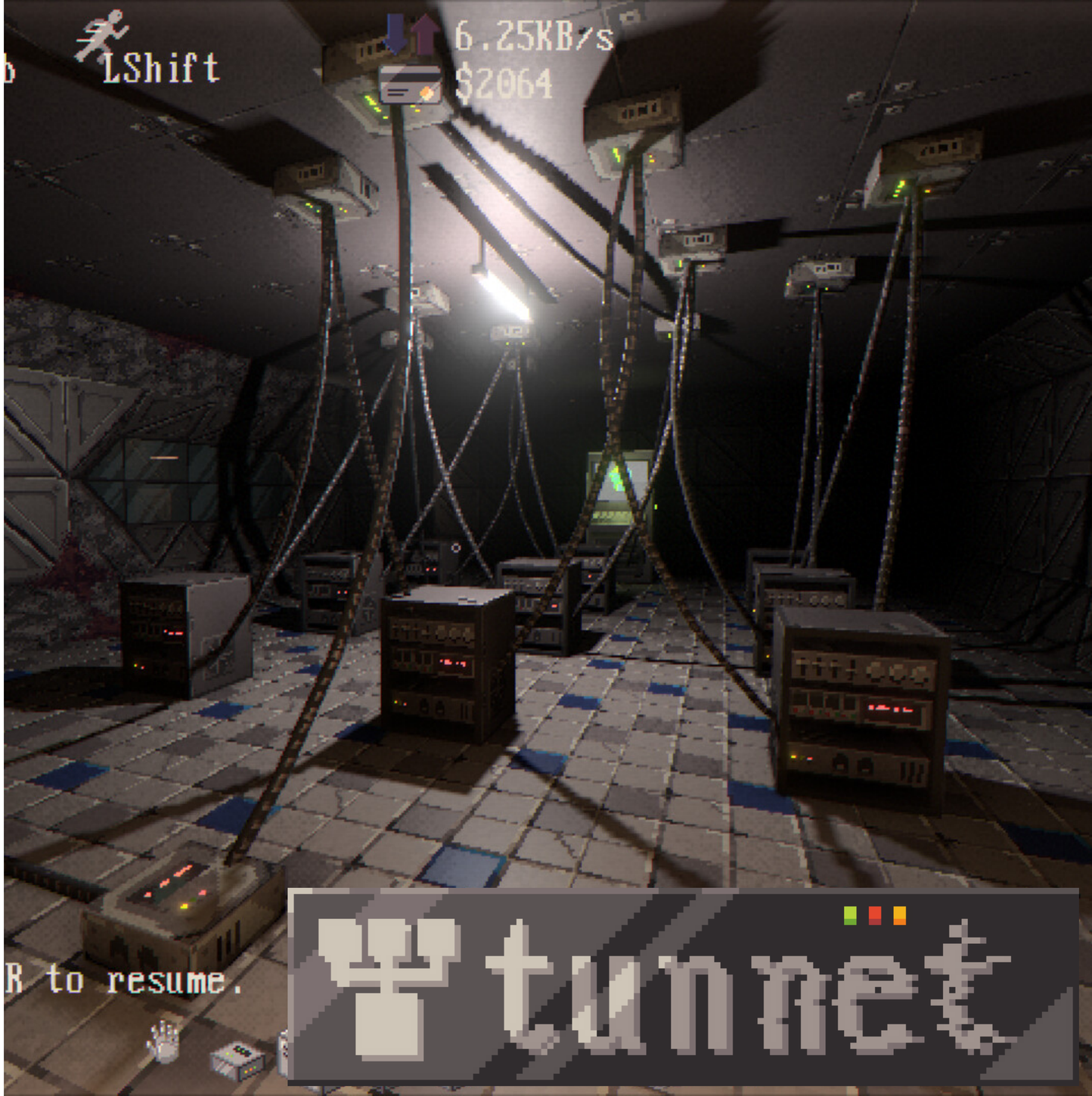
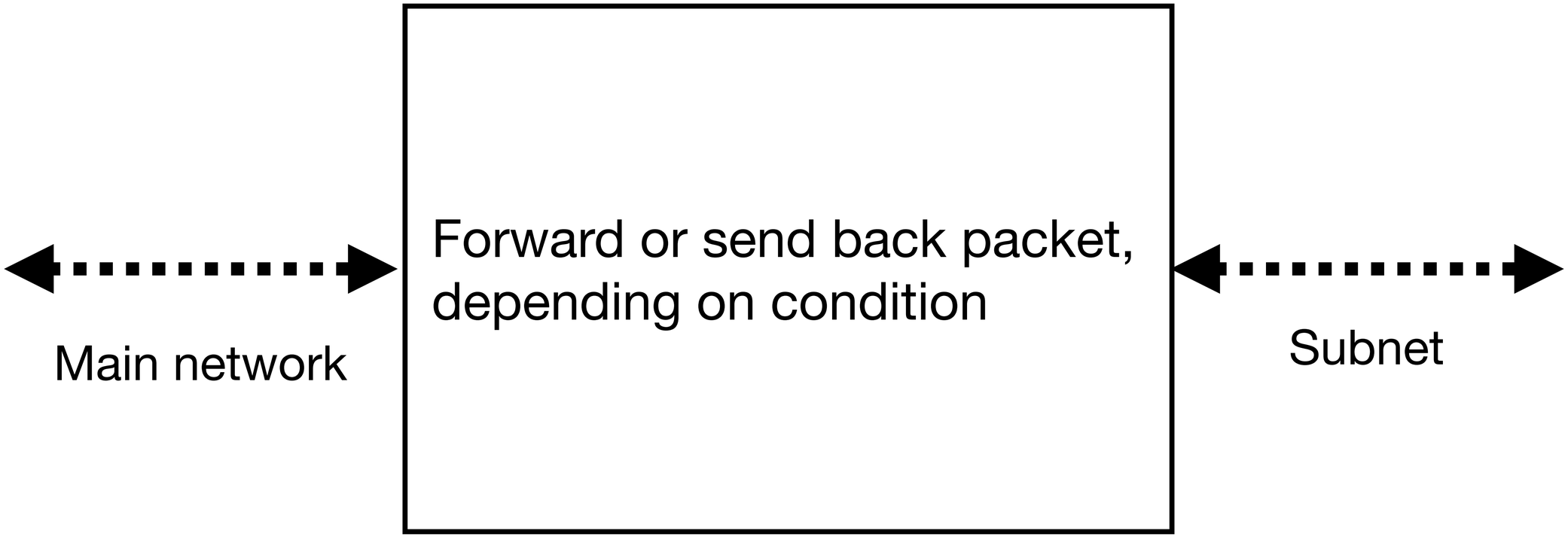
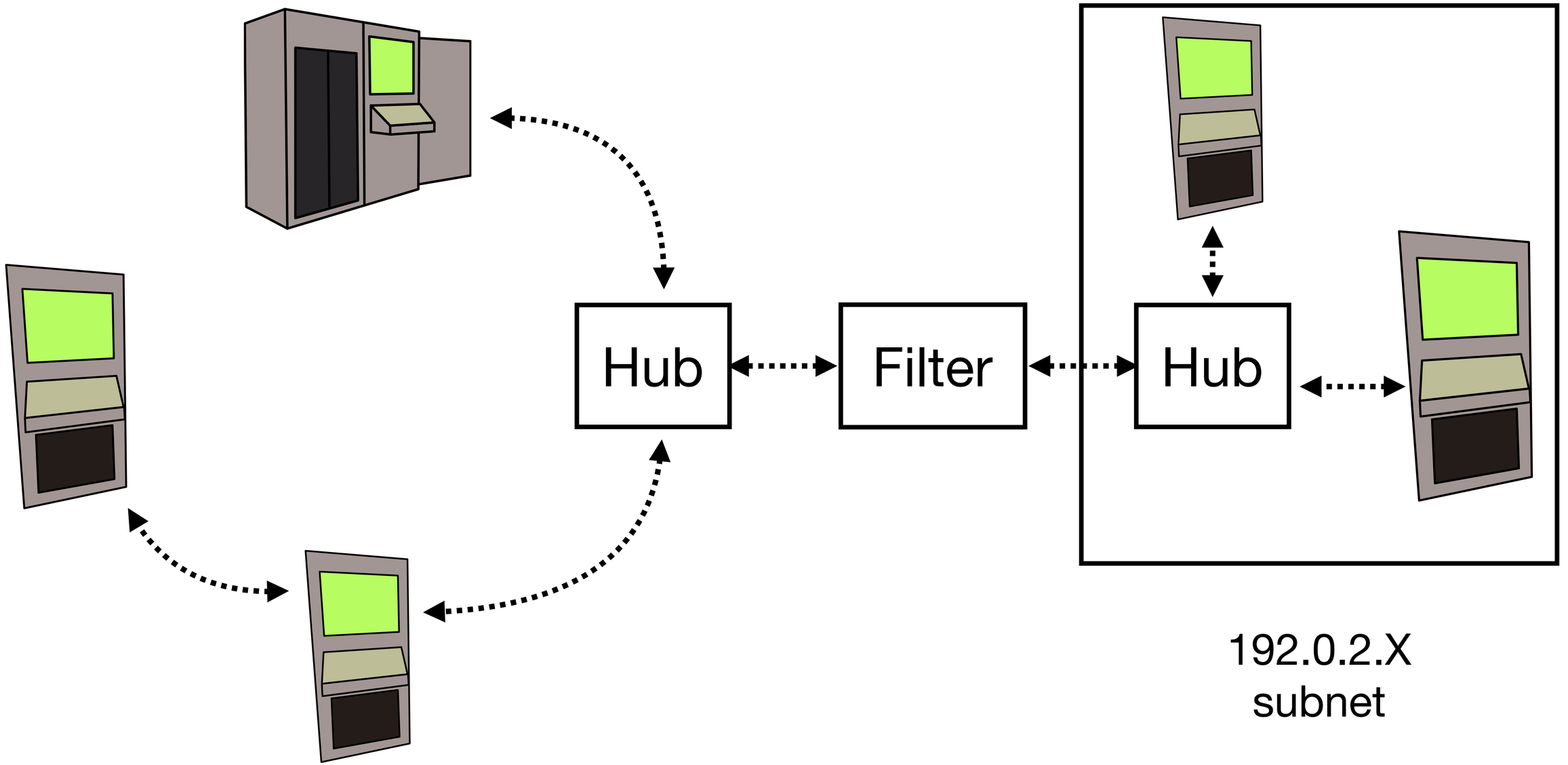


Filters (Tunnet)

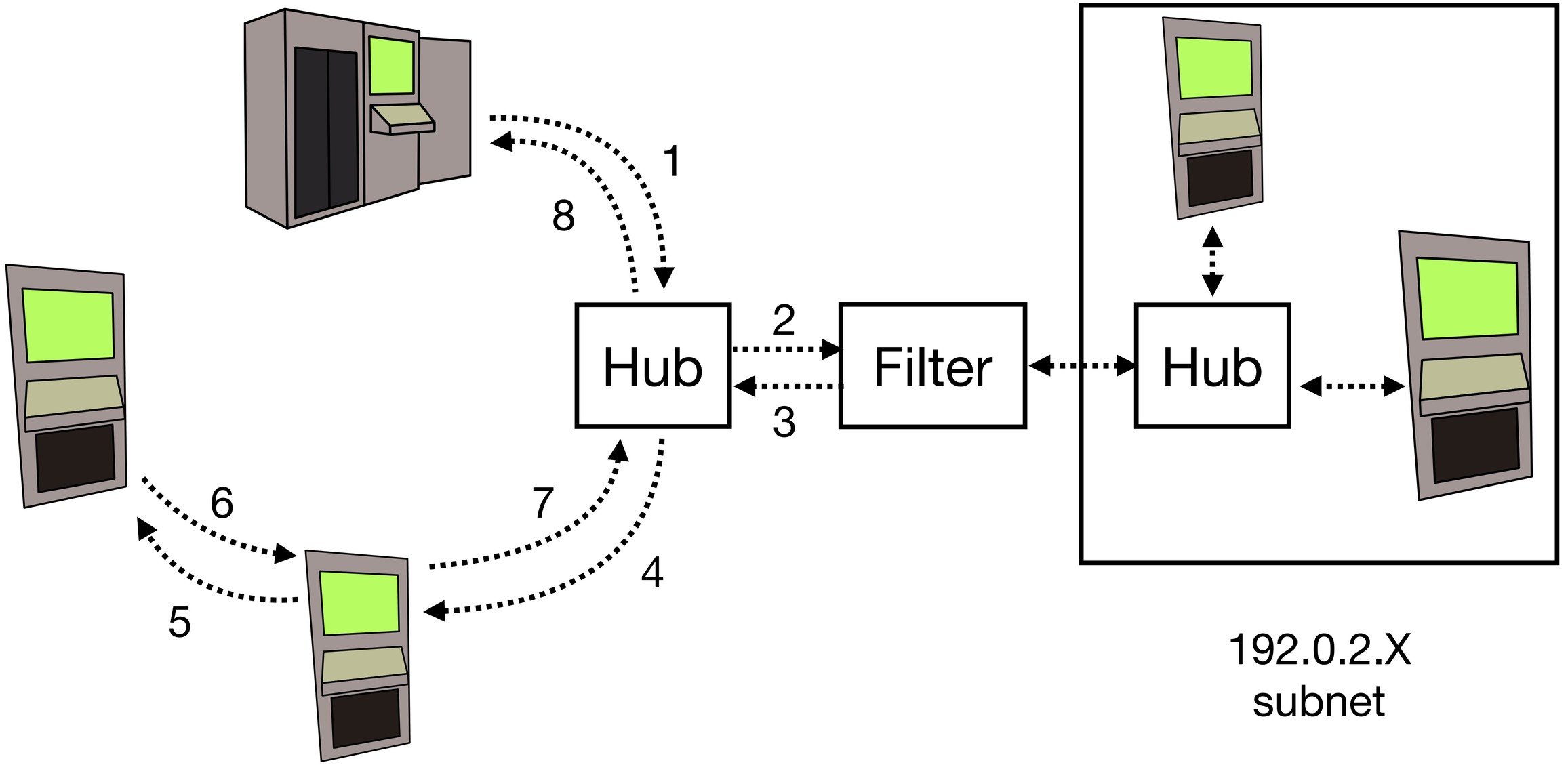


Example:
Packets not destined for main network/subnet,
stay in their initial network

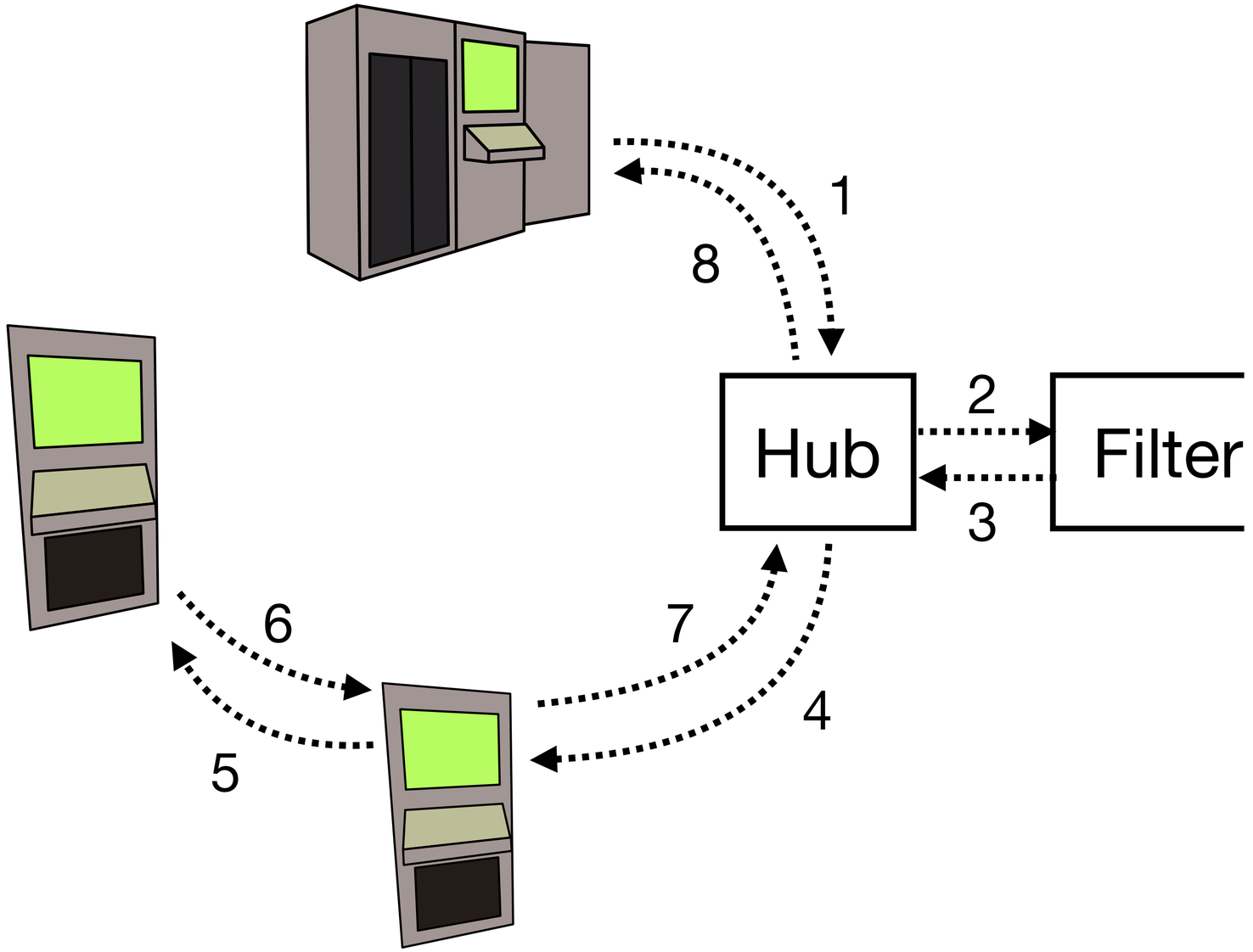
Example Tunnet Network

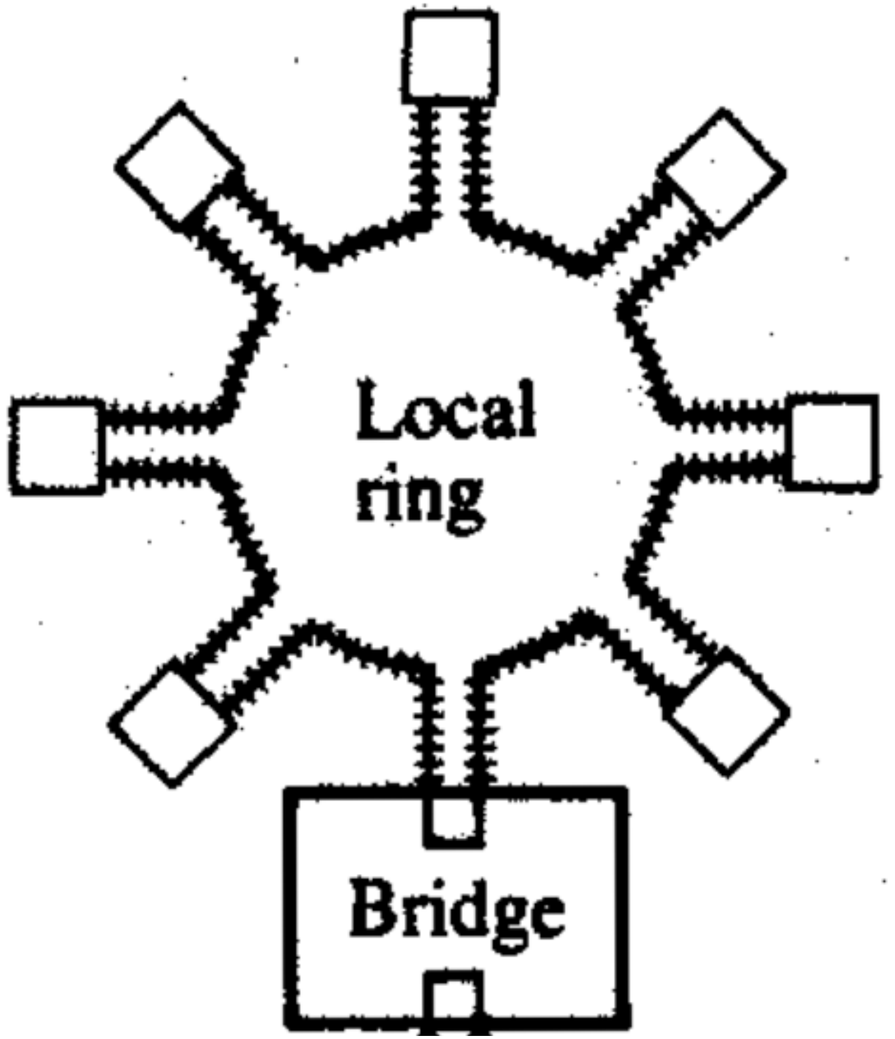


Example Tunnet Network

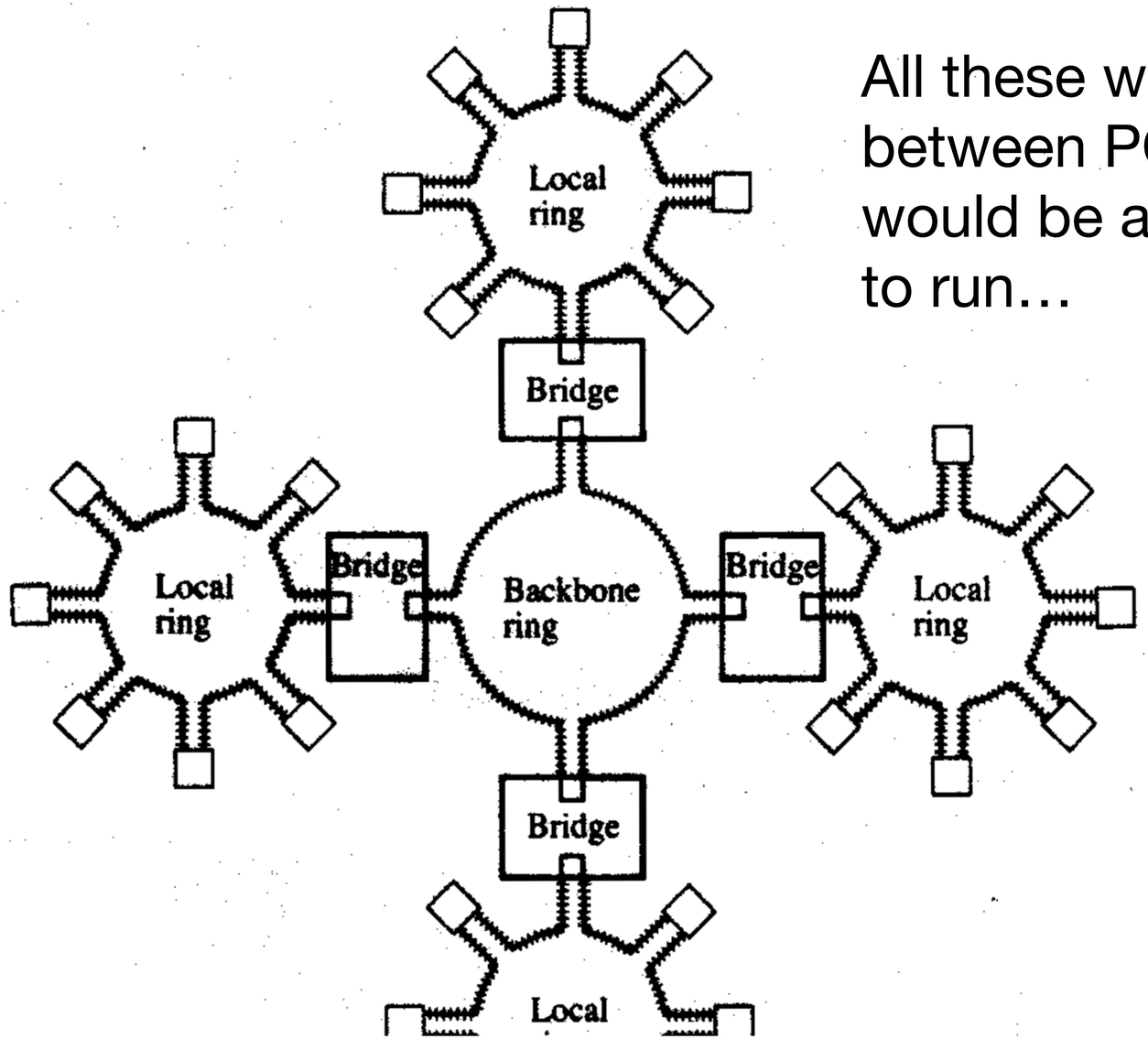


Example Tunnet Network





Token Ring conceptually



All these wires between PCs would be a pain to run…

Strole, N. C. (1983). A Local Communications Network Based on Interconnected Token-Access Rings: A Tutorial.

IBM Token Ring

Multistation Access Units (MAU)

A “switch”,
but wired like a ring

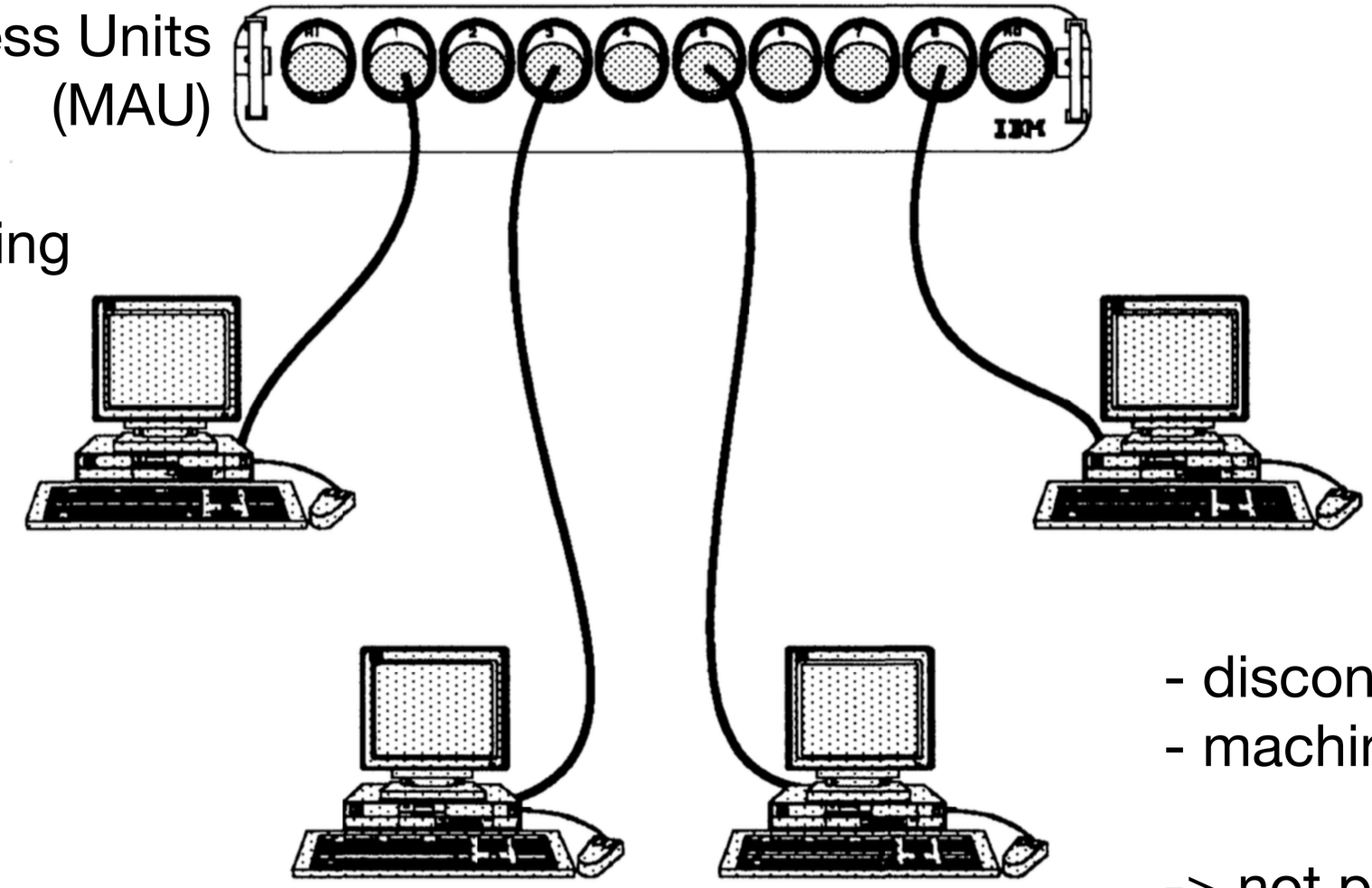


Figure 3.6 A star-wired ring network.

- disconnected ports
- machines turned off

-> not part of the ring

Sackett, G. C. (1993). IBM’s Token-ring Networking Handbook.

IBM Token Ring

Example of **MAU** and the **hermaphroditic** connector

hermaphroditic = “gender-less”
Imagine USB-C but every cable is also a port

Raymangold22 (2015). The IBM 8228 MAU featured with its setup aid to prime the ports.

IBM Token Ring: Broadband

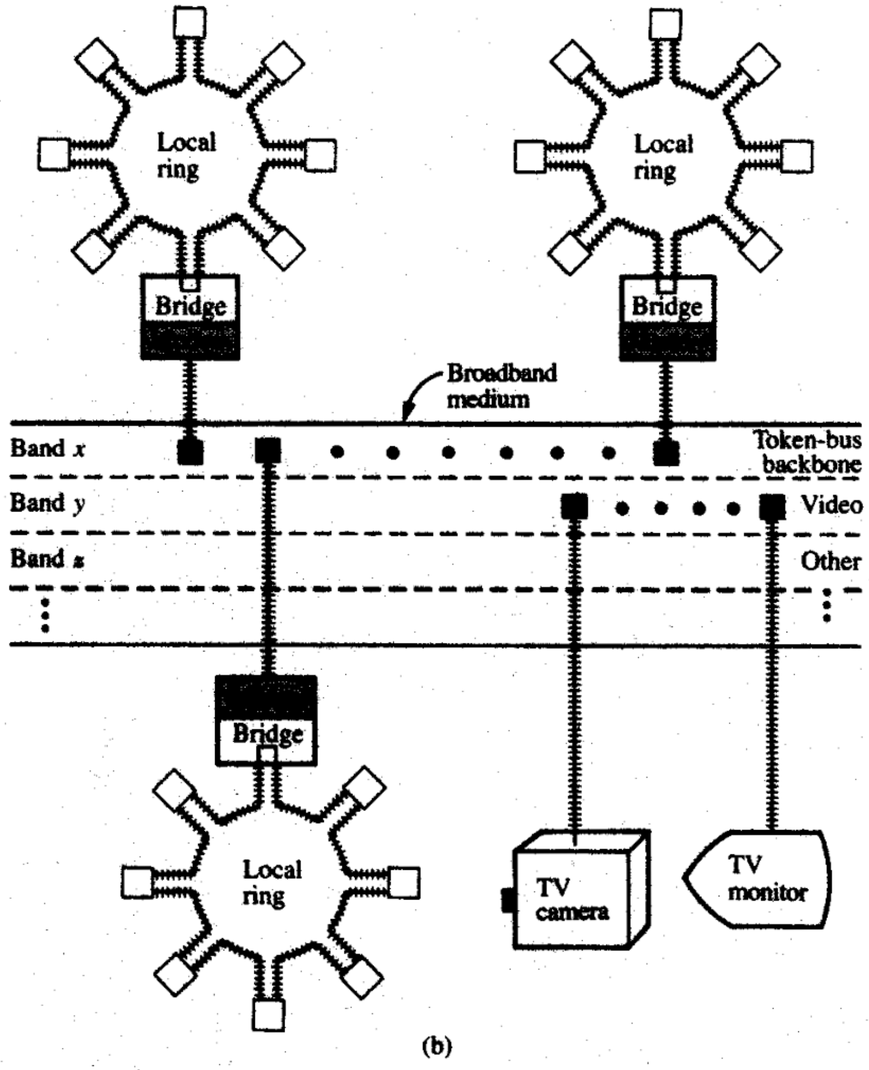


Figure 2 Multiple-bridge local area network: (a) A token-ring backbone wherein the bridges provide a logical routing of frames among rings and perform a speed conversion between the local rings and the backbone ring; (b) A broadband-bus backbone in which the bridges switch the ring data onto a channel of the broadband medium.

IBM genuinely thought (in 1983), that Token Ring could interconnect networks, using the example of the TV camera/monitor also being on bands

Strole, N. C. (1983). A Local Communications Network Based on Interconnected Token-Access Rings: A Tutorial.

Why aren’t we using Token Ring in 2025?

- It **died to Ethernet**
  - Significantly **more expensive** than the Ethernet equivalent
  - Classic Ethernet’s was “**good enough**” (even with collisions)
  - Token Ring was “**finicky**” at the time
  - Switched Ethernet brought **dedicated bandwidth** and **full-duplex**

(technically full-duplex was separate, and implementation came before the standard)

Go play Tunnet

- It’s a cool indie game where you connect computers! (in a ring way)

Thank you!

Questions?

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