

Wires Hubs and Switches

Linux Network Management Tools

Connection

- Four basic connections
 - back to back with a crossover cable
 - to a hub (descendant of repeater)
 - to a switch (descendant of bridge)
 - to a router

Crossover Cables

- If you connect a PC NIC card to a hub or switch you will need a "straight" cable
- If you connect PCs back to back you will need a crossover cable
- If you connect a PC directly to a router port you will also need a crossover

MDI or MDX

PC = MDI

Router = MDI

Hub = MDX

Switch = MDX

MDI <==> MDX or MDX <==> MDI

use STRAIGHT CABLE

MDI <==> MDI or MDX <==> MDX

use CROSSOVER CABLE

Life Saver

Buy a couple crossover cables

Buy a couple straight cables

Get weird colors so yours don't get mixed in

When there's any kind of question --

USE YOUR CABLES TO BE SURE

Check the link light

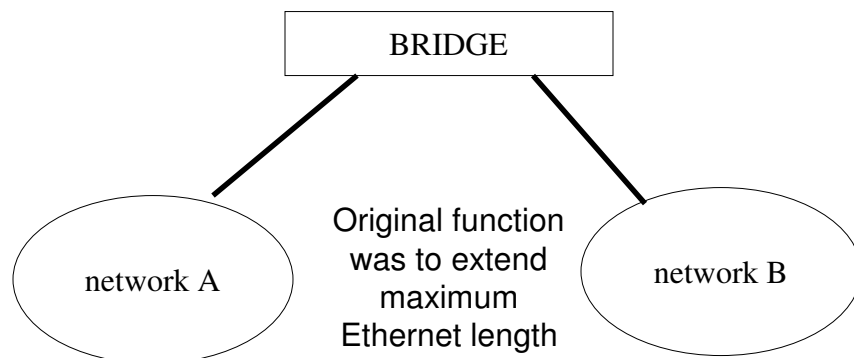
- Try one cable
- Try the other cable
- Check the MII registers

- Try back to back with your laptop

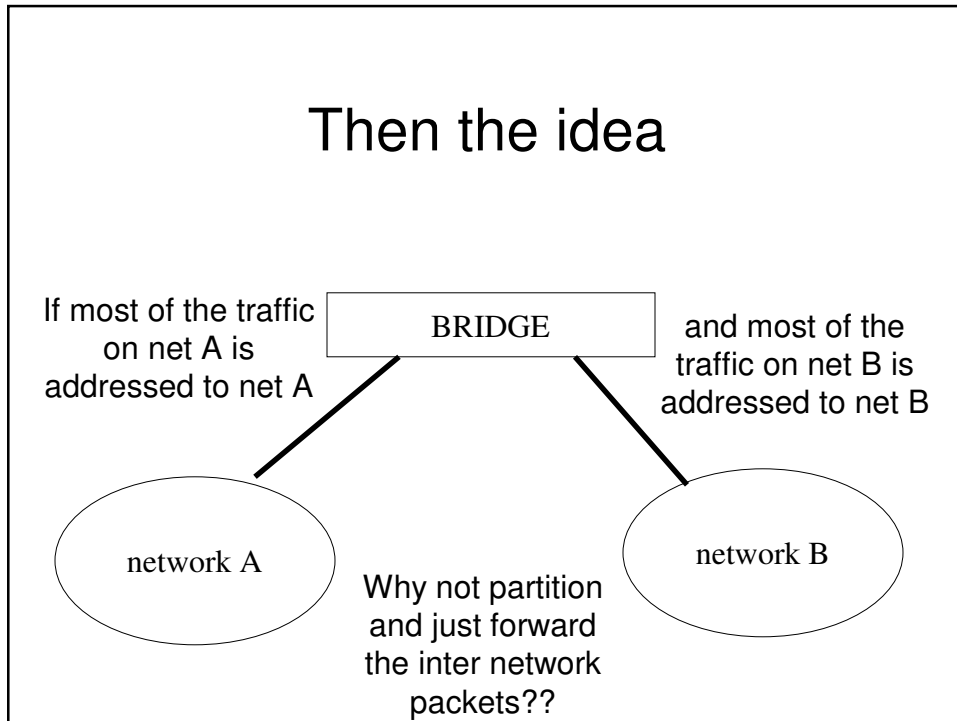
Hubs

- 10 Base T concentrator
- Almost like a wire
 - All nodes see traffic from all other ports
 - Single Collision Domain
- Most hubs will partition for excess collisions
- Dual speed hubs have some buffering

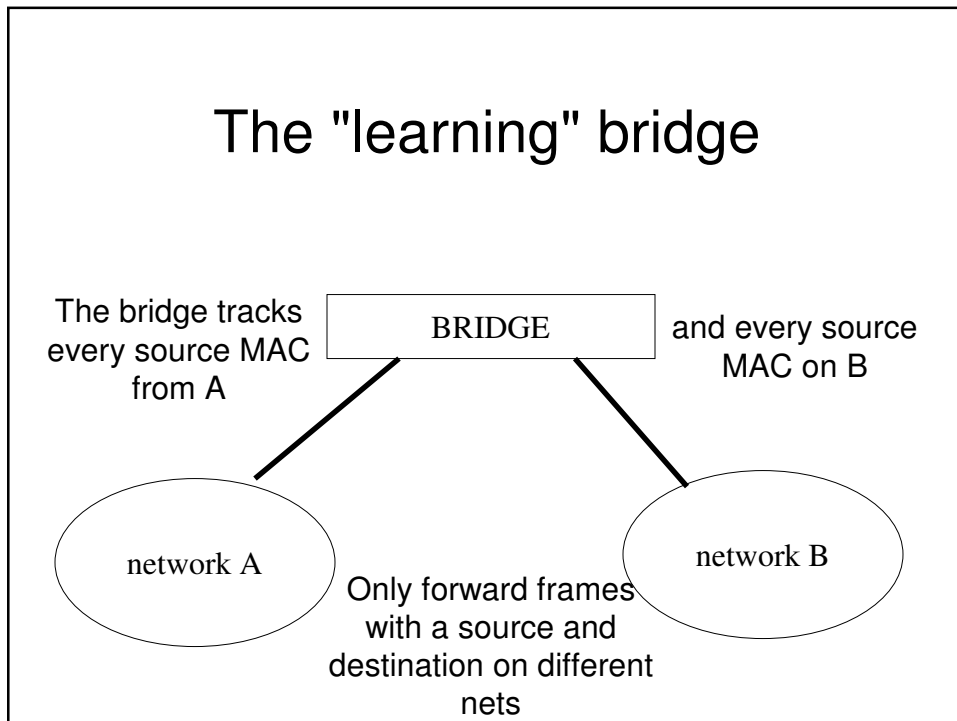
In the beginning there was a bridge



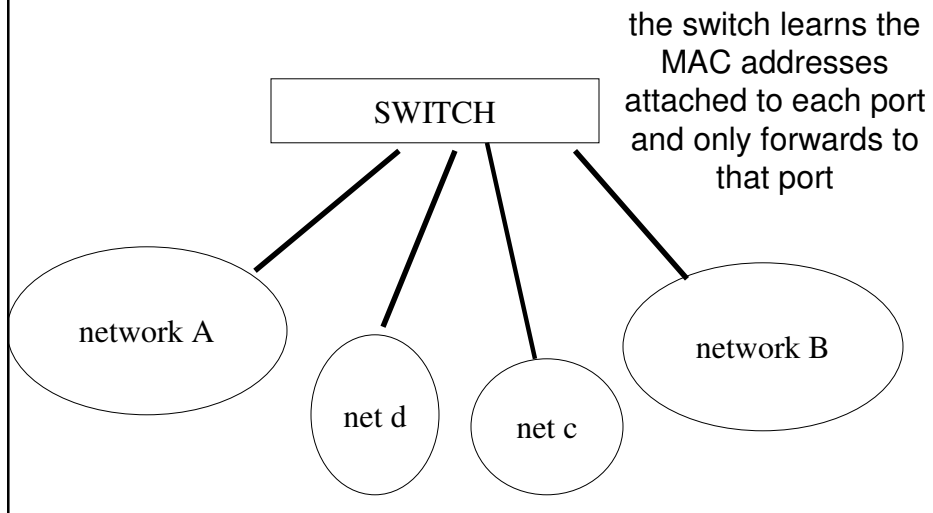
Then the idea



The "learning" bridge

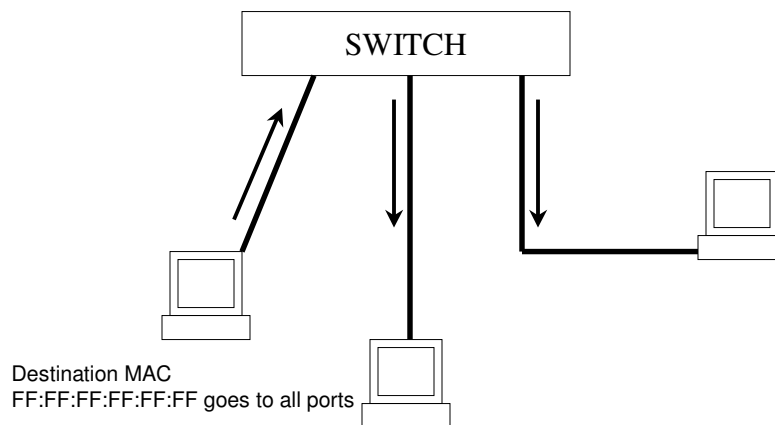


The "learning" bridge becomes a switch



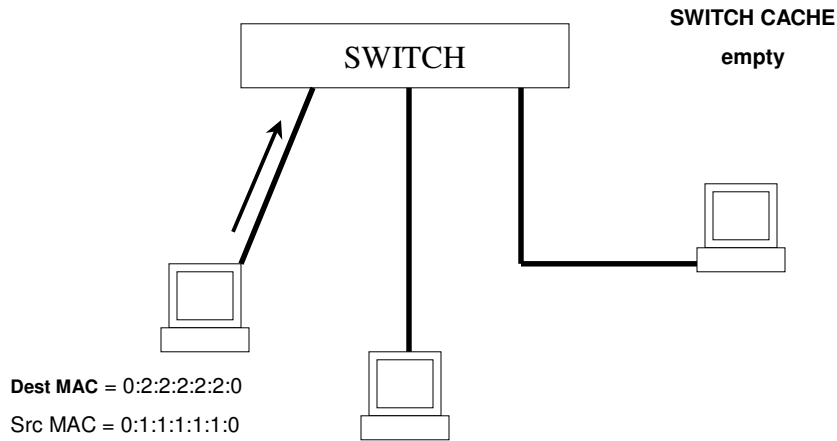
Broadcasts Always Forwarded

Broadcasts and Multicasts go to all ports **always**



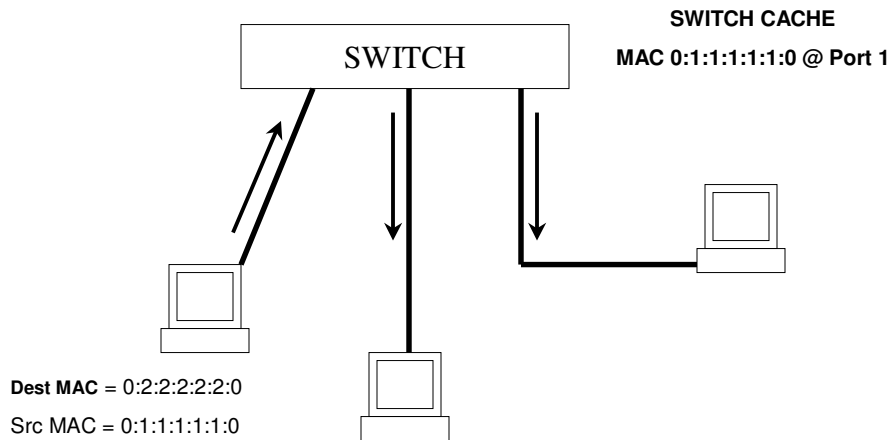
Addresses Get Learned

On power up, address cache is empty. Switch will learn the MAC addresses from the source MACs of received frames



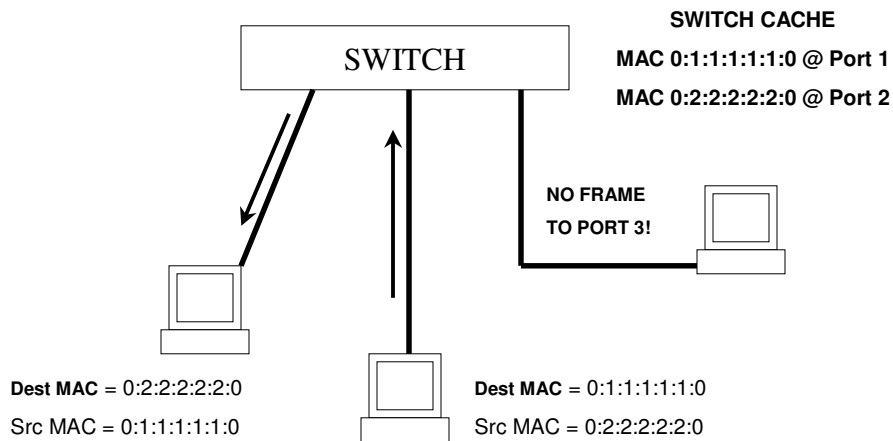
First Frame In

The first packet to a MAC address goes to all ports, but the switch learns the location of the sender and puts it in the cache



Reply ONLY to sending port

Since the switch has already learned that 0:1:1:1:1:0 is at Port 1 it does NOT forward it to the other ports



Switches have different features

- Some switches will learn new addresses after the address cache is full - some don't
- New MAC address location may be immediate or may be delayed.
- Some switches have management consoles that allow more configuration control.
- Some switches have additional features such as port mirroring, VLANs per MAC address or other extended functions