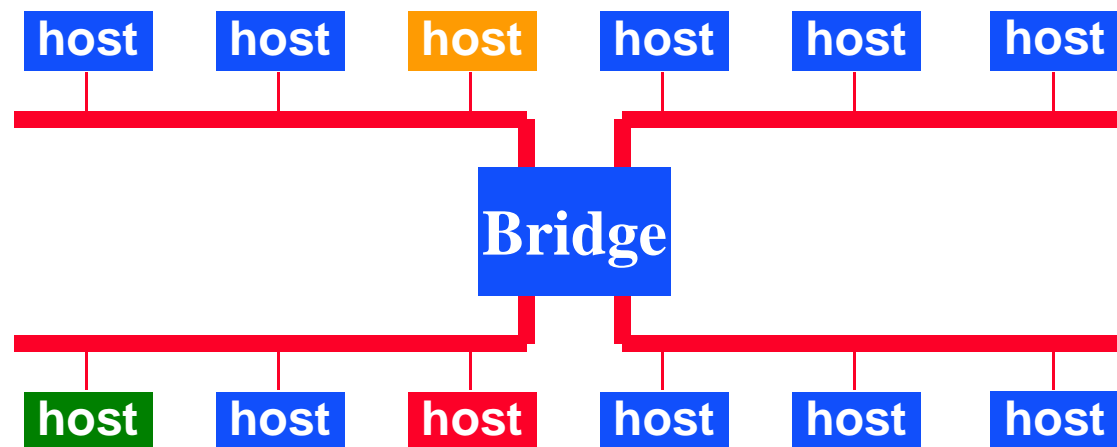# Building Larger LANs: Bridges

- **Bridges connect multiple IEEE 802 LANs at layer 2.**
  - » **Only forward packets to the right port**
  - » **Reduce collision domain compared with single LAN**
- **In contrast, hubs rebroadcast packets.**

| host | host | host | host | host | host |

Bridge

| host | host | host | host | host | host |

Transparent Bridges

- **Design goals:**
  - » **"Plug and play" capability**
  - » **Self-configuring without hardware or software changes**
  - » **Bridge do not impact the operation of the individual LANs**

- **Three parts to making bridges transparent:**

  1) Forwarding of frames

  2) Learning of addresses

  3) Spanning tree algorithm

Computer Network

Frame Forwarding

- **Each switch maintains a forwarding database:**

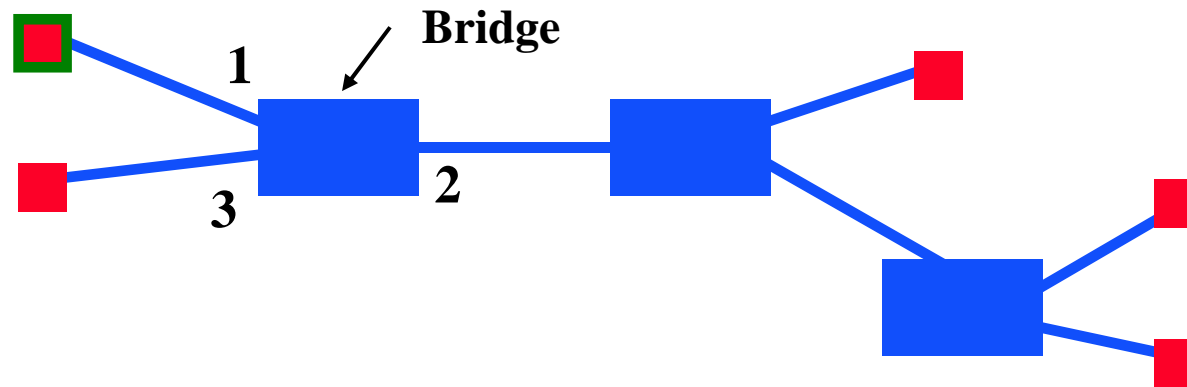   `<MAC address, port, age>`

    `MAC address: host or group address`

    `Port: port number on the bridge`

    `Age: age of the entry`

- **Meaning: A machine with <u>MAC address</u> lies in the direction of number <u>port</u> of the bridge**

- **For every packet, the bridge "looks up" the entry for the packets destination MAC address and forwards the packet on that port.**

    » **Other packets are broadcasted – why?**

Address Lookup

Bridge

Address	Next Hop	Info
A21032C9A591	1	8:36
99A323C90842	2	8:01
8711C98900AA	2	8:15
301B2369011C	2	8:16
695519001190	3	8:11

- Address is a 48 bit IEEE MAC address.
- Next hop: output port for packet.
- Timer is used to flush old entries
- Size of the table is equal to the number of hosts.

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Learning Bridges

- **Bridge tables can be filled in manually.**
  - » Time consuming, error-prone
  - » Self-configuring preferred
- **Keep track of source address of packets arriving on every link, showing what segment hosts are on.**
  - » Fill in the forwarding table based on this information

Computer Network