

LE 517 Data Communications and Networks

Week 11:- Local Area Network 2

By

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Local Area Network

- IEEE 802.4:- Token Bus
 - Token Bus Operations
 - Prioritizing Frames
- Interconnecting LANs
 - Layer 1 Connections
 - Layer 2 Connections
 - Bridge Routing

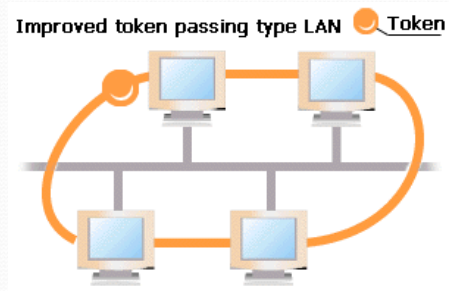
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IEEE 802.4:- Token Bus

- Token bus operates on the same principle as the token ring.
- The stations are logically organized into a ring and a token to arrive.
- Token is passing among the host e.g. A-> B->C->...
- Each host must know this order.

IEEE 802.4:- Token Bus



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Token Bus Operations

- How to organize station address, order, satisfy each other ?

- Discuss 5 – 10 minutes.

Token Bus Operations

Operation

◆ As Token Ring Except that it is a Logical Ring

| | | | | | | | | |
|-------|----------|----|----|---------------------|----------------|--------|----------|----|
| Bytes | >1 | 1 | 1 | 6 | 6 | 0-8192 | 4 | |
| | Preamble | SD | FC | Destination Address | Source Address | Data | Checksum | ED |

Token Bus Operations

- Removing Stations
 - If sender sends a frame and have got no response.
(It can verified because they are connected as a bus)
 - Then, sender try and listen for response again.
 - If still does not got a response, it will send to receiver's successor (next receiver).
 - It broadcasts to ask *who follows frame* of that receiver.
 - Then, that host will send *set successor frame* backs.
 - Start transmission again.

Token Bus Operations

- Adding Stations
 - Must wait for invitation before joining
 - Periodically, each station sends a *solicit successor 1 frame*.
 - If none response, the station assumes no one want to enter and pass token to its successor.
 - If there is a station, it now sends a bid by sending new successor and sends its next token there.

Token Bus Operations

- In previous scenarios, it sends set successor to higher order to acknowledge.
- However, if lower order, it needs to send ***solicit successor 2 frame***.
- If order is goes wrong or noise, it sends a resolve contention frame.
- This frame can fill in the address colliding stations.

Token Bus Operations

- Lost Tokens
 - If time is expire, it sends claim token frame
 - What if several stations timers are expire ?
 - To solve, it uses frame length 0,2,4 or 6 slot times.
 - The shortest claim the token

Token Bus Operations

- Ring Initialization
 - What to do when start up ? Everyone start the same time? Everyone do nothing at start forever?
 - It starts as lost token.
 - Once, completed there is one host in the ring.
 - Then, start process invitation and joining.

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Prioritizing Frames

- Every host maintain four priorities or service class numbered 0,2,4 and 6.
- 0 is the lowest and 6 is the highest
- Start from highest priority to lower ... then lowest.

Prioritizing Frames

- THT – Token holding timer
 - Maximum time a station may spend sending class 6 frames.
- TRT – Token rotation timer
 - Maximum time for a token to rotate around the ring.

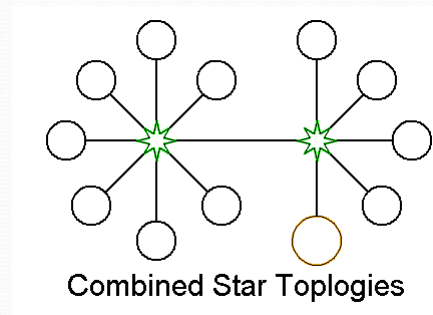
Prioritizing Frames

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Interconnecting LANs

- Recall “Combined Topology”
 - Lecture 1...



Interconnecting LANs

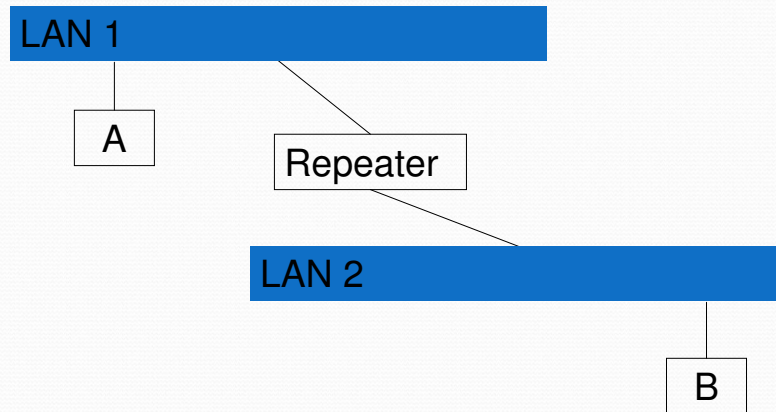
- In real world situations, office in Bangkok connects to office in Chiang Mai.
- How to connect this two network ?
- What if this two network use different type of network ?

Interconnecting LANs

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Layer 1 Connections



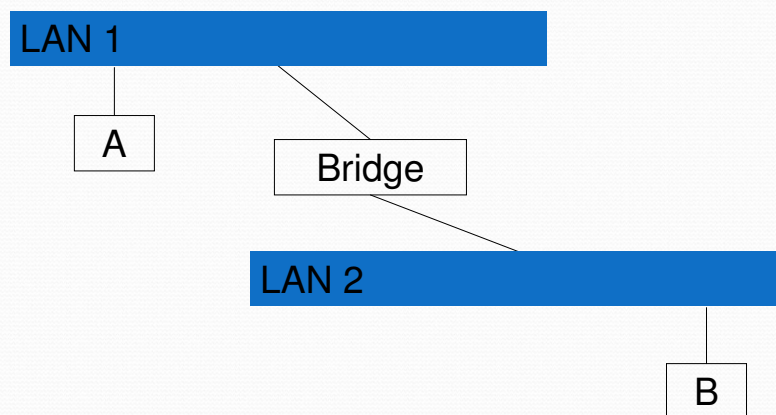
Layer 1 Connections

- Repeaters :- repeat the signal to both LAN network
- A can communicate with B.
- This is operated on layer 1.

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Layer 2 Connections



Layer 2 Connections

- Layer 2 operates by examines the destination address.
- If the frame is sending this LAN, it accepted.
- Otherwise, ignores the frame.

Bridging Different Types of LAN

Token Bus LAN

A

5000 byte frame

Bridge

3 x 1518 byte frame

Ethernet LAN

B

Bridging Different Types of LAN

- Frame Formatting e.g. Priority
- Transmission delay e.g. acknowledgement
- Maximum frame size
- Note: Device with bridge & router called “brouters”

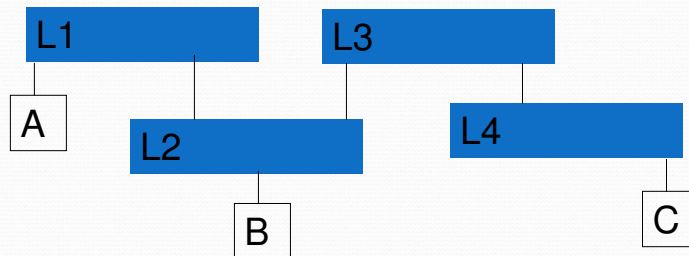
Fixed Routing Bridges

- To route frames between each bridge by routing table
- Routing table can be called as forwarding database or routing directory.

| Destination | LAN |
|-------------|-------|
| A | -- |
| B | LAN 2 |
| C | LAN 2 |

Bridge Routing

- The process of deciding which frames to forward and to where called **bridge routing**.
- What routing table should be look like for this network ?

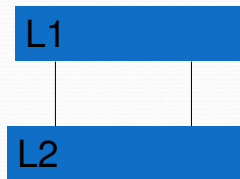


Transparent Bridge

- Bridges that create and update their own routing tables.
- Standard IEEE 802.1.d
- It learns by observing traffic and examine the source address.
- What if they don't know ? It use *flooding algorithm*.

Bridge Routing

- What if it has a loop ?



Bridge Routing

- Spanning Tree
- Cloud Theory
- Other minimum weigh graph calculation.

Reference

- www.smsc.jp/arcnet/en/about/img/to-ken_e.gif
- www.doc.ic.ac.uk/~kpt/Slides/Intro/img077.GIF

Q & A