Bridges
Bridges Outline

- Repeaters
- Bridges
  - Backward learning
- Bridge Loops
  - Spanning trees (transparent bridges)
  - Source-routing bridges (e.g., token rings)
A **repeater** operates at the physical layer and forwards everything between the two LANs.

LAN1 and LAN2 are in the same **collision domain**.
Bridges

- Operate at the data link layer.
- **Bridges** use **backward learning** in recording source address on transmissions.
- Unlike repeaters, bridges will not forward a frame onto another LAN segment if it knows about the location of the destination node.
- Bridge management gets more complicated when loops are possible in the frame route.
A bridge is a store and forward device that separates collision domains.
### Bridges

![Bridges Diagram]

#### Address Port Table

<table>
<thead>
<tr>
<th>Address</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>1</td>
</tr>
</tbody>
</table>

#### LAN1 to LAN3

- **S1** connected to **S5**
- **B1** connects **LAN1** to **LAN2**
- **B2** connects **LAN2** to **LAN3**

**LAN1**

<table>
<thead>
<tr>
<th>Address</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>1</td>
</tr>
</tbody>
</table>

**LAN2**

<table>
<thead>
<tr>
<th>Address</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>1</td>
</tr>
</tbody>
</table>

**LAN3**

<table>
<thead>
<tr>
<th>Address</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>1</td>
</tr>
</tbody>
</table>
### Bridges

![Diagram of Bridges]

**LAN1**
- **S1**
- **B1**
  - Port 1

**LAN2**
- **S3**
  - Port 1
- **B2**
  - Port 1
- **S2**
  - Port 2

**LAN3**
- **S4**
- **S5**

**Address Table for B1**

<table>
<thead>
<tr>
<th>Address</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>1</td>
</tr>
<tr>
<td>S3</td>
<td>2</td>
</tr>
</tbody>
</table>

**Address Table for B2**

<table>
<thead>
<tr>
<th>Address</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>1</td>
</tr>
<tr>
<td>S3</td>
<td>1</td>
</tr>
</tbody>
</table>

Leon-Garcia & Widjaja: *Communication Networks*
Bridge 1 does not forward the frame to LAN1
Bridge 1 does not forward the frame to LAN2.
MAN with Bridge Loops

LAN1

LAN2

LAN3

LAN4

B1

B2

B3

B4

B5

(1)

(1)

(1)

(1)

(2)

(2)

(2)

(2)

(3)

Leon-Garcia & Widjaja: Communication Networks
One solution to bridge loops

Build a Spanning Tree!
Bridges Summary

- Repeaters
- Bridges
  - Backward learning
- Bridge Loops
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