Lecture 8 Overview

- Pop quiz
- Project discussion
- PortLand paper discussion
- Overview of optical technology
### Comparing L2/L3 Architectures

<table>
<thead>
<tr>
<th>Features</th>
<th>Ethernet Bridging</th>
<th>IP Routing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of configuration</td>
<td>🟢</td>
<td>🟥</td>
</tr>
<tr>
<td>Optimality in addressing</td>
<td>🟢</td>
<td>🟥</td>
</tr>
<tr>
<td>Host mobility</td>
<td>🟢</td>
<td>🟥</td>
</tr>
<tr>
<td>Path efficiency</td>
<td>🟥</td>
<td>🟢</td>
</tr>
<tr>
<td>Load distribution</td>
<td>🟥</td>
<td>🟢</td>
</tr>
<tr>
<td>Convergence speed</td>
<td>🟥</td>
<td>🟢</td>
</tr>
<tr>
<td>Tolerance to loop</td>
<td>🟥</td>
<td>🟢</td>
</tr>
</tbody>
</table>

*CSE 222A – Lecture 9: L2 in the Data Center*
Potential solution: VLANs

- Scope broadcast traffic
- Simplify access control policies
- Decentralize network management
- Enable host mobility
Problem: Limited Granularity

- Limited number of VLANs
  - Placing multiple groups in the same VLAN
  - Reusing limited VLANs

- Limited number of hosts per VLAN
  - Divide a large group into multiple VLANs

- One VLAN per access port
  - Supporting VLANs on the end host
  - Supporting multiple groups at the router
Complex Configuration

- Host address assignment
  - Wasting IP addresses
  - Complex host address assignment
  - E.g., doesn’t work with Wednesday’s idea

- Spanning tree computation
  - Limitation of automated trunk configuration
  - Enabling extra links to survive failures
  - Distributing load over the root bridges
PortLand Discussion

- What are the challenges?
- How might you address them?
- What does PortLand do?
- What’s left?
The Case for Optics

**Electrical Packet Switch**
- $400/port
- 10 Gb/s fixed rate
- 12 W/port
- Requires transceivers
- Per-packet switching
- For bursty, uniform traffic

**Optical Circuit Switch**
- $400/port
- Rate free
- 240 mW/port
- No transceivers
- 1-ms switching time
- For stable, pair-wise traffic
For Next Class...

- Read Helios paper
- Work on project proposals
  - Details available on Project page in course Website