<table>
<thead>
<tr>
<th>Network Size</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Diameter</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talkers</td>
<td>64</td>
<td>128</td>
<td>512</td>
</tr>
<tr>
<td>Listeners</td>
<td>64</td>
<td>128</td>
<td>512</td>
</tr>
<tr>
<td><strong>Parameters</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Link speed</td>
<td>Application Dependent</td>
<td>Application Dependent</td>
<td>Application Dependent</td>
</tr>
<tr>
<td>Streams</td>
<td>256</td>
<td>1024</td>
<td>9K</td>
</tr>
<tr>
<td>FDB entries (streams)</td>
<td>128</td>
<td>256</td>
<td>4096</td>
</tr>
<tr>
<td>FDB entries (non-streams)</td>
<td>1024</td>
<td>1024</td>
<td>2048</td>
</tr>
<tr>
<td>Gate control list entries</td>
<td>16</td>
<td>16</td>
<td>256</td>
</tr>
<tr>
<td><strong>Forwarding Resources</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>egress queuing at 1 Gb/s</td>
<td>200 μs of frame data</td>
<td>200 μs of frame data</td>
<td>200 μs of frame data</td>
</tr>
<tr>
<td>- egress queuing at 100 Mb/s</td>
<td>500 μs of frame data</td>
<td>500 μs of frame data</td>
<td>500 μs of frame data</td>
</tr>
</tbody>
</table>
Blanking Line Application

Uncoiler → Leveler → Slitter → Catenary Guides → Feeder → Shear → Stacker

OEM A → OEM B → OEM C

System Integration
System Sizing Considerations

- Uncoiler Control
- Leveler Control
- Slitter Control
- Catenary Control & Side Guides
- High HP Servo Feeder Control
- Shear Control
- Belt Conveyor Control
- Stacker Control

OEM A
OEM B
OEM C

System Integration
System Sizing Considerations

OEM A
OEM B
OEM C

System Integration
System Sizing Considerations

From a control perspective, there is minimal communications between subsystems.

A line control function exists somewhere in the system to orchestrate coordinated control and to relay interlocking signals to the entire line. Communications to accomplish this are not usually large.

Network diameter is largely bounded by time synchronization, and vertically applied.

OEM A

OEM B

OEM C

System Integration
System Sizing Considerations

- Number of Streams in a subsystem may be denser compared to inter-subsystem communications.
  - However, most subsystems are still bound to a manageable number of total streams
  - From a control perspective, there is usually minimal communications between two subsystems
  - A line control function exists somewhere in the system to orchestrate coordinated control and to relay interlocking signals to the entire line. Communications to accomplish this are not usually large.

- Ultimately, Network Diameter is a function of Time Synchronization. The total number of hops is limited by the residence time across each node. Accuracy specifications are defined at 1 usec across 64 nodes.
  - Time synchronization tends to be “watershed;” i.e, top down, and not across machine.
    - Therefore, network diameter may be bound more vertically than horizontally across a machine, a manufacturing plant, or an enterprise.
    - Non-synchronized systems are not limited to a given number and may be expanded beyond those specified for 64 nodes at 1 usecs.
  - From a control perspective:
    - Nodes are synchronized top, down, or vertically
    - Control communicates horizontally
Hierarchical Time

GPS

Controller

Device