10 Gigabit Ethernet
The Market Opportunity

Nan Chen, Nortel Networks,
Bruce Tolley, 3Com Corp.
## Lawrence Berkeley Labs Bandwidth Requirement Projections

<table>
<thead>
<tr>
<th>FY</th>
<th>Fast Track</th>
<th>Acc. Track</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>2.5 Gbps</td>
<td>10 Gbps</td>
</tr>
<tr>
<td>2002</td>
<td>10 Gbps</td>
<td>160 Gbps</td>
</tr>
<tr>
<td>2004</td>
<td>40 Gbps</td>
<td>1000 Gbps</td>
</tr>
</tbody>
</table>

Source: Mike Bennett, LBNL, HSSG presentation, Idaho, June 1999
10 GbE for Enterprise LANs

- Server interconnect for clusters of servers
- Switch to server
- Aggregation: e.g. multiple 1000BASE-T segments to 10 GbE downlink
- Building to Building
- Media:
  - SM fiber, MM fiber
Data Center Switch Scenario

- **Wiring Closet**
  - 1 GbE downlinks
  - 1 GbE Switch with 10 GbE Uplinks
  - Trunked 1 GbE downlinks

- **100/1000 server connections**

- **Net Mgmt**
  - 10 GE

- **Data Center**
- **Campus Core**

B. Tolley/3Com; Nan Chen/Nortel

IEEE 802 Tutorial, Nov. 1999
Campus Core Scenario

Wiring Closet

1 GbE downlinks

Trunked 1 GbE downlinks

100/1000 server connections

Net Mgmt

Data Center

10 GbE

Campus Core

10 GbE Core Switch

IEEE 802 Tutorial, Nov. 1999
GbE Extended LAN: City of Santa Clara, CA

- City has access to dark fiber from AT&T/TCI cable company
- Ethernet-based “Connected Community” or private MAN Service
  - Cost-effective GbE to each site
- City IT dept. provides service to multiple city departments
- Backbone: meshed GbE switches
- 1000BASE-LX at 10 km
10 GbE Applications for ISPs/NSPs

- Server farm interconnect
- Intra-POP connections
  - MM fiber < 300 meters
- POP uplinks or Inter-POP
  - less than 40 km
- MAN access via WDM
- Media:
  - Dark fiber, dark color/wavelength, SONET/TDM infrastructure
ISP/NSP Applications

Transport Network

- Super POP/NSP
  - Core Routers
  - Edge Routers
  - Access Routers
  - 10GbE
  - 1GbE

- Core POP/NSP
  - Core Routers
  - Regional-Metro POP/ISP
  - Edge or Core Router
  - Access Routers
  - 10GbE

- DWDM

B. Tolley/3Com; Nan Chen/Nortel

IEEE 802 Tutorial, Nov. 1999
10 GbE Growth Projections

2002: 35 M GbE ports!

Sw 10, Sw 100, Sw 1000: Dell’Oro Group, Sw 10,000: 3Com/Nortel Estimates (Total Market)

B. Tolley/3Com; Nan Chen/Nortel

IEEE 802 Tutorial, Nov. 1999
Customer Benefits of 10 Gb Ethernet

- Solves bandwidth requirement
- Reliability
- Scalability (10/100/1000/10,000 Mbps)
- Cost reduction
- Standards-based, interoperability
- Competitive market of suppliers
- Optimized for data