



10GBASE-T: Economic Feasibility

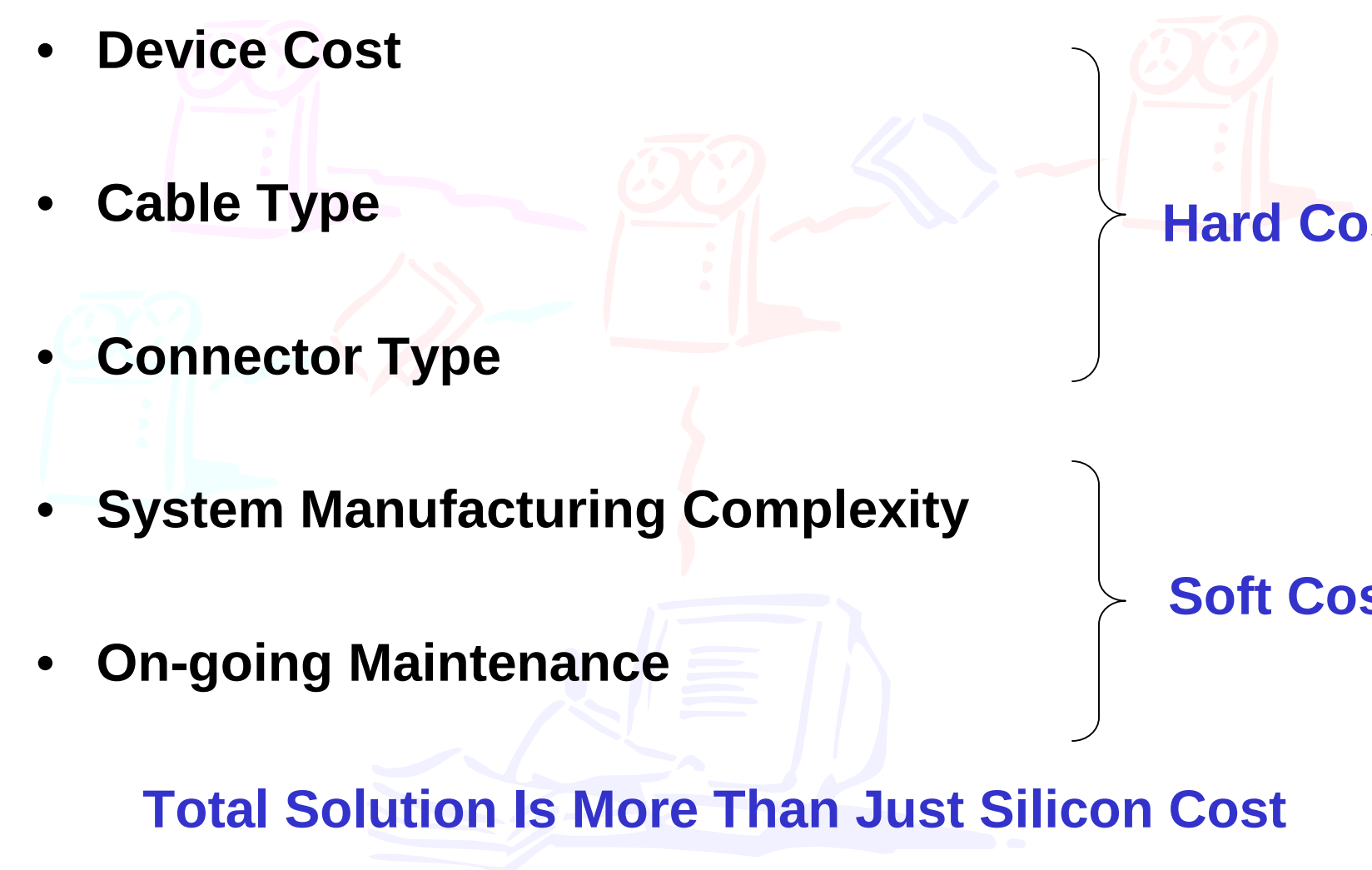
Presented by:

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With Assistance from:

10GBASE-T CFI Group

Economic Feasibility Factors

- **Device Cost**
 - **Cable Type**
 - **Connector Type**
 - **System Manufacturing Complexity**
 - **On-going Maintenance**
- Hard Costs**
- Soft Costs**
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- A faint background illustration featuring various electronic components and a person. On the left, there are stylized representations of a green circuit board, a pink cable, and a blue connector. In the center, a person is shown from the side, wearing a red shirt and working on a laptop. To the right, there is a large, stylized orange component, possibly a power supply or a large capacitor, with a blue cable connected to it. The overall style is a simple, hand-drawn sketch.

Total Solution Is More Than Just Silicon Cost

Matching Up With Alternatives

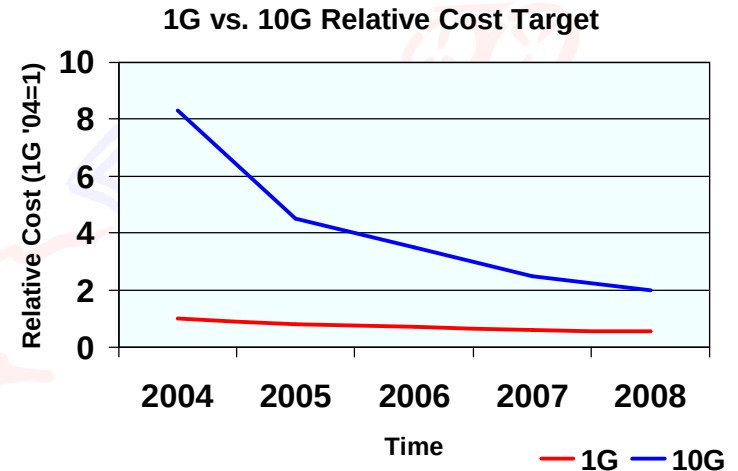
- **Economic Feasibility
Depends on Perspective**
- **Comparison is not just with
Copper Alternative**



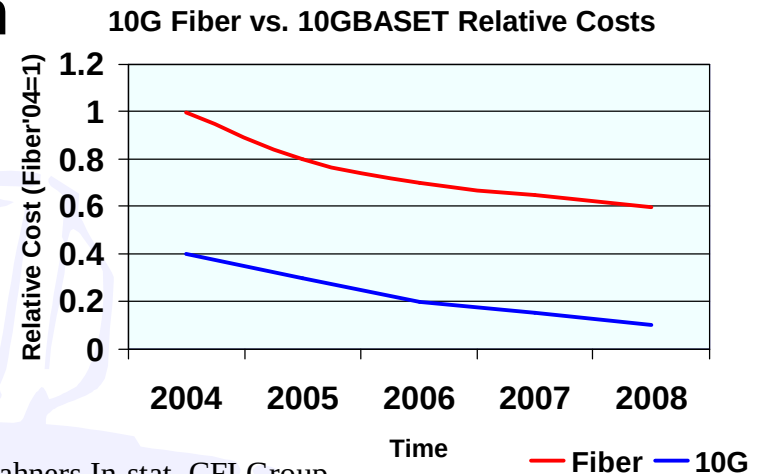
Performance of Fiber At the Cost of Copper

Device Cost

- **10GBASE-T vs. 1000BASE-T**
 - Absolute cost will be 8-9x and trend toward 2-3x
 - Cost per gigabit will start at 0.8x



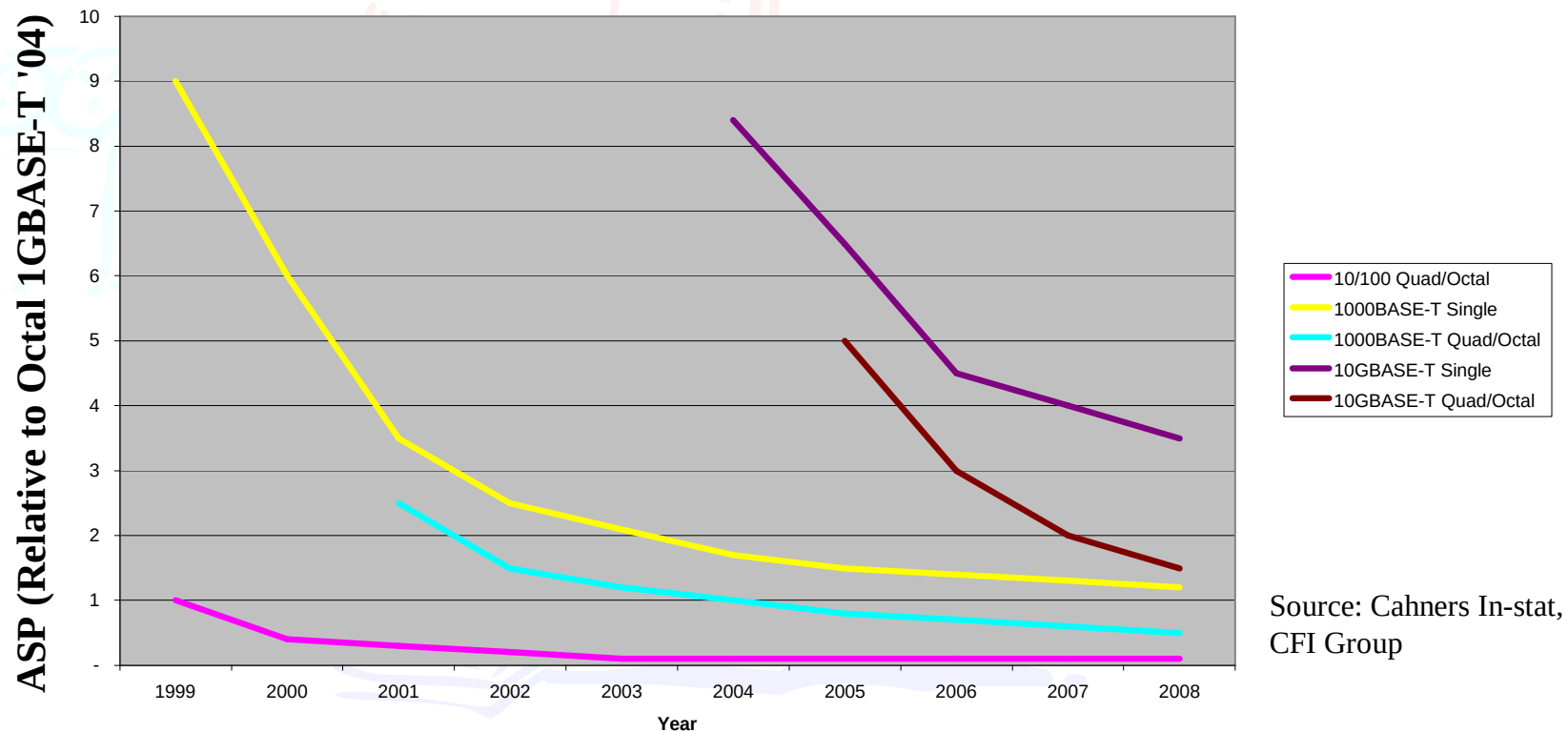
- **10GBASE-T vs. Fiber Solution**
 - E-only vs. EOE
 - Absolute cost will target 0.4x fiber and trend to 0.10x



Source: Cahners In-stat, CFI Group

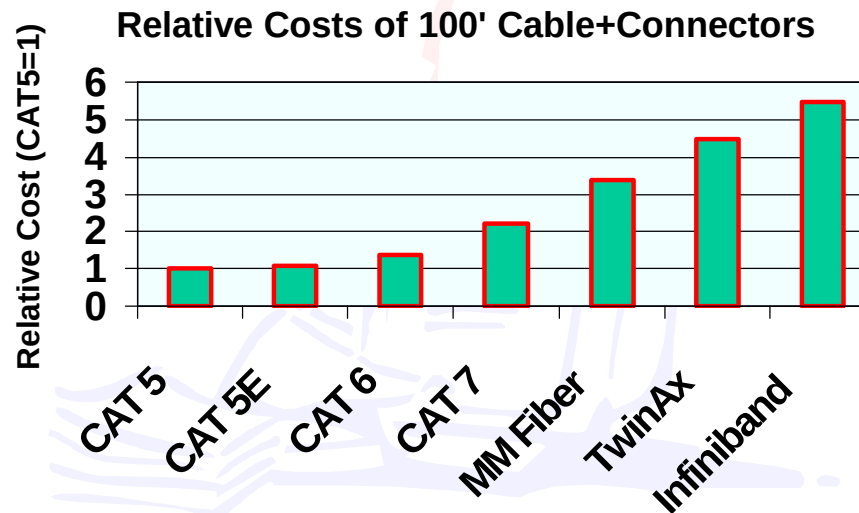
Device Costs

- Like its predecessors, 10GBASE-T benefits from silicon efficiencies
 - Using standard, low-power process; integration of multiple transceivers; broad market potential



Cable and Connector Types

- Use of installed cable creates minimal incremental cost
- Cost differential between types of cable is large
- Need to determine effect on overall solution cost



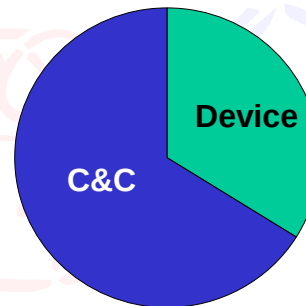
Source: L-com, CDT, CFI Group

Cable and Connector Types

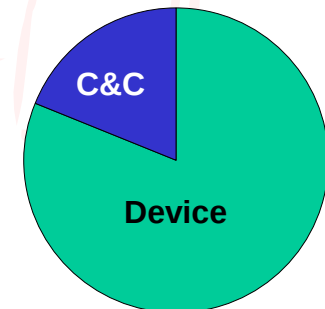
- **10GBASE-T vs. 1000BASE-T**

- Installed base of cable most likely
- New install cost dominated by device vs. C&C

New 1G Installation



New 10G Cu Installation

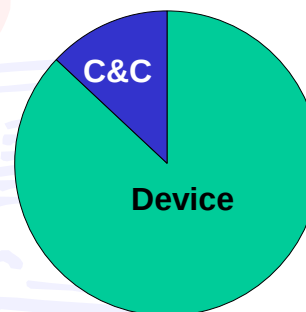


Cuts Cost Differential

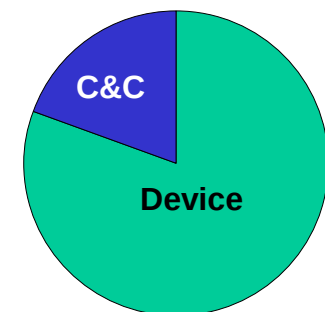
- **10GBASE-T vs. Fiber**

- Less likely to have installed cable
- Total cost dominated by device in both cases

New 10G Fiber Install



New 10G Cu Installation



Cost Differential Remains Constant

Manufacturing & Maintenance

- **Soft costs still can be major driver of economic feasibility**
 - **10GBASE-T soft costs lower than fiber alternative**
 - No “clean room” module assembly
 - More automated system manufacturing
 - Less power consumption and board space
 - No fiber optics connector cleaning issues
 - **Goal of 10GBASE-T is to approximate 1000BASE-T soft costs so differential will be negligible**
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Other “Economic” Considerations

- **Packaging and Module Integration**
- **Power Considerations**
- **Process Discussion**
- **Cost of EMI compliance**
- **Compatibility with 1000BASE-T**
- **Continue to Verify and Track Hard and Soft Costs**

For Consideration in Study Group

Summary

- **Total cost of ownership is more than device cost**
 - **Comparison against both 10G fiber as well as multiple 1GCu are valid**
 - **Most relevant comparison is with 10G fiber solution**
 - Even at start, cost of ICs will be a fraction of fiber costs
 - Cost of cable will be much less and approach zero, if installed base is used
 - Soft costs such as manufacturing and on-going maintenance are low
 - **10GBASE-T has feasibility even compared to 1GCu**
 - Draws on same cost reduction curve; lower cost/Gb
 - Benefits from standard silicon manufacturing process
 - Can possibly leverage same cable base
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