

# *The Optical Integration Revolution*

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# 1987 Cocoa Beach IETF



- Top (left to right): Len Bosack, Elise Gerich, Bill Norton, Tracy LaQuey Parker, Drew Perkins, ?, Cathy Aronson (ex-Wittbrodt), Steve Waldbusser, ?
- Bottom (left to right): Mike St. Johns, Mike Karels, Jeff Honig, Mark Fedor, Ross ? (U of IL)



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# Keys to Innovation



**Problem**

- Identify a large problem
  - Preferably in a large, robust, high-growth market
  - Ideally highly fragmented, with large, slow-moving competitors
- Identify a high-risk technology to get an unfair advantage
  - Look for a 10x economic value proposition
  - Need to be aggressive enough to deter imitators for several years
- Build an all-star team that can execute on the solution
  - It's all about the team
  - Never compromise on people. Never.
- Keep it well financed
  - Investors will beat a path to an all-star team developing a revolutionary solution to a large problem



**Solution**



**Team**



**Capital**

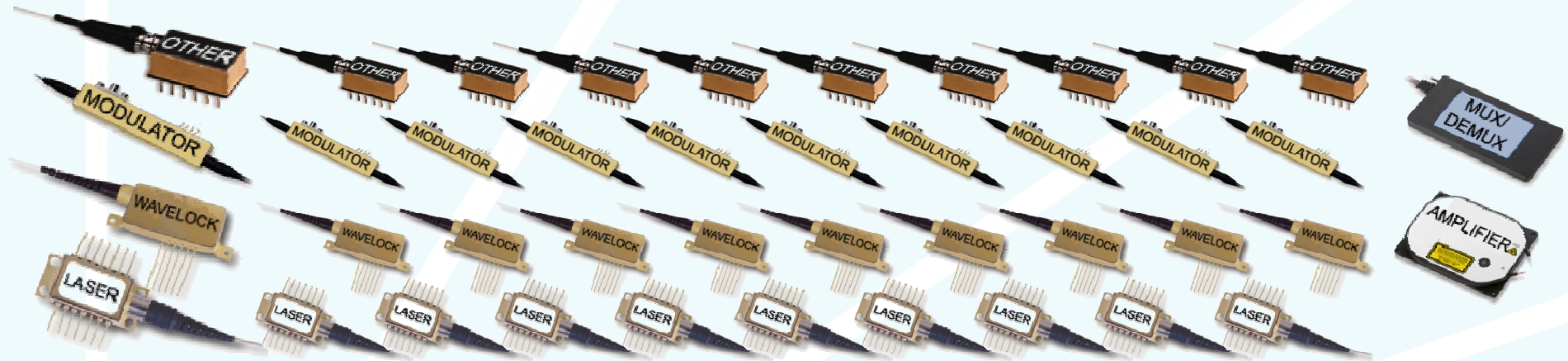


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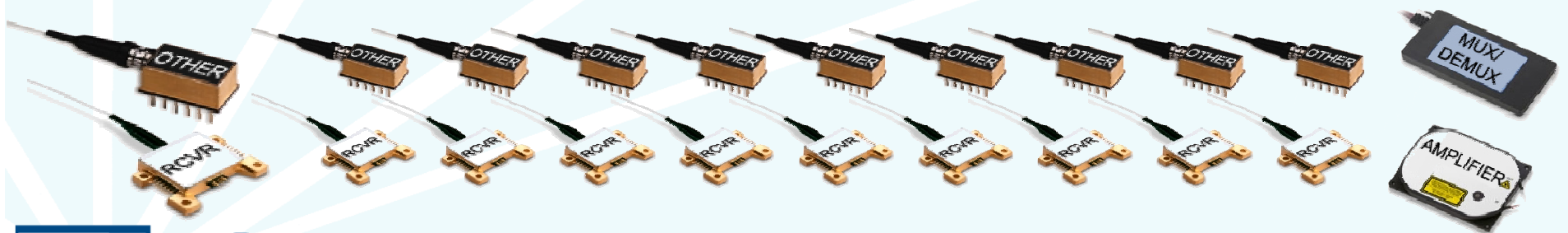
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# A Large Problem: The Lack of Scalability of Discrete Optical Components

**100 Gb/s Transmit**



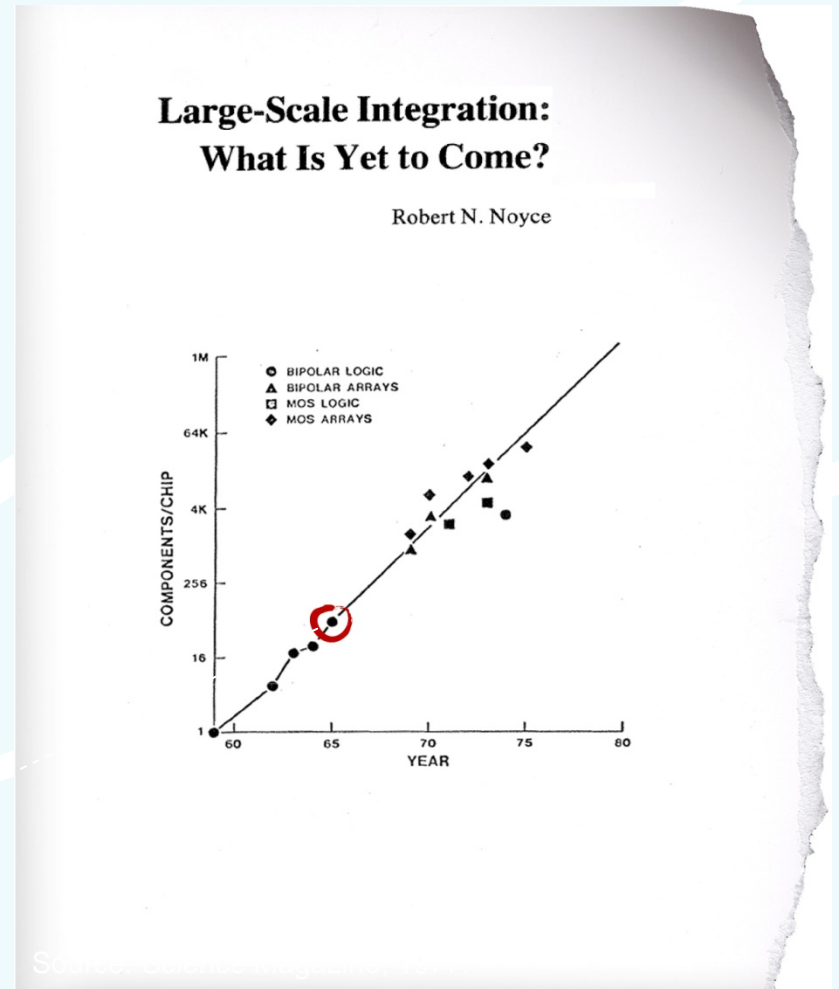
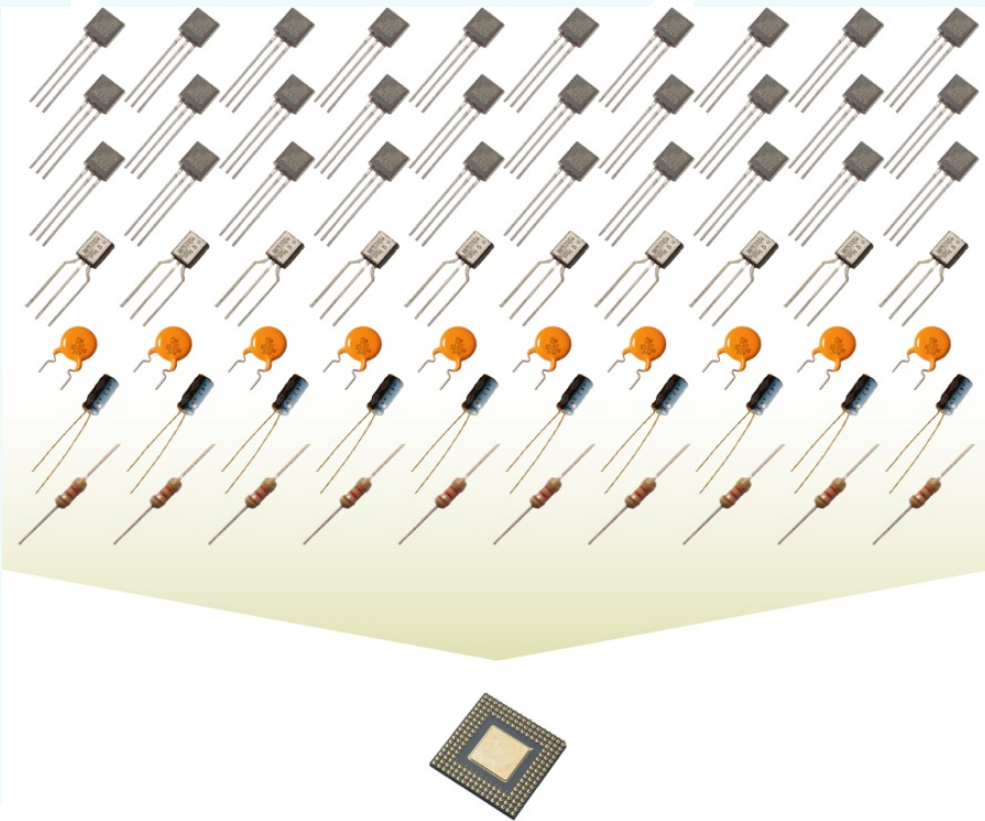
**100 Gb/s Receive**



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# Over 40 Years Ago, Electronic Integrated Circuits Solved a Similar Problem

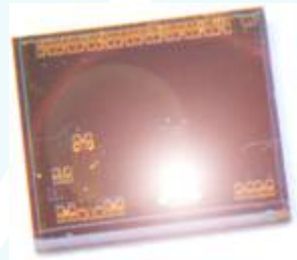


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# A Radical Solution: Photonic Integrated Circuits

## 100Gb/s DWDM “System-on-a-Chip”



100Gb/s Receive



100Gb/s Transmit

*Large-Scale Photonic Integration enables benefits of OEO conversion with 10x reduction in space, power, and cost*

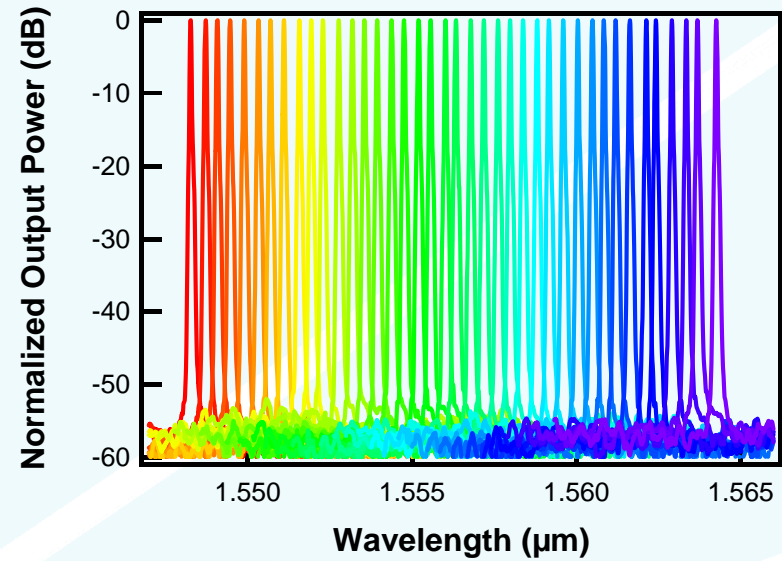
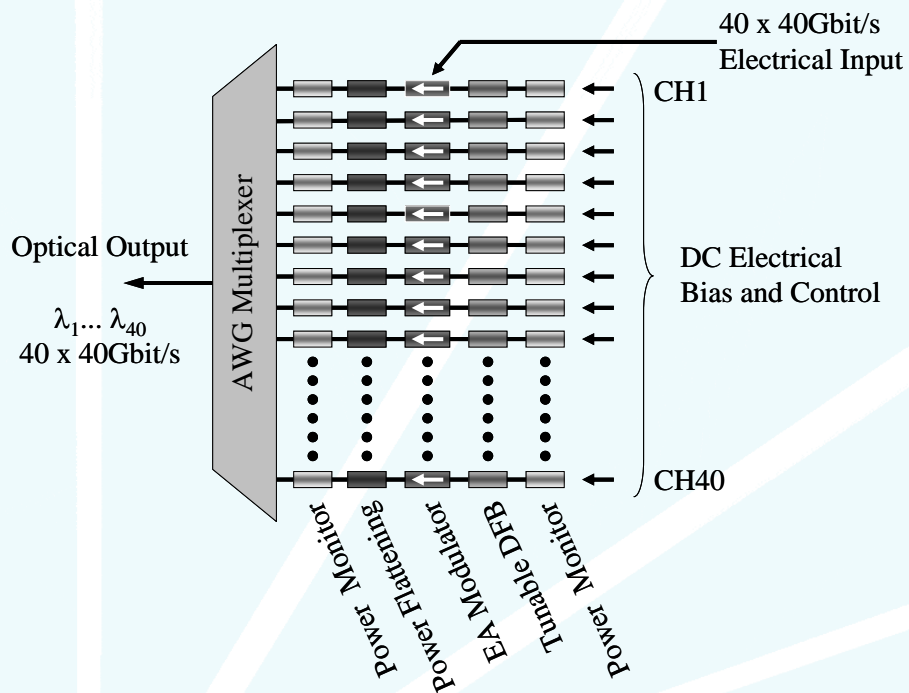
Today's photonic integration (over 60 devices per PIC pair) is equivalent to the state of integrated circuits circa 1965



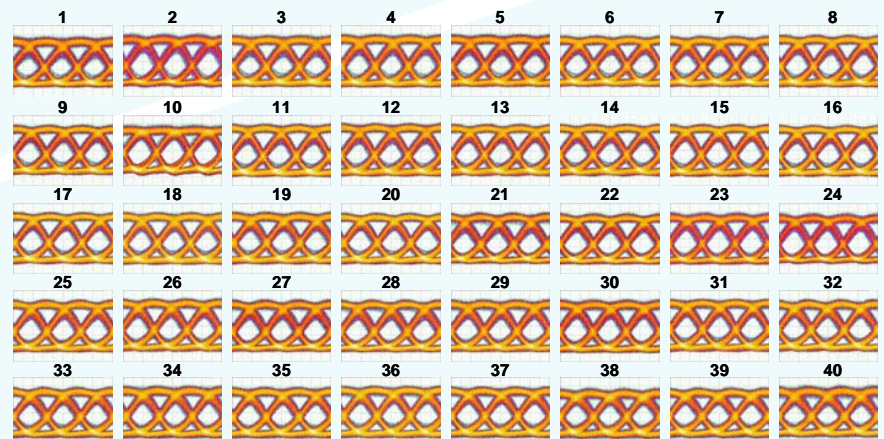
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# Accelerating the Revolution: 1.6Tbit/s DWDM PIC Transmitter



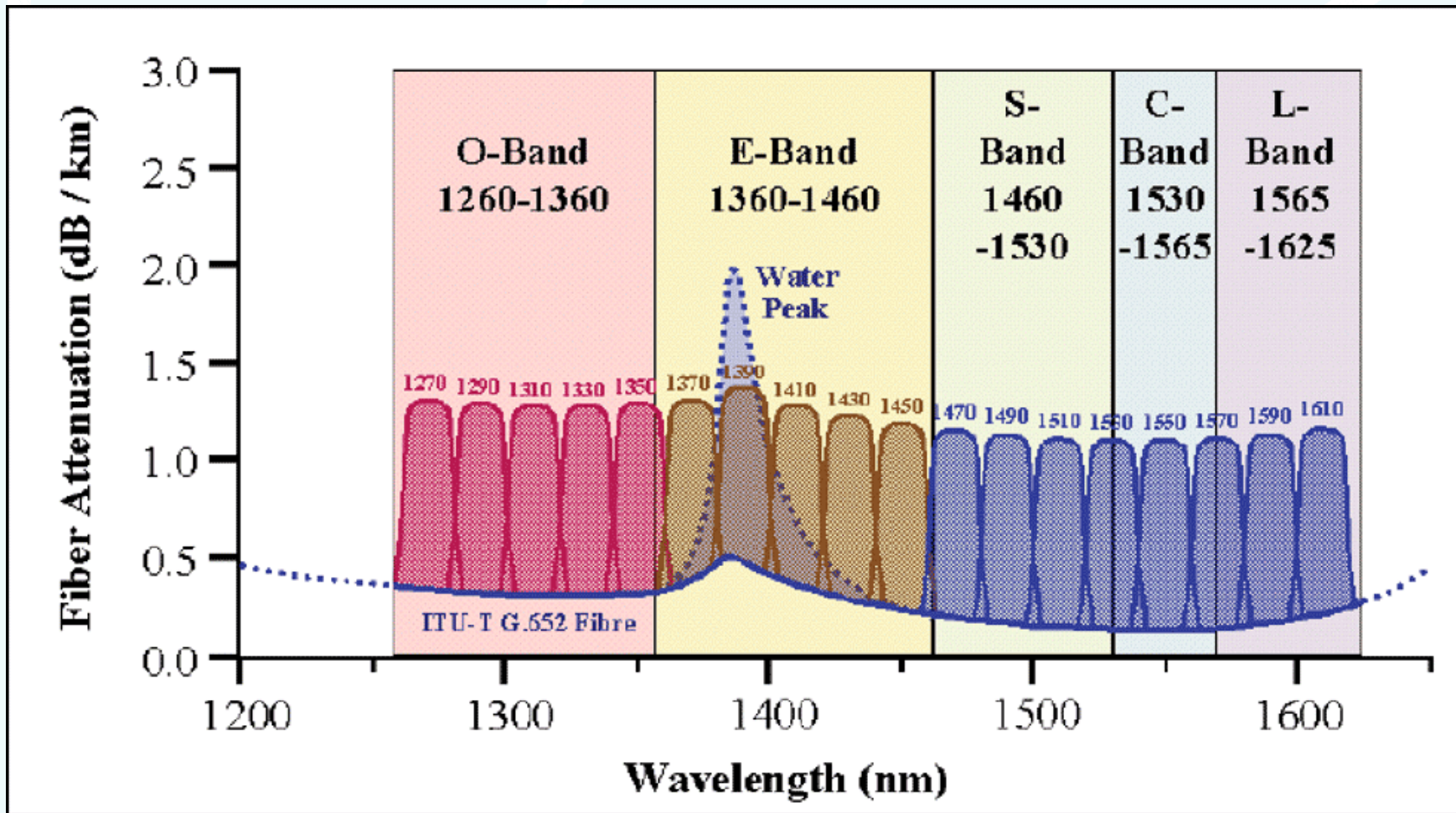
...40 channels x 40 Gb/s



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# Looking Forward: Over 50 THz of Optical Fiber Bandwidth

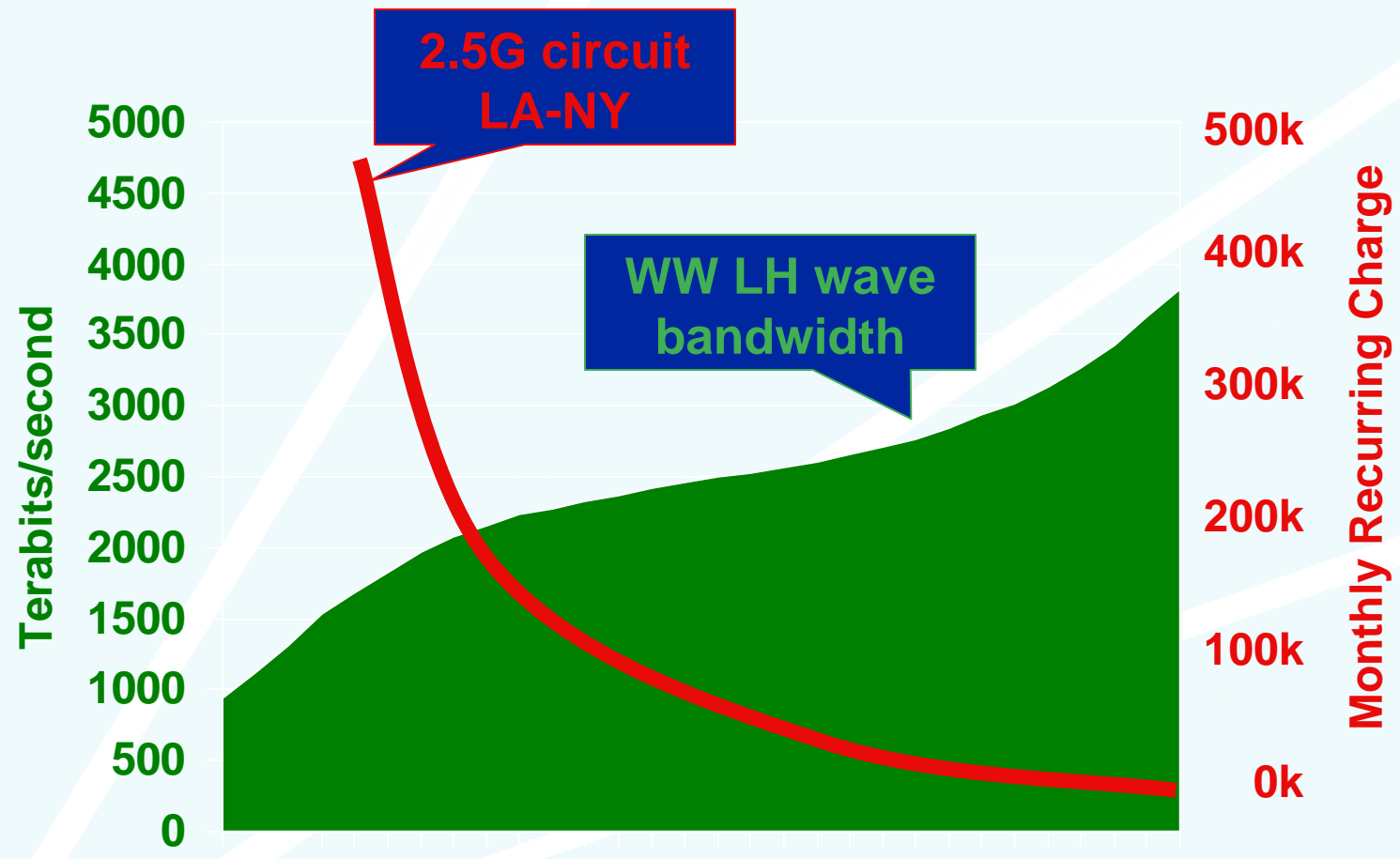


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# Long-Haul Network: Growth vs. Pricing



Source: Infinera analysis, Dell'Oro Group, Telegeography



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