Is IP-over-DWDM finally ready to Cross the Chasm?

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Lead Analyst

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OFC ‘23
IP-over-DWDM – The Promise

✓ Lower cost
✓ Lower space
✓ Lower power
✓ Higher reliability
✓ Multi-layer coordination
IP-over-DWDM has failed to Cross the Chasm

Why?  How is this time different?
400ZRx – this time is different

✓ Form factor parity
   And pluggability
✓ Timeliness
   400G investment cycle
✓ Multi-vendor ecosystem
   Price pressure and interop
✓ It works
   Perfectly for Metro DCI
400ZRx – Unprecedented rate of adoption

Coherent Generation Adoption

Year From Introduction

Coherent Generation Prevalence

Source: 3Q22 Transport Applications Report
Has IP-over-DWDM already crossed the chasm?
Not so fast. The chasm is large.

But so is the market on the other side.
Is IP-over-DWDM going to make it this time?
Crossing the Chasm

Innovators

Pragmatists

Conservatives

Skeptics

ROADM Compatibility

Long Haul Capability

THE CHASM
Crossing the Chasm

- Innovators
- Cost Reduction
- Public Success

Pragmatists
Conservatives
Skeptics

THE CHASM
How about a bridge?

- **Innovators**
  - ROADM Compatibility
  - Long Haul Capability
  - Host interop
  - Management & Control

- **Pragmatists**
  - Cost Reduction

- **Conservatives**
  - Public Success

- **Skeptics**

**THE CHASM**
Thank You
800ZR and 800LR Market

Scott Wilkinson
Lead Analyst

March 8, 2023

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Coherent Optical Generations

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Baud Rate
(P)erformance
(C)ompact

Maximum Speed
800G 600G 400G 200G 100G
1.2T 1.6T
400ZR Ignited a Revolution

• The fastest-growing new optical technology of all time
• Multiple varieties built on top of the original specification, expanding the market
• Networks can be built now that could not be built before
• There would be no 800ZR or 100ZR without the success of 400ZR
Gen120C: Pluggable 800Gbps

• Arriving concurrent with Gen120P
  • The development cycle has collapsed

• 800ZR: The successor to 400ZR
  • Lines up with the transition to 800GbE
  • Will operate as a long-distance 400Gbps pluggable – the killer app
  • Can also operate as 800G DCI, but 800GbE will not be as popular as 400GbE for DCI

• 800LR: Short distance (~10km) competitor to direct detect
  • Predicated on IMDD performance not being enough at 200GBaud
  • Not clear there is a market as a standalone product, especially if IMDD reaches 8-10km
  • Could be very interesting as part of a 1.6TbE solution
800LR: Limited demand

- The demand for LR optics – in general – is much smaller than for other reaches
- 800GbE demand will be smaller than 400GbE, except in AI/ML applications
  - Those are short-reach applications
- IMDD 800GbE solutions will be based on 100Gbps and 200Gbps PAM4
  - 100Gbps = more expensive (8 lanes) and complicated, but can easily reach 10km
  - 200Gbps = better (4-lane) solution, may stretch to 8km
- Things get interesting at 1.6TbE
  - Requires 200Gbps PAM4 optics (limited reach)
  - Could be well served with a 2x800LR solution
Telcos are excited about a pluggable 400Gbps QSFP-DD solution that can cover 1000s of km and/or dozens of ROADMs.

400Gbps coherent lines up with the need to 400GbE on the client side.

800Gbe is less popular, especially in networks that traditionally have a lot of DCI.
  - Webscales on the 100G/400G upgrade path will wait for 1.6G solutions.
  - BUT if 1.6G is delayed, then all bets are off.

Same DSP could be repurposed as an 800LR.
  - Less sophisticated front end.
  - No additional DSP development.

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**800ZR: 400ZR+++++**
Thank You

Not for distribution beyond Cignal AI Clients