

**Q&A of ON2030 Webinar #1 on  
“High-speed inter-data-center optics (400G/800G/1.6T ZR/ZR+)”  
April 24, 2024**

Q1:

[https://www.optica.org/membership/member\\_programs/optical\\_networks\\_toward\\_2030](https://www.optica.org/membership/member_programs/optical_networks_toward_2030) -> only has a registration link for the current webinar. Anyway to get notified automatically for each new webinar?

A1: Thank you for your question. Yes, we will forward the future webinar links to everyone.

Q2: What is the relative cost difference between HCF and solid core?

A2: HCF is still in the R&D phase and its cost for commercial use is not yet available.

Q3: Will you be able to share all the speakers' presentations? Thanks!

A3: The combined presentations will be shared on the OPTICA ON2030 website a couple of days after the event.

Q4: What are some of the biggest challenges for module manufacturers to reach an agreement in the 1600ZR IA? Why do we have these challenges?

A4: Please refer to Paul's last slide. Thanks.

Q5: Is there a push to get encryption in ZR space, what's the current status?

A5: I'm not aware of a standardization effort for encryption

Q6: When 800G ZR IA can be released? what is the remaining topic need to discuss

A6: Please refer to Ian's slide 6. Thanks.

Q7: With the IA of ZR, interoperability between different vendors could be available?

A7: Interoperability depends on how well different vendors implement ZR. Thanks.

Q8: Why 1600G if spectral density is not increased over 400/800G?

A8: To get the same reach in a given optical fiber link, the spectral efficiency would have to be similar. Thanks.

Q9: How much OSNR is for 800G back to back configuration

A9: Theoretically, the OSNR requirement of 800G would be 3dB higher than that of 400G for the same modulation format & FEC choice. Thanks.

Q10: Are there any plans to include FlexO-xe structure in 1.6T IA?

A10: Good collaboration between OIF and ITU-T SG15 is ongoing, so stay tuned. Thanks.

Q11: How much distance we can cover with 800G as i know 600G can cover up to may be 100 km?

A11: With high symbol rate (~130Gbaud), 800G defined in 800ZR can reach up to 120km.

Q12: Is this 1600G single ch.?

A12: With a single optical carrier, the modulation symbol rate would be ~240Gbaud. Its feasibility will be explored in OIF. Thanks.

Q13: Really great innovation is happening...looking forward to such more ...

A13: Indeed. The OPTICA ON2030 webinar series aims to update our community with these great innovations.

Q14: Does a module need to support both C and L bands?

A14: Preferably so, per Jeff's presentation. Thanks.

Q15: Is it Raman spectroscopy through fibers?

A15: Raman refers to amplification technique.

Q16: Will there still be a role to play for traditional DWDM system in Datacenter connectivity ?

A16: I (Jeff) focused on the standardized & pluggable optics for this webinar given the topic but I agree with Tom and Ian's answers here. We have asked that the pluggable optics be optimized to the 500 - 1000 km reach range, with the assumption that remaining links longer than 1000 km (including subsea) would deploy using high performance transponders given their benefits in spectral efficiency.

Q17: So is there a 3.2T working group?

A17: 1.6 has started, looking at the timeline in the past, 3.2 is still a few years out

Q18: As we are seeing more and more development towards high speed technology development so how much energy consumption are going to increase with development ? Are we also looking these area also...?

A18: Yes, a key motivation to go to higher modulation symbol rate (or baud) is to reduce the energy consumption per bit.

Q19: When the 3.2T DCN optical module and DCI will be considered?

A19: Based on the historical trend, 3.2T may occur 3~4 years after 1.6T provided that it is technically feasible.

Q20: When will 1.6T be deployed by Meta?

A20: N/A.

Q21: Will P2MP optics reach the speeds of these standards? I see that higher bandwidth PON standards are optimizing efficiency better than P2MP

A21: Yes, P2MP optics can leverage the same ecosystem. High-bandwidth PON is based on TDMA for P2MP, while coherent P2MP used in Open-XR is based on FDMA. Both TDMA and FDMA can be made to be bandwidth-efficient.

Q22: Will CPO block the application of ZR such as in 3.2T era?

A22: This remains to be an open topic to be explored by our community.

Q23: Will multicore fibers be adopted?

A23: The 1.6T ZR and ZR+ modules can be used for any type of single-mode fibers.

Q24: Would a more advanced CMOS technology, such as sub 3nm process, be able to push beyond 1.6Tbps?

A24: Going beyond 1.6Tbps needs advances in not only CMOS technology, but also high-speed DAC/ADC, optical modulator, modulator driver, and photodetectors.

Q25: When next webinar is going to happen... its quite informative for the community.

A25: The next webinar is expected to be about 2 months away in June 2024. Thanks.

Q26: Xiang that was my point, since BD product does not increase why go to 1600 or 3200G? It is just slicing 4880G spectrum another way.

A26: Yes, the overall bandwidth-distance (BD) product is not increased when going from 400ZR to 800ZR and 1600ZR if the same optical amplification bandwidth and fiber type are used. The key advantage of going to higher speed modules is the reduced cost and power per bit. With the use of wider optical amplification bandwidth (such as the use of C+L bands) and/or better fiber (such as the low-loss and low-nonlinearity G.654E fiber), the BD product of the DWDM system can be increased.

Q27: Great information...please share the webinar link if possible

A27: OPTICA will share the recorded webinar session and the presentation materials on the ON2030 website soon. Thanks.

## **ON2030 Webinar #1 Takeaway Message**

- **1.6T ZR & 1.6T ZR+ optical transceiver modules are on their way, with standardization picking up speed in OIF**
  - Inter-generational interoperability is key for roll-out of new technologies
  - Technical approaches are being worked out, with single-carrier and multi-carrier solutions on the table
  - Pluggable optical transceivers reduce energy and physical footprint in a simplified network architecture
- **Long-haul and ultralong-haul transponder systems are complementing these optical modules for longer distances**
- **Global cooperation among standards developing organizations such as ITU-T and IEEE is essential for our industry**