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EPIC Online Technology Meeting on Co-packaged Optics for Hyperscale Datacenters
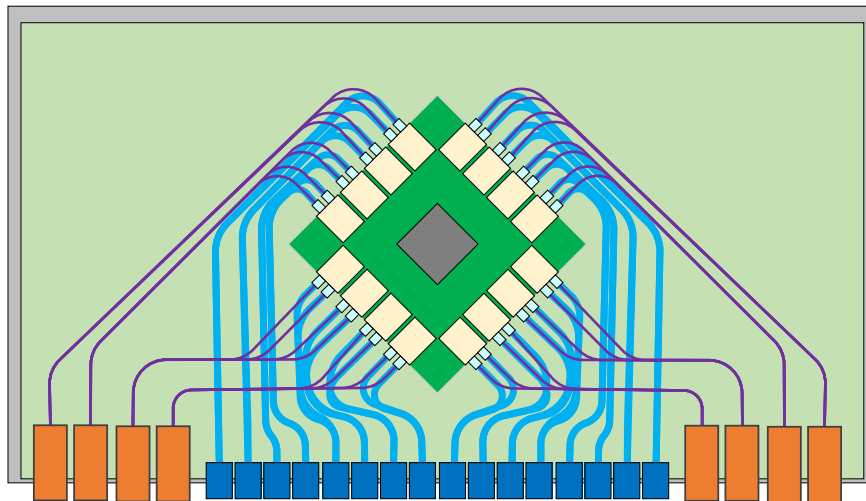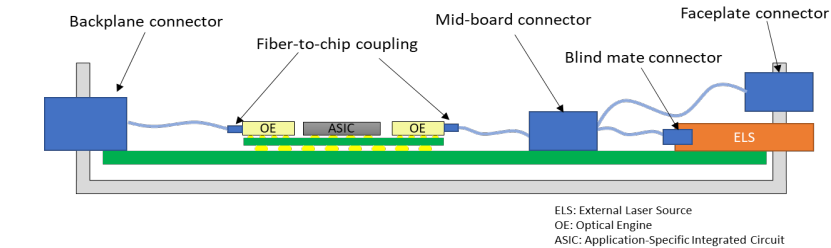# Optical Interconnect Challenges in CPO
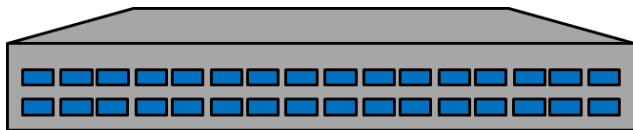
5/23/2022
Tiger Ninomiya
Technology & Innovation Manager

What's new with Co-Packaged Optics system

Backplane connector
Fiber-to-chip coupling
Mid-board connector
Blind mate connector
Faceplate connector

OE   ASIC   OE   ELS

ELS: External Laser Source
OE: Optical Engine
ASIC: Application-Specific Integrated Circuit

- Fiber counts

- External Laser Source

- Face plate density

- Fiber routing inside equipment

Optical Interconnect in CPO Switch

12.8 T Switch with Pluggable (DR4)

51.2T Switch with CPO (DR type)

32-port x 8F with MPO-12 = **256F**
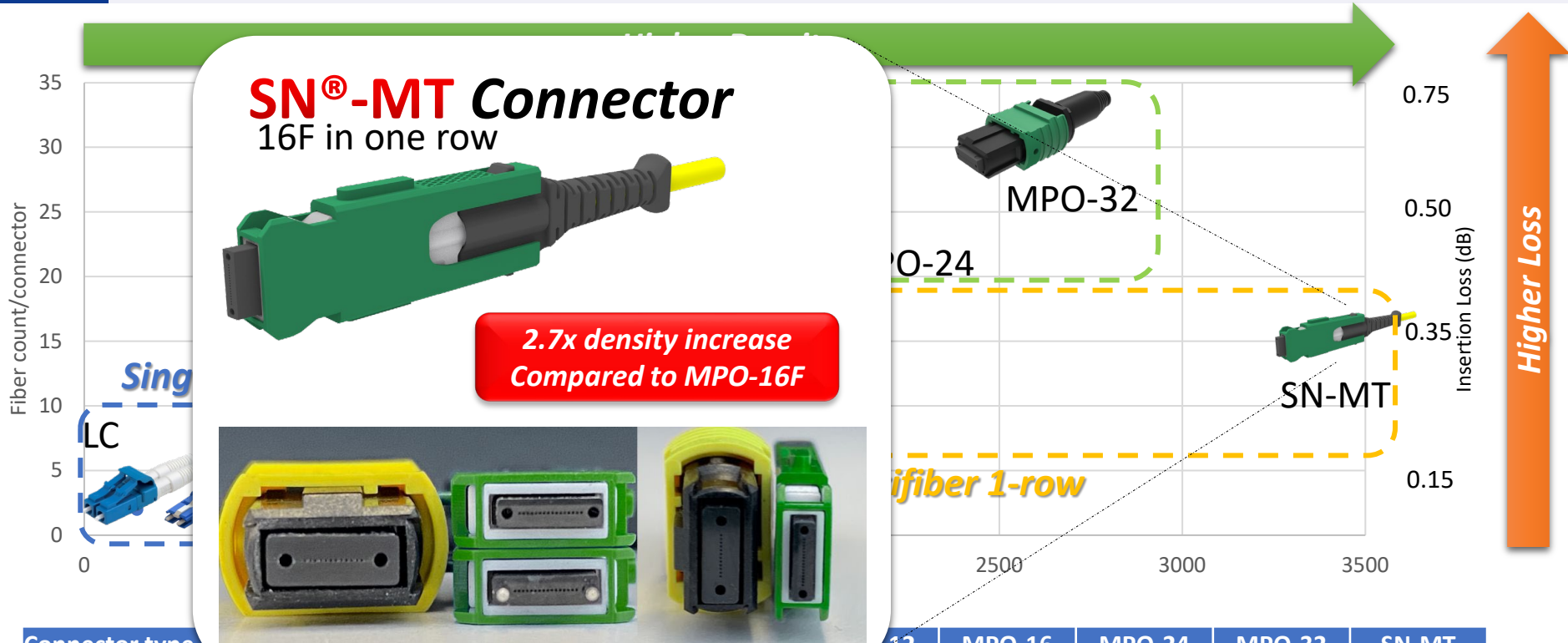
64-port x 16F MPO-16 = **1024F**

Switch Bandwidth	12.8T		51.2T	
Optics type	FR	DR	FR	DR
Number of transceiver/OE	32 x Pluggable	32 x Pluggable	16 x CPO OE	16 x CPO OE
Bandwidth per transceiver/OE	400G	400G	3.2T	3.2T
Fiber counts per transceiver/OE	2	8	16	64
Wavelength per fiber	4	1	4	1
Total fiber counts	64	256	256	1024

- *More fibers are needed per switch ASIC*
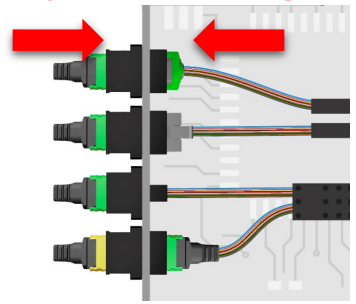- *Potential faceplate space needed for External Laser Source*
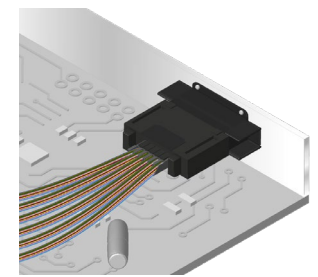
Connector Density and Insertion Loss

SN®-MT Connector
16F in one row

2.7x density increase Compared to MPO-16F

Fiber count/connector

Sing...

LC

...ifiber 1-row

Higher Loss

Insertion Loss (dB)

MPO-32

...O-24

SN-MT

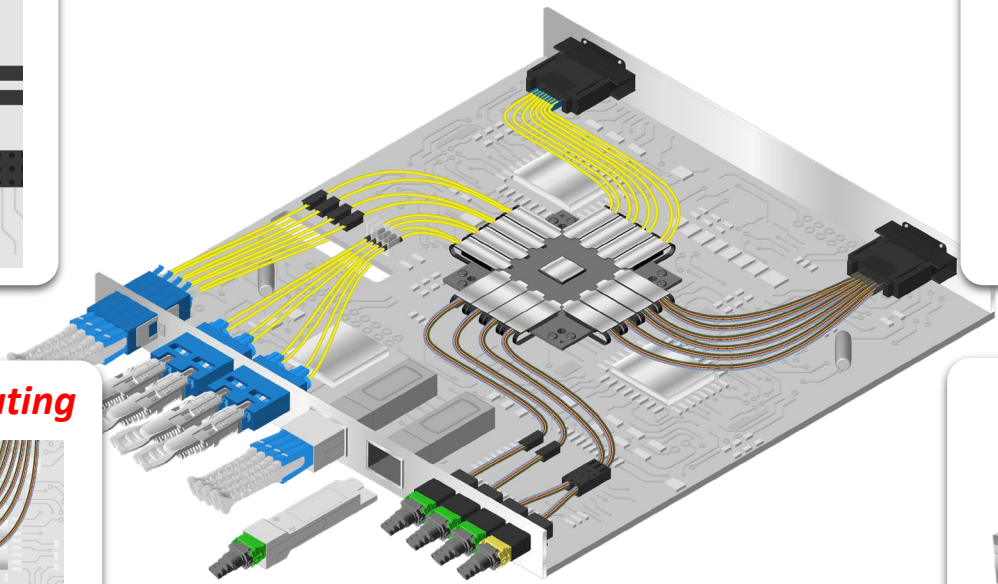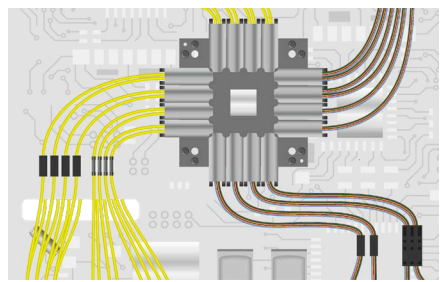| Connector type				-12	MPO-16	MPO-24	MPO-32	SN-MT
Fiber count/connector		2	2	2	12	16	24	32	16
Fiber count/19 inch 1RU panel		144	336	528	960	1280	1920	2560	3456

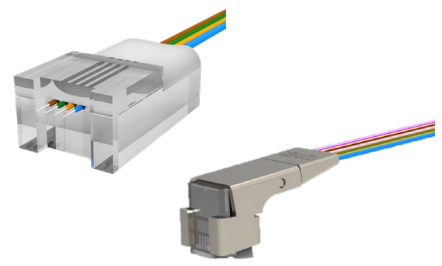# SENKO's Onboard Interconnect Solutions

Space saving

Backplane

Mid-plane & Fiber Routing

Fiber to Chip

COBO's Co-Packaged Optics Activities and New Project

Tiger Ninomiya
T&I Manager, Senko Advanced Components
Co-Packaged Optics Working Group Chair, Consortium for On-Board Optics

Co-Packaged Optics Working Group

- Scopes of CPO WG
  - Develop technical guidance
    and standards for CPO implementations
  - Focus on optical connectivity and remote
    laser sources
- Projects
  - Whitepaper for technical guidance
  - Standardization of External Laser Source
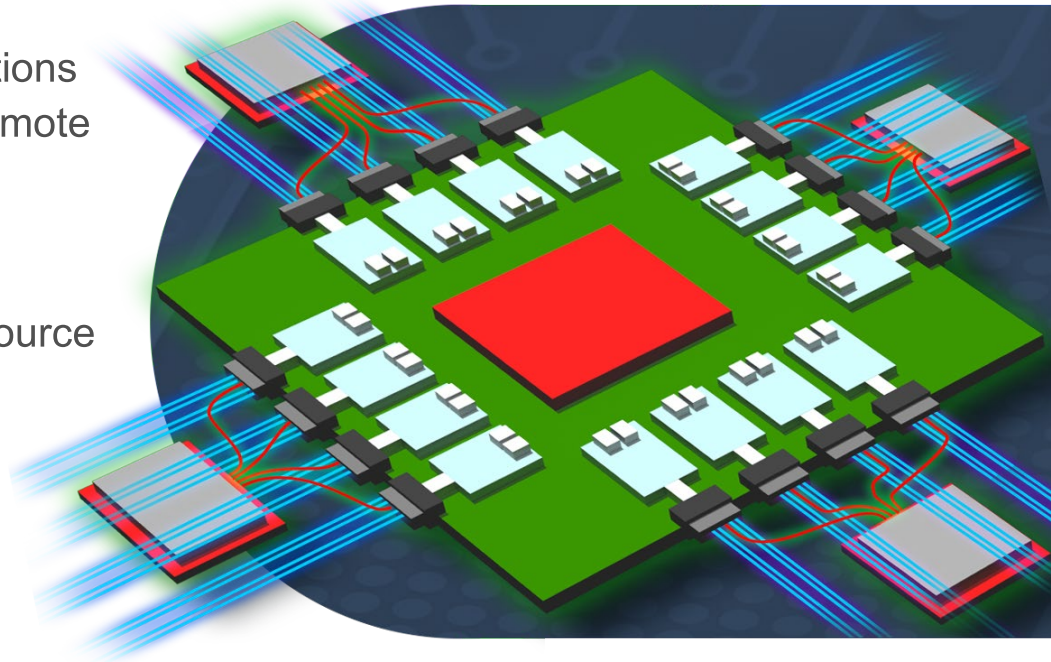 - Multi-Core Fiber Study

Anyone interested in participating

    Website: https://www.onboardoptics.org/about-us

    Contact:

        Melissa Kallos

        408-234-0379

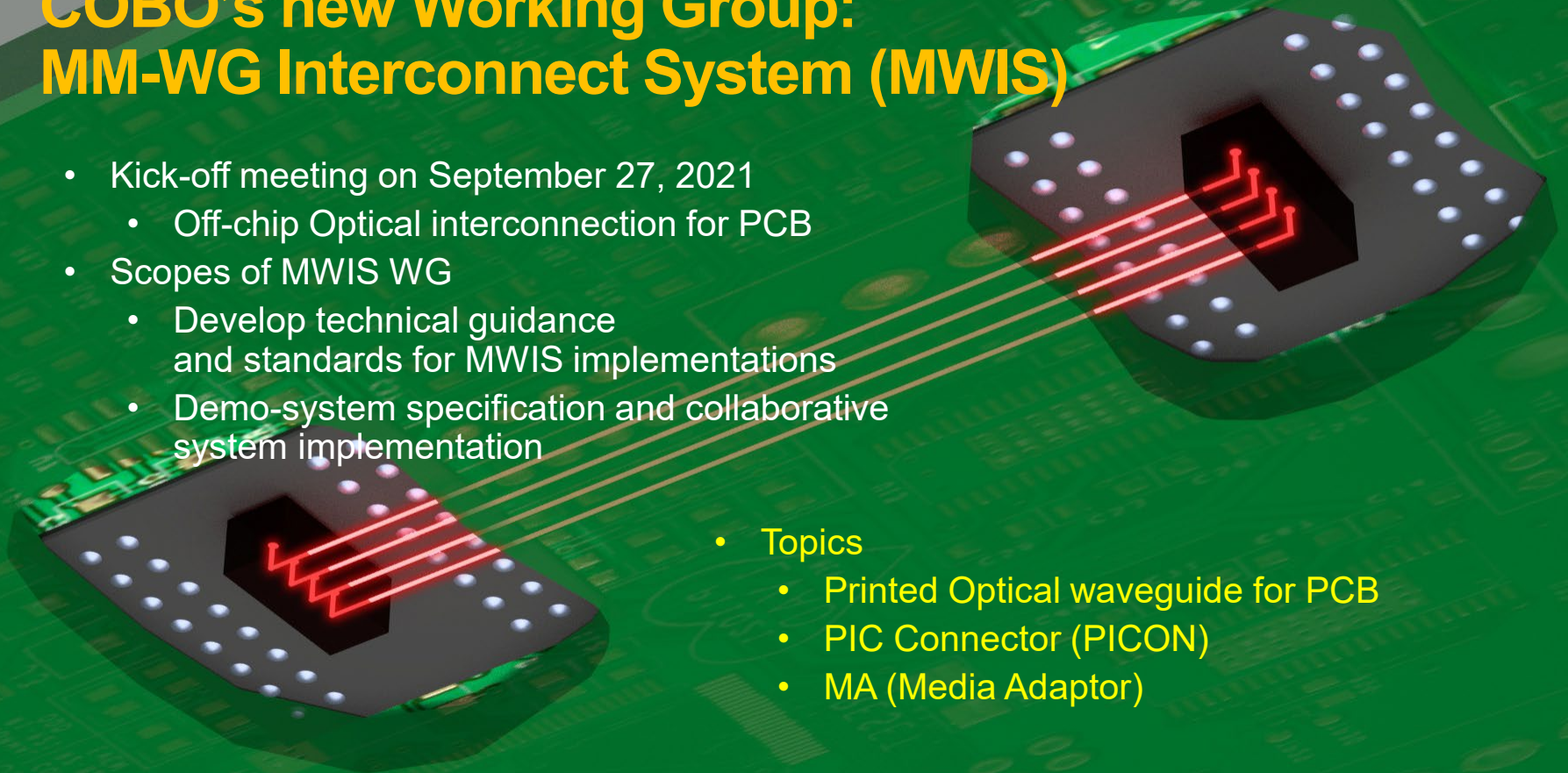   melissa@onboardoptics.org

COBO's new Working Group: MM-WG Interconnect System (MWIS)

- Kick-off meeting on September 27, 2021
  - Off-chip Optical interconnection for PCB
- Scopes of MWIS WG
  - Develop technical guidance and standards for MWIS implementations
  - Demo-system specification and collaborative system implementation

- Topics
  - Printed Optical waveguide for PCB
  - PIC Connector (PICON)
  - MA (Media Adaptor)

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