800G Pluggable MSA

Introduction and Announcement

Dr. Maxim Kuschnerov, Huawei

September 5th, 2019
Outline

• Why 800G
• Ethernet optical module market
• MSA targets
• Evolution of pluggable datacom optics
• 800G module interfaces
• Technical feasibility
• Pluggables vs. on-board & co-packaged optics
• Key milestones
• MSA members
Why 800G: Scaling of the switch capacity

Ethernet switching chip capacity

- 40G QSFP+ 32x@1U: 1.28T, 128 Lanes
- 100G QSFP28 64x@2U: 6.4T, 256 Lanes
- 100G QSFP28 32x@1U: 3.2T, 256 Lanes
- 400G QSFP56-DD&OSFP 32x@1U/64x@2U: >51.2T, 256/512 Lanes
- 800G QSFP112-DD&OSFP 32x@1U/64x@2U: 25.6T/51.2T, 256/512 Lanes

From 2013 to 2021-22:
- 10G Serdes
- 25G Serdes
- 50G Serdes
- 100G Serdes

OBO/Optical I/O?
Ethernet optical module market

- 100G dominates the market
- 200G/400G modules slowly ramping
- Potential 2x400G demand is seen to begin in 2021
- Co-packaging of 2x400G in a single module is not cost effective

➡ A true 800G solution is preferred

Datacom Ethernet optical module revenue
Key objectives of the 800G Pluggable MSA

1. Define the specifications for optical interfaces of 800Gb/s optical datacom transceivers
2. Develop essential parts of an eco-system to create a global direction for next generation 800G technology
3. Establish the eco-system of 800Gb/s optical transceivers
4. Value sharing of the technology within the supply-chain
Evolution towards 800G

400G

- Intra data center: 100m, 500m, 2km
- Campus, Router, Enterprise: 10km, 40km
- DCI metro: <120km, >120km
- OTN metro: 400ZR, 400ZR+

- SR8, SR4.2, DR4, FR8, FR4, LR8, LR4, ER8, 400ZR, Cooled EML, Coherent

- VCSEL, EML

800G

- Intra data center: 100m, 500m, 2km
- Campus, Router, Enterprise: 10-80km
- DCI metro: 10-80km
- OTN metro: 800ZR, 800ZR+

- PSM8 / PSM4, CWDM4, CWDM4
- SiP/DML, EML, Coherent

Investigation of several options
800G pluggable module interfaces

- 800G Pluggable MSA targets 8x100G / 4x200G signaling for optics
- Host side will rely on 8x112G
- Support of 8x100GbE, 2x400GbE on the host
- 800GbE will not be standardized in time, but should be supported in the future
200G/λ Technical feasibility

- 4x 200G/λ will be the core technology developed by the MSA
- History shows: 4 lambda solutions generally lead to lower cost than 8 lambda at lower baud rates
- A 224G PAM-4 technical proof-of-concept was demonstrated by the MSA members (see figure)
- The MSA will define the optimum modulation scheme & FEC to support 4x200G and continue improving the performance

Measured at the Huawei Munich Research Center, Germany
Pluggables vs. On-board optics vs. Co-packaging

Pluggables offer benefits vs. OBO/co-packaging
- Pluggability leverages established component eco-system
- No disruption to established supply chains and data center architectures
- Diverse supply chain will lead to cheaper optics
- Direct sourcing of optics without margin stacking
- Pay-as-you-grow
- Multi-service, multi-reach in any slot
- Easy servicing and replacement of defective optics
- Deploying future better/cheaper modules on the same line card

It is likely that on-board or co-packaged optics will be needed for the generation of post 800G interconnects.
Initial Key Milestones of the MSA

MSA preparation
2019/Aug

• Promoters Contact and Selection
• Agreement Signature

Announcement at CIOE & ECOC
2019/Sep

• Announcement of the MSA Establishment

Spec 1.0
2020/Q4

• Spec 1.0 version release

First prototypes of 800G pluggable subcomponents targeted for ca. Q4/2021
MSA Members

Promoters
• Establish and operate the MSA consortium
• Raise technical proposals
• Right to vote

Contributors
• Raise technical proposals

Who can join
• All relevant industrial partners incl. OTTs, service providers, system suppliers, optical/electrical component and module suppliers, integrated circuit manufacturers, etc.

List of promoters
- China Telecommunication Technology Labs
- HUAWEI
- H3C
- Accelink
- Hisense
- Luxshare ICT
- Sumitomo Electric
- Yamaichi Electronics
- Tencent

Components
- E-connector
- Industry Institutes
- OTT/Telco
- System
- Modules
Welcome to join the 800G Pluggable MSA

Contact: Dr. Hua Zhang
zhanghua8@hisense.com