



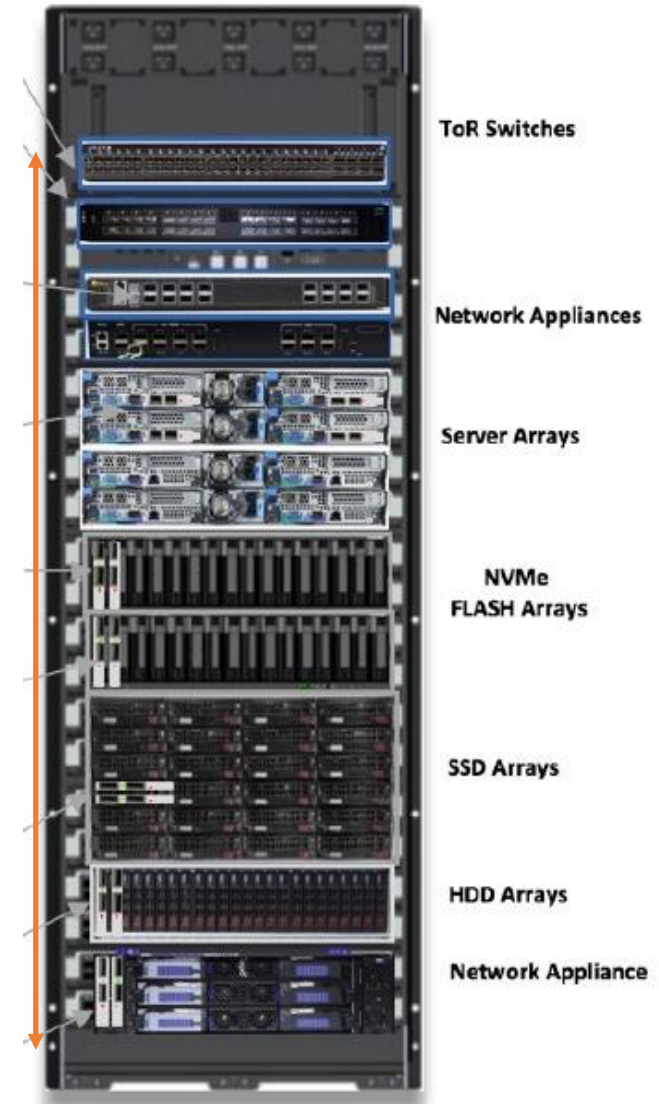
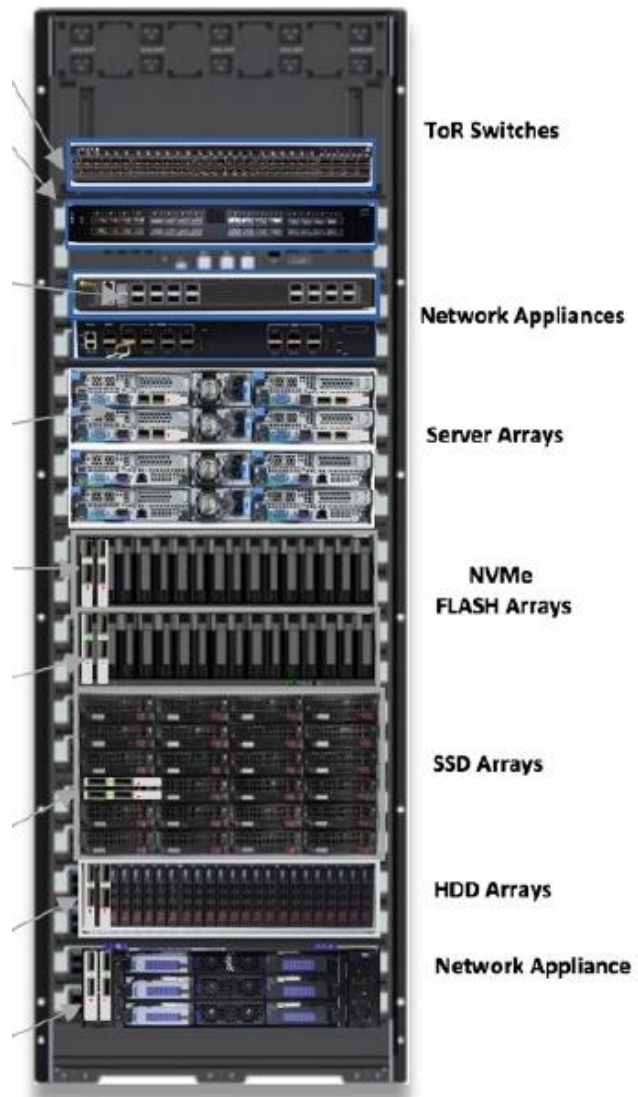
High Speed General Information

Chant Sincere Co., Ltd.

詮欣股份有限公司

2018/2/9 CCL

Server Rack



Outline



高速伝送コネクタ

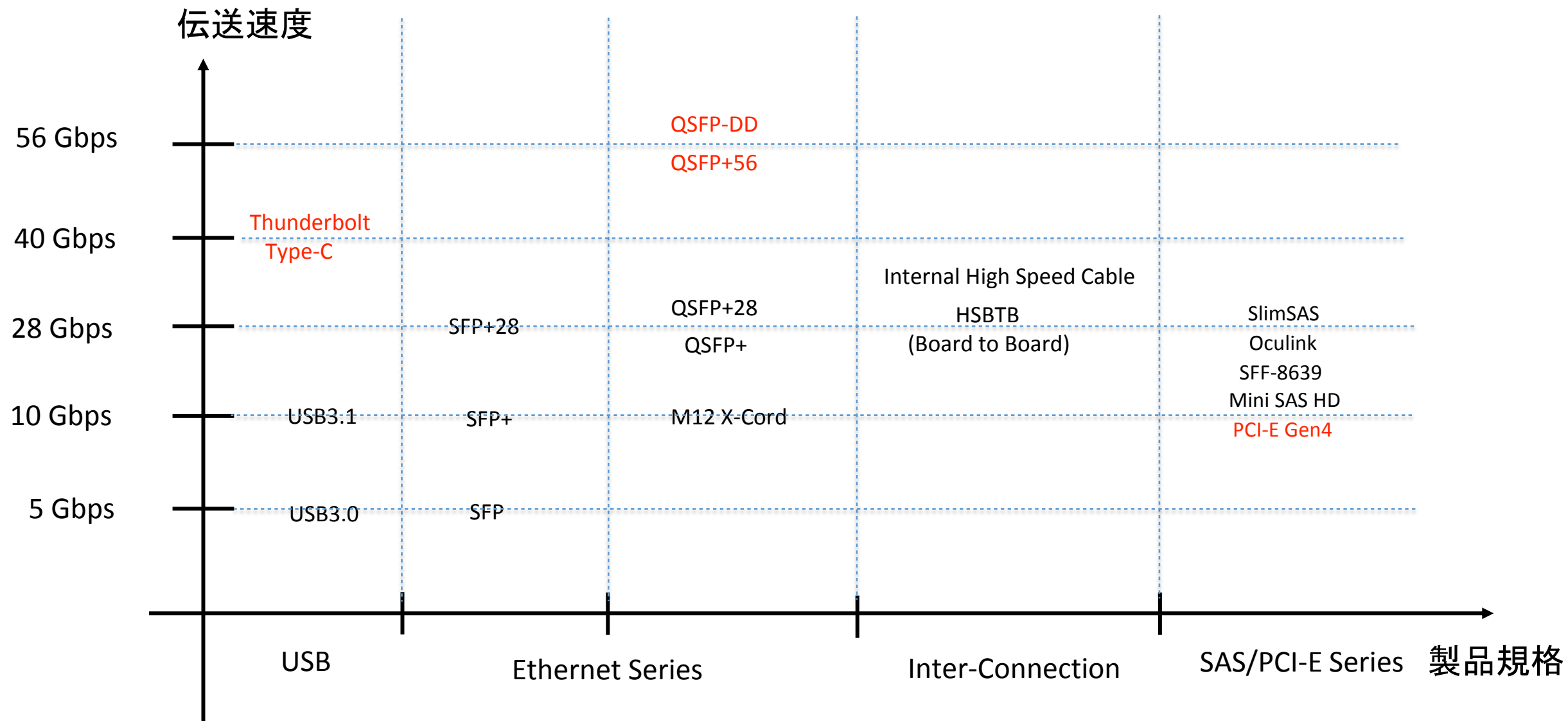
製品紹介

How to Choose

Application

EDM

伝送規格と伝送速度について



CAT 5 の需要はまだまだ続きます



“25G is the new 10G”

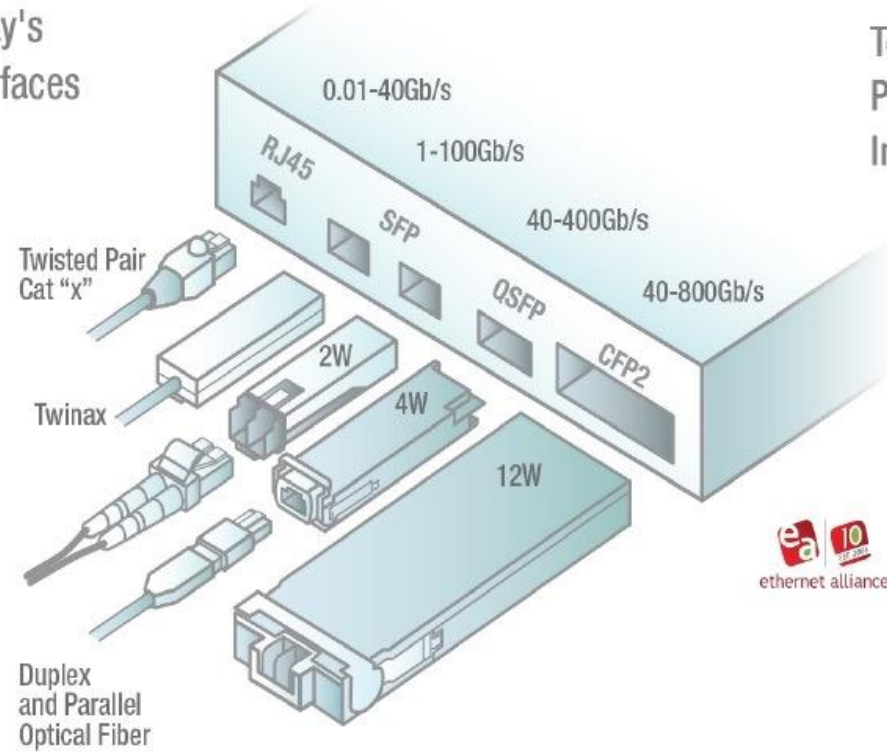
“100G is the new 40G”

次世代のコネクタは？

次世代インターフェイスの可能性

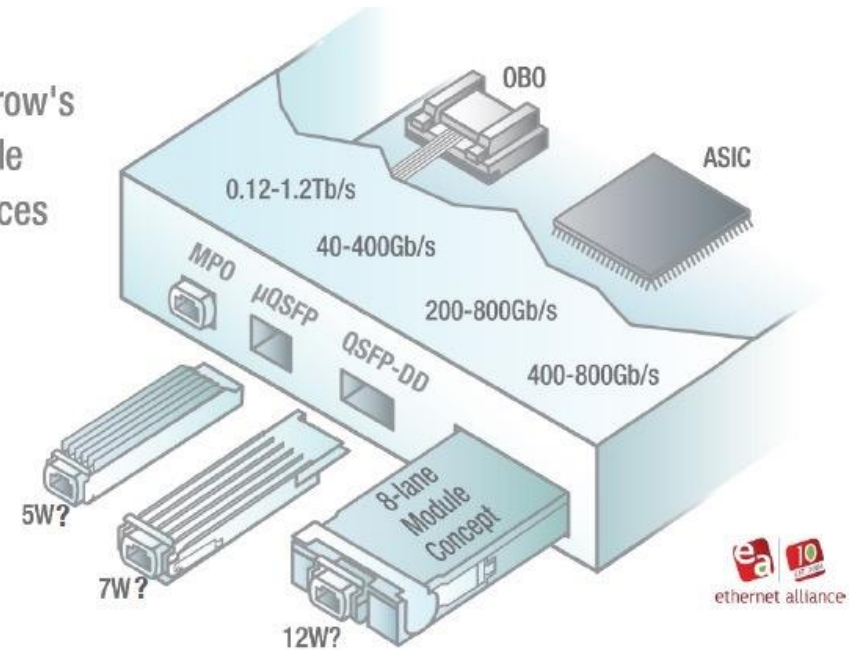


Today's
Interfaces



SOURCE: WWW.ETHERNETALLIANCE.ORG/ROADMAP

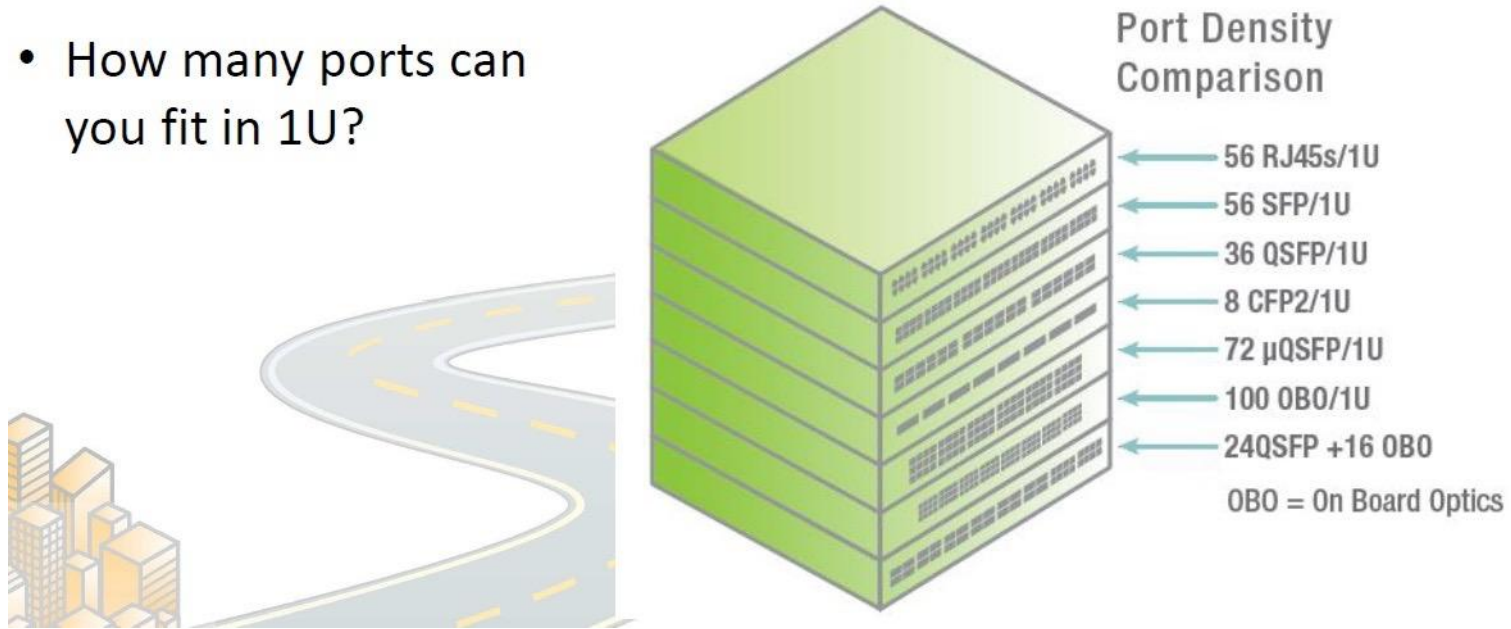
Tomorrow's
Possible
Interfaces



CFP8
OSFP
And CDFP

5

- How many ports can you fit in 1U?



誕生	名稱	光模塊	板端	訊號對	資料量	Pin數	Cable 功率	1RU端 口數	1RU總資 料量
2014	CDFP			16	16x25Gbps	120	10W max.	11	4.4Tbps
2017	CFP8			16	16x25Gbps-NRZ 8x50Gbps-PAM4	124	18W max.	18	7.2Tbps
2017	QSFP-DD			8	8x25Gbps-NRZ 8x50Gbps-PAM4	76	12W max.	36	14.4Tbps
2017	OSFP			8	8x25Gbps-NRZ 8x50Gbps-PAM4	60	15W max.	32	12.8Tbps

BOM Costs are Almost the Same;

40G (4x10G)

SR4, AOC, CWDM4, LR4



4-lasers
Laser Driver

4 Detectors
Detector Amplifier

PCB
Power controller
Microcontroller
QFP shell

MPO optical connector
8-Multi-mode fibers

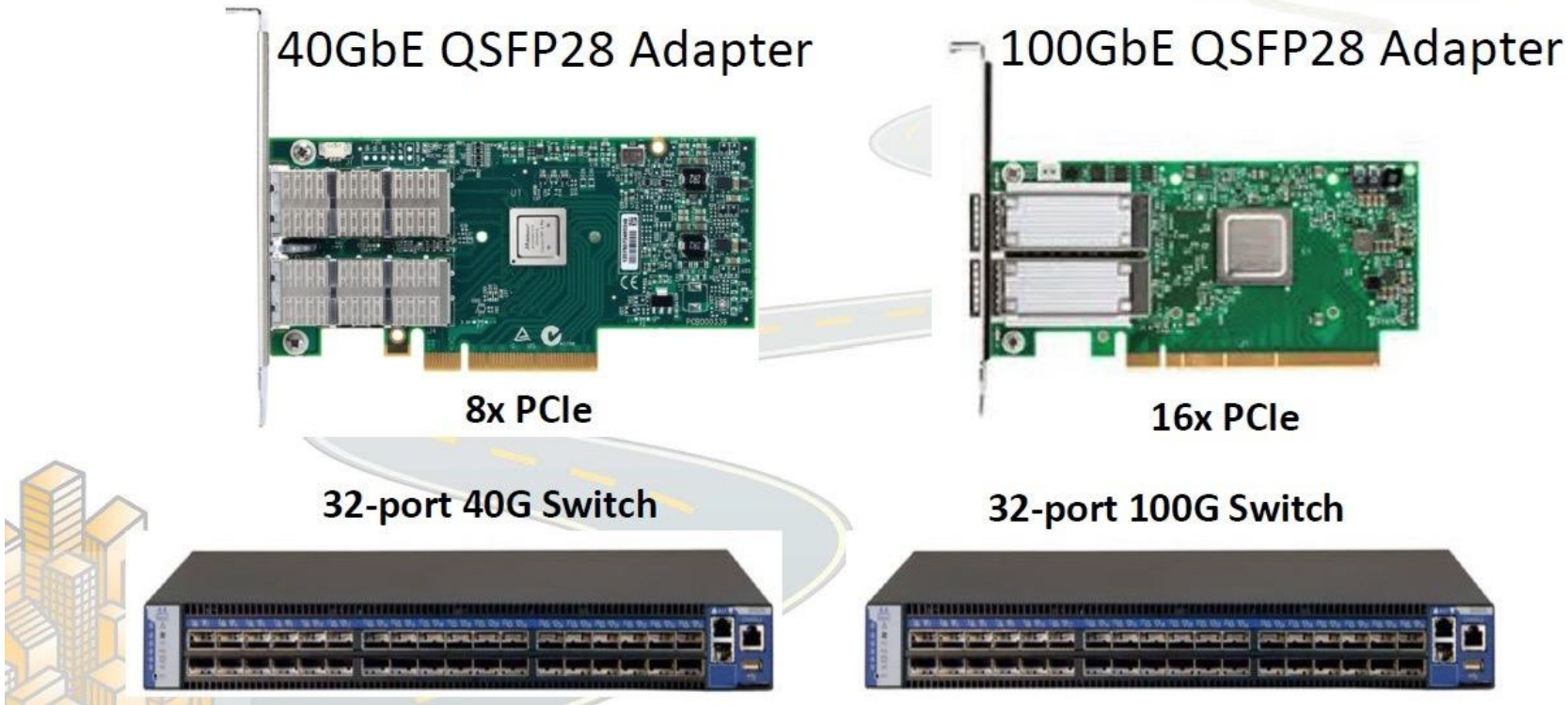


100G (4x25G)

SR4, AOC, CWDM4, LR4



Switches & Network Cards –Almost the same BOM costs



Unit	Dimension (W x H x D)
1U	19" x 1.75" x 17.7" 19" x 1.75" x 19.7" 19" x 1.75" x 21.5"
2U	19" x 3.5" x 17.7" 19" x 3.5" x 20.9" 19" x 3.5" x 24"
3U	17.1" x 5.1" x 25.5"
4U	19" x 7" x 17.8" 19" x 7" x 26.4"
5U	19" x 8.34" x 19.67" 19.1" x 8.75" x 26.4"
6U	19" x 10.5" x 19.5"
7U	17" x 12.2" x 19.8"

➤ 25GbE vs. 10GbE

- ◆ 2.5x BW at 1.5x the price
- ◆ Compatible with 10GbE

➤ 50GbE vs. 40GbE

- ◆ 1.25x BW at same price
- ◆ Half the lanes/fibers
- ◆ 2x switch port density

➤ 100GbE for switch links

- ◆ 60% fewer uplinks

Same optical cable supports 10 and 25GbE



Typical new generation switch

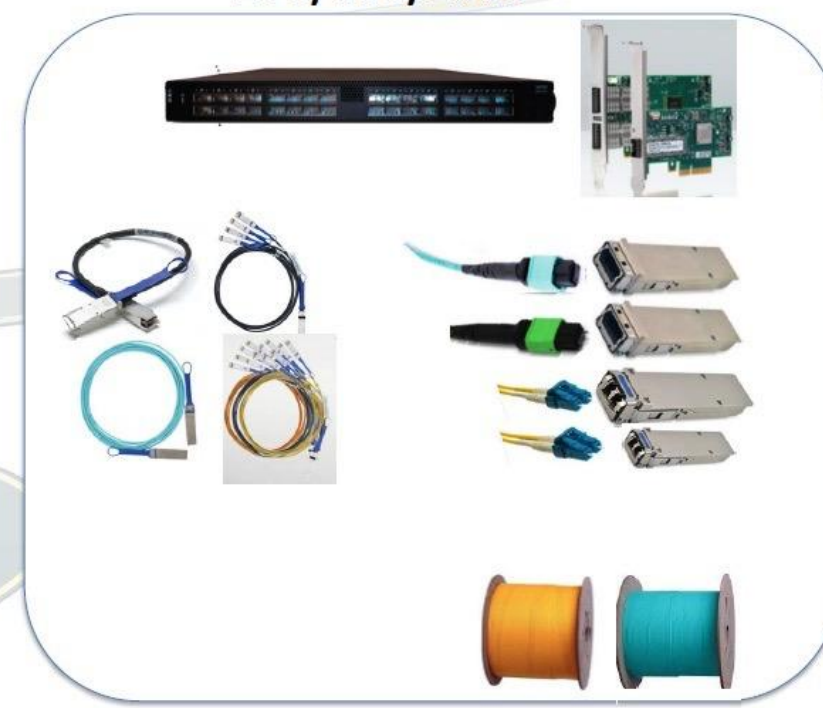
- Up to 32 ports at 40/100GbE
- Up to 64 at 50GbE (with breakout cables)
- Up to 128 ports at 10/25GbE (with breakout cables)

2.5X Speed/Bandwidth with Minimal Infrastructure Impact

10G/40G



25G/50G/100G



Cables

DAC



3m

AOC



<30m

Transceivers

Multi-mode
VCSEL Laser
GaAs

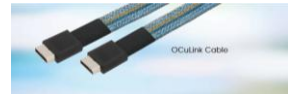
Single-mode
FP, DFB or Ext Modulated Laser
InP, PLCs, Silicon Photonics



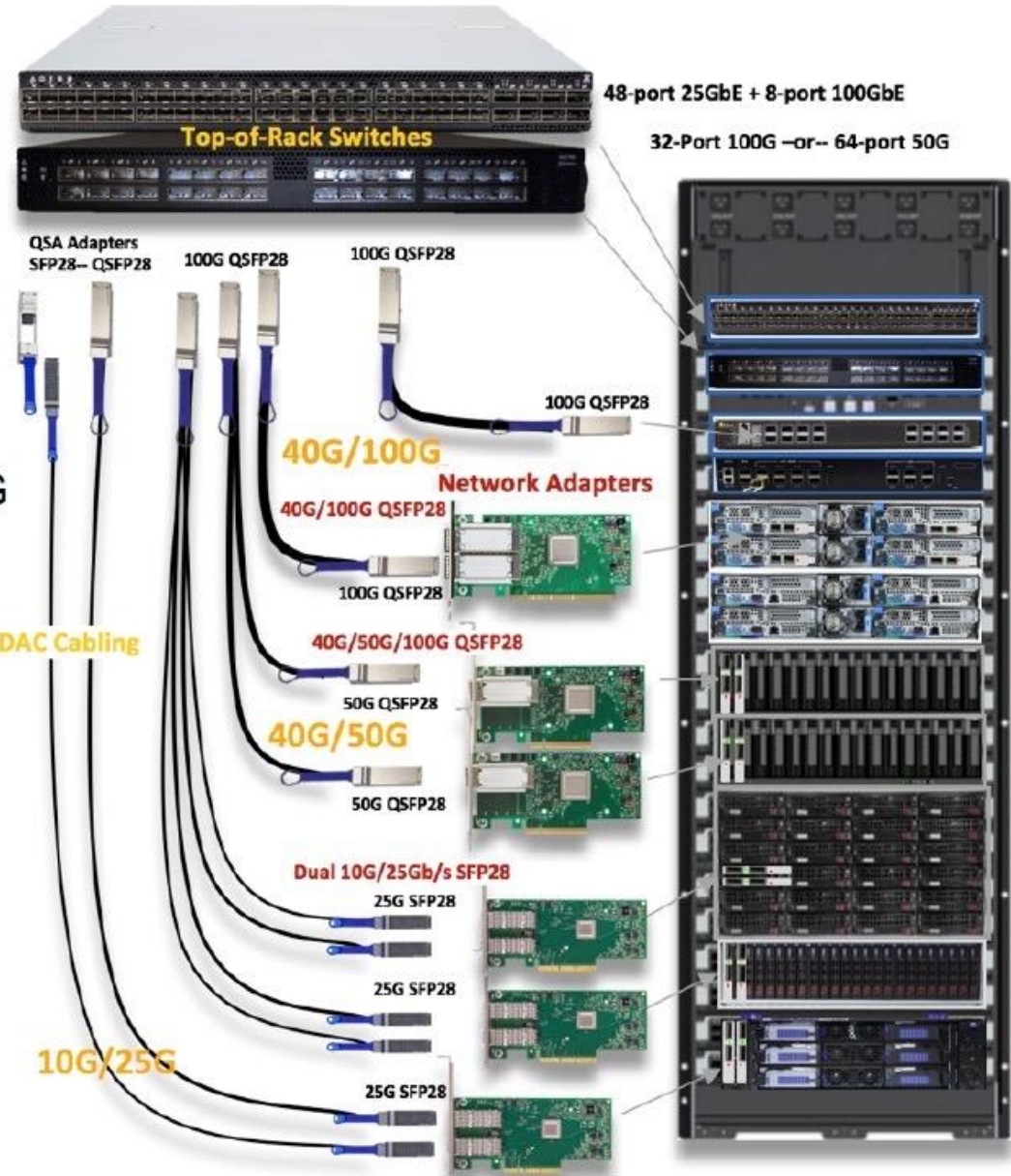
<100m

2Km, 10Km

項次	1	2	3	4	5	6	7	8	9	10	11	12	13	13	14	15	16
産 品	Mini SAS 4i cable	Mini SAS 8i cable	Mini SAS 4x cable	Mini SAS HD 4i cable	Mini SAS HD 8i cable	Mini SAS HD 4x cable	Mini SAS HD 8x cable	U.2 cable	Slimline 8i cable	Slimline 4i cable	SFP+ cable	SFP28 cable	10G QSFP+ cable	14G QSFP+ cable	QSFP28 cable	OCuLink 4i cable	HSBTB cable
Date Rate	6Gbps	6Gbps	6Gbps	12Gbps	12Gbps	12Gbps	12Gbps	12Gbps	24Gbps	24Gbps	10Gbps	28Gbps	40Gbps	56Gbps	112Gbps	24Gbps	28Gbps
SPEC.	SFF-8087	SFF-8087	SFF-8088	SFF-8643	SFF-8643	SFF-8644	SFF-8644	SFF-8639	SFF-8654	SFF-8654	SFF-8432	SFF-8432	SFF-8661	SFF-8661	SFF-8661	SFF-8611	
Pin No.	36	68	26	36	72	36	72	68	74	38	20	20	38	38	38	42	40 / 80 / 120 60 / 120 / 180
Pitch(mm)	0.8	0.8	0.8	0.75	0.75	0.75	0.75	1.27 / 0.8	0.6	0.6	0.8	0.8	0.8	0.8	0.8	0.5	0.5 0.8



DAC (intra the rack)



Unit	Dimension (W x H x D)
1U	19" x 1.75" x 17.7" 19" x 1.75" x 19.7" 19" x 1.75" x 21.5"
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Where Are DAC Links Used?



Up & Down the rack
Servers & Storage linked to
ToR Switches



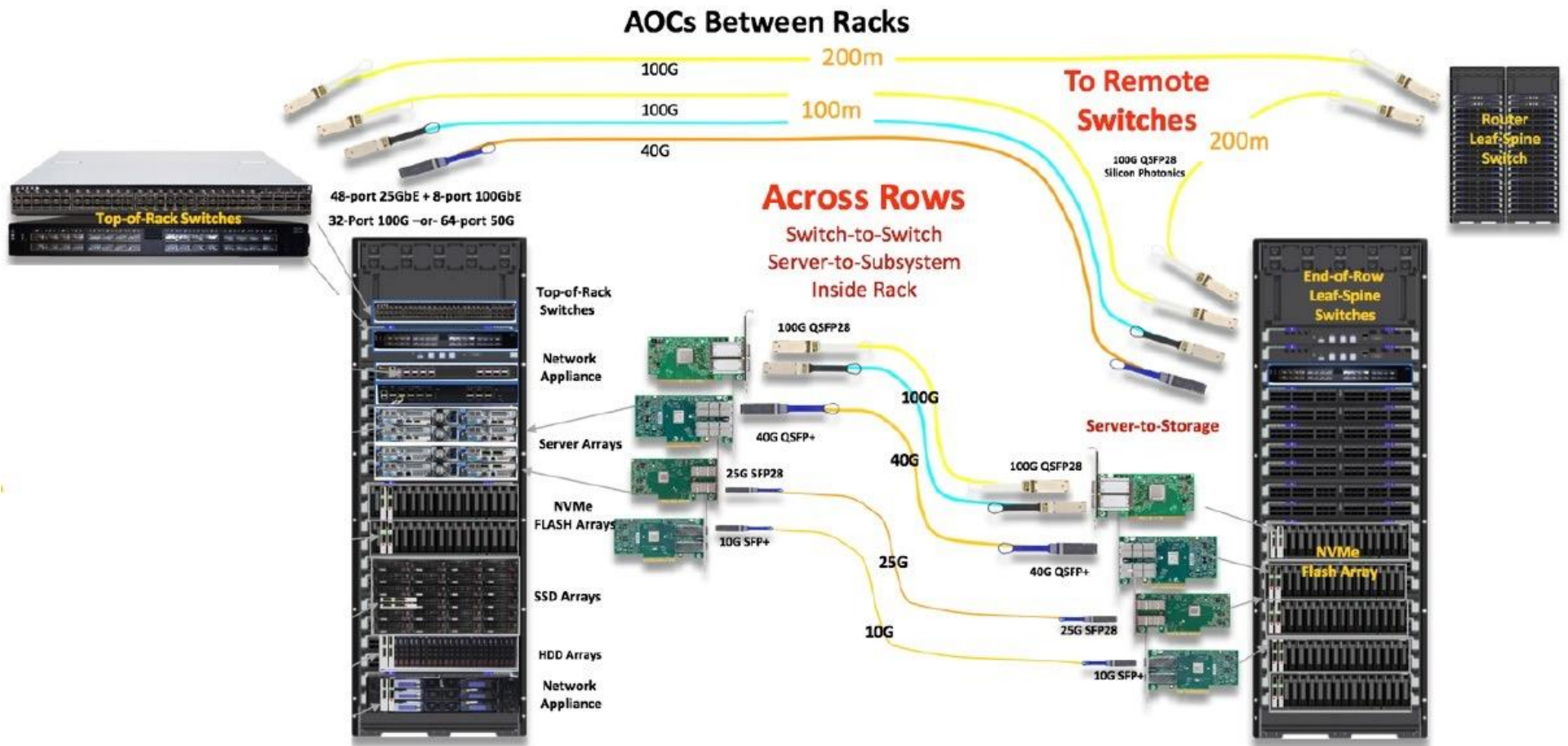
DAC
Up & down the
Rack.
Linking Servers &
storage to
Switches.

Hybrid breakout
cables



FLASH Storage

AOC (inter the rack)



Where AOCs Are Used?



AOC

Between Switches over short reaches <20m where access is easy (cable trays)



HPCs may use AOCs everywhere including up & down the rack

Where SR4/MPO Links Used?



Under the Floors
Requires optical connectors & SR4s



SR4 - To Optical Patch Panels



SR4 - Into Structured Cabling



PSM4 too

QSFP+DD / QSFP+56

QSFP+28 MP QSFP+DD MP (2021)



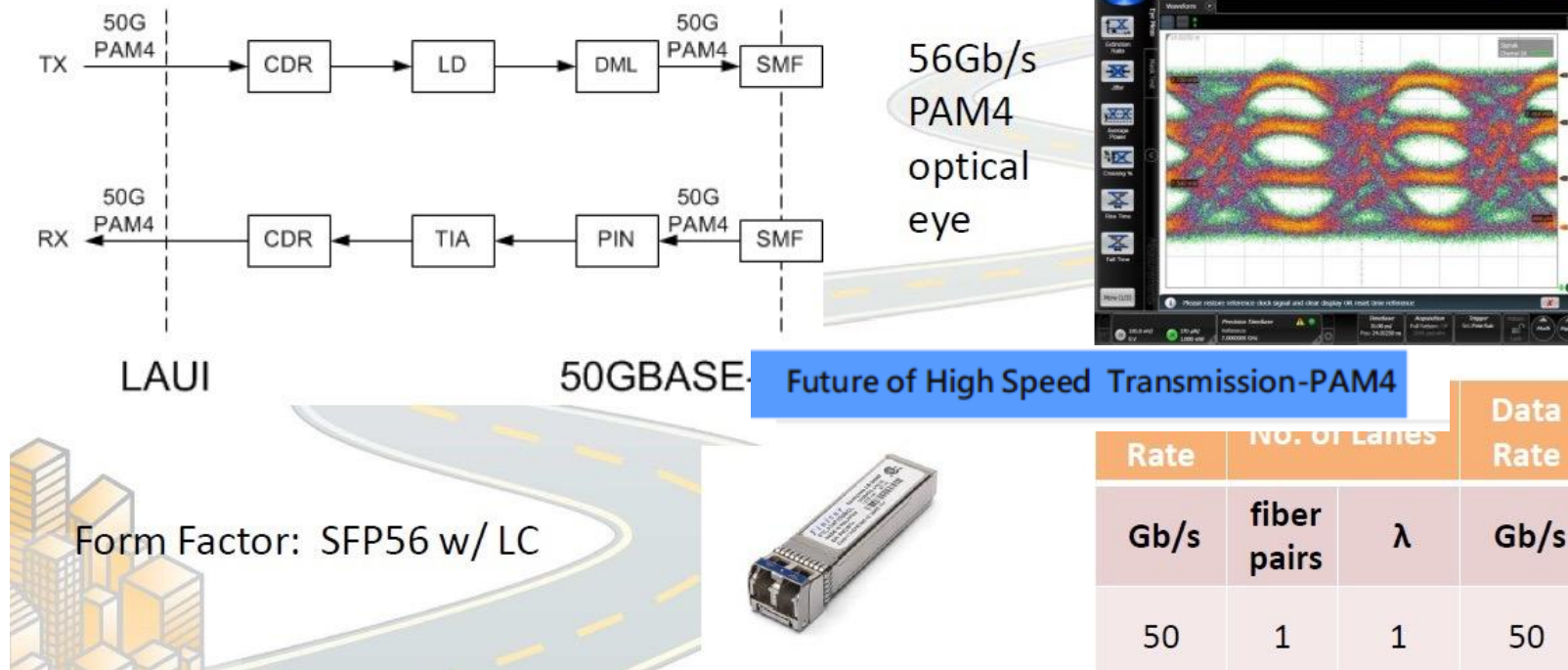
主要納入先：

Delta / Foxconn / Inventec / Compal /
Winstron / Pegatron / Broadcom

QSFP+28 Spec.
制定時間

QSFP+DD Spec.
制定時間

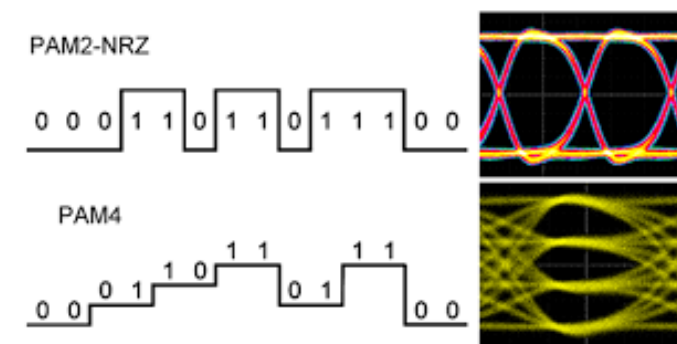
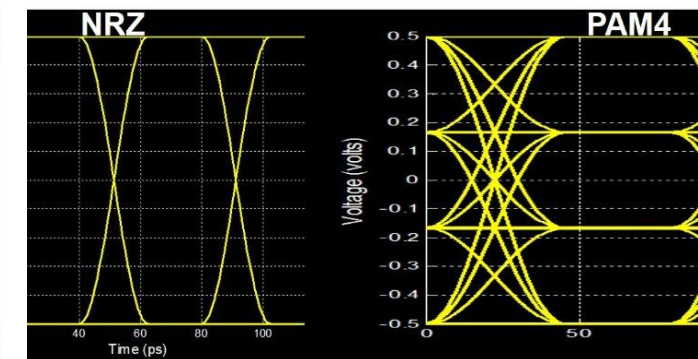
50G 1310nm SMF Optics



Future of High Speed Transmission-PAM4

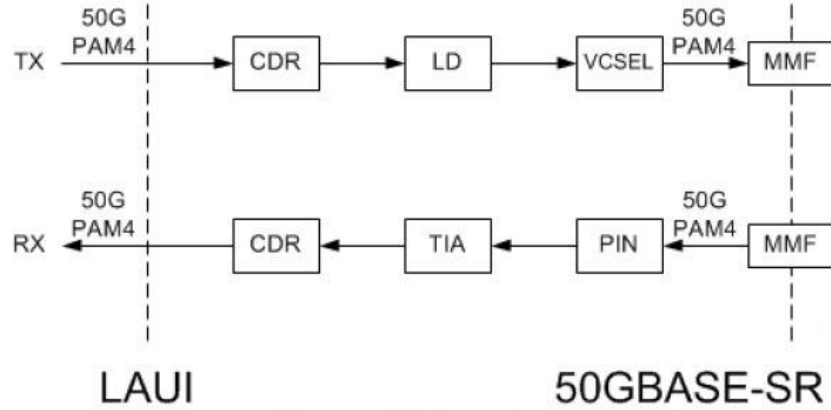
Rate	No. of Lanes		Data Rate
Gb/s	fiber pairs	λ	Gb/s
50	1	1	50

Comparison

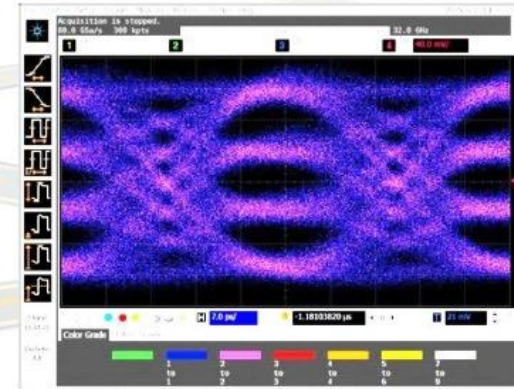


Module Type	# of I/O lanes	Electrical I/O	I/O Baud Rate	Module BW	Module Width (mm)
SFP+	1	10Gb/s-NRZ	10G	10Gb/s	13
QSFP+	4	10Gb/s-NRZ	10G	40Gb/s	18
QSFP28	4	25Gb/s-NRZ	25G	100Gb/s	18
QSFP56	4	50Gb/s-PAM4	25G	200Gb/s	18
QSFP-DD	8	50Gb/s-PAM4	25G	400Gb/s	18

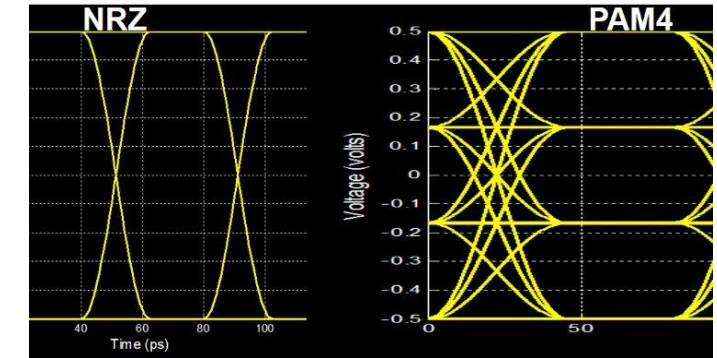
50G 850nm MMF Optics



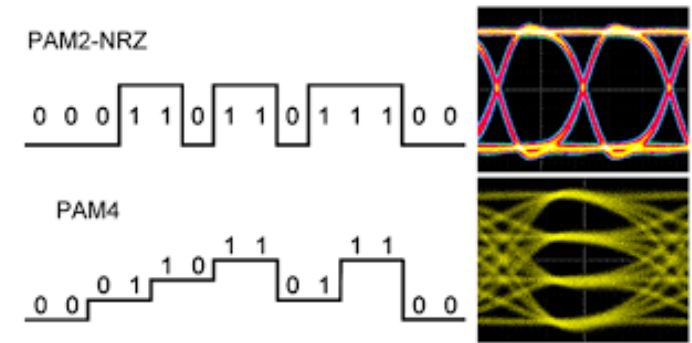
56Gb/s
PAM4
optical
eye



Lane Rate	No. of Lanes		Data Rate
Gb/s	fiber pairs	λ	Gb/s
50	1	1	50



Form Factor: SFP56 w/ LC

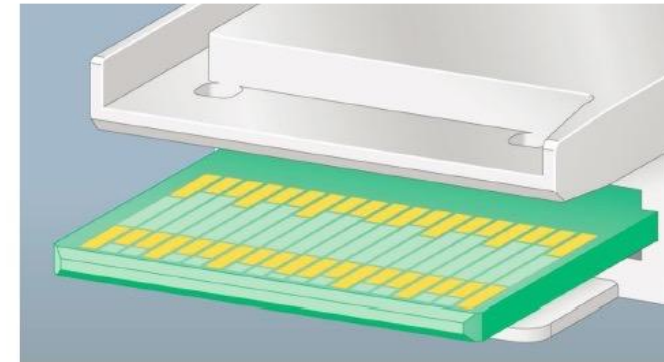
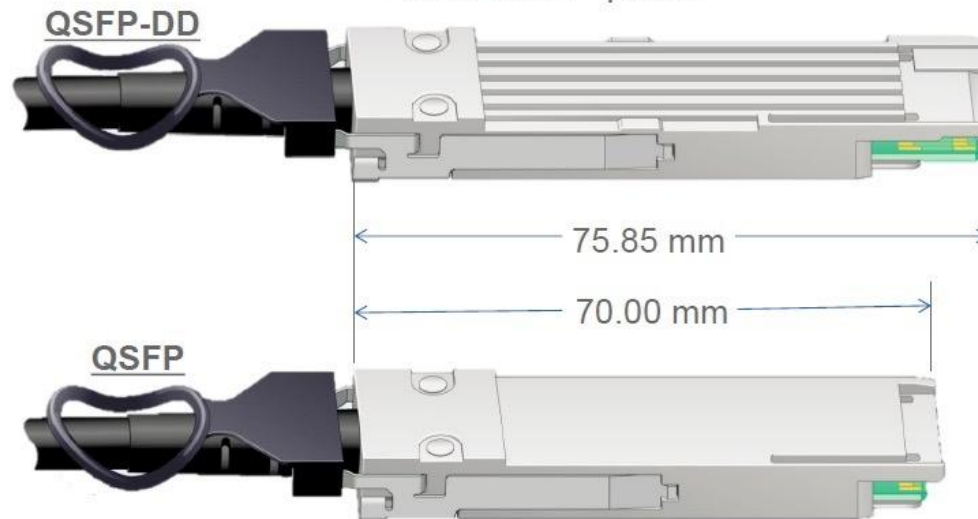


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QSFP28	4	25Gb/s-NRZ	25G	100Gb/s	18
QSFP56	4	50Gb/s-PAM4	25G	200Gb/s	18
QSFP-DD	8	50Gb/s-PAM4	25G	400Gb/s	18

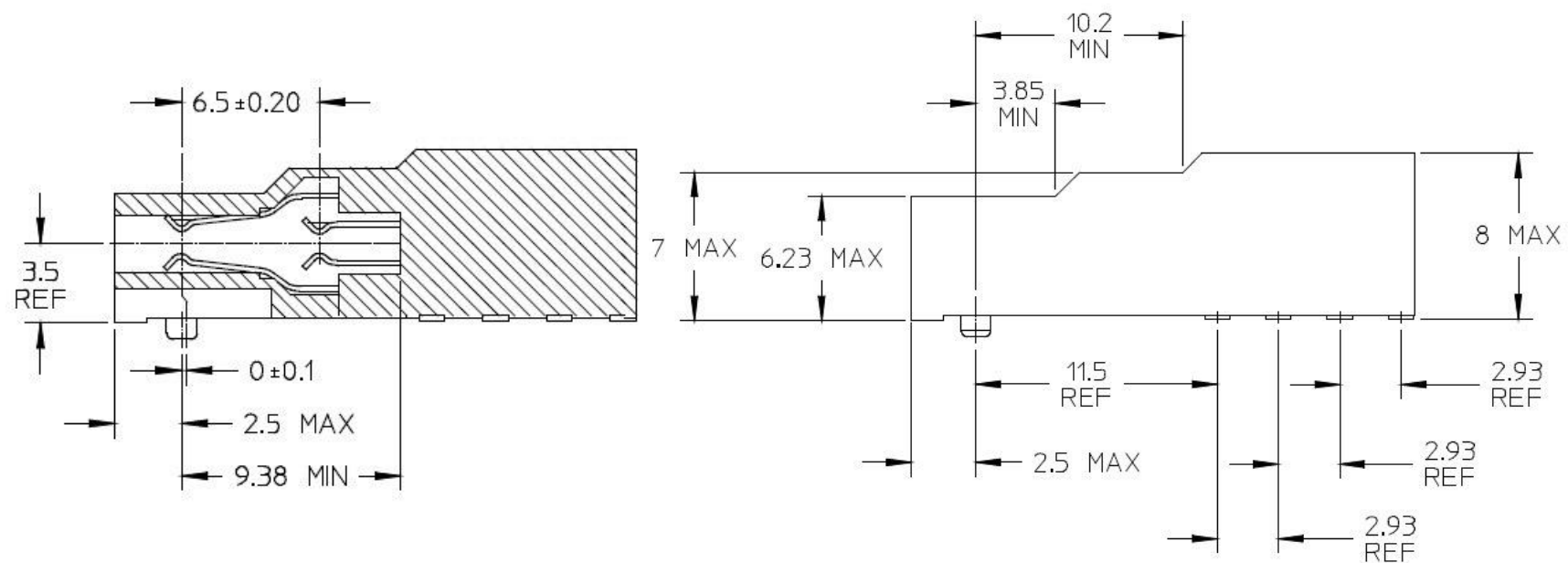
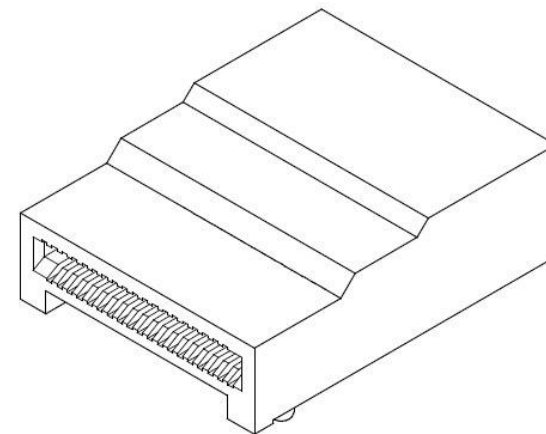
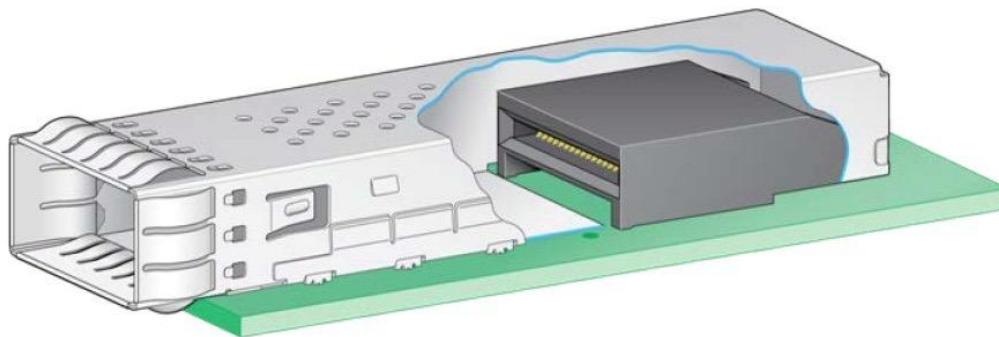
次世代アイテム

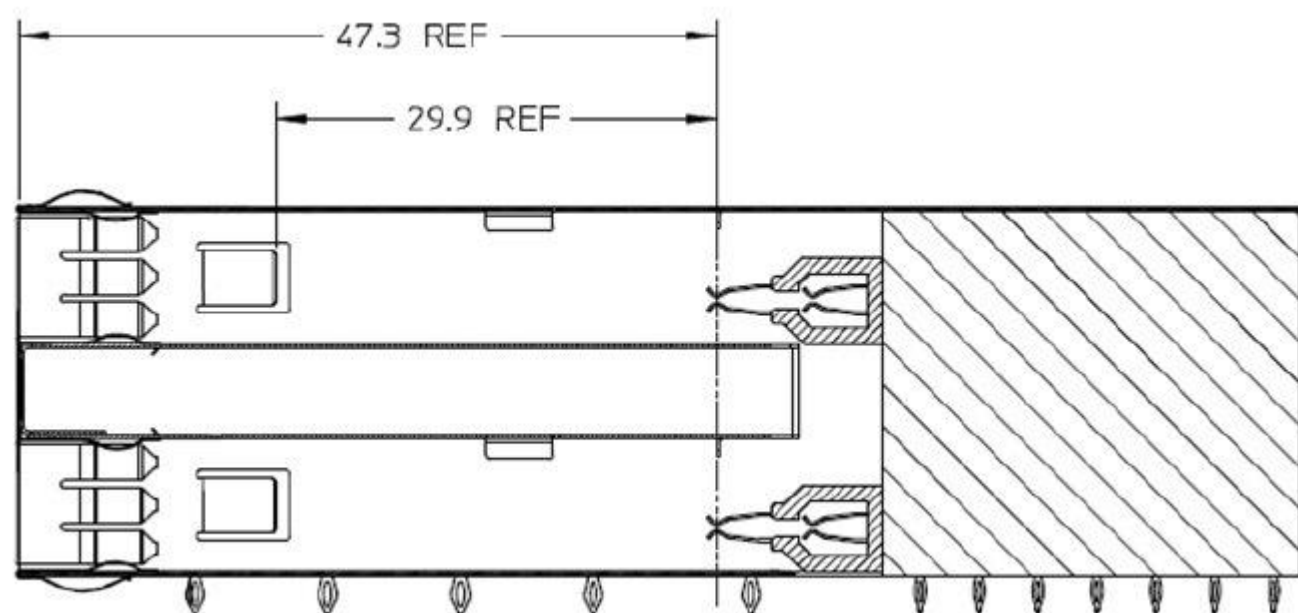
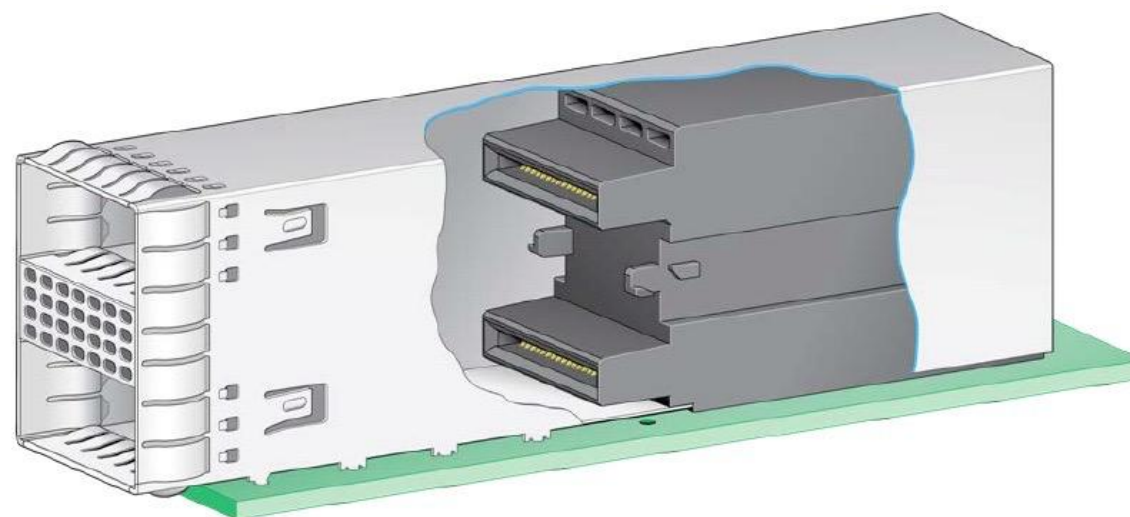
QSFP-DD

Improved thermal supports
>2.5x QSFP power



Essentially the same as QSFP
but with extra row of contacts.
Allows boards to be backwards
compatible to both.





QSFP-DD

Supports 8 electrical IO

- 8x50G (CDAUI) → 400 GbE, 8x 50GbE
- Dual 4x25G (CAUI) → 2x 100 GbE

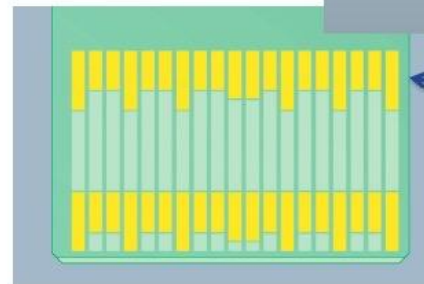
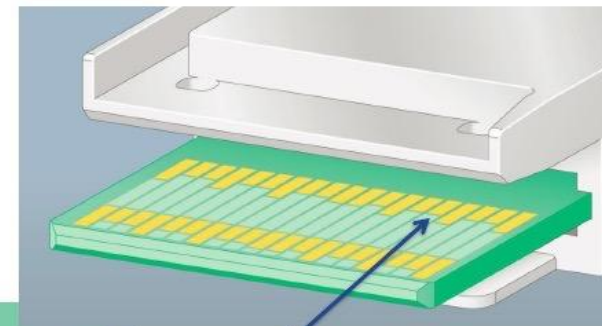
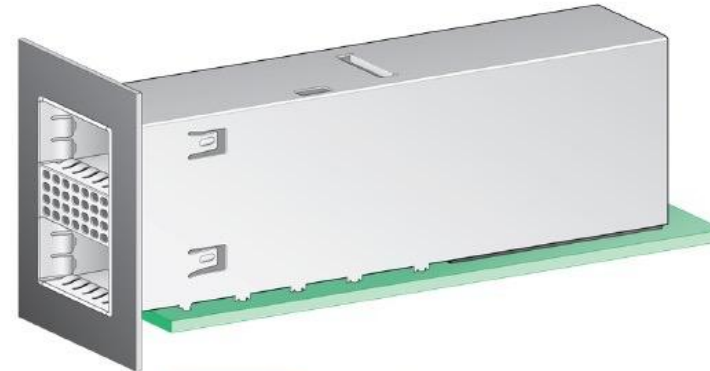
Host System fully backwards compatible to QSFP

Cooling/Thermal improvements enable up to 10W

- Advanced 2x1 cage design

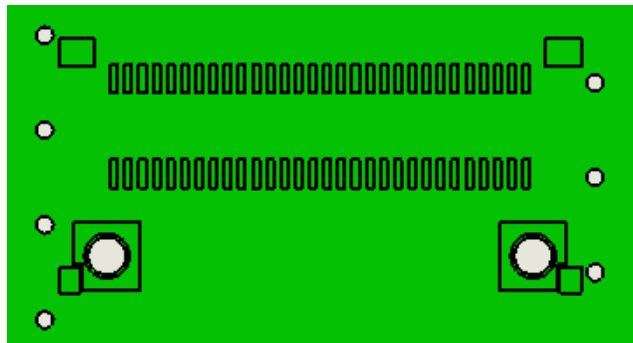
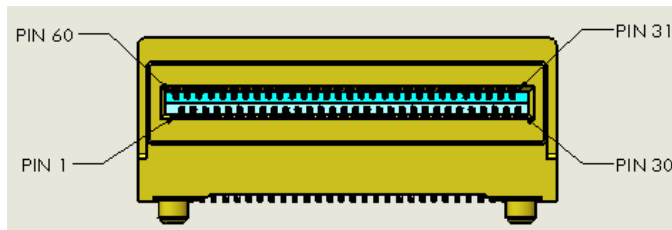
MSA has been announced

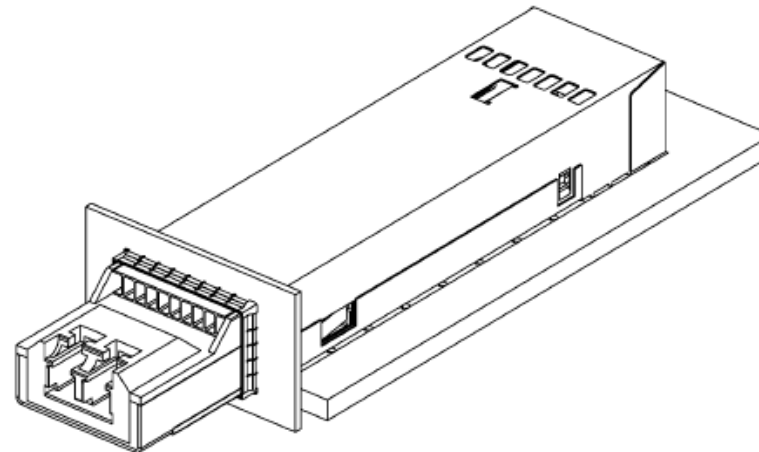
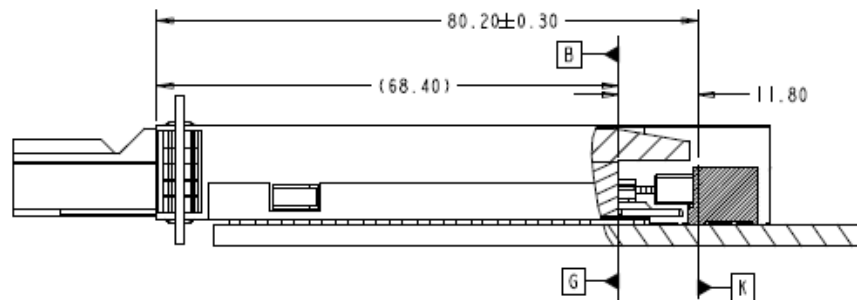
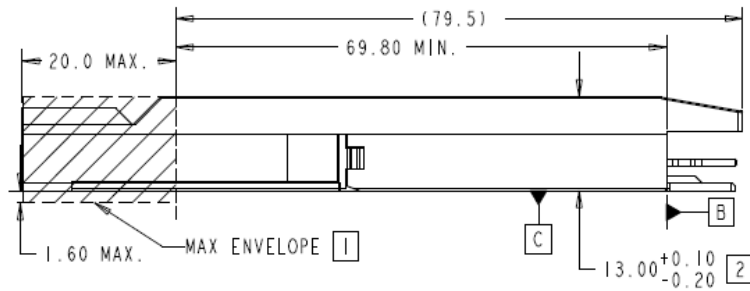
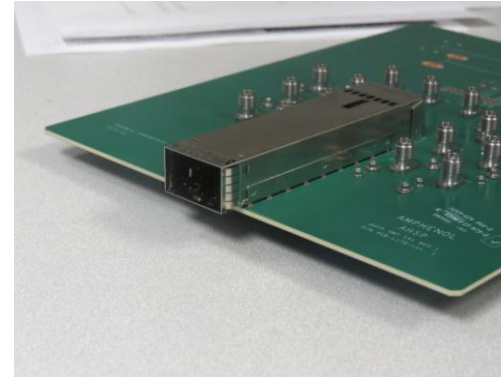
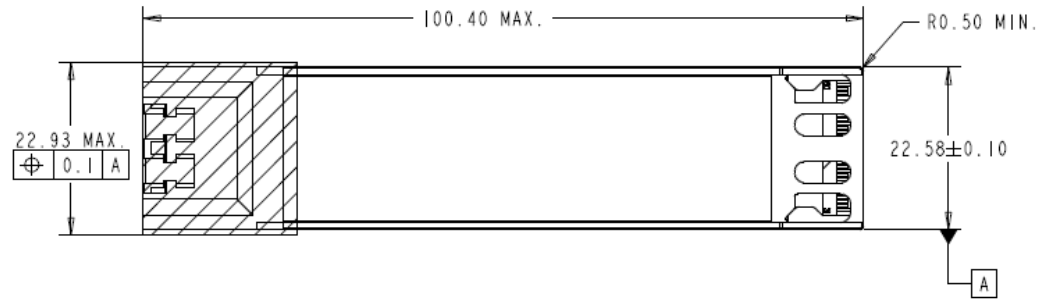
- 13 founding companies
- Spec under development



Original QSFP
contacts

- ・ 8ペア信号, 8x25Gb/s NRZ 、 8x50Gb/s PAM-4
- ・ 1ポート当たり60ピン／ 16 種ペア, 4 制御端子、4 電源端子
- ・ 1ポート当たり最大15W
- ・ ヒートシンクー体型モジュールハウジング





- ・ バックツーフロント・エアフロー冷却システム
- ・ インピーダンスレンジ(右側)
- ・ OSFP モジュールから QSFP への放熱シミュレーション及びエアフロー

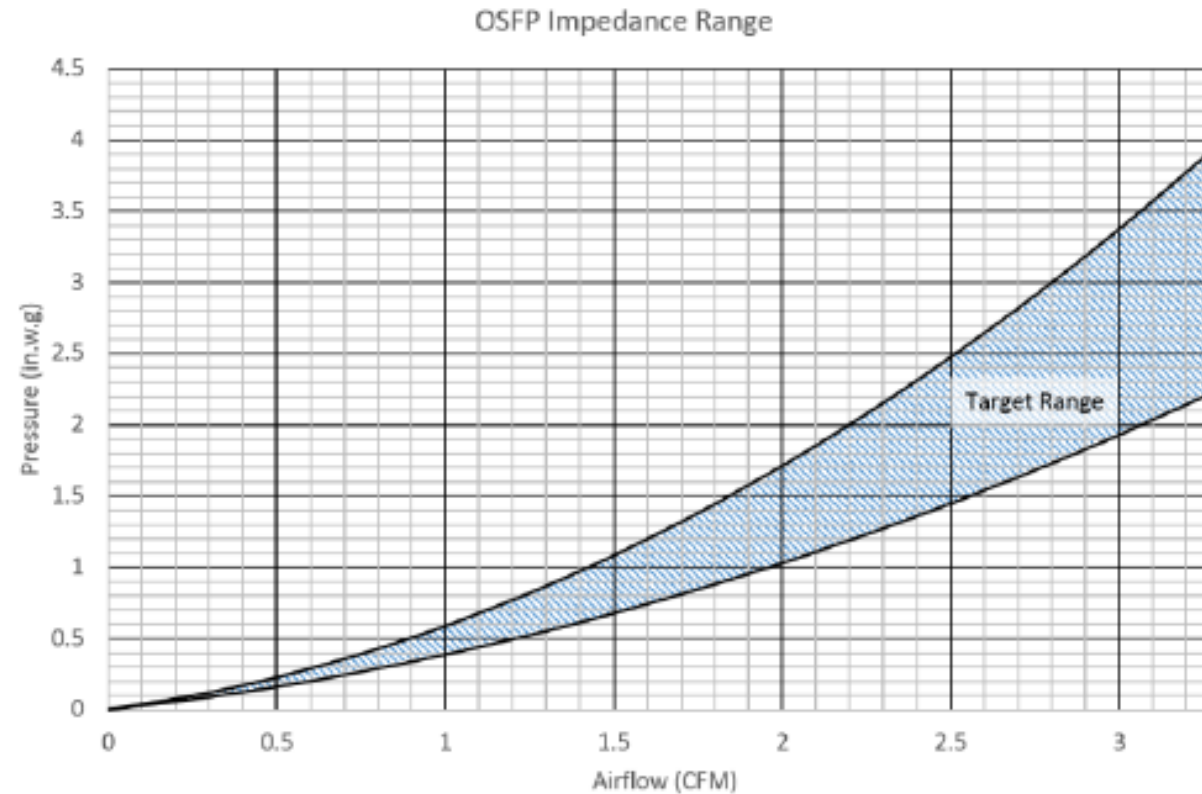
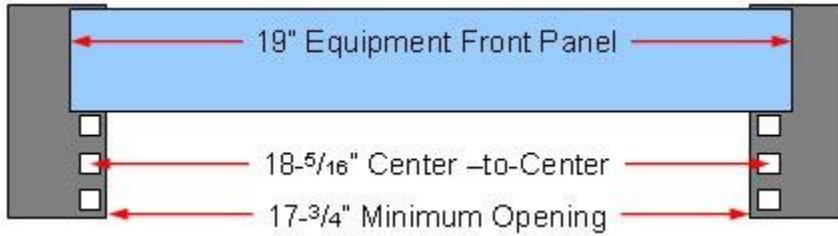


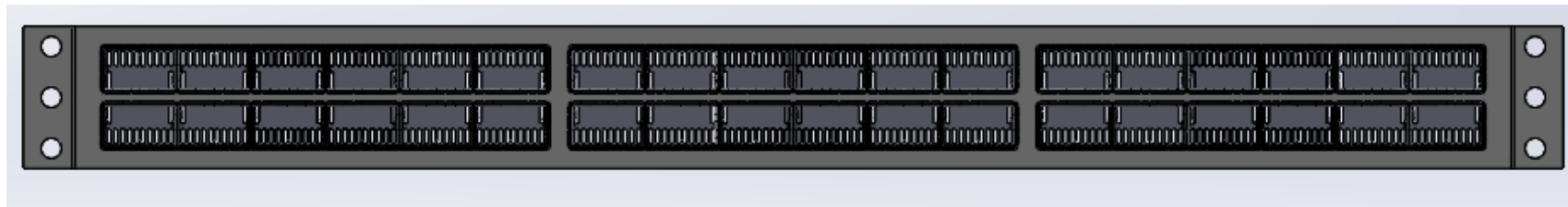
Figure 29: Target range of impediment to airflow of an OSFP module



EIA spec for 1RU



32 ports, OSFP 28(25)/56(50)G 4-1X4 belly to belly



36 ports, OSFP 28(25)/56(50)G 3-1X6 belly to belly

1. 次世代主要高速伝送コネクタは200G NRA もしくは400G PAM4へ
2. クラウド化により新インターフェイスは高いコストをもたらします。
3. QSFP-DD の互換性により、市場へ高い満足度を提供することが出来ます。

The image features a hand holding a small globe. Inside the globe, a city skyline and a green tree are visible. An airplane is flying in a circular path around the globe. The background shows a cityscape with smoke rising from buildings, suggesting environmental issues. A large blue circle on the right contains the text 'Thank you' and 'CHANT SINCERE CO.,LTD'.

Thank you

CHANT SINCERE CO.,LTD