



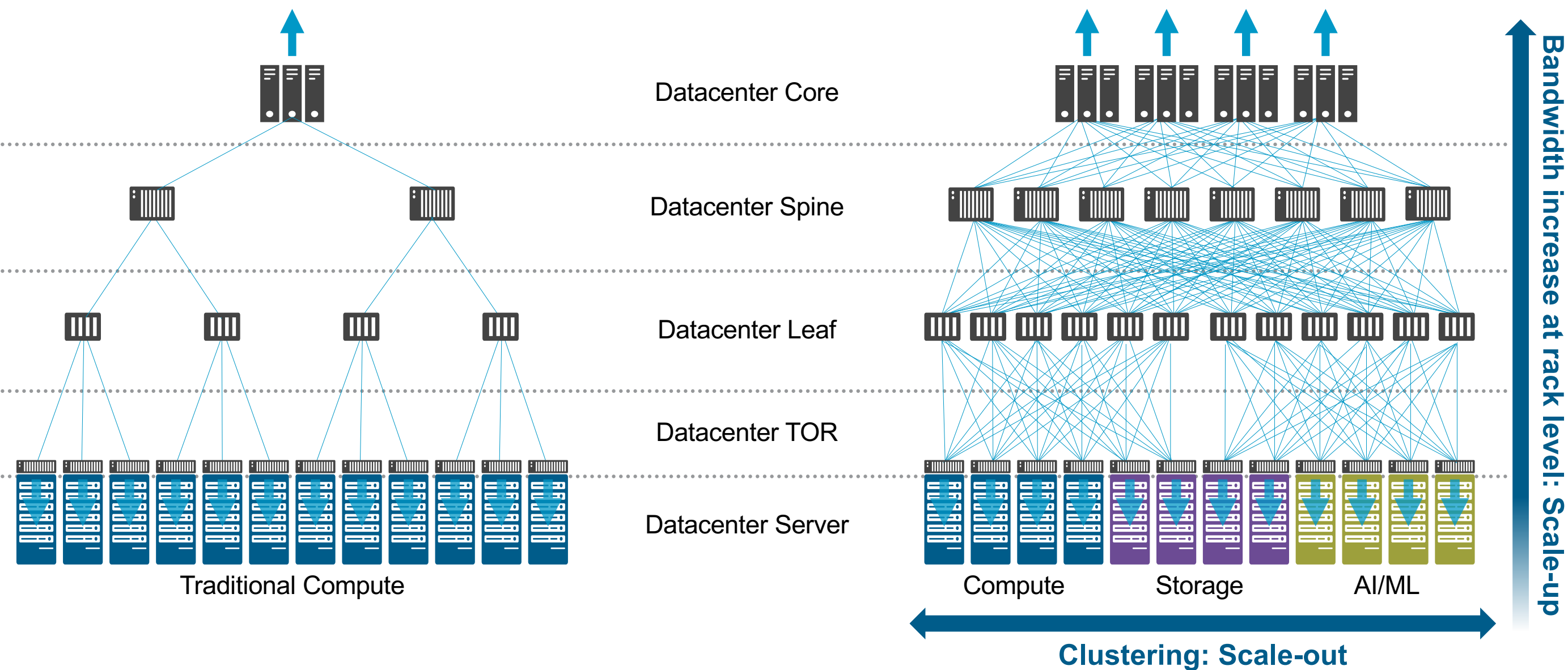
SiPh Chipllets In Package (SCIP)

Optical Systems Division (OSD)

November 2021

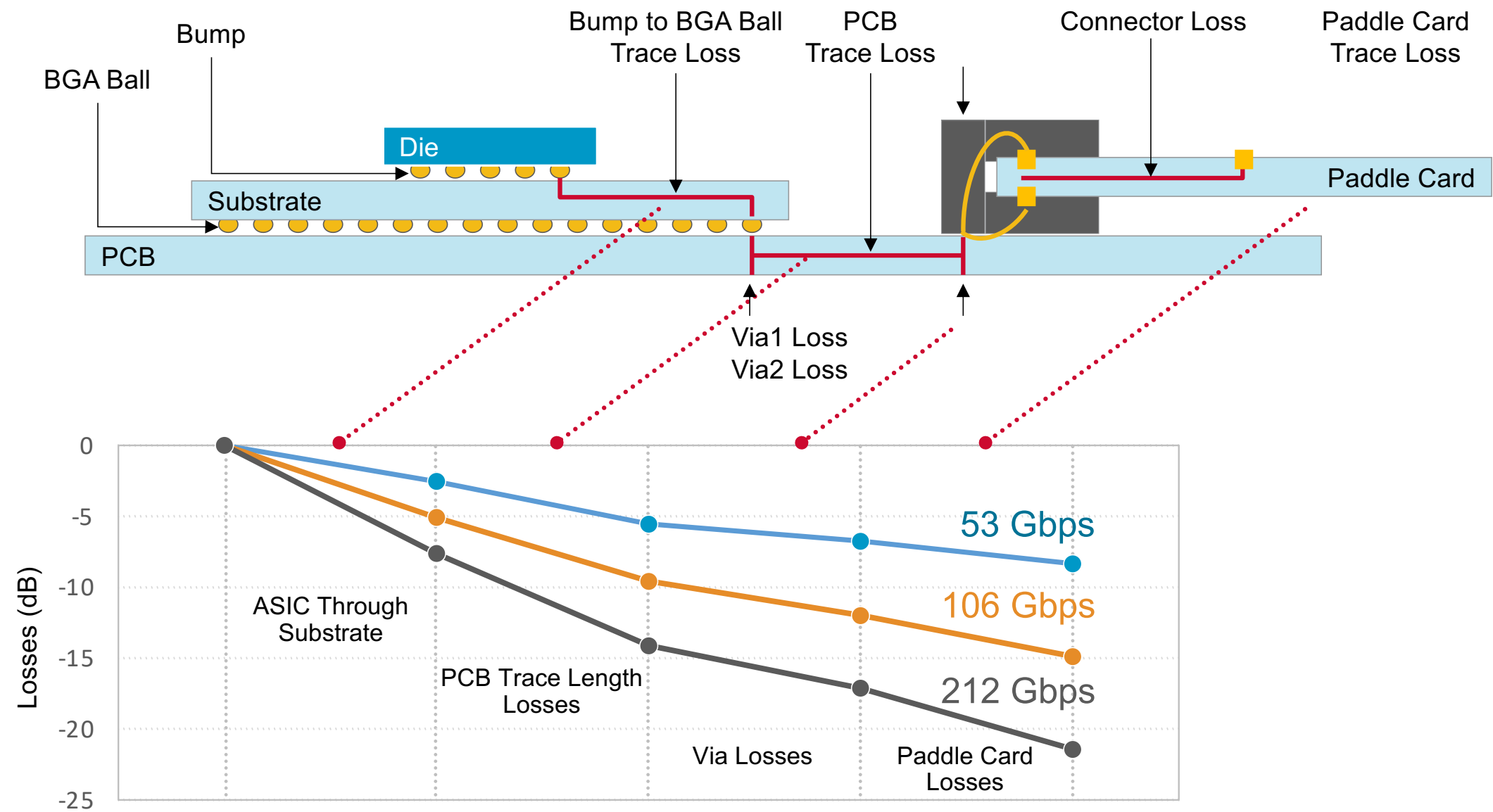


As data centers scale-out and scale-up.....

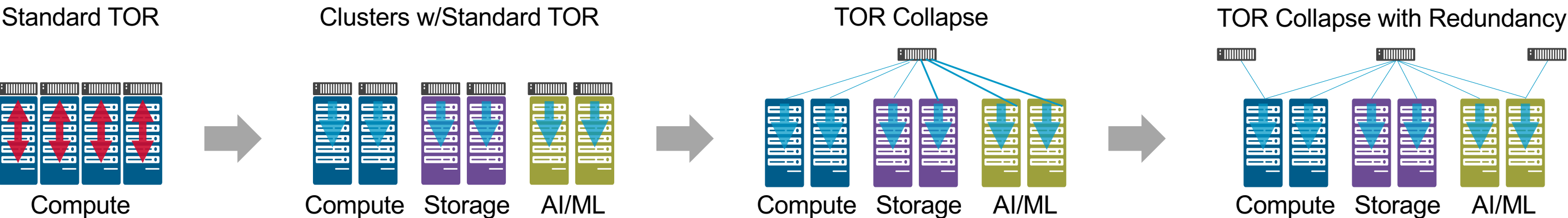


Resource utilization drives resource pooling and new connectivity and data movement paradigms

...and copper I/O approaches a reach limit...



...optical connectivity enables new architectures



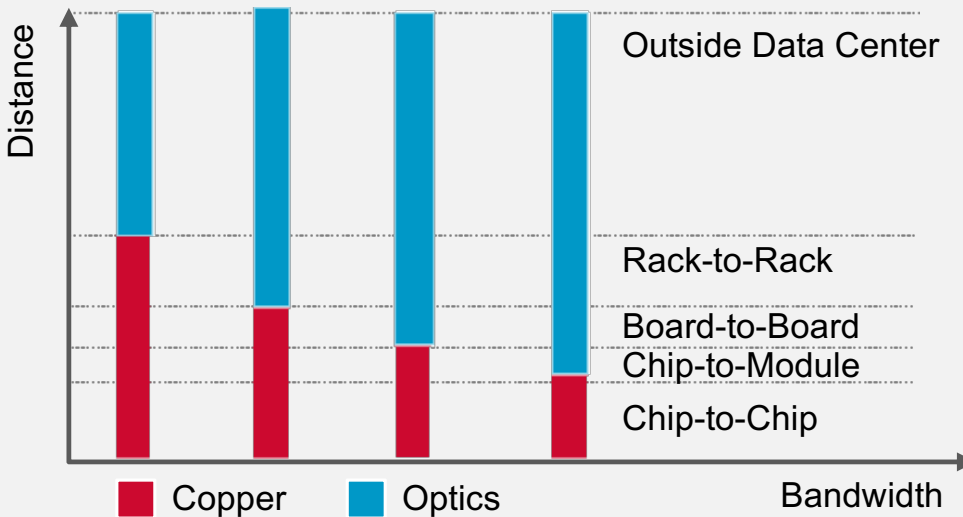
↓ Latency
50%¹

↓ Power
66%²

↑ Redundancy
2x – 4x

1. Internal Broadcom estimate

2. <https://www.youtube.com/watch?v=w1J9SW62Znl>

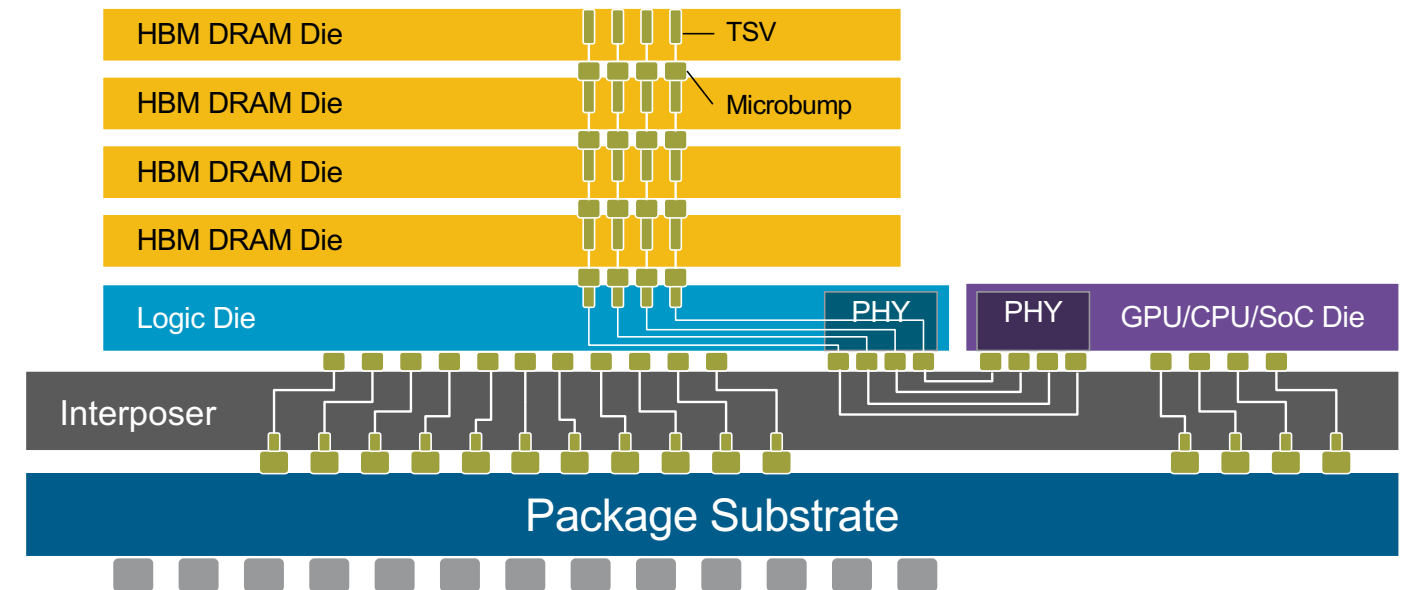


Expansion of east-west connectivity drives a transition from copper to optical

Introducing SCIP: Silicon Photonics Chipllets In Package

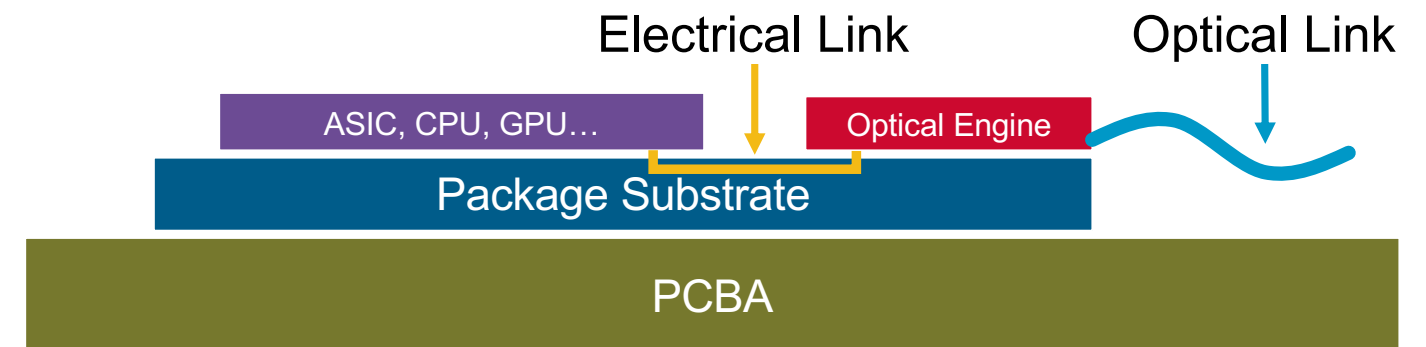
Co-Packaging

- Integration of **multiple dies** on a common package substrate
- High volume use cases today like HBM



SCIP: Co-Packaged Optics

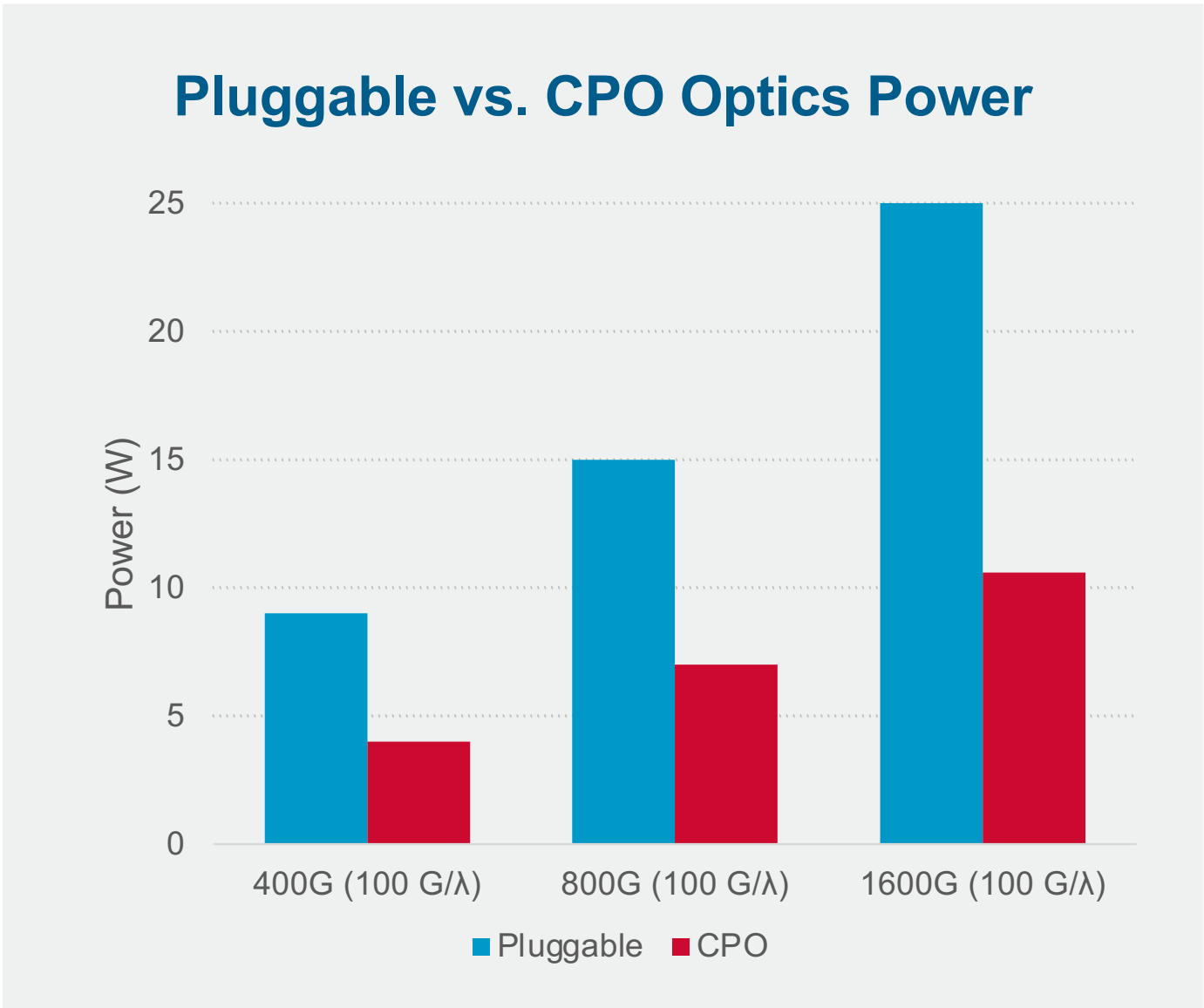
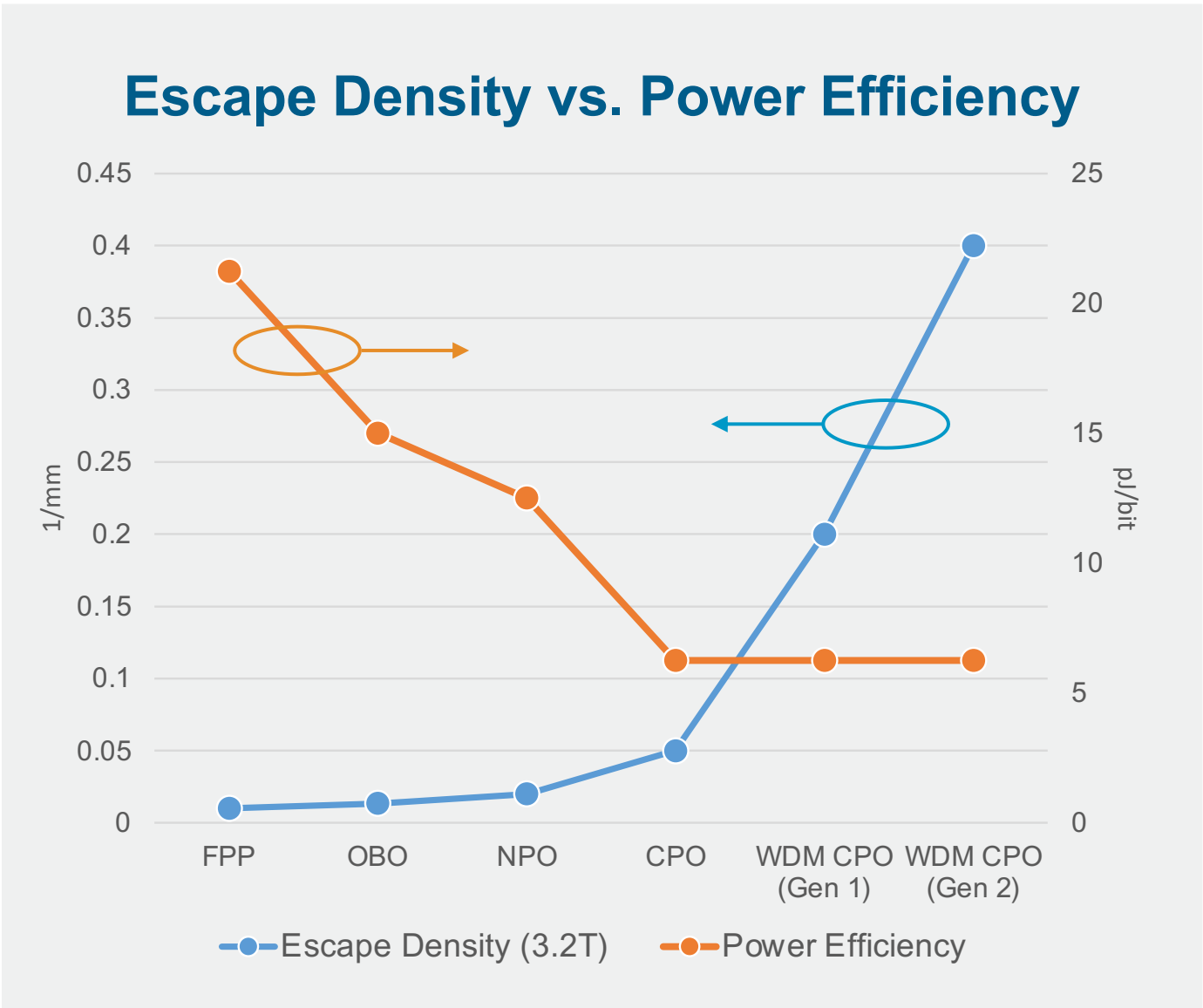
- Integration of **optical engines** on a common package substrate
- Objective: alleviate the “interconnect density bottleneck”



* Source: Image, AMD, <https://www.amd.com/en/technologies/hbm>

☆ Source: Yole Développement, http://www.yole.fr/3D_25D_Stacking_Technologies_IntelEMIB.aspx#.YJyx7pNKh25

SCIP offers power efficiency and bandwidth density benefits

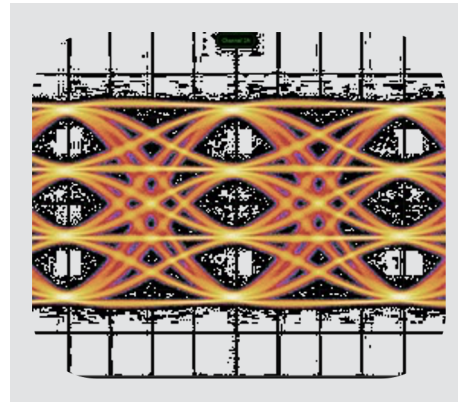


SCIP: The latest semiconductor innovation from Broadcom



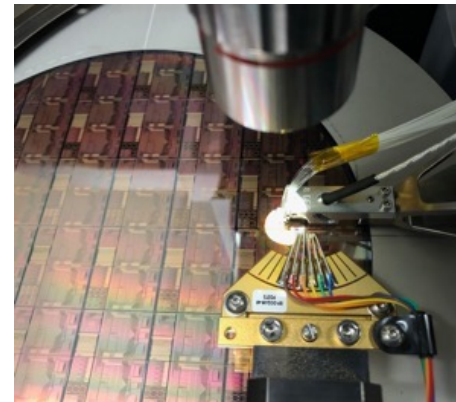
ASIC

- Core switch, SerDes and DSP in leading node
- Sustained generational differentiation



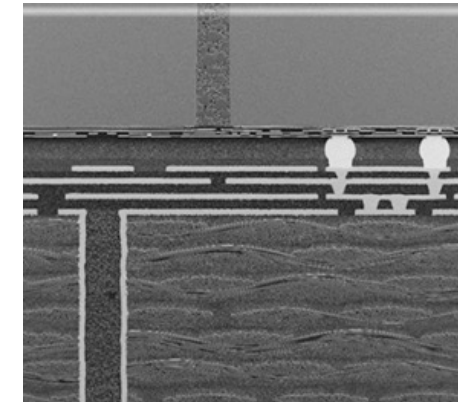
Mixed Signal IC

- Power and performance optimized in both SiGe and CMOS



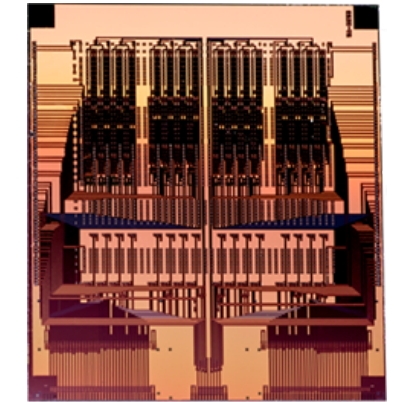
Optical Devices & Fabs

- 50M lasers/year from internal fabs
- High-volume optical manufacturing
- High-power, multi-wavelength sources



Advanced Packaging & Test

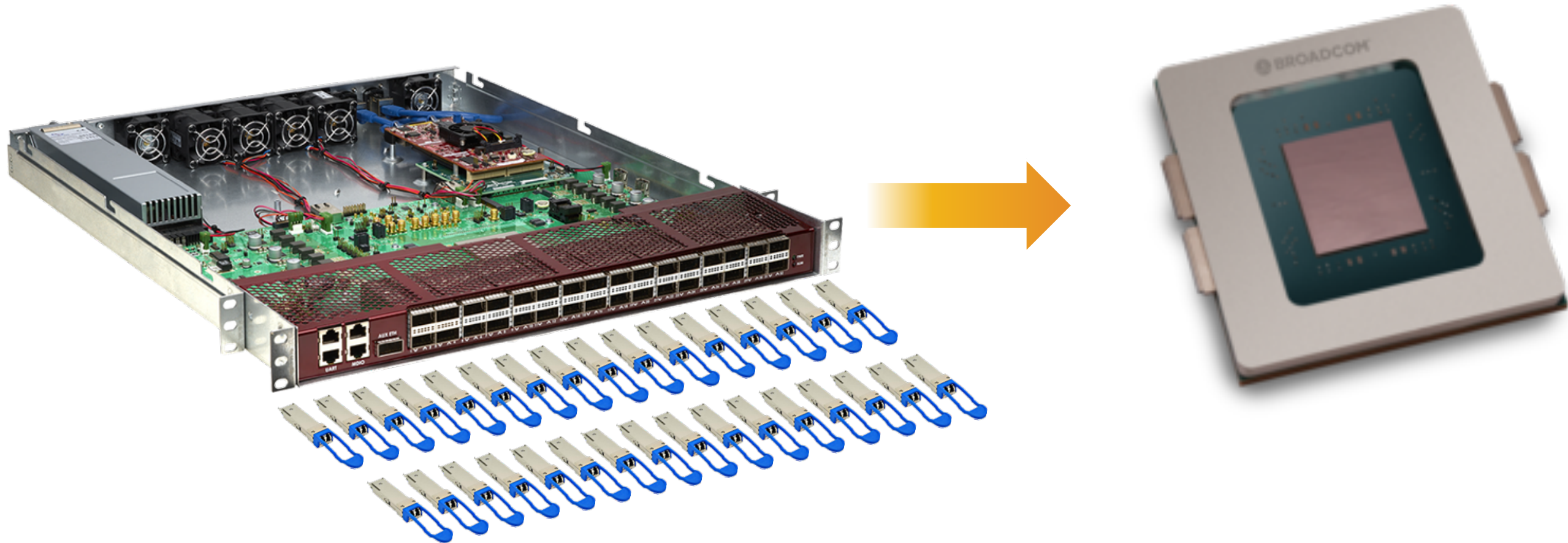
- Wafer-level test
- TSV
- 2.5D/3D integration



Silicon Photonics

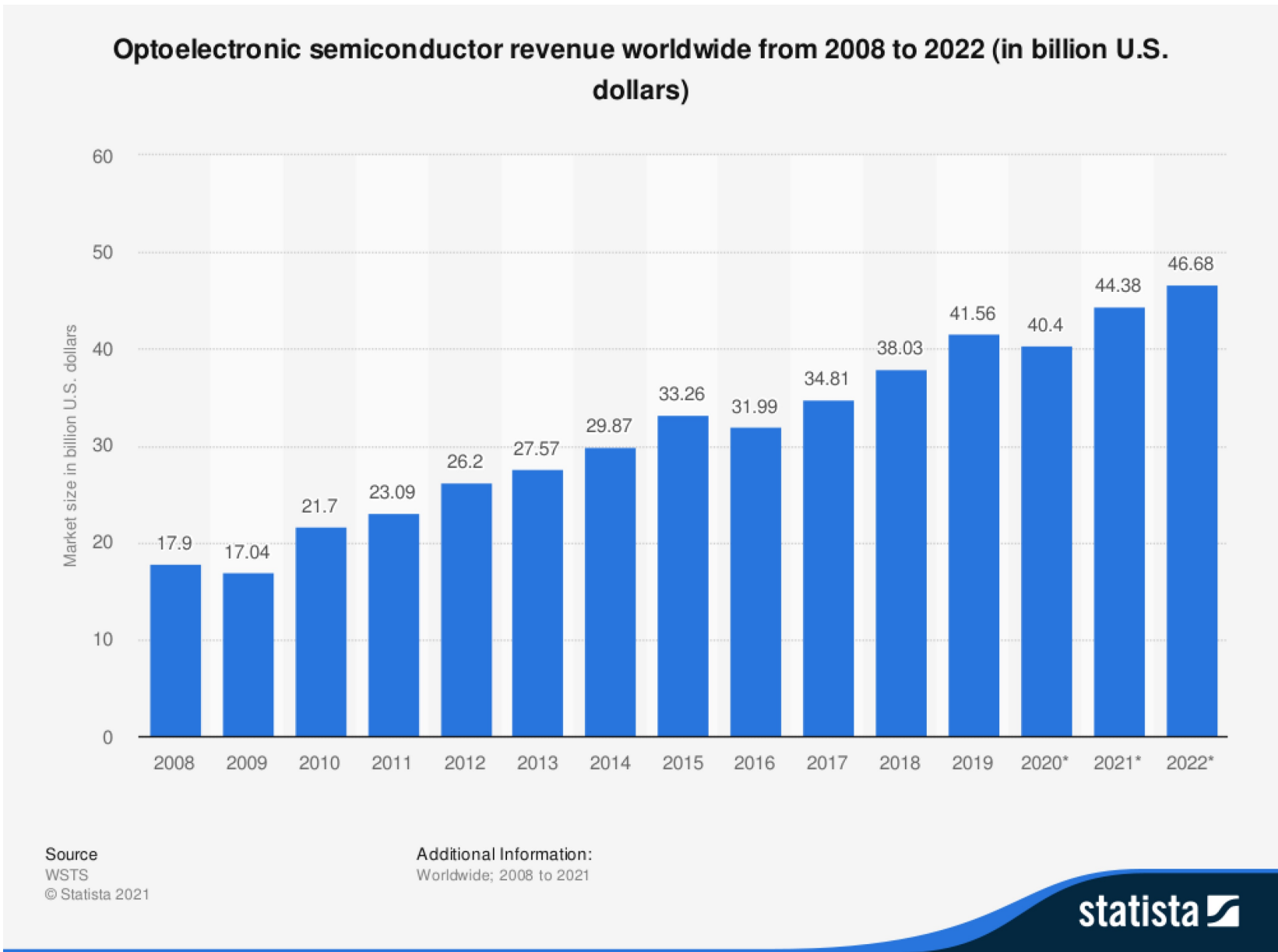
- High-density PIC design
- Modulators and PDs in silicon
- Low-loss SOI waveguides

Visualize the SCIP Benefit

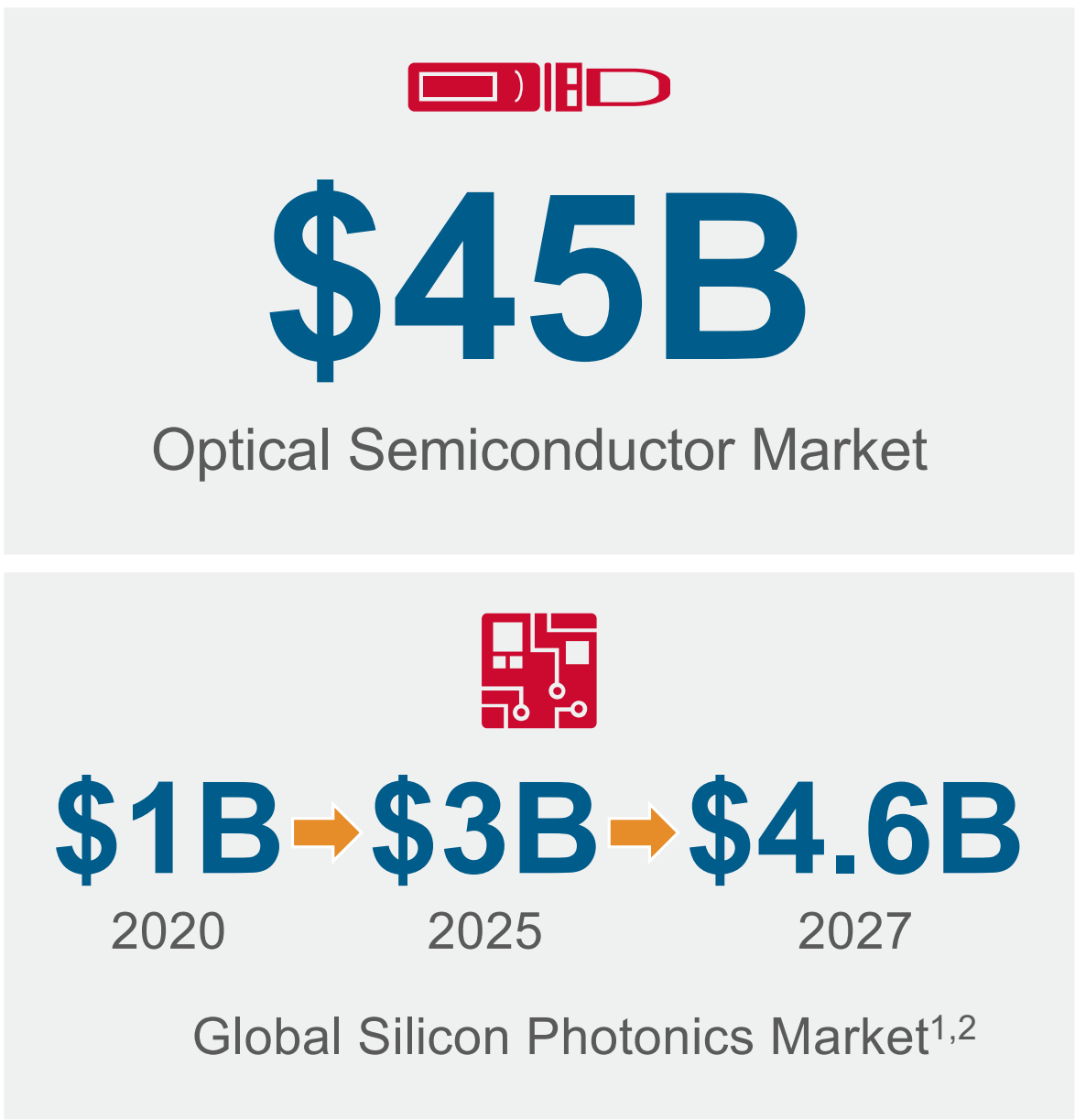


Simplifying next generation systems

SCIP: A new era of integrated connectivity begins



Source: Statista 2021



1. Markets and Markets, Silicon Photonics Market with COVID-19 Impact Analysis by Product
2. Emgen Research



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