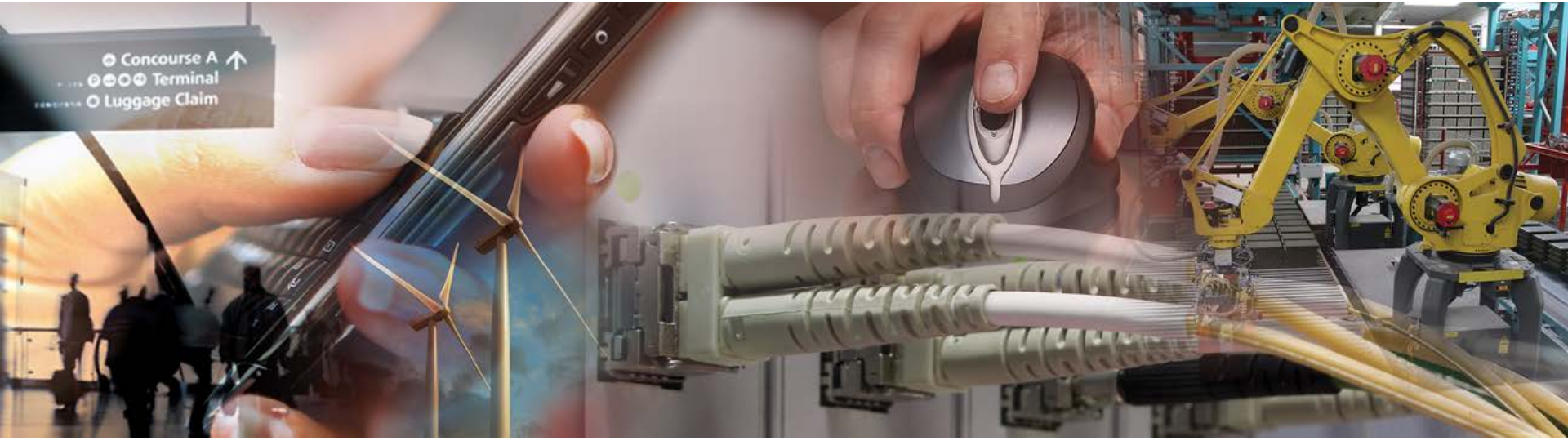
Optical Interconnects for Computing Applications



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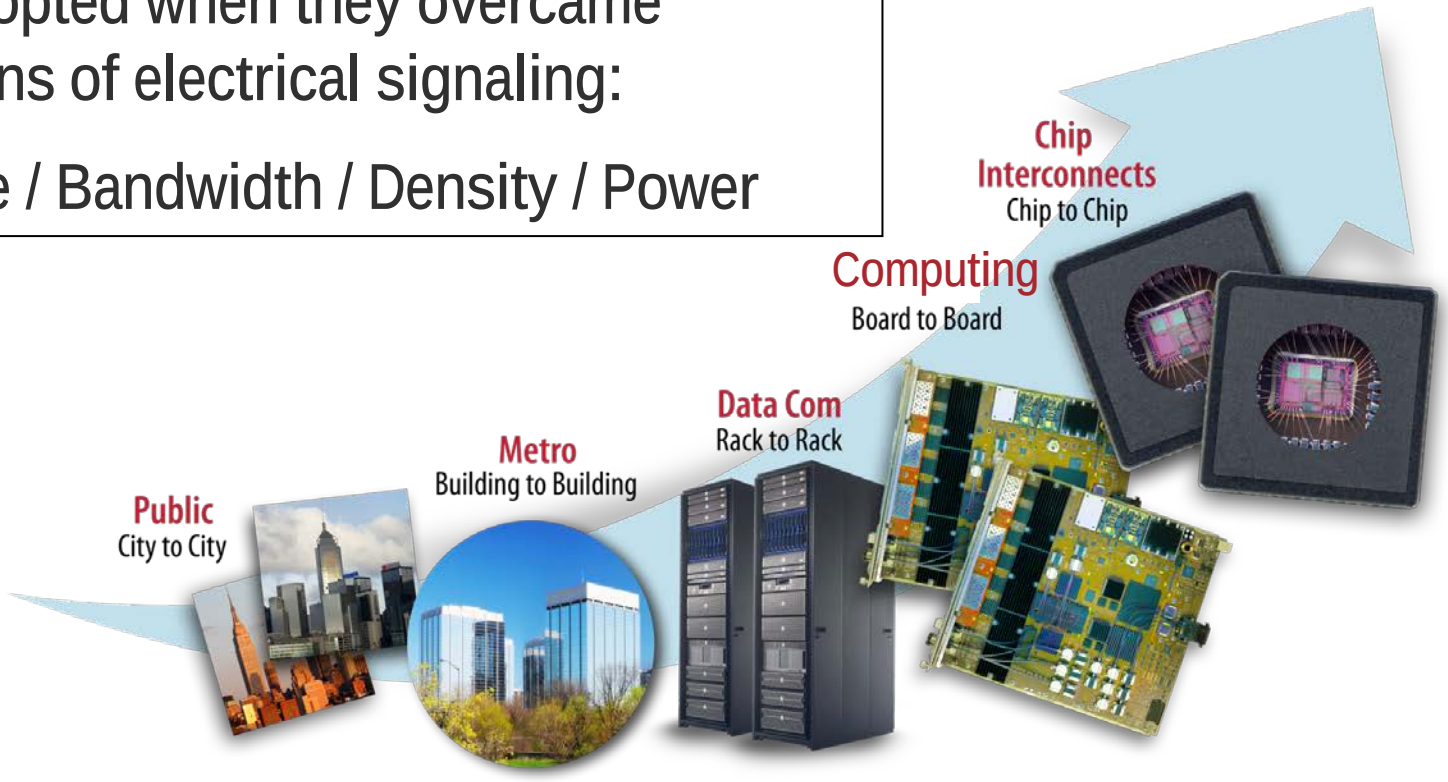
Evolution of high-bandwidth interconnects

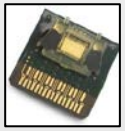
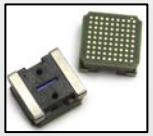
Throughout history, optical interconnects were adopted when they overcame limitations of electrical signaling:

Distance / Bandwidth / Density / Power



For optical interconnects in computing environments, COST and POWER are the most critical metrics.

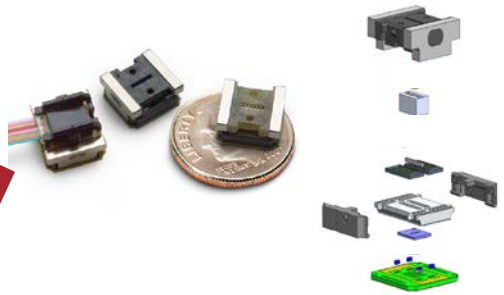
Modules targeted at different design points

Platform	AFBR-75 	MicroPOD 
Application range	Consumer and low-BW computer interconnects	HPC and high-BW system interconnects
Aggregate bandwidth	20G	120G
IC technology	CMOS	BiCMOS
Laser source	2xVCSEL array	12xVCSEL array
Receiver	2xPiN array	12xPiN array
Electrical socket	Socket	µLGA
Optical connector	J-cable	Prizm
Footprint (with and w/o socket and optical connector)	12x12x2 16x16x2.3	7.8x8.2x3.9 10.7x11.1x7.1
Power (mW/Gbps)	14	25
Nominal reach (m)	30	100
Diagnostic capability	ID and basic alarms	Full diagnostics
Signal integrity features	None	Equalization and de-emphasis

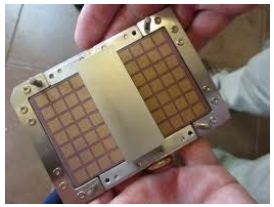
MicroPOD: Driven by high-performance computing

HPC Challenge:
Unprecedented sustained computing power

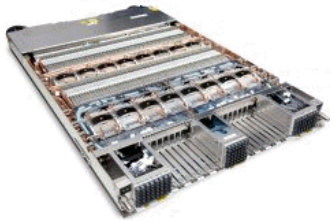
Partnership for differentiation



MicroPOD:
8.2mmx7.8mm 12-channel
10G Tx and Rx modules



IBM Hub Module:
28 Tx/Rx MicroPOD pairs
(~6 Tbps I/O!)

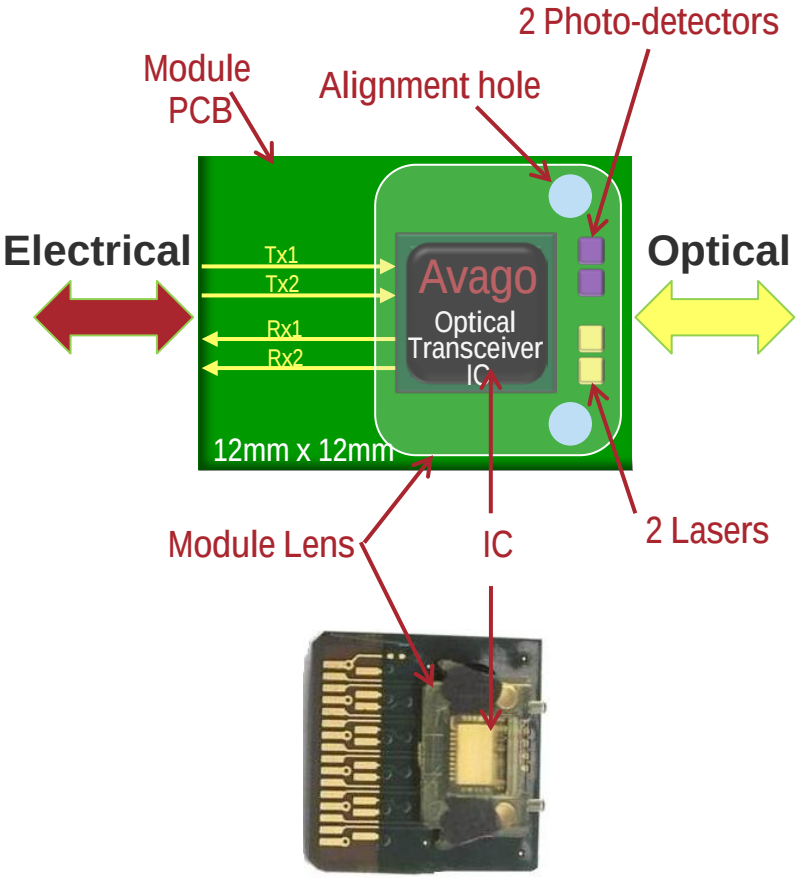


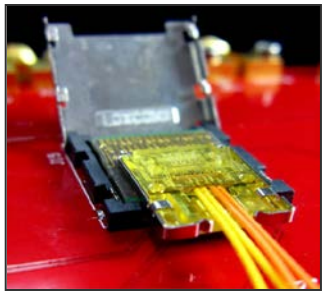
IBM Power775 drawer:
8 Hub modules

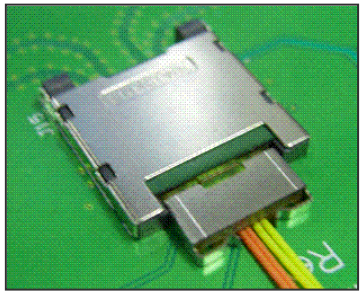
IBM Power775
Datacenter in a rack:
12 drawers / ~100TF

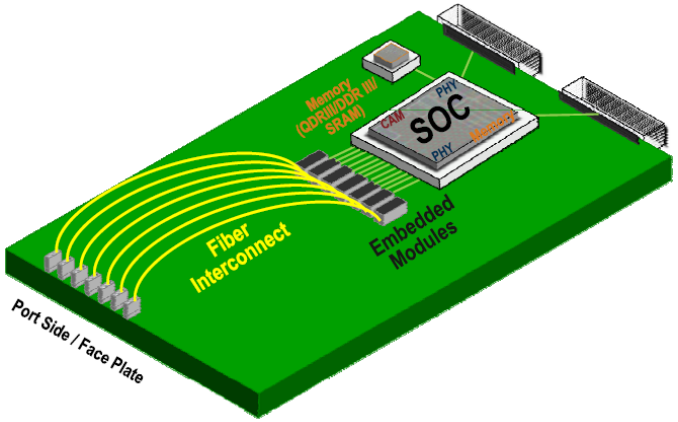
To build the world's most powerful computing system, IBM required a novel optical interconnect. MicroPOD was designed for low cost and high performance.

AFBR-75 Optical Module detailed overview









Optics for the consumer market utilized for computer networking.