Proposed Objectives for 100Gb/s Short Reach

IEEE 802.3 100 Gb/s Wavelength Short Reach PHYs Study Group

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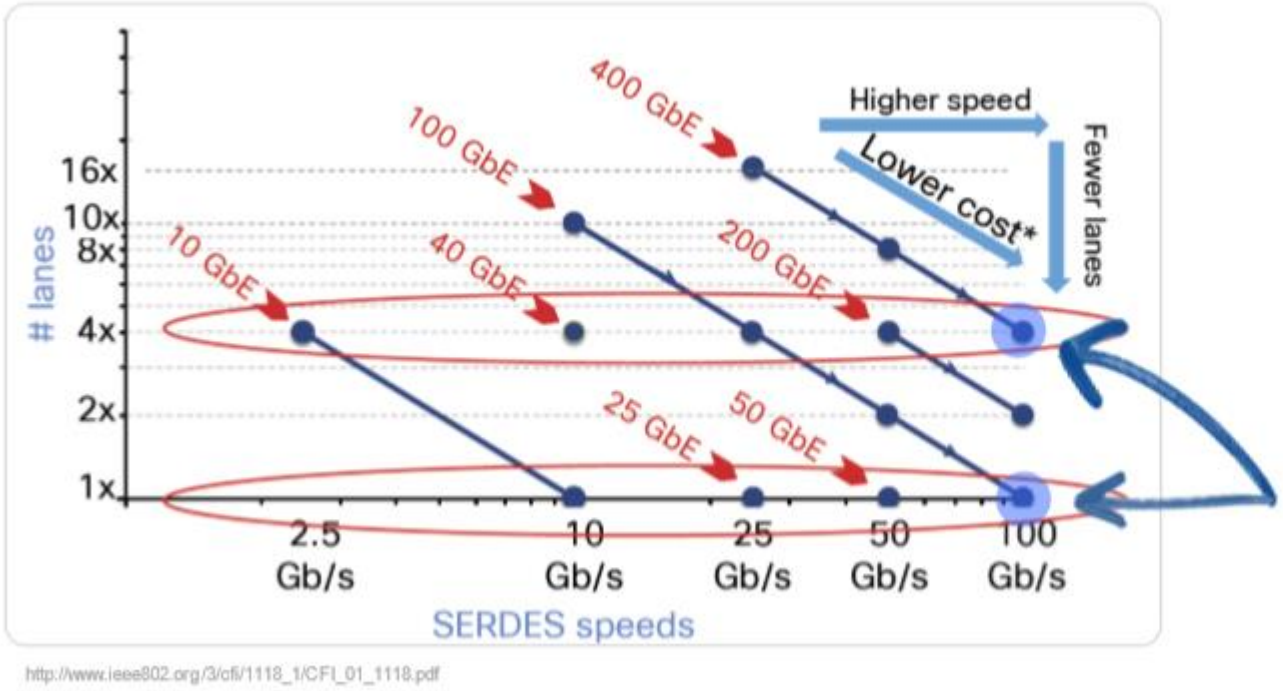
Proposed Foundational Objectives

- Support a MAC data rate of 100Gb/s
- Support a MAC data rate of 400Gb/s
- Support full-duplex operation only
- Preserve the Ethernet Frame format utilizing the Ethernet MAC
- Preserve minimum and maximum FrameSize of current IEEE 802.3 standard
- Support a BER of better than or equal to 10^{-12} at the MAC/PLS service interface (or the frame loss ratio equivalent) for 100Gb/s operation
- Support a BER of better than or equal to 10^{-13} at the MAC/PLC service interface (or the frame loss ratio equivalent) for 400Gb/s operation

Proposed PHY Objectives

- Provide physical layer specifications which support
  - 100 Gb/s operation over at least 30 m of single-lane MMF
  - 400Gb/s operation over at least 50m of 4-lane parallel MMF

Ethernet Trend



Trend

1x and 4x bus widths dominate volume adoption

Begin with multi lane, evolve towards single lane

Driven by new technologies that enable cost reductions and higher density

100G / 400G Lane Reduction

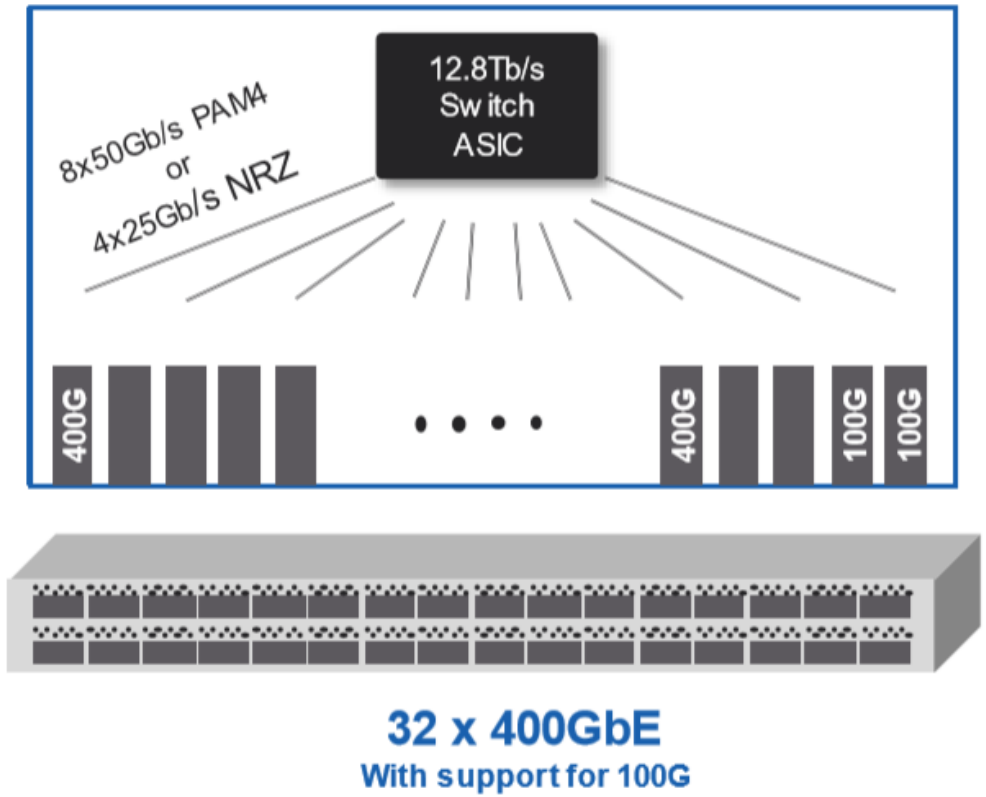
Lane reduction to lower cost and improved density

400G: 8 lanes → 4 lanes
100G: 4 lanes → 1 lane

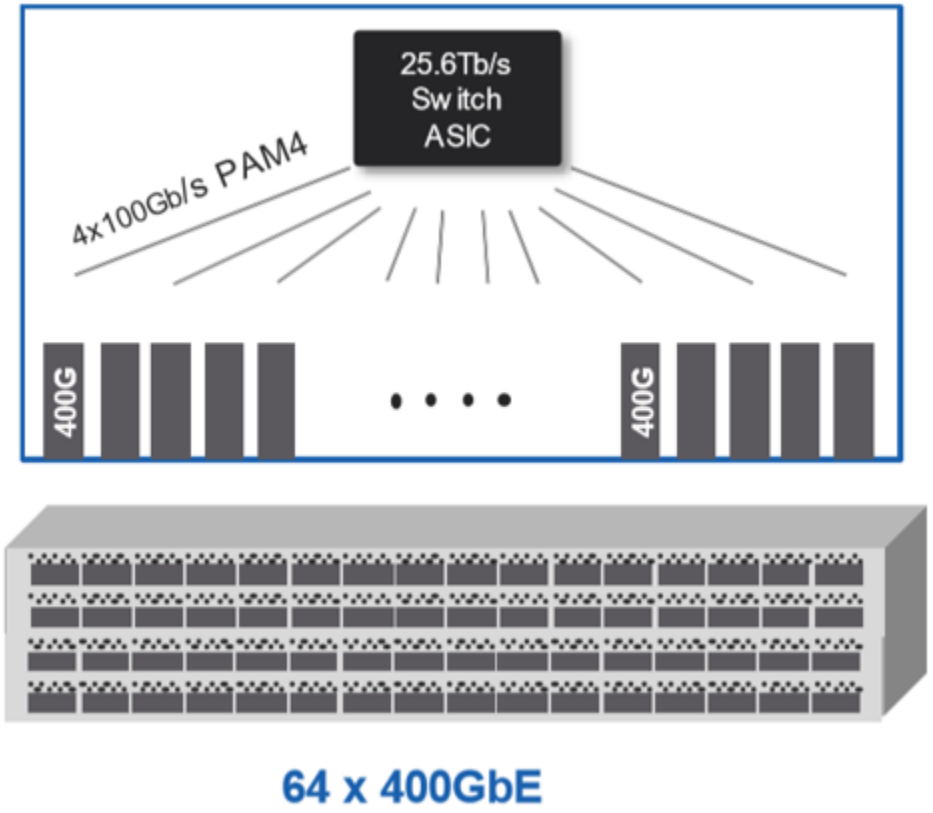
http://www.ieee802.org/3/100G_OPTX/public/Jan19/lewis_optx_01a_0119.pdf

Reduce optic lanes to provide lower cost and higher density.

Matching ASIC IO



32 x 400GbE
With support for 100G

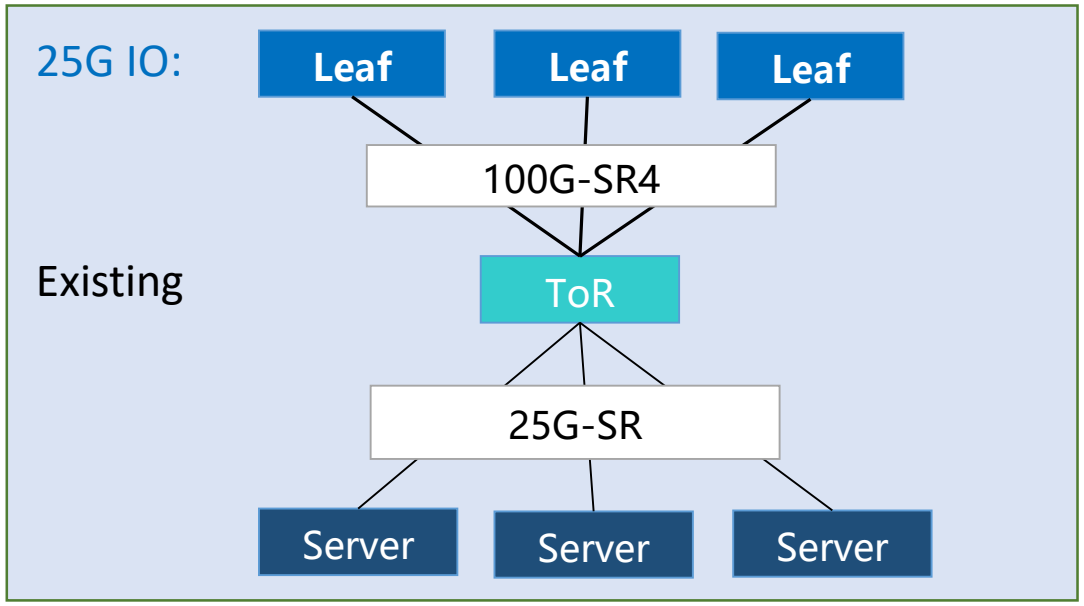


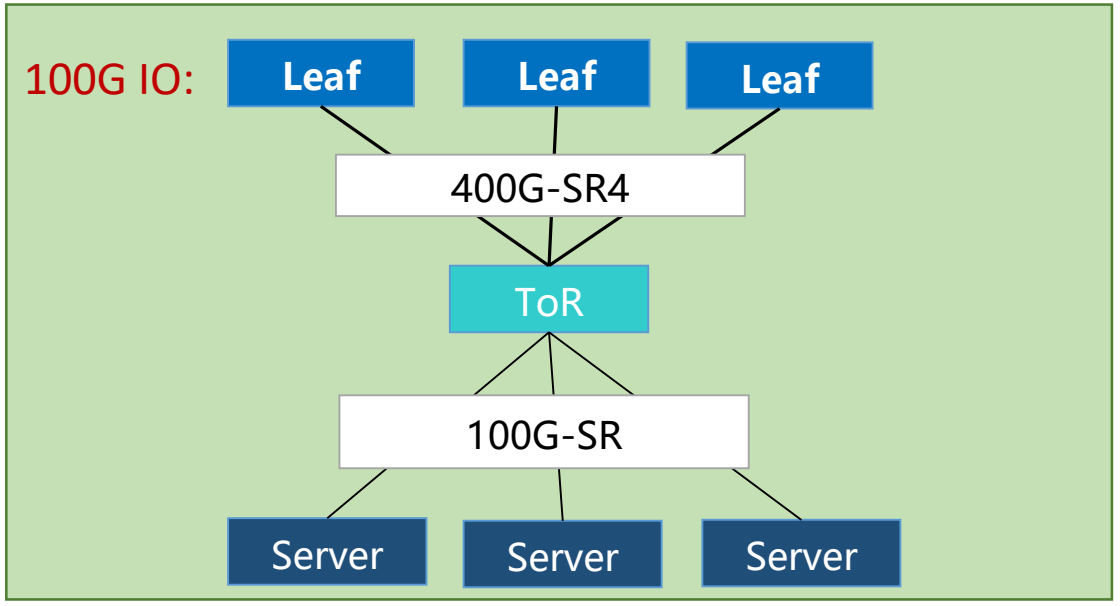
64 x 400GbE

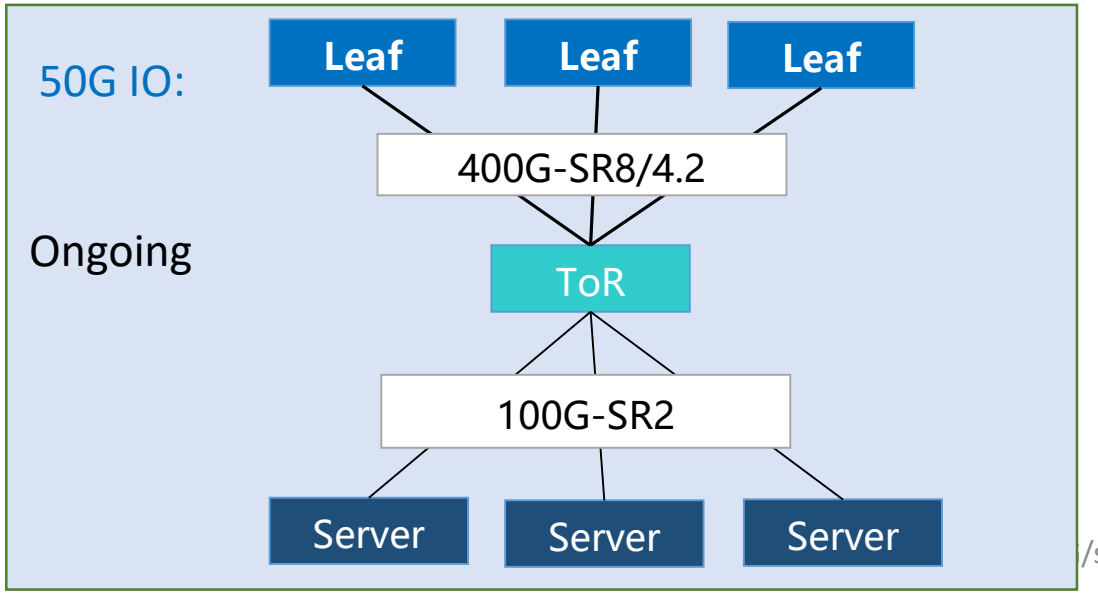
http://www.ieee802.org/3/100G_OPTX/public/Jan19/lewis_optx_01a_0119.pdf

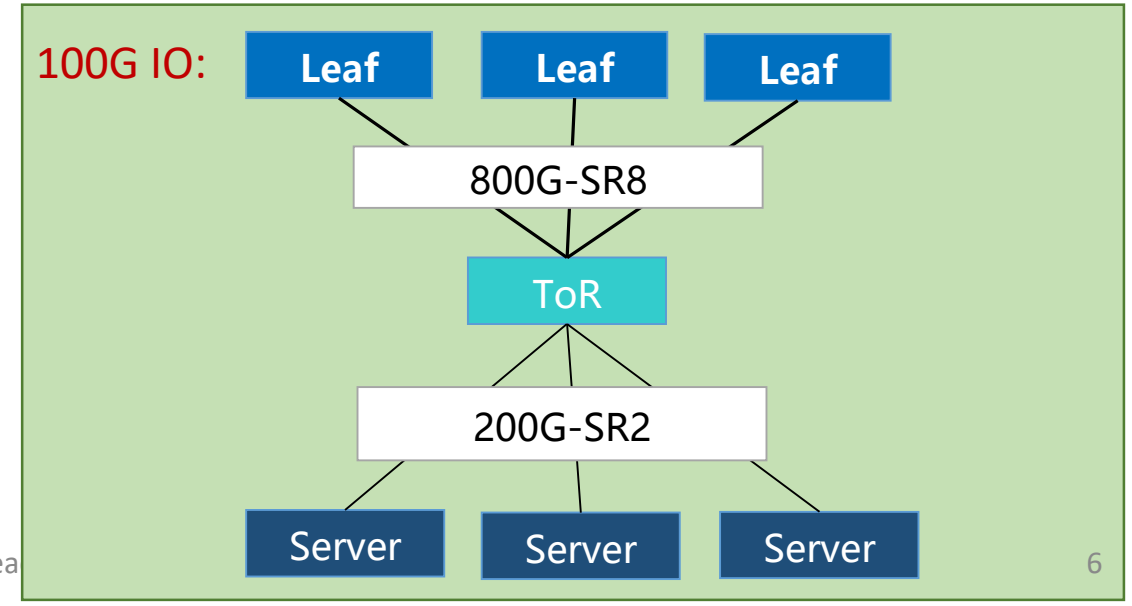
Provide more cost-effective and high density system.

Short Reach Connection Evolution









Survey of DC connections in China

- For China market, datacenter operators stated their existing deployments and expectations in the ODCC DCCNG project (http://www.ieee802.org/3/ad_hoc/ngrates/public/19_09/guo_bwa_01_0919.pdf).
  - Server to ToR connection:
    - 5m within cabinet; a small number of cross-rack interconnects up to 20m.
    - For 100G access, due to constraints of distance and deployment (the diameter becomes thicker, the degree of buckling and the compatibility interoperating testing between vendors become complicated), server connections may turn to AOC or multi-mode transceivers.
  - ToR to T1 switch connection:
    - 50m reach would cover a large percentage of their ToR to T1 switch links: 80%, 40%,100% and 100% by some large operators (http://www.ieee802.org/3/cfi/1119_1/CFI_01_1119.pdf)
    - 70m and 100m is preferred depending on cost-efficiency.
- Due to some limitation, datacenters in China is normally deployed in a building (around 4~6 floors).
  - Floor #4 to #6 is for devices.
  - On each floor, there might be 2~3 areas each of which is 50m block.
  - ToR and T1/Leaf nodes are always within the same area, while each area can be one pod or divided into serveral pods.

Thank you!