Is 100GbE Lamba a Compelling Investment?

Technology, Timing and the Math

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Key Questions

- Is there real demand for 100GbE in the DC?
- When will real 100G volumes happen and is this a profitable market for vendors?
- Is there agreement on technology and standards on 100G?
- Is 100GbE lambda necessary for broad 100G deployment in the DC?
- What are the factors to evaluate when deciding on when to invest in 100GbE lambda

100G in the DC – Is there Real Demand?

- Primary applications today are client side connections for 100G telco connectivity and short reach inter DC applications

- Flattening of networks, non blocking designs and 40G servers deployments beginning in the next 18 months will create need for 100G at the aggregation layer

- East-West traffic is orders of magnitude higher than North-South

SHORT ANSWER – YES!

100G in the DC - What is the Timing?

- 100G volumes today are primarily LR and for client side applications – unit volumes are relatively low and ASPs have declined sharply over the last year
- 10G servers going from 20% of total to over 50% in 12 to 18 mo - expect 10/40G to be primary technology at the aggregation layer over the next 2 years
- 100 GbE volumes within DC likely begin to pick up in 2015. Will be mix of SR and LR
- Significant volume ramp likely in 2016 and beyond

2014 IS A TRANSITION YEAR BUT THIS IS AN ATTRACTIVE MARKET

Convergence on Technology and Standards is Key

- Today's 100G modules are primarily 25Gx4 LR modules with reach of 2 to 10km
- High cost and low density of CFP modules has created fragmentation on technology and standards – CFPx, Qsfp-28, PSM-4
- Several factors at play including
  - What % of DC links outside the MSDC market will be longer than 100m?
  - Will large DC hyperscale DC standardize on single mode optics if the price is right?
  - Will Silicon Photonics be able to provide disruptive cost advantage bringing price single mode optics close to that of multimode optics?
  - Will there be significant demand for 100G SR and will VCSELs be able to reach speeds beyond 25G?

Convergence on Technology and Standards is Key

- Lack of technology and form factor standardization can be a major issue
- Comes in the way of volume related advantages including lowering cost and financial health of suppliers which impact investment in innovation
- We have seen this play out several times
  - 40G line side market was hobbled by too many modulation techniques while convergence around coherent allowed 100G line side market to ramp
  - 10G sfp+ standardization drove 10G volume growth

100G is Important But How about 100G Lambda?

- Believe 4x25G solutions, both parallel and CWDM will be the lowest cost way to deliver 100G over the next 3 to 5 years – THIS IS WHAT DC OPERATORS CARE ABOUT!
- Even at 400GE it is unclear whether the standard will be 8x50G or 4x100G
- 100G Lambda is likely to be an important long-term building block to support DC traffic growth but technology is complex and several years away
- Do not believe 100G Lambda is the next step in the evolution of DC transmission speeds – 50G maybe?

100G Lambda – Timing will be Key

- While early mover advantage can be meaningful, investing too early can be a significant disadvantage diluting R&D and impacting profitability
- Believe 100G lambda development will require significant investment and exploring expensive and complex modulation techniques
- Vertical integration benefits accrue only with volumes – contrast is clear in SR vs LR markets today
- Volumes ramp only with low costs and standardization

Summary

- 100G demand is real and volumes will likely accelerate over next couple of years
- Standardization is key to broad adoption and making this a healthy market for suppliers
- 4x25G will likely be the most cost effective 100G option
- 100G lambda is important long-term, but 50G could be the next step
- There is a ‘too early mover’ disadvantage – volume demand for 100G lambda is likely 4 to 5 years away