40GbE Host Controller Economics

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- Howard Frazier, Broadcom
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- Rob Hays, Intel
- David Martin, Nortel Networks
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Why not 4x10G Link Aggregation?

- 1x40GbE link will Cost Less than 4x10GbE links
  - 4 aggregated links cost 4 times as much as a single link

- 1x40GbE Link will be Lower Power and Smaller than 4x10GbE Links

- 4x10GbE Links Don’t Provide Line Rate Performance

- Management complexity of load balancing ‘N’ ports in host & switch

- Cable management: Maze of cables in the data center

4 x 10GbE is not efficient compared to a single 40GbE link
Why is 40GbE less cost than 4x 10GbE?

• The Network Controller has the following functions:
  - PHY interface
  - Host Interface
  - MAC
  - Memory
  - Logic (Packet processing, Queues, offload, etc.)
  - Control and Management

  \[ \text{Fixed} \quad \text{Shared} \]

• In a 4 x 10G Link aggregation all functions are multiplied by 4

• In a 40GbE Controller many functions can be shared, reducing the die size

**Power and Cost can be lowered significantly for 1x40GbE**
Host Controller Cost Estimation

100GbE too expensive for volume server deployment for the next 10 years
Cost of 40GbE vs 4x 10GbE

40G < 1/2 (4x10G)

Die Size

1 x 40G

40G is lower cost, lower power, and uses less board space