100g Technical Feasibility

Hugh Barrass, Cisco Systems
Subi Krishnamurthy, Force10 Networks
Shashi Patel, Foundry Networks
Scott Dredge, Juniper Networks

“Proving” technical feasibility

Technical feasibility cannot be rigorously “proven” at this time

- To prove feasibility, equipment must be built; this cannot be done in advance of the standard (or even a baseline)

Therefore we must address the technical feasibility as follows:

“Most people who expect to implement the standard believe that it will be achievable using a level of technology that is acceptable to them”

- This will be based on the objectives and reasonable assumptions about how the standard will develop
- The following slides show reasons to support such a belief

Objectives (so far …)

1. **Support full-duplex operation only**
   - (approved 11/16/06: All 73/0/4)
2. **Preserve the 802.3 / Ethernet frame format at the MAC Client service interface**
   - (approved 11/16/06: All 76/0/4)
3. **Preserve minimum and maximum FrameSize of current 802.3 Std**
   - (approved 11/16/06: All 74/0/4)
4. **Support a speed of 100 Gb/s at the MAC/PLS interface**
   - (approved 11/16/06: All 67/9/14, 802.3 26/4/11)
5. **Support at least 10km on SMF.**
   - (approved 11/16/06: All 86/0/4, 802.3 40/0/4)
6. **Support at least 100 meters on OM3 MMF.**
   - (approved 11/16/06, All 61/3/27, 802.3 33/2/13)

The easy ones & what we need to address

1. We know how to do Full Duplex (half duplex might be a challenge…)
2. No need or desire to change the standards hierarchy
3. No need to change the frame size
   - That means we can't increase the minimum to keep the FPS down ☹

5 & 6. These are optical problems…

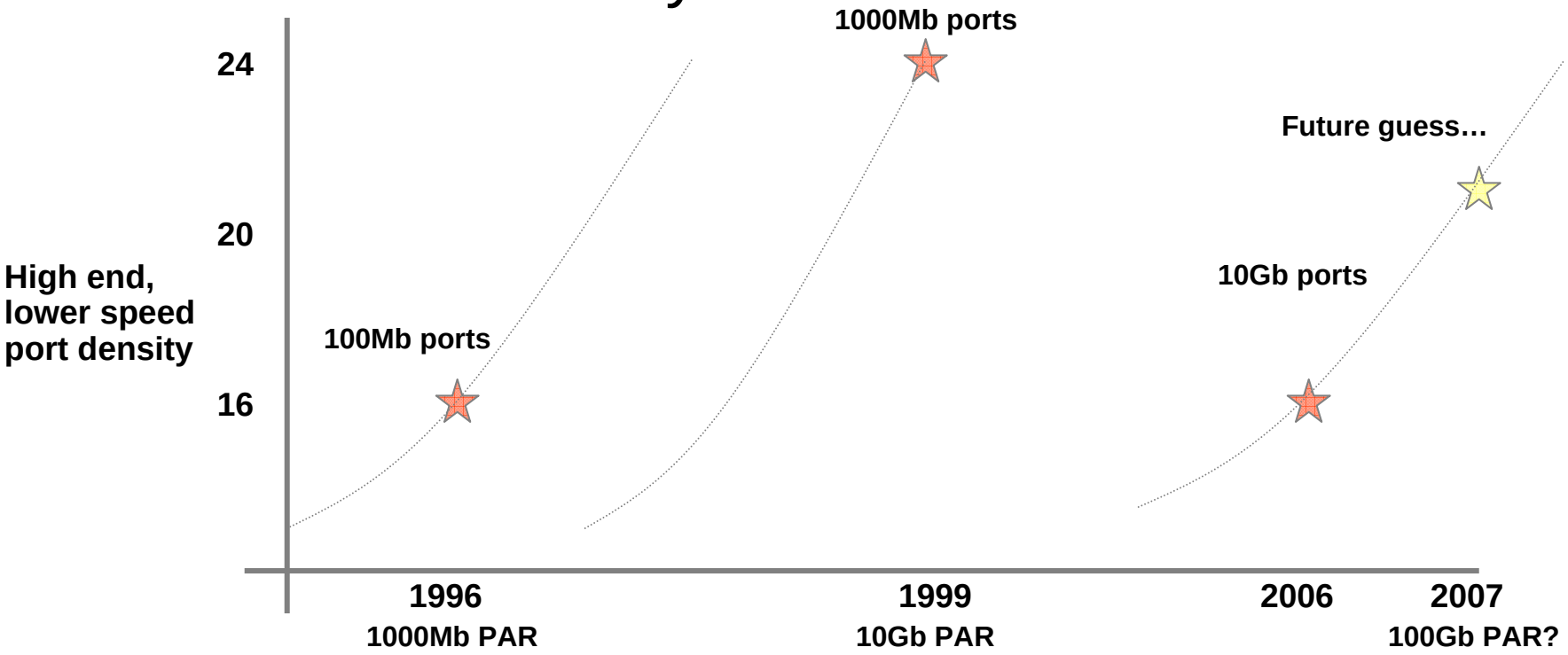
- Addressed by cole_01_1106.pdf

That leaves #4

- Can we build a MAC port that runs at 100Gb/s?
- Can we build systems that utilize such interfaces?
- All using technology that is reasonable & acceptable to implementors

Slower Port Density at the time of the Next Higher Speed Par

– Lower speed port densities show the state of the art for fabric speeds, address lookup and other scalability issues



Disclaimer: These datapoints do not represent specific products, but reflect general availability of mid-range equipment

100G line card architecture

- Line cards with net b/w > 100G already exist
  - Multiple 10GbE ports or 40G non-Ethernet
- Backplane b/w trends continue upward
  - Backplane fabrics already support enough b/w for early adopters
  - Trend is in line with previous generations
- New line cards could be implemented with current technology
  - Technology curve will allow density improvements
  - Architectural optimization from n x 10G to 100G…
  - Similar to previous generations

100G line card cost expectations

Optics costs covered in other presentations
- Expected to be price / Gbps improvement

Early adopter architecture based on n x 10G
- Probably similar cost per Gbps

Optimized architecture & technology curve should follow previous trends
- Higher gate counts, larger memories, wider buses…
- … all benefit from Moore's Law
- Higher I/O b/w lead to small cost increase over 10G

Expect long term (electronic) costs will trend down in the same way as previous generations

Next Steps

The progress of technology supports 100G Ethernet

- Relative state of products and technology match previous PARs

Current mainstream technology might struggle with 100G

- However :- 2007 PAR leads to standard in ~2009
- Technology will support leader products in that timescale…
- … mainstream technology and mid-range products will follow

Detailed response to “Technical Feasibility” must be reviewed

- Bearing in mind that the “spirit” is more important than the wording

Most people who intend to implement 100G Ethernet will agree that it will be feasible using acceptable and reasonable technology in the appropriate timescale

Supporters

The following people believe that the “technical feasibility” criterion is met for a 100G Ethernet PAR at this time

Brad Booth (AMCC)
Frank Chang (Vitesse)
Dan Dove (HP)
Joel Goergen (Force10)
David Law (3 Com)
Andy Moorwood (Extreme)
Mark Nowell (Cisco)
Neil Peers (Adva)
Petar Pepeljugoski (IBM)
Peter Tomaszewski (Force10)
Brad Turner (Juniper)
Aris Wong (Foundry)