



Carrier Hurdles To Meeting 10GE Demand

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Sprint Nextel



Supporters

- Adam Bechtel – Yahoo
- Michael J. Bennett - LBLnet Services Group
- Peter Harrison – Netflix
- Alan Judge – Amazon
- Louie Lee – Equinix
- Jay Moran – AOL
- Peter Schoenmaker – NTT America
- Troy Sprenger - EDS
- Henk Steenman – AMS-IX
- Takejiro Takabayashi – JPIX
- Bill Trubey – Time Warner Cable
- Jason Weil – Cox Communications
- Doug Wilson – Microsoft



Outline

- Carrier hurdles to 10G customers – what's holding back a lot of that demand
- What does a 40G Ethernet solution buy the SP Community
- Problems in Internet Data Center & Large IX's Space
- Standards Versus Traffic Growth – Not a Pretty Picture



Carrier Hurdles to 10G Cust

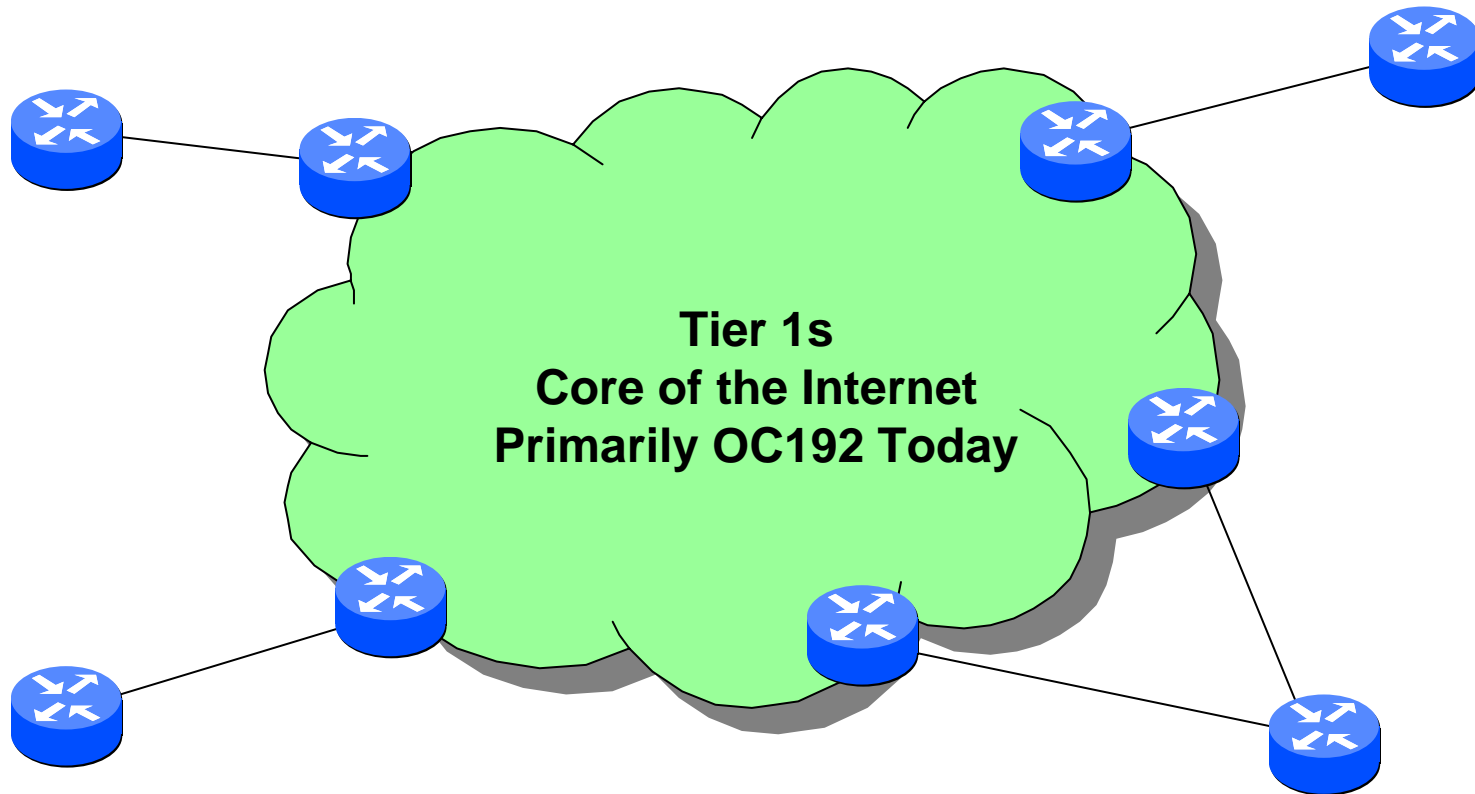
■ System Speedup Problem

- The same system speedup problem that exists in Routers and Switches across switch fabric exists in into the cores of our networks as well
- 10G customers also have a direct correlation on peering with other carriers
- This is preventing the carriers from meeting 10G demand

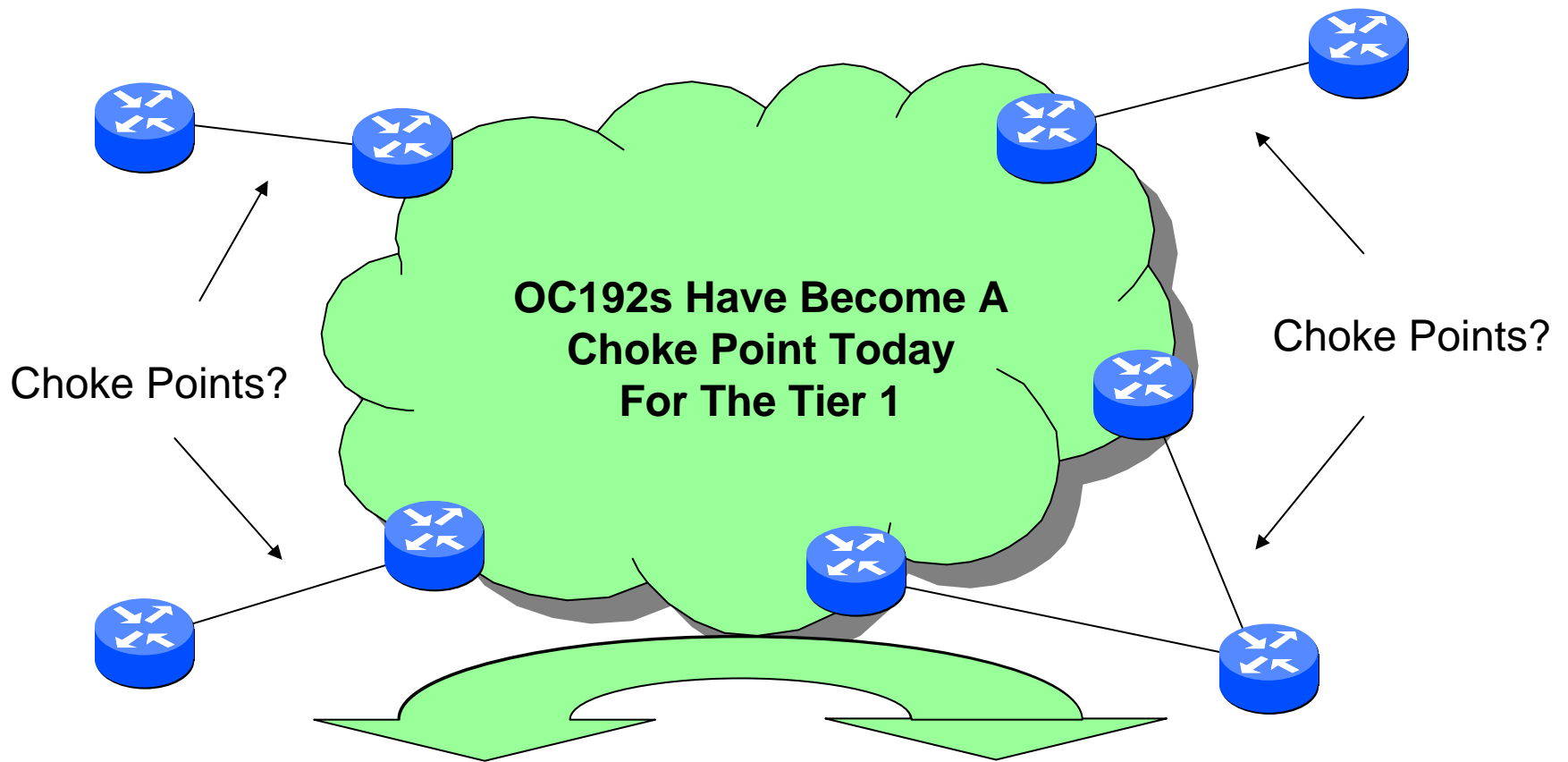
■ Network Ecosystem – The System as a whole can only go as fast as the Core

- Core Links Must Be Larger Than Edge – This is going to come back and haunt us again

Big Picture – Top of the Ecosystem



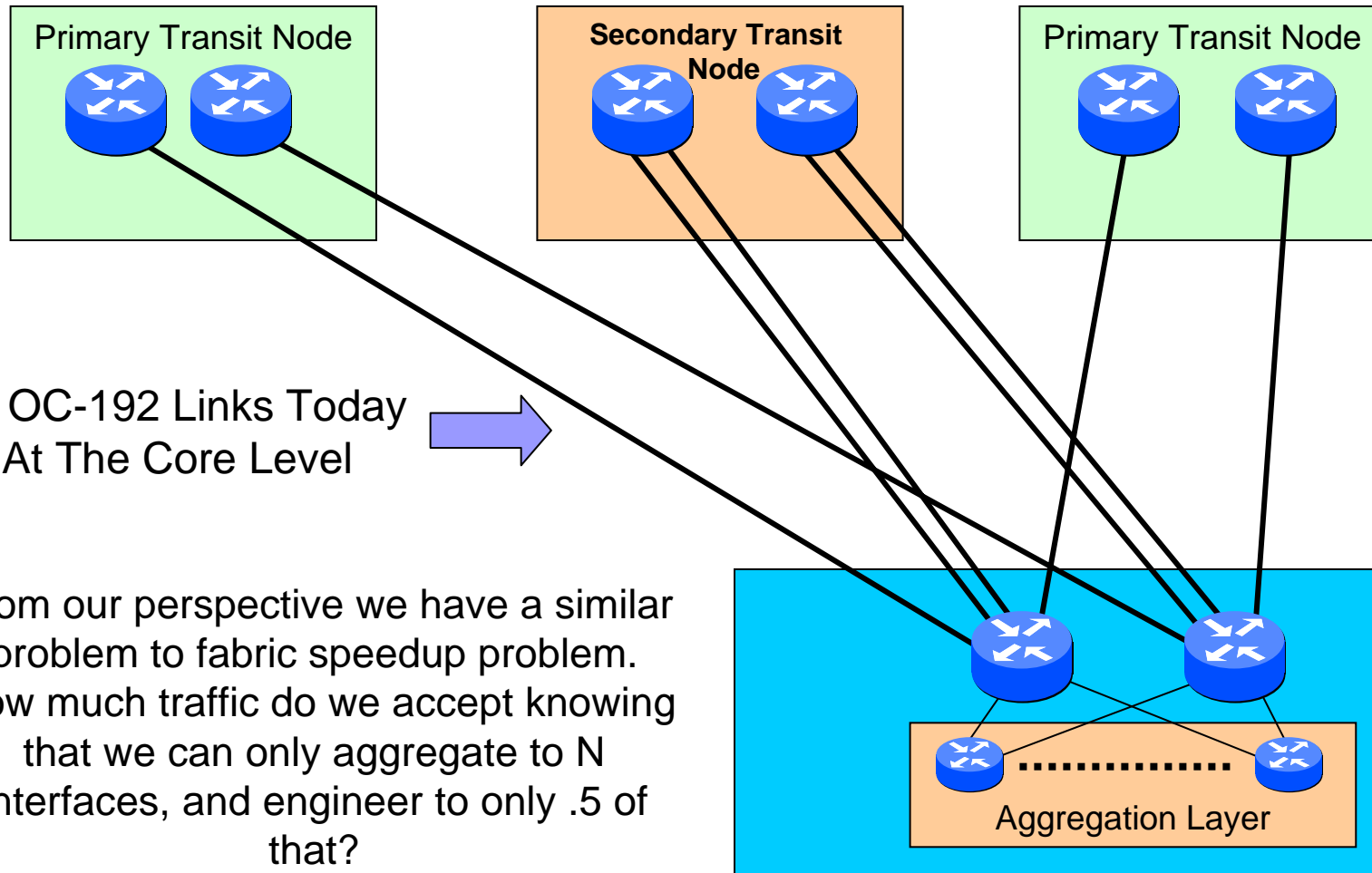
Big Picture – Top of the Ecosystem



Transit Services, Video, Music, File Sharing, Mobile, VPN Services

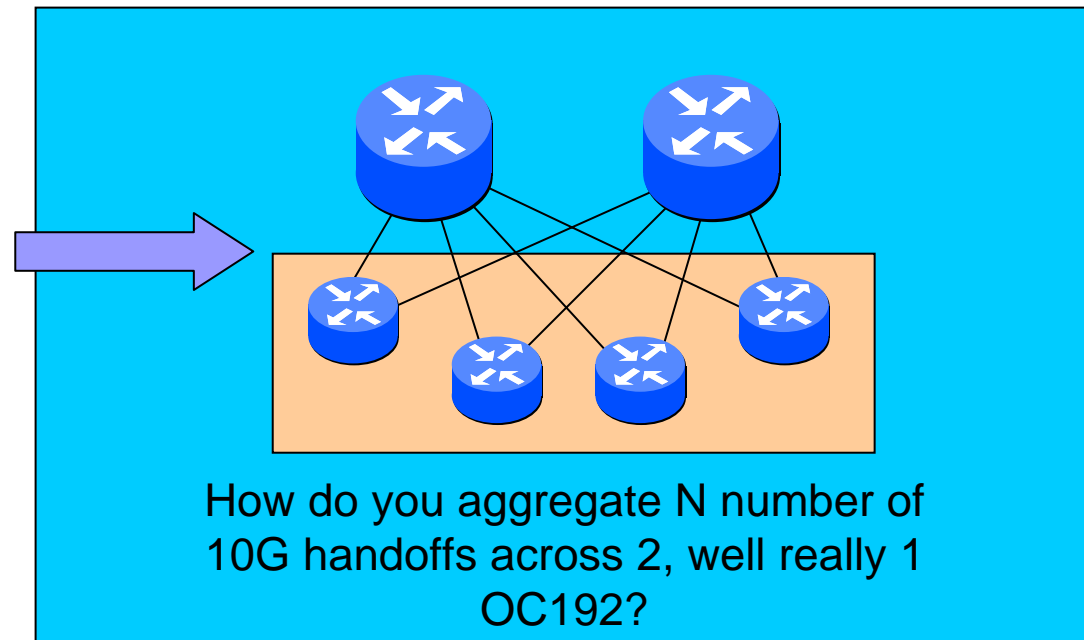
There are more bits than there is backbone today

A Little Further Down The Ecosystem - Aggregation / Speedup Problem



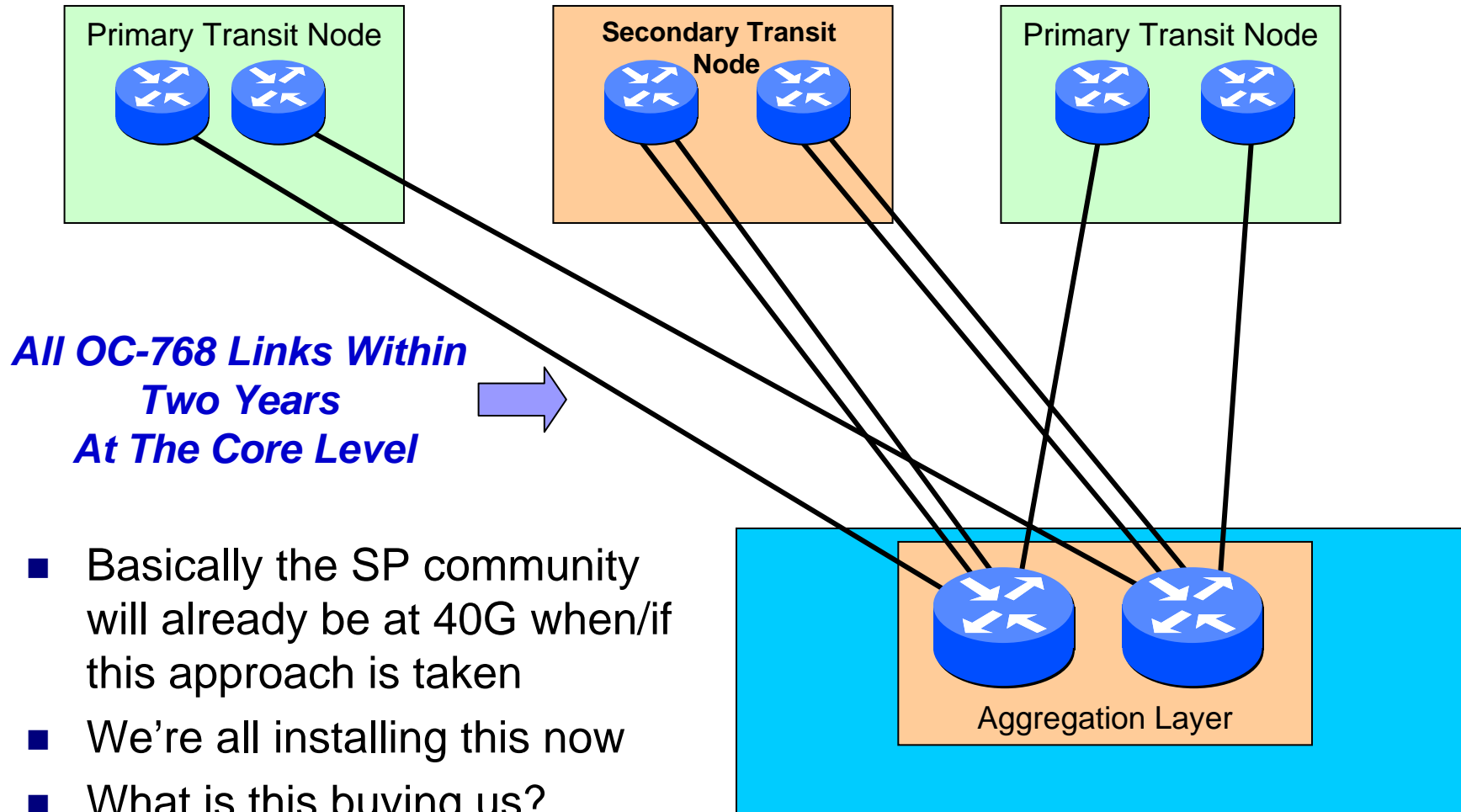
A Little More Further Down The Ecosystem - Aggregation / Speedup Problem Cont.

All of the interconnects for us are OC-192 links at the aggregation layer as well. This is extending the bottleneck right to the customer handoff.



- This is having a direct correlation on how the content providers build and architect their facilities and handoff capability
- Basically SPs are saying no to 10GE customers unless they will accept rate limiting, consider them “strategic”, both, etc...

40GE Solutions





Problems in the Internet Data Center & Large IX Space

- Data Center Does Not Imply Just Exchanges – Bits have to go in & out
 - What percentage of traffic leaves IDCs as Transit to the Tier 1s?
 - How many 10GEs would this be today if folks weren't saying no?
- What About Link Aggregation
 - Upper bound is gated by 8 links today in most HW (8 active, 8 standby)
 - Several Exchange Points have already exceeded today's link aggregation upper limits internally...
 - ...and transponder costs put you under water to use this approach on the WAN
 - Definitely not a good long haul fit for the SP



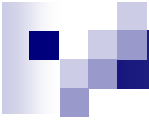
IDC & IX Space - Standards Versus Traffic Growth

- Traffic growing at 100% per year
- New standard every 3 to 4 years implies increase in data rates needs to be factor 10 to cope with traffic growth demand
- FE, GE and 10GE were in time to accommodate traffic growth.
- Was next standard (100GE?) needed in 2006?

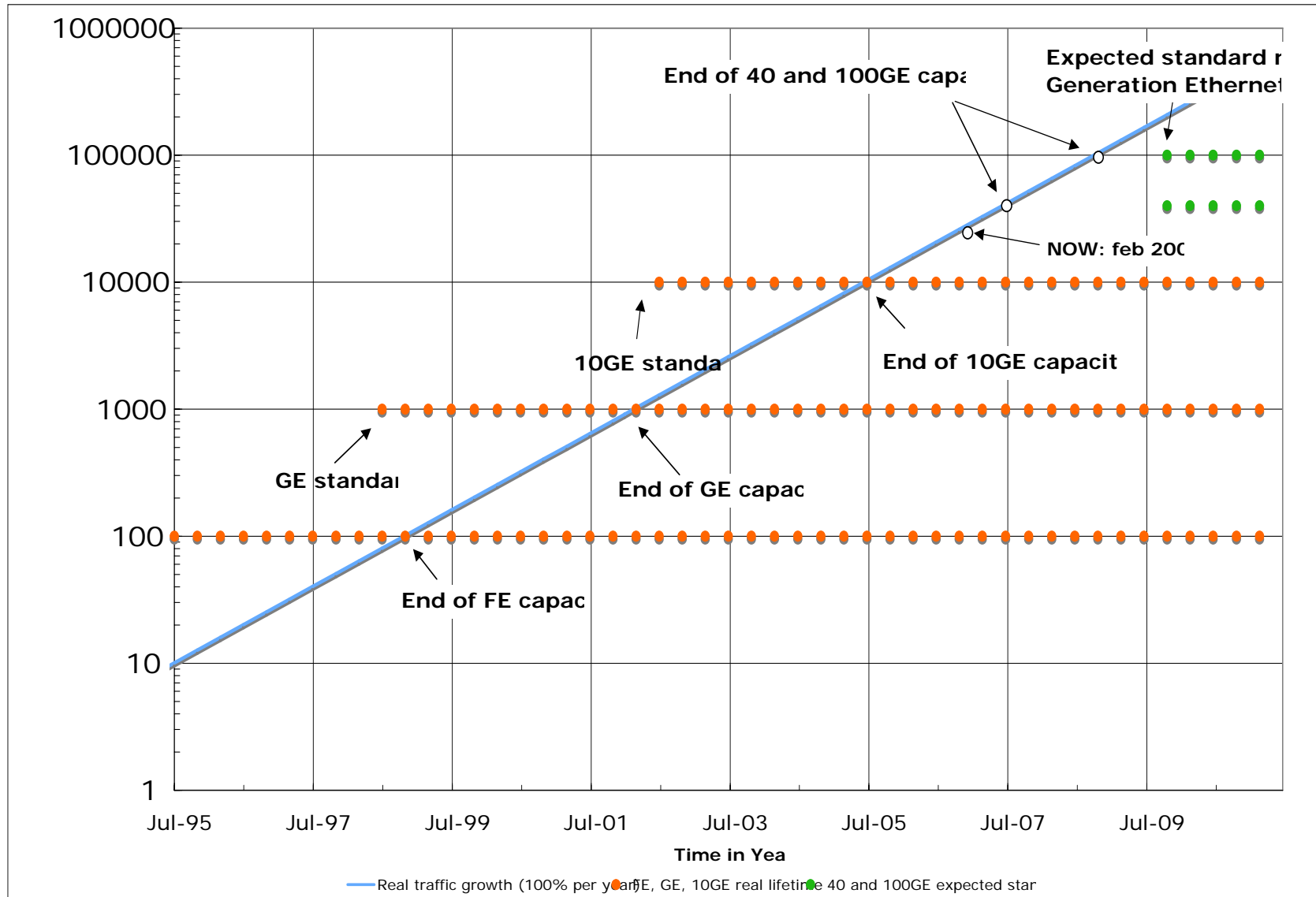


IDC & IX Space - Standards Versus Traffic Growth

- Introduction of 100GE end of 2009, early 2010 considered already too late by many.
 - Some IXs say they'll have to link aggregate 100GE day one
- 40GE solutions are considered inadequate to meet the projected demands assuming a 2009/2010 introduction
- Work on follow on standards greater than 100G needs to begin as soon as possible

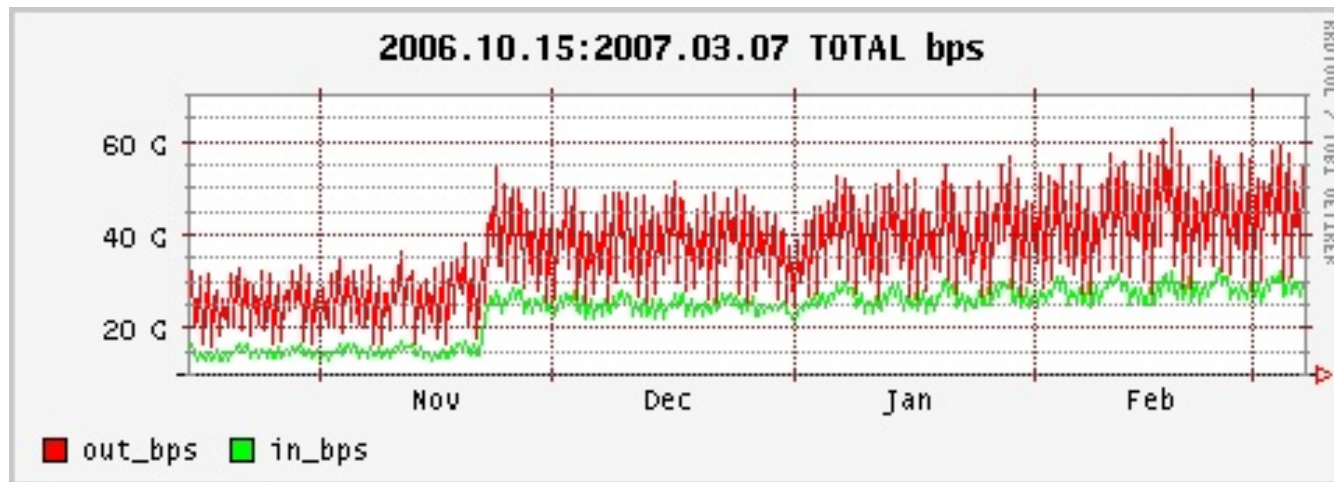


Standards Versus Traffic Growth – Current BW Curve*



* Courtesy of Henk Steenman

Standards Versus Traffic Growth – A Single Customer Link Agg Today For A Large SP



- If traffic is doubling year over year, assuming this customer fits that trend, this curve will be peaking at 224G in 2009.



Closing

- Port sales aren't materializing today because the system can't support them
 - 10GE is not a failure, on the contrary
 - 40G Backbones – lack thereof, are handicapping 10GE use today
 - If there isn't a 100GE solution, an alternative high speed one will be found
 - Work need to begin on whatever follows 100G as soon as possible



- Questions