



Broad Market Potential for 10 GbE - Update

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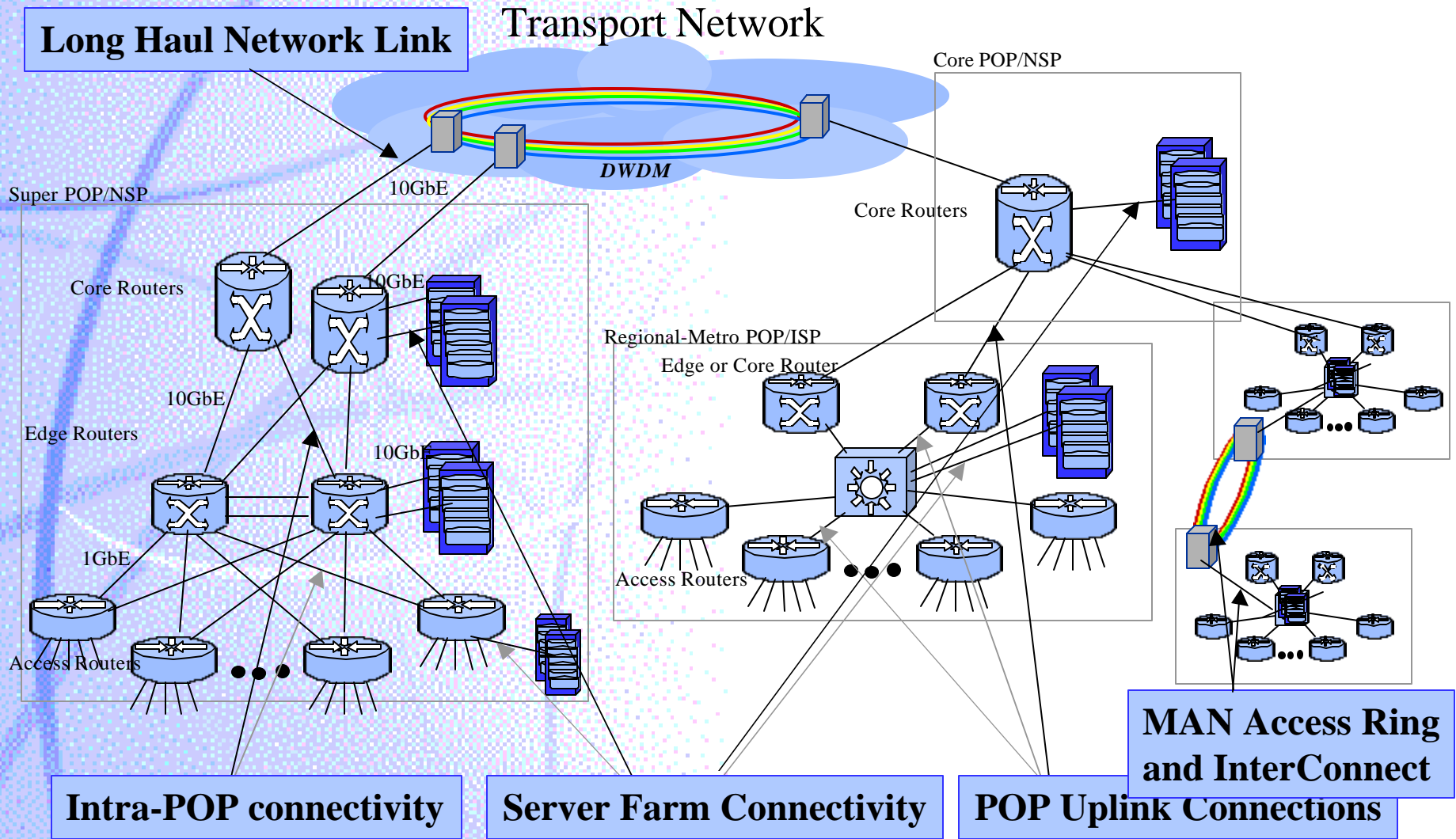
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Why create a WAN compatible 10 Gigabit Ethernet Standard

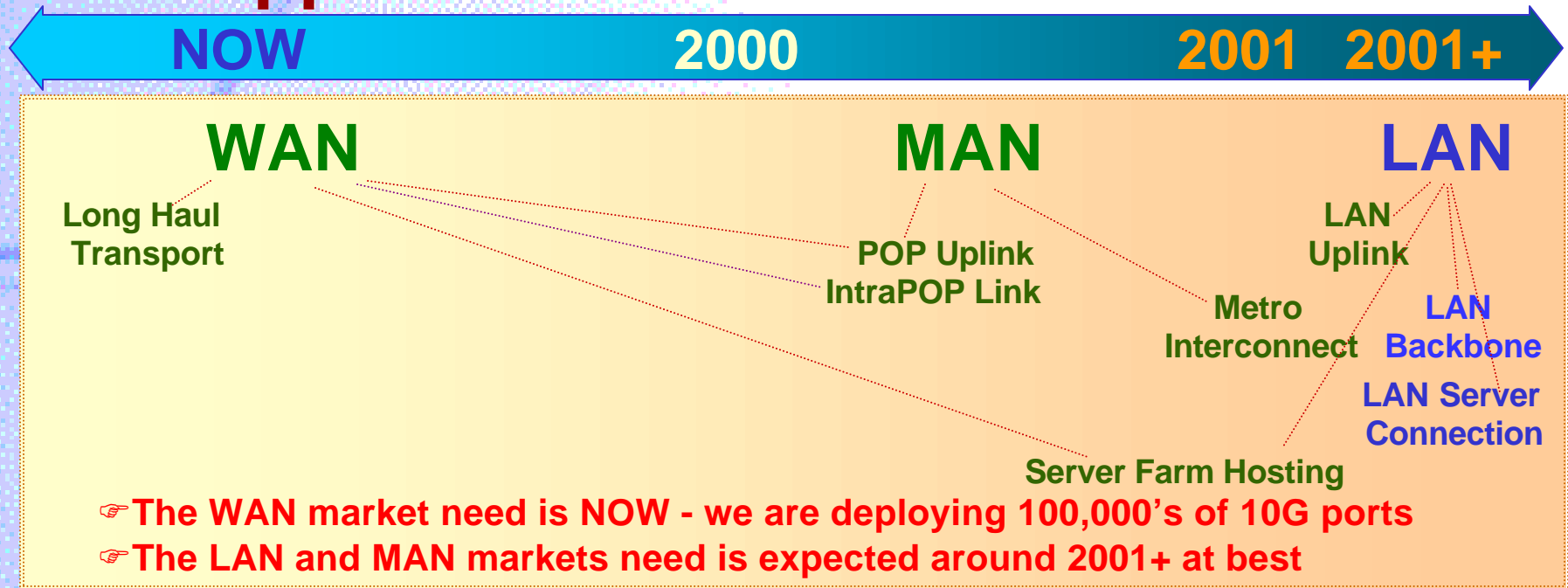
- ★ The additional revenue potential in the WAN for traditional Ethernet players is significant if a compatible rate is selected
- ★ The market need for 10 GbE in the WAN is now, and as such significant portion of up front costs will be absorbed by the WAN players leaving the LAN players to enjoy a low cost fast TTM product introduction
- ★ The Optical, Ethernet and Internet speeds are all converging on 10Gb speeds. Unification at 10G granularity is inevitable, logical and provides a seamless end-to-end LAN, MAN and WAN network.

WAN Applications of 10GbE



At least five different applications areas exist in the MAN and WAN

10Gb Application Market Overview



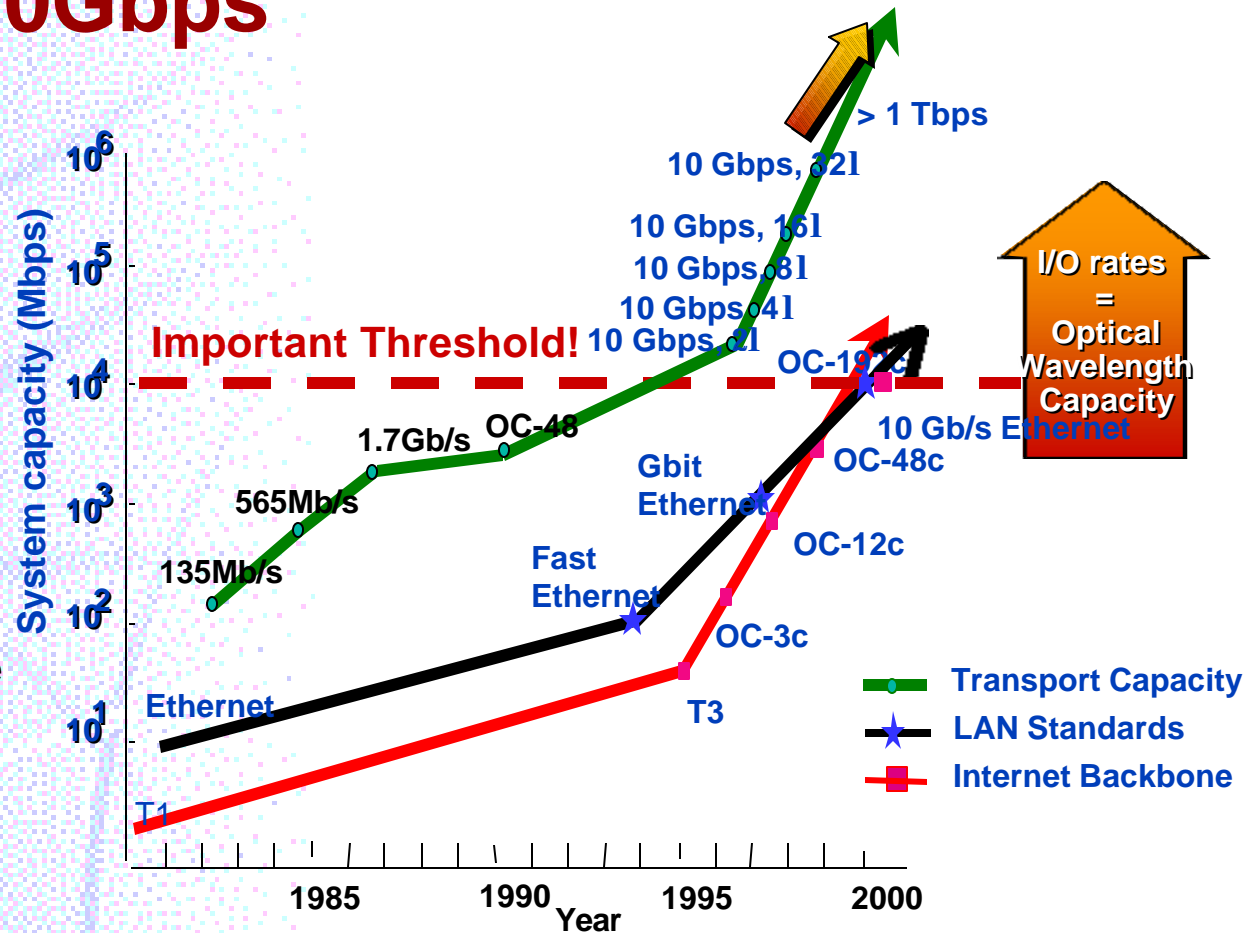
A true 10G Ethernet standard that is WAN compatible will;

- ☺ Have initial market penetration in the WAN with immediate return on technology investment
- ☺ Absorb the initial cost penalty typically seen before any Ethernet realizes its cost competitiveness
- ☹ If not compatible, solution will be uncompetitive in the LAN thus WAN market take will be slow and driven by the LAN environment

A WAN compatible rate opens up immediate and profitable opportunities

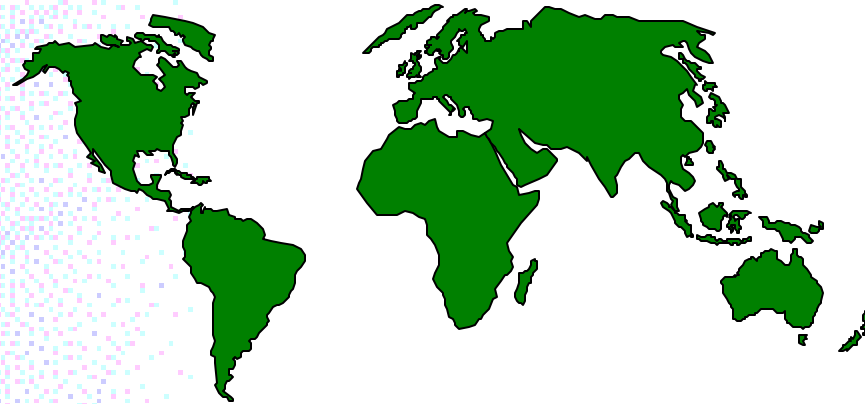
Unification at 10Gbps

- All are approaching 10Gb port speeds
- A common LAN and WAN standard provides a more seamless network
- A more seamless network provides more revenue opportunities for both the LAN and the WAN (ex. TLAN)
- And WDM will provide even higher capacity at this granularity



Unification is logical and inevitable!

Nortel Networks' Global 10 Gb/s WDM Projections

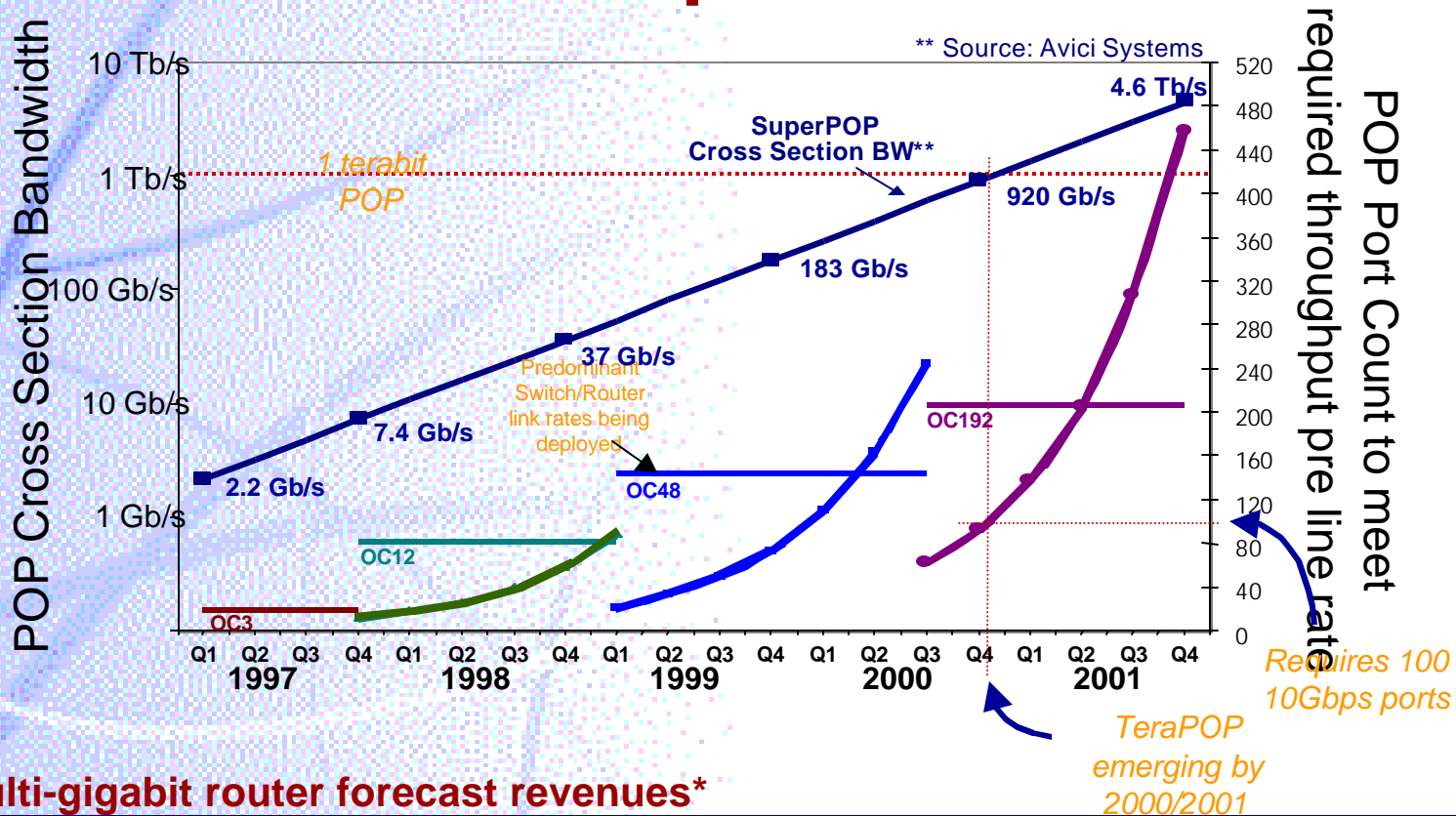


- These are DWDM ports
- Typically connected to OC-192 equipment as this is the only equipment today providing 10Gb/s data
- They do not have to be SONET, they could be 10Gb/s Ethernet if at appropriate data rate
- All major greenfield players are 9.58 based
- Many environments with dark fiber will still use the installed base for a portion of their networks

To date (Q2,99)	140,000
YE 1999	240,000
YE 2000	500,000
YE 2001	900,000
YE 2002	1,600,000

Of the systems we are shipping to date, only 25% are lit - the rest is available - but at 9.584640!

Core POP Router Requirements



Multi-gigabit router forecast revenues*

	1998	1999	2000	2001	2002	2003
Multi-gigabit Router Forecast (\$M)	169	455	1,289	2,380	4,051	5,531

*Source: RHK, Core Switching and Routing Forecast, April 1999

Large POP's will need over 2.2 M of WAN compatible 10 Gb/s ports by 2001

Server Market Forecast

- New applications driving server needs include web hosting, policy services etc.
- Server farms/clusters, with new architectures dealing with the I/O bottleneck, are emerging requiring multi-Gigabit connections.
- It will be advantageous to fit into a 9.584640 data rate as it would allow servers to connect directly into DWDM networks.
- Below is ISP use of servers. Additional spending occurs from other carriers.

National ISP's - POPs, Servers & Clusters**

	1998	1999	2000	2001	2002	2003
Cumulative number of POP's	3,912	4,264	4,648	5,066	5,522	6,019
Servers per POP	317	581	1,116	1,630	2,135	2,650
Total # of Servers	1,240,104	2,477,430	5,186,997	8,254,588	11,786,726	15,930,939
Total # of Clustered Units	74,406	235,356	622,439	1,238,188	2,180,544	3,584,461
Total Number of Clusters	7,440	23,535	62,243	123,818	218,054	358,466

**Source: Preliminary Gartner Group Study

In the ISP market, over 350K clusters will need core links - many at 10Gb/s

Conclusions - “Show me the Power!”

- ✘ **The LAN, MAN and WAN data rates are converging at 10Gb/s - with DWDM taking WAN rates beyond this**
- ✘ **It’s magic time to unify the local, metro and wide area networks, and 10 Gb/s Ethernet is a logical candidate**
- ✘ **By defining a WAN compatible 10 Gb/s Ethernet standard this committee serves the interests of the Ethernet LAN as well as the WAN community**
- ✘ **If a non WAN compatible standard is decided on, this market (802.3 products) will be the exclusive domain of LAN vendors and applications with slow WAN market uptake**

Conclusions - “Show me the Money!”

- × **The power of a unified and integrated solution will have enormous revenue potentials: components, and systems**
- × **Applications exist in the SONET, DWDM, router, switch and server markets**
- × **WAN apps are now, LAN is 2001+**
 - × WAN will absorb much of the technology up-front costs, leaving LAN players low cost faster TTM market introduction
- × **Number of 10 Gbps ports is exploding over the next 3 years.**
 - × 1.6 millions WDM ports by Nortel Networks alone in Year 2002 for WDM applications, of this only 25% are lit - the rest is available at the 9.58 data rate
- × **In the applications identified, the market for 10Gb ports will worth over \$ 3 billion in year 2003 if integration is possible.**