

10xGbE in the WAN and Long Haul Backbone A Market Perspective

Bill St Arnaud

Director Network Projects –
CANARIE

Bill.St.Arnaud@canarie.ca

- Many ISPs, regional networks, municipalities, school districts are purchasing dark fiber up to 1000 km rather than managed bandwidth
- With dark fiber increased bandwidth only entails upgraded equipment costs and no additional monthly charges
- Many CLECs and utilities specializing in only selling dark fiber
- Also many carriers willing to sell “gopher bait” fiber (fiber that does not meet stringent SONET/DWDM requirements) at a discount
- Estimates that 1/3 of installed fiber is “gopher bait” (both 1310 & 1550)
- As such, cost of transmission equipment is becoming a significant factor versus cost of fiber
- SONET and ATM networks require specialized engineering knowledge and skills
- Customers want a technology in the WAN they are familiar with and that is easily extensible from the LAN e.g. Ethernet

- GbE (or 10xGbE) WAN or long haul networks may be cost effective compared to SONET up to 500-1000km
- Biggest issues is transceivers, network management, bit jitter and frame jitter
- Cost of long haul 10xGbE should be compared to equivalent for SONET equipment and not 1xGbE
- Coding efficiency not critical – 8b/10b maybe ok. Overall cost is far more important, particularly up front capital costs.
- If coding efficiency that critical than use 10xGbE over SONET
- Major application is Internet, VoIP and IP video
 - Many school boards are looking to pay for cost of network by eliminating telephone circuits

Some ideal requirements

- Rate adaptive (step based, manual or automatic) to allow for longer repeater spacings with lower bit rates, and/or to use “gopher bait” fiber
- More expensive long reach laser modules or shorter repeater spacings can be added at a later date as traffic growth warrants
- May start with data rates at .5 Gbps => 1 Gbps => 2 Gbps => 5 Gbps => 10 Gbps => CWDM
- Should allow easy migration path to multi channel CWDM, each at 10xGbps