

10km SMF Reach Objective Relative Cost Analysis

IEEE 802.3 Higher Speed Study Group

12-15 November 2007

Chris Cole

chris.cole@finisar.com

Finisar

Finisar

Cost Analysis

- Optics Vendors have requested that the IEEE HSSG examine changing the 100GE 10km reach objective to 3km or 4km (3/4km) reach objective because of lower cost of 3/4km Transceivers.
- A straightforward cost analysis can be done to demonstrate the benefits of making this change
- Define:
 - v3 = volume of 0km to 3/4km 100GE ports
(= $x \cdot 10\text{GBASE-LR}$ volume, $x = X/48$ from goergen_01_1107)
 - v10 = volume of 3/4km to 10km 100GE ports
(= $(1-x) \cdot 10\text{GBASE-LR}$ volume, $x = X/48$ from goergen)
 - c3 = cost of 3/4km Transceiver
 - c10 = cost of 10km Transceiver
 - c40 = cost of 40km Transceiver
- Scenario 1: 10km is kept as a 100GE reach objective
total_cost1 = $(v3 + v10) \cdot c10$
- Scenario 2: 3/4km is adopted as a new 100GE reach objective
total_cost2 = $v3 \cdot c3 + v10 \cdot c40$

Cost Analysis

- 10km (scenario 1) should be changed to 3/4km (scenario 2) if:

total_cost1 > total_cost2:

$$(v3 + v10)*c10 > v3*c3 + v10*c40$$

- Solving:

$$v10 < v3*(c10 - c3)/(c40 - c10)$$

- Normalizing:

$$v10 < v3*(1 - c3/c10)/(c40/c10 - 1)$$

- Assumption set1 (traverso_01_1107, p7, and associated Q&A):

$$c3/c10 = 0.75$$

$$c40/c10 = 2$$

$$\underline{v10 < v3*25\% \text{ (or } (1-x)/x < 25\%)}$$

- Assumption set2 (New data, and cole_01_03, p12, cole_01_05, p11):

$$c3/c10 = 0.85$$

$$c40/c10 = 1.75$$

$$\underline{v10 < v3*20\% \text{ (or } (1-x)/x < 20\%)}$$