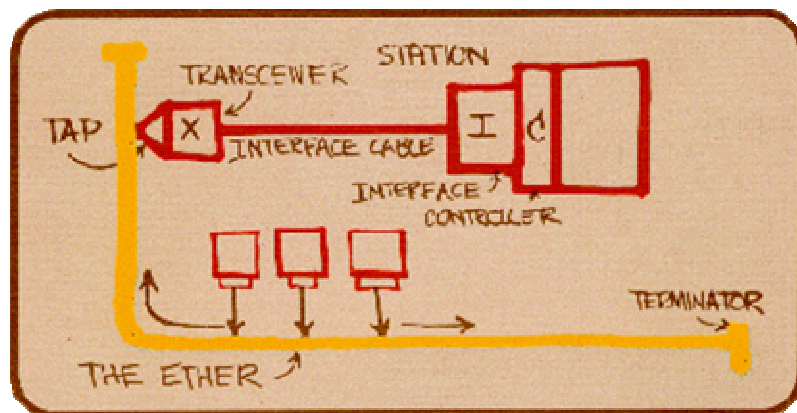


# FORCE10™



## 40 GbE and 100 GbE Update

***Greg Hankins***

***<ghankins@force10networks.com>***

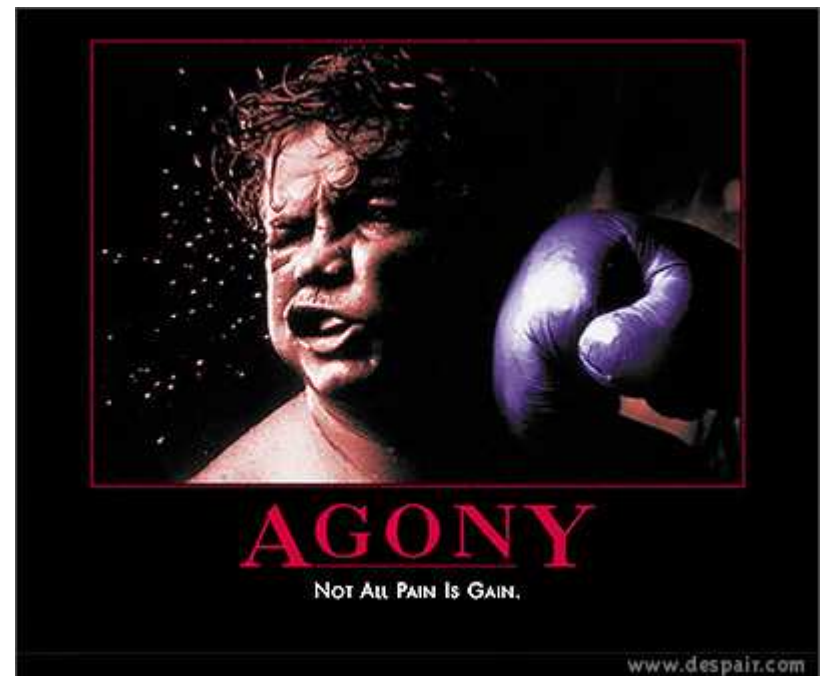
***Peering BOF XVI***

## Per IEEE-SA Standards Board Operations Manual, January 2005

At lectures, symposia, seminars, or educational courses, an individual presenting information on IEEE standards shall make it clear that his or her views should be considered the personal views of that individual rather than the formal position, explanation, or interpretation of the IEEE.

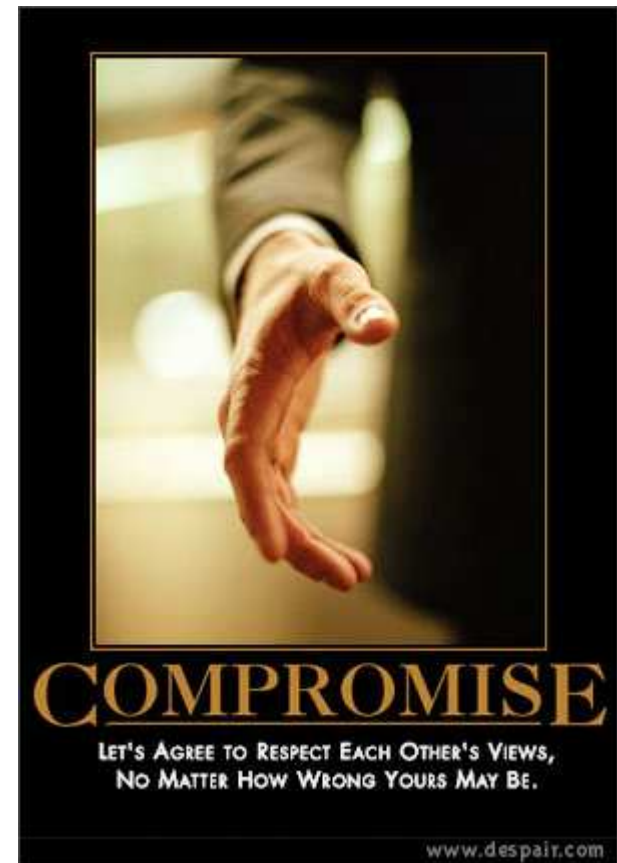
# After Failed Motions in May...

- After the May Interim meeting in Geneva
  - HSSG was split into 40 Gb/s and 100 Gb/s camps
  - Compromise looked difficult
  - Motions to move forward failed
  - Frustration levels were high



# ...We Made Progress in July

- Major compromises were worked out before, and during the July Plenary
  - Voted to adopt both 40 Gb/s and 100 Gb/s rates
  - Submitted PAR and 5 Criteria which were approved by the 802.3 Working Group
  - Approval by 802 EC, NESCOM and Standards Board pending in November



# The Next Generation of Ethernet

- The Higher Speed Study Group will become the IEEE 802.3ba Task Force
- The Task Force will produce one amendment to the IEEE 802.3 specification
- The 40 GbE and 100 GbE standards will be delivered together

# Summary of Adopted Objectives – July 2007 Plenary

## Common Objectives

Support full-duplex operation only

Preserve the 802.3 / Ethernet frame format  
utilizing the 802.3 MAC

Preserve minimum and maximum FrameSize of  
current 802.3 standard

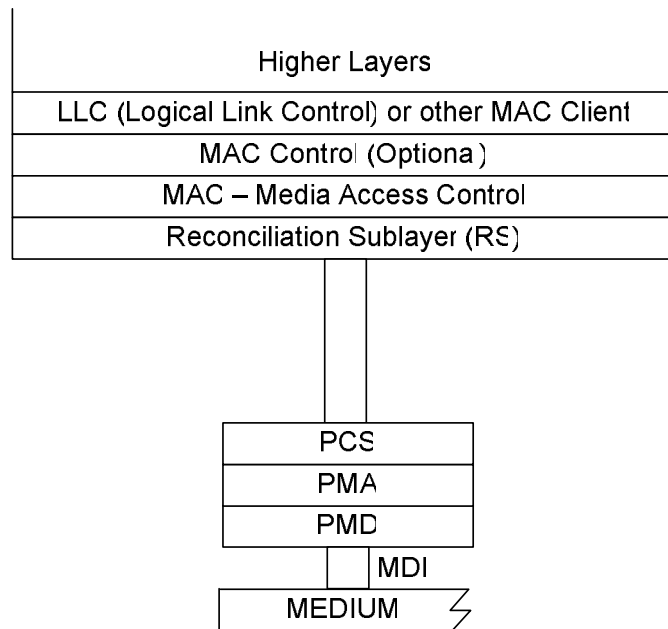
Support a BER better than or equal to  $10^{-12}$  at the  
MAC/PLS service interface

Provide appropriate support for OTN

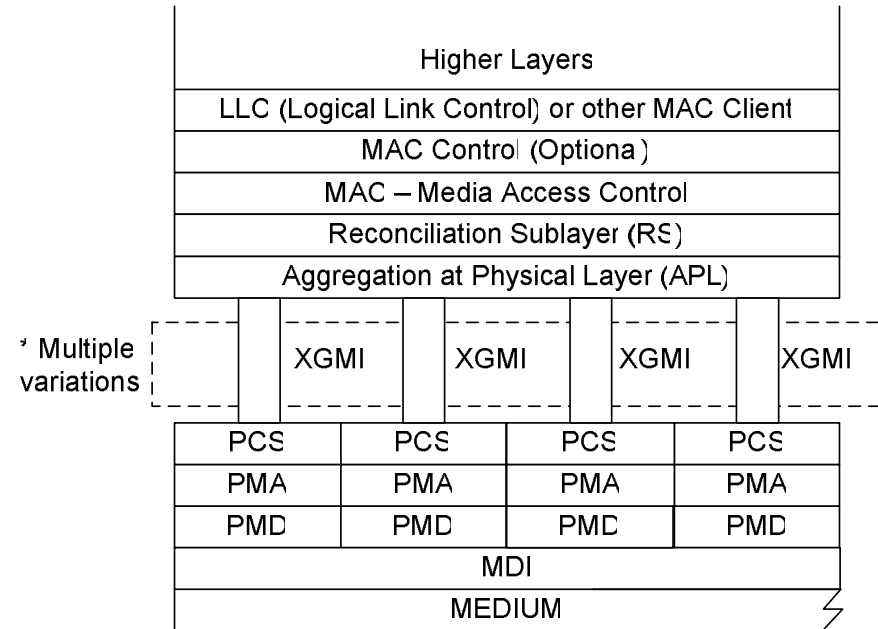
# Summary of Adopted Objectives – July 2007 Plenary

	40 Gb/s MAC Data Rate	100 Gb/s MAC Data Rate
Target Applications	Server and Computing Interfaces	Aggregation and Core Networks
<b>Physical Layer Specification Objectives</b>		
1m Backplane	✓	✗
10m Copper	✓	✓
100m OM3 MMF	✓	✓
10km SMF	✗	✓ (Might Add a 2km – 4km Objective)
40km SMF	✗	✓

# Questions to be Answered: Architecture Options Discussion



Multi-lane PHY



Aggregation of PHYs

- Is a solution “n” lanes by “m” Gb/s?
- Is a solution “n” instances of PHY by “m” Gb/s PHY?
- Multiple approaches to be considered



## Questions to be Answered: “Provide appropriate support for OTN”

- The ITU-T and IEEE will work together to specify mappings for 40 GbE and 100 GbE into OTN
  - Several people attend both the IEEE and ITU-T meetings
  - Liaison established
- Define transparent mapping of 40 GbE into existing ODU3
  - One option is transcoding 64B/66B to 512B/513B
- Define new ODU4 tier for 100 GbE
  - Transparent transport of 100 GbE over new wave
  - Multiplexed tributaries
    - ODU3-3v, 3 bonded waves of 40 Gb/s
    - ODU2-11v, 11 bonded waves of 10 Gb/s
  - TBD based on optical transmission feasibility

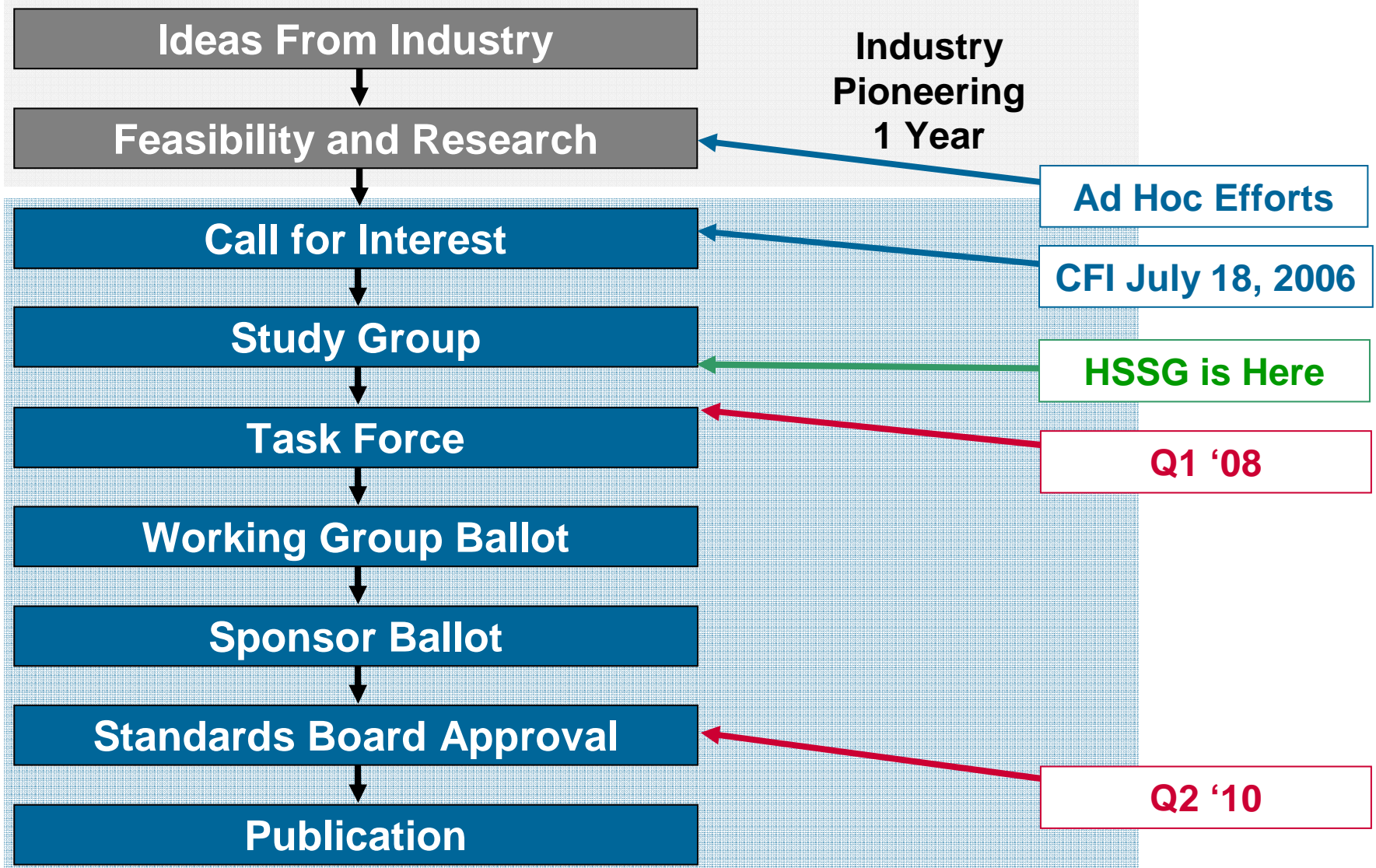
# Questions to be Answered: Physical Layer Specifications

- 40 Gb/s operation over
  - At least 1m over a backplane
  - At least 10m over a copper cable assembly
  - At least 100m on OM3 MMF
- 100 Gb/s operation over
  - At least 10m over a copper cable assembly
  - At least 100m on OM3 MMF
  - At least 10km on SMF (might add a 2km – 4km objective)
  - At least 40km on SMF

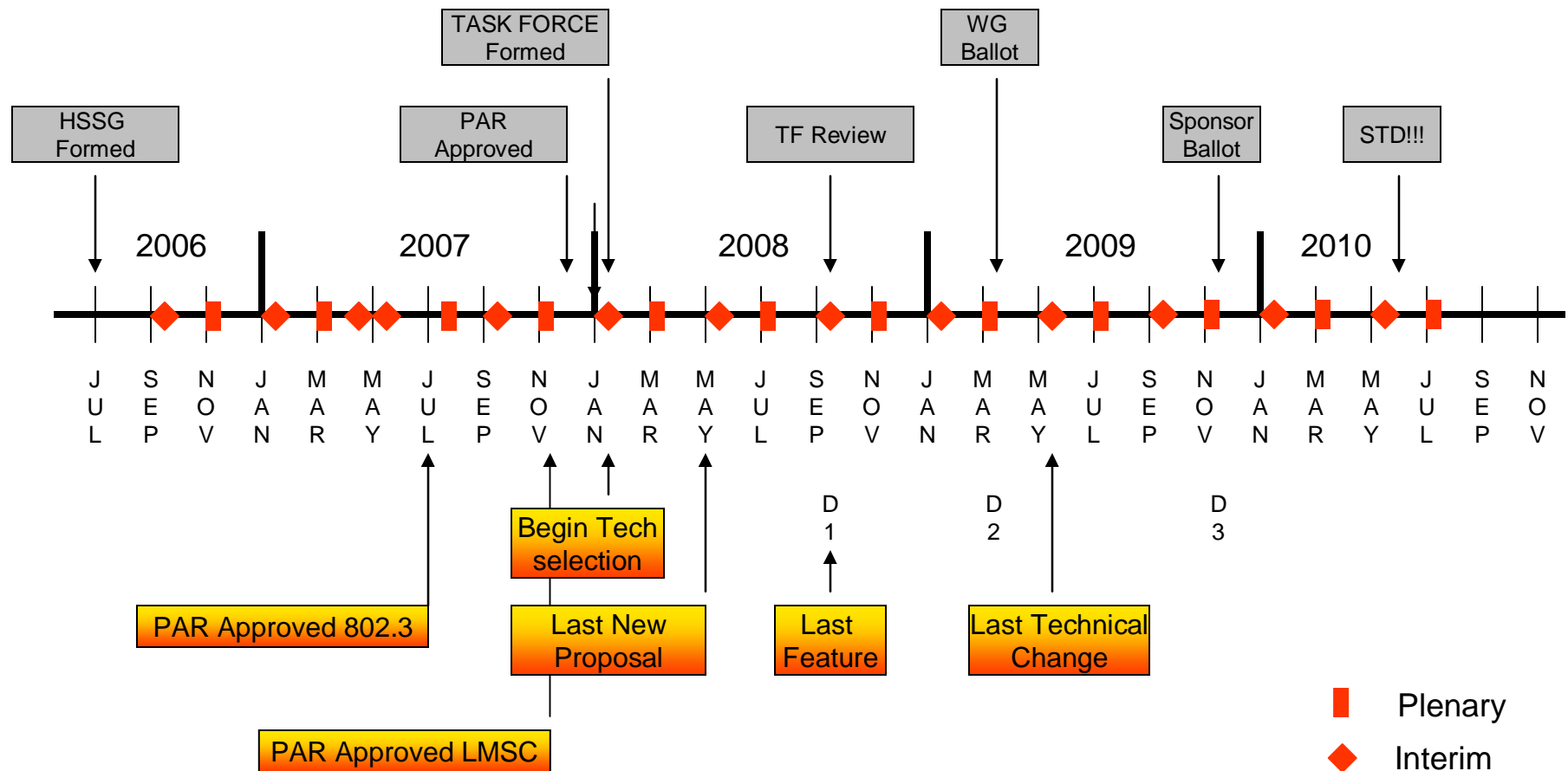
# Other Questions to be Answered

- Commonality between 40 Gb/s and 100 Gb/s?
  - How much stuff can we reuse?
- Naming nomenclature of interfaces and components
- Management (Clause 30, Annex 30A, SNMP MIBs)
- Define test procedures

# Developing an IEEE Standard



# Detailed Timeline (Not Approved)



# Future Meetings

- November 2007 IEEE 802 Plenary
  - November 13 - 15
  - Atlanta, GA
- January 2008 Interim
  - TBD



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