The EFM-Copper Deadlock

IEEE802.3ah

Supporters

- Michael Beck, Alcatel
- Massimo Sorbara, GlobespanVirata
- Tariq Haddad, Zarlink
- John Cioffi, Stanford University
- Douglas Artman, Texas Instruments
- Jacky Chow, Teknovus
- Christophe Del-Toso, STMicroelectronics
- Daun Langston, Metanoia
- Sedat Oelcer, IBM
- Klaus Fosmark, FirstMile Systems
- Mikael Isaksson, UpZide
- Daniel Bengtsson, Telia Research AB
- Per-Erik Eriksson, Ericsson
- Reza Alavi, Analog Devices
- Nelson Zagalsky, ADC
- Tetsu Koyama, NEC
- To be completed…
Goal of this presentation

- **History of EFM-Copper:** How did we get here?
- **Current status:** Where are we?
- **Proposal:** Where can we go?
January 2001 (Irvine): All Copper Objectives Fail

- **Y: 54  N: 31** - Ethernet over Cu @ >= X Mbps @ >= Y km
- **Y: 47  N: 39** - EoVDSL @ >= X Mbps @ >= Y km
- **Y: 34  N: 32** - Make recommendation re: EoVDSL
- **Y: 33  N: 36** - EoxDSL (Ethernet over some flavor of DSL)
- **Y: 46  N: 24** - Ethernet over Cu (for the MxU)
- **Y: 61  N: 21** - Ethernet over Cu (for the OSP)
- **Y: 50  N: 27** - One PMD for all Local Loop Cu Twisted Pair
March 2001 (Hilton Head Island): After presentations by Marvell, Elastic, Cisco and Alcatel, the copper objectives finally pass.

- **Y: 64 N: 1 A: 33** – (Topologies:) Point to point on copper
- **Y: 68 N: 0 A: 27** – (PHY Specifications:) PHY for copper

May 2001 (St. Louis): Copper Rate-Reach Objective

- PHY for single pair non-loaded voice grade copper distance $\geq 2500$ft and speed $\geq 10$Mbps aggregate
July 2001 (Portland): Spectrum Management Objective

- The point-to-point copper PHY shall recognize spectrum management restrictions imposed by operation in public access networks, including:
  - Recommendations from NRIC-V (USA)
  - ANSI T1.417-2001 (for frequencies up to 1.1MHz)
  - Frequency plans approved by ITU-T SG15/Q4, T1E1.4 and ETSI/TM6
November 2001 (Austin): The long-distance PHYs

PHY for single pair non-loaded voice grade copper, distance $\geq 4600\,\text{m}$,
$0.4\,\text{mm} \geq 256\,\text{kbps}$

- PHY for single pair non-loaded voice grade copper, distance $\geq 3700\,\text{m}$,
  $0.5\,\text{mm} \geq 4\,\text{Mbps}$

- Include an optional specification for combined operation on multiple copper pairs

The long-distance objectives get negative feedback at the IEEE802.3 closing plenary.
January 2002 (Raleigh): Only one rate-reaching objective survives the “rewording effort”.

- PHY for single pair non-loaded voice grade copper distance ≥ 750m and speed ≥ 10Mbps full-duplex

March 2002 (St. Louis):

- “Higher layer” baseline proposals are approved by CuSTF and EFM TF (Marris, Fosmark, Simon).

- VDSL baseline (Rezvani) is approved by CuSTF but rejected by EFM TF (Y:43 N:37 A:47 / Y:24 N:21 A:28)

- A motion to restrict work to higher layers (Eckert) received considerable support in EFM TF (Y:51 N:32 A:68 / Y:27 N:24 A:33)
The St. Louis Deadlock Analysis (1)

♦ Why did the VDSL baseline fail in the Task Force?

- VDSL vendors were unhappy about the lack of progress on the linecode selection criteria.

- Some people were unhappy about the short range of the proposed PHY. Other PHYs might allow us to address a larger part of the market.

- Some people wanted to limit the work of the CuSTF to the layer between the γ-interface and the MII. This was already proposed in Raleigh (without a motion) and brought to a vote for the first time in St.Louis.
We seem to agree that…

- We want to do something on point-to-point copper.
- It may have applications in the public network, it may have applications in MTU/MDUs.
- Different xDSL flavors can be used, if we define the layer between the \( \gamma \)-interface and the MII.

But we disagree on…

- The rate-reach pair that will optimize the potential of EFM-Copper.
- The choice of a technology and/or a linecode for EFM-Copper.
Three “higher layer” baseline proposals have been approved.

Below the γ-interface, we don’t have (and may never have) 75% support in the Task Force for any technology or linecode.

We could stop now and write a draft around what we have, but the IEEE 802.3 Working Group will never call it a PHY.

If we don’t think of something quickly, the Copper Track will die without a standard.
The authors and supporters of this presentation are seeking support for the following motion:

- *Change the Copper PHY objective into: “A specification of the functions needed to transport IEEE 802.3 MAC frames over xDSL systems that have a PTM specific γ-interface as defined in ITU-T Recommendation G.993.1 Annex H.”*

- This change would allow us to save the work we have done so far, while getting out of the linecode deadlock.

- The specification may become a separate Clause or Annex in the IEEE 802.3 standard.
Proposal

MAC Control (Optional)

MAC – Media Access Control

Reconciliation

From IEEE® 802.3

IEEE 802.3ah

From existing DSL standards

PCS →

PTM-TC

PMS-TC

PMD

voice grade Cu

MII →

Ethernet-over-xDSL AL

MDI →

PMA

PMD

voice grade Cu
“Ethernet-over-xDSL” has been proposed in these presentations:

- staszak_1_01_2001.pdf
- easy_1_0501.pdf
- kimpe_1_0901.pdf
- langston_1_0901.pdf
- bar-or_1_1101.pdf
- langston_1_1101.pdf
- kimpe_1_0102.pdf
- haas_1_0102.pdf
- beck_1_0102.pdf