Auto-Negotiation
… an HSSG Objective?

Rich Taborek

rtaborek@earthlink.net

HSSG Reflector Traffic

I wrote: "Based on Jonathan's response to my question about adding Auto-Negotiation as an HSSG objective and getting the response that Auto-Negotiation is an integral part of Ethernet and therefore does not require a distinct objective." (Question posed in Coeur d'Alene)

Rich Seifert responded: "If 10 GbE will need some form of AN, it needs to be put into the requirements; it is not "presumed" to be a requirement of all 802.3 standards."

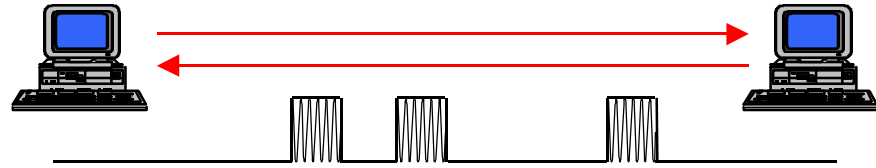- It's time to consider AN as an HSSG objective

AN Facts & History

- AN is integral part of Ethernet over twisted-pair
  - Since 100BASE-T, all future Ethernet PHYs that operate over twisted-pair cable and that use RJ-45 style connectors are required to implement AN.

- 1000BASE-X supports AN except for link speed.
  - Protocol operates at a single line rate (1.25 GBaud)
  - No Serial AN was present in Fibre Channel
  - No Serial AN was developed for GbE (no time)

- Current TIA FO 2.2 100BASE-SX draft supports optical AN only for 10 and 100 Mbps

Serial/Optical AN Benefits

- Provides parity with Ethernet over copper
  - Optical/CX connectors **DO NOT** denote speed
  - 10/100/1 Gig/10 Gig Optical Ethernet devices can be connected to each other - They just don't work!
  - The user is left to determine why not
- AN provides valuable services to Ethernet users
  - Automatically determines interoperability
  - Automatically enables highest common technology
  - If link does not come up, AN tell you **WHY NOT**
- Applicable to all 10 GbE PHYs... bar none!
  - WAN, WWDM, MAS, Parallel, Serial

Serial AN

- Proposal to HSSG made in Coeur d'Alene (6/99)

  http://grouper.ieee.org/groups/802/3/10G_study/public/june99/taborek_3_0699.pdf

- Protocol uses Signal Detect-based "tones"

  - Tone frequency can easily span 10X line rates

  - Tone Pulses correspond to Fast Link Pulses (FLPs)

  - Tone Pulses are arranged 17-33 Pulses to a Burst

- All else is standard, simple, reliable Ethernet AN

Proposal: Add Serial AN as an HSSG Objective

Auto-Negotiation Review

- Method to exchange info between 2 stations
- Used to configure operating parameters such as speed, flow control;
- An AN device advertises its abilities and detects the abilities of its Link Partner (remote device);
- AN information is exchanged using link pulses and acknowledged;
- AN uses a priority resolution algorithm to establish the best mode of operation;
- The highest performance common technology is attached to the media;
- AN becomes transparent until reinvoked due to reset, power-on, link failure, etc.;