Network Elements Inc.

enabling the Next Generation Internet

Packet Interface Standardization for Ten Gigabit Ethernet

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Media Independent Interfaces

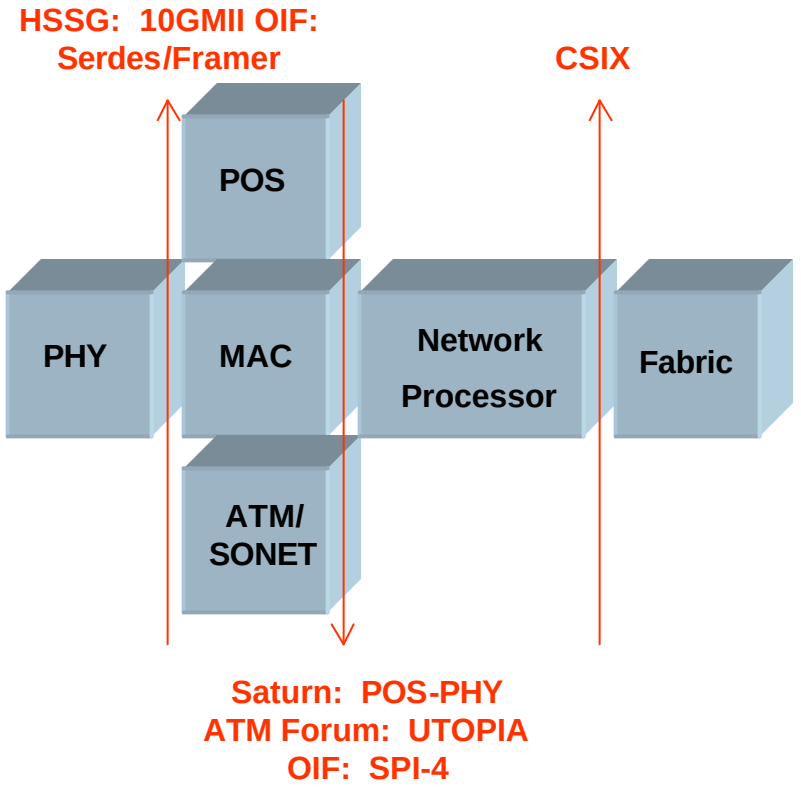
- Previous IEEE 802.3 activities have standardized the interface from MAC to PHY.
  - 10BaseT: AUI (Attachment Unit Interface)
  - 100BaseT: MII (Media Independent Interface)
  - 1000BaseT: GMII (Gigabit Media-Independent Interface)
  - 10GbE: Objective to "specify an optional Media Independent Interface."
- The Media Independent Interface makes a lot of sense for Layer 2 products
  - Allows use of different PHY interfaces from same MAC processing element

Flexible Packet Interface Standardization

- Increased LAN sizes and WAN connectivity has led to a proliferation of Layer 3 switches
  - Allows easier scaling of networks
- Makes sense to standardize a packet interface
  - Increased “siliconization” of higher layer functionality
  - Emergence of network processors for Layer 3/4
  - Standardization already taking place in other forums

Standard Interfaces are Moving Up the Stack

- Flexible Packet Interface Advantages:
  - Facilitates common system implementations
  - Leverages forthcoming network processor silicon
  - Leverages development efforts of OIF, ATM Forum, Saturn Group
  - Increases commonality of IP transport
  - Useful for LAN and WAN implementations



Interface Standards are Being Developed

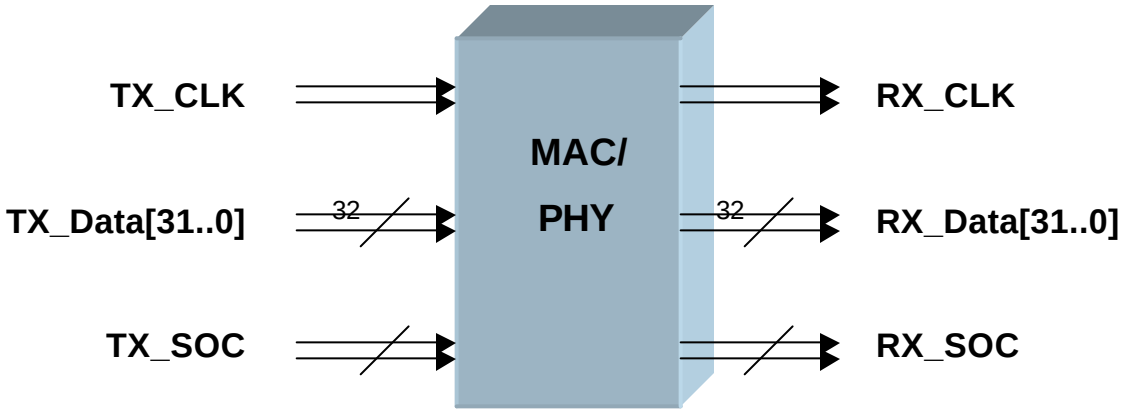
- UTOPIA-4 at ATM Forum
  - 32-bit parallel differential
  - LVDS (Low Voltage Differential Signaling)
  - In-band signaling
  - Unlike previous UTOPIA standards, supports variable-length packets
- Packet over SONET (POS-PHY 4) at Saturn Group
  - 32-bit parallel differential, 400Mbps per line
  - LVDS
- System Physical Interface (SPI-4) at OIF (Optical Internetworking Forum)
  - 64-bit parallel, single-ended interface; 200Mbps per line
  - HSTL (High-Speed Transceiver Logic)
  - Allows system prototyping with FPGA's
- All of these standards are still Work in Progress

Recommended Interface

- We recommend the UTOPIA-4 specification in work at the ATM Forum as a starting point

- Issues:
  - Packet type identification on interface
  - Convergence on in-band signaling format
  - Coordination of activity with other standards groups

UTOPIA-4 Interface



Proposal

- We propose that the HSSG add an objective to specify an optional Flexible Packet Interface.