Intra-Switch Management Interface Use Cases for Single Pair Ethernet

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Current Intra-Switch Management Plane Architecture

- Intra-switch control plane is used to perform configuration/monitoring of components in the switch
- Many different components with various control plane interfaces

- I2C/SMB Bus
  - Optical Module, AC/DC Power Supplies, FAN Control, DC-DC Converters, Temp monitors, EPROM etc….
  - 2 wire – Clock + Shared Data (Tx/Rx)
  - Clock speed 100KHz, data BW (25 to 30Kb/s) limited due half-duplex and protocol overhead
- UART: Universal Asynchronous Rx/Tx
  - Micro-controllers/CPU
  - 2 wire – Rx/Tx
  - 9.6Kb/s

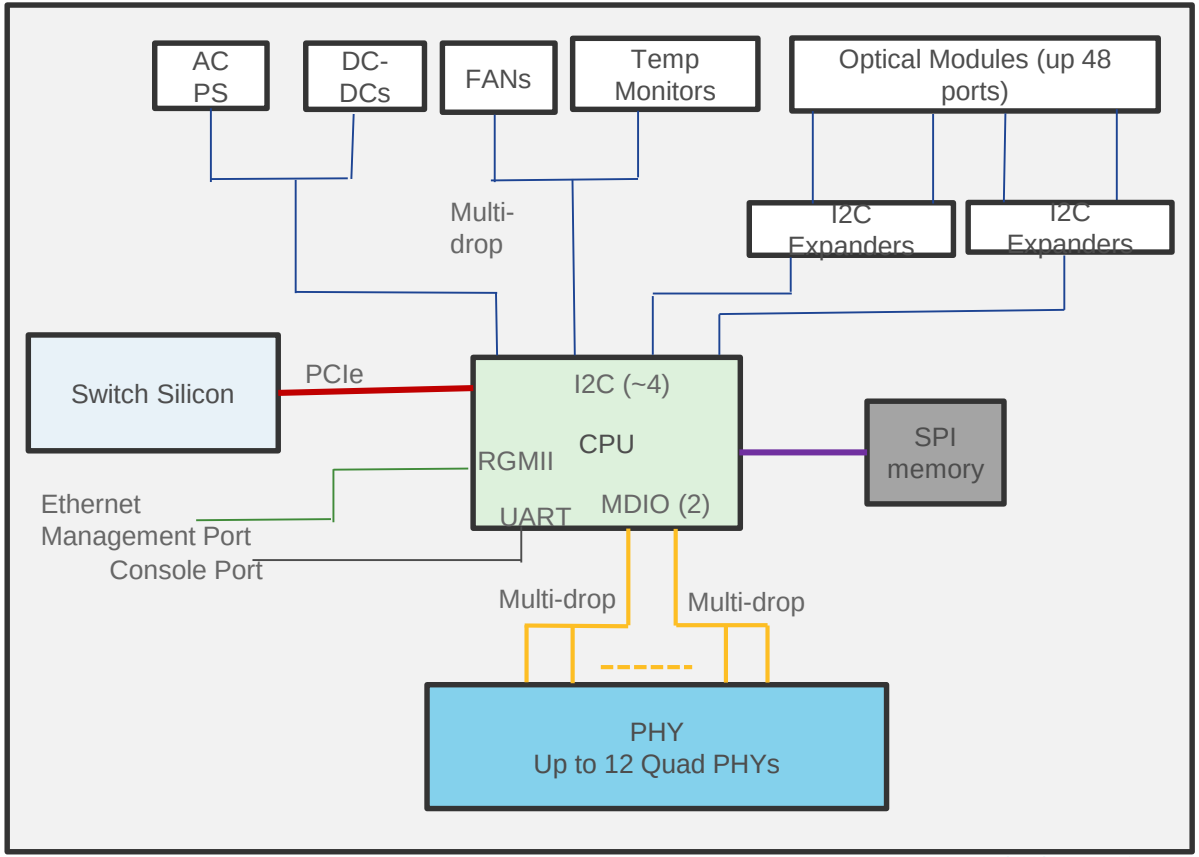
- MDIO (IEEE 802.3 Clause 22/45): Copper PHYs and Fiber PHYs
  - 2 wire
  - Tx/Rx shared (half-duplex)
  - Max specified MDC clock of 2.5MHz (avg. BW 1Mb/s)
- SPI :
  - SD card, Sensors, eMMC
  - Minimum of 4 wire – Clock, Rx, Tx and Save Select (incase of multiple devices connected to same data pins
  - Typically 12 to 25Mb/s
  - Allows more data wires to used for higher bandwidth

Current Intra-Switch Management Interface

- Current management interfaces specified in isolation to solve a particular issue, not ideal for overall system management
- Management Interfaces have not kept up with BW requirements – Devices require more configuration and status monitoring
  - AC Power Supplies: Temp, voltage, current, fan monitoring
  - DC-DC converters : Temp, voltage, current
  - Copper PHY and Copper PHY => Firmware image increases with complexity
  - Memories: Size increases with every technology node, requires higher BW for writes and reads
  - As complexity increases, management interface needs to be provide reliable and faster access - E.g. I2C/SMBUS very un-reliable when used as multi-drop bus
  - Each interface requires different “Software Drivers” : Creates development and maintenance issues

Current Typical Switch Management Arch

- Too many interface types
- I/O types limited on CPU – require external devices to expand I/O
- Multi-drop – subject multiple failure conditions
- Limited BW
- Multiple Software Driver requirements



Proposed Intra-Switch Management Interface

- 2-wire: Reduce inter-connect
- At least 10Mb/s (up to 100Mb/s should be considered for future apps)
- Ethernet based – one common driver
- Switched Point-to-Point full duplex – for BW or hot-puggable devices

Proposed Switch Management Arch

- Number of different I/O types reduced by using
- CPU I/O limitation for I2C/MDO removed
- Point-Point Ethernet for BW and or Hot-pluggable interfaces
- Ethernet Driver