



Leverage existing IEEE 802.3 technology for 2.5/5GBASE backplane

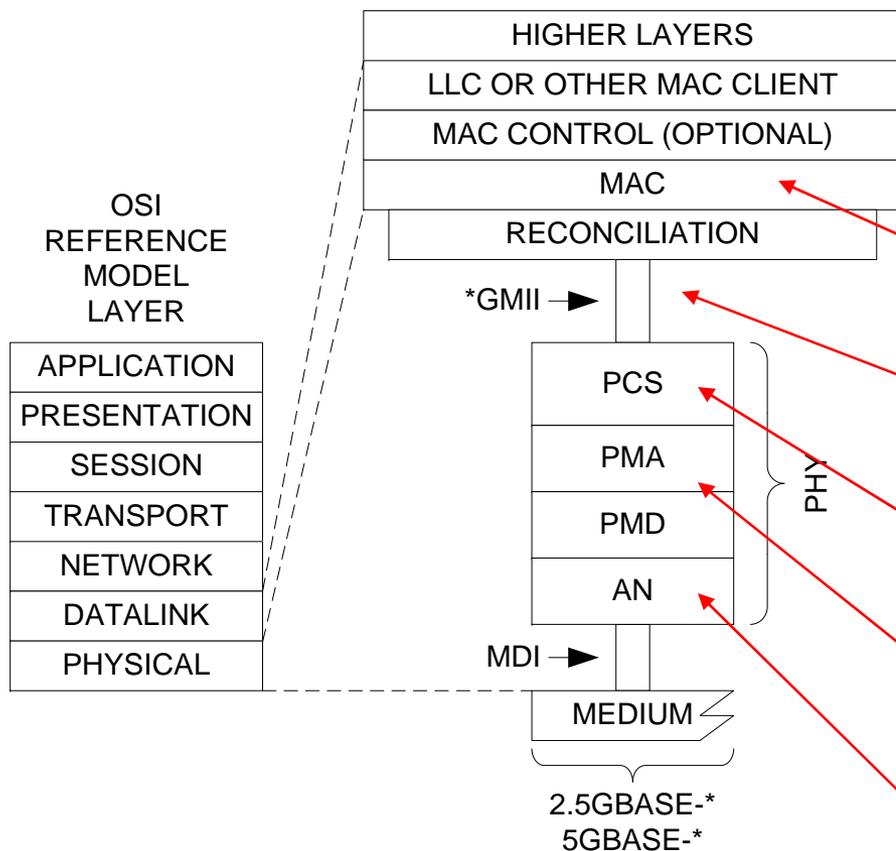
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Agenda

- ▶ **Specify 2.5G and 5G Backplane Ethernet reusing as much of existing 802.3 as possible**
- ▶ **Describe work needed on a high level**
 - Not diving into details
 - Not making any technical decisions
- ▶ **Show technical feasibility**
 - Modifications based on technologies already deployed in the field

Ethernet Reference Model



- ▶ **Management (Clause 30)**
 - Add new capabilities
- ▶ **Registers (Clause 45)**
 - Add / Modify registers
- ▶ **2.5G/5G MAC (Clause 4)**
 - Being handled by 802.3bz Task Force
- ▶ ***GMII (Clause 46)**
 - Being handled by 802.3bz Task Force
- ▶ **PCS (New)**
 - Either 1 or 2 new clauses
- ▶ **PMA/PMD (New)**
 - At least one new clause possibly more
- ▶ **Auto-Negotiation (Clause 73)**
 - Add new speed definitions
- ▶ **Energy Efficient Ethernet (Clause 78)**
 - Some modifications

Simple Changes

- ▶ **Clause 1 - Introduction**
 - Add definition to the new backplanes introduced
- ▶ **Clause 30 - Management**
 - Addition of new PHY management attributes for new speeds
- ▶ **Clause 125 – Introduction to 2.5 Gb/s and 5 Gb/s networks**
 - Addition to introduce the new backplanes
- ▶ **Clause 4 – Media Access Control**
 - New MAC speeds – work already being done by 802.3bz
 - 2.5G and 5G backplane will only support full duplex
- ▶ **Clause 46 – Reconciliation Sublayer**
 - Optional digital interface – work already being done by 802.3bz
- ▶ **Clause 73 – Auto-Negotiation**
 - Add definition to the new backplanes capability

Straightforward but More Involved Changes

- ▶ **Clause 45 – Management Data Input/Output Interface**
 - Register Section
 - Not hard to specify, but gets messy and tedious working with existing registers

- ▶ **Clause 69 – Introduction to Ethernet Operation Over Electrical Backplane**
 - Describe layering for new speeds
 - Specify delay constraints

Physical Coding Sublayer (PCS)

- ▶ **Leverage 1000BASE-X (Clause 36)**
 - Existing implementations running at 2.5G already
 - Need minor alterations to attach to XGMII as chosen by 802.3bz
- ▶ **Leverage 10GBASE-R (Clause 49)**
 - More bandwidth efficient
 - Easy to leverage KR training if needed
- ▶ **1000BASE-X a good choice for 2.5G and 10GBASE-R for 5G**

Physical Medium Attachment Sublayer (PMA)

▶ 2.5G PMA

- Can use Clause 36 – simple to incorporate

▶ 5G PMA

- Can use Clause 51 as starting point
- Can simplify a lot as an exposed PMA interface does not need to be defined

Physical Medium Dependent Sublayer (PMD)

- ▶ **2.5G Backplane Electrical Characteristics**
 - Use Clause 71 PMD 10GBASE-KX4 except one lane instead of four
 - Already 3.125 Gb/s raw rate
- ▶ **2.5G Short Reach Copper Electrical Characteristics**
 - Use Clause 54 PMD 10GBASE-CX4 except one lane instead of four
 - Already 3.125 Gb/s raw rate
- ▶ **5G Backplane Electrical Characteristics**
 - Can start with Clause 72 PMD 10GBASE-KR
 - Need to change parameters from 10G to 5G
 - KR training can be used as is if included in the standard
 - Good subject of discussion as no raw 5G backplane PMD defined
- ▶ **5G Short Reach Copper Electrical Characteristics**
 - Can start with Clause 85 PMD 40GBASE-CR4 except one lane instead of four
 - Need to change parameters from 10G to 5G
 - Good subject of discussion as no raw 5G copper PMD defined

Energy Efficient Ethernet

- ▶ **Clause 78 – Energy Efficient Ethernet**
 - Need to specify the timing parameters for the new backplane speeds
 - Optional capability
- ▶ **Need to discuss EEE within the new backplane PMD sections**
- ▶ **Leverage 1000BASE-KX and 10GBASE-KR as is**
 - May need some timer adjustments, but no change needed in mechanism

Technically Feasible

- ▶ **Scale up 1G and/or scale down 10G**
- ▶ **Incrementally add to the infrastructure already in place**

THANK YOU