

Additional Non-Industrial Use Cases for 10SPE May 2017

Peter Jones - Cisco

From Vancouver

http://www.ieee802.org/3/cg/public/Mar2017/Lewis_3cg_01_0317.pdf

Non-Industrial Use of P802.3cg

Jon Lewis

Vancouver, BC Canada

14 March, 2017

DELLEMC



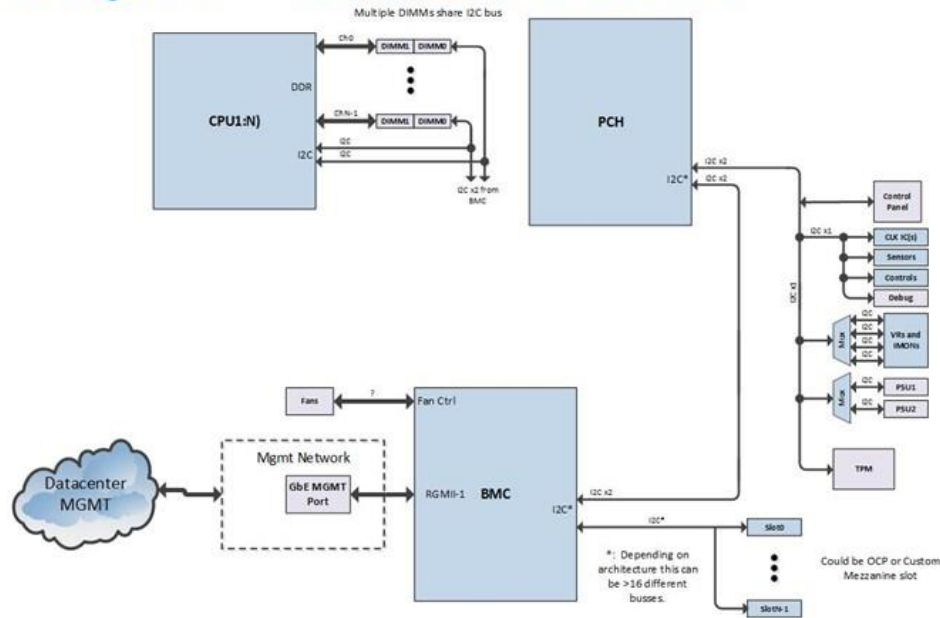
Quick recap from Vancouver

- Jon Lewis from Dell EMC presented “Non-Industrial Use of P802.3cg”
http://www.ieee802.org/3/cg/public/Mar2017/Lewis_3cg_01_0317.pdf
 - This described a new and significant use case for “intra-system control” of the many and varied devices inside a modern day server.
 - Key points (slides) from this presentation follow this slide.

From Vancouver

http://www.ieee802.org/3/cg/public/Mar2017/Lewis_3cg_01_0317.pdf

Block Diagram – Current Architecture



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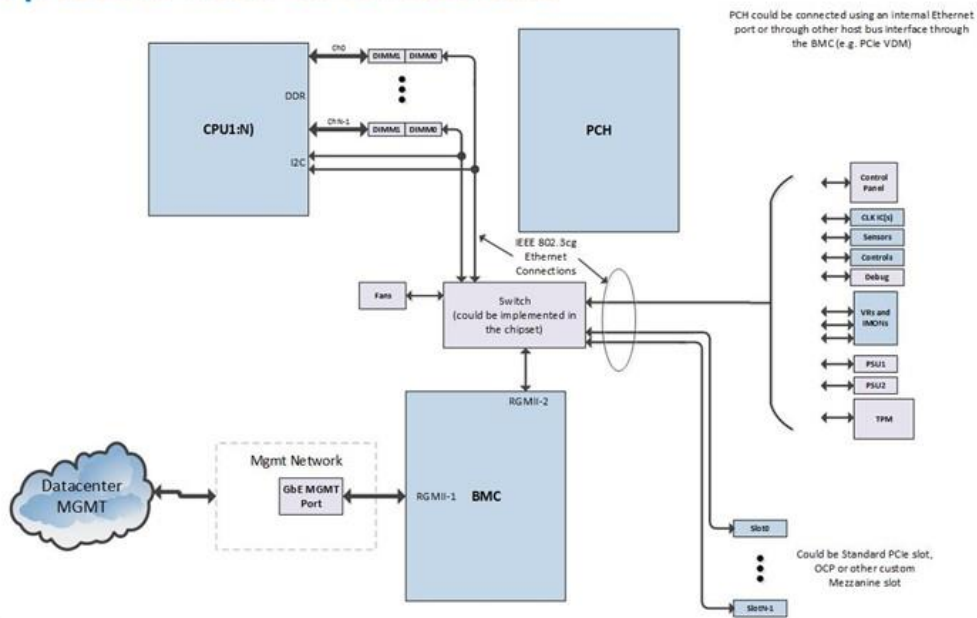
IEEE P802.3cg 10 Mbps Single Twisted Pair Ethernet Task Force

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http://www.ieee802.org/3/cg/public/Mar2017/Lewis_3cg_01_0317.pdf

Proposed new architecture



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IEEE P802.3cg 10 Mbps Single Twisted Pair Ethernet Task Force

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http://www.ieee802.org/3/cg/public/Mar2017/Lewis_3cg_01_0317.pdf

Why 10 Mbps Single Twisted Pair Ethernet?

- Same number of pins as SMBus which would maintain current PCIe standard pin count while adding network functionality.
- Using Ethernet allows for discovery of devices using a common BMC driver.
 - Going from >10 custom drivers to a standard Ethernet driver reduces complexity on the BMC coding and will greatly reduce validation time now required for all custom implementations.
- As the compute node and networking “converge” there is a fine line between what is in a traditional server and what is in the networking “Ether”
 - External PCIe Expanders
 - Chassis servers
 - Modular server implementations. Ethernet provides a standard ubiquitous management communication path
- Easier for automated alerts than multi-master SMBus.
 - Using SMBus multiplexers makes multi-master difficult → impossible. Thus scanning the bus continuously is required.
 - Using Ethernet the endpoint could transmit the alert at any time without a master/slave relationship.

My Summary (reflective listening)

- It seems that there could be a significant advantage in converting older intra-system control interfaces (e.g., I2C, SPI, MDIO, etc) to 10SPE.
- The advantage as described is not in the area of relative cost, but improvement on the development timeline and reduction in defects seen during or after development.
 - There may or may not be relative cost advantages in the system. To answer that question for given type of system requires a much more detailed evaluation.

Other types of system – Network devices

- Talking to a number of my colleagues offline, I believe that there are equivalent simplification benefits available in (at least) mid to high end networking devices (e.g. network switch, router, firewall, etc).
- These devices normally have a large number of older intra-system control interfaces (e.g., I2C, SPI, MDIO, etc) to control internal infrastructure (e.g. fans, power supplies, etc)
- These control interfaces are well known in the industry to be a significant source of functional and performance issues.
- I found that the potential benefits of this 10SPE use case could be explained in ~ 5 minutes, and were enthusiastically embraced.
- This would marry very well to the “backplane Ethernet” which is the dominant higher speed intra system control plane today.

Other types of system – optics modules (inc copper)

- An additional type of control interfaces present in most network systems is the I2C (or similar) used to control pluggable optics (e.g. SFP+, QSFP+, etc).
- There are lots of these in most networking devices, and they have the same issues.
- As technology develops (e.g. QSFP-DD), the current control interface is becoming a significant bottleneck.
- 10SPE could be a very effective solution to this issue.
 - It potentially offers all the same benefits listed for the server in slide 6

Applicability & Audience

- I believe that use case is broadly applicable across the industry, from low end IoT devices to high end systems (e.g. core internet switches/routers).
- Individuals from many of the potential users attend 802.3, but not 802.3cg. This may also be of significant interest to individuals in the 802.1 group.
- We need to broaden the discussion beyond 802.3cg and it's meetings and adHocs to address the needs of the broad market

Wrap up and next steps (1)

- I believe that:
 - the “intra system” control interface is a very significant opportunity to use the 10SPE technology.
 - use of a “simple” point to point short reach 10SPE system (with optional power) could address a significant proportion of the current I2C, SPI, MDIO, etc use cases.
 - Adding 10SPE as an included interface in low end microcontrollers (like those used in pluggable fans, power supplies, optics modules etc) is an obvious application of the technology
 - Creating “intra-system” (aka “on-board”) switch devices to build the ethernet network to connect these devices to the main intra-system control loop is well within the capabilities of the industry

Wrap up and next steps (2)

- Next steps I think are needed
 - Produce at least the equivalent deck to [Lewis 3cg 01 0317.pdf](#) for a small number of types of networking devices (including for pluggable optics)
 - Socialize these applications within the broader 802.3 community as many individuals are not following 10SPE closely.
 - Summarize requirements for this intra-system control interface use case.
 - Provide estimates of the numbers of links (equivalent of ports) that could benefit from this technology annually
 - Provide relative cost/complexity for incorporating a 10SPE Ethernet interface into the class of low end micro controllers use for these applications.
 - Assess if there are any gaps between the requirements and what 10SPE currently plans to deliver.

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Wrap up and next steps (3)

- Next steps I think are needed (cont.)
 - Start some work in the 802.3 NEA AdHoc to broadly socialize this topic.
 - Plan for 2 (or more) NEA AdHoc conference calls between New Orleans and Berlin.
 - Depending on the outcome of the conference calls, possibly request a physical meeting slot for this topic within NEA.

10SPE ask to NEA AdHoc

- It's clear that we need a broader discussion about this (and at least one other) new use case.
- The following request has been sent to the NEA AdHoc chair:

During the work of the 802.3cg 10SPE task force, we have discovered or clarified the following broad use cases (within scope of our current PAR)

- Building automation control interface
http://www.ieee802.org/3/cg/public/May2017/herbst_3cg_01_0517.pdf
- Intra-system (e.g. server, switch, etc) control interface
http://www.ieee802.org/3/cg/public/Mar2017/Lewis_3cg_01_0317.pdf
http://www.ieee802.org/3/cg/public/May2017/jones_10spe_02_0517.pdf

We believe that NEA AdHoc is the appropriate forum to progress these discussions with a broader interest group than may be currently participating in the 802.3cg. We would like to use it as a vehicle to discuss these use cases and build consensus on their requirements before and at the July plenary.

NEA report to 802.3

http://www.ieee802.org/3/minutes/may17/0517_NEA_report.pdf

Future NEA Activity

- Building automation control interface
 - Reference –
 - http://www.ieee802.org/3/cg/public/May2017/herbst_3cg_01_0517.pdf
- Intra-system (e.g. server, switch, etc) control interface
 - References
 - http://www.ieee802.org/3/cg/public/Mar2017/Lewis_3cg_01_0317.pdf
 - http://www.ieee802.org/3/cg/public/May2017/jones_10spe_02_0517.pdf
- Planning conference calls before July Plenary with possible meeting at Plenary

Consensus

WE BUILD IT.

May 2017, New Orleans, LA

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