Non-Industrial Use of P802.3cg

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Current Server Architecture

- Device to device communication in a server uses a variety of bus technologies typically connected using multiple topologies.
    - SMBus (or I2C)
    - SPI

- These legacy busses while performing well for many years are a design challenge for baseboard management controllers (BMCs) especially from a SW perspective.
    - Many of the devices while claiming ″compliance″ require special drivers to operate properly

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Block Diagram – Current Architecture
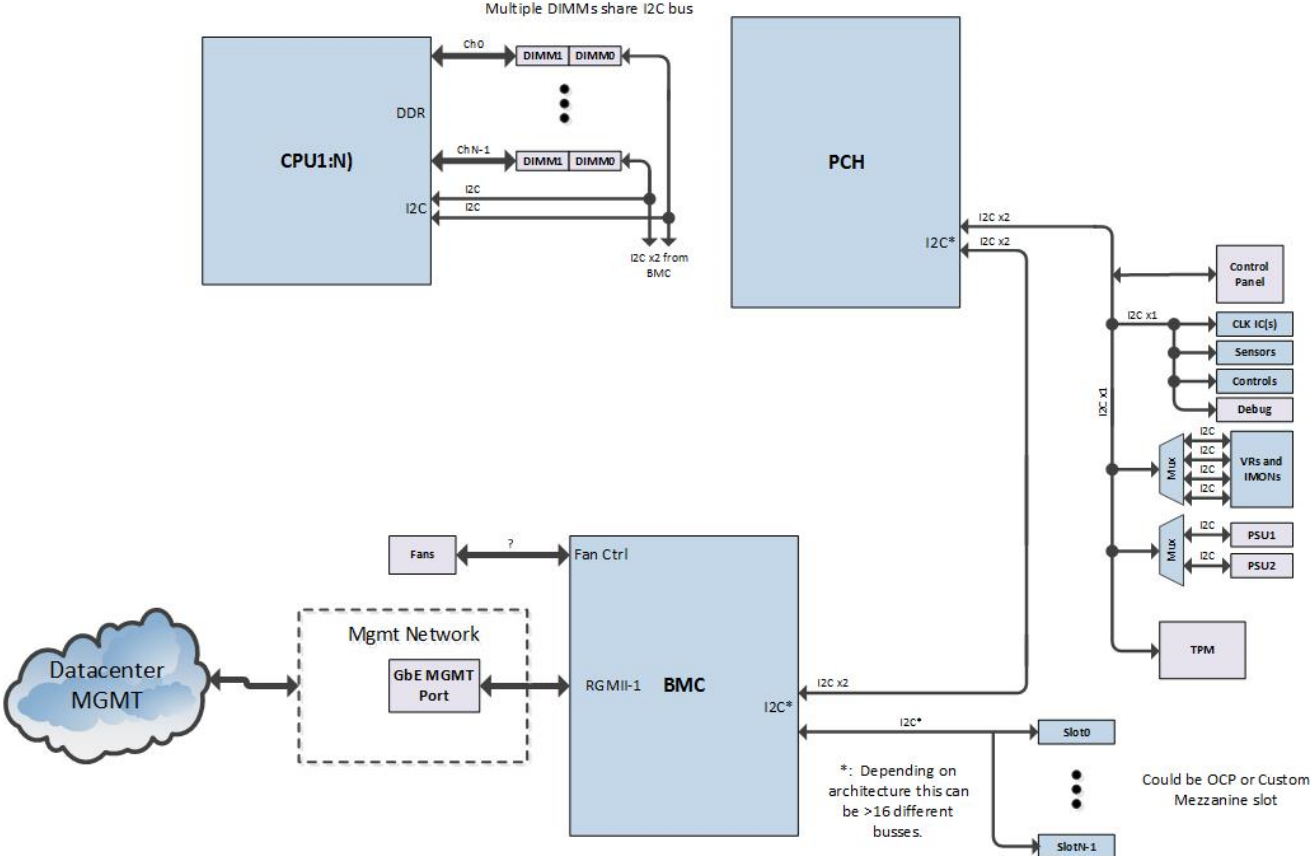
Proposed new architecture
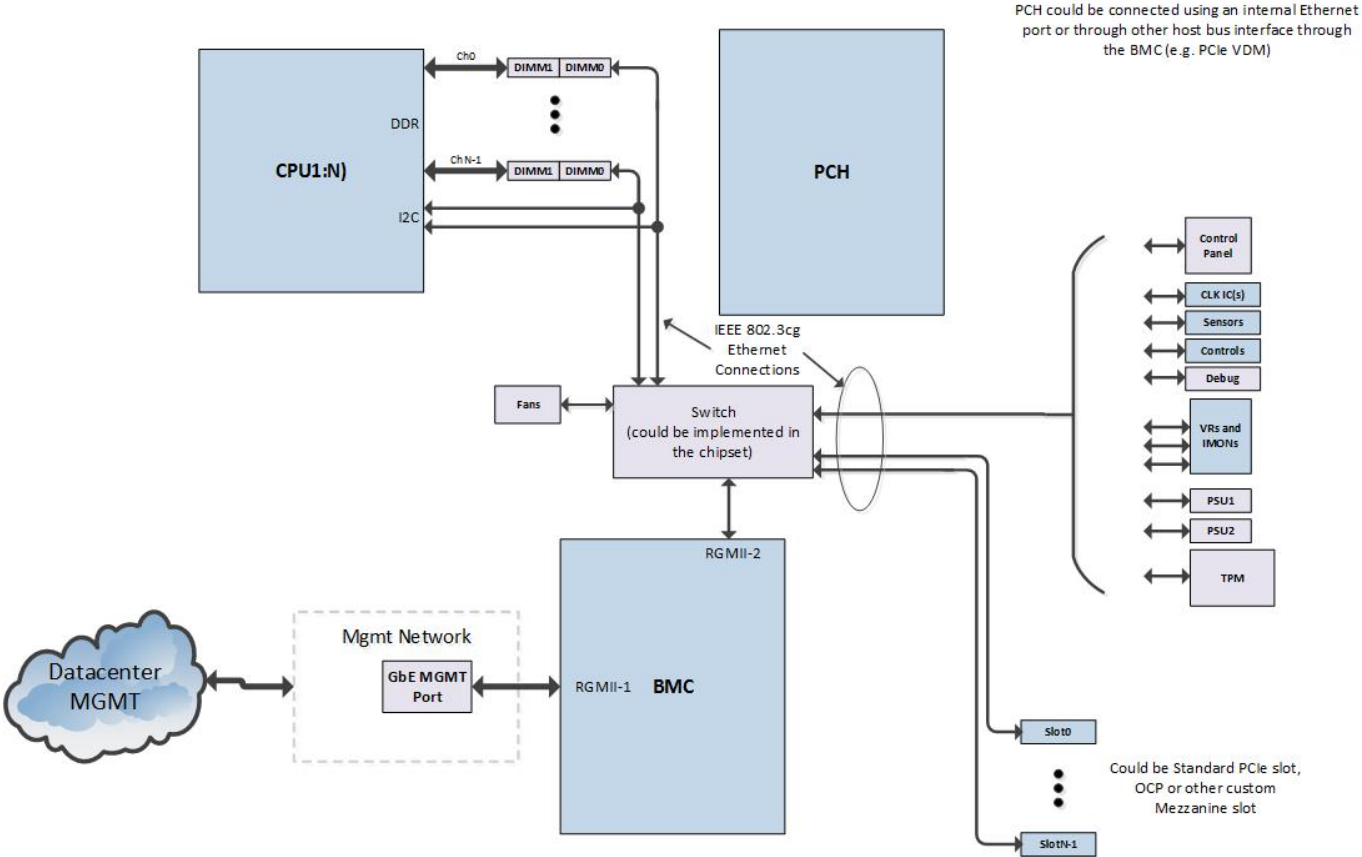
PCH could be connected using an internal Ethernet port or through other host bus interface through the BMC (e.g. PCIe VDM)

CPU1:N)

ChO
DIMM1 DIMM0

DDR

Ch N-1
DIMM1 DIMM0

I2C

PCH

Control Panel

CLK IC(s)

Sensors

Controls

Debug

VRs and IMONs

PSU1

PSU2

TPM

IEEE 802.3cg Ethernet Connections

Fans

Switch (could be implemented in the chipset)

RGMII-2

Mgmt Network

Datacenter MGMT

GbE MGMT Port

RGMII-1 BMC

Slot0

Could be Standard PCIe slot, OCP or other custom Mezzanine slot

SlotN-1

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Other applications

- I2C/SMBus/SPI driver issues continue to drive late issues in both server and switch designs. Although extensive debug applications/equipment is available normally it is difficult to access the signals for debug.

- Consider a rack of equipment that has multiple server nodes, PSUs, Storage Elements and High Speed Networking. For intra-system device communication 10 Mbps single pair Ethernet would provide a simple, cost effective solution to replace the existing complexity of I2C, UART, SPI, …

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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.

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What is being requested?

- No new phy type is being requested!
  - Use of short reach P802.3cg phy is preferred as it allows use out of the server node for applications that exceed a single chassis or have pluggable elements (chassis switches, modular servers, …)

- Specify the link segment in terms that will not preclude other use cases.

- Consider multi-drop to reduce the total number of required segments.
  - Some manageable devices do not need a substantial amount of data transfer. These devices would still benefit from moving away from the master/slave topology and allow automated alerts.

- PoDL/PoE is not required for this internal chassis type of application but may be a interesting concept for chassis servers.

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Thanks ☺

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