

Musings on Our Future with Integrated IICs

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Will the on-chip network dramatically change the processor design?

- Initially, no
 - Current software stacks must be supported
- Eventually, yes
 - If it were up to me
 - Optimizations for PGAS
 - Expect optimizations for memory hierarchy
 - Volatile
 - Non-volatile

What will Happen to the Data Center?

- Will improve density
- Storage opportunities
 - Non-volatile memory hierarchy
 - More direct coupling between compute and storage processors
- Virtualization will be enhanced

What will Happen to HPC?

- Improvements in
 - Latency
 - Power dissipation
 - Density
- May encourage PGAS
 - Allows HPC to be applied to non-traditional applications
- Wild Card: Happening coincident with non-volatile revolution

Will the Integration of the Network On-socket Generate a Monopoly and Kill the Bio-diversity that Allowed the Existence of Many Small Networking Companies?

- There will likely be “reduced” diversity in “platform interconnect hardware”
 - just as the hardware diversity declined in the microcomputer industry in the mid 80s
- Intel will not be providing all networked devices
 - Fibre Channel and others will still need to be supported
- Near term impact is to reduce diversity in HPC
 - Elimination of qLogic as an IB vendor
- ARM-based, nVidia, et al. will not just roll over
 - what is to stop them from integrating a NIC?

Will the Integration of the Network On-socket Generate a Monopoly and Kill the Bio-diversity that Allowed the Existence of Many Small Networking Companies?

- Will enable new forms of diversity
 - Enables tighter coupling between
 - Xeon and Phi, if Intel chooses to support heterogeneity
 - Third party devices, if Intel chooses to collaborate
 - Compute and storage processors
 - Could enable NUMA-like distribution in the non-volatile memory hierarchy
 - Encourages PGAS development
 - Critical mass will be obtained
 - SGI and Cray support this now. Coming into play with IB RDMA

The image shows a close-up of a perforated metal surface, likely part of a server rack. The surface is illuminated from behind, creating a pattern of green light through the hexagonal holes. A white rectangular sticker with the 'sgi' logo is affixed to the surface. The logo consists of the letters 's' and 'g' in blue, and the letter 'i' in blue with a green dot above it. To the right of the sticker, there is a dark rectangular slot or opening in the metal panel. The overall scene is dimly lit, with the primary light source being the green glow from the perforations.

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