

CMSC 714

Lecture 9

Ethernet and Infiniband

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Notes

- OpenMP assignment due Wednesday
 - don't compile for profiling (with `-pg`) and for OpenMP at same time
 - when you time runs with multiple threads, make sure enough cores are available – wall clock timings with threads sharing cores will not give useful results
 - other questions?
- Sample topics for group project posted

Ethernet

- One of the first, and definitely the most successful, local area network (LAN) protocol and implementation
- Notice that also targeted at multiprocessing, not just distributed computing
- CSMA/CD wire protocol – carrier sense multiple access, with collision detection
 - a shared physical medium, even with repeaters
 - randomized exponential backoff after a collision
 - error detection using checksums on medium, still need end-to-end error detection since whole packets can be lost
- Modern Ethernet protocols are different – for a switched physical medium to scale better
 - original at 3Mb/s (shared), 1Gb/sec (switched) common now, with 10Gb/sec and soon 100Gb/sec in HPC environments

Infiniband

- Designed to support I/O and network connectivity, from a single PCB to a cluster network to a LAN
 - over copper (twisted pairs) and fiber
- Targeted at cluster networks, SANs, and even embedded systems
 - scalable, and provides RAS – “bandwidth out of the box”
 - idea is to extend the on-processor I/O bus to off-chip network
- Switched point-to-point I/O fabric
 - endpoints (host machines, I/O devices, ...) connect to switches, which route connections to other endpoints
 - link speed from 2.5Gb/sec (1X) to 30GB/sec (12X) by adding more wires – parallel transfers
- Protocols described in terms of standard network layers
 - physical, link, network, transport