

High Performance Communication

- Ada Gavrilovska – ada@cc
- class web page
- 8803 (4803) – the ‘history’ of 8803HPC
- grading:
 - programming exercise: 20%; paper presentation: 15%; class participation: 5%;
 - class project: 40% - *implementation*, 10% - *report*, 10% - *presentation* (total of 60%)
- letter grade, P/F, audit

Administrative

- get access to ILAB cluster
 - should be automatic for everyone in class, but send email to help@cc if not
 - will have a home dir on /net/hp31/
- communication – mailing list + ixp@cc.

Material

- Most papers/documents – online
- + handouts in class
- recommended
 - [IXP2400/2800 Programming](#), *The Complete Microengine Coding Guide*, by Erik J. Johnson and Aaron Kunze
- IXP technical documents – in /net/hp31/ixpdev

Course components

- Lectures – list tentative and open for suggestions
- Paper presentations
- Warm-up exercise – 2, based on IXP
- Projects
 - define by end of Jan
 - midterm report – 1page status update, before Spring break
 - last week of classes – project presentations
 - final project report and demo due by end of finals week

Project info

- possible platforms: IXP (recommended), Infiniband (status...), other – FPGA-based, programmable routers, kernel hacking...
- “sponsored by industry partners”
- Ideas
 - online list, talk to me, look at class papers for inspiration...
 - what do you want to do?
 - related to current work, or want to experiment with potential research ideas

Scope

- Application domain
 - scientific – traditional parallel applications, simulations, remote collaborations
 - enterprise – commercial systems – banks, airlines, dynamic/personalized delivery of remote content...
 - dynamic – inputs/outputs, interactions, needs/interests, policies and regulations
- High performance communication for high performance applications
 - should translate to high availability, reliability, scalability, consistency, manageability, security...
 - should enable high rate of operations/transactions

- communication
 - getting the needed data from sources to destinations
- high-performance
 - high data-rate, low-delay
 - quality => latency and bandwidth, jitter and error rates;
 - but also quality in terms of application-specific metrics => data and processing needed now
- need mechanisms at all levels

Lecture schedule

- Intro & overview of tools
- War of the Interconnects
- Programmable Networking vs. NetASICs
- IP and Multiprocessor Networking Protocols
- Programming Models & Environments
- Middleware and Applications
- Evaluation and Modeling Tools