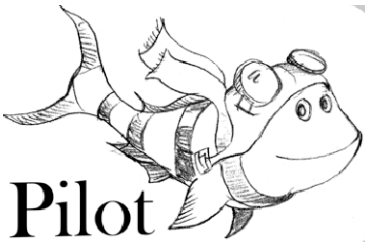

SHARCNET™

HPCS'09 Workshop

Using the Pilot Library: A Fresh Alternative to MPI for HPC Clusters

Lecturer: Dr. Bill Gardner
Assisting: Graduate students John Carter & Natalie Girard
Department of Computing & Information Science
University of Guelph, Ontario

Thursday June 18, 9am—12pm
Queen's University, Kingston

Pilot is a new way to program high-performance clusters based on a high-level model featuring *processes* executing on cluster nodes, and *channels* for passing messages among them. Designed to smooth the learning curve for novice scientific programmers, the set of library functions is small—less than one-tenth that of MPI—and easy to learn, since the syntax mirrors C's well-known printf and scanf. The process/channel abstraction inherently reduces the opportunities for communication errors that result in deadlock, and a runtime mechanism detects and diagnoses deadlocks arising from circular waiting. The Pilot library is built as a transparent layer on top of conventional MPI, and shields users from the latter's complexity while adding minimal overhead.

This tutorial assumes basic exposure to C programming. Familiarity with MPI is not required, but will make the comparisons more meaningful.

What you will learn:

- Purpose of Pilot library and conceptual overview
- Planning, coding, compiling and running a Pilot application
- Hands-on: Hello World and sample programs
- Hands-on: Runtime monitor for usage errors, logging, and deadlock detection
- Patterns in Pilot: master/worker and pipeline
- Hands-on: Pilot's collective operations on groups of channels
- Compare/contrast Pilot and MPI
- Pilot performance
- Status and availability of library

Pilot website: http://carmel.cis.uoguelph.ca/pilot/

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