Message-Passing Programming

Neil MacDonald, Elspeth Minty, Joel Malard, Tim Harding, Simon Brown, Mario Antonioletti, David Henty

epcc

THE UNIVERSITY OF EDINBURGH

Reusing this material

Syllabus

- Message Passing Concepts
- Basic MPI Programs
- Point-to-Point Communication
- Modes, Tags and Communicators
- Non-blocking Communication
- Collective Communications
- Virtual Topologies
- Derived Datatypes
- Case Study: Cellular Automaton
- MPI design
- Performance measurement and scalability

Aims

- A practical course to teach you to
  - understand the message-passing model for parallel programming
  - write parallel programs in C, C++ or Fortran using the MPI library

- You will learn this through
  - lectures
  - notes

- But **MOST IMPORTANTLY** by
  - writing and executing example MPI programs
    - each lecture has an associated practical example

Motivation

- The MPI library is the most important piece of software in parallel programming
- All of the world's largest supercomputers are programmed using MPI
- Writing parallel programs using MPI is fun!