

# DEPICT: A Topology-based Debugger for MPI Programs

Simon Huband and Chris McDonald  
University of Western Australia  
*e-mail: huey@cs.uwa.edu.au*

Most parallel programs use regular topologies to support their computation. Since they define the relationship between processes, process topologies present an excellent opportunity for debugging. The primary benefit is that patterns of expected behaviour can be abstracted and identified, and unexpected behaviour reported.

However, topology support is inadequate in many environments, including the popular Message Passing Interface (MPI). Programmers typically implement topology support themselves, increasing the possibility of introducing errors. Moreover, debugger support that exploits topological information is lacking.

We have undertaken to develop a debugger that exploits topological information. This paper presents DEPICT (DEbugger of Parallel but Inconsistent Communication Traces), a (preliminary) topology-based debugger for MPI. Currently, DEPICT presents high-level visualisations of parallel program communication behaviour, where logically similar processes are clearly indicated in a manner that allows the programmer insight into overall program behaviour. To assist in understanding unexpected behaviour, DEPICT allows programmers to investigate the observed semantic differences between processes.