Distributing EGS across the NPL United Devices grid

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ABSTRACT

The intranet at NPL links several hundred desktop PCs running a variety of applications, mostly on MS Windows 2000. This is a potentially significant compute resource most of which is idle, most of the time. United Devices Grid MPTM software provides a means to harness this resource for at least some data parallel computational tasks, including radiation transport Monte Carlo simulations. The overall efficiency of such distributed computing systems depends on the ratio of computation to data communication for the tasks to be processed.

The grid consists of a central server, holding a database of compiled applications and their data, and software agents running on desktop workstations. The agents are in regular communication with management software running on the server, which despatches computational tasks as the agents become available. The porting and compilation of applications is carried out by the user on their own PC, from which jobs may be submitted to the grid either interactively, using a web-based interface, or using scripts run from a command prompt. There are several options in porting applications, which in our case were previously running on Linux. The simplest approach uses Cygwin to compile and run source code with minimal changes. In particular, reasonable efficiency can be achieved in some cases without major restructuring of the code. The actual performance obtained in our tests using EGS Monte Carlo simulations will be presented, and preliminary conclusions can be drawn on the scaling behaviour of the system.