Lightweight, Scalable Tool Identifies Supercomputers’ Code Errors

The stack trace analysis tool (STAT) can identify errors in code running on today’s largest machines. STAT works by detecting and grouping similar processes at suspicious points in an application’s execution. It quickly and automatically identifies anomalies and outliers — processes that cannot be grouped or that behave substantially different — because they often indicate flawed execution.

**Speed Daemons**

STAT offers varying levels of detail in the call stacks, from coarser function granularity to specific source-code line numbers. Because STAT gathers stack traces across the entire application, it provides a global view of what every process is doing. These stack traces are merged to reduce the problem search space, so users can identify a small yet representative subset of tasks on which to apply heavyweight analysis. Its lightweight design allows the tool to maintain interactive response times.

**Pinpointing Problems**

STAT can not only distinguish a process that is stuck in a single location in the code but also pinpoint the exact task causing the hang. The tool also derives the relative execution progress of each application task, which is useful for determining problematic application processes. STAT has run on a wide range of supercomputer platforms, including the IBM BlueGene family of machines and several of the world’s fastest as reported by the Top500 Supercomputer Sites list.

The stack trace analysis tool (STAT) includes a powerful and intuitive graphical user interface that allows the user to identify quickly where a bug exists in an application. STAT automatically analyzes the state of the application and presents potential bug locations.

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