

RESULTS OF THE PERI SURVEY OF SciDAC APPLICATIONS

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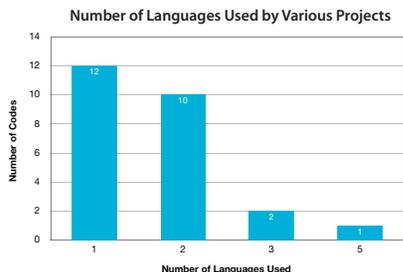
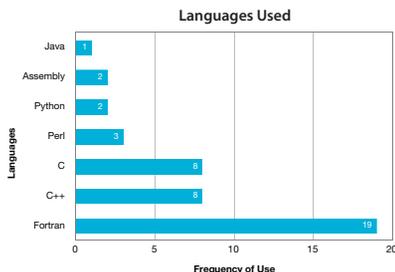
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The SciDAC Performance Engineering Research Institute has three main thrusts:

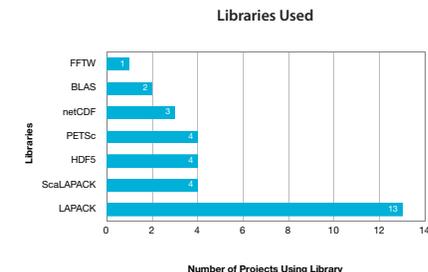
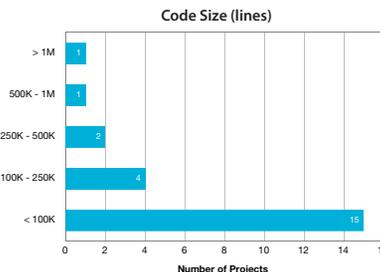
- application modeling and performance prediction;
- automated performance tuning; and
- direct engagement with SciDAC application projects.

The initial PERI engagement activity was a survey of the SciDAC application teams. The primary goal of the survey is to capture information that can be used to guide the other application engagement activities, ensuring that realistic SciDAC performance priorities are met. The survey consists of three main sections: project contact information, performance issues, and code characteristics and structure. The code characteristics and structure are essential for designing automated performance tuning support. In addition, they can shape the form of performance models. Finally, characteristics common across many of the applications, such as the use of LAPACK, indicate opportunities to improve performance of many applications with one focused effort. The survey has been successful, both in the number submitted and in the quality of the information collected, and has proved to be a vital tool for the efficient allocation of PERI engagement resources.

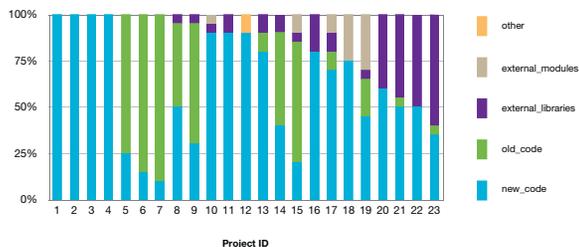
LANGUAGES



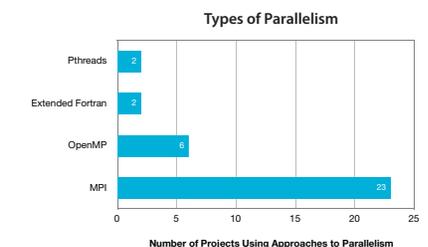
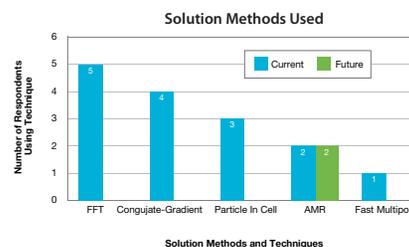
CODE CHARACTERISTICS



CODE DEVELOPMENT AND REUSE



TECHNIQUES USED



PERFORMANCE GOALS CITED

Performance Goal	Number of Applications Citing This Goal
scaling	6 (1 1000s, 3 10000s, 2 100000s of processes)
FLOPS	8 (1 20%, 1 40%, 3 50% of peak)
speedup	1 (4x)
lower overhead	1
application specific	7 (e.g., calendar years simulated/day)

PERFORMANCE BOTTLENECKS CITED

Performance bottleneck	Number of applications citing this bottleneck
FFTs	3
linear algebra	7
AMR	1
memory access	3
Serial code	2
Load balancing	3

Performance bottleneck	Number of applications citing this bottleneck
Interprocess communication	6
Collective communication	1
Graph partitioning	1
I/O	3
Code coupling	2



<http://peri-scidac.org/>

