

Parallel Scientific: An HPC Development and Services Company

We accelerate your world

Commercial, government and academic organizations today depend heavily on parallel, hybrid HPC clusters that are increasingly difficult to exploit effectively. Organizations that fail to do this can quickly fall behind their peers, because to out-compute is to out-compete. Parallel Scientific can affordably help you maximize the return on your HPC investments by making your applications run better and faster and keep your organization and users highly productive and at the forefront of their fields. We augment the capabilities of your in-house HPC staff by providing specialized expertise.

Our teams of seasoned specialists cover the most crucial areas of High Performance Computing system design and optimization. We can:

- **Optimize existing parallel systems and applications**
- **Create new parallel systems and applications**
- **Use state of the art tools for system analysis, benchmarking and optimization**
- **Integrate FPGAs for your applications**

Redesigning and Optimizing HPC and Big Data Environments

We begin the redesign and optimization process by performing a full analysis of all aspects of your system. By understanding critical architectural attributes we can better map applications to system hardware and understand performance issues and paths for optimization.

This analysis includes deep inspection of:

- System architecture and configuration
- Network architecture and topology
- GPU and/or FPGA coprocessor applicability and usage
- Algorithm partitioning and data usage patterns

Creating New Applications or Optimizing Existing Applications

We begin our process by analyzing existing application performance using an array of tools to identify bottlenecks and target areas for optimization. Once problem sectors have been identified we then document and implement architectural and/or algorithmic enhancements.

Our analysis includes:

- Mathematical modeling of performance
- MPI, OpenMP and OpenACC implementations
- Memory and I/O latencies and throughput
- Data placement and low level cache analysis

Integrating FPGAs into Applications

Our FPGA team has developed tools and expertise to help integrate FPGAs into customer solutions. This integration can dramatically accelerate application development time as well as overall performance.

The FPGA team:

- Maintains and supports our Domain Specific Language (DSL) to Verilog compiler
- Targets environments that use stand-alone, PCI-based or network switch based FPGAs
- Provides consulting and design/development services

Credentials: Broad Background, Skills and Experience

Parallel Scientific's CEO and Chief Architect is Dr. Peter J. Braam, a former senior academic at Oxford and Carnegie Mellon. He has extensive experience in the HPC community and created the Lustre file system as the founder of Cluster File Systems. Dr. Braam advises on parallel computing efforts across the U.S. in numerous roles, and acts as an expert advisor to the European Community on numerous committees.

Parallel Scientific has assembled a team of world class designers and developers in cities across the US. We believe our team has the skills to bring a broad range of very complex and wide reaching solutions to your present environment or to support you in initiating new parallel applications.

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