



## Special Analysis

# HPSF: A New Foundation for High-Performance Software

Mike Heroux and Tom Sorensen  
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## OVERVIEW

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The High Performance Software Foundation (HPSF), launched in 2024, has emerged as a new organization focused on the high-performance computing (HPC) software ecosystem. Modeled after successful open-source governance structures in other domains, and sponsored by the Linux Foundation, HPSF provides a neutral home for performance-critical, open-source software projects that span the HPC and AI/ML landscape. In the first year of operation, the foundation has attracted major hardware and software providers, end-user organizations, and software projects seeking long-term sustainability and collaborative development.

### A Neutral Hub for Sustainable High-Performance Software

HPSF aims to reduce barriers to productivity in high performance computing by supporting software projects that promote portability across diverse architectures. At its core, HPSF operates as a neutral foundation, fostering trust and collaboration across organizational, vendor, and international boundaries. The model is built on open governance, ensuring no single entity can dominate the direction of any project. This approach enhances the sustainability of the software ecosystem by aligning incentives across users, vendors, and developers.

The foundation's key goals include:

- Lowering the barriers to productive use of modern and future HPC systems
  - Supporting software development best practices, including continuous integration, security, and benchmarking
  - Encouraging adoption and community participation for established and emerging scientific software libraries and tools
  - Enabling vendors to integrate and support key projects in their hardware and software stacks
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### Organizational Structure and Governance

HPSF is governed by a Governing Board (GB) and a Technical Advisory Council (TAC). The GB includes representatives from premier and general members, as well as technical projects. The TAC represents each core HPSF project and guides technical priorities and project lifecycle status.

The project lifecycle model adopted by HPSF provides a roadmap for projects to mature within the foundation:

- Emerging: Open governance, early adoption, and alignment with best practices
- Established: Production use at three or more institutions with sustained development
- Core: Broad community usage, robust contributions, and stable maintenance cycles

Since its launch, HPSF has:

- Grown to include 9 new member organizations
- Onboarded 4 new projects across diverse domains, including build and deployment, solver frameworks, performance tools, and parallel programming models
- Supported events and training that have strengthened adoption and interoperability

**The HPSF Conference Series**

The first HPSF Conference (HPSFCon 2025) was held in early May in Chicago. 204 people attended the meeting from many leading organizations in the HPC and AI community. The meeting included presentations and discussions on a variety of timely topics including the status and future directions for HPSF, computing system trends and challenges, and updates on HPSF member products. In addition to the core meeting, the Spack, Kokkos, and Trilinos product teams scheduled user group meetings for their communities.

HPSFCon 2026 is scheduled for March 16 - 20, 2026 in Chicago. More information is available at <https://events.linuxfoundation.org/hpsf-conference/>

**TABLE 1**

**Member Roles**

Role	Contributions	Benefits
Vendors	Provide hardware/software integration feedback, support testing on platforms	Ensure hardware/software stack compatibility with open-source tools
Users	Share use cases, performance requirements, and validation data	Engage with maintainers, voice requirements, de-risk software decisions
Projects	Contribute open-source code, documentation, and development infrastructure	Gain neutral governance, shared infrastructure, exposure to a wider audience

Source: Hyperion Research, 2025

**TABLE 2****Standing HPSF Groups**

Group	Purpose	Key Activities / Status
Continuous Integration (CI): Testing Working Group	Ensure software correctness across platforms; foster continuous integration and continuous deployment (CI/CD) best practices	Host biweekly meetings. Manage key CI/CD testing resources. Provide active collaboration space for CI tooling. Encourage member project use of testing resources and pipelines
Benchmarking: Working Group	Prevent performance regressions; develop shared benchmarking strategies	Run and categorize benchmarks, enabling collaborative performance testing. Tight coordination with CI working group.
Outreach Committee	Amplify HPSF's message to scientific and HPC communities	Focused on branding and key messaging. Organized inaugural HPSF Conference. Establish and manage social media and curated public video content

Source: Hyperion Research, 2025

**ANALYST COMMENT**

The High Performance Software Foundation (HPSF) provides a qualitatively new organization that enables coordination across all parties interested in sponsoring, producing, and using high-performance software. By acting as a connective tissue across the HPC software stack, HPSF helps vendors and users align their investments with community-maintained software that is portable, efficient, and sustainable.

The modern HPC landscape is evolving rapidly with a growing need for software portability across GPUs, CPUs, AI accelerators, and FPGAs. Proprietary ecosystems such as NVIDIA's CUDA, AMD's ROCm, and Intel's oneAPI remain dominant, but they do not interoperate and often lead to vendor lock-in. While portability-focused libraries like Kokkos, standard C++, and OpenMP are gaining traction, they require community coordination and shared investment to thrive.

HPSF provides a foundation to:

- Coordinate these efforts, particularly for multi-platform HPC and AI workflows
- Support middleware and tooling that fills gaps in portability and performance
- Promote best practices in software engineering, fostering a new culture of transparency and reproducibility in scientific computing

By enabling long-term, community-led development of critical software, HPSF reduces fragmentation and duplication of effort, increasing ROI for funders and users alike.

For people who participated in the Exascale Computing Project (ECP) annual meetings, HPSFCon 2025 had a similar vibrancy and focus. Attendees came from many organizations and with diverse contributions and needs but all had the common purpose of advancing the development, support, and use of high-performance software. Unlike ECP, whose participants were necessarily limited to US Department of Energy labs, vendors, and universities, HPSF has no prescribed limits to who can participate, enabling growth that is limited only by its ability to serve the needs of the high-performance software community.

The emergence of HPSF reflects a maturing view of software as infrastructure within the scientific computing community. Its neutral governance model and support for key projects make it a strategic asset for organizations seeking to de-risk technology adoption and ensure longevity of software investments.

In the near term, HPSF will be judged by its ability to attract and retain foundational software projects, develop robust CI/CD pipelines, and provide value to both member organizations and end users. If successful, it will be positioned to shape the future of performance-portable software at a time when architectural diversity continues to grow.

- In a fragmented ecosystem of vendor-specific tools and libraries, HPSF's role as a convener and steward of community-driven, performance-portable software is both timely and critical.

## About Hyperion Research, LLC

Hyperion Research provides data-driven research, analysis and recommendations for technologies, applications, and markets in high performance computing and emerging technology areas to help organizations worldwide make effective decisions and seize growth opportunities. Research includes market sizing and forecasting, share tracking, segmentation, technology, and related trend analysis, and both user & vendor analysis for multi-user technical server technology used for HPC and HPDA (high performance data analysis). Hyperion Research provides thought leadership and practical guidance for users, vendors, and other members of the HPC community by focusing on key market and technology trends across government, industry, commerce, and academia.

## Headquarters

365 Summit Avenue  
St. Paul, MN 55102  
USA  
612.812.5798

[www.HyperionResearch.com](http://www.HyperionResearch.com) and [www.hpcuserforum.com](http://www.hpcuserforum.com)

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