



Objectives and Organization of the European IESP workshop

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IESP General Objectives



- Provide a framework for organizing the software research community
- Encourage and facilitate collaboration in education and training
- Engage and coordinate vendor community in crosscutting efforts
- Develop a common, high quality computational environment for peta/exascale systems

IESP Strategy



- Assess the short-term, medium-term and long-term **software needs of applications for peta/exascale systems**
- **Gather and analyze existing R&D plans** for developing new programming models and tools that address extreme scale, multicore, heterogeneity and performance
- Explore **how laboratories, universities, and vendors can work together** to develop coordinated open source HPC software
- **Begin the development of a roadmap for software** on extreme-scale systems

IESP Deliverables



- Begin creation of a thorough assessment of needs, issues and strategies for Exascale software
- Initiate development of a coordinated software roadmap
- Create a strategy for catalyzing, coordinating, and sustaining the effort of the international open source software community to create that environment as quickly as possible

Paris workshop objective



After surveying the complex problem space of IESP at Santa Fe,

Paris meeting,

- will focus on actively developing **a draft IESP roadmap**

For this objective,

- we will be **breaking into working groups**

Successful Roadmapping



Roadmap creation

- Include the status of computational science **software activities across industry, government, and academia.**
- **Be created and maintained via an open process** that involves broad input from industry, academia and government.
- **Identify quantitative and measurable milestones and timelines.**
- **Be evaluated and revised as needed** at prescribed intervals.

Expected impacts

- **Agency strategies** for computational science should be shaped in response to the roadmap
- **Strategic plans** should recognize and address roadmap priorities and funding requirements.

Roadmap focus



- Identify key technical areas on which to focus, e.g., file systems, message-passing and multi-threading software, fundamental numerical algorithms, system management tools, debuggers, ...
- Identify which groups would like to tackle what areas and which funding sources might support the work
- Develop the cooperation-collaboration modes and the program organization for developing international open source software

Technical Areas of the Roadmap

- Potential **System Architectures**
- **Multi/Many Core** issues
- **Resilience**
- **Programming Models and Compilers** (MPI + OpenMP or OpenCL, speculation, transactional memories, performance monitoring, selftuning, debugging support, etc.)
- **IO and Filesystems** (or perhaps more generally persistent storage models)
- **OS issues** (virtualization, fault management, advanced memory management, power management)
- **Numerical Libraries** (should be prioritized by applications requirements)
- **Systems Management** and Configuration (making future systems easier to manage than current Petascale systems)
- **Networking and Integration** with Broader Infrastructures (clouds, global filesystems, real-time data streams, etc.)

Roadmap content

2 aspects:

- 1) **Essential mechanisms for coordination** (how we organize as a community): Workshops, WIKI, Educational activities, Standardization, Funding, etc.
- 2) **Research topics** (where we are, what is needed, dependencies with others, opportunity for co-design, priorities)

--> Evolutionary as well as Revolutionary ideas

	2009	2010	2011	2012	2013	2014	2015	2016
Software/ Language Issues								
Sustainability								
Collaborative workshops								
Coordinated research								
Educational activities								
Standards activities								
Priorities								
Staffing								

Breakout Groups

- **Group 1: Technical challenges** and needs of academic and industrial **software** infrastructure research and development (2 groups)
 - ▣ Chair: Satoshi Matsuoka; Secretary: Michael Heroux
- **Group 2: Computational challenges** and needs for academic and industrial **application** communities
 - ▣ Chair: Thomas Lippert; Secretary: David Keyes and Jean-Claude André
- **Group 3: Economic and management challenges** and needs of computational **resource providers and vendors**
 - ▣ Chair: Dan Reed; Secretary: Jean-François Lavignon
- **Group 4: Role and participation of national and intern. funding agencies**
 - ▣ Chair: Kostas Glinos; Secretary: Abani Patra

Mode of operation



Produce 4 draft sets of slides (1 per group)

- Subgroups would fill out the set of slides during their sessions
- Plenary sessions will help to converge and produce consistent roadmaps between groups
- Would like to see 10 pages of text for each subgroup for the next workshop.

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Agenda



Preparing the groups work:

- 10:00 10:30 Main results of the Santa Fe Meeting by P. Beckman
- 11:00 11:30 Feedback of the Santa Fe Meeting by J-Y. Berthou
- 11:30 12:00 Synthesis of the white papers by T. Lippert
- 12:00 12:30 Report on DOE Exascale studies by P. Messina

Works in groups 1/2

- 2:00 2:15 Organize to split into groups
- 2:15 4:00 Breakout groups

Share and exchange group progresses

- 4:30 6:00 Plenary: "Consolidate groups to build draft documented set of recommendations in terms of objectives, results, actions for IESP"

Agenda (cont.)



June 29, 2009; Monday

Works in groups 2/2

- 9:00 11:00 Breakout groups continue building draft

Share group results

- 11:30 12:30 Presentation of the groups results (Plenary)

Generate the main deliverable of Paris meeting:

- 2:00 3:30 Preparation of a first research agenda (Plenary)

Prepare next meeting in Japan:

- 4:00 5:00 Identification of future agenda (Plenary)