PITAC Open Source Panel for High End Computing

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Open Source Software

- Freely distributable, possibly under certain conditions determined by a licensing agreement
- Source code is distributed along with binaries. This access allows users to modify, study, or augment the software's functionality
- Any licensing agreement must allow distribution of the initial software and redistribution of that software in modified form

Open Source Panel Members

Chair
Larry Smarr

Overall Architecture
Steve Wallach-PITAC
Rick Stevens-ANL
Bo Ewald-PITAC
Dave Cooper-PITAC
Bill Carlson-NSA/IDA
Tom Sterling-Caltech/JPL

Industry
Dan Frye-IBM
Tom Gibbs-Intel
Greg Lindahl-High Performance Technology Inc
Tim O'Reilly-O'Reilly & Associates
Todd Needham-Microsoft
Gabriel Broner-SGI
Michael Tiemann - Redhat

Systems
Peter Beckman-LANL
Dennis Gannon-IU
Ian Foster-ANL
Susan Graham-PITAC
Ken Kennedy-PITAC
Irving Wladawsky-Berger-PITAC
John Reynders-LANL

PACI
John Toole-Alliance
Philip Papadopoulos-NPACI

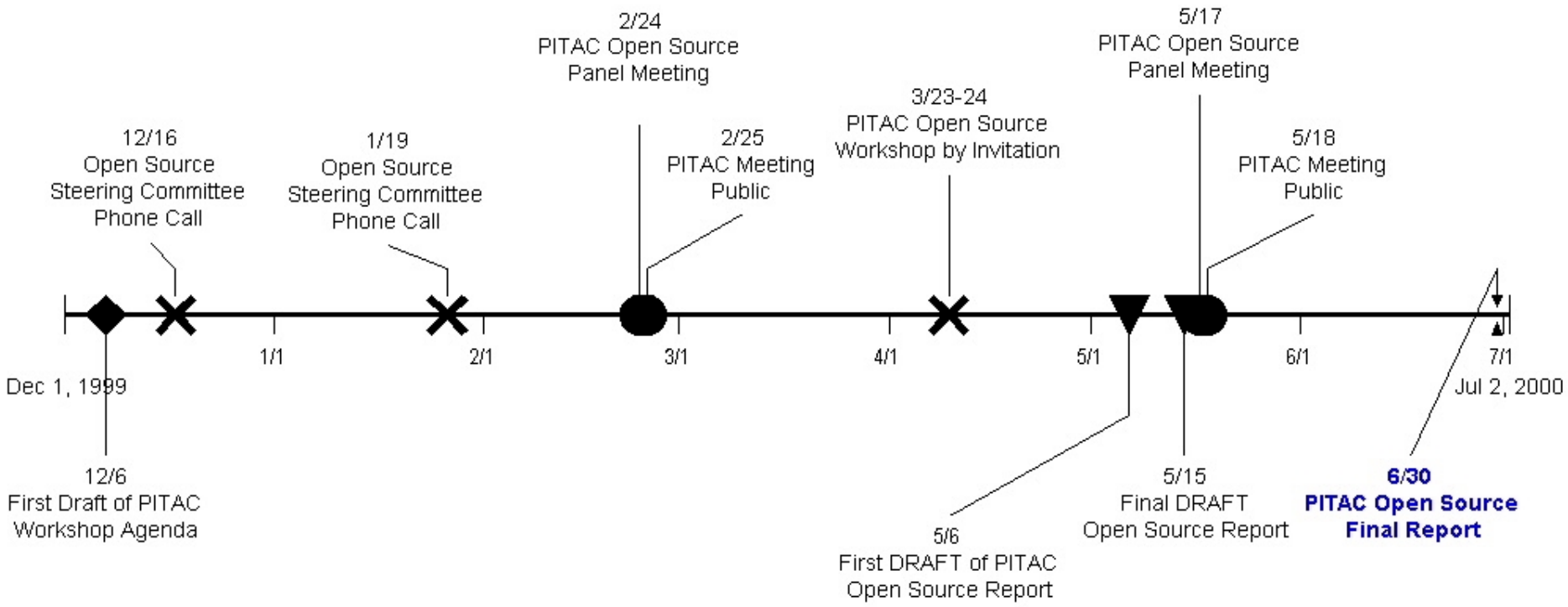
Application, Algorithms, Libraries
Bob Sugar-UCSB
Bob Lucas-LBL
Jack Dongarra-Univ of Tenn

Government Liaison
Bob Borchers-NSF/HCCWG
Paul Messina-DOE
Bill Feiereisen-NASA
Jose Munoz-DOE/HCCWG
Dan Hitchcock-DOE/ER
Bill Nitzberg-NASA
Fred Johnson-DOE/ER

PITAC OSS Charter

- Develop a Vision of How the Federal Government Can Support the Developing Open Source Software for HPC Activities
- Define a Policy Framework for Accomplishing This
  - Identify Policy, Legal, or Administrative Barriers to Widespread Adoption of Open Source Software Efforts
  - Define Potential Roles for Public Institutions in Open Source Software Economic Models
- Encourage Broad Technical Working Groups Drawn From Labs, Academia, Agencies, and Industry to Draw up Technical Roadmaps for Creating Open Source Software for HPC

Open Source Panel Process Timeline



PITAC Workshop Participants

Bill Carlson NSA/IDA	Sue Graham, PITAC	Larry Smarr, PITAC OSS Chair	Eric Raymond Thyrsus Enterprises
Scott Hissam CMU	Rich Hirsch NSF	Tom Sterling Caltech/JPL	Chuck Koelbel NSF
Kay Howell NCO	Fred Johnson DOE/ER	Rick Stevens ANL	Bernard Lang European Working Group
Paul Messina DOE	Lex Lane Alliance/PACI	Bob Sugar UCSB	Art Hale Sandia Natl. Lab
Krish Namboodiri NCO/PIPS	Greg Lindahl HPTI	Michael Tiemann Redhat	Dave Emery MITRE
John Reynders LANL	Bob Lucas LBL	Neil Abrams IBM	Leslie Hart NOAA
John Toole Alliance/PACI	Jose Munoz DOE	Gabriel Broner SGI	Frank Hecker Collab.Net
Ian Foster ANL	Todd Needham Microsoft	Joshua Simons SUN	Tom Page NSA
Dan Frye IBM	Philip Papadpopoulous NPACI/PACI	Tim O'Reilly O'Reilly and Associates	
Dennis Gannon Indiana Univ.	Gary Koob DARPA	Bill Feiereisen NASA	
Tom Gibbs Intel	Jerry Sheehan Alliance/PACI	Lee Holcomb NASA	

Findings

- Open Source Software development efforts are a promising means to enable High End Computing
- The Federal government needs to participate and invest in the development, support, distribution, and maintenance of OSS
  - Funds are not currently available for OSS developers
- Open Source Software development efforts are inherently community driven and bottom-up
  - A non-traditional model of funding and project management needs to be developed in the Federal government

Findings

- **Open Source Software development, in the age of the Internet, is an international activity**
  - **It would be unrealistic for government policy to be developed in a U.S. centric fashion**
  - **This international collaboration raises substantial policy questions in export control**

Findings

- **Open Source Software development efforts could offer some potential security advantages over the traditional proprietary development model**
  - **Access by developers to source code enables a careful look, decreasing the potential for embedded trap doors/Trojan horses**
  - **Many programmers will search for software bugs and develop subsequent fixes**

Findings

- There are numerous licensing agreements being used by the Open Source development community
  - Licensing requirements may be incompatible, leading to delays in project development and software distribution
  - More education is needed within federal agencies to understand the nuances of existing open source licenses and under which conditions each licensing agreement should be used

Findings

- **Existing federal procurement rules inhibit competition between Open Source alternatives and proprietary software**
  - **There is a lack of guidance under what circumstance an open source or proprietary approaches are better**
  - **Sometimes proprietary approaches are better; sometimes open source software is more appropriate**
- **Responsibility for deciding if a project should be open sourced is often unclear**
  - **Principal Investigator or Institution or Funding Agency**

Findings

- **The European Working Group on Libre' Software, which in December of 1999 reviewed the broad topic of Open Source Software, identified lack of clearinghouses for Open Source projects as an obstacle to development efforts**
  - **This is also a problem for High End Computing Open Source Software efforts**

Findings

- **The success of Linux was based in part on the easy availability and affordability of hardware development platforms**
  - **In High End Computing, access to HEC hardware for experimentation and debugging of Open Source Software is essential**

Findings

- **Open Source software will impact three classes of High End Computing Systems**
  - **Conventional MPPs provided by mainstream vendors**
  - **Rapidly emerging clusters that are significantly improving price-performance for some classes of problems, and**
  - **New research on prototype architectures**

Findings

- **There is a robust multi-agency effort underway to develop technical specifications for Open Source Software needs within high end computing**
  - **Such multi-agency approaches and workshops are important for encouraging consensus**

Findings

- A large opportunity may exist outside high end computing for Open Source Software development efforts, in particular within embedded systems
  - This PITAC panel did not examine these issues

Recommendations

1. **The federal government should encourage the development of Open Source Software as an alternate path for software development for High End Computing. Such an initiative should address:**

   a. **A non-traditional project management and funding model that would provide flexibility in project organization and support.**

   b. **The policy implications of current export control regulations and national security concerns**

Recommendations

c. A cost estimate for a robust Open Source development effort in High End Computing, including enumeration of agencies for implementation.

d. A plan for the creation of a Web clearinghouse and a marketplace akin to http://www.collab.net/, where agencies could post High End Computing Software needs and find OSS community developers.

Recommendations

e. **A process developed in coordination between federal agencies and leading High End Computing hardware vendors to provide access to needed HEC hardware for developer testing.**

Due to the underlying national security and scientific importance of High End Computing and the critical need for HEC software, we recommend that this plan be developed prior to the initiation of the next federal fiscal year

Recommendations

2. **The federal government should allow Open Source development efforts to compete on a "level playing field" with proprietary solutions in government procurement of High End Computing Software.**

Recommendations

3. **Government sponsored Open Source projects should choose from a small set of established Open Source licenses.**

   An analysis of existing Open Source licensing agreements should be undertaken with results distributed to all agencies funding High End Computing.

   The analysis should specify characteristics of each license and give specific examples under which it may be preferable to use one type over the other.