

Shaping Collaboration 2006: Action Items for the LHC

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Abstract. *Shaping Collaboration 2006* was a workshop held in Geneva, on December 11-13, 2006, to examine the status and future of collaborative tool technology and its usage for large global scientific collaborations, such as those of the CERN LHC [1]. The workshop brought together some of the leading experts in the field of collaborative tools (WACE 2006) [2] with physicists and developers of the LHC collaborations and HENP (High-Energy and Nuclear Physics). We highlight important presentations and key discussions held during the workshop, then focus on a large and aggressive set of goals and specific action items targeted at institutes from all levels of the LHC organization. This list of action items, assembled during a panel discussion at the close of the LHC sessions, includes recommendations for the LHC Users, their Universities, Project Managers, Spokespersons, National Funding Agencies and Host Laboratories. We present this list, along with suggestions for priorities in addressing the immediate and long-term leads of HENP.

1. Introduction

The content of this write-up are taken more-or-less verbatim from a Conference Summary written by the organizing committee (listed below). That summary, which also includes a collection of selected slides from presentations made during the conference, can be found on the Shaping Collaboration 2006 web site at [3].

2. Conference Goals

Shaping Collaboration 2006 focused on exploring how collaborative tools could meet the urgent needs of global science projects, in particular those of the CERN LHC, to provide essential means of communication between each member of their large and geographically diverse communities.

It brought together representatives of the LHC user community with experts in collaborative tool technologies to inform the latter individuals of LHC needs, and to teach the LHC community of the state of the art in collaborative tools and of innovations currently under development.

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3. Conference Overview

3.1. Organizing Committee

The program was established by an Organizing Committee, who consulted widely with experts concerning the topics of the conference. Members of the Organizing Committee included:

- R. Eisberg (DESY IT)
- P. Galvez (California Institute of Technology)
- S. Goldfarb (University of Michigan)
- J. Herr (University of Michigan)
- E. Hofer (University of Michigan, School of Information)
- T. Kawamoto (ICEPP, University of Tokyo)
- H. Neal (University of Michigan, Chair)
- H. Newman (California Institute of Technology)
- M. Storr (CERN DSU/ED)

3.2. Attendees and Speakers

There were approximately 100 conference participants, including registered attendees, as well as those opting to attend remotely through audio or video conferencing. The list of speakers included individuals from Germany, Italy, U.K., Japan, Korea, CERN and the US. They came from universities, research institutes, laboratories and private industry. A partial listing of speakers includes:

- Jos Engelen - CERN Deputy Director General for Science
- Doug van Houweling - Director Internet 2
- Tim Smith - CERN IT/UDS Group Leader
- Markus Nordberg - ATLAS Resources Coordinator
- Steinar Stapnes - ATLAS Deputy Project Leader
- Dan Atkins - US NSF Director Office of Cyberinfrastructure
- Harvey Newman – CMS, US CMS Collaboration Board Chair, VRVS/EVO, US LHCNet, ICFA SCIC, UltraLight, ...
- Homer A. Neal - ATLAS, WLAP, ATLAS Collaboratory Project, ...
- and more...

4. Session Topics

Conference sessions covered the following subjects:

- The Human Component of Collaboration
- Views from the LHC
- The Impact of Geography
- Collaborative Tools and Developing Countries
- Collaborative Tools, Education and Training
- A Vision for the Future
- Funding Models and Strategies for Collaborative Tool Support in Scientific Projects
- Frontiers in Collaborative Tool Research (WACE 2006)

5. Program Agenda

Here we list each session (and session chair), followed by the presentations (and speakers).

- **Introduction/Keynote (Homer A. Neal – University of Michigan)**
 - Welcome (Jos Engelen - CERN)
 - Keynote Presentation (Douglas van Houweling - Internet2)
- **Reflections on the Development of the Web (Mick Storr - CERN)**
 - Reflections on the Development of the Web: The Goal of Scientific Collaboration (Robert Cailliau - CERN) [presented by Mick Storr]
- **The Human Component of Collaboration (Reinhard Eisberg - DESY)**

- Intergroup Protocols and Human Collaboration (Deb Agarwal - LBNL)
- Theory of Remote Scientific Collaboration (Erik Hofer – University of Michigan)
- Collaboration in Context - capturing and utilizing context to support collaborative knowledge building (Martin Wessner - Fraunhofer Institute)
- **Deployment Experiences / Remote Control Room (Steven Goldfarb – University of Michigan)**
 - Beyond HENP - Experiences from UK eScience (Andy Parker - Cambridge eScience Centre)
 - CMS Plans for Centres (Lucas Taylor – Northeastern University)
 - Plans for the USCMS Remote Operations Center (Erik Gottschalk - FNAL)
- **Views from the LHC (Mick Storr - CERN)**
 - An Overview of the ATLAS Experiment and the Role of Collaborative Tools in Scientific Discovery (Steinar Stapnes - CERN)
 - Collaborative Tools in a Grid Environment (Rick Cavanaugh – University of Florida)
 - RTAG 12: An Assessment of the Collaborative Tool Needs of the LHC (Steven Goldfarb – University of Michigan)
 - Collaborative Tool Plans at CERN (Tim Smith - CERN)
- **Geography Matters (Tatsuo Kawamoto - ICEPP, Tokyo)**
 - The Impact of Distance and Time in Large Scientific Collaborations (Hiroshi Sakamoto -
 - ICEPP, Tokyo)
 - The Importance of Collaborative Tools in Developing Countries (Airong Luo – University of Michigan)
- **Maximizing Returns on National Investments (Homer Neal – University of Michigan)**
 - Maximizing Returns on National Investments (Dan Atkins - U.S. NSF Office of CyberInfrastructure)
- **Collaborative Tools, Education & Training (Mick Storr - CERN)**
 - Collaborative Tools, Education and Training (Joseph Hardin - Sakai Project)
- **State of the Art (Philippe Galvez – California Institute of Technology)**
 - Enabling Virtual Organizations (EVO) (Philippe Galvez – California Institute of Technology)
 - Web Lecture Archiving, Robotic Tracking Systems, and the Lecture Object (Jeremy Herr - University of Michigan)
 - MVL, a Tool to Support Maintaining, Optimizing, and Trouble Shooting Accelerator Components from Off-Site (Roberto Pugliese - Elettra, Trieste)
 - ConferenceXP: Shaping the Future of Collaboration (Todd Needham - Microsoft Research)
- **A Vision for the Future (Harvey Newman – California Institute of Technology)**
 - A Vision of Collaboration at the High Energy Frontier in the LHC Era (Harvey Newman - California Institute of Technology)
 - Using OpenGL and 3D to Manage Large Numbers of Video Conferencing Streams (Pavel Farkas - California Institute of Technology)
 - Collaborative Tools and the Management of Large Experiments (Markus Nordberg - CERN)
 - Grid Enabled Collaborative Tools for Scientific Research (Charles Severance – University of Michigan)
- **Wrap-Up (Homer Alfred Neal – University of Michigan)**
 - Panel Discussion

6. Issues and Outcomes

During the formal presentations, group discussions, and the final panel discussion, the following issues were identified as important conference outcomes, representing conclusions, recommendations and follow up action.

In terms of collaborative tool usage:

- **What Should the LHC Users and Their Universities Do To Prepare Themselves for LHC Data Taking and Analysis?**
 - Propagate the culture of collaboration within groups.
 - Train group members to utilize collaborative tools.
 - Become familiar with the collaborative tool systems CERN has deployed and plans to deploy.
 - Review and determine how to configure rooms for effective collaboration.
 - Initiate desktop conferencing, and pervasive use of collaborative tools as needed.
 - Seek cost proposals; assemble costing options.
 - Consult with national project offices about best-practices.
 - Engage university administration in discussions about the importance of cost sharing for collaborative tools.
- **What should LHC Project Managers Do?**
 - Collect information about best practices within national environment.
 - Assign special responsibilities within national LHC structure (e.g., Tier-2 sites).
 - Attach collaborative tool training sessions to Grid (and other) meetings.
 - Share widely the experiences of challenges faced by remote colleagues.
- **What are the Spokespersons' Responsibilities?**
 - Make sure that remote collaboration is possible and supported
- **What Should National Funding Agencies Do?**
 - Recognize the importance of supporting collaborative tools for its research groups; recognize the critical nature of collaborative tools for success of the LHC program.
 - Eliminate policies that restrict funding for collaborative tools
 - Support interdisciplinary efforts to develop a coordinated approach to generate collaborative environment for HENP research.
- **What Should the Host Laboratory Do?**
 - Provide necessary local facilities to support laboratory meetings and interconnectivity.
 - Modernize network connections.
 - Show users best practices and equipment information.
 - Establish "standards" for use.
 - Support laboratory structures that seek user input and advice.
- **What Funding Models Should be Used for Collaborative Tool Hardware and Staff Support?**
 - Given that experiments have become proactive in supporting collaborative tools, an approach for cost sharing with the Lab should be pursued; all entities are short of funds and a shared effort should be pursued.
 - Team account charges for specific services should be implemented.
 - Experiments must be prepared to provide funds for critical short-term needs, until such time as long-term plans may be put in place. This is particularly important now in the first year of LHC running.
- **What Are Some Notable Takeaways?**
 - Many interesting r/d projects were reported (e.g., EVO developments, GECSR',...).
 - Should pursue collaboration with other communities (Fusion Energy Community, ILC,...).
- **What Areas Should Be Given The Highest Priorities For Future R/D?**
 - Integration;

- Robustness & Ease of Use;
- Security;
- Pervasiveness.
- **How Would One Form A Multi-disciplinary Effort To Pursue The Collaborative Tool Needs Of LHC Experiments?**
 - Agency sponsored workshop; Goal to develop vision.
 - Focus on CyberInfrastructure proposal development.
- **How can industry and the HENP community become better connected in terms of meeting the HENP collaborative tool needs?**
 - Motivate industry to partner in developments that serve large distributed organizations such as those in HENP.
 - Define pilot projects with industry with service level agreements.
 - Involve industry experts in the planned agency workshops.

7. More Information

A complete record of the conference, including slides and web lecture archives, is accessible from the conference web site [3].

8. References

- [1] The LHC is the Large Hadron Collider under construction at CERN, the European Laboratory for Particle Physics, in Geneva Switzerland. The collaborations include ALICE, ATLAS, CMS, and LHCb. More information can be found at <http://www.cern.ch>.
- [2] WACE is the Workshop on Advanced Collaborative Environments, an annual workshop on collaborative tool theory, research, and technology: <http://www-unix.mcs.anl.gov/wace>.
- [3] Shaping Collaboration 2006 was a conference on collaborative tool developments and policy for the LHC and for large, global science projects, in general. A summary description of the conference, agenda, and attached materials, including video archives of presentations can be found at <http://cern.ch/ShapingCollab2006>.

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