



PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

HPC Training Perspectives and Collaborations from
PRACE (Europe), XSEDE (US) and RIKEN AICS (Japan)

PRACE Advanced Training Centres



PARTNERSHIP
FOR ADVANCED COMPUTING
IN EUROPE





See survey at:

tinyurl.com/sc13bof174

(please answer Q0 now!)

Q0: Warmup

Which is better?

- emacs
- vi / vim

What kind of machine are you using today?

- Mac
- Windows
- Linux
- Other

Submit

Never submit passwords through Google Forms

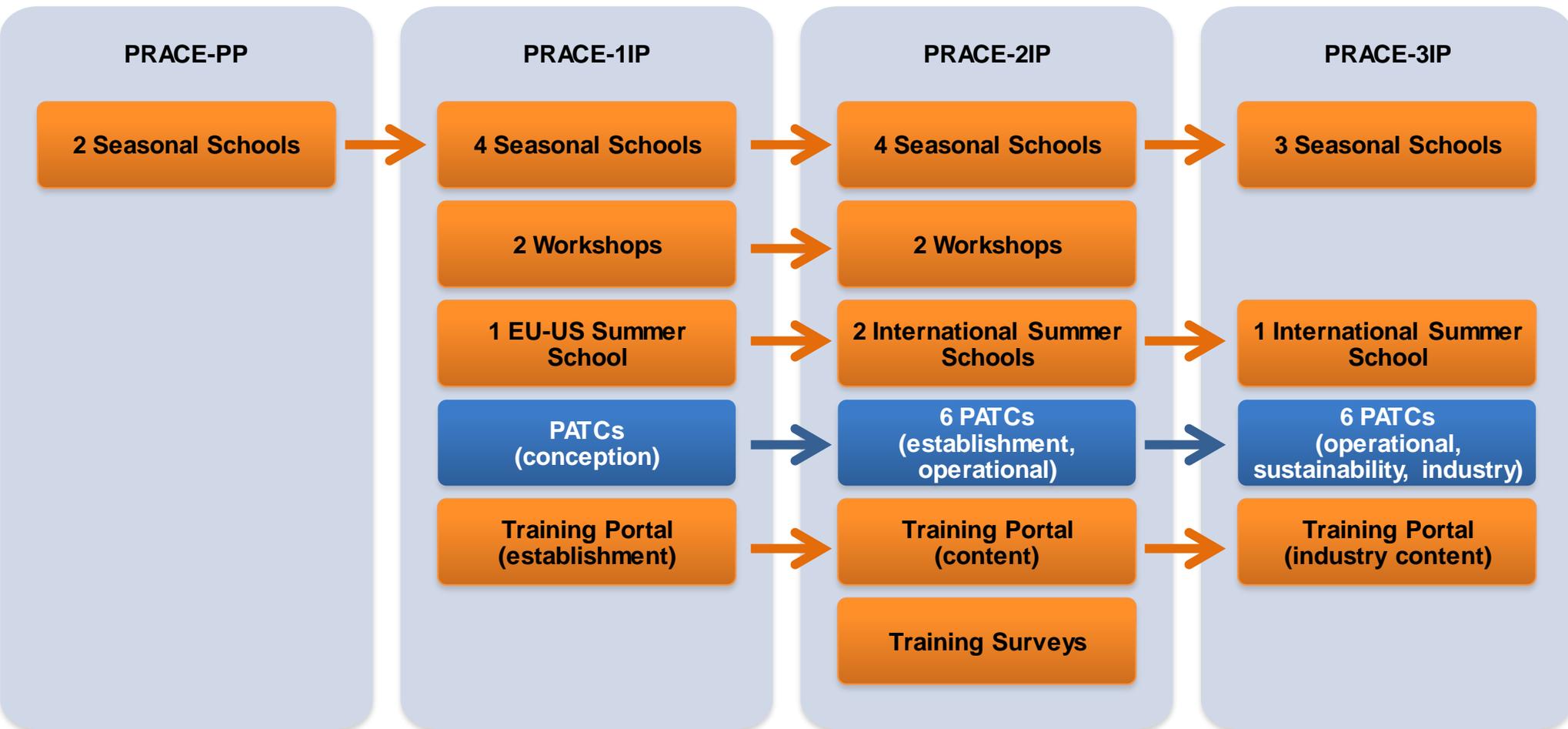
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 Google Drive

Q1: Demographics

Do you work in:

- Africa

In the context of overall PRACE training...



In the context of overall PRACE training...



PRACE Advanced Training Centres

6 PRACE Advanced Training Centres (PATCs): Hubs for world-class HPC training for researchers in Europe.

- Barcelona Supercomputing Center (Spain)
 - **Maria-Ribera Sancho** (director)
 - Nia Alexandrov (coordinator)
- CINECA - Consorzio Interuniversitario (Italy)
 - **Nico Sanna** (director)
 - Francesco Falciano (coordinator)
- CSC - IT Center for Science Ltd (Finland)
 - **Martti Louhivuori** (director)
 - Minna Hahl (coordinator)



D4.2

PRACE Advanced Training Centres

- EPCC at the University of Edinburgh (UK)
 - **David Henty** (director)
 - Irina Nazarova (coordinator)
- Gauss Centre for Supercomputing (Germany)
 - **Rolf Rabenseifner** (director)
 - Sabine Höfler-Thierfeldt (coordinator)
- Maison de la Simulation (France)
 - **Edouard Audit** (director)
 - Michel Kern (coordinator)



D4.2

Definitions

Syllabus

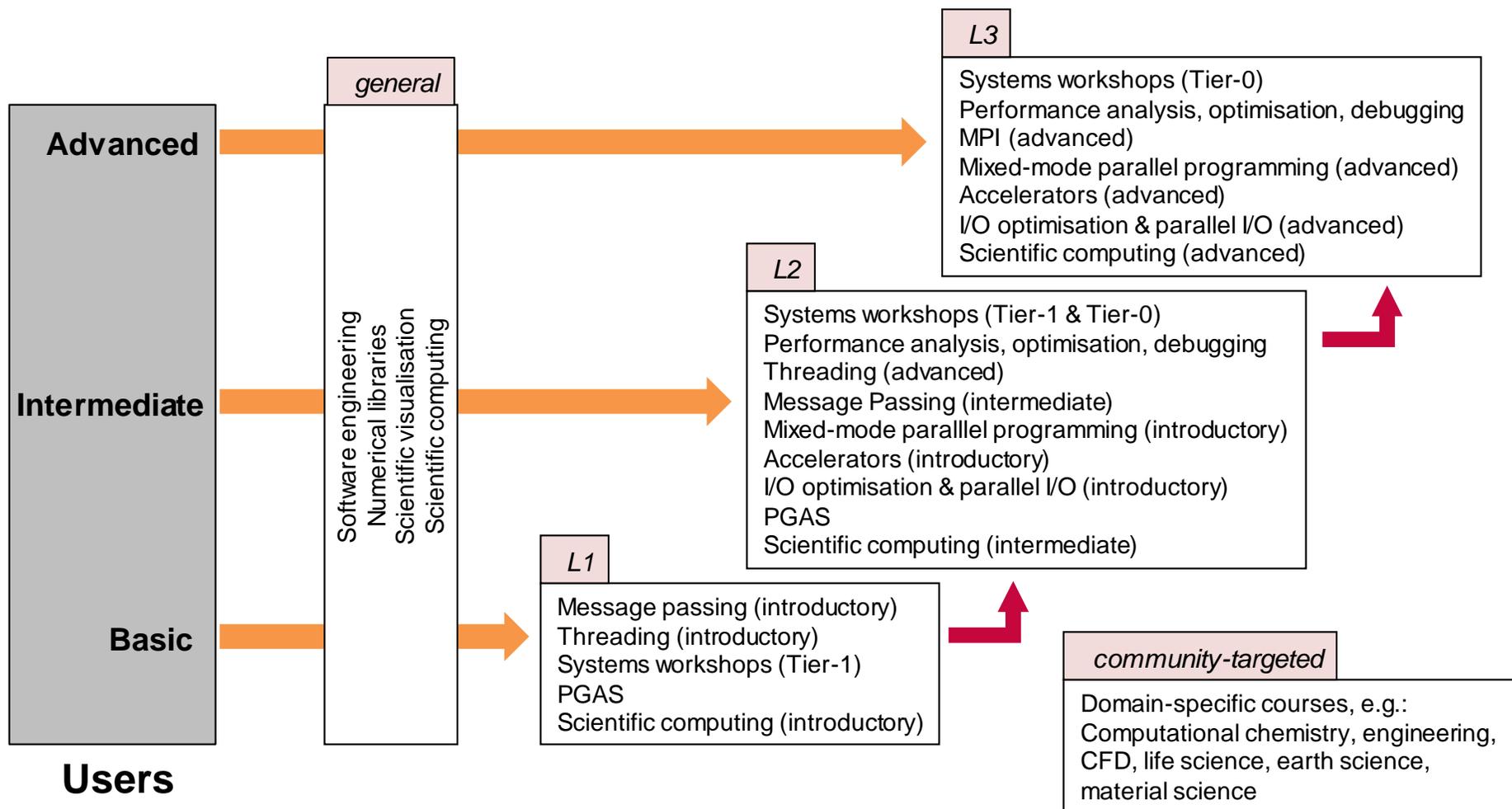
list of subject areas, or individual courses here

Curriculum

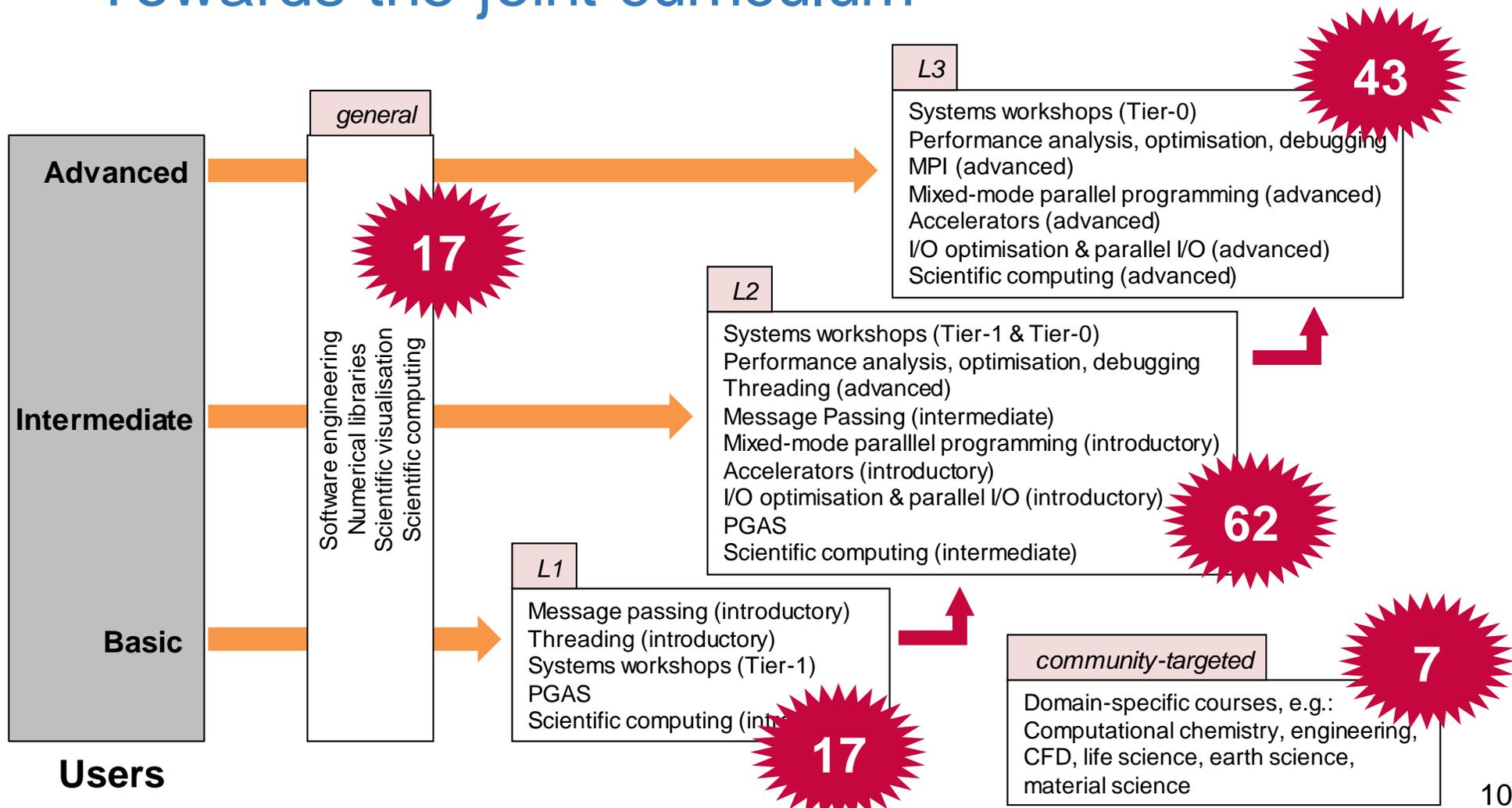
an aggregate of courses; “prescribed learning paths”

Target a **joint** PATC curriculum that caters for researchers with varying levels of HPC experience, along with domain-specific and industry-oriented courses.

Towards the joint curriculum



Towards the joint curriculum



Summary of work so far

- Have run 90 PATC training courses
- 2,000 attendees from all over Europe (and beyond)
- Taken together the joint curriculum covers:
 - key subjects of importance
 - different target audience (HPC experience), including focus on intermediate and advanced users
- Course material (slides, videos etc.) centrally collated

Coherent information, registration and evaluation www.training.prace-ri.eu



OpenACC Programming for Parallel Accelerated Supercomputers -- an alternative to CUDA from Cray perspective @ HLRS

29-30 April 2013 *Stuttgart (Germany)*
CET timezone

Overview

Registration

Registration Form

Evaluation

Evaluation Form

Local organizer: Rolf Rabenseifner

This workshop will cover the programming environment of the Cray XK7 hybrid supercomputer, which combines multicore CPUs with GPU accelerators (<http://www.cray.com/Products/Computing/XK7.aspx>). Attendees will learn about the directive-based OpenACC programming model (<http://www.openacc-standard.org>), whose multi-vendor support allows users to portably develop applications for parallel accelerated supercomputers.

The workshop will also demonstrate how to use the Cray Programming Environment tools to identify CPU application bottlenecks, facilitate the OpenACC porting, provide accelerated performance feedback and to tune the ported applications. The Cray scientific libraries for accelerators will be presented, and interoperability of OpenACC directives with these and with CUDA will be demonstrated. Through application case studies and tutorials, users will gain direct experience of using OpenACC directives in realistic applications.



Success Story: Mar 2012 – July 2013

90 courses

260 days of training

6417 participant-days

8.5 / 10

- Average overall course rating, from 1037 feedback forms from 77 courses

Challenges

- Trainee mobility
- Training the trainers
- Sustainability
- Industrial involvement
- Scope: only “Advanced” courses?
- Scope: training beyond the main curriculum?

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(please answer all questions!)

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Birds of a Feather Session

- Come to the PRACE/XSEDE/Riken training BoF
 - Thursday 21st, 12:15PM - 1:15PM, room 501/502
 - **HPC Training Perspectives and Collaborations** from PRACE (Europe), XSEDE (US) and RIKEN AICS (Japan)
 - *“HPC training plays a vital role in fostering an ever-growing community of researchers and developers who conducts their work on supercomputers. In this BOF session, representatives from the Partnership for Advanced Computing in Europe (PRACE), the Extreme Science and Engineering Discovery Environment (XSEDE), and the RIKEN Advanced Institute for Computational Science (AICS) will each present their HPC training programs in Europe, the US, and Japan, respectively. The presentations will be followed by a discussion of the respective experiences and lessons learned, opportunities for sharing materials, processes for assessing and certifying knowledge acquisition, and a discussion of opportunities for collaboration.”*

XSEDE Training Overview

- XSEDE is a multi-institution partnership, each partner has experience providing training on HPC-related topics.
- XSEDE uses a multi-pronged approach to training, with in-person events, synchronous, and asynchronous online offerings.
- XSEDE has a central calendar of training events, and events can choose to register participants through the XSEDE Portal.



Some XSEDE Training Resources

- Asynchronous training
 - <http://www.citutor.org/>
 - <https://www.cac.cornell.edu/VW/>
- Live / Synchronous training
 - <https://www.xsede.org/web/xup/course-calendar>
 - Annual XSEDE Conference tutorials
 - Collaborative workshops with Blue Waters, International partners
 - Individual Centers' training offerings

Advanced Institute for Computational Science (AICS)

- The institute have been established at the K computer in Kobe (started in October 2010)
- Missions
 - To run the K computer efficiently for users of wide research areas
 - Carry out the leading edge of computational science technologies and contribute for COE of computational science in Japan
 - Propose the future directions of HPC in Japan and conduct it.
- Organization
 - Operation division, to run and manage the K computer
 - Research division
 - 10 computational science research teams and 6 computer science research teams.
 - Promoting strong collaborations between computational and computer scientists, working with core-organizations of each fields together.



Educational Activities in RIKEN AICS (1/2)



- AICS HPC Summer School
 - Started from 2011
 - Basic courses for HPC
 - 4~5 days including hands-on
 - supported by U Tokyo and Kobe-U

Year	2011	2012	2013
Universities	40	24	27
K computer proj		4	4
Riken & misc		3	2
Industries	3	10	4
total	43	41	37

- AICS Spring School
 - Started from this year
 - Higher level courses including parallel numerical computation and performance tuning
 - 3 days including hands-on, supported by U Tokyo and Kobe U

- International HPC Summer School
 - Joined from this year
 - 10 students (inc. Post-doc) from Japan

Educational Activities in RIKEN AICS (2/2)



- Education in Universities
 - Team Leaders of AICS hold positions of visiting professors concurrently
 - Kobe-U and University of Hyogo (located in the same area)
- AICS Internship program
 - Planed from next year (2014)
 - For post-graduate students
 - 1~2 months, staying at AICS teams for researches
- Exchange with Industries
 - Accept researchers sent from Industries
 - 1~3 years

京コンピュータ “The K computer”



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Topics for Discussion



Topic 0

Check that the survey system works correctly!

Topic 1

- Demographic of the Audience
 - How many are HPC training providers/instructors
 - From US, Europe, Asia, others?

Topic 2

Should we now invest MORE in online training instead of live training?

- What are the general experiences with online resources?
- What is effective? What is not?

Topic 3

Teaching Material/Content

- People are always re-inventing the wheel in developing basic training material?
- Should there be a standard set of material for some topics (e.g. MPI, OpenMP)?
- Any of the audience generating new material?
- Is there a willingness to share material through a centralised repository?
- Barriers for doing so (e.g. copyright, licensing)?

Topic 4

- Live Training

- Very effective but can sometimes be difficult to get numbers in the same place (e.g. more advanced courses)

- Can we train more people with the same effort? Live training to remote participants, streaming of talks along with on-site "demonstrators/helpers" at distributed locations?

- Any experience/new ideas for distributed "live" training?

Topic 5

- Accreditation, certification
 - Is there interest for more formal accreditation/certification of HPC skills?
 - e.g. badges, industry accreditation

Topic 6

Roadmap to learning HPC - HPC University currently has an example.

- Any feedback?
- Are there subjects where training is desperately lacking?
- Or any subject that is not currently taught in the right way/context for the target audience?