China Spallation Neutron Source data analysis software project

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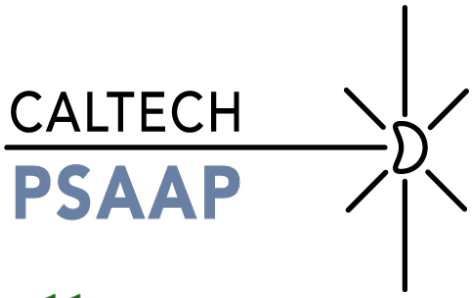
CSNS – China Spallation Neutron Source

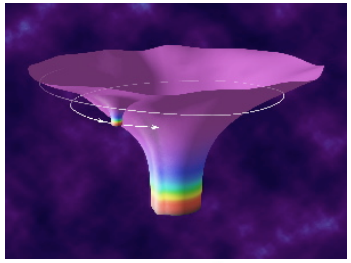
- Neutron scattering: a material probe
- Spallation neutron sources: ISIS, SNS, JPARC ...
- CSNS: A 1.4billion RMB project in Dongguang
  - First neutrons in 2016
- Software for CSNS users
  - Goal: useful. easy to use
  - starting to be built in IHEP, led by Dr Tao
  - integration and customization of existing tools
  - new tools

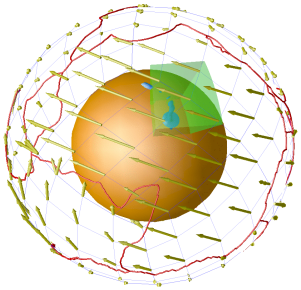
CNIC – Computer network information center

Luo Ze

Caltech CACR







Jet Propulsion Laboratory
California Institute of Technology

Accelerating scientific discovery through advanced computation, collaboration and research

Mark Stalzer

China US Software Workshop Series - Workshop 2
5 – 7 March, San Diego, California, USA

Some CACR research focus

- Make it easier for scientists/researchers to program their analysis/modeling/simulation through higher level descriptions
- Bridge the gap to the end users (scientists/researchers) by building an expressive system.
- Examples: pyre and luban

CACR research example: Luban

- The most compact set of abstractions that is powerful enough for constructing good (web) user interfaces
- Practical and useful for scientists/ researchers (non-programmers) to create specifications of their UI
- http://lubanui.org

Focus of CSNS software project

- Fusion of computing and scientific research
- Introduction of modern software engineering techniques and practices to the development team
- Techniques:
  - source control, build system, testing, design patterns, component architecture
- Project management:
  - “lean startup”

Management of scientific computing project

- Hard to measure productivity
- If too ambitious - often lead to waste of resources
- Development management dilemma: rigorous software engineering process vs creativity
- Especially difficult in academic setting

“Lean startup”

- A philosophy for startups, but useful in highly-creative activities
- Lean Startup is a disciplined, scientific and resource efficient method for discovering and building products and services that people love.
- Resources could be easily wasted in software projects
- Hypothesis testing
- MVP (minimal viable product)
- Software development management dilemma: rigorous software engineering process vs creativity

CSNS data analysis

Objectives and significance of the research

- A suite of useful software solutions for users of CSNS
- A data analysis platform for CSNS
- Research for useful techniques, middleware, strategies
- Fusion of science and software eng.

Need for and impact of China-US collaboration

- Experiences of neutron software development in US apply directly to CSNS
- Contribution to global neutron software community through feedbacks, new algorithms/tools/...

Approach and mechanisms; support required

- Joint effort of CNIC, IHEP, Caltech, ...
- python, Mantid, DANSE, luban, ...
- source control, build system, testing, design patterns, component architecture
- “lean startup”

Team & Roles

- IHEP+CNIC: main development team
- IHEP: more on working out software solutions
- CNIC: more on middleware
- Caltech: more on assessing existing solutions and help on architectural design, procedures, etc