Status of WLCG FCPPL project

- Status of Beijing site
- Activities over last year
- Ongoing work and prospects for next year

CHEN Gang & LANÇON Eric

Last year activities on one page

- Participation of Chinese colleagues to monthly ATLAS and technical computing French meetings + vidyo/ Skype/…

  - Sharing of expertise and tools (grid middleware and experiment specific)

  - Network monitoring

  - Multi-core processing

  - Deployment of WebDAV interface to storage (http access)

- ATLAS computing workshop in Beijing, May 2013

  - Exchanges between Chinese, French & Japanese collaborators

- Arc-CE (grid interface from Nordugrid) testing of at Beijing Tier-2

- Start up of ATLAS@home project

  - WU Wenjing (伍 文静) spent 2 months in Europe

Towards LHC Run-2

The grid works and physics analyses use it

Beijing Tier-2 - status

>1k Cores

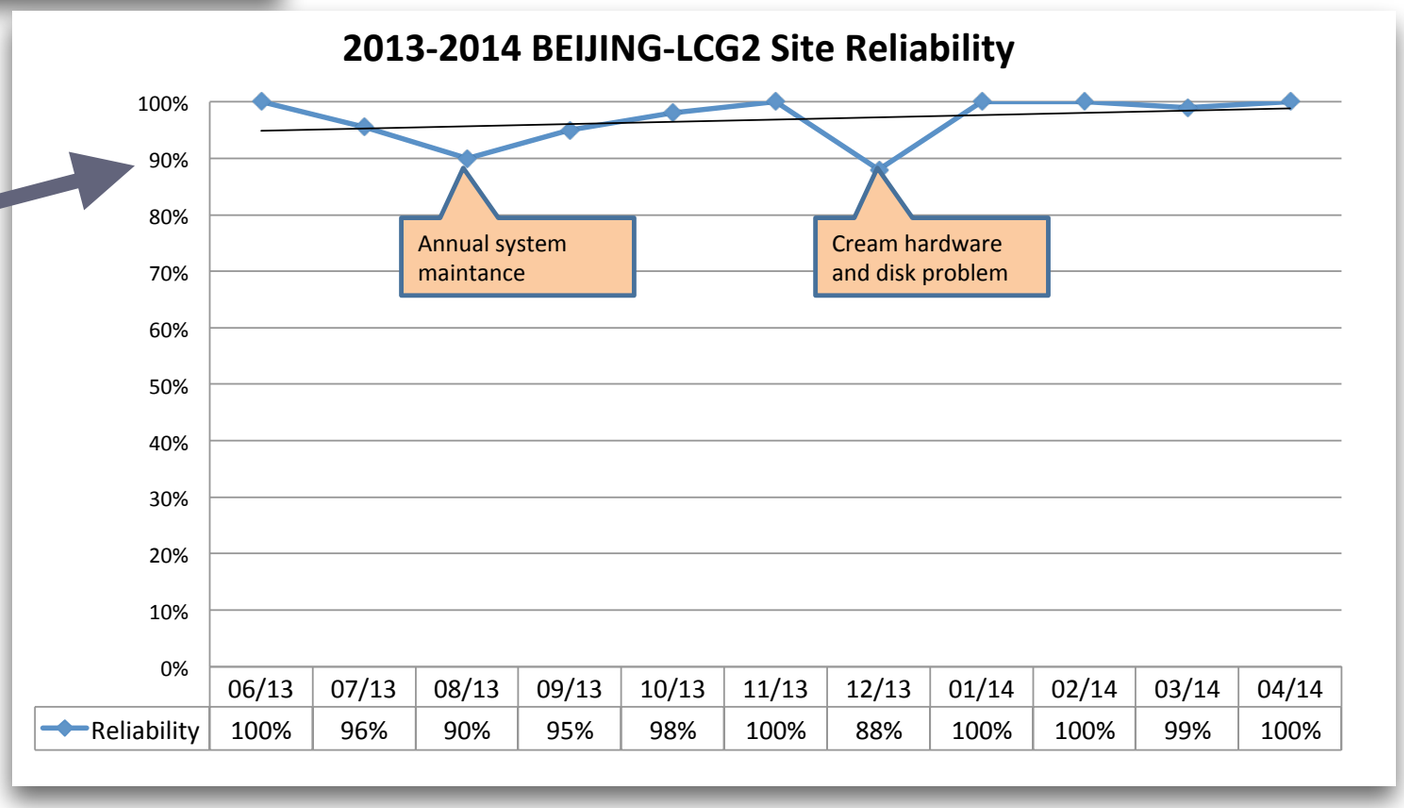
- Cpu Cores: 1088;
  - (Intel E5430: 896 cores; X5650: 192 cores)
- HepSpec06 : 11889
- Storage:
  - Atlas(DPM): 80TB
  - CMS(dCache): 300TB
- Configration Module: Puppet + Forman
- Monitoring: http://ganglia.ihep.ac.cn/mon/

Storage

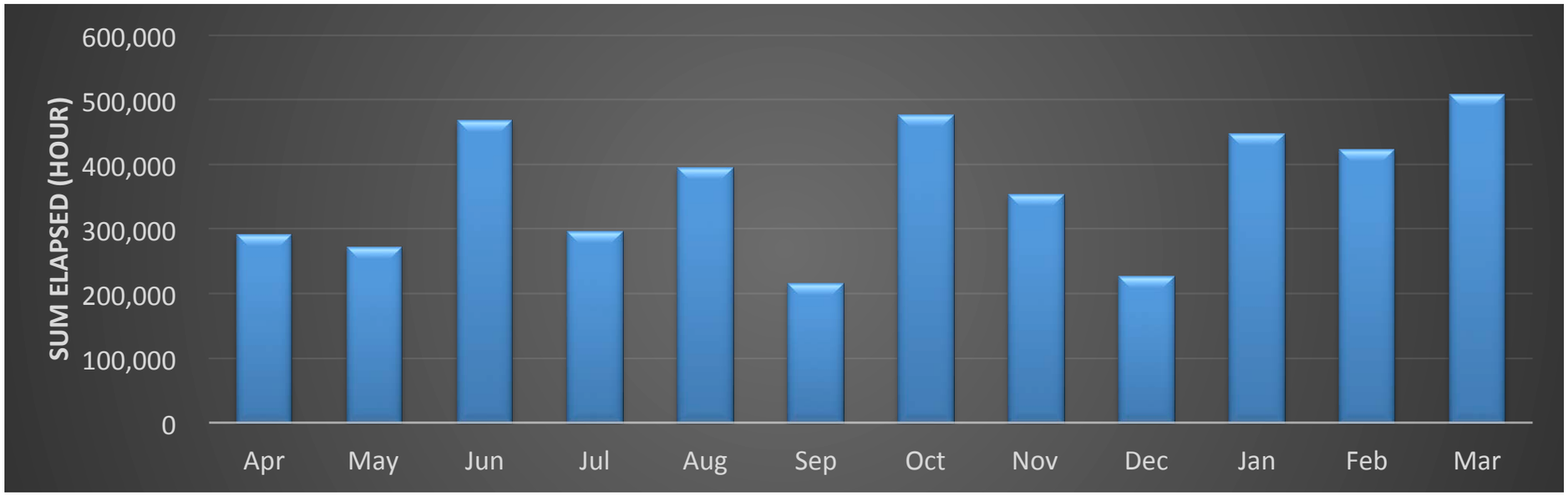
Xiaofei YAN (闫晓飞)

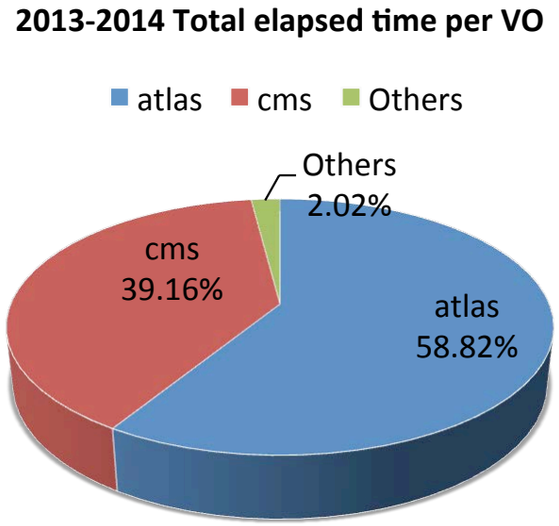
Zhang Xiaomei (张小梅)

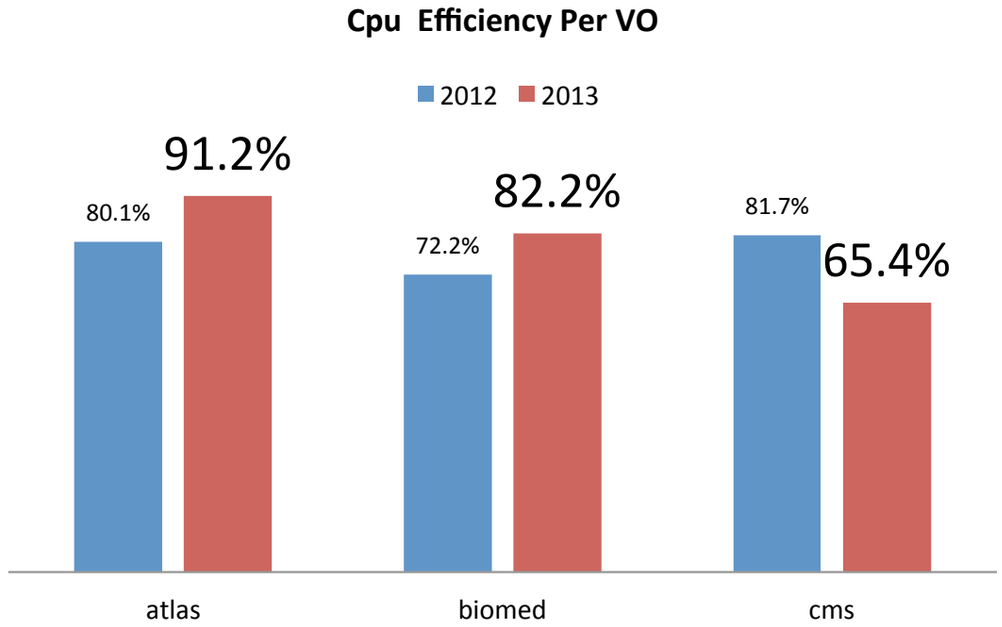
90%



CPU consumption at Beijing Tier-2





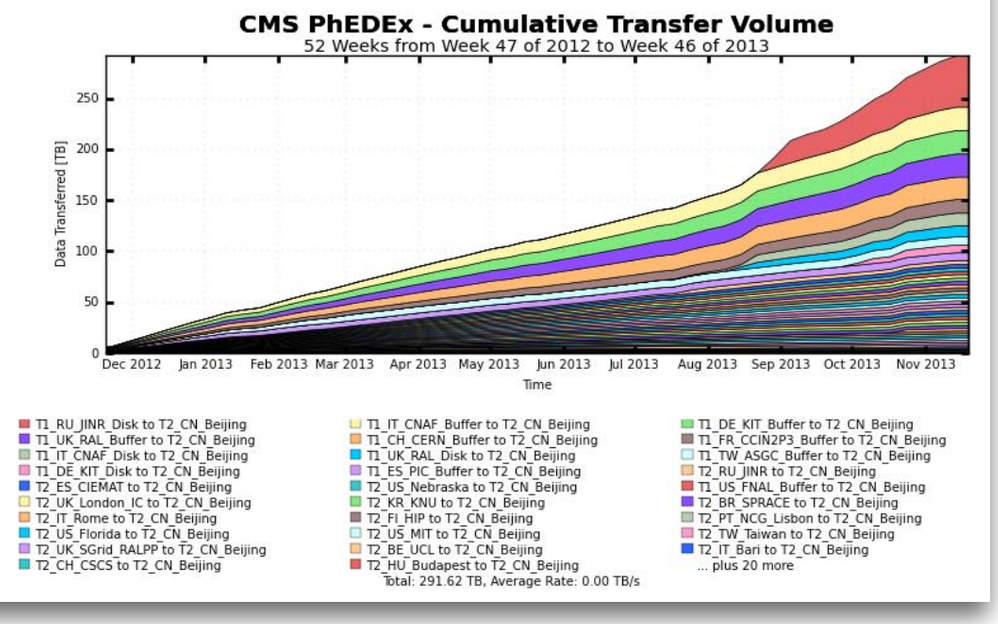


International link to Beijing

- New 10Gbps link between EU and China operational in 2013
- Bandwidth x 4 and better stability
- Monitoring at both ends by French & Chinese patterns, perfSonar machines at Beijing (**Fazhi QI/齐法制**)
  - Work done in cooperation with French sites within the WLCG networking group
  - Identical configuration files for French and Chinese perfsonar instances

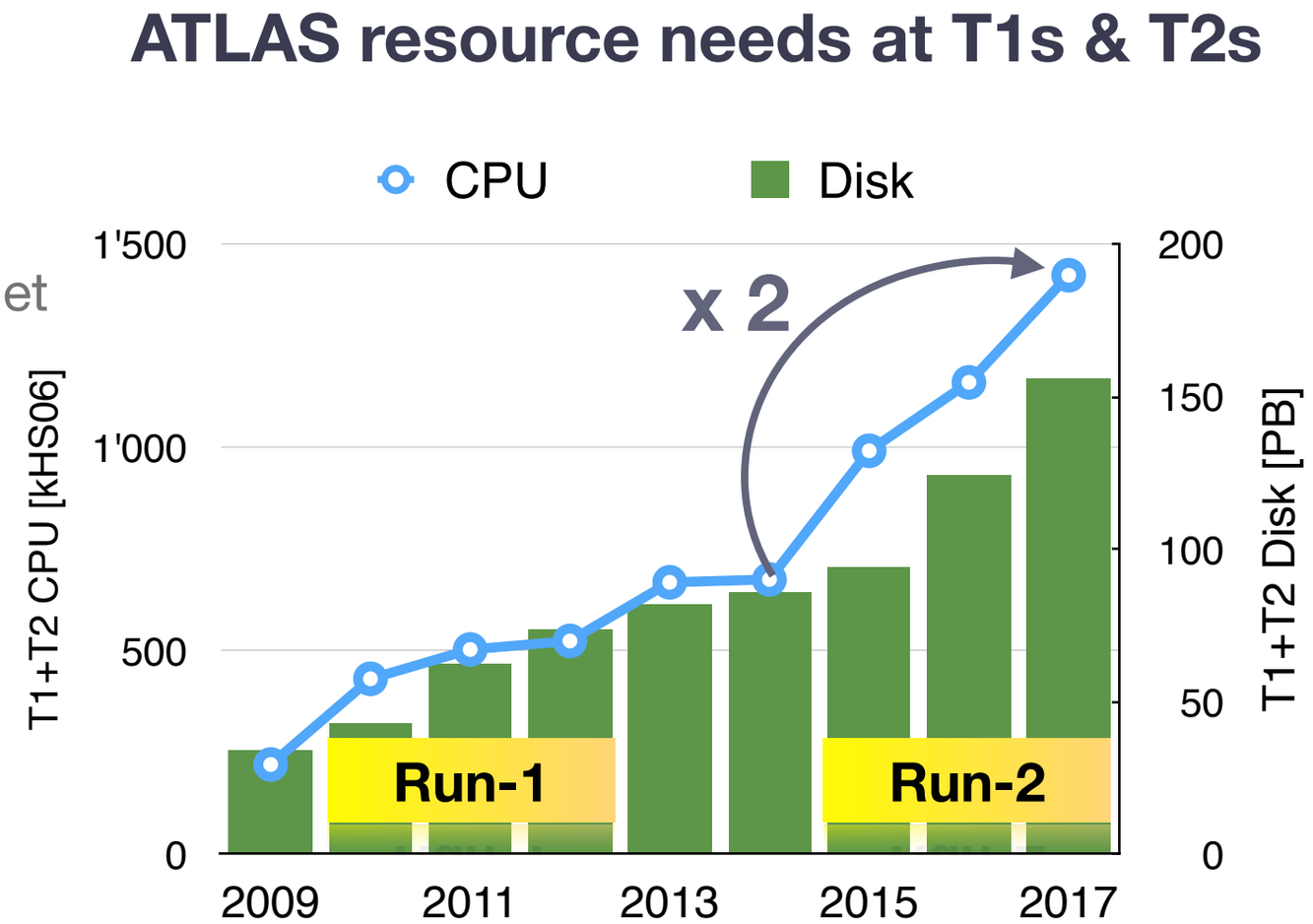
CMS transfers

- Total throughout volume is 758TB. The imported volume is about 291TB



Seeking extra CPU resources

- LHC experiments need and use more CPU than pledged resources
- **LHC Run-2 : CPU needs x 2**
- Every possible options are investigated to get extra resources
  - Cloud computing
  - HPC (High Performance Computing) centres
  - Volunteer computing
- **Our collaboration is active in these 3 areas**



HPC (High-Performance Computing) resources

- Large investments in many countries : from Peta to Exa scales initiatives[1]
- Latest competitive supercomputers are familiar Linux clusters
- **Large** number of spare CPU cycles are available at HPCs which are not used by 'standard' HPC applications
- **China** host some of the largest HPC facilities worldwide
- Difficulties to use HPC centres for I/O intensive applications & out-bound connectivity is an issue

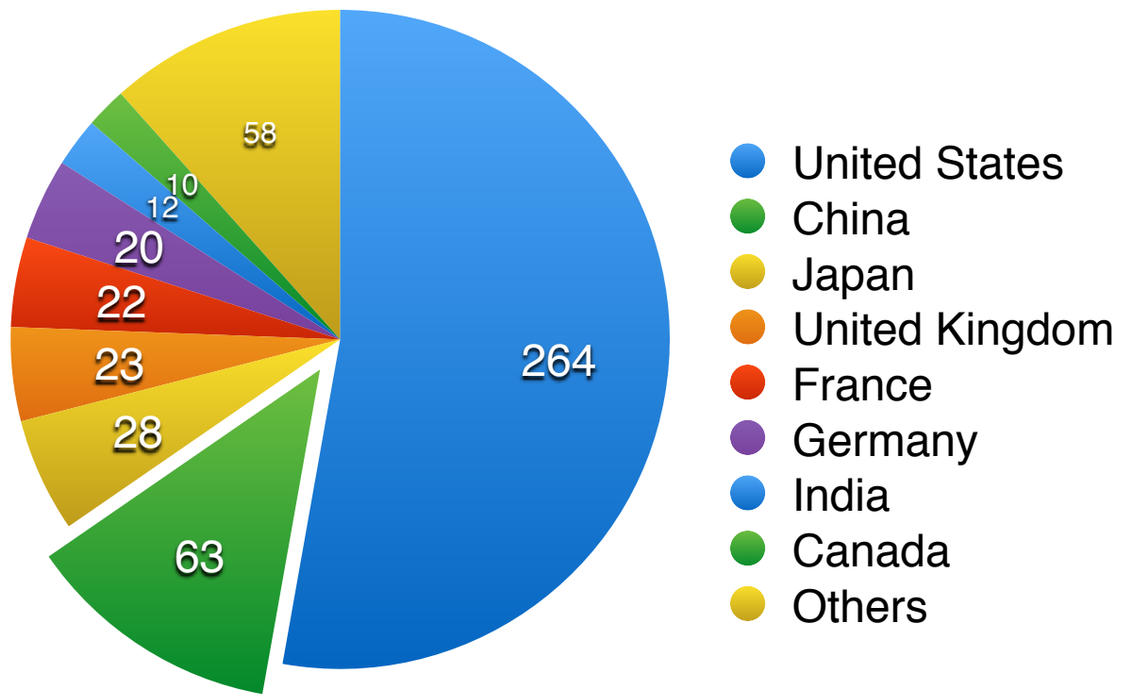
PRACE, the Partnership for Advanced Computing in Europe

SuperMUC a PRACE Tier-0 centre :

155,000 Sandy Bridge cores 2.8M HS06

WLCG 2013 T0/1/2 pledges ~2.0M HS06

Number of facilities in Top500 per country



[1] : http://www.eesi-project.eu/pages/menu/eesi-1/publications/investigation-of-hpc-initiatives.php

Use of HPC

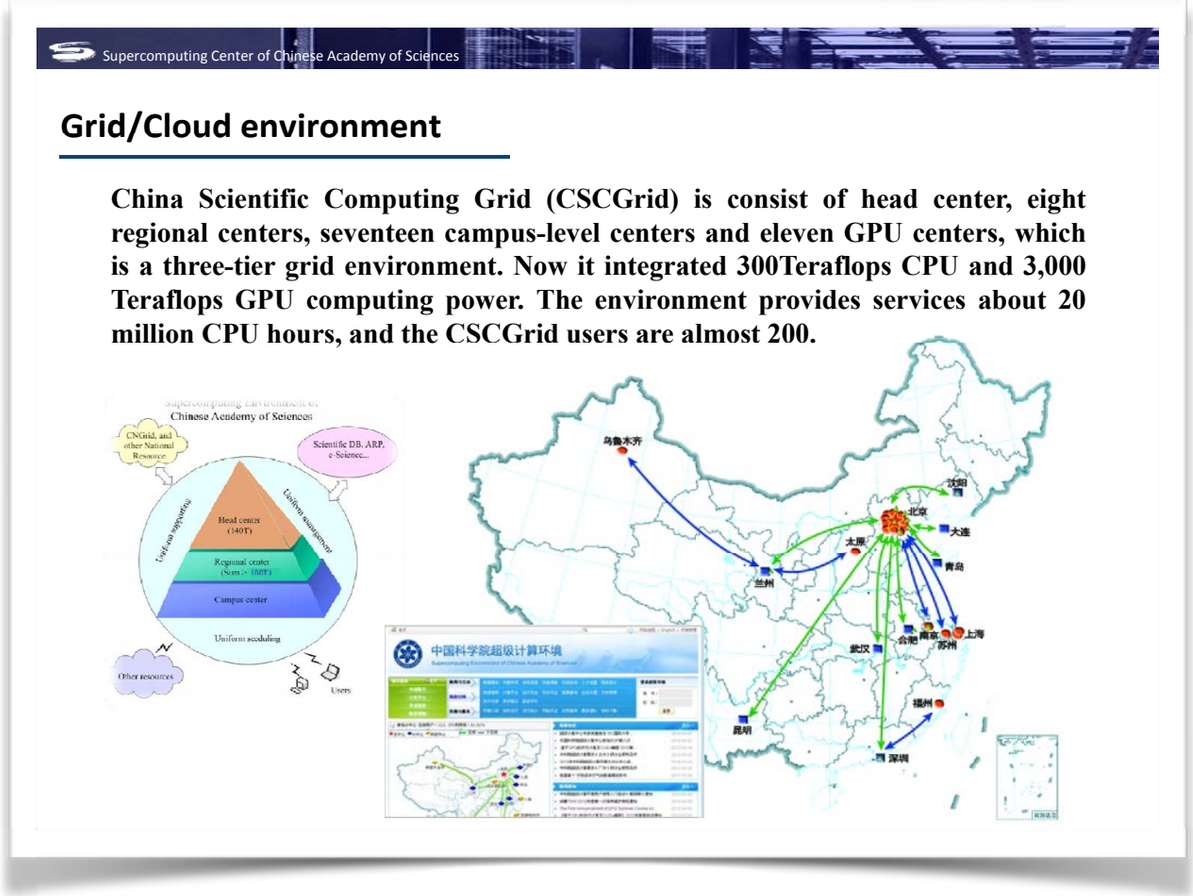
- Arc-CE (grid interface from Nordugrid) installed and tested at Beijing Tier-2 site

  - To acquire expertise

  - Arc-CE used in Europe to run ATLAS production at several HPC centres

- Visits and meetings at CAS HPC center to explain the use case and discuss implementation

- Contacts also establish with other HPC centres in China



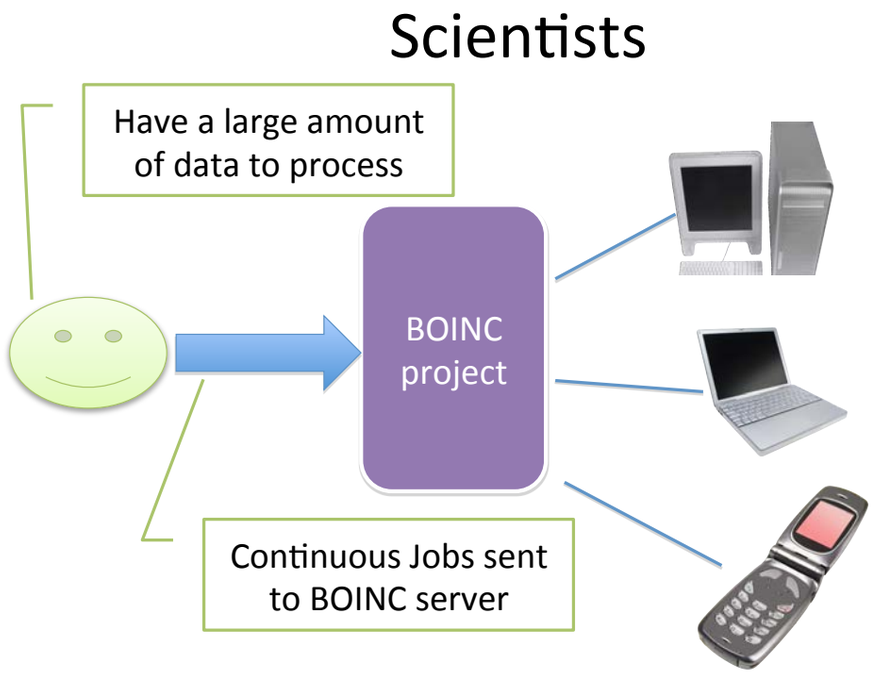
Volunteer computing

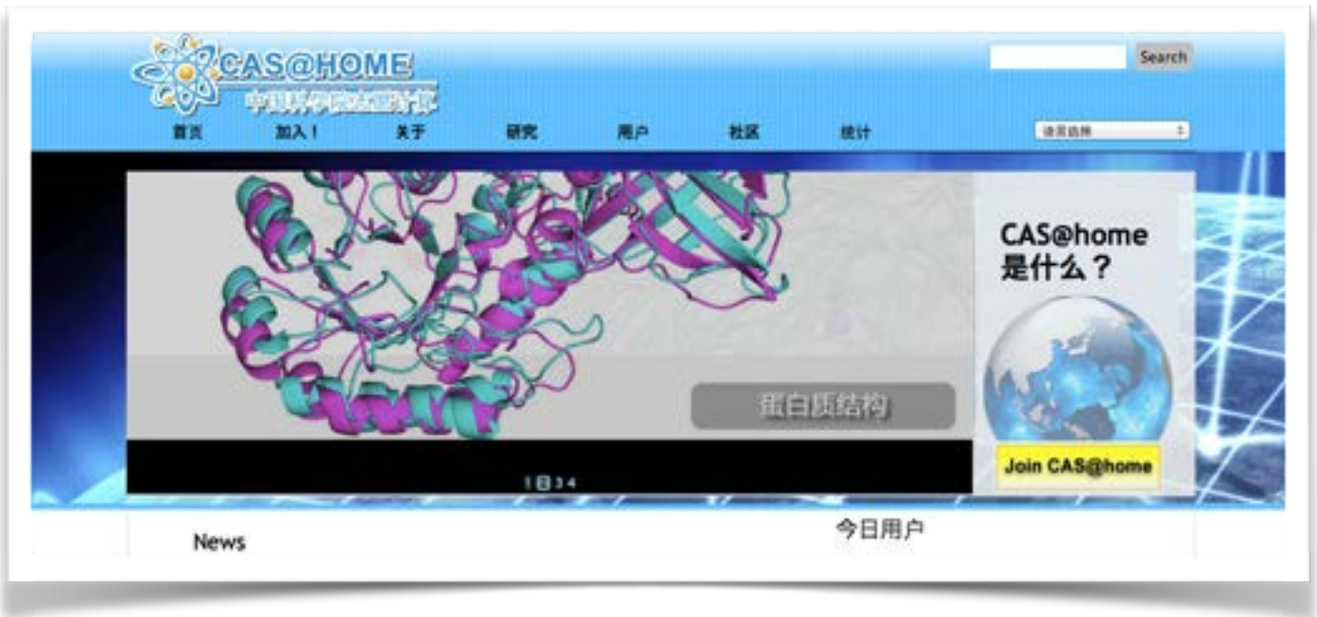
- Use of personal computer spare cycles (when computer sleeps) to run jobs for a community

- Initial project SETI (Search for Extra-Terrestrial Intelligence) launched in 1999

- Standard interfaces provided by BOINC project (Berkeley Open Infrastructure for Network Computing)

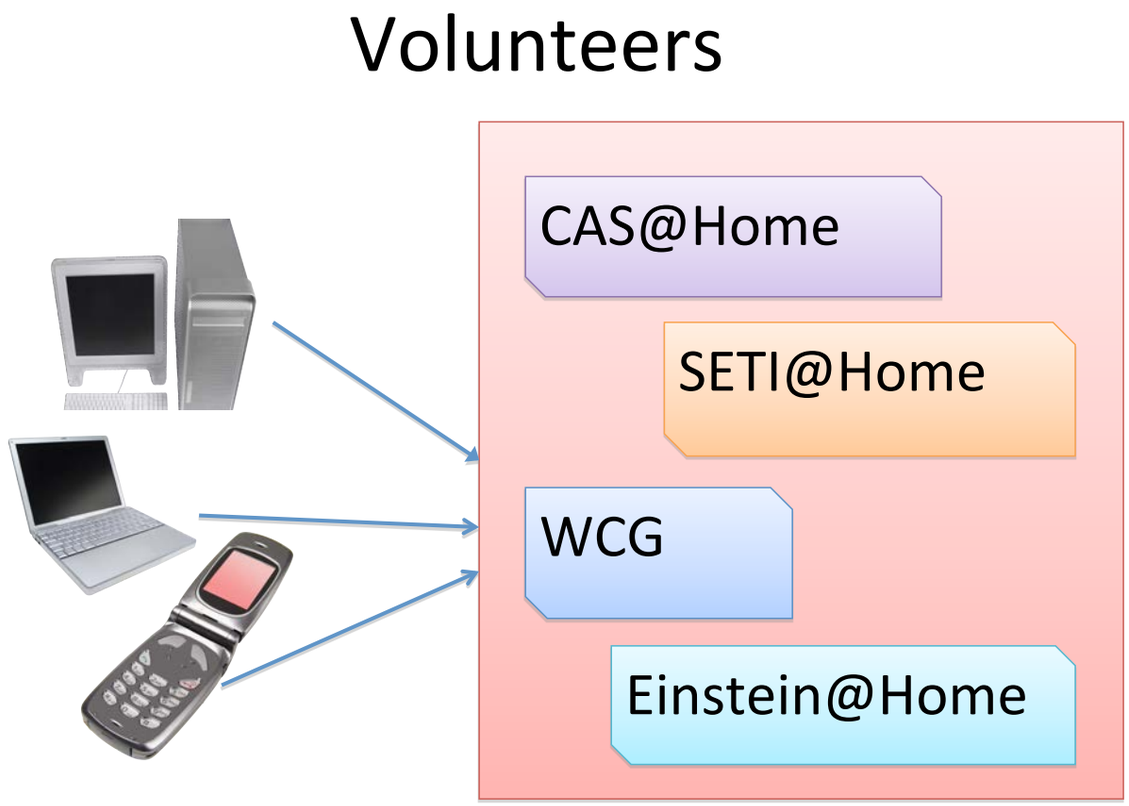
- Pioneer project in Asia : CAS@home





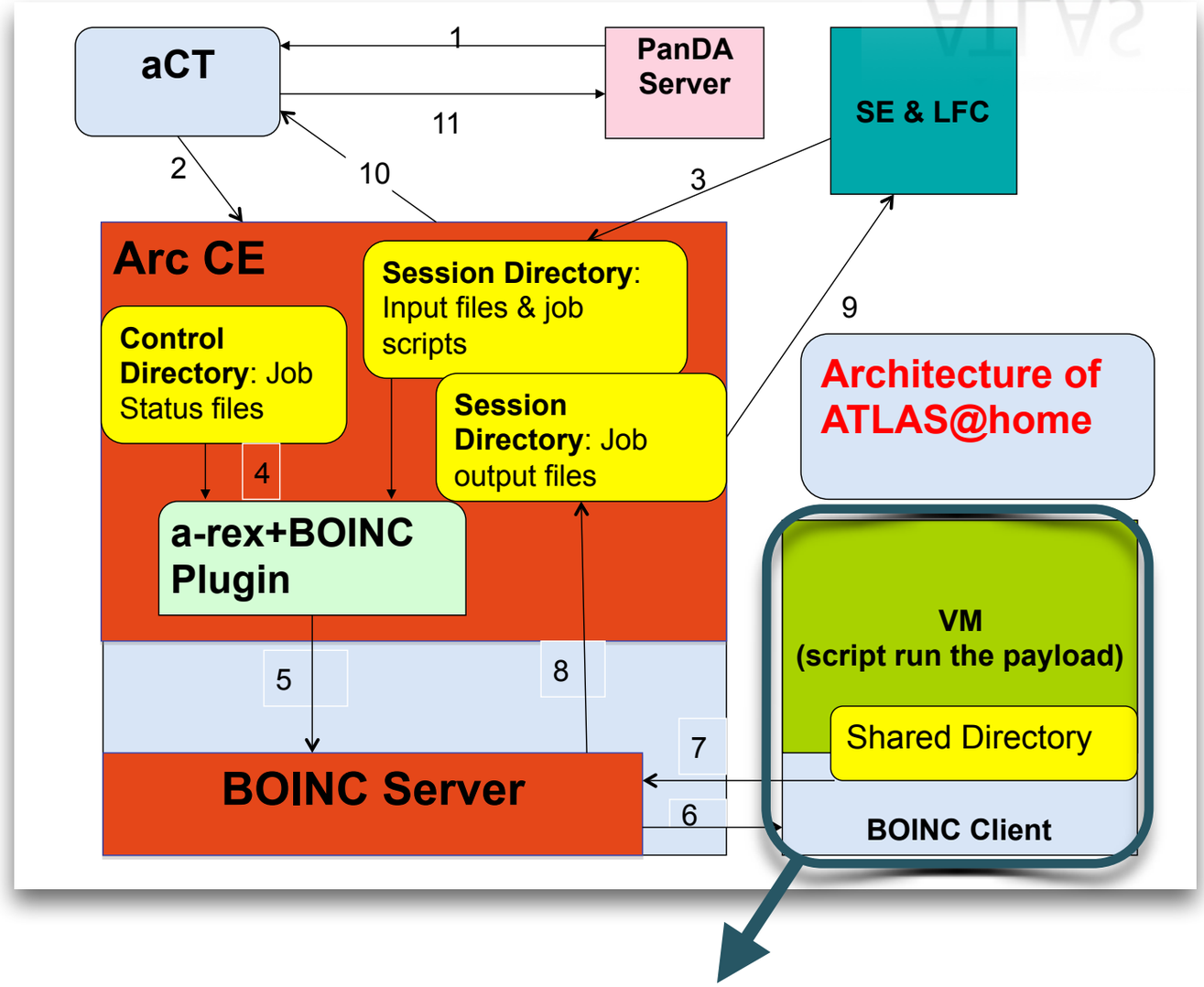
On the client side

- Desktop Resources are virtualised into volunteer clouds
- A volunteer installs (in 2 clicks) :
  - Virtualbox hypervisor: to run the Virtual Image of the application
  - BOINC client : get a payload from BOINC sever and pass it to Virtualbox
  - And joins a project : SETI@home, CAS@home, …
- **BUT how to connect the volunteer to the LHC grid ?**



ATLAS@home

- BOINC server integrated to Arc-CE
  - Communicate with PanDA the ATLAS production system
  - Submit regular BOINC job to client, credential (proxy) are not used
  - Check outputs, register them on the grid and update PanDA
- **It works !**
  - **Very light architecture**



The client (you!) knows nothing about the grid!

Future of ATLAS@home

- From prototype to production by summer
  - Presentation at GDB (Grid Deployment Board) Spring 2014
- Will be used for ATLAS outreach activities
  - Web portal currently designed by professional
- Can also be used by local batch clusters (Tier-3) to participate to ATLAS production
  - No need to install the full (heavy) grid middleware
  - No need of local storage

Activities on cloud computing

- One CSC student LI Sha/李莎 will spend one year at LPSC (Grenoble) starting May-2014 to work on cloud computing with Catherine BISCARAT

  - Integration of cloud infrastructureS to LHC workflow

  - Optimisation of Virtual Machine size (in connexion with ATLAS@home project)

  - Storage issues related to cloud computing

Summary & Outlook

- A very healthy collaboration !
- With visible contributions
- Prospects for the forthcoming year

- ATLAS@home : from prototype to mature project
- HPC : from contacts to prototype
- Cloud computing : optimisation for LHC usage
- Many changes to come on WLCG with updated computing models from LHC experiments in view of Run-2

謝謝