WP9 - Workshop Summary

http://cern.ch/cernvm

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Overview

- Summary of Talks in Virtualization Session
- To Do List
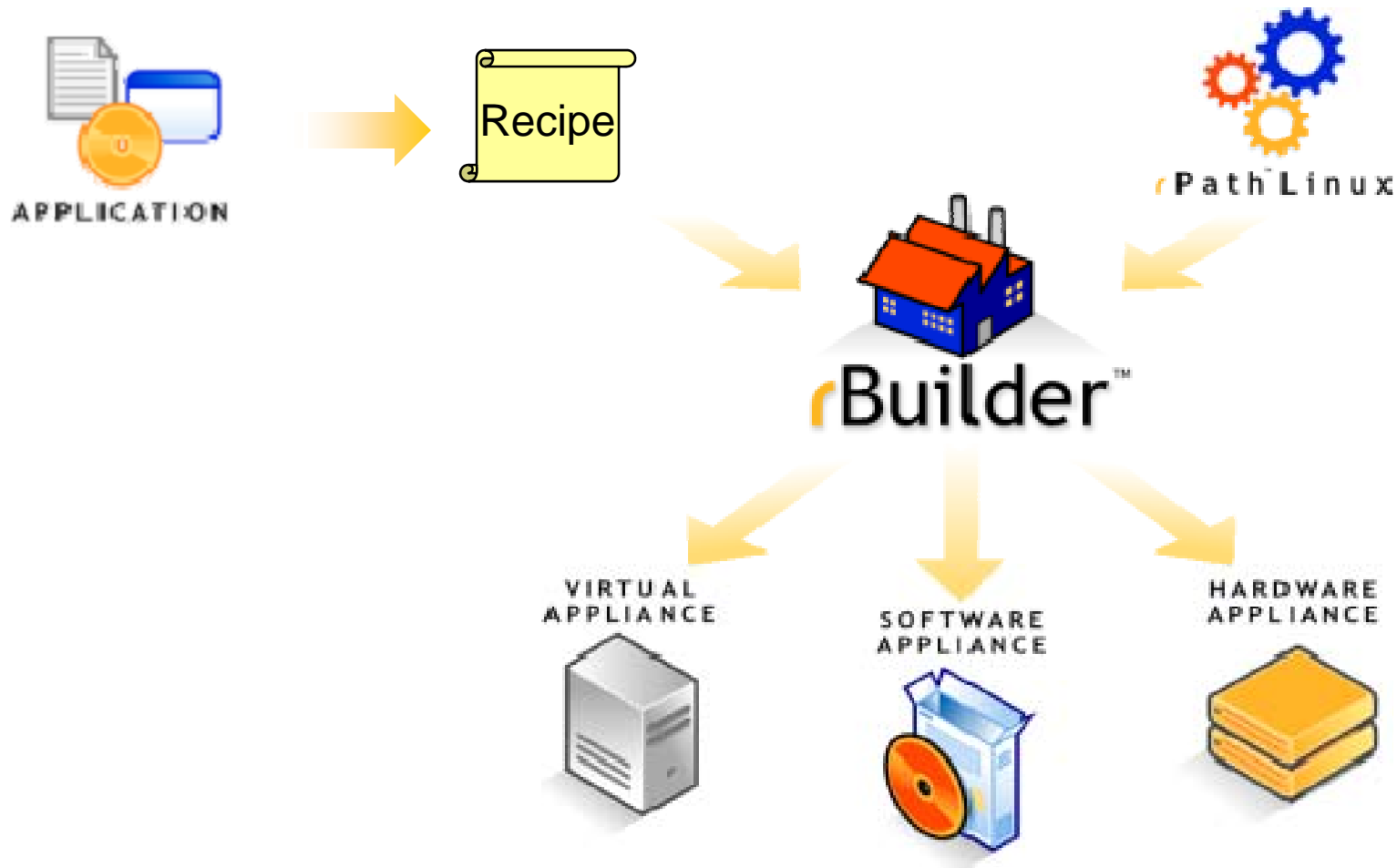- Building the community
- Conclusions

Summary of Talks

- Intel (H Cornelius)
  - Multi and many core CPUs are not future, they are reality in Intel labs

- VMware (Richard Garsthagen)
  - Virtualization technology is much more than simple server virtualization
  - High Availability, Debugging, Vmotion tools, Power saving…
  - This extras do not come for free

- rPath (Tim Gerla)
  - rBuilder makes it really easy to build your own VM images
  - Independent of virtualization technology
  - rPath Appliance Platform makes it simple to upgrade, manage components and services in the appliance

- IgorFS (Thomas Fuhrman, TU Munich)
  - Using P2P technology to build fast and scalable file system for software distribution
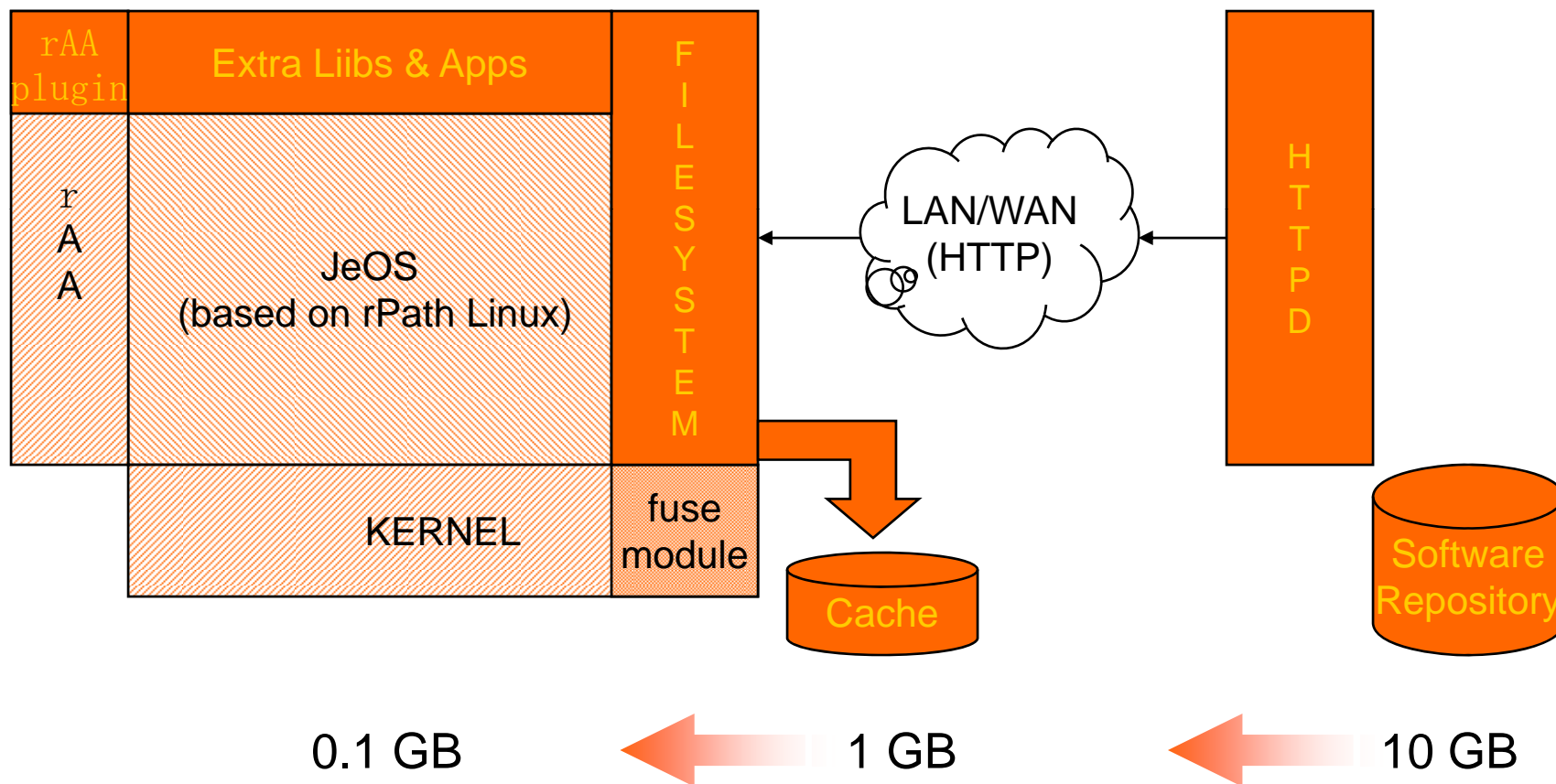
CernVM: Initial Project Plan

1. Evaluation of the available virtualization technologies
   - Understand and validate technologies by checking their performance in HEP environment
2. Evaluation of the tools to build and manage Virtual Appliances
3. Collect User Requirements from experiments
   - Confront them with available technologies
   - Suggest an optimal choice for a given use case
4. Development and deployment of a read-only distributed Network File System for software distribution
   - Essential to keep the basic appliance small in size (<100MB)
   - Validate performance, scalability and usability of such approach
5. Provide prototypes for at least two LHC experiments
   - Assist experiments in adapting their software practices to this platform
6. Setup a service and support infrastructure
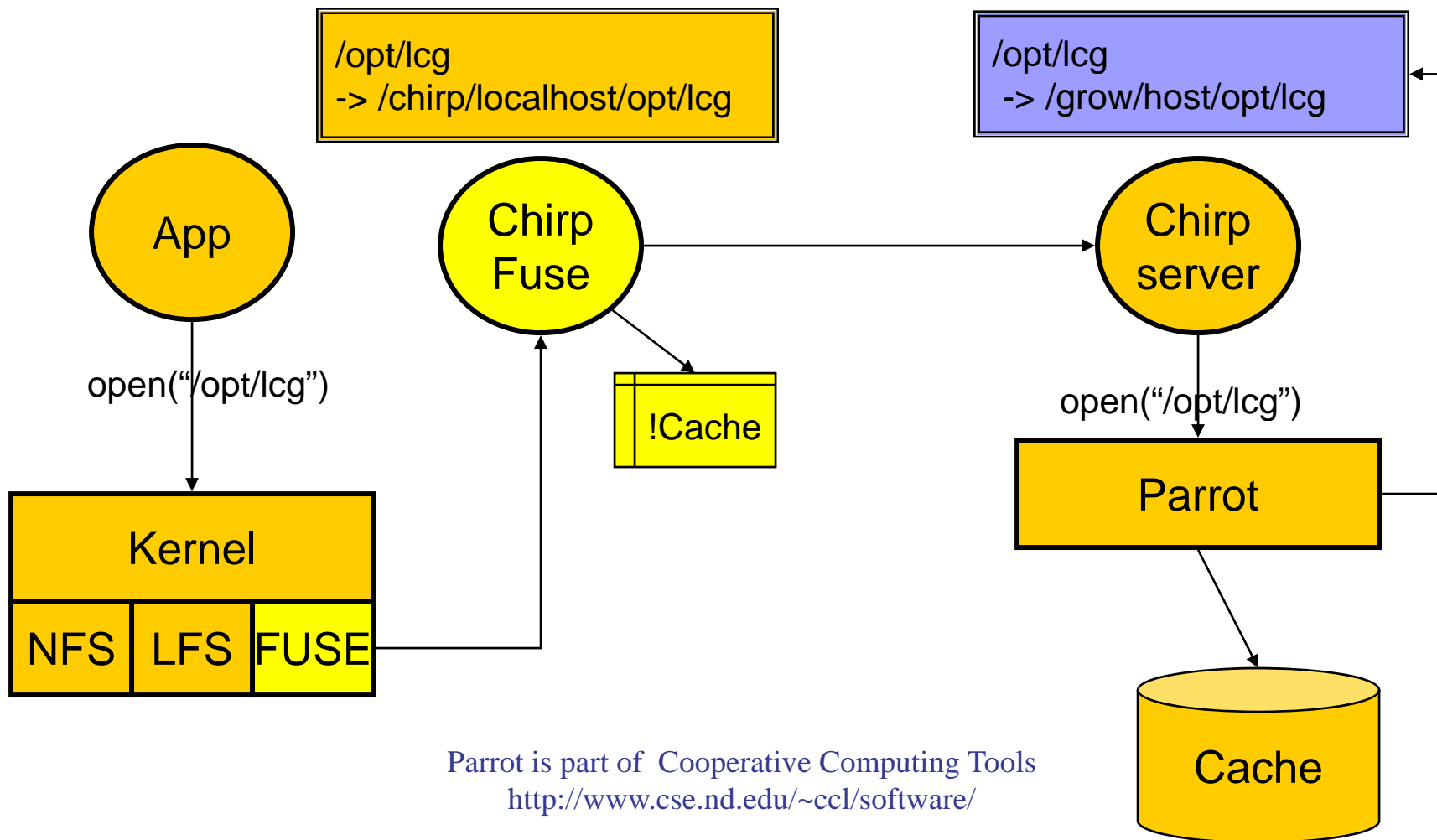
CernVM: Built using rBuilder

"Thin" Software Appliance

Reusing existing tools

On same host:

On File Server

/opt/lcg
-> /chirp/localhost/opt/lcg

/opt/lcg
 -> /grow/host/opt/lcg

App

Chirp Fuse

Chirp server

open("/opt/lcg")

!Cache

open("/opt/lcg")

Kernel

| NFS | LFS | FUSE |

Parrot

Cache

Parrot is part of Cooperative Computing Tools
http://www.cse.nd.edu/~ccl/software/

Foreseen development

On same host:

On File Server

/opt/lcg
-> /chirp/localhost/opt/lcg

/opt/lcg
-> /grow/host/opt/lcg

App

CernVM
Fuse

open("/opt/lcg")

!Cache

Kernel

NFS | LFS | FUSE

Cache

Alpha release 0.3

CernVM — SoFTware Appliance
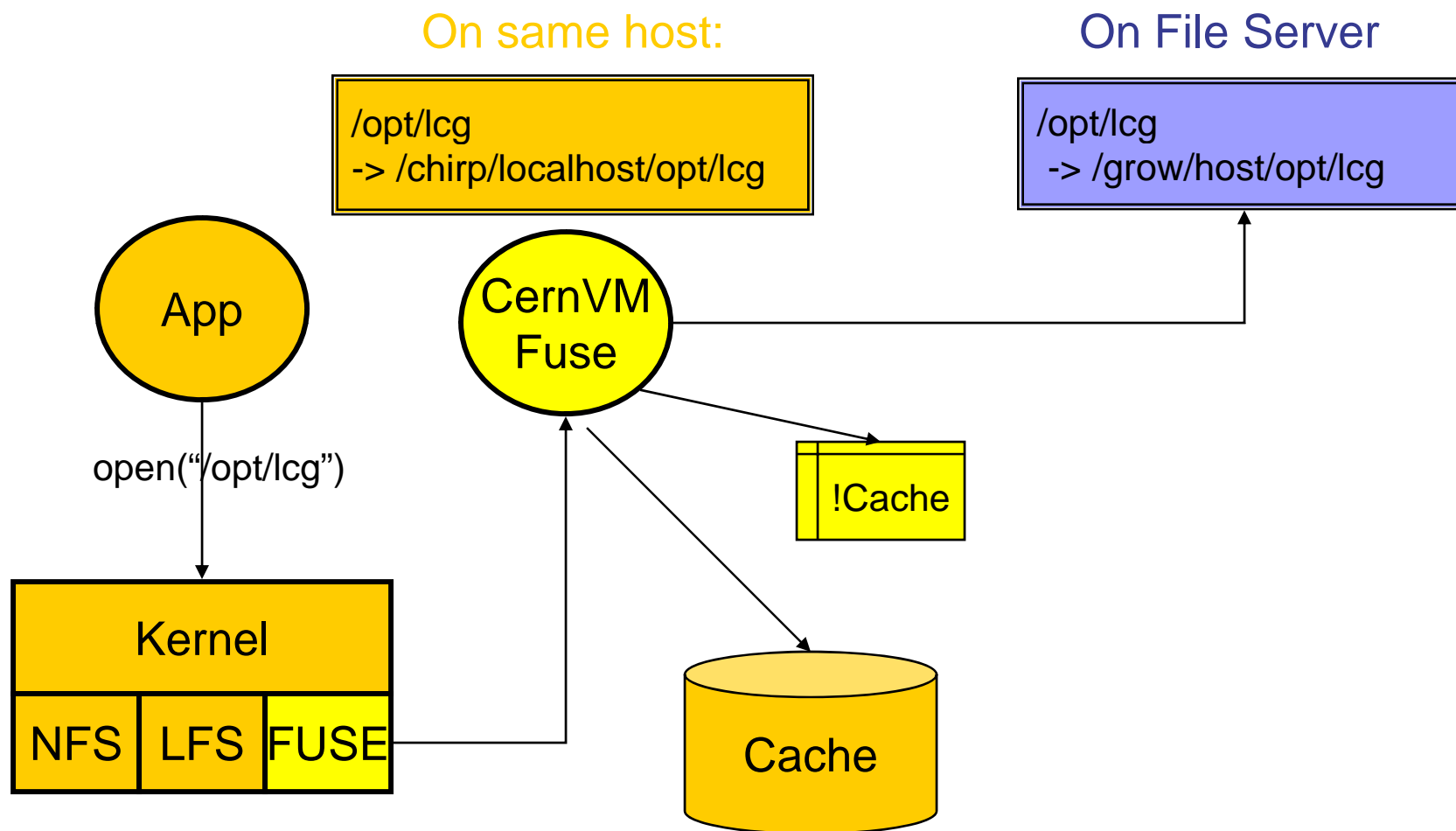
QuickTime™ and a
decompressor
are needed to see this picture.

- Available for download from
  - http://rbuilder.cern.ch/project/cernvm-devel/releases
- Can be run on
  - Linux (Xen,VMware Player)
  - Windows(WMware Player)
  - Mac (Fusion, Parallels)
- Minimal HowTO at
- http://cernvm.web.cern.ch/cernvm/?page=HowTo

- Limited testing to verify that appliance can be configured and used with Alice and LHCb software frameworks
- ATLAS is next in line
- Waiting for input from CMS

Feedback from Experiments

- ALICE (Stefan Boettger):
  - HLT cluster
  - Currently 100, will grow to 900 cores
  - Running grid jobs on VMware VM when not busy with HLT
  - Concern: the price for VMvare server product line
  - Question: Can afford CERN site license?
- ATLAS (Yushu Yao):
  - Performance comparison of QEMU and VMWare
  - Conclusion that VMWare offers acceptable performance for casual user
  - Suggestion to distribute Atlas software as virtual disk that users can attach to the VM
- ATLAS (Amir Farbin):
  - Very welcome summary of user requirements based on two years of practical experience
  - Outlines some of the problems that we have tacked in CernVM prototype
  - Stresses concern about I/O performance and optimal way to move things in and out of VM

From CERN

- SFT (Jakob Blomer):
  - Benchmarking HEP applications in VM
  - Work done as summer student last year
  - Applications tested: Geant4, ROOT, AliRoot
  - Results point to very good performance of Xen under Linux
  - Surprisingly good performance of VMware and Parallels under MacOs

- IT (Andreas Unterkircher):
  - Using VMs in test environment
  - Deploying grid components for testing
  - VNODE tool
  - Xen supported by IT (Quattor profile for Xen exist for SLC4)

- SFT (Carlos Aguado Sanchez):
  - Looking for Open Source tools to deploy VMs on a small physical clusters
  - Enomalism2 chosen

To Do List

- Analyse Atlas requirements
  - Formalize in URD
- Continue development of read-only file system for software distribution
  - Compatible with both Atlas presentations
  - Simplify and make it faster
  - Add extra management interfaces
    - Explicitly fetch subdirectory
    - Pin the directory content in cache
    - Clear the cache
- Continue work towards first release
  - Add support for ATLAS, CMS
  - Functional test of exp frameworks
  - Performance test
- Add capability to act as Grid User interface
  - Verify that Grid Data Management works
    - Know problem with rfio
- Documentation

Building the community

- Regular meetings (2 weeks)
- Mailing list
- Web site
  - http://cern.ch/cernvm

Conclusions

- The work on the project has started according to initial planning and is progressing well
  - Planning based on initial discussions with experiments trying to identify interest for collaboration
  - Update plan with items in To Do list and suggestions from the floor
- Contacts have been established with goal to carry out further research
- The evaluation of performance indicates that it is possible to use virtualization technologies in HEP context
- rBilder instance installed at CERN and seem to live up to the promises
- Work on setting up scalable service infrastructure is in progress
- Prototype of file system for s/w distribution is implemented
- Alpha release is available and is ready for 2 experiments
  - Work on Atlas will start next
- Expecting first release that could be used by the real users in September