

## Report from the CHIPP Computing Board

- Status of the Swiss Tier-2 RC activities at CSCS
- Plans and next steps for RC
- CHIPP Computing and analysis efforts for future

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### Reminder: Roadmap to Swiss Tier-2 RC



1. **Step : Prototyping and first DC : 2002-2005**
  - Setup prototype Tier-2 and
  - Participate in phase-1 of LCG and experiment's data challenges
2. **Step : Deployment of full RC : 2005-2008:**
  - Gradually increase setup to reach full operational Tier-2 RC by ~2008; closely linked to CERN Tier-1; ramp-up infrastructure and staff
  - Integrate and support Tier-3 institute/Univ. centres
3. **Step : Maintenance and Operation: from LHC start on:**
  - Operate full production Tier-2 RC, attached to CERN as Tier-1;
  - constant staff, "rolling replacement" of hardware components.

## Status – Prototype cluster at CSCS (1)

**Goal was:** to setup a prototype Tier-2 RC at CSCS to join the LCG "Grid"

- **Prototype cluster HW installed** in Jan 2003 (= CH-LCG cluster)
- **LCG middleware SW installation** done (several times)
- **versions of experiment's SW installed** (CMS, ATLAS, LHCb done)
- **Installation of LCG1-1\_1\_3 done and LCG GD ran their test suite successful.** CH-Tier2 included officially into LCG1 GRID → **Proof of principle done (Jan.04)**
- **HOWEVER : hardware situation is completely unsatisfactory !!!**
  - **cluster hardware is extremely unstable** (temp.problems: CPU, disks..).
  - **many attempts to fix hardware failed.**
- → **THUS: cluster cannot run in production mode.**
  - **Result of this: wasted many people's time, and caused frustration.**

## Hardware setup – CH-LCG Prototype (2)

- **20 dual CPU boxes:**
  - **Dual AMD Athlon CPU** (2000MP+; 1.666 GHz) (662 SI2k single)
  - **240 GB (80+120+40) disk**
  - **2 x 512 MB main memory**
  - **256 kB (L1+L2) cache**
  - **2 Ethernet cards each:**
    - ❖ **fast E-net between nodes**
    - ❖ **Gbit uplink**



<http://www.cscs.ch/grid/lcg-cluster.html>

## Comments on prototype cluster (3)

- **Criteria:** LCG required lower limit on size to join officially:  
20x2 CPU + 5 TB disk
- Components bought from small local company (supplier to CSCS) and home-assembled at CSCS, within short period of time.
- No budget existed → cheap solution favoured
  - needed to go around "with the hat" to collect money
  - Note: still no CHIPP money available
- **Lessons learned:**
  - put higher **priority on operation as production centre:** demands on resources, maintenance contracts, warranty....
  - some minor productions done (LHCb, Atlas, ..)
  - gained some experience in LCG-SW installation ...

## Timeline – Prototype cluster (for ref)

- Hardware requirements for joining officially the LCG by Dec 2002 :
  - minimal size : 20 dual CPU and 5 TB disk (at no cost);
  - deadline put forth by LCG: end of 2002
- cluster hardware acquired, assembled and installed in Dec/Jan 2003. Funding collected...
- installation cluster software; OS compliance with LCG-SW for MP Athlons (Feb)
- LCG middleware SW installations unstable, redone several times; wait for stable LCG (April 03).
- First occurrences of HW problems (temperature caused disk and file system failures) May 03.
- Experiments SW production kits installed (May/June 03); cluster operated in standard batch mode for Atlas, CMS ... (whenever hardware permitted)
- Get server certificates from CNRS (Oct/Nov 03)
- Obtain open I/O ports at CSCS Nov/Dec 03 (security issues for CSCS)
- Installation of LCG1-1\_1\_3 done. LCG GD test suite successful.
- CH-Tier2 included officially into LCG1 GRID → **Proof of principle done. (16 Jan 04)** ☺
- Cluster hardware is extremely unstable:
  - disk crashes , CPU failures, corrupted filesystem (related to CPU instability..) etc.
  - apparently temperature sensitivity observed elsewhere too ...
- **Cluster cannot be used in production mode !!!!** ☹

## What do the Physicists want?

- To **participate** in LCG2 and **expt's DC**.
- To **run experiments code** in normal batch mode.
  - need **stability** and need **reliability ....**
- Want to "be able to run in stable production mode".
  - For large scale production we are not really competitive (LCG2 production run primarily on Tier-1 RC anyway)
  - But for simulation/analysis, expt's SW-development ...
    - a **high-quality stable smaller cluster** with direct access **is very attractive**, in particular **for our own people** (e.g. large main memory for Atlas, etc. direct outbound I/O for LHCb etc.)
  - **Political statement** : we are officially part of LCG-GRID, but jobs cannot be run on our cluster .... ☒ ☒
- **Absolutely essential to have a production system and to be able to use LHC-data efficiently !!!**

## Proposal: Pursue a two line option

- 1) **Bootstrap phase:** **replace present hardware** and with high priority **setup a new small production cluster : "Phoenix cluster"**
  - to establish LCG-compliance, **demonstrate reliability**, participate in DC
  - supply resources **to the Swiss physicists** for LHC-computing and **regain confidence**.
    - Get institutes more involved for experiment specific jobs.
  - **contracting better HW from a major vendor** (through CSCS), with warranty; and getting infrastructure from CSCS.
    - Size of this BS-cluster of order (20 2xCPU + FS 5 TB) (⇒)
- 2) **Longterm:** **In parallel, prepare** everything for acquisition and **rollout of the final version**, to meet needs at LHC start .
  - (+ Observe developments at CSCS ...)

## NF Requests - Status

- In Feb. 04 we have submitted a **request to the National Fond** for (FORCE) money of the amount: 128 kFr to cover the next round of computing hardware acquisition (signed by CH institutes)
- If approved, the money will be available in Oct 2004.
- The request contains a specific HW cluster offer as an example, "LINUX HP cluster solution by DALCO", which is a
  - fully integrated rack-solution with terminal-server
  - Including file server
- Further, a **request to SUK/CUS** was submitted for funding for period 2005-2007: → **however it was rejected** ☹

## Offers for cluster HW

- **System configuration consistent with LCG architecture:**
  - 20 + 1 node dual AMD Opteron Rack system + Terminal Server
  - $\geq 500$  MB/CPU
  - 40 GB + 120 GB local disk / node
  - Gigabit Ethernet
  - 2.5 TB / 5 TB Fileserver, RAID system
- **Transtec:**
  - Cluster: 70940
  - Fileservers: 9770 SFr (3TB), 13360 SFr (5 TB) (less performance)
- **DALCO**
  - Cluster: 68804 SFr
  - Fileservers: 14557 SFr (2.5 TB), 23953 SFr (5 TB)
- **More offers in progress through CSCS**

## Timescale for bootstrap cluster

Estimates for acquisition, installation and commissioning the bootstrap cluster:

- **2 - 4 weeks** : define specification requirements; ask for offers.
- **2 - 3 weeks** : get offers from vendors
- **4 - 6 weeks** : analyse offers, do stress testing of components...
- **2 - 4 weeks** : wait for hardware delivery
- **2 weeks** : installation of cluster SW, OS
- **2 - 3 weeks** : LCG SW installation and GDB-compliance tests.

➔ **new cluster could be operational by beginning of Nov. 2004**

➔ **Chipp computing board will review and make recommendations to CHIPP EC.**

## Status – Personnell

**Personnell** involvement for CH-LCG cluster at CSCS (up to now):

- part of our 2 FTE located @CERN (2 \* 0.2 FTE) – LCG SW
- 2\*0.1 FTE at CSCS (cluster hardware and OS maintenance)
- Necessary to have **one dedicated computing physicist per experiment**
- One contact person per Swiss institutes

**Strong committment by CSCS :**

- **One full FTE by CSCS** for LCG-Grid exclusively as of 1.6.04 !!!
- Welcome to **Gian Luca Volpato**
- MoU between CSCS and CHIPP to be setup and signed !
- One additional computing physicist position is possible at CSCS.

**Members of Swiss CHIPP computing board are presently:**

**Representatives of institutes and expt's :**

- A.Clark (chair of CHIPP, Atlas, UNI Ge)
- C.Grab (chair, CMS, ETHZ)
- M-C. Sawley (CSCS general manager), G-L. Volpato (CH-LCG)
- A.Bay (LHCb, UNIL; dep. N.Neufeld)
- H.P.Beck (Atlas, UNI Bern; dep. S.Gadomski)
- R.Bernet (LHCb, UNIZH)

**Swiss involvement in LCG (full time, located at CERN, <= fall 2005):**

- F.Orellana (Uni Ge)
- D.Feichtinger (PSI)

➔ **All persons interested in CHIPP computing activities and want to get involved are welcome.**

- Up to now CHIPP computing was primarily targeted for LHC, want to extend that to all.
- **CSCS is committed to develop a strong partnership with CHIPP.**
- **An MoU between CHIPP-community and CSCS is being drafted to establish a cooperation:**
  - CSCS can become the "**CHIPP scientific computing centre**"; ie. a contractor for computing (HW, M&O, networking, ...)
  - Allows CSCS to play a much more active role
- **MoU contains :**
  - General framework for cooperation, modus operandi and responsibilities for CSCS and the CHIPP institutes
  - Appendices describe details for individual time periods.

## CHIPP workshop (1)

CHIPP EC calls for a

**"CHIPP workshop on LHC analysis and computing".**

- Idea: in a two day workshop **bring people together to discuss** and collect the needs of the institutes for **data analysis and computing** for next few years.
  - What do the LHC experiments really need?
  - How are the institutes going to organise their analysis and get their analysis procedures up and running? Who does it?
  - Interests and needs of non-LHC community, i.e. theory?
  - Discuss the MoU CHIPP between CSCS → endorse MoU

## CHIPP workshop (2)

**Date :**

after having achieved stable operation of the bootstrap LCG-CSCS-cluster, and gained some experience (Q1/05 ?)

**Agenda (prel.):**

1<sup>st</sup> day: hardware and technical issues

2<sup>nd</sup> day: physics analysis issues

**Setup subgroup (in fall 04) to organise the workshop.**

## Thanks to

- **D. Feichtinger and F. Orellana (at CERN):**
  - major contributions to LCG for Switzerland (now in ARDA);
  - Installation + operation of middleware + expt's SW on cluster
- **V. Annaloro, H. Harake** : HW efforts at CSCS; re- fixing the breaking HW
- **A. Clark** : (CHIPP chair)
- **M.C. Sawley** (CSCS general manager)
  
- **R. Bernet (UNIZH): LHCb** experiment's SW + some production
- **G. Comune, C. Haerberli, I. Aracena (Bern): ATLAS** SW efforts
- **S. Moed (ATLAS, Geneva): ATLAS** SW efforts
- **A. Holzner (ETHZ): CMS** SW efforts

## Conclusions

- **If Switzerland wants to be taken seriously as partner in LCG :**
  - need to get a stable situation with a **computing cluster CH-LCG at CSCS**
  - present HW is faulty; we have learned it the hard way. now replace it. ☹
  - **Propose:** acquire a new small cluster with full maintenance contracts and warranty, and participate in experiments data challenges (in Q4 2004).
  
- **Enter a new cooperation between CHIPP and CSCS, to supply computing to the CHIPP community (not restricted to LHC)**
- **Strong commitment by CSCS exists; including now one FTE !**
- **Where is the strong commitment from the institutes?**
  
- **We need to follow the roadmap**

**Get ready to DO PHYSICS ! ☺**