

GRID COMPUTING @ IA MEETING

**Bonn
8.12.2011**

M.Kasemann

GRID: STATUS

- **Die vorgesehenen Personal- und Investitionsmittel werden vorraussichtlich abfließen.**
 - **Problem: Finanzierung von Stellen im 2. Halbjahr 2012**

Details: siehe Anhang

- **Workshops in 2011:**
 - **Networking for Data Analysis: Januar 2011 in Göttingen**
=> **Unterstützung des LHCOne Prototypprojekts**
 - **Computing needs in 2013++: Februar 2011 in Göttingen**
=> **Investitionsbedarf für die T2's in 2011-2015**
=> **Entwicklungsprojekte zur Unterstützung der LHC Daten Analyse**

ALLIANZ V I.5 (2013-14)

Der deutsche Beitrag von T1 und T2 Zentren im internationalen WLCG Verbund ist durch MuO's geregelt und bedingt eine Fortführung und den Ausbau der bestehenden Zentren.

**Für die weitere Hardware Finanzierung der universitären Tier-2 Zentren (~ 50% der D-T2 Ressourcen) muß noch eine Lösung gefunden werden!
=> Vortrag G.Quast auf dem KET Meeting**

Wichtig ist die Erhaltung der Entwicklungs- und Betriebskompetenz an allen Tier1 und Tier2 Zentren:

- für den zuverlässigen Betrieb,**
- für die Weiterentwicklung und Anpassung an neue Technologien,**
- für die Motivation am Standort, zusätzliche Mittel einzuwerben.**

Prioritäten:

1) Förderung von jeweils einer halben Stelle an allen T1 und T2 Standorten als Minimallösung für die Zeit der Zwischenfinanzierung.

=> Die Standorte müssen sich bemühen, während dieser Zeit die Mittel auf das notwendige Maß von mindestens 1- 1,5 Stellen aufzustocken.

2) Die NAF muss weiter ausgebaut werden.

BACKUP

GRID: FINANZ STATUS

Aachen:

- alle Personalstellen besetzt,
- Investitionen: Mittelverwendung für die Erfüllung der WLCG Zusagen

Berlin:

- Investitionen: werden genutzt + benötigt für Netzwerkhardware

Freiburg:

- Personal: Mittel für ~ 1 FTE-Jahr, Verwendungsplan existiert.
- Investitionen: Mittelverwendung für die Erfüllung der WLCG Zusagen

GRID: FINANZ STATUS (2)

KIT Nord:

- keine Investitionsmittel,
- alle Personalstellen besetzt

KIT Süd:

- keine Investitionsmittel
- alle Personalstellen besetzt

Göttingen:

- Investitionen: Mittelverwendung für die Erfüllung der WLCG Zusagen

Hamburg:

- 1/3 Personalstelle für Entwicklung von PROOF Werkzeugen zu besetzen

GRID: FINANZ STATUS (3)

LMU:

- Investitionsmittel: Mittelverwendung für die Erfüllung der WLCG Zusagen
- alle Personalstellen besetzt

Wuppertal:

- Investitionsmittel: Mittelverwendung für die Erfüllung der WLCG Zusagen
- alle Personalstellen besetzt
- keine anteiligen Netzwerkkosten in 2012 geplant

DESY:

- alle Personalstellen besetzt
- Investitionen: in 2011/12 für NAF Ausbau
- Netzwerkkosten 2011/12 verplant, in 2012 zu wenig....

COMPUTING WS IN GÖTTINGEN, 28.2.2011

- Scope of the workshop:
 - Resource requirements for 2011-2015 for data analysis
 - Future R&D proposals supporting LHC Data Analysis

Terascale Workshop: Computing for HEP Data Analysis in Germany, Göttingen 28.2.2011

Agenda and presentations:

A new Allianz proposal: scope and schedule

Computing Resource requirements

- G.Duckeck: ATLAS
- T.Kress: CMS
- Y.Kemp: NAF

Computing Projects I: Distributed Storage Concepts

- Y.Kemp: The dCache Storage Element
- A.Heiss: A German Expert- and Support Group for Storage and Grid Services
- M.Gasthuber: Fast and Large Storage for Physics Analysis

Computing Projects II: Analysis optimization

- J.Elmsheuer: Optimizing LHC Data Analysis: Hammercloud
- P.Weber: Grid Site monitoring, automatic fault detection and curing

Computing Projects III: Analysis adaptation to new technologies Discussion: wrap-up, next steps

- V.Büscher: Use of GPUs and many core CPUs for HEP computing
- LMU: Evaluating and prototyping Cloud Computing for ATLAS
- O.Oberst: HEP workflows on virtualized resources

COMPUTING RESOURCES

- T2 resources requirements:
 - We reviewed the hardware installation costs of T2 centers
 - 4-5 year old hardware needs to be replaced regularly
 - Experiments updated plans for 2012-2013:
substantial increase for high pile-up running in 2011-2012
 - longer term planning heavily depends on LHC schedule and performance
- We recommend to plan with a fixed annual budget as in the past.
- We need to adapt to the emerging LHC schedule by purchasing early/late in fiscal years.
- 'T2 Computing Resource Plans' written by D-ATLAS and D-CMS
(notes for internal discussion)
- We recommend to fund university T2's by the Alliance to ensure strong sites at Universities.

FUTURE R&D PROPOSALS SUPPORTING LHC DATA ANALYSIS

- At the workshop several R&D projects were presented.
- They support to use our distributed analysis infrastructure efficiently when we are faced with the sizable growth of new data.
- They will allow to further improve the utilization and operation of resources for analysis, to enhance the functionality of storage concepts and to develop strategies and tools to use new and evolving computing technologies in HEP.

R&D projects in three areas are proposed

1. **Distributed Storage Concepts**

1. Functionality and performance development of dCache
2. Dedicated R&D and prototyping of large&fast file systems for end-user analysis
3. Storage and Grid services support at German T2 and T3 sites

2. **Analysis optimizations**

1. Functional Site-Tests, including high load and analysis performance tuning
2. Expert-system for automatic Grid-site operation including monitoring, fault detection, expert-notification

3. **New technologies for HEP computing**

1. Fully exploit Cloud technology for HEP data analysis
2. HEP Libraries and code adaptation for Multi-core CPU's and GPU's

R&D projects: Draft Participation Matrix

		Partner									
		Aachen	DESY	Freiburg	Göttingen	Hamburg Uni	KIT Nord+Süd	Mainz	München LMU	Wuppertal	München MPI
1	Development and Support of Distributed Storage Concepts										
1.1	Functionality and performance development of dCache	X	X								
1.2	Dedicated R&D and prototyping of large&fast file systems for end-user analysis		X			X	X				
1.3	Storage and Grid services support at German T2 and T3 sites	X	X				X		X		
2	Data Analysis optimizations										
2.1	Functional Site-Tests, including high load and analysis performance tuning		X	X	X	X	X		X		
2.2	Expert-system for automatic Grid-site operation including monitoring, fault detection, expert-notification	X			X		X			X	
3	New technologies for HEP computing										
3.1	Fully exploit Cloud technology for HEP data analysis		X				X		X		
3.2	HEP Libraries and code adaptation for Multi-core CPU's and GPU's		X	X	X	X	X	X		X	X

- Exact scopes and participation to be finalized.

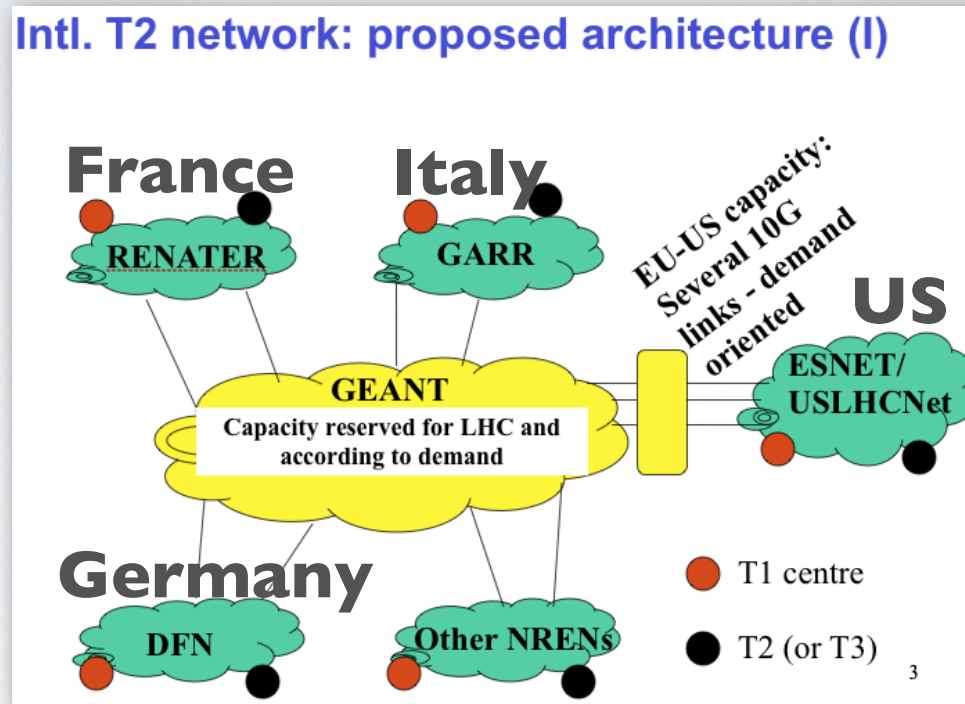
LHCONE - LHC Open Network Environment T1/T2/T3 Network infrastructure for LHC Data Analysis

- **Goal:** Provide international exchange points for a network that is private to the LHC T1/2/3 sites, i.e. for LHC analysis traffic only.
 - Connect “Leadership T2 installations” with 10+Gb/s internationally
 - Complementary to the LHC-OPN (T0-T1).
 - Based on a study of ATLAS and CMS on future networking needs for analysis (09/2010)
- **Financing** of this structure is a **national matter** – the federated architecture takes this into account
- The **architecture** provides a **scalable** system, i.e. other national LHC communities can easily join through their National Research Network Provider.

LHCONE - LHC Open Network Environment

T1/T2/T3 Network infrastructure for LHC Data Analysis

- **Schedule:** first prototype within few months (summer 2011)
 - Participating countries: Italy, France, Germany, US, others are also making plans



- **In Germany** we participate in LHCone prototype with four sites
 - Alliance network funding contributed
- Funding model is unclear. **Possible role for the Alliance to continue.**

SUMMARY: GRID COMPUTING

- We recommend to continue to fund the university T2 centers through the Alliance.
- To keep the relative status quo for analysis resources we need to invest into T2's and the NAF every year.
- Three development projects are proposed for continuous improvements of efficient operation and utilization of the distributed computing infrastructure.
- Substantial interest is gathered in D around these RD projects.
- World-wide LHC analysis network prototype is starting. Germany is participating with Alliance funds.