

Austrian Federated WLCG Tier-2

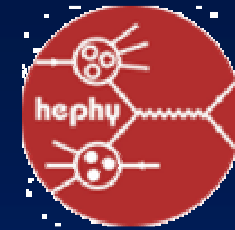
Gregor Mair
on behalf of

Reinhard Bischof, Natascha Hoermann, Wolfgang Jais, Dietrich Liko,
Gregor Mair, Katharina Nimeth, Peter Oettl and Gerhard Walzel

Joint Annual Meeting of ÖPG/SPS/ÖGAA - Innsbruck 09-01-2009



Content

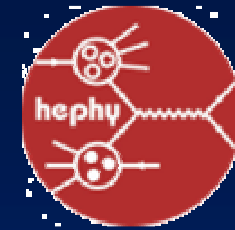


- Introduction
- WLCG – Structure
- Austrian Federated Tier-2
- Recent Tests
- Outlook & Conclusion

Notice of warning:
This talk is not about physics but computing!



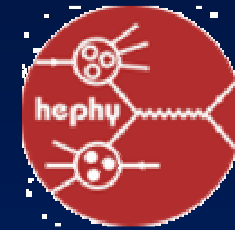
Introduction



- LHC operation starts again in fall 2009
- experiments will produce about 15PB of physics data per year
- Data needs to be stored, processed and made available to over 5000 physicists at more than 500 research institutions
- Worldwide LHC computing Grid (WLCG) should provide enough resources
- Austria participates in the WLCG as Federated Tier-2 (between Vienna and Innsbruck)



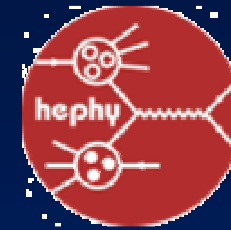
WLCG – Structure



- WLCG is a worldwide distributed, multi-layered Grid environment
- Layers:
 - Tier-0: located at CERN, responsible for ad hoc preprocessing and data distribution (to Tier-1s)
 - Tier-1: 11 very big computing centers with high quality of service (24/7) requirements. Together they hold at least one complete copy of all the data.
 - Tier-2: Provide resources for Monte-Carlo production and user analysis. Associated to a local Tier-1; can significantly vary in size.
 - Tier-3: local Grid access for individual institutes
 - Tier-4: not in use yet. Could be single desktops.



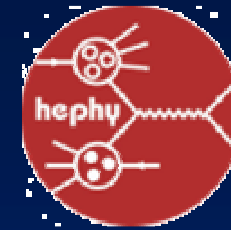
WLCG – Structure cont'd



- Setup of each site may vary in size, used Grid flavor (LCG, OSG, NorduGrid,...), disk management (DPM, dCache, Lustre,...), used hardware, tape systems...
- WLCG provides an interface to allow access to all these ,unique‘ resource centers
- First year of operation about:
 - 140 mln. SPECint2k (=CPU benchmark)
 - 60 PB disk storage (=HDD)
 - 50 PB mass storage (=tape)



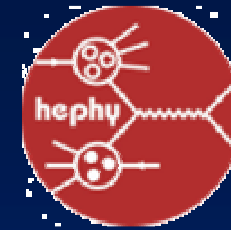
Austrian Federated Tier-2



- Innsbruck is associated to ATLAS via the German GridKa cloud
- Innsbruck set up their first WLCG Grid site in 2003 and participated in ATLAS Data Challenge 2 and large scale production for the physics workshop in Rome 2005
- Vienna started in 2005 but upgraded their site only recently ~1000CPUs and 500 TB storage
- Vienna is associated to CMS and supports SUSY and Btag groups



Austrian Federated Tier-2 cont'd

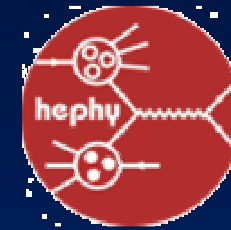


Vienna

- Computing Element
 - standard LCG CE with Torque/Maui Batch System and SLC 4.7
 - present about 400 CPUs will be increased up to 1000 CPUs in summer 2009
- Storage Element
 - new Worker Nodes (WN): SUN blades, Intel 2 x Quad processors
 - DPM on SLC 4.7 with XFS file system, planned to move to dCache under Solaris with ZFS file system
 - Supermicro raid with 45 hard drives of 1 TB size each
 - present HW RAID-6, will be upgraded to a software raid with ZFS file system
 - present about 100 TB, upgrade up to 500 TB until summer 2009



Austrian Federated Tier-2 cont'd

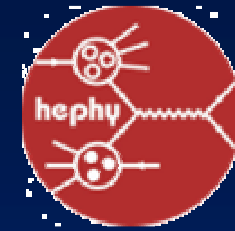


Innsbruck

- Computing Elements
 - IcgCE with Torque/Maui Batch System and SLC 4.7
 - glite-creamCE with Torque/Maui Batch System and SLC 4.7
 - 28 WN: 2 x Quad Intel(R) Xeon(R) CPU L5420, 2.5 GHz, 2 GB RAM
 - (9 WN: 2 x Dual Intel(R) Xeon(R), 3.0 GHz, 2 GB RAM)
- Storage Elements
 - SUMO Raid with 48 hard drives of 1 TB size each
 - Starline Easy raid with 16 hard drives of 1 TB size each
- additional Grid Services
 - Berkeley Database Information Index (BDII) (Top-level BDII)



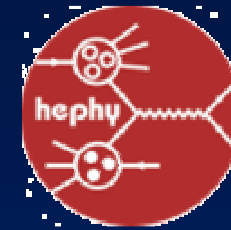
Austrian Federated Tier-2 cont'd



- Differences in use (lot of UA in Vienna, mostly MC in Innsbruck)
- Plans to extend services and provide resources for a broader user community, which will require more interaction, are currently discussed



Austrian Federated Tier-2 cont'd



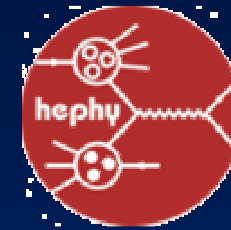
Pledges for Austrian Federated Tier-2 according to MoU(CERN-CRRB-2005-01/Rev.)

	2008	2009	2010	2011	2012	2013
CPU (kSI2k)	540	1060	1200	1300	1300	1300
Disk (TB)	110	300	330	390	440	440
Nominal WAN (Mbit / s)	1000	1000	1000	1000	1000	1000

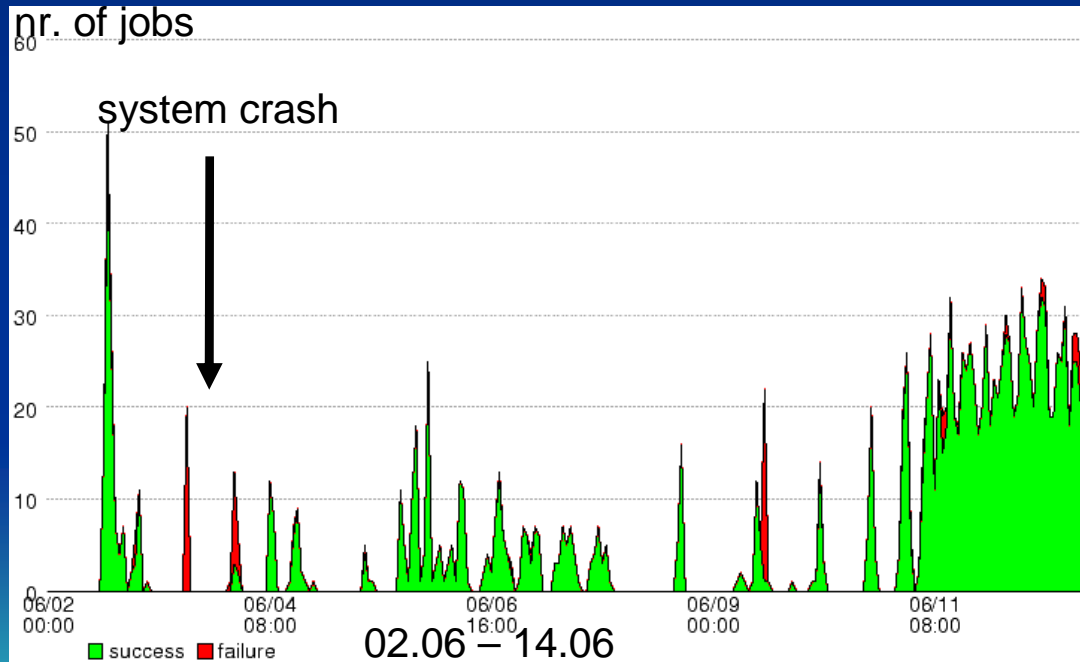
Resources provided by Austrian Federated Tier-2			
	Vienna	Innsbruck	Together
CPU (kSI2k)	775	550	1297
Disk (TB)	150	49	199



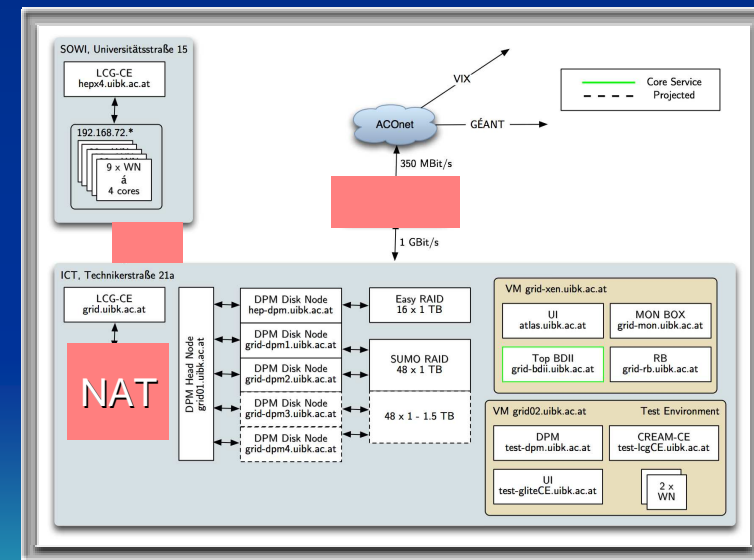
Recent Tests



- Step 09
 - All experiments nominal rate
 - Good performance of Innsbruck
 - Problem @ many sites: network overload



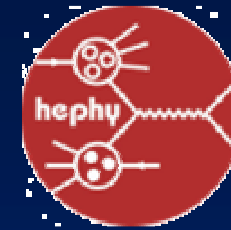
bottlenecks identified



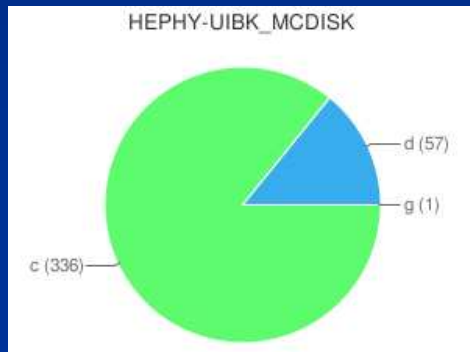
Production during Step09



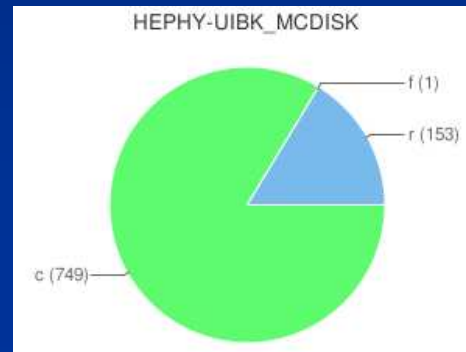
Recent Tests cont'd



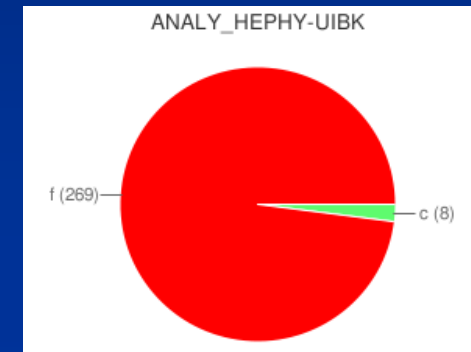
- Ganga Hammer Cloud Tests (August)
 - Problem with different protocols



575 File Stager



574 DQ2_LOCAL



579 PANDA

completed

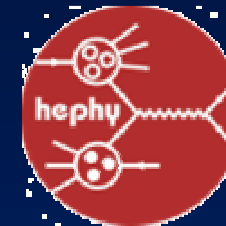
failed

running

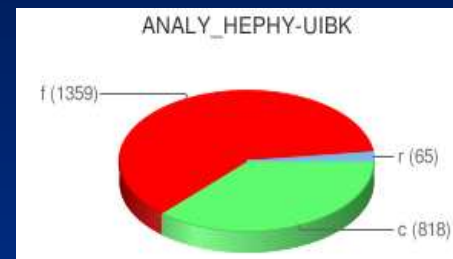
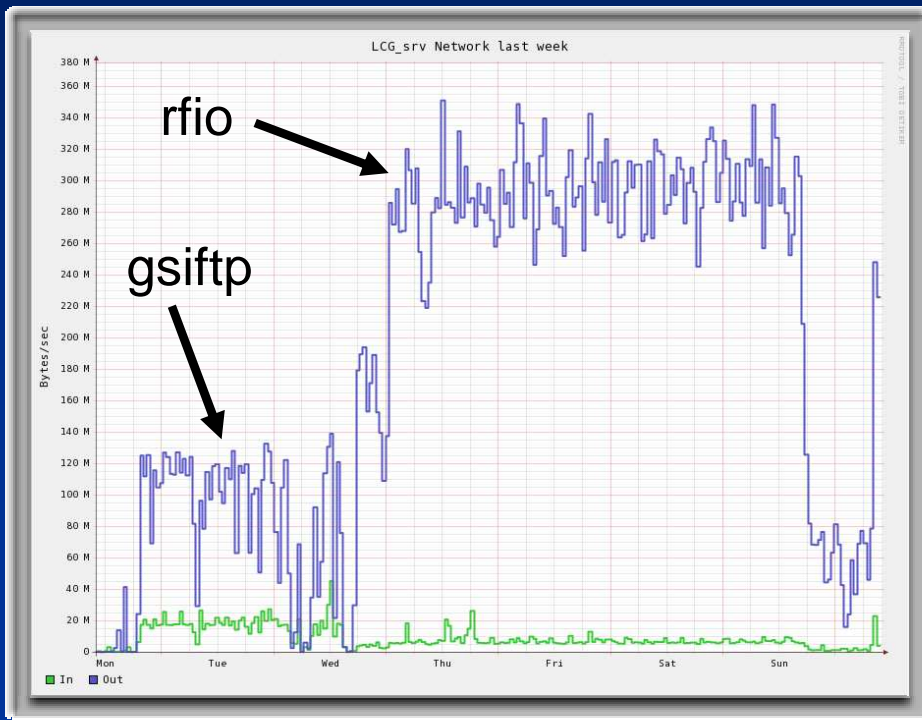
submitted



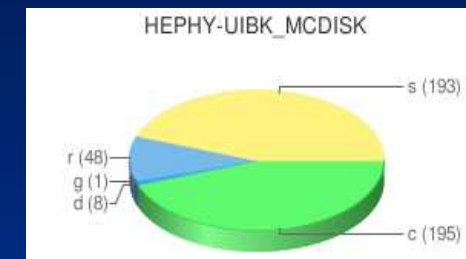
Recent Tests cont'd



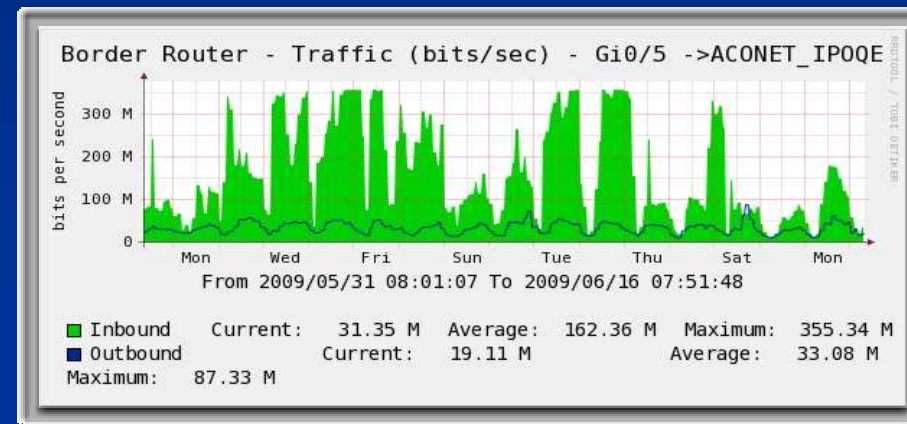
Networking tests in July



HC 525

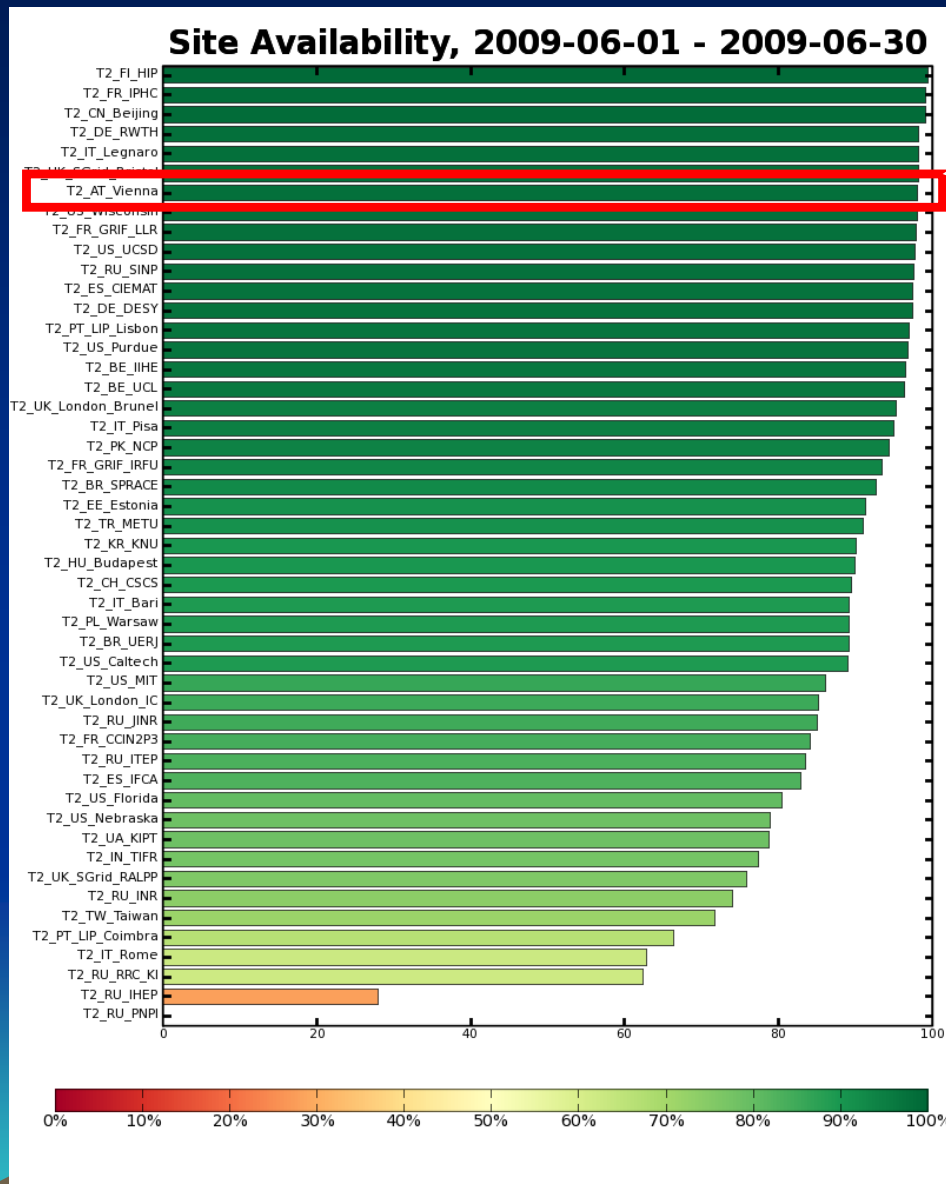


HC 528



Instead of buying more CPUs sites should focus on improving there networks to get the data at a reasonable speed to the WNs. (K. Bos, GridKa F2F Wuppertal)

Recent Tests cont'd

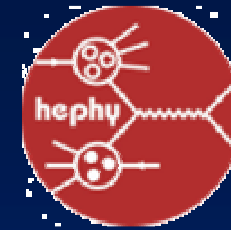


Austrian Tier-2

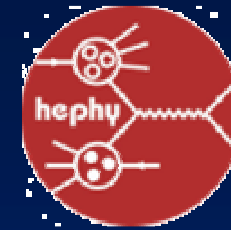
For tests and results on CMS please attend the talk of Dietrich Liko: 'Data analysis for the CMS experiment in the petabyte range at the Vienna Tier-2 centre' (3. Sept. 2009, 18:00, Room B)



Outlook & Conclusion



- Some minor problems with
 - network connections and
 - configurationwere identified.
- Fixing these may take a while.
- But sufficient resources are available.
- When the LHC starts operation in November, computing resources will be ready!



Thank you for your attention!

For more information please have a look here:

<http://www.uibk.ac.at/austrian-wlwg-tier-2/>

Questions?