The GridKa Tier-1 Computing Center within the ALICE Grid Framework

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GridKa Tier-1 Computing Center in the WLCG and EGI

- Hosted by Steinbuch Centre for Computing
- The largest German Tier-1 center in WLCG
  - supports all LHC experiments
  - provides ~14% of WLCG resources
  - also supports non-LHC experiments
- Available resources in 2013
  - 135kHS06, 11PB disk, 17PB tape

ALICE Grid Computing

- ALICE Experiment
  - A Large Ion Collider Experiment
  - dedicated heavy-ion experiment at the CERN LHC
  - more than 1200 people from 132 institutes in 36 countries
  - produces the overall data volume of ~5 PB per year
- Data Production and Analysis Framework
  - based on AliRoot project
  - analysis train and LEGO train for efficient analysis
  - CVMFS filesystem for delivering softwares
- AliEn(ALICE Environment) Middleware
  - site can be seen and used as a single entry
  - handling jobs and data access are transparent to the user
  - strong certificate-based security and authentication protocols
  - CMreport, ClusterMonitor, PackMan, AliEn CE, MonALISA
- MonALISA monitoring service
  - monitor the entire AliEn Grid system
    - central/site services
    - job status and resource usage
    - network traffic (inter and intra site)

Performance in 2013

- Overall job efficiency (CPU/wall time) of 82%
- Averaged XRootD traffic of 713 MB/s to the world
- 3762 average number of active jobs
- Total 22.3 million hours of CPU time

GridKa within ALICE Framework

- Computing Resources for ALICE
  - 30k HEPSPEC'06, 2.7 PB of disk, 5.25 PB of tape space
  - running VO-box, CREAM CE and WNs
- Storage
  - disk and tape elements using XRootD middleware
  - 2 redirectors and 10 XRootD servers for the disk
  - MPS XRootD extension for the tape storage
- Network
  - 10 Gbit/s network to CERN and several Tier-1 centers
  - ~1 PB of data transfer to/from GridKa in 2012
- Monitoring
  - MonALISA service from the ALICE level
  - Icinga and Ganglia from the GridKa
  - 24/7 support of on-call alarm system
- On-site representation
  - full-time position since 2010
  - interface between site and experiment
  - organization of workshops

Summary and Outlook

- ALICE Grid Computing at the GridKa Tier-1 center has been running successfully for several years
- Very well established services and framework
- More efficient use of resources is anticipated in the future