SUPPORT FOR CMS EXPERIMENT
AT TIER1 CENTER
IN GERMANY

N. Ratnikova, J. Berger, C. Böser, O. Oberst, G. Quast,
S. Röcker, S. Wayand, M. Zeise, M. Zvada

July 16 - 21, 2012
Dubna, Russia
Compact Muon Solenoid (CMS) is one of the four large experiments running on the Large Hadron Collider (LHC) facility at CERN intended to test the Standard Model at the TeV energy level, search for Higgs Boson and physics beyond the Standard Model.

CMS data processing and storage rely on a multi-tiered structure of distributed computing centers: Worldwide LHC Computing Grid.
ROLE OF CMS TIER1 CENTER

• Provide a wide range of high-throughput high-reliability computing services for the entire Collaboration through both WLCG-agreed Grid interfaces and higher-level CMS services.

• High level of availability and support is expected.

• Main functions:
  • Organized sequential processing of the data: event selection, skims, reprocessing, and other tasks
  • Custodial storage of a large fraction of the experiment raw and simulated event data
  • Serve data to other Tier-1-2-3 sites for replication and analysis.
• Total CMS Tier 1 resources in 2012:
  • 145 kHS06 of CPU power
  • 22 PB of disk space
  • 45 PB of tape storage

• Site local Support
  • 217 FTE months of credited service work

TOTAL GRIDKA RESOURCES DISCUSSED IN MARIAN’S TALK
CMS GRIDKA CONTRIBUTION IN 2012

- **CPU:**
  - 3'750.0 kSI2k, 1'456 job slots

- **Storage:**
  - 5'000 TB tape, 1'950.0 TB disk,
  - 175,000 TB local, 75,000 TB WAN

- **Network:**
  - 10 Gbps national regional network
  - 10 Gbps OPN international connection speed

- **Site local Support:**
  - 31 FTE months of credited service work
The CMS site contributions credit for Tier-1s is allocated based on the defined tasks that were established several years ago.

The credit was intended not to credit for normal infrastructure operations, but to concentrate on CMS specifics:

- Data management infrastructure
- CMS operations and meeting participation
- Dedicated VO monitoring for utilization
- Transfer operations
TIER1 SUPPORT TEAM

• IEKP at KIT is one of the largest CMS institutes
• Combined research Lab and University environment
• Since end 2010 we are employing an “expert”-rotation scheme:
  • for a period of 6 to 8 weeks a senior member of the group takes care of the routine data operations
  • regular monitoring shifts, using HappyFace tool
• “Field” experts responsible for particular tasks
EVERYDAY OPERATIONS

- Managing data transfer operations
- Managing storage
- Site configuration (SITECONF) and resource accounting (SITEDB)
- Data consistency checks
- GridKa shifts (see HappyFace talk by Steffen)
- Weekly coordination meetings:
  - local, GridKa, CMS central computing operations
- Troubleshooting and handling requests:
  - Savannah, GGUS tickets
ALL THIS COULD BE BORING UNLESS WE HAD DEVELOPMENT PROJECTS
• Data management
• PhEDEx development AND validation
• Job submission, glideInWMS
• Research projects in the areas of virtualization and cloud computing
• Site monitoring: HappyFace project
• Central computing operations and shifts
• Computing Integration projects
• Physics analysis work (TOP, Higgs, SUSY, QCD, Stats, generators..)
GlideinWMS is inherently more efficient than non-pilot jobs by reducing the start overhead.

GlideinWMS expands Condor by spreading jobs across the grid.

Submitting jobs on the grid becomes as simple as submitting to any other condor pool.
Site admins no longer have to micromanage O(1k) users.
This is taken care of in the glidein negotiator by the CMS glidein admins.
Dubna, 18 July 2012

N. Ratnikova: Support for CMS Experiment at Tier1 Center in Germany

GRID 2012

Wednesday, July 18, 2012
• Namespace framework to “talk” to various storage technologies
• Storage consistency checking tools
• Lifecycle validation framework
• Transfer Latency monitoring

SEE PHEDEX PRESENTATIONS AT CHEP2012
• http://ekphappyface.physik.uni-karlsruhe.de/~happyface/gridka/webpage/index.php

DEMO NOW
AND
TALK BY STEFFEN LATER THIS AFTERNOON
SUMMARY

• Combination of Research Lab and Technical University at IEKP KIT allows to combine Tier 1 operational services with training of young scientists in the computing areas.

• Services provided by PhD students are necessary to become CMS authors.

• IEKP provides strong contribution to CMS core computing development and share expertise with the sites

• “Expert” rotation scheme helps to provide sustained support of Tier1 CMS specific services during the active data taking

WE `RE OPEN FOR COLLABORATION WITH OTHER SITES AND EXPERIMENTS