Status and Activities
Topic Area B
Application and Test of virtualized Software Components in the Context of heterogeneous Computing Resources

Christian Zeitnitz

Bergische Universität Wuppertal

BERGISCHE UNIVERSITÄT WUPPERTAL

Plans from the Proposal

- WP 1 – Test of Technology Components
  - Storage- and caching solutions
  - Virtualized services
  - Institutes: DESY, Frankfurt, KIT, Munich, Wuppertal
- WP 2 – Job and Resourcemanagement
  - Job distribution and monitoring in the context of heterogeneous computing infrastructures
  - Dynamic utilization of computing ressources
  - Scalability of these systems
  - Monitoring
  - Institutes: (Bonn), Freiburg, KIT
- WP 3 – Virtualization of User Jobs
  - Containerization of jobs
  - Automatic extraction of meta data (data sets, resolve external dependencies, e.g. Data bases)
  - Scalability and robustness tests
  - Institutes: (Bonn), Munich, Wuppertal
- WP 4 – Combined Tests
  - Institutes: ALL

Table from the Proposal

Standort	PI	FTE	Experiment	AP 1	AP 2	AP 3	AP 4
Aachen	Stahl	-	CMS				X
Bonn	Bechtle	1	ATLAS		X	X	X
CERN	Elsing	-	ATLAS				X
DESY	Gülzow/Fuhrmann	-	-				X
Freiburg	Schumacher	0,5	ATLAS		X		X
Göttingen	Quadt	1	ATLAS				X
GSI	Schwarz	-	ALICE				X
Frankfurt	Lindenstruth	0,5	ALICE	X			X
KIT	Quast	-	CMS/Auger	X	X		X
KIT/Gridka	Petzold	-	-				X
München	Kuhr	0,7	ATLAS/Belle II	X		X	X
Wuppertal	Zeitnitz	1	ATLAS	X		X	X

Status

- Relation to TA A
  - Development of software component is by definition intertwined with testing
  - Activities in TA A contain a natural transition to some of the TA B work packages
- WP 1 – Test of Technology Components
  - Test of caching in production environment
    - Extensive tests of Xcache at LMU (storage at MPPMU)
    - tests of disk caching on the fly at F/GSI

  Need large scale tests in production environment (e.g. at Tier-2/DESY/GSI)
  - Virtualized services
    - Some activities ongoing (monitoring, Data bases) at different institutes. Accounting?

  Need combined tests by different experiments

- WP 2
  - Larger scale application of COBalD/TARDIS (KIT)
    - E.g. utilization in production environment in Aachen, Bonn and Freiburg hosted at KIT

  Combine with components from other work packages. Need scalability tests
  - Monitoring
    - Extension of COBalD/TARDIS (FR)

Status (2)

- WP 3 – Virtualization of User Jobs
  - o Containerization of jobs
    - Some independent activities
    - In production: ATLAS stand-alone containers (simulation, reconstruction). Based on development in W (automatic extraction of DB and meta data into containers)
  - o Tests at F/GSI of containerized jobs with SLURM and test of analysis jobs
  - o Monitoring within containers is under development

  Need combined projects (preferentially from different experiments) and tests

- WP 4 – Combined tests
  - o Current COBalD/TARDIS application are the first step towards combined tests

  Need to plan larger combined tests
    - Include more sites
    - Include different site caching strategies
    - Virtualization of different jobs (simulation, reconstruction, user jobs)

Need to meet soon to organize combined efforts

Frankfurt/GSI

Serhat Atay Frankfurt/GSI, Disk-caching-on-the-fly

- Connection between Frankfurt (Goethe-HLR) and Darmstadt (GSI)
  - 120Gbit/s link between Goethe-HLR and GSI (to be established)
  - Already established a 10Gbit/s link (more links to be established)
- Tests for Disk-Caching-on-the-Fly (DCOTF) (in progress)
  - A sample SLURM job at Goethe-HLR to check the initialization of the DCOTF and the read rates
  - Just to read and cache data from GSI
  - To read data from the cache
  - A sample Grid job at Goethe-HLR
  - Submitted manually to the local Goethe-HLR's batch system
  - To analyze data using the DCOTF
  - The comparison of performance of the Grid job with and w/o DCOTF
- Test for singularity container (accomplished)
  - Installation of singularity package
  - Slurm jobs running inside a singularity container at Goethe-HLR
- Combined Tests (in progress)
  - The sample Grid job analyzing data using DCOTF inside a singularity container at Goethe-HLR
  - Detailed results and documentation of the planned tests

Status and Activities in Wuppertal

- WP 1/3
  - Stand-alone containers (network-less)
    - Complexity of external dependencies (e.g. data bases with different APIs, CVMFS) makes generalization difficult
    - Heavy activity within ATLAS production (simulation, reconstruction and more)
  - Generalization to other experiments
    - Need well defined software interfaces
    - Example: ATLAS/CMS plan for a common data base concept (CREST project)
  - Containerized monitoring of user jobs is under development