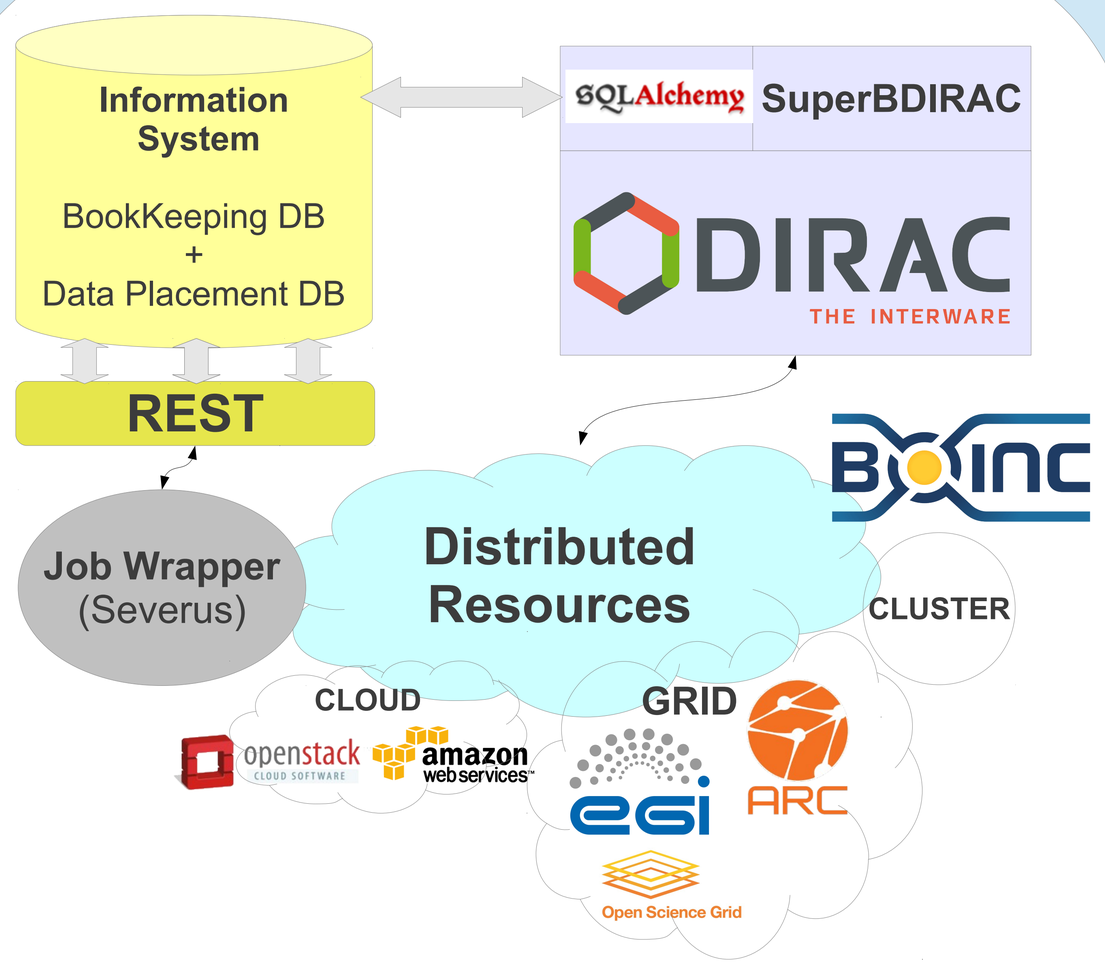
Dirac integration with a general purpose bookkeeping DB: a complete general suite for distributed resources exploitation

Contributors: F Bianchi[a,b], M Chrzaszcz[c,d], V Ciaschini[d], M Corvo[e], C De Santis[f,g], D Del Prete[h], A Di Simone[f,g], G Donvito[i], A Fella[l,m], P Franchini[d], F Giacomini[d], A Gianelle[e], R Grzymkowski[d], S Longo[e], S Luitz[o], E Luppi[p,q], M Manzali[p,q], M Rama[r], G Russo[h], S Pardi[h], L Perez Perez[l], B Santeramo[i,s], R Stroili[e], L Tomassetti[,m,q], M Zdybal[d]

a) University of Torino, Turin, Italy b) INFN – Sezione di Torino, Turin, Italy c) Physik-Institut, Universität Zürich, Zürich, Switzerland d) Henryk Niewodniczanski Institute of Nuclear Physics Polish Academy of Sciences, Krakow, Poland d) INFN CNAF, Bologna, Italy e) INFN – Sezione di Padova, Padua, Italy f) INFN, Sezione di Roma Tor Vergata, Rome, Italy – g) Department of Physics, University of Rome Tor Vergata, Rome, Italy h) INFN – Sezione di Napoli, Naples, Italy i) INFN, Sezione di Bari, Bari, Italy l) INFN - Sezione di Pisa, Pisa, Italy m) Department of Mathematics and Computer Science, University of Ferrara, Ferrara, Italy o) SLAC – Menlo Park – CA - USA p) Department of Physics, University of Ferrara, Ferrara, Italy q) INFN - Sezione di Ferrara, Ferrara, Italy r) INFN LNF – Frascati, Italy s) Department of Physics, University and Polytechnic of Bari, Bari, Italy

Abstract

In the context of High Energy Physics computing field the R&D studies aimed to the definition of the data and workload models have been carried on and completed by the SuperB community beyond the experiment life itself. The work resulted of great interest for a generic mid- and small size VO to fulfill Grid exploiting requirements involving CPU-intensive tasks. We present the R&D line achievements in the design, developments and test of a distributed resource exploitation suite based on DIRAC. The main components of such a suite are the information system, the job wrapper and the new generation DIRAC framework. The DB schema and the SQL logic have been designed to be able to be adaptive with respect to the VO requirements in terms of physics application, job environment and bookkeeping parameters. A deep and flexible integration with DIRAC features has been obtained using SQLAlchemy technology allowing mapping and interaction with the information system. A new DIRAC extension has been developed to include this functionality along with a new set of DIRAC portal interfaces aimed to the job, distributed resources, and metadata management. The results of the first functionality and efficiency tests will be reported.



Simple, standard and long term solution

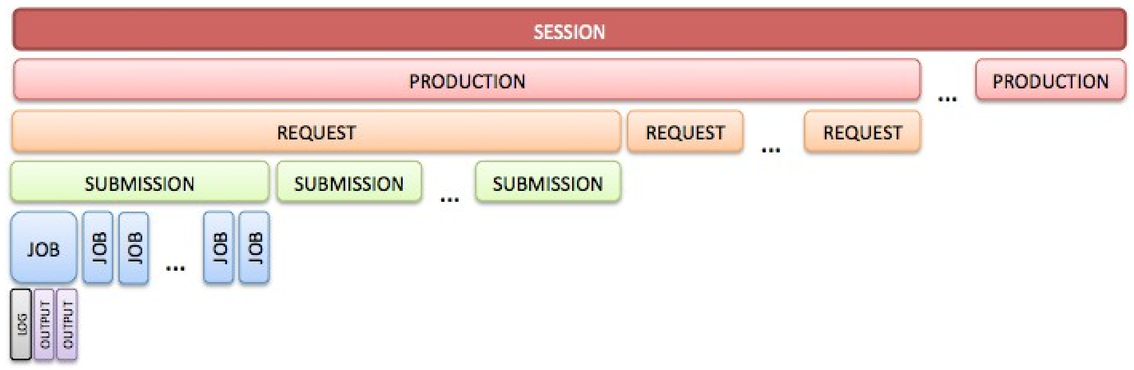
Flexible enough to fulfill needs of a generic VO

Information System – SBK database

- **Relies on PostgresSQL 9.1**
- **Exploits hstore fields, trigger and PL/pgSQL language**
- **Normalized structure: NF1, NF2 and NF3 compliant**
- **Capable to sustain high transaction load (900 operations/sec)**

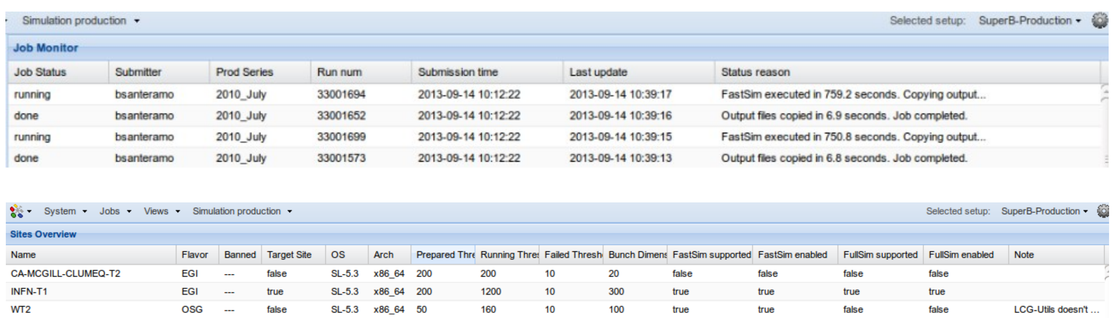
SBK entities

- **Session**: defines a simulation (parameter and software)
- **Production**: Session subset to produce all needed to simulate a scenario (eg. Background in detector)
- **Request**: Production subset – set required events to simulate
- **Submission**: final step is job submission
  - Scheduling
  - Re-submission
  - Monitoring



SuperBDIRAC

- **DIRAC extension**
  - **SQLALchemy layer**
  - **Integration with Information System**
  - **Severus compatible**
- **DIRAC webportal extension**
  - **Site monitoring**
  - **Simulation job monitoring**


Simulation production — Selected setup: SuperB-Production

Job Monitor

Job Status	Submitter	Prod Series	Run num	Submission time	Last update	Status reason
running	bsanteramo	2010_July	33001694	2013-09-14 10:12:22	2013-09-14 10:39:17	FastSim executed in 759.2 seconds. Copying output...
done	bsanteramo	2010_July	33001652	2013-09-14 10:12:22	2013-09-14 10:39:16	Output files copied in 6.9 seconds. Job completed.
running	bsanteramo	2010_July	33001699	2013-09-14 10:12:22	2013-09-14 10:39:15	FastSim executed in 750.8 seconds. Copying output...
done	bsanteramo	2010_July	33001573	2013-09-14 10:12:22	2013-09-14 10:39:13	Output files copied in 6.8 seconds. Job completed.

System — Jobs — Views — Simulation production — Selected setup: SuperB-Production

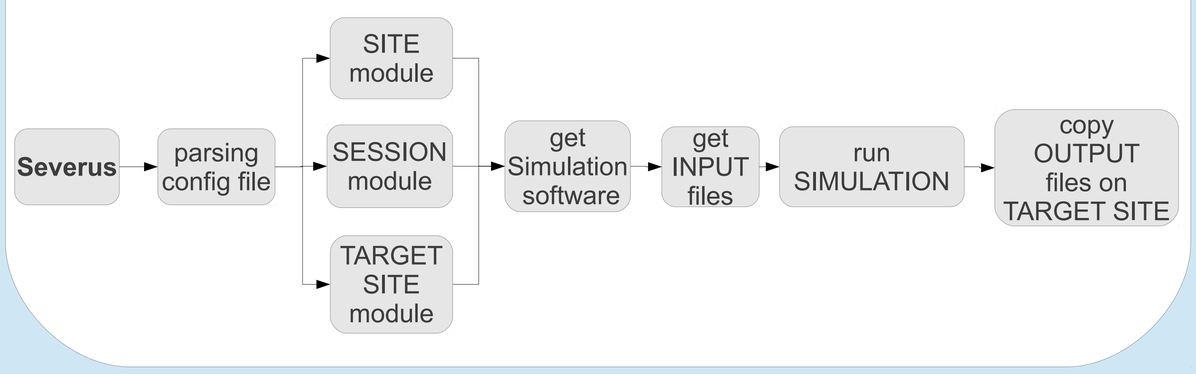
Sites Overview

Name	Flavor	Banned	Target Site	OS	Arch	Prepared Thr	Running Thres	Failed Thresh	Bunch Dimens	FastSim supported	FastSim enabled	FullSim supported	FullSim enabled	Note
CA-MCGILL-CLUMEQ-T2	EGI	---	false	SL-5.3	x86_64	200	200	10	20	false	false	false	false	
INFN-T1	EGI	---	true	SL-5.3	x86_64	200	1200	10	300	true	true	true	true	
WT2	OSG	---	false	SL-5.3	x86_64	50	160	10	100	true	true	false	false	LCG-Utils doesn't ...

Severus Job Wrapper

Configuration file define:

- **OPTIONS**
- **SOFTWARE**
- **REST**
- **SITE**
- **TARGET SITE**
- **INPUT**
- **OUTPUT**
- **EXPORT VARS**
- **SESSION NAME**



CHEP2013: October 14 - 18, 2013 - Amsterdam, The Netherlands
contact email: bruno.santeramo@ba.infn.it

References:

[1] http://diracgrid.org - [2] http://www.postgresql.org/ - [3] http://www.sqlalchemy.org/ - [4] http://boinc.berkeley.edu/ - [5] SuperB Technical Design Report, http://arxiv.org/abs/1306.5655
[6] Fielding R T 2000 Architectural Styles and The Design of Network-based Software Architectures , PhD Thesis,University of California Irvine
[7] A.Fella, E.Luppi, L.Tomassetti A General Purpose Suite for Job Management, Bookkeeping and Grid Submission. International Journal of Grid Computing & Applications (IJGCA) Vol.2, No.2, June 2011. DOI: 10.5121/ijgca.2011.2202.