LHCb – first tests of the LCG-1

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Outline
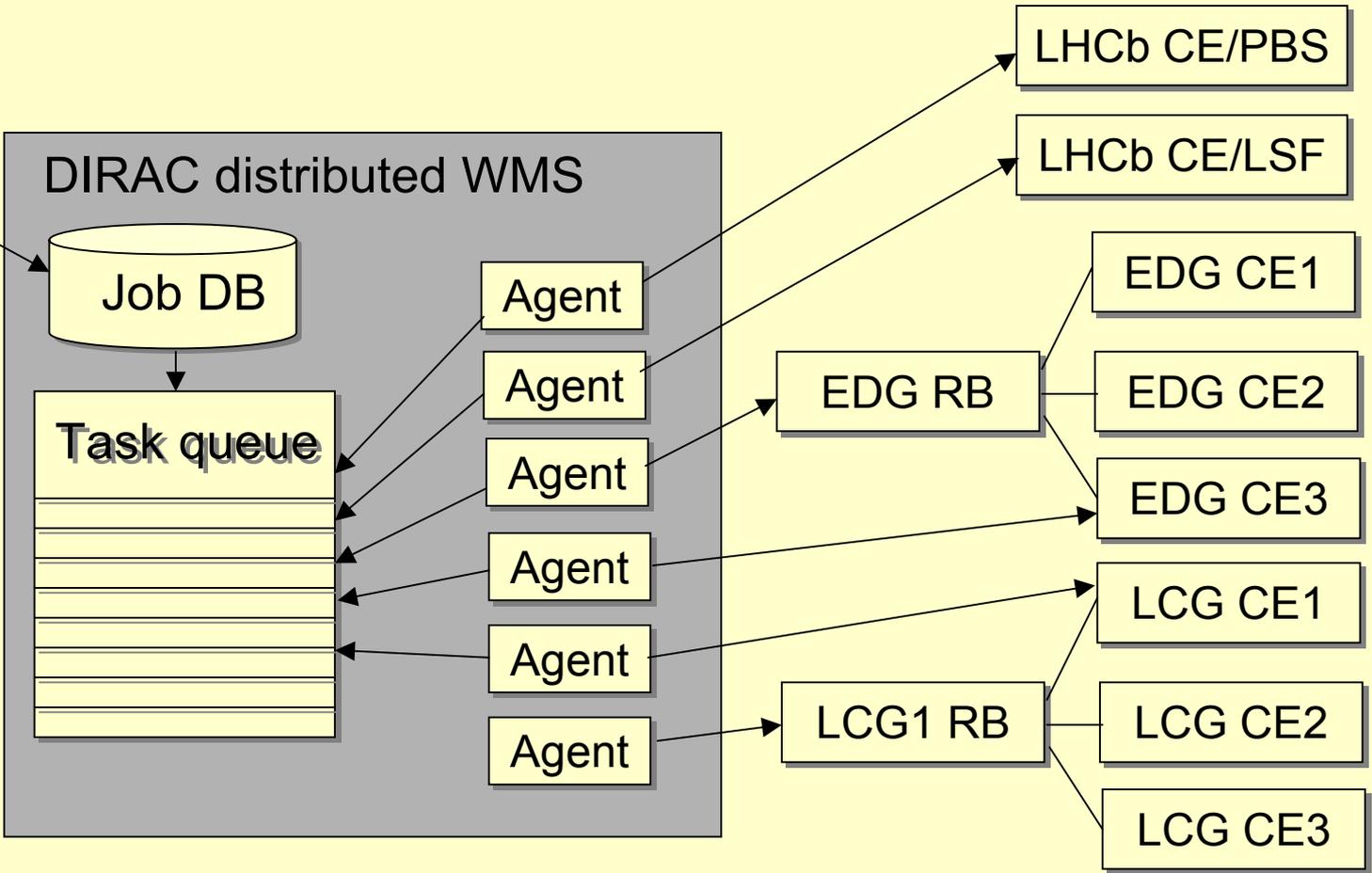
- ◆ LHCb setup on the LCG-1 platform
- ◆ LCG-1 tests
- ◆ Next steps

DIRAC use of computing resources

◆ **DIRAC design goals to facilitate operation in various environments:**

✦ Scheduling jobs to "any grid" computing resources:
- "native" sites, running DIRAC Agents;
- EDG/LCG grid as a whole, passing through RB;
- EDG/LCG CE's and SE's as DIRAC resources.

✦ Flexibility in software installation:
- Software preinstalled by grid site managers (rpms, etc);
- Software preinstalled on the sites by the LHCb managers;
- Software installation on the flight by a running job

✦ Using "any grid" storage resources:
- Data Management component to be able to replicate data between LCG and DIRAC storage elements;

DIRAC WMS architecture

Production manager

LHCb CE/PBS

LHCb CE/LSF

DIRAC distributed WMS

Job DB

Task queue

Agent
Agent
Agent
Agent
Agent
Agent

EDG CE1

EDG CE2

EDG RB

EDG CE3

LCG CE1

LCG1 RB

LCG CE2

LCG CE3

EDG 2.0 tests

◆ **So far most of the tests were done on the EDG 2.0 testbed:**

   ✦ Direct scheduling to the CE;

   ✦ Job deploys a DIRAC agent on the WN which:

   • Installs software on the fly on the WN;
   ➡ From the LHCb http server;
   ➡ Cleaned up in the end of job;
   • Steers the job execution;
   • Steers transfers of the resulting data.

   ✦ Using Replica Manager tools to deliver Input/Output sandboxes and datasets;

   ✦ Jobs reporting their status to the Job Monitoring Service via XML-RPC messages.

EDG 2.0 tests (2)

◆ Results:

  ✦ LHCb production jobs are properly running if no system failures;
    • Short jobs (2 events);
    • In bunches of ~50 jobs.

  ✦ Very unstable R-GMA based Information System:
    • Screws up job submission but also Replica Manager tools which we heavily rely upon;

  ✦ No large scale production yet done with EDG 2.0:
    • 300K events production with EDG 1.4 in Feb 2003

  ✦ Tests continue

LCG tests (1)

◆ New software packaging in rpms ;
  ✦ Testing the new LCG-2 proposed software installation tools;

◆ New generation software to run:
  ✦ Gauss/Geant4+Boole+Brunel+…

◆ Using the LCG Resource Broker
  ✦ Unlike direct scheduling to a CE in the EDG 2.0 tests;
  ✦ Direct scheduling if necessary.

LCG tests (2)

- ◆ **Tests of the basic functionality**
  - ✦ LHCb software correctly installed from rpms ;
  - ✦ Tests with standard LHCb production jobs:
    - 4 steps – 3 simulation datasets, 1 reconstructed dataset;
    - Low statistics – 2 events per step;
  - ✦ Applications run OK ;
  - ✦ Produced datasets are properly uploaded to a SE and registered in the LCG catalog;
  - ✦ Produced datasets are properly found and retrieved for the subsequent use.

LCG tests – next steps

- ◆ Long jobs:
  - ✦ 500 events ;
  - ✦ 24-48 hours depending on CPU ;
- ◆ Large number of jobs to test the scalability:
  - ✦ Limited only by the resources available.
- ◆ LCG-2 should bring important improvements for LHCb which we will try as soon as they will be available:
  - ✦ Experiment driven software installation;
    - • Testing now on the "installation" testbed.
  - ✦ Access to MSS (at least Castor/CERN)

LCG tests – next steps

◆ LCG-2 seen as an integral part of the LHCb production system for the DC 2004 (Feb 2004)

◆ Necessary conditions :

  ✦ The availability of major non LHC dedicated centers both through usual and LCG workload management system;
    • E.g CC/IN2P3, Lyon.

  ✦ The LCG Data Management tools accessing to major MSS (Castor/CERN, HPSS/IN2P3, FZK, CNAF, RAL);

  ✦ The overall stability and efficiency (>90%) of the system.