Improved LCG Job Submission

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Outline

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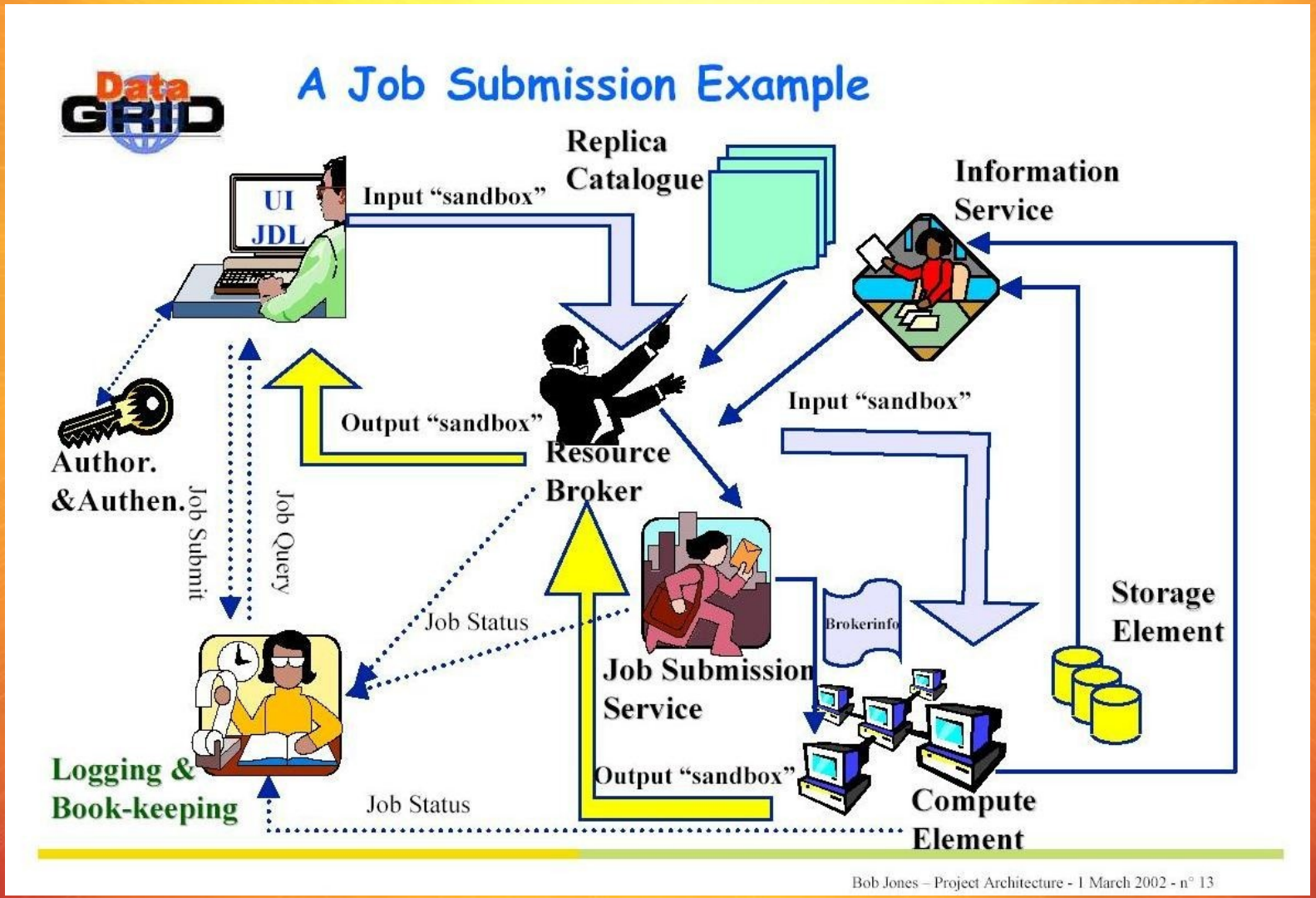
  - EDG/LCG job flow
  - DIRAC (LHCb) architecture
- Improved job submission in LCG
  - Architecture
  - API
- Conclusions & future plan

EDG/LCG Architecture



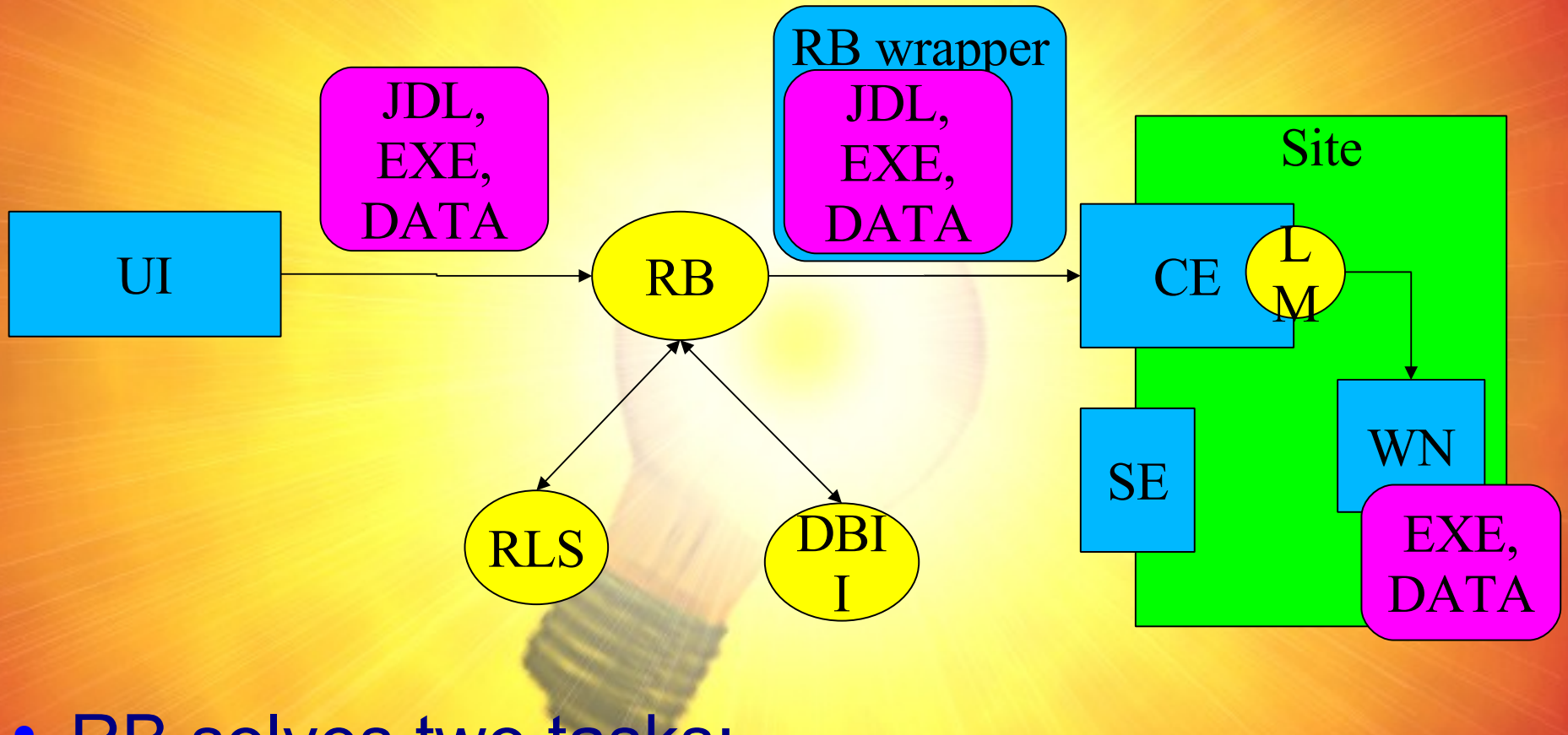
EDG/LCG Architecture

- Advantages:
  - “complete” information about available resources
    - more deeper optimization of resource utilization

EDG/LCG Architecture

- Disadvantages:
  - Resource Broker is a bottleneck. It makes two tasks mainly:
    - finding the computer resource satisfied job requirements
    - transport all necessary files to start a job
  - No buffering input jobs
    - a user have to wait the response of RB before start next job.

EDG/LCG job flow

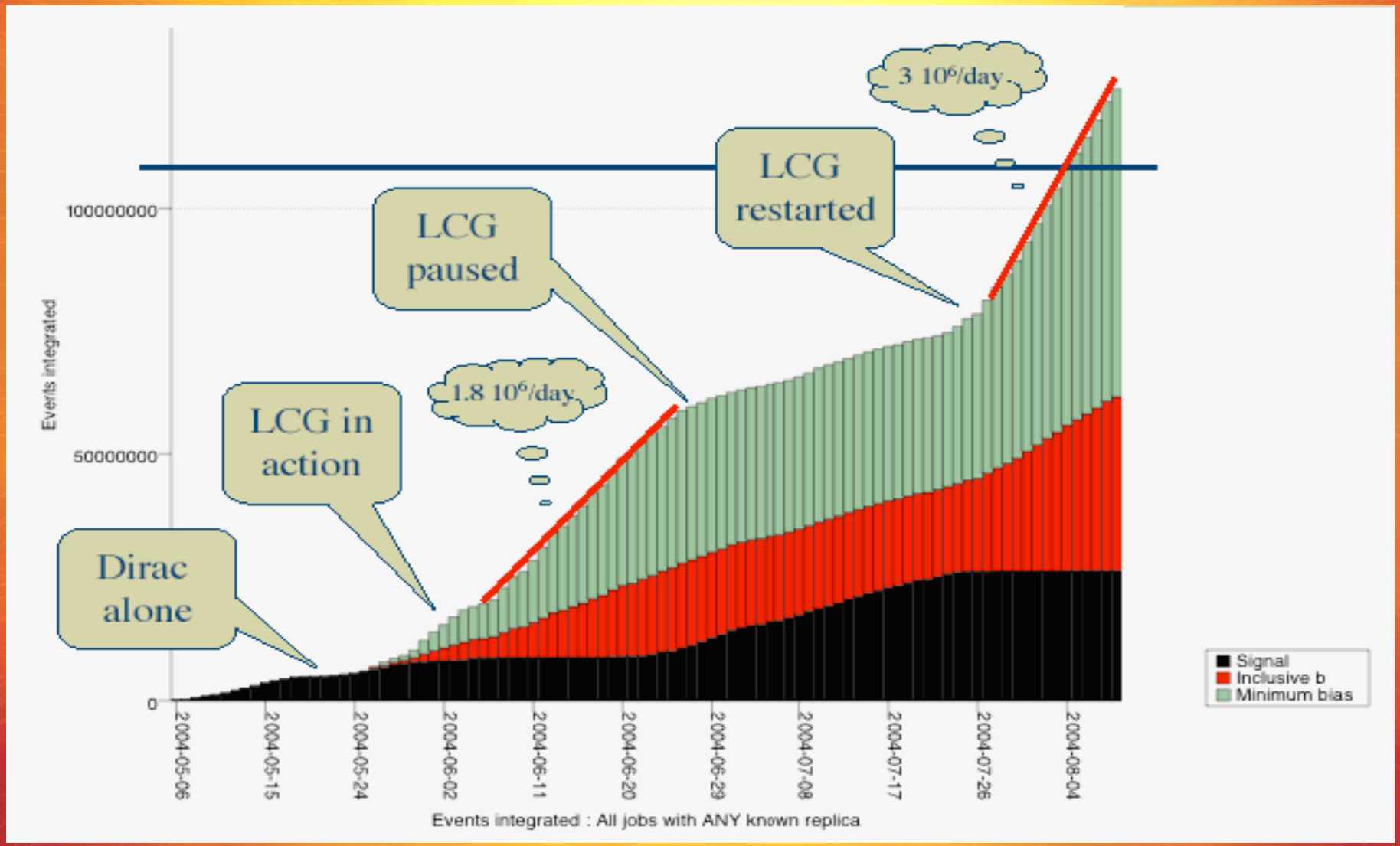


- RB solves two tasks:
  - Find resource matched to job requirements
  - Transport files to the CE all files necessary files

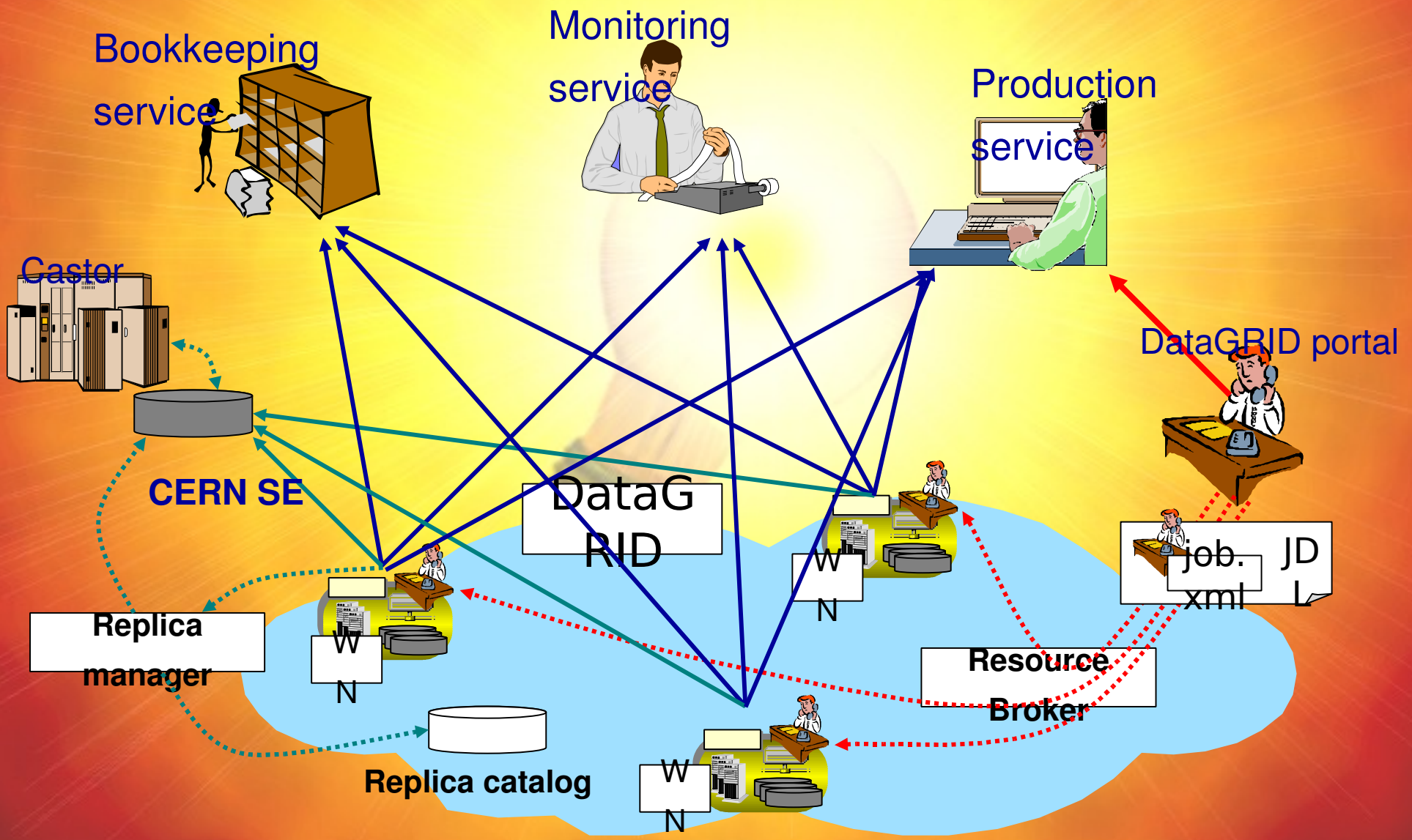
EDG/LCG job flow (cont.)

- Typical task in CMS – CMKIN:
  - Size of executable is about 20MB
  - Number of generated events is ~10000 (for draft analysis)
  - So, user submit **500 jobs** in a session
- It looks like DoS attack!

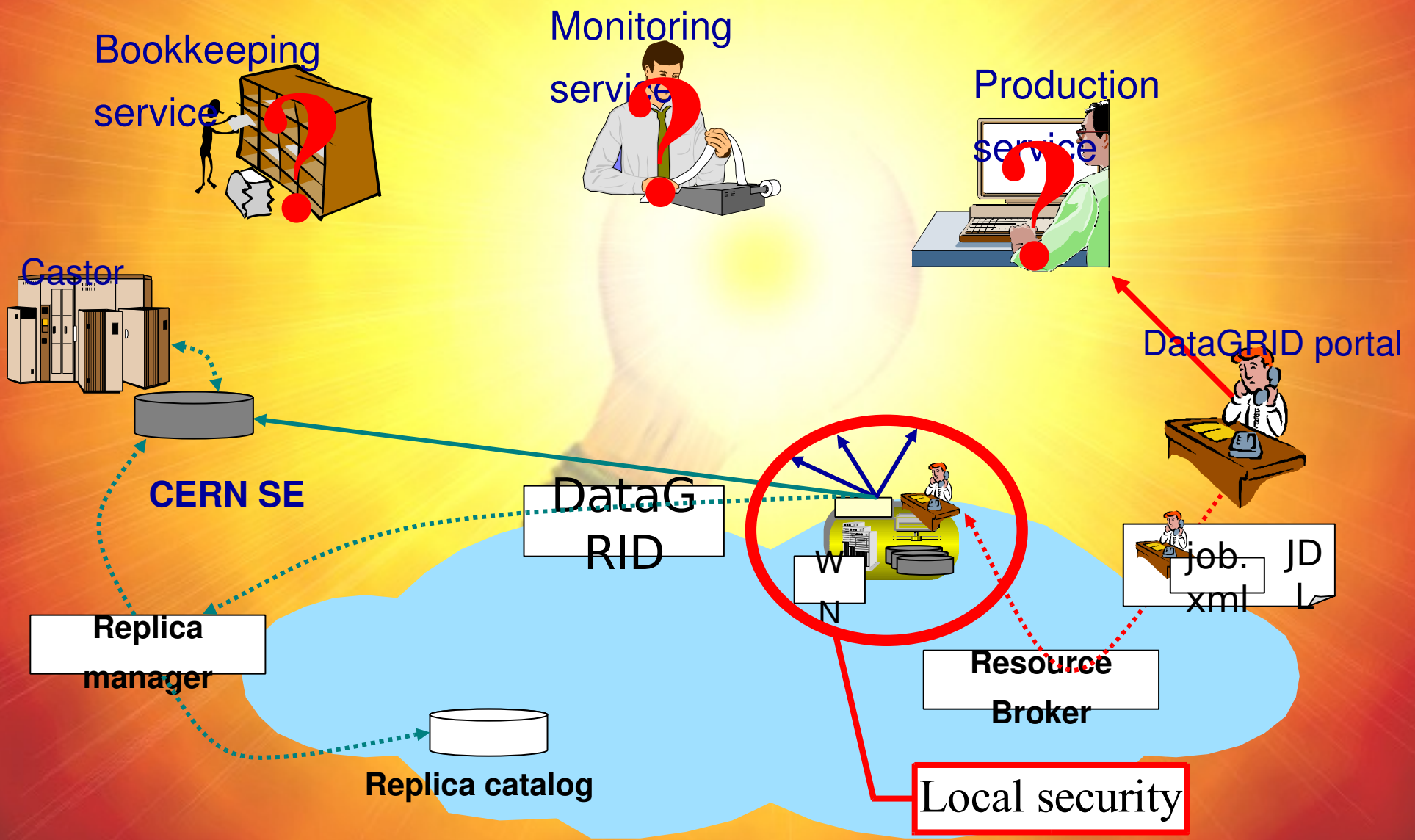
LCHb DC04


3 10⁶/day
LCG restarted
LCG paused
1.8 10⁶/day
LCG in action
Dirac alone
100000000
50000000
0
Events integrated
2004-05-06
2004-05-15
2004-05-24
2004-06-02
2004-06-11
2004-06-20
2004-06-29
2004-07-08
2004-07-17
2004-07-26
2004-08-04
Events integrated : All jobs with ANY known replica
Signal
Inclusive b
Minimum bias

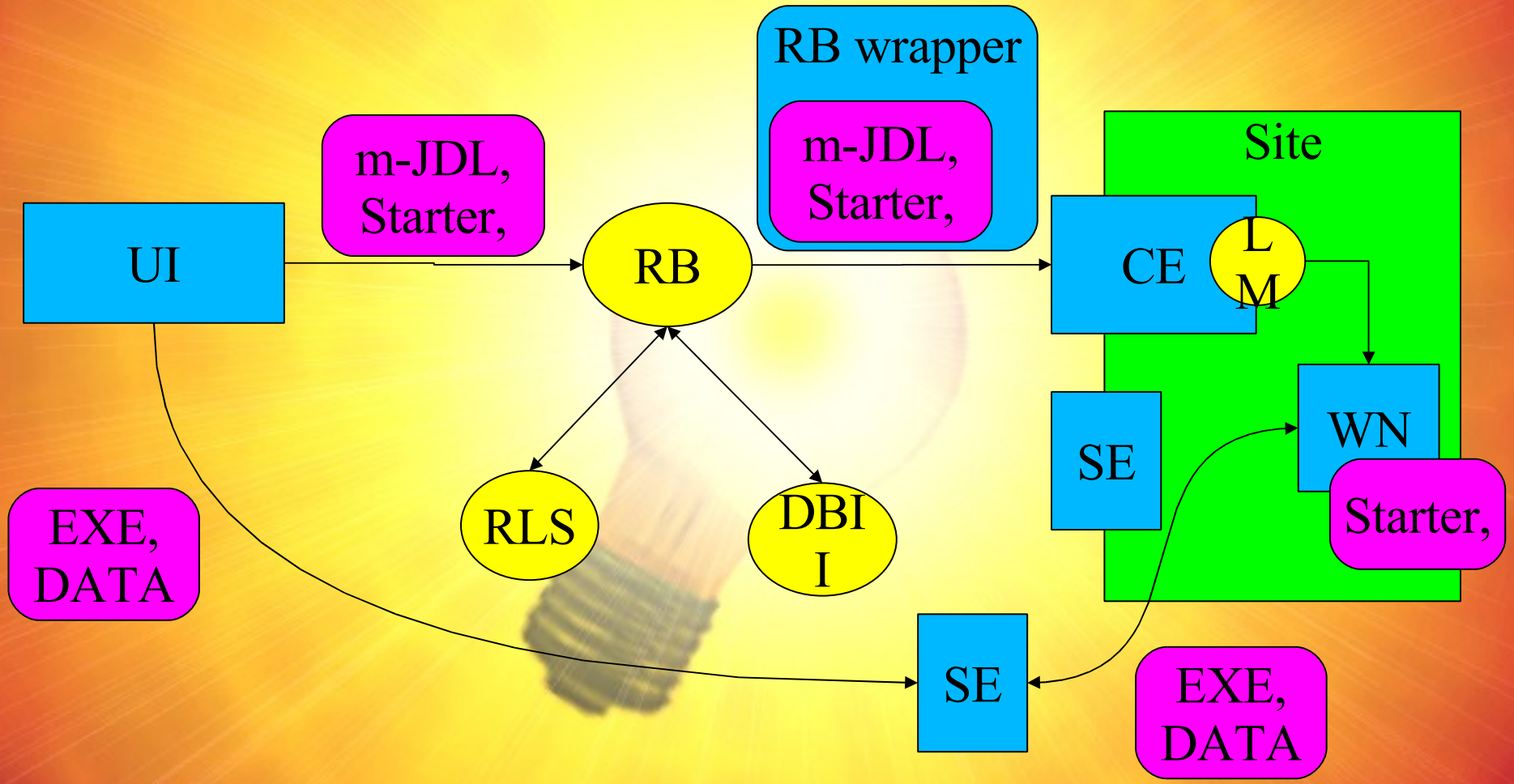
DIRAC (LHCb) hack



DIRAC (LHCb) Architecture



Improved LCG job flow



API

- lcg-job-submit
  - prepare tar-file in accordance JDL
  - transfer tar-file to SE
  - modify original JDL
  - submit modified JDL by edg-job-submit
  - logging information to ~/.lcg-job-submit-log
- local-job-wrapper
  - transfer tar-file from SE
  - untar tar-file
  - start original executable

API (cont.)

- lcg-se-clear
  - remove tar-file from SE
    - for example, if job was aborted for some reasons
- lcg-se-test
  - check the possibilities to store file on the SE
- TRANSMIT_SE
  - environment variable defined SE to transfer data

Conclusions & Plan

- Proposed approach allow upload RB and improve robustness and productivity of them
  - no modification in present LCG components
  - use the standard grid protocols only
  - use the standard grid security infrastructure
- Future plan:
  - realize job buffering to reduce wall-time of job submission
  - using single copy of executables for multiple submission