Proposal for a Database On Demand Service (DBOD)

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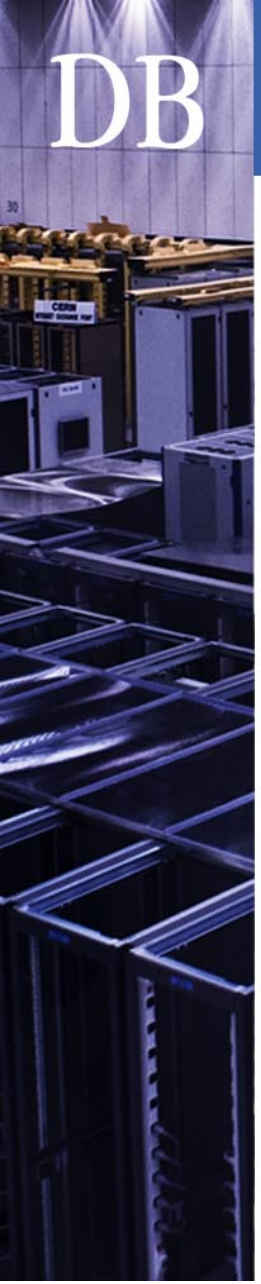
Database SERVICES

CERN



Agenda

- Objectives
- Demo
- Behind the scenes
- Next

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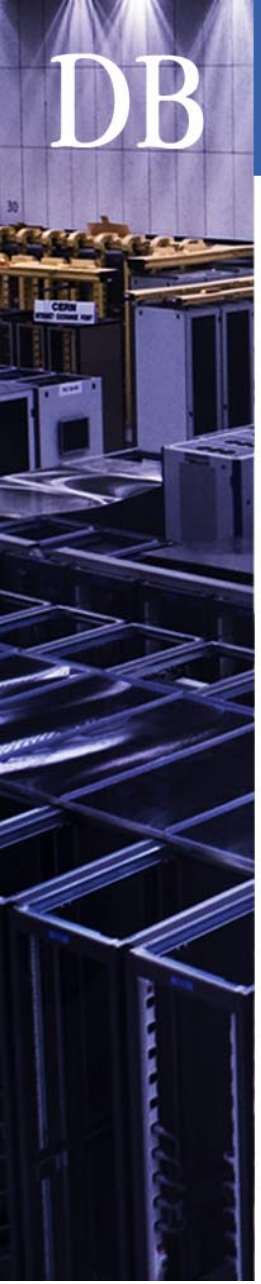

Objectives

- Allow the CERN user community to create and manage database instances. DBOD Users will have full DBA privileges on their instance.
- Offer different DBMS vendors. MySQL is our starter. Service designed to scale.
- DBOD users will have a set of operations available via a web interface. More on that later ☺
- DBOD comes on a preconfigured virtual machine.
- The DBOD service will take care of system administration operations and provide upgrade paths for DBMS
- DBOD users are entirely responsible for ensuring that their systems, and the use of their systems comply fully with the Rules for the use of CERN Computing Facilities.
- The DBOD service will not provide DBA or application support.
  - Although we could consider a community oriented support site (as for iOS/Android).
- Users needing advanced features such as performance analysis, clustering, replication, or guaranteed links to Oracle databases should use the Oracle service.

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DBOnDemand site

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https://cern.ch/DBOnDemand/

DEMO

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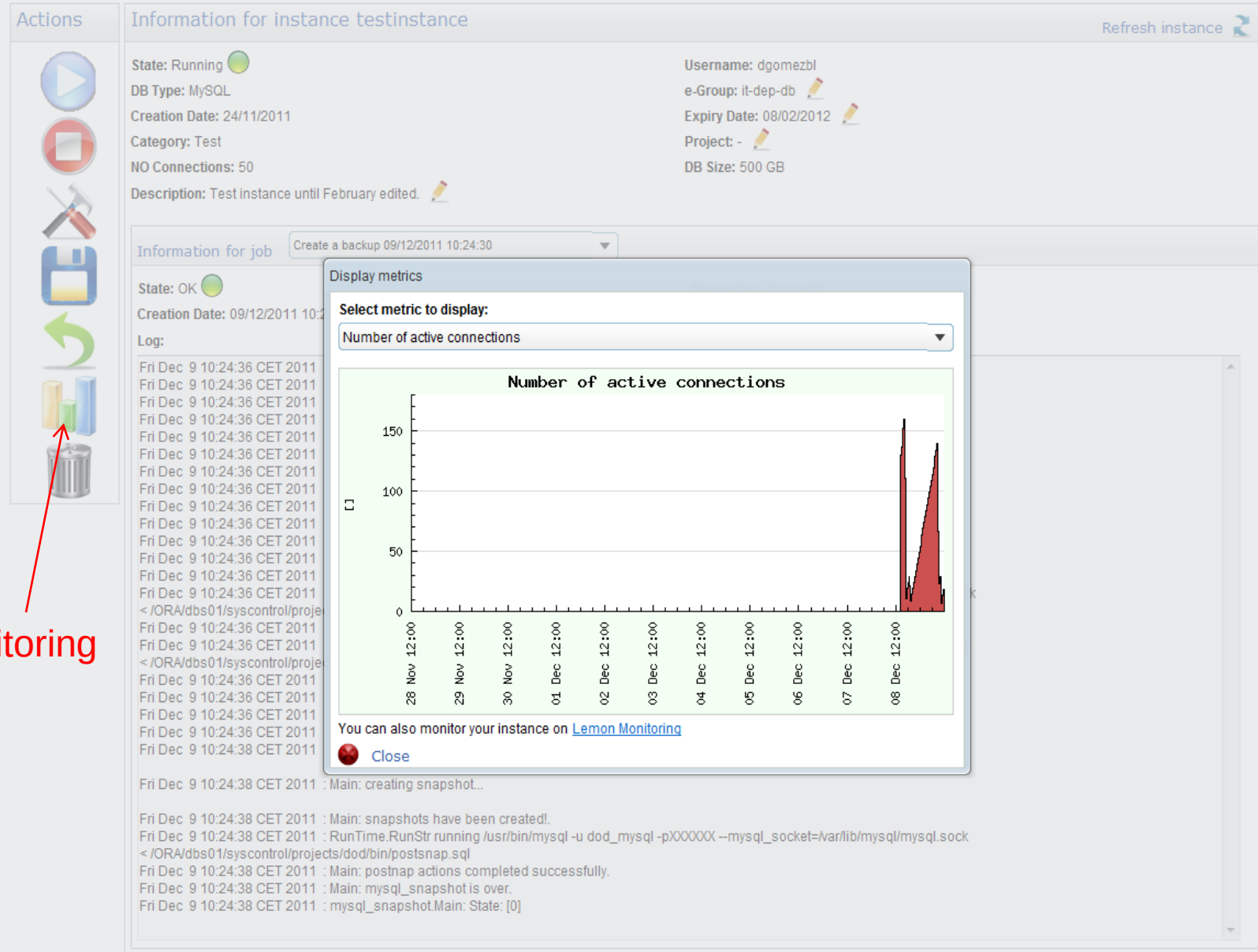
Demo: Monitoring your instance

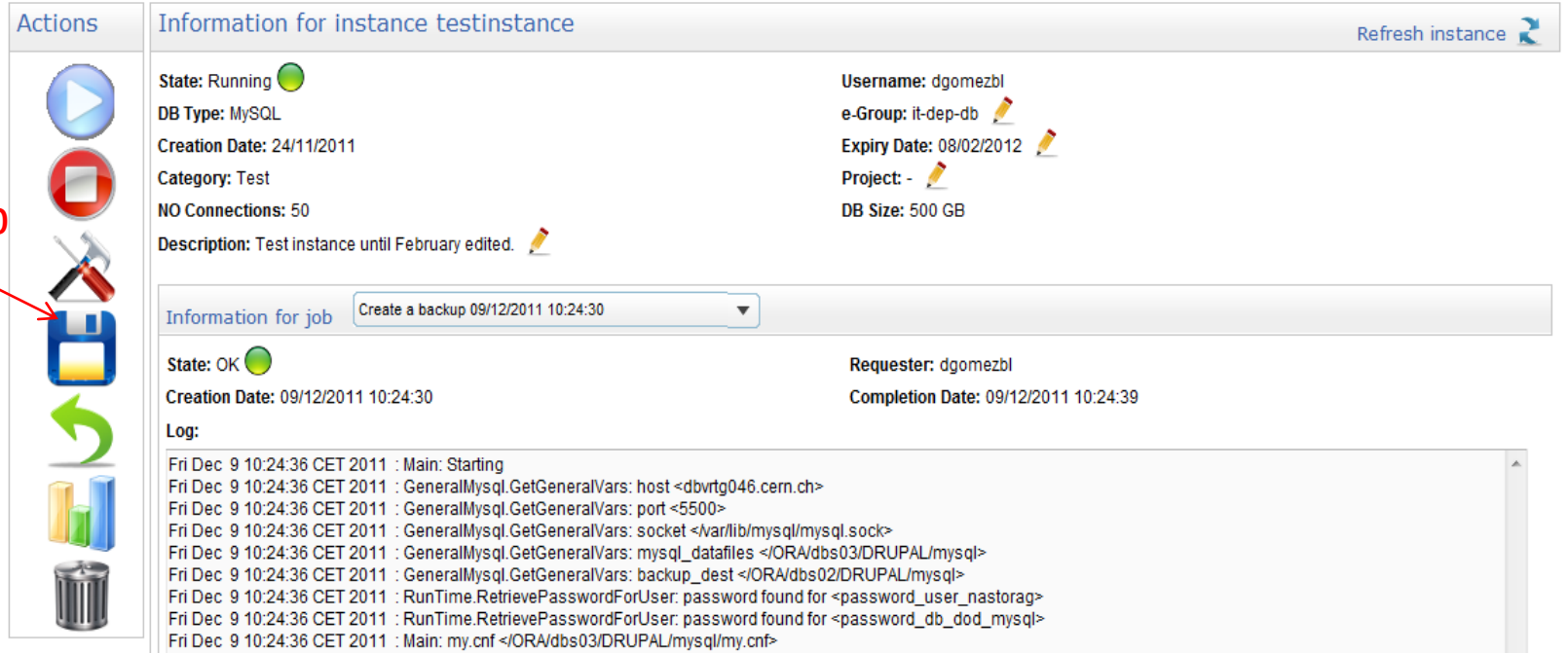


Monitoring

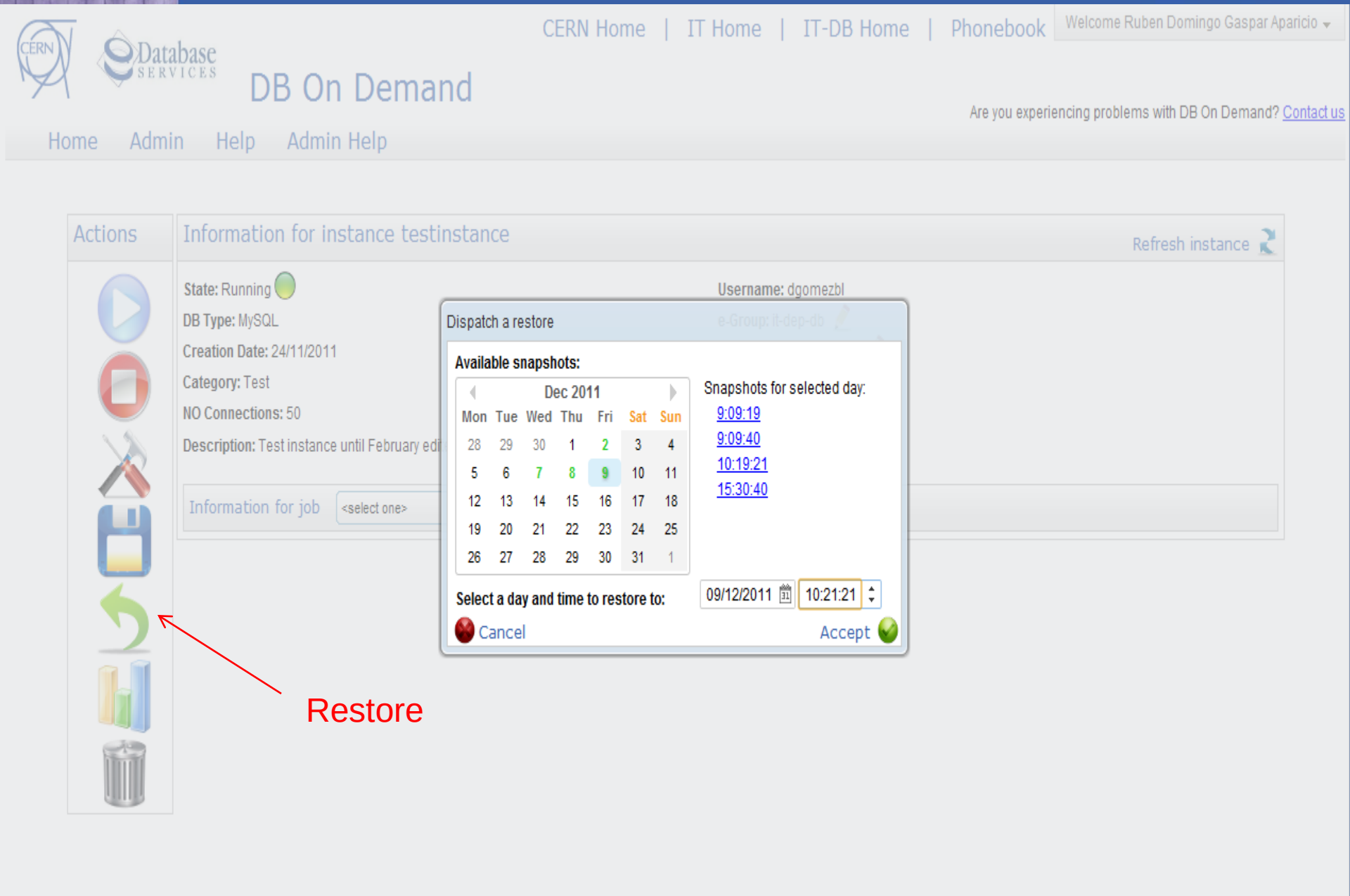
Demo: creating a backup

backup

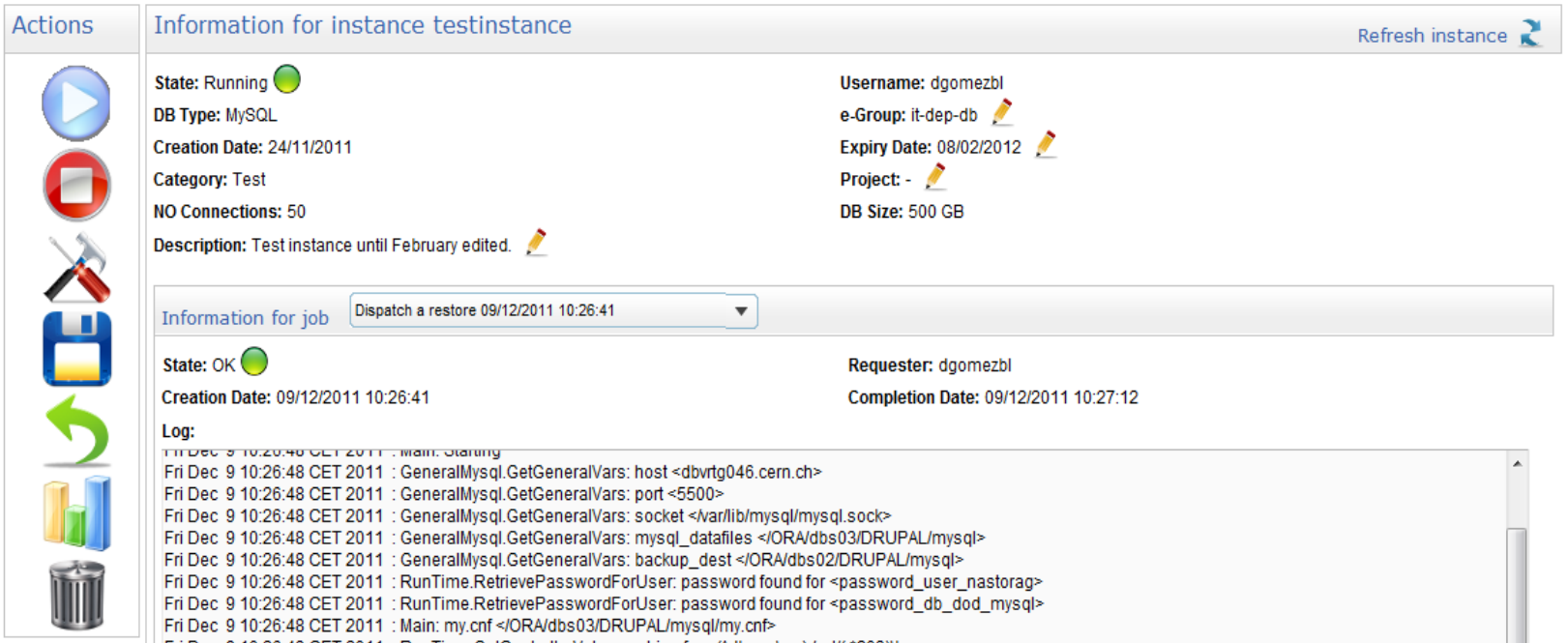
Takes 2 secs



Demo: Point in Time restore I



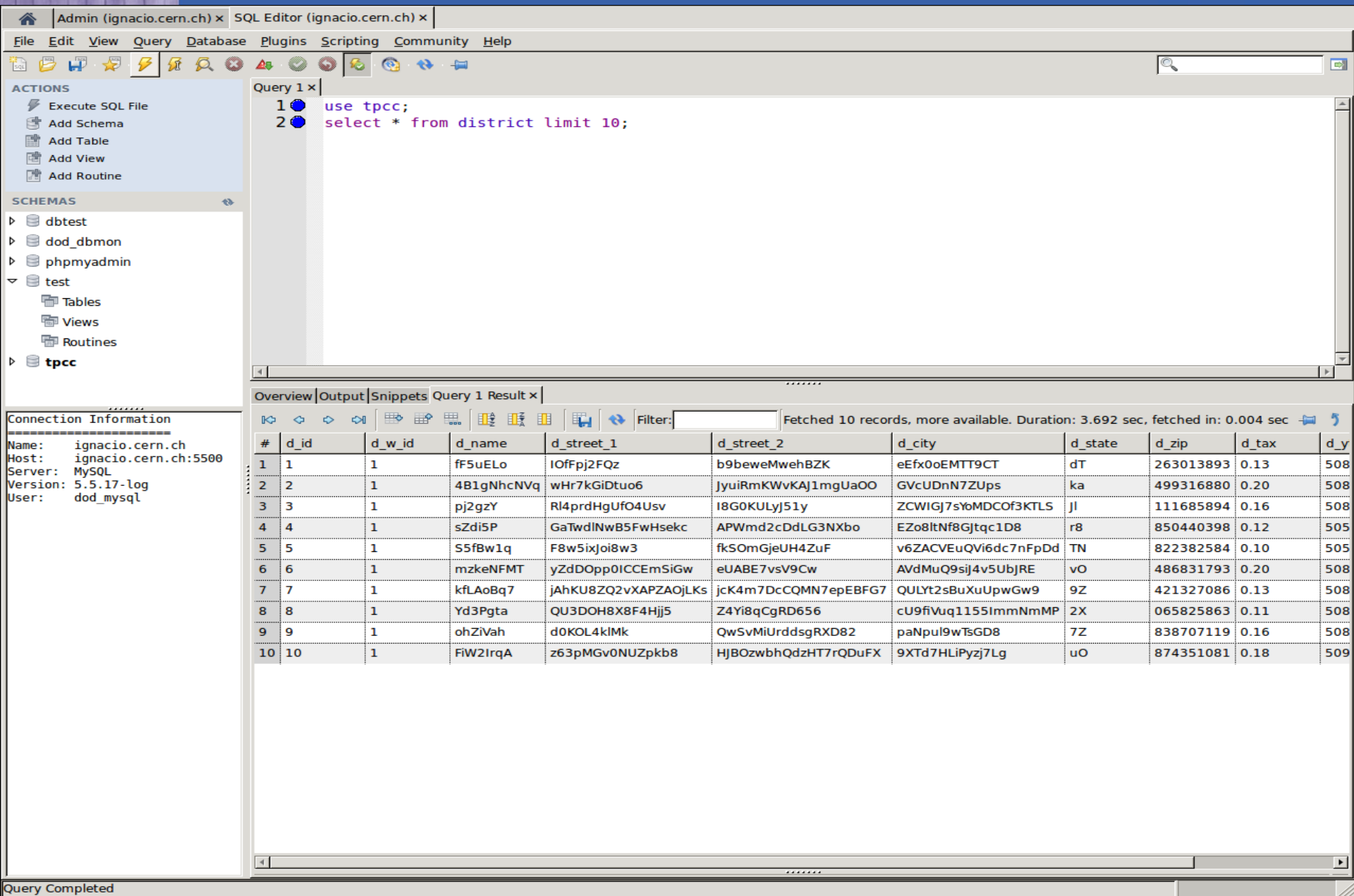
Demo: Point in Time restore II



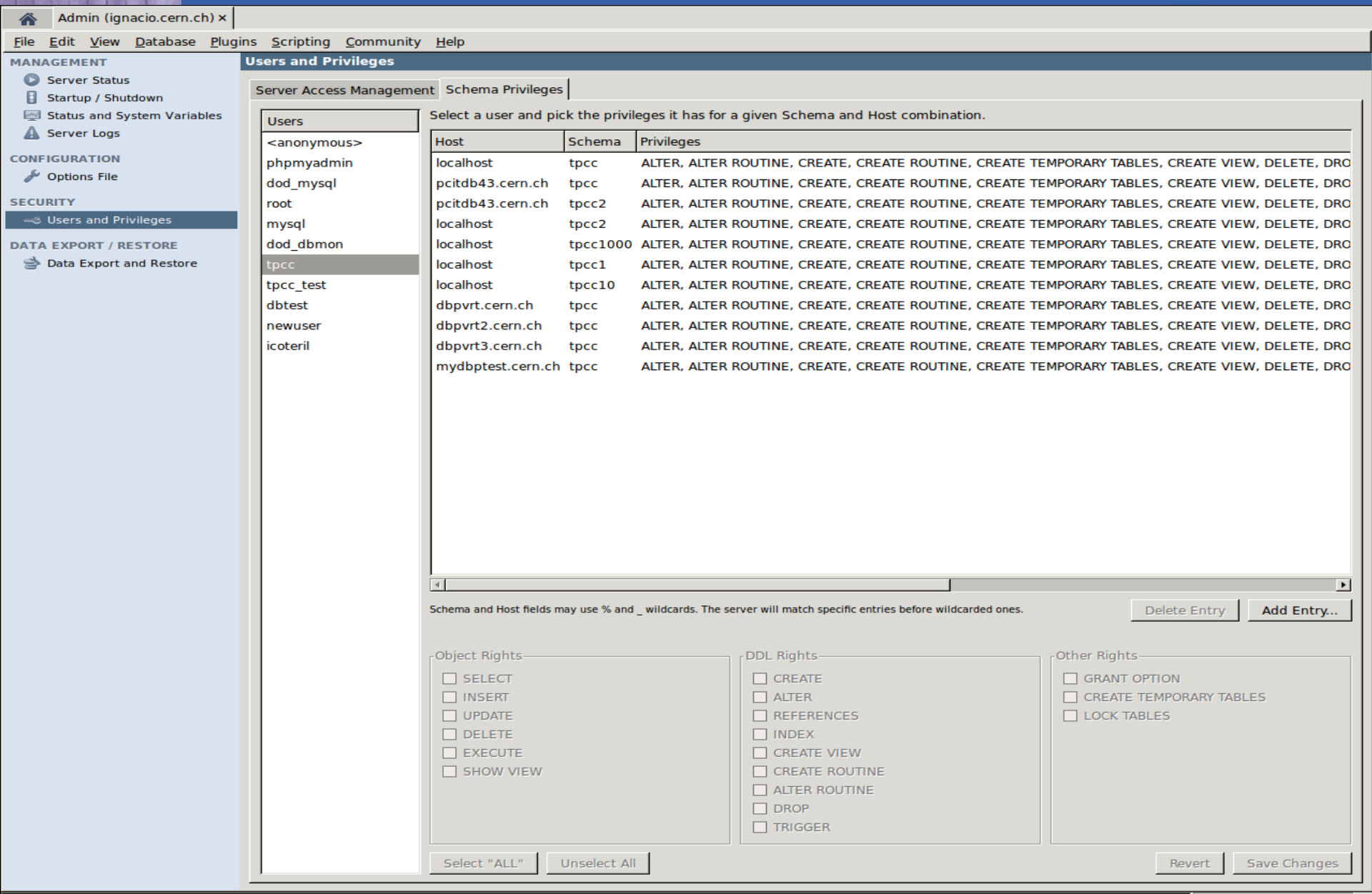
Restore time: 2secs

Recovery time

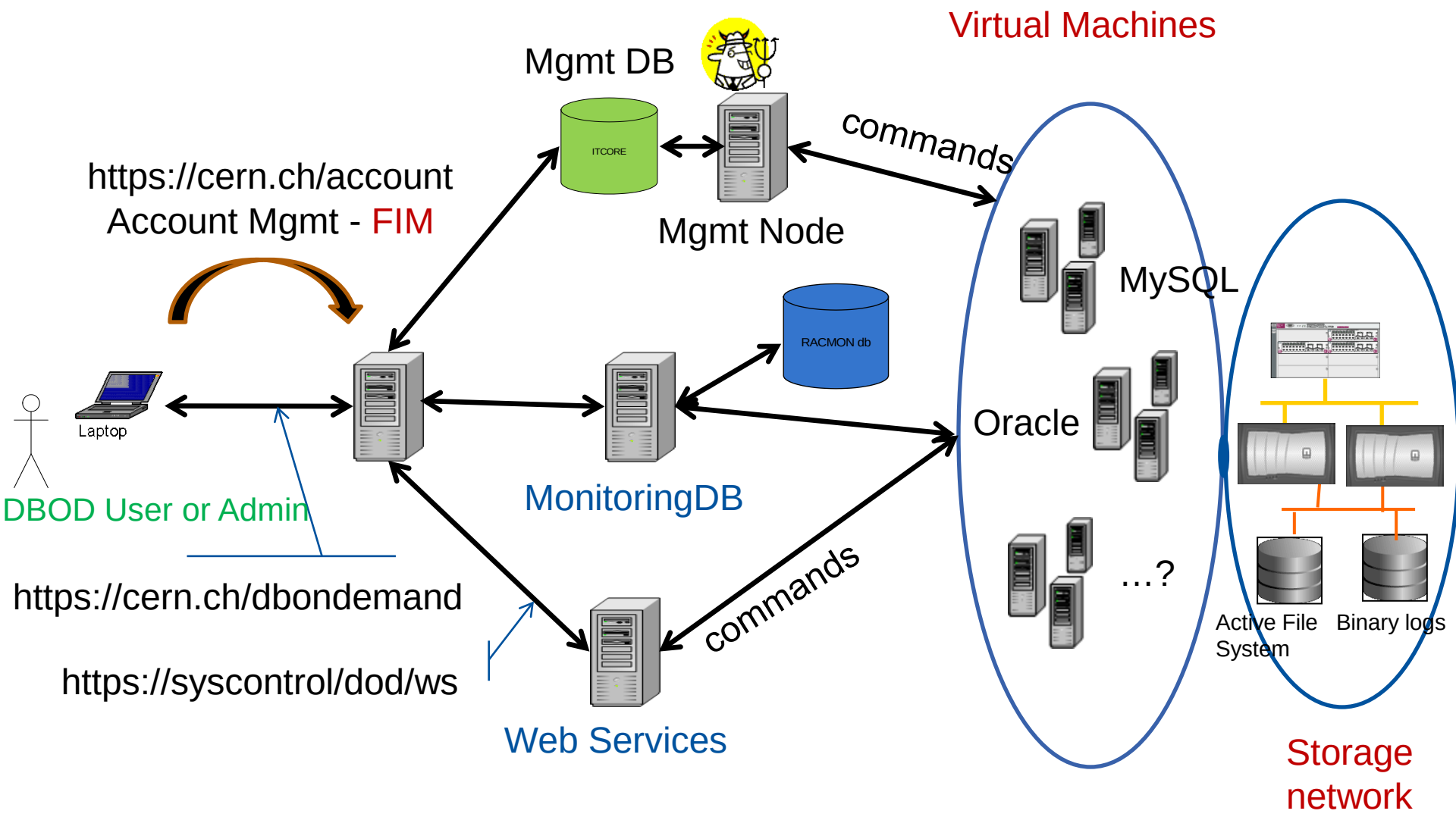
Demo: Mysql Workbench

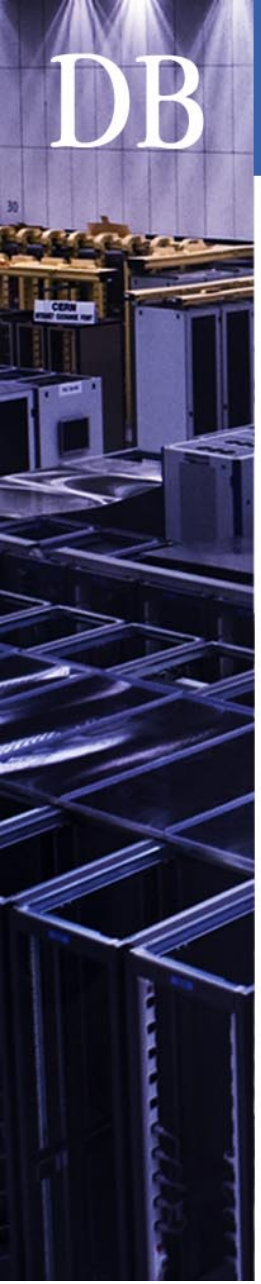


Demo: IDE admin view



Architecture



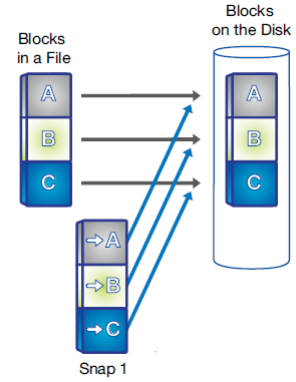


Web interface

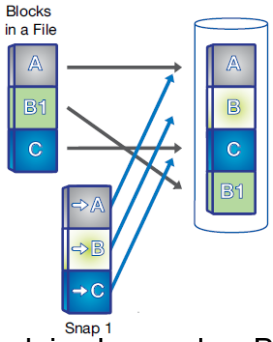
- Implementation
  - J2EE Web Application running on central web servers
    - ZK Framework 5.0.7.1 (Ajax based)
    - SSO (Single Sign On) + SSL for authentication/authorisation
    - JDBC + Apache BDCP connection pooling via JNDI
    - Apache Axis 1.4 for SOAP Web Services
- User operations
  - Request for a new instance
  - Instance administration: backup/restore, stop/start,…
  - Documentation (Twiki)
- Service Administration operations
  - Special collective actions
  - System administration maintenance, MySQL Upgrades,…
  - Approval of requests
  - Documentation (Twiki)

Backup of a DBOD instance

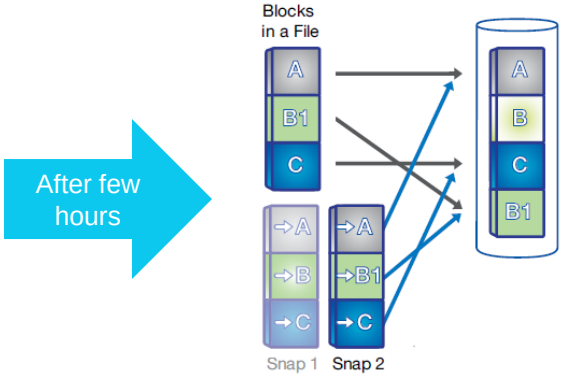
- It's a tool, good to know how to use it (see doc)
- Based on snapshots. Full database backup in few secs.



Snapshot taken



B block is changed → B1
Snap1 offers a historical view



Snapshot taken

- How many snapshots can I have? How long backwards in time can I go?
  - Extra 20% space provided for snapshots: i.e active file system 100GB, snapshot area 20 GB → total: 120GB
  - Depends on DBOD instance activity, i.e. changing 2% active file system will allow to have 10 days of snapshots
- For MySQL: storage engine 'innodb' recommended. More in next slide.
- Soon possibility to send to tape: sorting out policy & software

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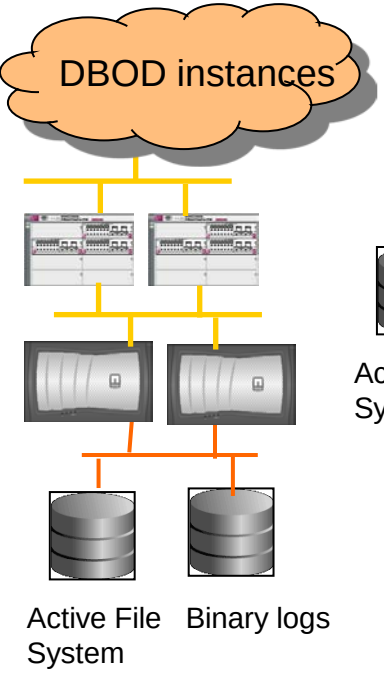
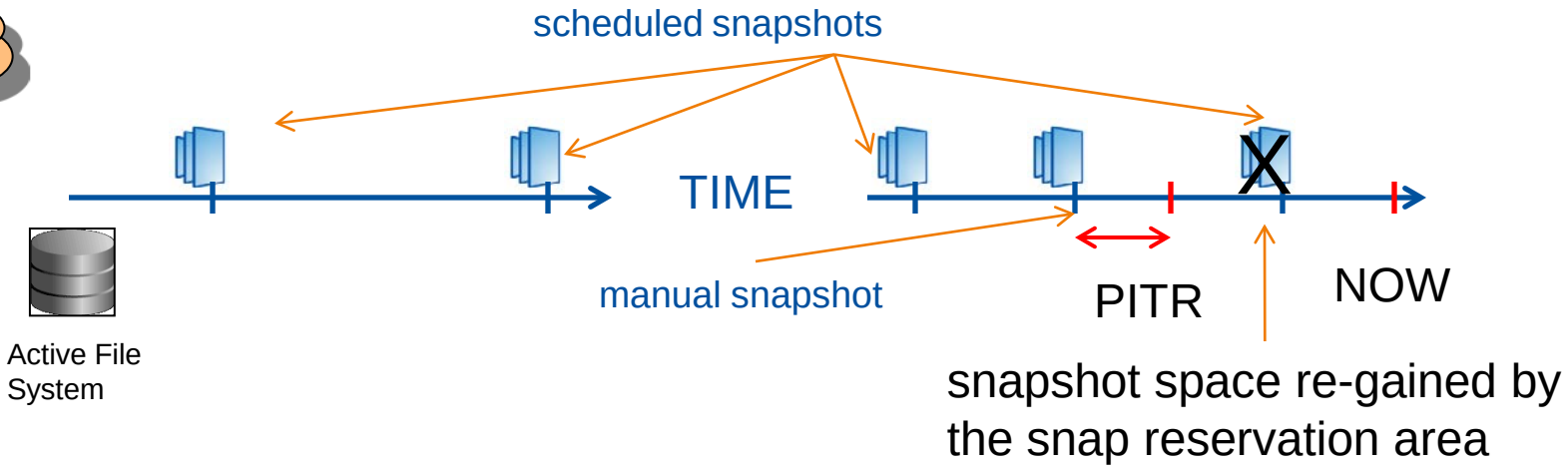
Restore of a DBOD instance

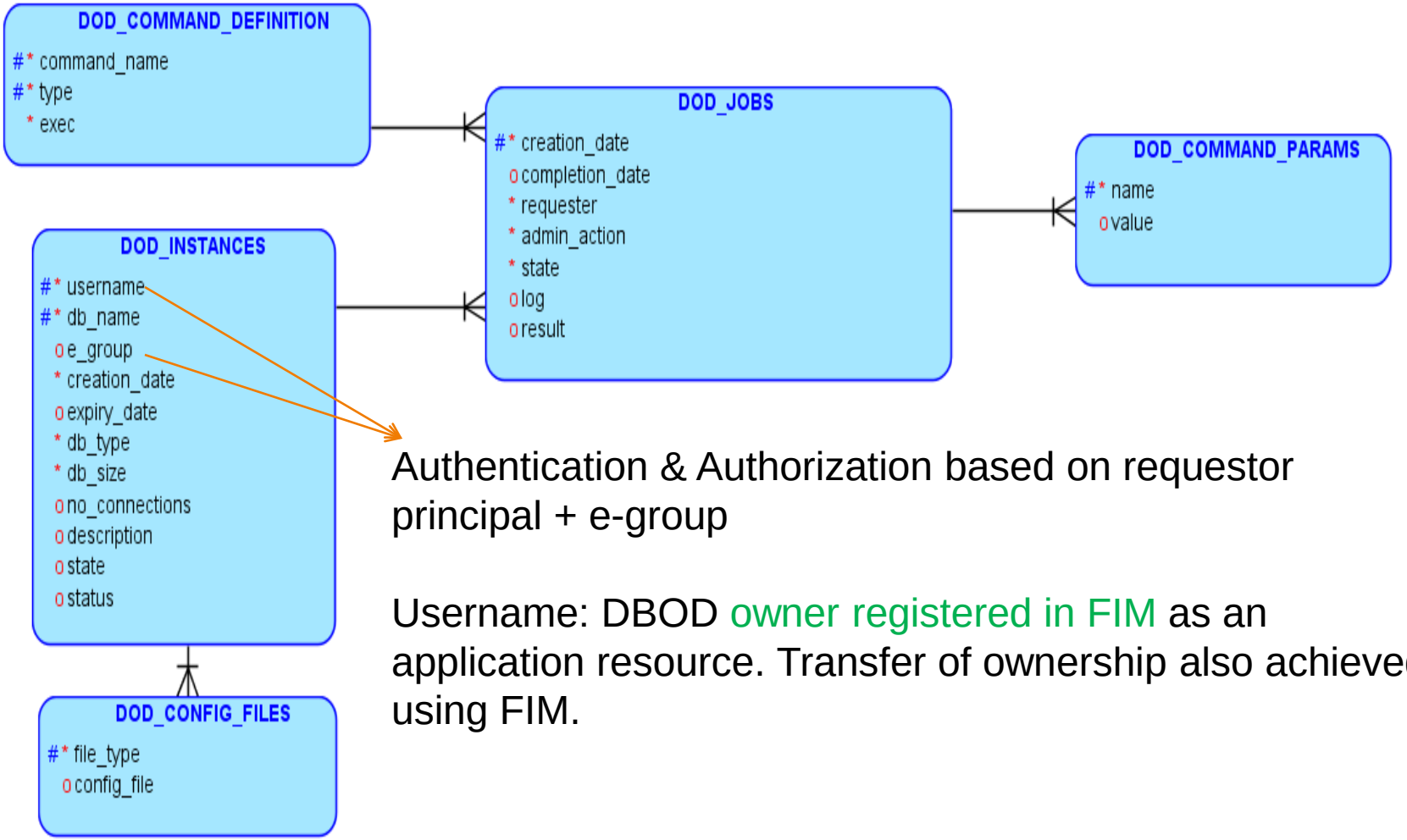
- Based on snapshots
  - Restore time reduced to a few seconds
- Full restore of whole database
- DBOD instances configured with binary logs
  - Point In Time Recovery feasible





Restore operation can be repeated using same PITR.

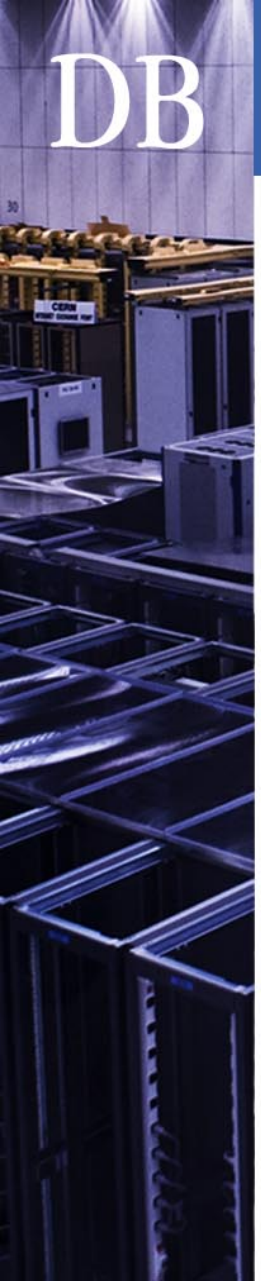
DBOnDemand schema



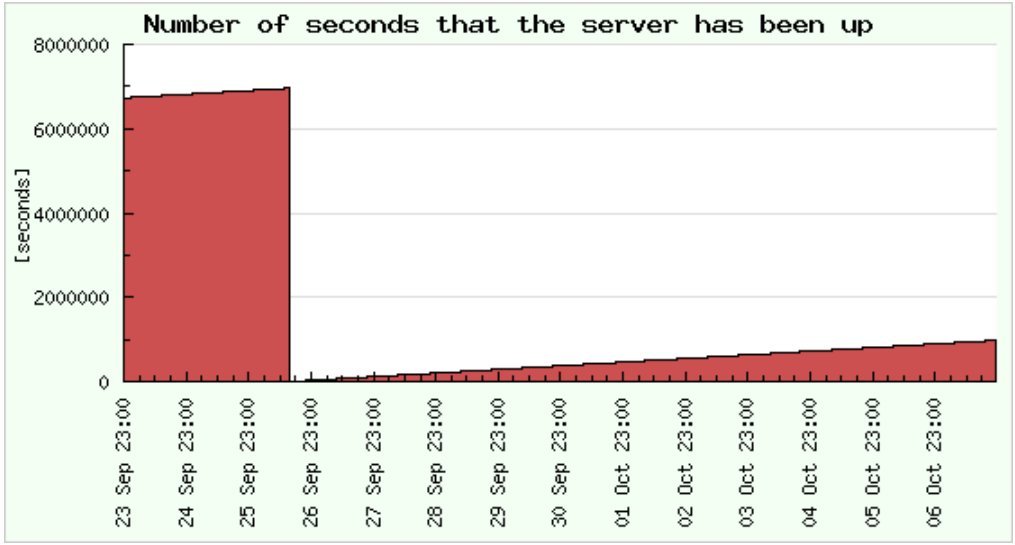
Authentication & Authorization based on requestor principal + e-group

Username: DBOD owner registered in FIM as an application resource. Transfer of ownership also achieved using FIM.

Monitoring of a DBOD instance



- Lemon
- SLS
- In house monitoring
  - Easy to adapt to different use cases
  - Weekly notifications to DBOD owners (coming)
  - Accessible via https://cern.ch/dbondemand



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Jobs execution

- Technical: Perl + IT-DB framework

  Main process:

  Timed loop querying <dod_jobs> every 5secs.
  FIFO type queue.

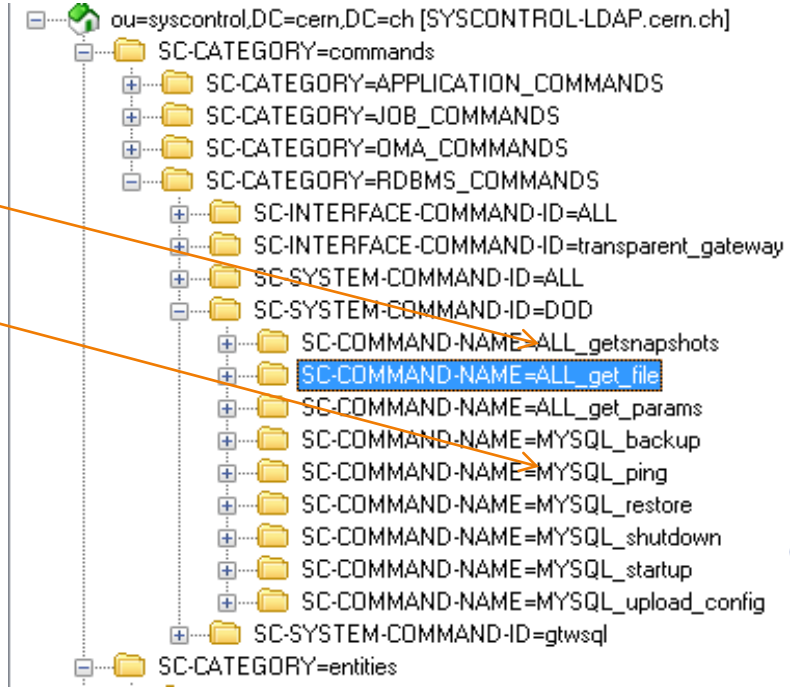
  Worker processes:

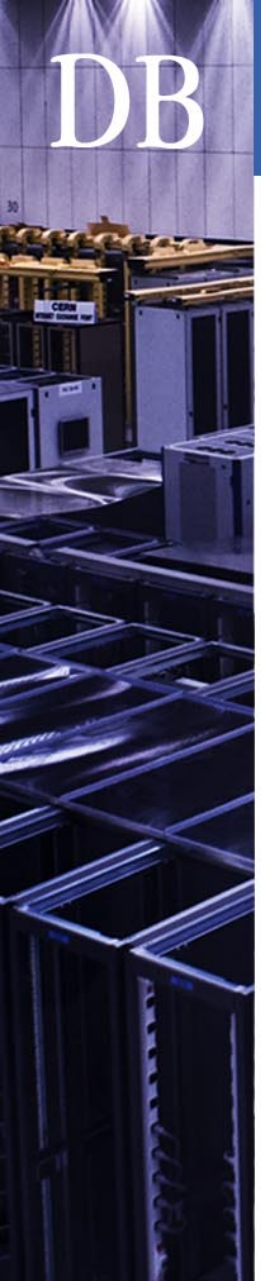
  Executes and logs a job

  Operations implemented:

ALL: all flavours
MYSQL: specific to

Basic core functionality of DBOD





Virtualization Platform

- Based on Oracle VM, a Xen-based hypervisor
  - Required for support on Oracle DBOD instances.
- Provisioning: Enterprise Manager 12cloud
  - Easy to integrate on our IT-DB actual infrastructure. Running experience.
  - So far, creation of vm is a manual process
- OpenStack…
  - … rackspace have recently announced a MySQL Cloud database API (REST interface)
  - We should aim to be compatible with this.
  - And also track storage (NetApp) integration with OpenStack

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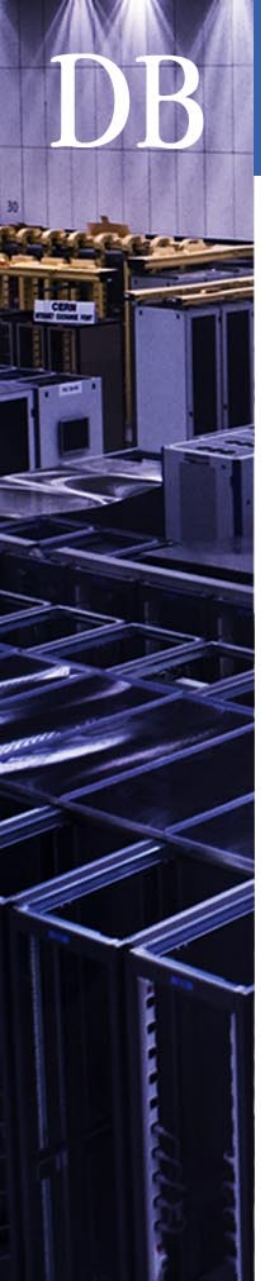

Next

- Business clients already testing the system and giving feedback – Thank You!
  - PH-LBC
  - IT-PES
- Possibly move to MySQL enterprise next year
  - Admin monitoring, sql analyzer, security plug-in, backup.
- More coming:
  - Other RDBMS databases: oracle
  - Tape backup
  - Upgrade functionality
  - …

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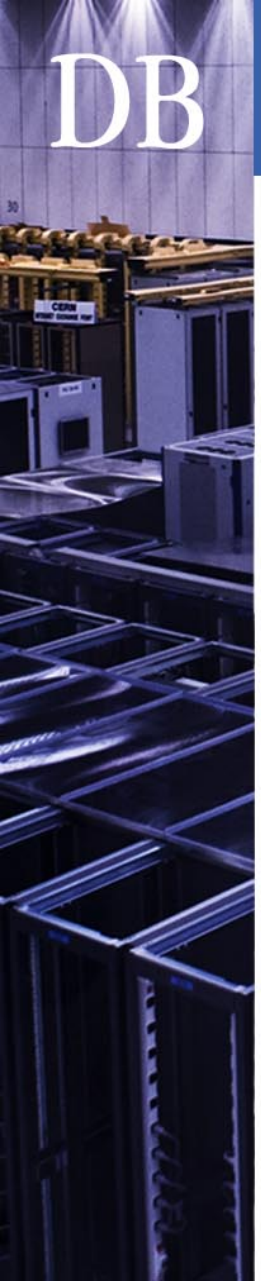

Thank You!

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