Databases for Physics - update

CERN openlab II
Monthly Technical Review
11th December 2007

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Monthly Technical Review

- Streams Optimizations

- New Streams 11g Features

- 32-bit Linux to 64-bit migration

- New HA setup for backups and monitoring

- Other

- Future plans

- Using rules
  - ATLAS: filter tables by prefix
  - rules on the capture side caused more overhead than on the propagation side
  - **complex rules converted to simple rules**

Complex Rule

condition => '(**SUBSTR(:ddl.get_object_name(),1,7)** IN ("COMP200", "OFLP200", "CMCP200", "TMCP200", "TBDP200", "STRM200")
OR **SUBSTR (:ddl.get_base_table_name(),1,7)** IN ("COMP200", "OFLP200", "CMCP200", "TMCP200", "TBDP200", "STRM200")) '
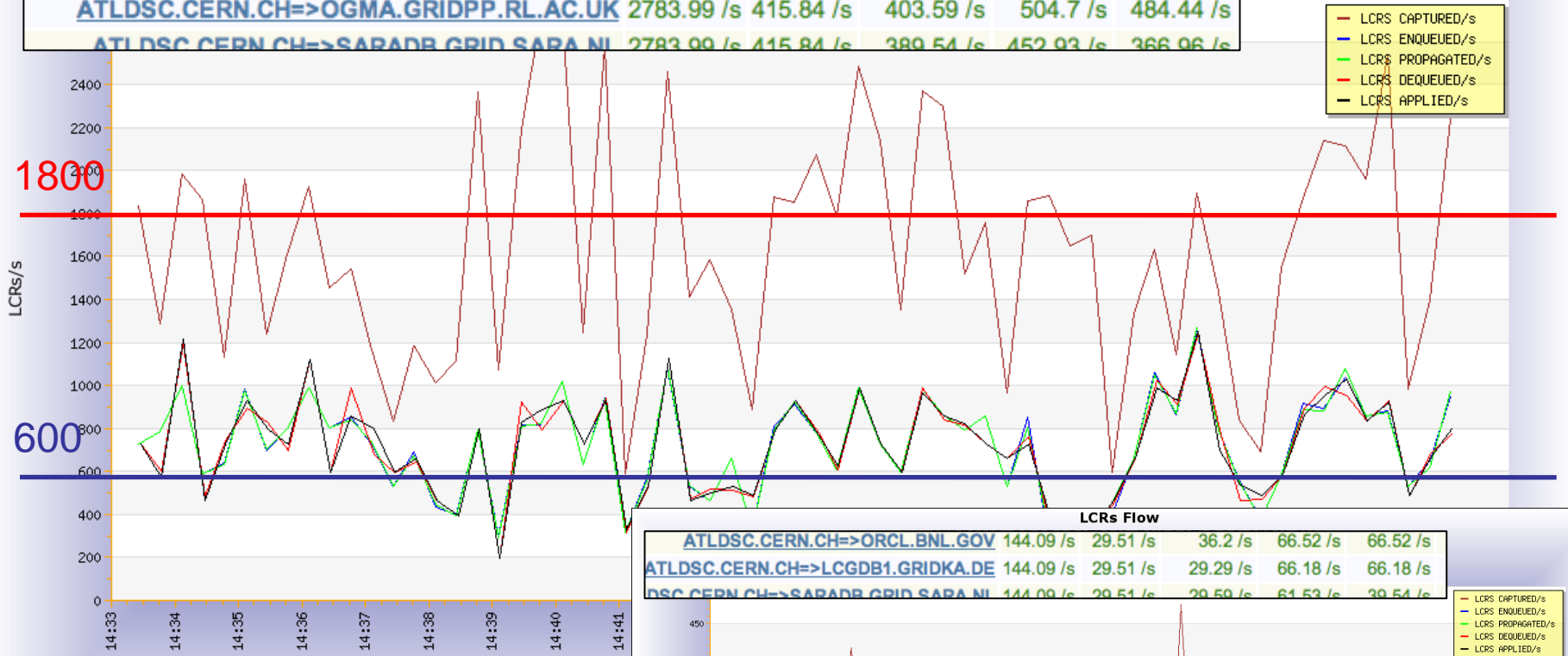

Avoid complex rules:
- LIKE
- Functions
- NOT

Simple Rule

condition => '(((:ddl.get_object_name() **>=** "STRM200_A" and :ddl.get_object_name() **<=** "STRM200_Z") OR
(:ddl.get_base_table_name() **>=** "STRM200_A" and :ddl.get_base_table_name() **<=** "STRM200_Z"))
OR ((:ddl.get_object_name() **>=** "OFLP200_A" and :ddl.get_object_name() **<=** "OFLP200_Z") OR
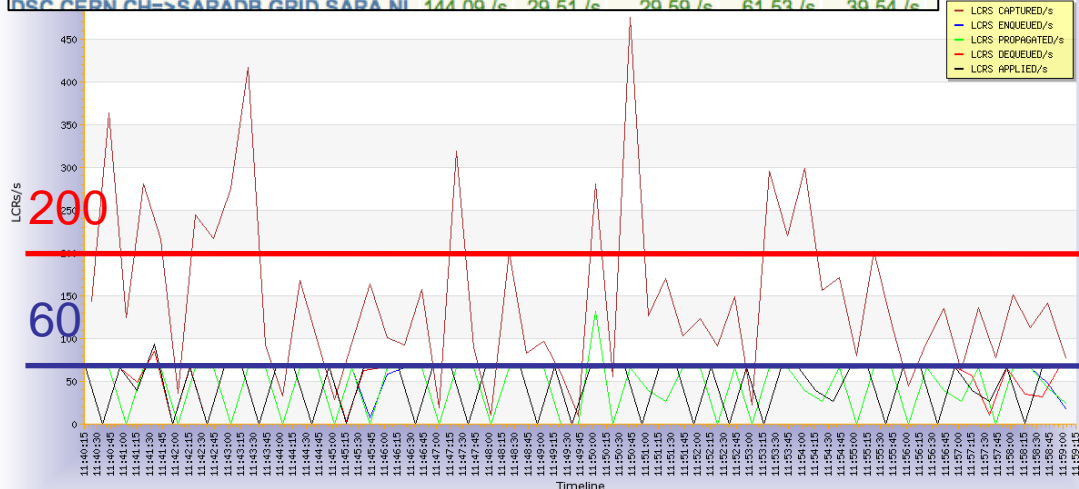(:ddl.get_base_table_name() **>=** "OFLP200_A" and :ddl.get_base_table_name() **<=** "OFLP200_Z"))

LCRs Flow

ATLDSC.CERN.CH=>LCGDB1.GRIDKA.DE	2783.99 /s	415.84 /s	413.94 /s	329.89 /s	320.84 /s
ATLDSC.CERN.CH=>ATLAS.DB1TIER1.NDGF.ORG	2783.99 /s	415.84 /s	406.71 /s	404.14 /s	388.76 /s
ATLDSC.CERN.CH=>OGMA.GRIDPP.RL.AC.UK	2783.99 /s	415.84 /s	403.59 /s	504.7 /s	484.44 /s
ATLDSC.CERN.CH=>SARADB.GRID.SARA.NL	2783.99 /s	415.84 /s	389.54 /s	452.93 /s	366.96 /s

Legend: LCRS CAPTURED/s, LCRS ENQUEUED/s, LCRS PROPAGATED/s, LCRS DEQUEUED/s, LCRS APPLIED/s

1800

600

Simple Rules

LCRs Flow

ATLDSC.CERN.CH=>ORCL.BNL.GOV	144.09 /s	29.51 /s	36.2 /s	66.52 /s	66.52 /s
ATLDSC.CERN.CH=>LCGDB1.GRIDKA.DE	144.09 /s	29.51 /s	29.29 /s	66.18 /s	66.18 /s
DSC.CERN.CH=>SARADB.GRID.SARA.NL	144.09 /s	29.51 /s	29.59 /s	61.53 /s	39.54 /s

Legend: LCRS CAPTURED/s, LCRS ENQUEUED/s, LCRS PROPAGATED/s, LCRS DEQUEUED/s, LCRS APPLIED/s

200

60

Complex Rules

CERN

- **Combined Capture and Apply**
  - capture sends LCRs directly to apply
  - source and target 11g databases
  - only 1 propagation job running
  - configuration detected automatically
  - big performance improvement
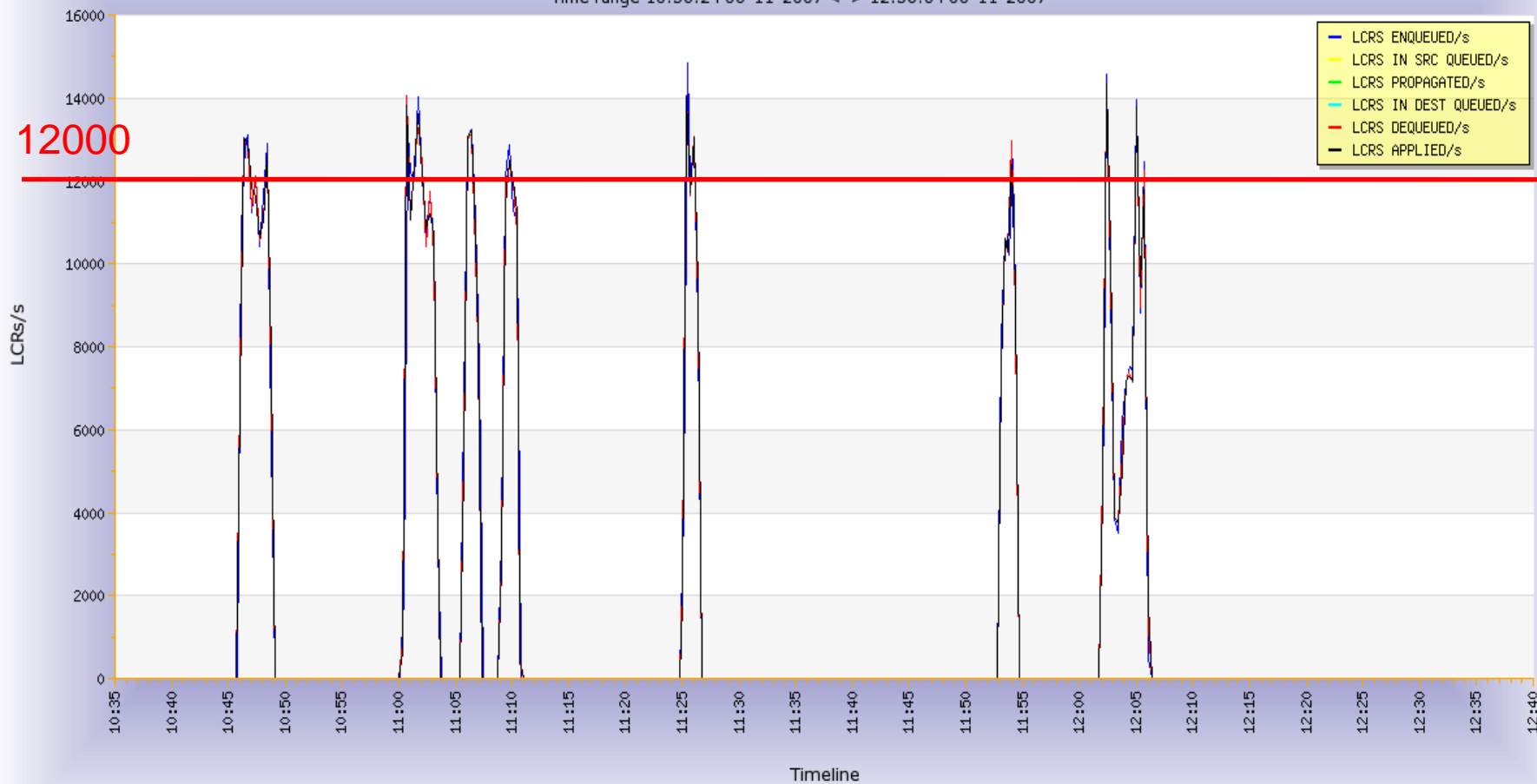   - rate: 14.000 LCRs/sec (before 5.000 LCRs/sec)

New Streams 11g features

- **Split/Merge of Streams**
  - maintains high performance for all replicas
  - automated, fast "catch-up" for unavailable replica

- **Cross-database LCR tracking**
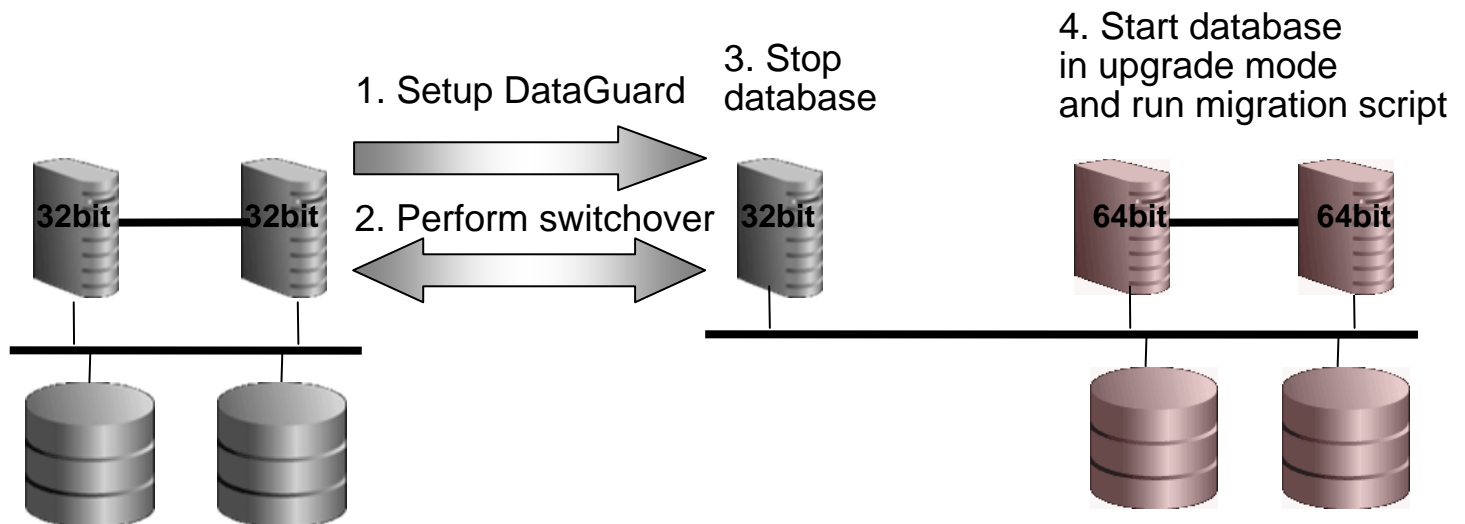 - trace Streams messages from start to finish in single view

- **Source and Target data compare & converge**
  - compare rows in an object at 2 databases
  - converge objects in case of differences

32-bit Linux to 64-bit migration

- New hardware acquisitions next year
    - 60 SAN diskservers (16 disks x 400GB)
    - 35 mid-range servers (2 x Intel quad core, 16 GB RAM)

- Moving from 32-bit Linux to 64-bit Linux
    - Migration using Oracle DataGuard
        - minimum downtime required (independent of database size)
        - easy to rollback if something goes wrong

32-bit Linux to 64-bit migration

- Setup DataGuard

- Perform switchover

- Stop intermediate database

- Perform upgrade (*utlirp.sql*)

1. Setup DataGuard

3. Stop database

4. Start database in upgrade mode and run migration script

2. Perform switchover

32bit   32bit   32bit

64bit   64bit

- **Migrated backup/monitoring machine to cluster configuration (active-pasive mode)**
  - file system mounted on demand on the node that is active
  - cron jobs schedule backup, monitoring and PKI access management on active node
  - machine behind VIP to provide HA in case the current node fails
  - LDAP setup as cluster service for TNS names resolution

- ## More PVSS tests
  - space waste investigation (result of direct path inserts)
- ## Following issues on production RACs
  - ORA-00600 when updating more than 2 CLOB columns in one go
  - ORA-07445 when using nested joins in a query
  - ORA-00942 table or view does not exist – investigating
- ## Presentations on WLCG Service Reliability Workshop
  - DB application design issues
  - DB Monitoring tools
  - Streams service review

- ## More 11g features tests
  - ### streams testing
  - ### ASM

- ## HA setup for downstream capture (failover)

- ## HA setup for streams monitoring

- ## Big migration of services to 64-bit Linux using DataGuard
  - ### 35 new mid-range servers (280 cores) – 175% of current CPU power dedicated to databases (160 cores)

Programme's Feedback

The feedback is circulated between the people involved.

Oracle EMEA

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Q & A