CMS Requirements 2005

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Overview

- This talk covers non-event data for CMS to manage production, testbeam, calibration and conditions databases for 2005.
- Only relational databases are covered.
- The motivation for the requirements is to give the LCG 3D project a baseline from which to work.
- In CMS we believe it is way too early for accurate estimates because the details of the databases are not worked out.
- Different areas use relational databases. Each one is at a different stage of development and understanding.

General Requirements

- Replicating entire server.
  - Can be of the same technology.
- Replicating tables between databases.
  - Support copying tables between databases with the same and different database technologies.
- Replicating part of a table between databases.
  - Support copying selected part of the table between databases with the same and different database technologies.
- Data types: string, int, double, long long (for time).
  - Clear definition of mapping of these C++ types on different database technologies.
- String type: the case and length of the string data must be preserved during replication and distribution.
- Separate development and production servers

Local File Catalog

- Distribution: None
- Tiers: 0, 1, 2, 3
- Source/Producer: each tier generates and maintains a database locally.
- Data Volume: 2 Gigabytes per site.
- # of Clients: not available
- Access modes: required is read/write/update.
- Ownership: of the data is a number of users per site.
- Write/update rate: not available

Local File Catalog [continued]

- Max. Latency: not available
- RAL Use: partial
- Oracle Implementation: yes
- MySQL Implementation: yes
- Source of information: Lassi Tuura, Tony Wildish

Data Replication (TMDB)

- Distribution: (a) None initially, then (b) peer-to-peer
- Tiers: (a) 0 OR (b) 0, 1, 2
- Source/Producer: (a) local OR (b) each tier (local)
- Data Volume: (a) Tier 0 = 5 G OR (b) Tier0 = 5G, Tier1 = 2G and Tier2 = 1G
- # of Clients: 150
- Access modes: required is read/write/update.
- Ownership: of the data is a number of users per site.
- Write/update rate: not available

Data Replication (TMDB)

- Max. Latency: not available
- RAL Use: no
- Oracle Implementation: yes
- MySQL Implementation: yes
- Source of information: Lassi Tuura

Metadata System (RefDB)

- Distribution: (a) None initially, then (b) fan out (second quarter of 2005)
- Tiers: (a) 0 OR (b) 0, 1, 2
- Source/Producer: T0
- Data Volume: (a) Tier 0 = 1 G OR (b) Tier0 = 1G, Tier1 = 0.5G and Tier2 = 0.5G
- # of Clients: not available
- Access modes: Tier0 – read/write/update (b) Tier1, Tier2 read-only
- Ownership: 3 users per site.
- Write/update rate: 5 Mb per day.

Metadata System (RefDB)[cont]

- Max. Latency: not available
- RAL Use: partial
- Oracle Implementation: yes
- MySQL Implementation: yes
- Source of information: Lassi Tuura, Werner Jank

CARF Metadata

- Distribution: n/a
- Tiers: 0, 1, 2
- Source/Producer: 0, 1, 2
- Data Volume: 0.5G per site
- # of Clients: not available
- Access modes: n/a
- Ownership: n/a
- Write/update rate: n/a

CARF Metadata [cont]

- Max. Latency: not available
- RAL Use: no (POOL yes)
- Oracle Implementation: no
- MySQL Implementation: no
- Source of information: Vincenzo Innocente

Offline Conditions DB

- Distribution: none (squid model)
- Tiers: 0
- Source/Producer: 0
- Data Volume: 50G
- # of Clients: not available
- Access modes: read/write/update
- Ownership: a number of users per site.
- Write/update rate: n/a

Offline Condition DB [cont]

- Max. Latency: not available
- RAL Use: no
- Oracle Implementation: yes
- MySQL Implementation: no
- Source of information: Lucia Silvestris, Werner Jank
- The implication here is that all offline conditions will read from Tier 0.

Online Databases

- Distribution: none
- Tiers: -1
- Source/Producer: -1
- Data Volume: 50G
- # of Clients: not available
- Access modes: read/write/update
- Ownership: a number of users per site.
- Write/update rate: n/a

Online Databases [cont]

- Max. Latency: not available
- RAL Use: no
- Oracle Implementation: yes
- MySQL Implementation: no
- Source of information: Frank Glege
- Primarily this request is for development and early efforts.
- January: (end) there is a workshop (Frank Glege, Lee Lueking) to help sub-detector groups (re)define databases.
- March: all sub-detector groups should have prototype schemas.
- June: we should have software (of some kind) in place.

Prototype in CMS

- The COBRA CARF/Conditions interface was designed initially to use the LCG Conditions DB implementation.
- It was abstracted up one layer so other implementations could be made available.
- The LCG implementation was brought up-to-date.
- An implementation was made using the Relational Abstraction Layer of Pool.
- An implementation from Frontier is in the works.
- I'm mentioning this because the RAL implementation has features which take care of some of the database distribution.
- See http://agenda.cern.ch/fullAgenda.php?ida=a045415 talks by Michael Case and Zhen Xie.

Summary

- Total: T0 = 109 GB, T1 = 5 GB, T2 = 4 GB
  - All can be doubled ☺ and not impact the definition of a database server…
- This is a first realistic effort for 2005.
- It was not easy to get people to commit to numbers.
- People just don't know yet what the distribution needs will be.

Thoughts…

The answer to...

```
#include <stdio.h>
#define SIX 1 + 5
#define NINE 8 + 1
int main(void) {
printf( "What you get if you multiply six by nine: %d\n", SIX * NINE );
return 0; }
```

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