# Integrating Pool in COBRA

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# From Objy to Pool: a short history

- **CMS decided to abandon Objy in Autumn 2001**
  - Workshop on Root (link)
  - Workshop on Persistency (link)
- **Oracle 9i**
  - Unsatisfactory C++ binding
- **Root Trees (chep`03)**
  - Exploiting the full power of all root paraphernalia
  - Not satisfying CMS use cases
- **ODBMS inspired (chep `03)**
  - Use Root Keyed-object and TRef
  - Essentially a prototype of POOL

**Decision to go ODBMS way and then to POOL following internal review in September 2002 (link)**

# CMS & Pool

- **CMS has established a fruitful collaboration with the Pool team since the very beginning of the project**
  - Direct participation to the project itself: **2.6 FTE**
  - Efficient communication
    - Savannah Portal
    - Direct mail (and phone) exchange among developers
    - In person meetings when required
  - Continuous and prompt feedback
    - CMS typically feedbacks on any new pre-release in few hours
    - POOL responds to bug reports in 24/48 hours
      - Only few bugs took more than a week to be fixed in a new pre-release

# Few old milestones

- **Dec 2002: dictionary built for typical CMS data classes parsing original header file with gcc-xml**
  - dictionary moved to SEAL, no further direct involvement of CMS
- **March 2003: first tests of FileCatalog**
  - Feedback on performances, API and command-line tools
- **April 2003: POOL_0_5_0 released**
  - First version able to support realistic use-cases
- **May 2003: first full scale integration completed**
  - 99% of persistent classes in lcg-dict
  - Missing features identified
    - All about items already supported by “Vanilla” Root
- **14 June 2003: POOL_1_1_0-theta released**
  - satisfied most of the cms requirements
  - Start of full-scale realistic tests

# Use of Pool in CMS: Current Status

- **COBRA 7.4.x  OSCAR 2.4.y ORCA 7.5.w**
  - Based on POOL 1.3.z  (now 1.3.3)
  - First public release on September 20
  - Under test in production
- **Usable for initial production**
  - 1-2 Million events produced with OSCAR (G4 simulation) each week
- **Essentially same functionality as Objectivity-based code but**
  - No concurrent update of databases
    - No direct connection to central database while running
  - Remote access limited to RFIO or dCache
  - No Schema evolution
- **Still few bugs, missing-features, performance problems**
  - Affect more complex use-cases
  - Make difficult  the deployment to a large developer/user community

# What CMS use of POOL?

**All objects (event and metadata) are stores as root keyed-objects (no root-tree)**

**Only object navigation is used, no other access mechanisms**

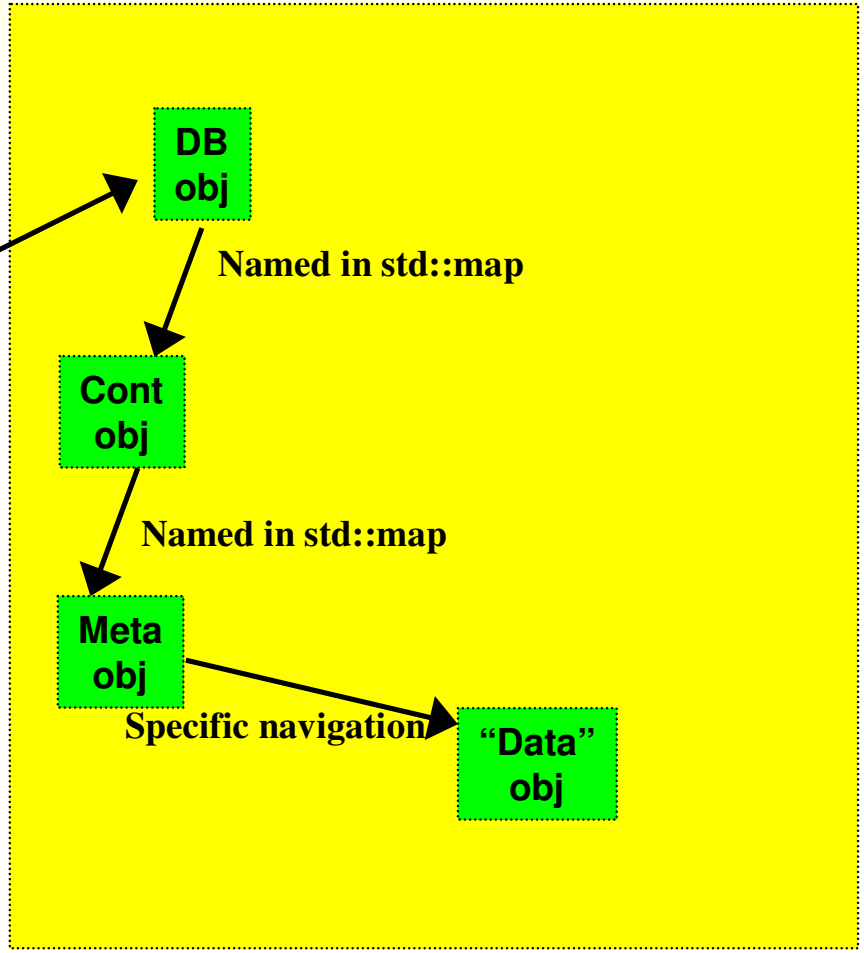
- **File Catalog**
  - Full interface
  - XML implementation in Physics Applications
  - MySQL & RLS under test for production use cases
- **Ref**
  - Full interface
- **Session**
  - Only Transaction Management
- **Few other classes and methods**
  - Mainly workaround to bug/missing-features
  - In test programs

# CMS persistency paraphernalia

- **Thread-safe proxy-wrappers to pool-interfaces**
- **Scoped (exception-safe) nested-transaction**
- **Context/Thread-specific Data Services**
- **Creation and management of DataBases and Containers**
  - Including catalog, PFN, LFN and metadata
- **Object (RefBase) -based placement hint**
- **Generic “named” navigation**
  - Mono and bi-directional map<string,Ref>
- **Specialized (base) classes**
  - Smart-Proxies
  - Collections
  - …

# CMS top level access

```
<File ID="0C701391-3FE4-D711-801A-00D0B7B86D05">
<physical>
<pfn file_status="Fully-Registered" filetype="ROOT_All"
job_status="1"
name="rfio:shift20:/shift/shift20/data11/zh/cmsprod/OSCAR_2_4
_0/mu03_mu_pt5_100/CARF_System.META.sw_Hit2402_g133"/>
</physical>
<logical>
<lfn name="CARF_System.META.sw_Hit2402_g133"/>
</logical>
<metadata att_name="DBoid" att_value="[DB=0C701391-3FE4-
D711-801A-00D0B7B86D05]
[CNT=.master][CLID=7D721C8E-530D-608F-BFD9-
70E61D0F1EB5][TECH=00000201][OID=00000003-00000000]"/>
<metadata att_name="DataType" att_value="META"/>
<metadata att_name="FileCategory" att_value="System"/>
<metadata att_name="dataset" att_value=""/>
<metadata att_name="jobid" att_value=""/>
<metadata att_name="owner" att_value="Hit2402_g133"/>
<metadata att_name="runid" att_value=""/>
</File>
```




A real catalog (test data)

# CMS Data Model (same since `97)

- EventStructure498 (web)
- CARF1298 (web)
- Conditions (web)

# Future

- **Freeze schema now for next 18 months**
  - SEAL/POOL will not support schema evolution in near future
- **Follow a minimalist approach to avoid further confrontations with bugs, missing features, performance problems**
  - Use only what is really needed and produces major benefits to CMS use-cases
  - Avoid migration to LCG/AA software in areas were CMS has already deployed solutions
- **Focus on CMS near-term use-cases**
  - Develop/integrate only components with a wide use potential
  - Do not get involved in projects of unclear benefit to CMS

# Concluding Remarks

**CMS has ported to Pool all applications that were previously based on Objectivity for all previously supported use cases.**

**Still a long way ahead of us**

- Some critical use cases not yet supported
- LAN and WAN data access/replication not fully tested
- Tuning of performances will require more work

**Pool itself should not be considered anymore on the critical path toward CMS Data Challenge in 2004**