Company:  European Organization for Nuclear Research

Industry: Fundamental Research

Oracle Technology and Services:

- Oracle JDeveloper / Oracle ADF
  - ADF Faces
  - ADF Business Components
- Oracle Application Server 10.1.3
- Oracle RDBMS 10g R2

Additional Software

- CVS

Executive Summary: CERN, the European Organization for Nuclear Research, is the world's largest particle physics research centre. Founded in 1954, astride the Franco–Swiss border near Geneva, CERN currently has 20 Member States, as well as many non-European observers, such as the United States, Russia and Japan.

CERN is a research laboratory, whose business is fundamental physics - finding out what the Universe is made of and how it works. Some 6500 visiting scientists, representing 500 universities and over 85 nationalities, unite at CERN to study the building blocks of matter and the forces that hold them together.

The world's largest and most complex scientific instruments – particle accelerators and detectors, are used to study the laws of nature. Accelerators boost beams of particles to high energies before they are made to collide with each other or with stationary targets, while detectors observe and record the results of these collisions.

Numerous scientists have received prestigious awards, such as Nobel prizes, for the important discoveries made at CERN. CERN's contributions are not only in the area of particle physics, but other technologies as well – for example the development of the World Wide Web.

Key Challenges:

- Re-engineer applications used to configure the control system of the world's largest accelerator complex.

- The existing Oracle Forms applications, which has 20+ years history of continuous development of layer upon layer, were poorly documented and overly complex.
- The developers had no prior knowledge of Oracle ADF and J2EE and had to learn the framework
- The applications had to be delivered to production within a relatively short lead-time without disrupting the ongoing operations.
- The new applications had to be client platform-independent, user friendly and provide much higher level of security and traceability than their predecessors.

Solution: A suite of web-deployed applications called Controls Configuration Editor based on ADF Faces and Business Components architecture, using J2EE JAAS for user authentication and authorisation and reusing the existing database schema for data tier.

The Business Issue:
The CERN accelerator complex is operated remotely from a central control room by means of high-level graphical user interfaces. These software applications are directly driven by data stored in databases. The data tier has been based on an Oracle RDBMS since version 5 in 1986 and now comprises 200+ tables with complex relationships. The legacy Oracle Forms solution was based on the notion that data entry is carried out by a specialised unit manned by the Forms developers themselves as opposed to the controls equipment specialists. The result was very limited usability of applications for engineers without Oracle expertise and in-depth knowledge of the database schema. It would have been a major effort to utilize more than 200 legacy Forms to deal with maintenance. All those issues triggered the elaboration of the following strategy for the development of the replacement applications:

- Application technology well integrated with Oracle RDBMS.
- Use of technology stack:
    - Based on recognised industry standards (no in-house framework development).
    - Delivering web deployed applications running on CERN supported web browsers (MS IE, Mozilla Firefox)
- Suppression of central data entry service – the data entry and modification responsibility handed over to the equipment experts. They become the owners of the data.
- User-friendliness and completeness of tools.
- Short development cycle, frequent iterations.
- Data security, full audit of DML.

The Oracle Solution: Oracle JDeveloper / Oracle ADF, Oracle Application Server, Oracle RDBMS:
We needed a technology that seamlessly integrates with the database tier and could support an initial 100 plus users, which for CERN has been for more than 20 years the Oracle RDBMS. It is for this reason, coupled with the speed of development that we decided to use ADF Business Components. In addition, ADF is built on top of widely accepted industry standards and integrates very well with other existing J2EE

technologies. Our experience shows that deploying the ADF applications to Oracle Application Server is a stable and scalable solution.

Project Scale:

- One system architect being also a part-time developer
- One full-time developer
- Currently more than 80 screens
- 2 application servers
- 100+ database tables
- 5 application modules
- 50+ entity objects

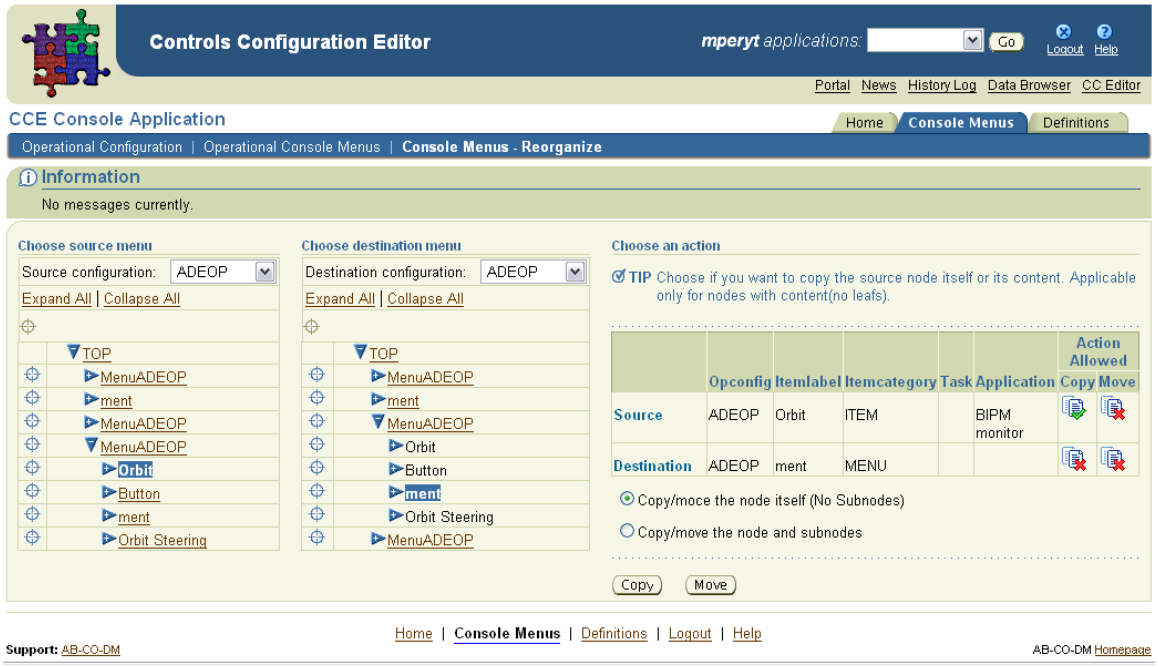
Oracle Value:

- New developers can become productive relatively quickly.
- Thanks to seamless JDeveloper and ADF Faces combination the development life cycle was very short.
- ADF is well suited for team development.
- The development environment is considered more exciting than Forms Designer by the developers – increased motivation.
- J2EE/ADF considered a better long-term investment than Forms.

Business Value:

- Increased user satisfaction through more user-friendly interfaces.
- The UI screens are designed together with the end-users through short iterations – the user involvement increased.
- Easier to find qualified developers.
- Increased platform-independence.
- Decreased development effort.

Application View:



Credits:

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