



PROJECT RESULTS

Generic platform for e-maintenance

Bringing cost- and time-savings to industry

The main operational objective of PROTEUS was to improve the efficiency of industrial maintenance by bringing expertise directly to the user site via the Internet. Its main scientific objective was to promote a de-facto form of standardisation through extensive use of new data structuring (XML), application integration techniques and Internet-related technologies. Its economic goals were both to reduce the maintenance process costs (time-to-diagnosis and duration of intervention) and to prevent failures by early monitoring of field equipment (conditions-based predictive maintenance).

According to OMI Observatoire de la maintenance industrielle, BIPE/AFIM, total manpower and materials costs in the maintenance domain amount to about €22.7 million/year, representing:

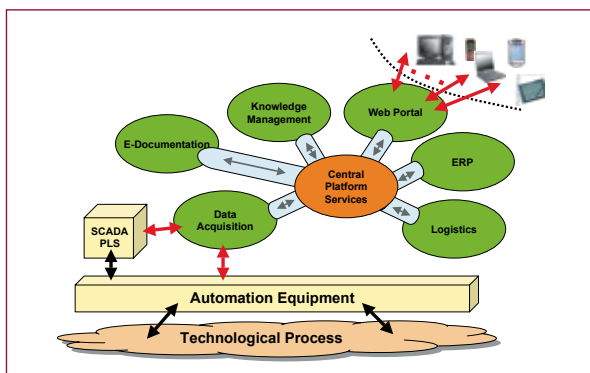
- around 50% of general industrial services expenses;
- 12% of the average added value (up to 35% in some industrial areas);
- 300.000 people (7% of the total industrial workforce).

Today's market for maintenance-oriented tools is largely filled by isolated sub-systems or packages that are domain-specific. The consortium of the PROTEUS project therefore set out to improve this situation by developing a generic tool based on integration and standardisation, thus bringing substantial benefits in terms of cost and efficiency. Its systemic approach, built upon broad maintenance expertise and taking account of most representative business interests, fulfils a wide spectrum of technical and economic requirements.

The resultant system provides easy and controlled access to maintenance information, while retaining an appropriate level of data confidentiality. It enables maintenance actors to function efficiently by working in a co-operative way, removes obstacles to outsourcing and enables maintenance service providers to propose added-value services bringing a higher return on experience and investment. Finally, the outcomes of the initiative enable manufacturers to take better account of maintenance aspects at the equipment design phase. Its expected impact on the maintenance market is to increase outsourcing activity by an estimated €1 million over a five-year period.

Three-tier integration

PROTEUS focuses on maintenance application integration (MAI). The underlying idea is to provide a fully integrated platform for maintenance services, using existing maintenance applications (tools) rather than providing dedicated tools. Integration is based on co-operative and orchestrated execution of distributed



PROTEUS (ITEA 01011)

Partners

- AKN
- ARC Informatique
- BIKIT
- Cegelec France
- Cegelec Germany
- Institut für Automation und Kommunikation (ifak)
- Institut Materialfluss und Logistik (IML)
- Laboratoire d'Automatique de Besançon (LAB)
- Laboratoire d'Informatique de l'Université de Franche-Comté (LIFC)
- Laboratoire d'Informatique de l'Université de Paris 6 (LIP6)
- Laboratoire Lorrain de Recherche en Informatique et ses Applications (LORIA)
- Pertinence
- Schneider Electric
- Technical University of Munich (TUM)
- TIL Technologies
- Vartec

Countries involved

- Belgium
- France
- Germany

Start of the project

October 2002

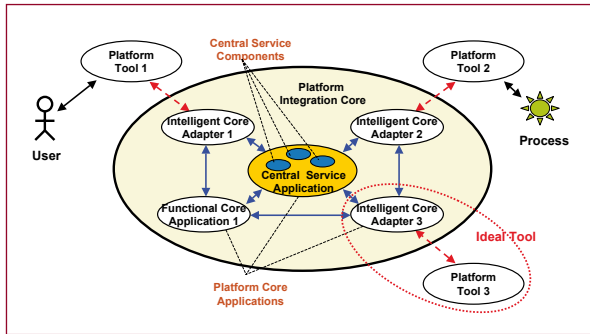
End of the project

February 2005



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processes, running on heterogeneous hardware/software platforms and communicating via web services.



Software applications completely or partially implement three functional tiers in the PROTEUS platform:

- The **data tier** is represented by data models hosted by existing applications;
- The **business logic tier** is partially represented by the business logic already existing in legacy applications. Business logic, which spans multiple applications, is implemented in business logic objects (BLOs) residing either in intelligent core adapters (ICA) or in functional core applications (FCA). ICAs and FCAs are specified within PROTEUS;
- The **presentation tier** is partially represented by user interfaces of the legacy tools. PROTEUS specifies a supplementary web portal as the interface for workflows for multiple legacy applications or selected functionality thereof.

Major project outcomes

Dissemination

- 23 publications
- 8 presentations at conferences

Exploitation

- 3 platforms for internal use (Cegelec S.A., AKN, Cegelec AT)
- 1 specific tool (transparent Ready) developed by Schneider

Standardisation

- Related to XML ISO TC37/SC 30

Distributed design and execution

Several central service applications have been specified within the platform integration core:

- **Central object relation database (CORD)** – providing linkage between all PROTEUS applications and the equipment to be maintained;
- **Central access rights and authorisation server (CAAS)** – an application performing all login operations and controlling access operation within the PROTEUS platform.
- **Central event distribution server (CEDs)** – defined as a central point for collection and distribution of events.

At the heart of ICAs and FCAs is a collection of BLOs used to control workflow and to transform data into or from a common exchange format used for communication within the platform. This opens the way to real distributed design and execution of maintenance tasks, while improving or even replacing centralised maintenance management through distributed components.

Awakening interest

A demonstrator has been installed in Cegelec-Belfort, France, to help maintenance actions on its BAPS system for the fully automated production of alternator blades. The company will also extend this platform to cover third-party equipment, while another partner, KN, will continue to update its own platform.

Companies involved in ship maintenance and the production of escalators, water treatment plant and machine tools are already showing interest in the projects' results.

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Σ! 2023