

LEONARDO PROJECT

With Technology Reply's help, the General Command of the Italian Carabinieri Force launched a process to upgrade, potentiate and enhance the information systems used by Carabinieri Department Cultural Heritage Supervision (Leonardo system), to support processes of investigation and planning of interventions and safeguarding works of art. The result is the creation of a new computer system called "Leonardo", which introduces new emerging technologies to allow real-time interaction with the database through cutting-edge equipment and performing of searches relying on all of the information gathered over more than twenty years of activity.

SCENARIO

The project to enhance the Leonardo IT System is part of the initiatives provided for by the National Operation Programme realized by Interior Minister, and cofunded by European Union.

The CCTPC, Carabinieri Department Cultural Heritage Supervision, increasingly bases its commitment to identify and recover stolen works of art on new technologies capable of monitoring and keeping the national and international situation up-to-date, engaging in effective measures of prevention, protection and crime-fighting.

SOLUTION

To meet the complex needs of the Carabinieri Department Cultural Heritage Supervision, Technology Reply proposed a solution with a logical and software architecture based on the following distinctive elements:

- **Three-Layered Architecture:**

the system is completely accessible via the Web through the user of a common Internet browser. The system consists of the three layers: web – application – database, based on Oracle 10g technology, with a database based on Real Application Cluster technology, capable of guaranteeing enterprise class levels of service and performance.

- **Java 2 Enterprise Edition (J2EE):**

for creating an environment independent from the specific technological platform and, therefore portable, capable of adapting itself to the evolution of platforms by abstracting it from the specific operating system and hardware infrastructure, guaranteeing flexibility in integration with any type of software product and/or application.

- **“Service Oriented Architecture” (SOA):**

it guarantees a high level of standardization, expandability, solution modularity, and independence of the levels that comprise the architecture. The key characteristic of this architectural paradigm is the modeling of application functions in terms of web services, which can be used through a standard interface and oriented to use via Web/Intranet, since they are based on the SOAP protocol (http and XML). Web services are the key element for an ample guarantee of inter-operability of the system with other entities.

- **“Enterprise Application Integration” (EAI):**

the new systems from the Application Platform Suite (such as Oracle 10g Application Server) guarantee ease of integration between heterogeneous products; EAI facilitates the task of obtaining a system with adequate recovery of efficiency and consistency on very complex, geographically distributed databases.

- **“Enterprise Search Platform” (ESP):**

one of the main roles of the Leonardo System is the search component; the clustering proposal includes the use of an enterprise-class platform (Oracle Intermedia and Autonomy) to fully meet performance, innovation (semantic search, visual search) and usability.

The new software platform on which the Leonardo Project is based includes a multi-lingual interface and offers advanced functions such as document management, geographical search and analysis, and integration with a market-leading product for investigative analysis. The use of a service-oriented architecture (SOA) guarantees a high level of integration and inter-operability with systems of other entities.

The new computer system allows Carabinieri staff operating in the field to interact with the database in real time through a wireless application and cutting-edge equipment, such as palm PCs and laptop computers.

This permits users, for example during control operations, to have at their direct disposal on the spot all information useful for their activity, requesting when necessary verification from the system of the lawful origin of the work of art (for example a painting or a sculpture) based on a photo taken on location with a digital camera. Furthermore, from the place of intervention, users from the Carabinieri Department Cultural Heritage Supervision can compile an electronic supporting report and send it to the central system for further control and investigative analysis.

At the central level, all information sent from the place of intervention by Carabinieri, or originating from indications of other police forces, is under the control of the Data Processing Section of the Carabinieri Department Cultural Heritage Supervision.

A highly specialized staff, using complex classification software (based on an iconographic database) looks after entry of all of the artistic asset's special characteristics, such as, for example, its type (painting, sculpture, ancient book, etc.), the subject depicted, the authors, materials and techniques of execution. This information is further enriched through the consultation of outside databases, integrated into the system.

The new system's strength is its evolved search capacity, capable not only of controlling and finding lexical items used to describe the work of art, but also of comparing "images" or portions of images based on their graphical characteristics, as well as using "concepts" contained in the context to be found as terms of the search.

In addition, through a geographical database and specific search functions (based on Oracle Spatial and Oracle Map Viewer), users can understand the development of a phenomenon directly from the field and engage in the necessary preventative or repressive actions.

REPLY VALUE

In addition to potentiating the technological and software infrastructure, Technology Reply reorganized the entire database of the Carabinieri Department Cultural Heritage Supervision by introducing new, highly-evolved functions that make investigative activities more effective and rapid for planning interventions to protect Italian and international cultural heritage.



Technology Reply is the Reply Group company specialized in ORACLE technology. In addition to being an Oracle Advantage Partner, it has been for years an Oracle DB beta site, partner and skills center for Oracle Collaboration Suite.



Technology Reply's mission is to support clients in their technological innovation processes by planning, realizing and administering data diffusion and knowledge systems based on Oracle Internet Platform Track.

Technology Reply draws on its deep experience and skills to provide clients with a team of professionals capable of intervening in all phases of system planning: from the initial assessment, to the analysis of requirements, to the definition of architectural choices, to the drafting of functional and technological requirements, to development, deployment and evolution of the created systems.

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