COBOL - Telos Corporation - DURS - DTIC

Telos Corporation
Defense User Registration System (DURS)
Defense Technical Information Center (DTIC)

UNISYS 2200 COBOL to J2SE Java

History: The Defense User Registration System (DURS) of the Defense Technical Information Center (DTIC) consisted of a UNISYS 2200 COBOL application running within the DPS form-based presentation system (DPS 1100). DURS accessed the RDMS using MASM calls with dynamically assembled SQL for database calls. DURS required conversion into a Java/J2SE multi-tiered application to support DTIC modernization requirements. DURS is a unique application with no commercial-off the-shelf (COTS) equivalent. Modernization required a manual re-write or an automated transformation. Platform obsolescence and escalating operating costs were major financial drivers for the DURS modernization.
Defense Technical Information Center (DTIC) engaged Telos Corporation to manually convert DURS from COBOL into Java. Telos was successful in converting approximately 30% of the DURS system into Java, however, this limited success required 12 months and over $11.00 per line of code (loc). With over 70% of the DURS system still needing conversion, continuing the manual solution was not feasible. Telos Corporation was aware of TSRI's technology and suggested contracting with TSRI to complete the project. A fixed-price contract was awarded to TSRI to automatically modernize the DURS 2200 COBOL, MASM and SQL into J2SE Java running in an iPlanet web server. The contract also included custom development of an application life cycle management Java/J2SE session support layer required for the multi-tiered web-based target architecture.

Challenge: To achieve compliance with DTIC requirements, the DURS Application required a web-enabled user interface developed using Java and J2SE technology interfacing with re-factored Java components. Telos converted the RDMS database into Oracl8i. TSRI was assigned several tasks. TSRI converted the remaining DURS UNISYS 2200 COBOL, SQL and MASM calls into J2SE Java and JDBC. TSRI developed a new DURS architecture to support the Netscape web server for life cycle management of the business logic tier and interface with the JDBC/Oracl8i database and JSP web-presentation tiers. Finally, TSRI modified the database interface layer to interface with Telos' newly modified Oracl8i dataformats.
Transformation of the UNISYS 2200 COBOL, SQL and MASM into J2SE Java and JDBC compatible SQL was accomplished with 100% automation. Automated re-architecting and web-enablement of DURS was used to meet the DTIC target architecture and platform requirements. The original DURS UNISY 2200 COBOL programs had executed their business logic and formulated data for presentation to dumb terminals. TSRI created the multi-tiered Java/J2SE application by transforming the existing MASM call layer into calls to a JDBC database tier and the existing DPS 1100 screen handling calls into calls to a JSP user interface tier. The transformation into Java automatically introduced method calls from the Java business logic layer, which lived within a session layer providing life-cycle support for the session to the underlying JDBC database tier.
A Java API generated from the DSP calls provided screen displays and management of the GUI layer, which generated Java Server Pages (JSP) on the fly for the Netscape browser and accepted user inputs from the web browser. The Java business logic in the TSRI developed session layer accessed the Oracl8i database through a JDBC interface layer through Java method invocations derived from the MASM calls. The conversion of a UNISYS legacy application includes the conversion of Unisys 9-bit bytes into modern 8-bit ASCII equivalents. This is technically challenging because special care must be taken to maintain the integrity of UNISYS 2200 COBOL, which freely uses 9-bit Bytes in all forms of data manipulations. While intricate transformation processes were required to accurately achieve this integrity, TSRI still achieved 100% automated transformation of the UNISYS 2200 COBOL.

The resulting multi-tiered Java/J2SE consisted of a JSP presentation layer, JDBC database layer, custom Java session-bean layer (for maintaining the state of user sessions), and a business logic layer written in pure J2SE Java.
Additional challenges included on-the-fly transformation of dynamically generated UNISYS SQL into JDBC compatible SQL, modification of the data interface to accommodate changes to data formats used in the Oracl8i DB, and automated generation of a high-quality browser user-interface written in JSP and HTML managed by the custom-built session server.

Result: The modernized DURS is a multi-tiered, high-performance, multi-threaded, multi-user web-based application that meets strict DOD modernization guidelines for compliance with the J2SE standard. DURS is a fully functional Java/J2SE system with a custom J2SE Java session layer running on the Sun Solaris operating system with Java Server Page (JSP) screen services provided by the iPlanet™ web server. The project was completed in 9 months at an approximate cost of $1.10 per loc. The cost savings for DTIC are estimated at over $440,000.