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Migrating legacy systems: rising to the challenge

Migrating to Microsoft .NET has become much easier with new tools available, says Luís Andrade

Financial institutions have some of the longest established IT systems in the world. Many of them are built using legacy technologies such as mainframe COBOL or Oracle Forms and a number of companies are looking for safe strategies for migrating these types of systems to modern technologies such as Microsoft .NET or cloud computing. Reasons for this demand vary, but usually include the need for cost savings, a superior development environment or superior agility. Further reasons include the need for platform standardisation, improved usability or integration with other applications and tools.

One of the most significant challenges with legacy systems is that they are not agile enough to adapt to continually changing business demands. The economics of maintaining these systems are not feasible anymore and, as the last generation of these developers approach retirement, even finding skilled programmers is difficult.

Migration is no simple project though. The size of the semantic gap between source and target technologies, for example COBOL and .NET, is often prohibitive to resolving by hand, requiring significant effort and extensive testing. When looking at moving towards cloud computing, applications need to be reengineered to thin, layer-based architectures with an isolated data layer that encapsulates cloud-based databases.

Until recently, there has been no suitable migration solution from these legacy technologies to .NET or cloud computing. To be viable, a solution needs to minimise the time, cost and risk associated with such complex projects, while at the same time maintaining the original functionality so that the investment in the original development is not lost.

Migrating to .NET

The Microsoft .NET Framework includes a comprehensive set of development tools, servers, software applications and services. Productivity of .NET developers is significantly higher through the use of Visual Studio but, more importantly, .NET provides an agile platform in which it becomes possible to react quickly and efficiently to changing demands, at low cost and over a wide scale. .NET also offers easier deployment management, superior look and feel and usability of user interfaces, and the potential for integration with external systems, including Web Services.

When migrating to .NET, legacy code can be optionally reorganised, in order to enable a future service-oriented architecture. The database can be encapsulated by a data access layer, which makes it possible for further evolution towards cloud computing.

Over the last 20 years, ATX Technologies has developed an innovative and powerful set of computer-aided reengineering solutions for migration and modernisation. Thanks to a high rate of automation, the manual effort required is significantly reduced and risks are mitigated as much as possible. Two of the most popular solutions target the migration of Oracle Forms and COBOL applications to .NET.

Forms2Net is a worldwide proven solution for the automated migration of Oracle Forms applications to .NET technology. The complexity of each project depends on a number of factors such as the quantity and size of modules, and the number of lines of PL/SQL code. The Forms2Net Analyzer tool is freely available from the Forms2Net Web site and will assist with determining the project's complexity and effort required.

The Forms2Net Converter is a Visual Studio add-on that offers up to 100 per cent conversion of Oracle Forms modules (forms, menus and libraries) to .NET, leaving the database intact. Generated code is organised into a new structure according to the model- view controller (MVC) pattern, permitting different user interface technologies and offering the potential for significant code reuse. Users get a choice of target language (C# or VB.NET) and platform (Windows Forms, ASP.NET and Windows Presentation Foundation) – ASP.NET MVC2 and Silverlight targets are under development. The Reports2Net Converter is another Visual Studio add-on that converts Oracle Reports to SQL Server Reporting Services, again with a choice of language (C# or VB.NET). Because the database is left intact, users can decide what transformation they want. Many have opted to migrate their Oracle database to SQL Server, facilitated by the SQL Server Migration Assistant available from Microsoft.

Cobol2Net is another migration service that is based on ATX's core reengineering environment. It makes use of a number of tools to migrate existing COBOL applications to .NET, a significant proportion of this process being automated. Despite the many semantic differences between the source procedural COBOL and the target object-oriented .NET, which can often be the barrier to the migration, the majority of the migration is performed safely and completely automatically. The service can also take into account client-specific requirements (for example, changing data storage from flat files to SQL Server and specific code conventions) through customisation of tools.

Both solutions include safe transformations of code structures rather than just code lines. Because the migration is performed at the semantic level, the output code is tailored to the target platform, following suitable best practices. The transformations are also automatic, independently of the quantity or size of the source modules to migrate. The result is precision migration with less effort required, even in testing.

The converted code is pure .NET code using several application blocks from the Microsoft Enterprise Library, ready for any seasoned .NET developer to understand. Although the functionality of the new application is equivalent to the original one, its code structure has been reorganised to the MVC-based architectural pattern, permitting more code reuse, easier maintenance and greater scope for future developments. It also adopts a service-oriented architectural style, thus offering all the advantages and potential of agile, Internet-based computing. The migration process is always fully documented and, in the case of Forms2Net, developers are guided by code comments and documents automatically generated during conversion. These comments assist developers when it comes to code completion, where manual coding steps are required to complete the migration.

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