Reducing Costs and Improving Agility Through Legacy Migration

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Legacy Migration

Summary

Legacy applications are usually the most valuable software systems many large organisations possess. During the twenty, thirty or more years they have been used much effort has gone into making sure they deliver value, integrate with other applications and implement the methods and style of the organisation. The term 'legacy' does not usually refer to the functionality these applications deliver, but indicates aging software and hardware infrastructure that is expensive to maintain and inhibits change. Separating the inherent value of an application from its restrictive infrastructure is the main task associated with legacy migration.

Moving an application to a contemporary hardware and software infrastructure has many benefits associated with it:

- A migrated system is more amenable to change, enhancing the agility of the organisation.
- Software licensing costs are dramatically reduced.
- Hardware infrastructure costs are reduced.
- Integration with other systems becomes less costly and easier.
- Application runtime performance is enhanced - which can deliver large productivity gains.
- Access to more productive development tools.
- Access to a larger skills pool.

Having decided that a legacy application is too costly and inflexible, management have several options available to them - legacy migration being just one of them. All options have their associated benefits, costs and risks, but in many instances migration will be the lowest risk, and lowest cost option. The main options are:

- **Total rewrite** on a new hardware and software platform. This is probably the highest risk option in many cases. Not only is a large design and programming effort involved, which by its nature will introduce many teething problems, but the organisation is presented with a new set of unfamiliar technologies which have to be understood at the same time development is taking place - effectively doubling the uncertainty. Rewrites are not short projects; the organisation can expect a project of this nature to take at least three years and often longer. Meantime the existing systems have to be maintained and modified as the business changes. These changes have to be replicated in the new systems and developers often find themselves aiming at a moving target.
- **Buying a solution** can also be an option for some applications. In some ways this is riskier than the rewrite option. While the technical risks are lower the operational risks are higher. The organisation is presented with a wholly new way of working, and not until all the pieces are in place and the application is used will management

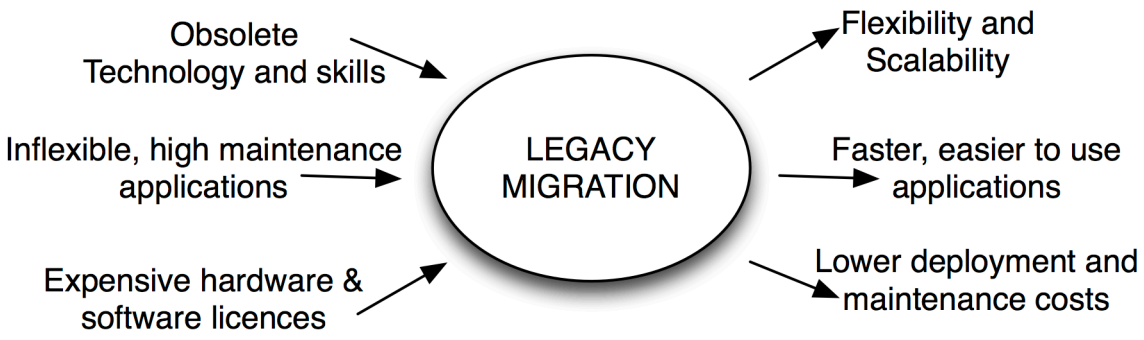
know whether the packaged solution provides a suitable option. Operational disruption is always experienced when wholly new applications are implemented and sometimes this can become chronic. There are many well documented examples of packed applications bringing an organization to its knees - and in rare cases causing it to fail.

- **Legacy migration** is much speedier than a rewrite (possibly by a factor of three or four) and the operational risks are low - simply because the functionality is already familiar. It will almost certainly be the lowest cost option and depending on the new software and hardware platform, may provide the lowest ongoing operational costs. If managers are unhappy with the functionality a legacy application provides then legacy migration is probably less appealing.

The technologies to achieve legacy migration have moved on considerably during the last decade. Much of the process is automated and sophisticated workflow systems help the migration team deliver the resulting application much more rapidly and with fewer teething troubles. We expect this development in migration technologies to continue as the need for legacy migration increases.It is our opinion that legacy migration is a low risk, speedy route to move applications from aging infrastructure that should be preferred to more radical solutions in many instances.

The Business Issues

While the trend is toward investment in IT systems which show the fastest payback the reality of the value derived from IT is somewhat different. The longer a system is used the more value it delivers to the organisation. The initial glitches are ironed out, users become more proficient at using the system, modifications are made to enhance productivity and functionality, and integration with other systems becomes more profound with associated productivity benefits. On the opposite side of the coin systems tend to become harder to maintain as they get older - simply because they become more complex. They also start to become isolated from more contemporary systems environments and it becomes harder to recruit the necessary skills. Sooner or later management is presented with a paradox - the systems that deliver most value to the organisation are the ones which are most expensive to maintain and the most difficult to change. Something has to give, and a decision is made to rewrite, replace or migrate the system to a contemporary infrastructure - since stasis is unacceptable.



Where the functionality of a system is considered to be inadequate migration may not be the obvious way forward. However these situations are quite rare since legacy applications usually represent the collective experience and wisdom of the organisation. Some organisations see difficulties with legacy applications as an opportunity to start again, but such simplistic

thinking inevitably leads to 'throwing the baby out with the bath water', and a whole new set of problems associated with unknown new ways of working and technologies. Once migration has been achieved the benefits to the business are substantial and numerous.

- The performance of a migrated application is the first major difference that users will experience and productivity will often increase as a result.
- The user interface is typically more user friendly and productive.
- The time taken to make modifications falls significantly and the delay between request and fulfilment decreases significantly.
- Integration with other applications becomes much easier and speedier using contemporary technologies such as Service Oriented Architectures (SOA).
- Migrated applications scale much more easily and systems can grow with the business.
- Contemporary enhancements are possible (search integration, social networking functionality etc) because of the new technology.
- Software and hardware costs are dramatically reduced.
- Risk of obsolescence and unknown future costs are eliminiated.

Legacy migration can be based on fixed price contracts with migration specialists, and this leads to a fairly easy calculation of return-on-investment (ROI).

Technology

Legacy migration would present many of the risks of a system rewrite if it was not for automation. The number of lines of code (LOC) in a legacy application can usually be measured in the millions and a manual rewrite of two million LOC for example might take four or five years - and be very expensive. Automation means that the same number of LOC using legacy migration technology can be converted in around a year, and because it involves fewer technicians is far cheaper. This automation also means that the deadly embrace between application size and escalating cost can be avoided - as the number of lines of code grows the cost of a rewrite grows exponentially.

The tools used to migrate a legacy application are absolutely crucial and the main components are:

- Analysis - to assess the nature of the system to be migrated.
- Conversion tools - to automate the code and data conversion.
- Testing tools - to minimise user testing overheads. These tools can also be used to stress test a system before real loading scenarios.
- Quality tools - to manage the conversion process.
- Maintenance - once a system has been migrated it becomes important that maintenance tools are available.

The more advanced migration specialists use sophisticated workflow management tools and methods. This leads to easy inspection of the status of a project for the customer and project partners - this is very important.

The most common migrations involve moves away from proprietary mainframe 4GL products like CA-IDMS, Pacbase, APS and Natural. Visual Basic 6 migrations are also becoming more common. Hardware migrations typically involve moves away from Bull, IBM, Unisys and Siemens mainframes.

Integration

Integration is worthy of special mention simply because well established systems often have many connections with other systems. The migration process should not only maintain integration with other applications, but it should also provide new capabilities for integration. This is established using contemporary integration technologies such as Service Oriented Architectures (SOA) and others which help modularise the functionality provided by an application.

Opening up the interfaces to a legacy application is one of the major benefits of migration, and with it comes dramatically reduced integration costs. There are many subtleties involved in creating an efficient integration strategy for migrated applications, and suppliers with extensive experience of the relevant issues will have a number of options available.

Migration Specialists

Legacy migration is offered by a variety of suppliers. The large players such as IBM, Oracle and Microsoft clearly have platform preferences, while the systems integrators may offer such services, but typically do not specialise in this field. We believe that specialist companies with proven track records will usually be the best option, and specifically companies that are platform agnostic. Such specialists will inevitably work with some of the large suppliers since they will provide the hardware and software infrastructure, but project lead should rest with the expert company. The inevitable result of platform agnosticism is greater leverage with vendors - and the savings are often substantial.

Conclusion

Legacy migration technologies and methods make the migration of even very large applications quite feasible and relatively painless when compared with other options. Migration will become a much more common approach as a generation of mainframe technologies and ageing programming languages create pressure to adopt contemporary technologies. This will cause the cost of migration to fall further and become even more attractive when compared with alternatives.

While we tend to think of migration as an exception, organisations should have a migration policy because there will always be a generation of applications that are migration candidates. To this end it will pay to become familiar with migration options and forge relationships with specialists in this area. And unlike so many IT projects legacy migration projects are well scoped (by definition) and tend to come in around budget and on time - when an experienced migration specialist is used.

Industry Perspective

Automated Application Modernization
By Ben Wilson, Migration Director, Anubex

That the actual lifespan of software applications often exceeds their life expectancy as originally envisioned by the applications' developers, is one of the many lessons learned from the challenge of the Y2K problem. Today, thousands of companies face a similar challenge as their core business applications (which may have accumulated several million lines of code worth of functionality over the years) run on obsolete hardware and software development platforms.

Legacy applications are bespoke applications that fit the organizations that use them in ways that packaged solutions never can. As these applications provide value to the organizations that run them, they take on a timeless quality – and they can easily outlive the usefulness of the technologies with which they were built.

Over time, organizations tailor their working practices and their information systems to gain competitive advantage. The resulting systems can become huge in size as functionality is added over a period of 20 years or more. It is in the first place their hugeness that presents a practical barrier to redeveloping these applications using another more modern set of development tools.

When the organization one day realizes that the technology that has served them so well for so long has become obsolete, it is normally suffering from a common set of symptoms – the technical skills to maintain the obsolete technologies become increasingly hard to come by, it becomes increasingly difficult to ensure the interoperability of the applications with the newest technology, and due to the non-standard nature of the technologies they become ever more expensive to operate.

Anubex application modernization relies on automated techniques to consistently and rapidly transform software applications to take advantage of the latest open computing platforms. Anubex migrations are frequently used to liberate valuable business applications from their dependence on outdated or otherwise unstrategic runtime or development technologies.

Obsolete, often pre-relational databases; proprietary and inflexible programming languages and 4GLs; character-based user interfaces; and 70s-style transaction monitors are all technologies its customers have been able to decommission, often with ROI in as low as one or two years. Following the migration, Anubex customers are able to execute their mission-critical business processes using state-of-the-art development tools, programming languages, databases, and operating systems.

The projects are executed according to Anubex' unique snapshot-oriented SOAR process: a set of best practices that maximizes flexibility by enabling businesses to change core systems as much as needed while their migration is in progress. Central to the SOAR process is the use of tooling to automate the transformation of code and other artifacts – Anubex builds its own conversion tools to perform the bulk of the transformations with technical precision and consistency.

With Anubex' migration solution, companies are able to, among others:

- Fully retain their competitive working practices
- Keep the knowledge of IT staff and users of the core systems relevant
- Reduce support and license costs for the outdated technology

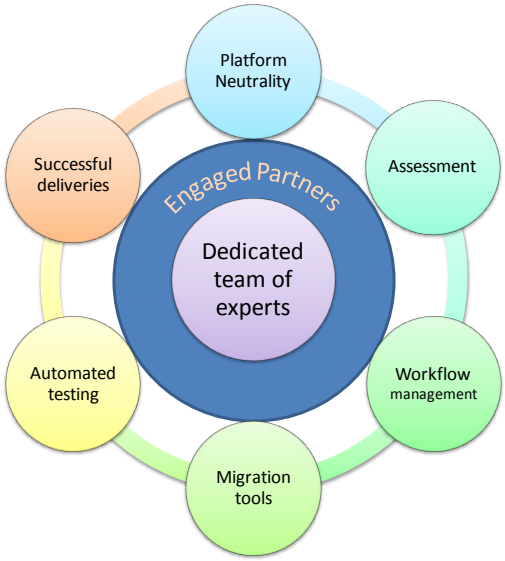
Anubex migration projects aim to achieve the following:

- User interaction and programmatic interfaces with the migrated system are unaffected;
- Functionally equivalent and computationally exact;
- Performance of the system should be equivalent or better;
- Be at least as maintainable as the original version.

Business processes should not be affected by a migration – Anubex considers it a hallmark of a successful migration project that the end users of the original application can use the migrated applications without requiring any retraining. At the same time, Anubex supplies technology of its own making (developer frameworks) that its customers can use after the migration in order to seamlessly and incrementally modernize their converted applications to maximize the value from their new environment. Such tools make it possible to leverage SOA architectures and to incrementally graphically enrich the character-based user interfaces.

Anubex Differentiators

Surrounding its team of technology experts, Anubex identifies six differentiators.



Migration assessments

To bring projects to a successful completion it is necessary to thoroughly analyze the application and its dependencies before the project starts so that project phases can be accurately planned and the right resources allocated. Migration Assessments are a differentiator for Anubex because they allow complex migrations to be planned, and in turn delivered on schedule.

With custom analysis tools and an expert approach, assessment projects are standardized and highly accurate.

Workflow management

Especially during the middle and final phases of migration projects, Anubex makes new versions of the converted software available for testing in rapid succession, for example once every week. It is during these phases that speed and precision are critical to the project's success and also in building user confidence. To enhance the QA of this critical phase, Anubex continues to develop its dedicated workflow management platform called Migratonomy. The automation of workflow management is a differentiator for Anubex because it leads to increased accuracy and repeatability, and enables real-time project visualization and tracking.

Migratonomy facilitates the execution of projects that are spread out over geographically remote locations. This includes allowing customers or partners to execute some parts of the migration themselves, or ultimately allow Anubex to offer a repositioned service in which the customer or partner can complete their own migration autonomously while using the tools over a user-friendly web interface.

Migration tools

The use of migration tools in projects that are led according to the SOAR™ process is a differentiator for Anubex because their use guarantees consistency in code translation and generation. The high-performance of SLAM™ tools is a further source of competitive advantage because they can process even millions of lines of code in a few hours, effectively enabling Anubex to migrate the entire core applications of a large bank overnight.

Until now, most of Anubex' work in migration and especially language translation has been conservative, with source and targets being closely related either by expressiveness or their underlying data types. This is evidenced by much of the work Anubex has done in the area of migrations to COBOL: COBOL-to-COBOL, ADS-to-COBOL and Natural-to-COBOL together account for the bulk of Anubex' mainframe business to date. The principles on which these tools were built are also applicable for migration to non-COBOL targets, and the Anubex VB NETamorpher tool that converts VB6 to.NET is an example. Future tools development will include mainframe language translation to C# or Java.

Automated testing

Minimizing user involvement is a concern common to all reengineering projects. Users have an important role to play in migrations and that is to perform system acceptance and verify the system is functioning correctly. Such acceptance testing can demand a lot of time from users if they have to verify the correctness of several million lines of mission-critical code.

Automated testing from Anubex addresses this issue. The objective with automated testing is to remove the human element as much as possible from the testing process and to allow the verification of program behavior to be performed by tools. Using automated testing

techniques, Anubex has been able to reduce the mandatory involvement of users by as much as 98% in acceptance testing.

Anubex customers have found other uses for the testing tools and that is to continue using them once the project is completed, to perform regression testing and streamline the post-migration maintenance of the applications.

Successful deliveries

One competitive advantage Anubex especially values is the growing list of prestigious references which gets longer each year as it completes more projects successfully. In fact, Anubex considers each and every migration referenceable and by now has customers spread over many industries and countries.

The value of such a reference network is important since migrations are not everyday exercises for its customers. Companies win confidence stepping into an automated migration having the sense they've mastered one or two lessons learned before having to learn them the hard way. Anubex organizes reference site visits with its prospects to help provide the new customer with additional perspective on their project.

Platform neutrality

Another of Anubex' differentiators is its non-alignment to any one platform, operating system, database, or programming language. This neutrality has a number of benefits:

- Anubex is flexible and can offer our customers a solution, whatever their target platform preference may be;
- Anubex can fit into any imaginable consortium since it works with all technology providers;
- In extreme situations Anubex customers can make changes to the target system architecture after the project has begun which gives them added security;
- Anubex' platform neutrality gives its customers more freedom to negotiate with multiple vendors.

Anubex' neutrality is more than just a pledge. In the three main databases (Oracle, SQL Server, DB2) and three main operating systems (Windows, Linux/Unix, and zOS) Anubex has built up considerable expertise and has one or more certified experts in each. Furthermore, its claim to neutrality is credible since it can show actual references of successful migrations to each of these technologies.

More Info:

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