Strategies for Legacy System Replacement

With many government agencies looking to replace their aging legacy systems, common themes are emerging. The challenges stem from the variety of choices being offered in the marketplace and the pervasiveness of technology change. As a result there is an understandable lack of confidence in choosing an appropriate solution which is leading to inaction with adoption of technology innovation. The common objectives which are exercising the minds of senior decision makers include -

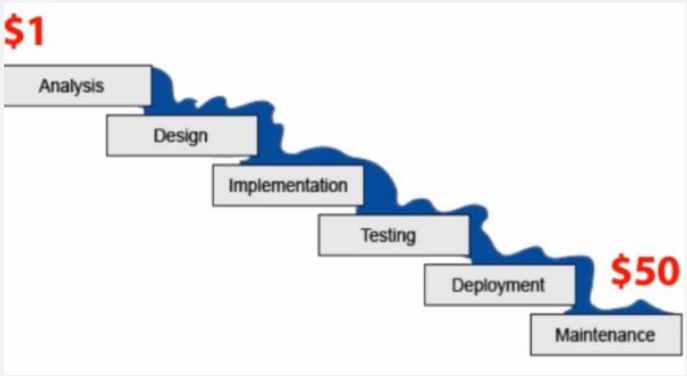
A Business Process Review can help the agency to review its practices against current and likely legislative changes.

- Reducing complexity and cost
- Reducing risk in implementation and transition
- Understanding the current business rules embedded in their current system and what the business rules should be
- Securing a proven, enterprise grade solution that meets most of their business needs either "out of the box" or can be configured or customised quickly to meet the balance of their needs now and in the future
- Utilising and sharing of data simply, easily and effectively without specialist intervention
- Providing on-line or off-line mobility access
- Future proofing against technology change or changing needs.

Research & Lessons Learnt

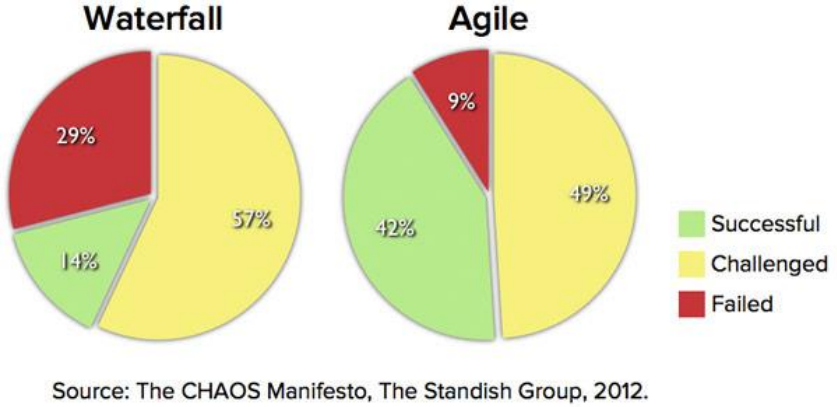
There are consistent patterns of behaviour that are common in the replacement of most aging enterprise legacy applications that are supported by research and experience garnered from past projects–

1. **Software costs much more to change after it is delivered** (Forester: 50 times), this is because it has developed more complexity and changes impact on other functionality which grows with every change introduced. Over time, the application complexity increases to the point where making any change affects more and more areas until the cost of making changes gets so high it is cheaper to replace the system. (Application Lifecycle & Technology Debt)

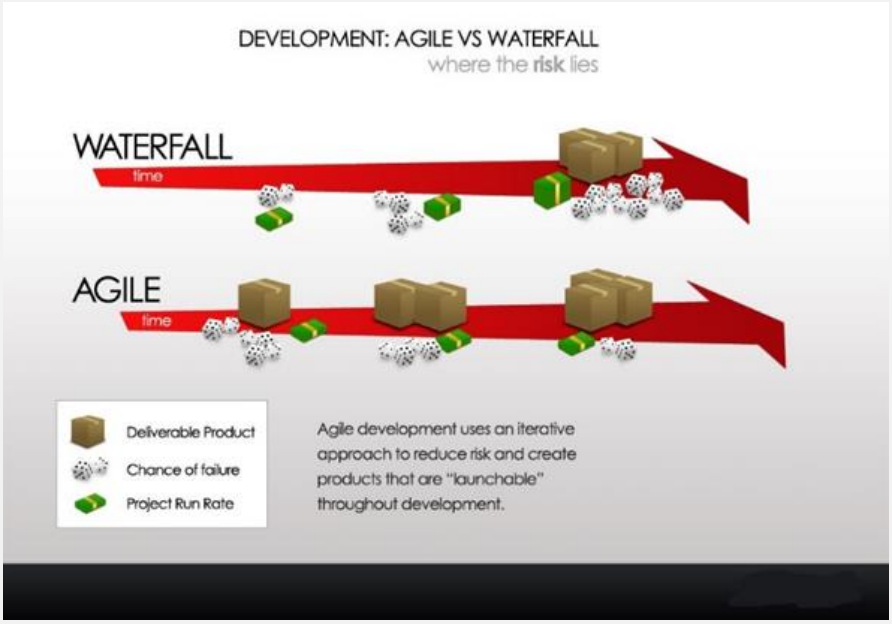


2. **Software developed more than 10 years ago is often dependant on specific technology or skills** which are no longer being taught or supported. Therefore any architecture that doesn't allow the enterprise to change their technology is held hostage by those who control the knowledge. (Technology Dependency)

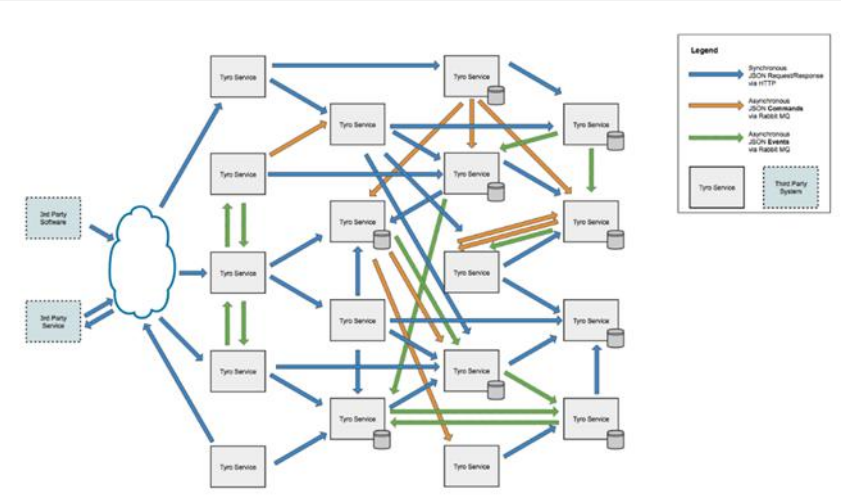
3. **The "Big Bang" or "Forklift Approach" to changing a legacy system is fraught with risks** as this "Waterfall" process is dependent upon understanding all requirements "up-front" which is rare in legacy systems, as demonstrated in a number of agencies. ("Agency dumps new system" 1, 2, 3,). This is because systems developed over many years have had many people involved and what they did or how they did it is often lost or not even recorded. This means that resolving defects is a case of trial and error over many months to refine and rework code to meet unexpected deficiencies but at a significant cost (Due to point 1).



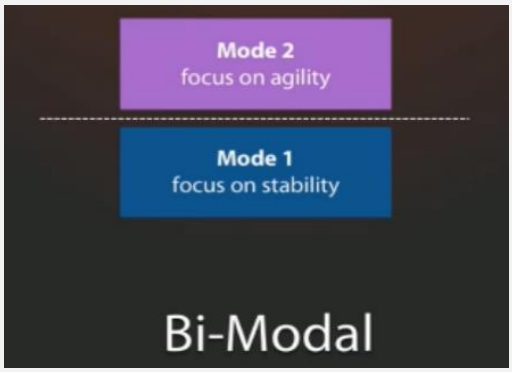
4. **Adopting a large requirements gathering and analysis phase incurs significant cost and time,** often without commensurate benefits. This also runs the risk that changing technology or business needs (legislation) creates a continual process without a finite outcome. Further, duplication of system functionality without measurement of need or value creates unnecessary complexity and cost which is counteractive to productivity improvements.

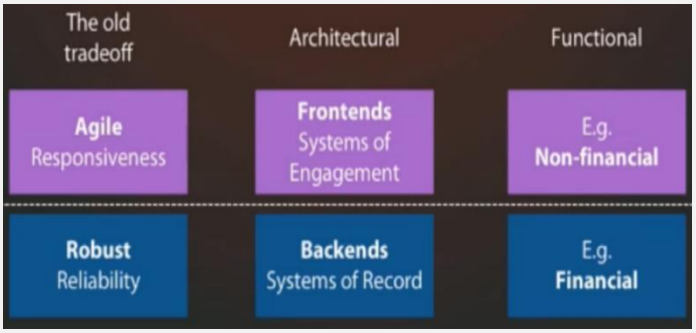


5. **Strategies using Microservices and "web services"** to Modernise outdated parts of an aging legacy system have been successfully implemented in many places. However, this runs into the same issue of complexity where often there are multiple vendors who redevelop different parts of an application as independent functions of the old legacy system. Each time a change is made in any Mini Application or "Microservice" the web service must be recompiled and tested multiple times requiring increased co-ordination and cost as more and more "Microservices" are added.



6. Most recently Gartner suggests introducing a "Bi-Modal" **digital architecture to create a "two speed" environment** that allows stability for standardised systems and agility for those that need to adapt to changing requirements. This works if only a few changes are required in the standardised environments, however it limits agility where changes impact upon or are required on those standardised systems.





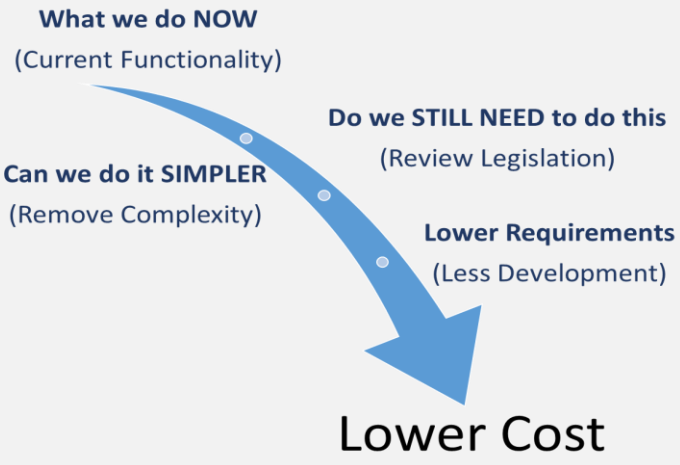
A Stage-Gated Approach to Legacy System Replacement

While each legacy system comes with its own challenges and issues to be resolved, the following provides some insights into strategies which can deliver more positive results in Cost, Complexity and Risk Mitigation. The issues have been addressed as a stage-gated approach to better inform the steps most likely to:

- Reduce complexity (eat the elephant in small pieces)
- Improve transparency with greater control over cost through approvals
- Provide technology flexibility using innovative (Magic Quadrant) tools and
- Future-proof technology change to extend the application lifecycle through improved integration architecture.

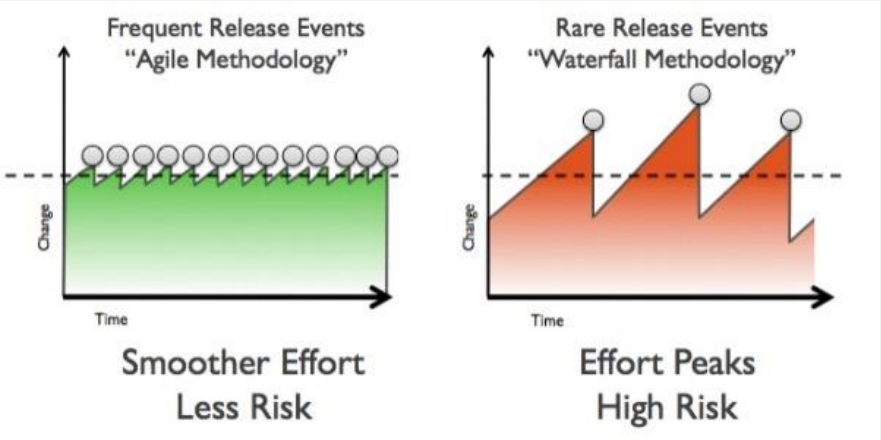
Step One

Use "Business Process Re-engineering" (BPR) to review current and likely future legislation against the current practices. Reductions in functionality requirements will reduce the need for software development, resource utilisation and therefore cost. Looking for efficiencies that enable greater front-line service delivery or stakeholder engagement has proven to enhance delivery satisfaction, quantify value in requirements and reduce costs of operation.



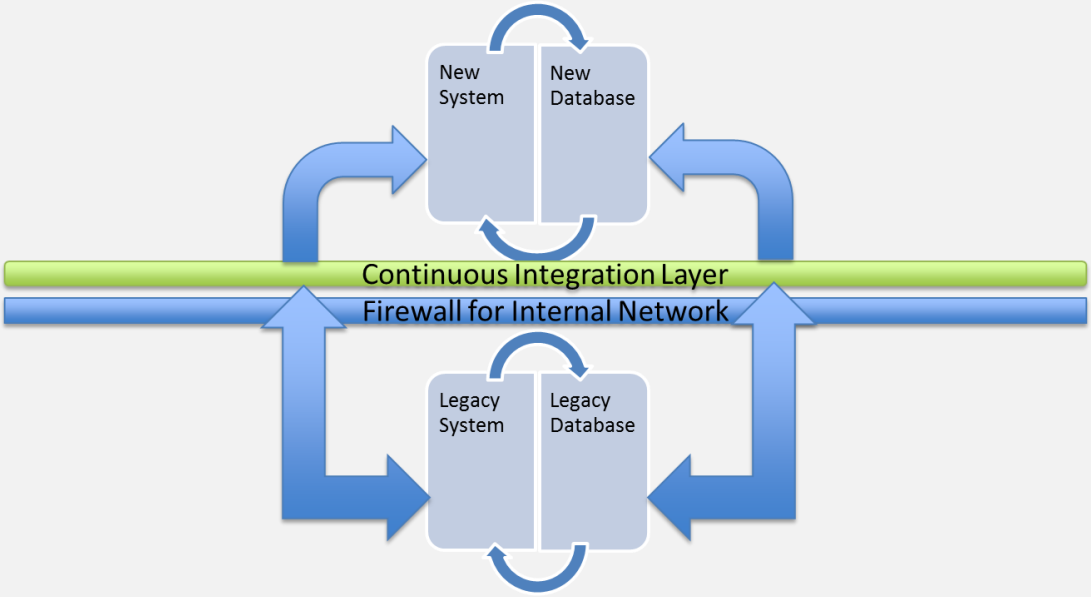
Step Two

Adopt an "Agile" approach to project management by breaking up delivery into a prioritised group of smaller projects that progressively replace the legacy system "piece by piece". Adopt an adaptive process of learning that allows the project to adapt as complexity is uncovered, priorities are re-arranged, savings are identified or technology changes.



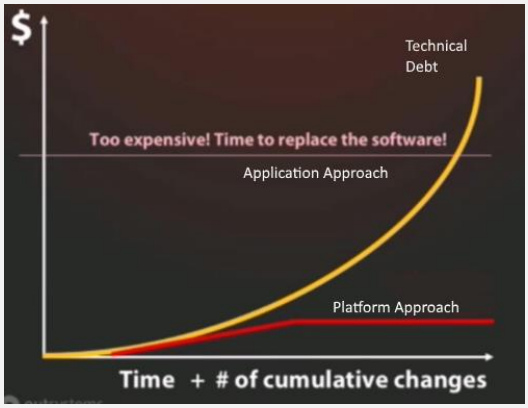
Step Three

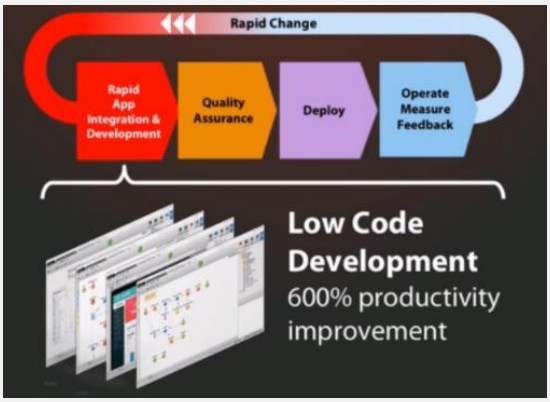
Introduce a continual integration layer to the solution platform that enables you to map the business rules by capturing data movements and comparing those to "known business rules" and user operation. This enables you to implement a new solution alongside the existing system, test and compare the results from functions performed in both systems and progressively replace the system reliably over time without risk to operational performance. When completed, you can reliably turn off the old system without risk. This will also allow for potentially extending the life of certain low-cost legacy systems or further integration of other systems as a means of developing a consolidated view of data across many systems for "Business Intelligence Analysis" as a "Single Point of Truth", "Comparative Analysis" or "Predictive Analysis"



Step Four

Adopt an integrated "Platform Approach" instead of an "Application Approach" to the "Digital Architecture" of your solution. A common failing in developing a digital or "Bi-Modal" approach is to have multiple providers and multiple applications who comply with a standard parameter but often managing multiple vendors and getting them to develop consistently to a set standard is not easy. Like a project team with more than 5 members, it gets progressively harder to co-ordinate communication and actions as you add more connections. Ideally a hybrid "low code" COTS approach can save on both initial development time and also on the complexities of extended development when adapting systems after deployment. This has the added benefit of extending the "application lifecycle" and reducing the frequency of application replacement due to changing technology availability or increased complexity.

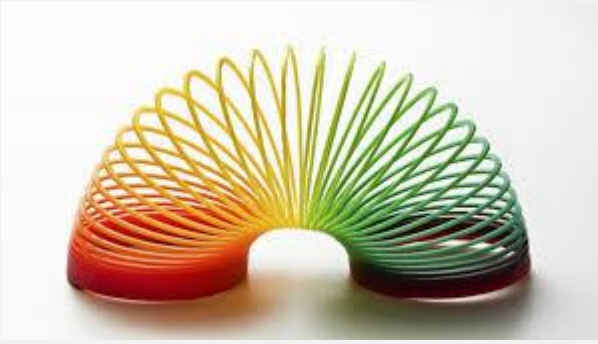




Step Five

Choose your supplier carefully.

- Ensure you have a flexible agreement that provides shared benefits realisation based on outcomes. Sharing both Risk and Reward provides a collaborative engagement with both parties focused on delivering outcomes for each other and building a longer term relationship through joint delivery and commercialisation of solutions able to be leveraged across other potential customers.
- Engagement with a commercial provider has the potential to deliver greater productivity improvements – "Commercial" led technology innovation has delivered 60% productivity improvements whereas "Public Sector" led technology innovation has failed to deliver much, if any in some cases.
- Research has indicated that smaller companies are more likely to be successful in delivering innovative solutions. This is due to their ability to be more agile in their business model, have lower costs and more interest in co-development as a mechanism for growth.



About the Author

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