Legacy Application Modernization

Balancing Risk vs. Reward

How many millions of lines of code written for business applications more than 20 years ago are still being sustained for a variety of political and financial reasons—and at what risk and cost? Many of those legacy applications have been maintained with various forms of IT life support—emulators, code wrappers, virtualization—far too long, and should have been allowed to die a natural death years ago. Why then do so many persist?

Whether it is the fear of touching heavily patched programs, or simply the daunting task of creating and fine-tuning new original code, many organizations continue living with these ticking time-bombs—with fingers crossed and eyes covered. This white paper explores key aspects to assessing your legacy application technology, as well as strategies for upgrading such applications if you don't like the answers your assessment provides.

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What are Legacy Applications and why should they be "modernized"?

A legacy application is any business application that is based on older technologies yet continues to support core business functions of an organization. These systems tend to be monolithic *(meaning little or no modularity or reusable code "snippets")* as well as difficult to understand and modify.

Instead of attempting to upgrade legacy applications, some organizations simply elect to "entomb" them and build a layer of integrated services on top of them to "consume" the important bits of business logic and data they contain. Although that approach can be a legitimate one in some instances, it is more often an attempt to "avoid the inevitable." Whether a legacy program is entombed, encased, or modified, each process adds a new link of unknown strength to the historical chain of the existing application. Is that link steel, bailing wire, or twine?

Whatever the approach, risks typically persist in legacy applications that:

- Are built on an aging infrastructure.
  (Do you need to buy parts on eBay?)

- Are programmed with an obsolete language.
  (Do they even teach that language in college anymore?)

- Depend upon technologies no longer supported by their vendors.

- Demand the support of skill sets that are in decline as the developers who understand these systems are retiring.

- Carry a high Total Cost of Ownership in an environment being pressured to reduce IT costs.

Beyond the potential risk of technology breakdowns, legacy applications also pose issues related to opportunities and challenges introduced by digitalization and globalization of the general business environment. If your organization is too dependent on one or many timeworn applications, it will be neither agile nor nimble, and might not be able to respond quickly to either the challenges or the opportunities. In that sense, legacy applications can limit your organization's ability to meet current and future business needs effectively and efficiently, or to integrate emerging technologies. They can also limit the effectiveness of the "digital natives" *(i.e. young men and women who grew up with the Internet and social media)* who are entering the workforce with different expectations and demands of business technologies.

It is important to note that old programming languages such as COBOL or Fortran top the list for what would be considered "legacy," but they are by no means the only ones. Newer languages can be every bit as monolithic, hard to modify, and inflexible, and, if so, are also candidates for modernization. The answer, however, is not simply replacing millions of lines of old custom code with millions of lines of new custom code.

"I don't want to be in the line-of-code business. I want to use commercial off-the-shelf building blocks to develop my application."

*– **Dale Vecchio**, Research Vice President, Gartner Research for application development, speaking about legacy modernization.*

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The Modernization Process: How you approach it makes a difference.

Business applications live within the larger context of their technology infrastructure, including the people who use them and maintain them. Modernizing those applications successfully requires a shared vision and commitment among stakeholders in business and IT. These are complex decisions that necessitate collaboration across the organization—not just on a "one time" basis, but also as part of an on-going process of application life-cycle management.

Many experts now agree that well-defined, well-structured, and disciplined management processes ensure results. A comprehensive approach to such processes provides the structure necessary to support the design, implementation, and maintenance of the applications in your "IT portfolio" throughout their life cycles.

STEP 1 **Assessment:** Application modernization decisions have infrastructure impacts, and vice-versa, with infrastructure decisions increasingly having an impact on how your application is delivered. Before making ANY decision, it is critically important to perform a thorough assessment of your total IT environment.

Legacy applications and related workflow processes can span multiple decades. Instead of the clean, modern efficiency depicted in an InformationWeek advertisement, the reality might more closely resemble an archeological dig. Taking the time to perform a detailed inventory of your infrastructure and applications will enable you to understand how IT is impacting your business, and allow you to make informed decisions based on real costs, inherent risks, and the value to the business. It is vital that both the business and IT stakeholders are in agreement with regard to how value and costs are determined.

Some factors to consider include:

* Evaluating applications based on current and future business needs.

* Determining continuing operating, maintenance, and replacement costs.

* Identifying the operational risks and unexpected cost of application failure. *(Having to replace an application in an emergency is usually much more costly and disruptive then a planned transformation.)*

* Exploring the use of managed, shared, or cloud services

STEP 2 **Strategic Planning:** Define your business goals and how IT can support opportunities for growth, cost savings, and process efficiencies. In Step 1, you assessed the running costs of the applications. Now it is time to ask, "Does the business value justify that cost?"

Overlaying the results of your assessment against your business goals will help you prioritize your efforts, enabling you to:

* Identify applications that require a replacement or an upgrade.

* Plan to eliminate overly expensive, obsolete applications.

* Consolidate applications that might duplicate functions.

* Simplify applications that are too complex, or acquire one that meets your needs without the extra bloat.

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Specify, Design & Build (or Buy):

The overall strategic plan should allow you to prioritize application projects to be addressed through legacy modernization. There are multiple traditional approaches you might take, including:

- **Maintain-As-Is**, with full awareness of the potential risks and rewards.

- **Re-Hosting**, consisting of taking a legacy system that lives within a mainframe machine and moving it wholesale to another platform—typically a more flexible, cost-effective "open system."

- **Automated Code Transformation**, powerful software technologies deployed to analyze, de-construct, document, and re-construct legacy code into a new language, automatically, while maintaining the customer's specific business logic, data, and naming conventions.

- **Service Oriented Architecture (SOA) Enablement**, the earlier mentioned strategy of leaving the legacy application as is while data is exposed and "consumed" for use by a more modern application layer.

- **Commercial-Off-The-Shelf (COTS) Software**, pre-built software usually from a 3rd party vendor. COTS can be purchased, leased, or even licensed to the general public.

- **Custom Re-write**, taking into account the cost, timing, and long-term maintenance implications.

- **Private/Public Cloud**, can be a COTS solution such as Salesforce, which is a leased service (Software-as-a-Service, or SaaS). It can also be a delivery method or outsourced IT infrastructure option, such as Amazon Web Services.

Evaluating and adopting new tools and methodologies that support an agile, iterative approach, however, can allow your organization to adapt and evolve to current and future conditions. In fact, they will change the way you conceptualize and support the application life cycle. Applications designed and developed to enhance your organization's ability to be responsive to change are optimal.

One such methodology—a hybrid approach to legacy modernization made possible by the NetReach toolset—offers a unique balance between the **COTS** and **Custom Re-write** approaches. It surpasses the limitations of COTS *(commonly expressed as, "this packaged software just doesn't quite meet our requirements")*, while avoiding the added expense and risk of the Custom Re-write approach.

Using such a hybrid approach empowers you to re-design an old application to meet new business goals while eliminating the idiosyncrasies of the old approach. The NetReach hybrid approach also includes a thorough technical specification of each project's requirements, enabling you to spell out key functions of the current application as well as address key re-design elements in the process.

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STEP 4

QA, Training and Deployment: Quality assurance is an important phase in any legacy modernization project. Plan to give this phase sufficient time and resources. Essentially you are testing to ensure that the new application fulfills its technical requirements. Depending upon the approach used to address the legacy modernization in Step 3, QA processes could include use case testing, stress/load testing, and user acceptance testing, among others. QA "paper mock-ups" can also be used early in the project to generate end user feedback before anything is built. In the case of buying a COTS solution, devote time and resources to a demo to see if most of your use-cases are met.

One of the challenges with any modernization project is that it involves change. It is important to keep stakeholders in the loop throughout the process and allow them to become comfortable with the new application. Plan on formal training sessions with end users and other stakeholders. A period of built-in support after deployment is also a good idea.

STEP 5

Maintenance & Support: As with any technology implementation, legacy modernization is not a "once-and-done" process. Lehman's Law states, "Systems must continually be adapted to the changing environment, otherwise their utility will progressively decline." Understanding that applications have a life cycle, and adopting a pro-active application life-cycle management philosophy, will positively impact application performance and ensure on-going success. The relatively short time needed to make modifications using the hybrid-tool approach to legacy modernization is a critical advantage in controlling the total life-cycle costs of the legacy replacement application.

Taking the next step.

Evaluating the hidden true costs and risks of an existing legacy application and determining sound business reasons for finally addressing the problem head-on, should help offset some of the apprehension about "opening the can of worms" that legacy applications are perceived to be.

If you choose an outside resource with specific expertise in modernizing legacy applications, be sure to review examples of their process and technology experience as well as their references from past projects. If you choose to attack the issue on your own, be sure to document and justify your plan in detail and gain consensus from the affected business and technical associates within the organization.

With the right approach, you will sleep more soundly knowing that the potential ticking time bomb of an archaic legacy application is finally being de-fused.

ABOUT THE AUTHOR

NetReach Technologies is a producer of complex data-driven Web-based solutions, with extensive experience in legacy application modernization, as well as original application and website design and development, built upon a powerful Web technology toolset. This expertise offers the best of both worlds—application specific Web solutions with the freedom for non-technical users to manage their own updates, including database modifications, if they choose.

To learn more about Legacy Application Modernization and other "freedom of choice" viewpoints, contact us at: info@netreach.com *or call* 1.215.283.2300