Application Modernization
A Business Case for Enterprise RIA

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The last year has seen considerable excitement in a new breed of web applications based on Rich Internet Application (RIA) technologies. Most of that excitement has been focused on consumer facing applications like Google Maps and mail innovations that have been driven by the hundreds of Ajax frameworks. However, as enterprises begin to examine how RIA technology can factor into their efforts to modernize legacy applications they are realizing that the Ajax approach has serious performance and security shortcomings. A category of RIA technologies that offer enterprise performance, scalability and security is emerging. We call this category Enterprise RIA, which is where Curl competes along with Adobe Flex/AIR, and Microsoft Silverlight.

Critical to successful application modernization is construction of a meaningful business case. While there are unmistakable benefits of web based delivery vs. client-server or high vs. slow performance the question remains how to quantify those benefits into real business value.

This paper will define the characteristics of Enterprise RIA platforms and examine how to construct a business case for their use in application modernization.

**RIA as a category**

RIA has emerged as a category and analyst groups such as Forrester have been conducting various surveys and studies to quantify their benefits.¹ What they are finding is that there is a spectrum of RIA technologies that satisfy a range of needs from simple B2C to complex B2B applications. RIA for the enterprise differs significantly from RIA for consumer-centric applications. While sites such as Google or Yahoo handle very large numbers of users, the interactivity with business-critical databases and existing legacy applications is not a requirement. Enterprise RIA focuses on Fortune 1000 companies who spent a lot of resources during the 1980’s and 1990’s building client-server applications using the rich user interface of desktop clients such as Windows. Examples here range from custom-built applications to packaged applications such as those from vendors like SAP, and Oracle. Motivating this community to switch to a web-based GUI platform has been very slow, however critical to modernizing these applications is making a compelling business case.

Figure 1 illustrates General RIA as driving a shift to add more interactive and dynamic features to simple thin client Web 1.0 applications. On the other end of the spectrum Enterprise RIA is driving a shift from client-server applications that require high performance, scale and security to web delivery.

Requirements of Enterprise RIA
The key requirements for enterprise RIA are as follows:

- **Complex graphics and reports** – a customer in the GRC (Governance, Risk, Compliance) space needs to display complex graphics with lots of details for the user. With minimal clicks, the user gets all the relevant information for decision making. This may include 3D graphics with animations and drill-down functionality.

- **Large Data Sets** – Enterprise applications deal with large volumes of data that must be processed efficiently at the client. In the financial sector, the size of data sets can be in the hundreds of thousand records.

- **Offline-Online** – Enterprises need the offline operation of their application because business must continue even if connectivity is lost. When connectivity is restored the data gathered and modified at the client can be synchronized with the server.

- **Very high scalability** – The number of concurrent users can grow fast, especially in a B2B environment, as partners, suppliers, and buyers get added to the system.

- **SOA & Standards** – Enterprise RIA must follow the basic fundamentals of Service Oriented Architecture. Although SOA discussions mostly refer to server-side application construction, the front-end must have the same attributes. Use of standards such as SOAP, WSDL, and REST must be followed for easy server-side interoperability.

- **Migration tools from legacy applications** – To make the migration of old client-server applications, some tools should be provided to lower the labor costs.

- **Platform independence** – RIA must be able to run on any client operating system and any browser environment.
Rich development tools – A rich IDE must be provided with an appropriate plug-in to standard IDE’s such as Eclipse, deployed at many large enterprises.

Very high performance – Enterprises have spent decades fine-tuning the performance of their applications and would not accept anything less. So latencies must be minimized for sub-second response time for many business-critical applications. High throughput and fast performance are the two critical metrics for transactional systems. The division of work between the client and the server must be carefully evaluated to minimize the round-trips. The client-side must perform much of the user interaction and caching of data.

Security – Enterprises have strict security requirements for business-critical data. RIA has to address data and application protection via various technologies such as encryption and careful use of client privilege.

Manageability – Applications must provide functions for performance monitoring and tuning. Dynamic configurability is also a requirement for changing needs.

Solutions for Enterprise RIA
The industry offers only a few solutions to the above requirements. Ajax fails in meeting a number of the requirements, such as offline facility and high scalability. Adobe’s Flex/AIR offers good animation (due to its pedigree from Macromedia) capability, but can not handle complex 3D graphical interfaces without a lot of complex programming. In addition, the scripting language does not provide highly sufficient client performance.

Microsoft with its product Silverlight, based on WPF (Windows Presentation Framework) must also be considered. To this point Silverlight has focused almost exclusively on high performance streaming video. Microsoft has stated that they intend to make Silverlight into an enterprise platform but today it lacks many of the required features.

Curl (origin from MIT research with the same name) addresses enterprise needs effectively. Curl has a language that covers the spectrum of text, graphics, to computational logic. This “content language” comes with a JIT compiler that compiles Curl applications to the native client hardware which means very fast run time performance. Several large enterprises in Japan are current users of Curl, providing many proof points for the merits of this solution.

All of these products (Curl, AIR, Silverlight) have client-side environments that simulate a desktop environment over the web browser.

How to measure RIA
While evaluating an Enterprise-scale RIA it is important to consider several metrics. These should include development time, lines of code, functionality, transaction speed, round-trip cycles, usability, and number of clicks to complete a transaction. Additionally the breadth and sophistication of the supporting libraries should be evaluated. An ideal RIA must follow the principles of SOA (Service Oriented Architecture) which advocates invocable services and assembly of such services forming an application. Most of the SOA discussion centers on server-side component assembly. An enterprise RIA should act as the front-end to the server side SOA.

Finding Business Value

Now that Enterprise RIA based Web applications are reaching the sophistication of client-server capabilities enterprises are considering their modernization. Tim Pacileo in his recent article in eWeek\(^3\) states:

“CIOs of large organizations recognize the benefits of modernizing applications and moving away from legacy systems. But starting the process—and justifying the investment needed in an application modernization initiative—can be daunting. And too often, the potential gains of a streamlined environment are deferred in favor of a short-term focus on cost containment through maintenance of outdated, redundant and inefficient legacy applications.”

Indeed many application modernization situations involve making a trade-off between strategic long-term investment and short-term cost containment. In these situations project managers must construct the business case for a strategic investment. Here are some sample business savings based on real Curl customer cases but using hypothetical data. While these are hypothetical cases they represent broad categories of business value and are useful in initiating and framing the discussion on business value.

- **Better Performance** - The current application takes 90 seconds to perform complex data visualization. If 1,000 employees perform this operation 50 times per day this is 1250 hours of wait time per day. If the visualization time is reduced to 1 second this saves 300,000 hours per year and at $20/hour that is more than $6M/year!

- **Better Visualization** - The current process to find error patterns in operational data takes 60 minutes and the department of 100 employees whose job it is to identify and fix these errors typically finds 600 errors a day. If good data visualization can reduce the time to find one error pattern to 10 minutes this would save 500 hours per day or 130,000 hours per year. At $20 per hour this is $2.6M in savings per year!

- **Support Cost** - The current client-server application must be updated 6 times a year to 10,000 users. Each update costs $5 in distribution and material costs and 15 minutes of end user time. A Web application would eliminate this cost and save approximately $600,000 a year.

While these are hypothetical examples they show the considerable savings application modernization can offer. This can be highly useful when considering an application modernization strategy\(^4\).

In the section following we consider a real customer case using the Curl Enterprise RIA platform.

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\(^3\)“How to Build a Business Case for Application Modernization By Tim Pacileo, eWeek, November 30, 2008”

\(^4\)“The Application Management Continuum Offers CIOs A Contemporary Approach To Modernization”, Forrester Research Report by Phil Murphy, July 14th, 2008
Panasonic – Voice of the Engineer (VOE)

Aiming to become the number one company worldwide in customer satisfaction, Panasonic is one of the world’s most-recognized brand names, largely on the basis of its highly successful Panasonic AVC Networks business segment. The division manufactures and markets the majority of the company’s consumer products, including plasma TVs and LCD monitors, Blu-ray and DVD players, digital cameras, video recorders, home theater systems and many other products. But while Panasonic welcomes strong sales, the reality is that the more diverse and successful its product lines become, the greater the challenge for its service department becomes.

Panasonic AVC’s service division has simple objectives: discover and respond to potential quality and safety issues as early as possible in the product lifecycle. And, from the standpoint of safety, ensure absolutely safe operation of all electrical products over the long term. Sounds simple enough, but with an evolving product line that gets ever more complex, Panasonic service technicians have to continually educate themselves on new technologies and new repair techniques. But while it is critical that Panasonic technicians stay up to date with the latest technology improvements and developments, how do you make that happen for a huge global workforce that is responsible for thousands of products and product parts?

Panasonic AVC approaches this challenge through what it calls the Voice Of Engineering (VOE). An enterprise-wide program, VOE encompasses all the initiatives and activities geared toward discovering potential critical issues in product quality by sharing and analyzing information and trends. This includes an ongoing dialog between service technicians in the field and company management to uncover potential quality issues, and nurture and advance repair and servicing capabilities in the field. The company’s technological approach to its service challenges was to create an automated system—built on the Curl platform—to provide its service and support staff with up-to-date repair manuals, parts diagrams, specification sheets, and other kinds of documentation.
Originally launched in 2005, the Service Information Sharing System also allows supports technicians and engineers to:

- Use forums and comment areas to share their knowledge of new repair techniques, describe repair cases and support a higher level of customer service across the entire organization
- Through Curl, view information using a variety of methods: graphs, tables, charts with multi-layout format, etc.
- Integrate external document and data formats—Excel, PDF, etc.
- Easily operate system functions using drag-and-drop features, data filtering and graph combining

**High Performance and Data Visualization**

Panasonic AVC Networks chose Curl as the development platform for its Service Information Sharing System because it provides the ideal environment for live documentation and interactive education. Initially Panasonic AVC used a database application as its service support information system.

Another advantage of the Curl-powered Service Information Sharing System is that it enabled Panasonic AVC to retain the comprehensive information storage capabilities of its existing database system, yet enhance the capabilities of that system with a powerful and flexible front end. Curl makes complicated screen controls possible, surpassing ordinary Web browser capabilities, so Panasonic developers built in the kind of advanced features and functions typically found only in client-server type applications. For instance, the Panasonic system enables users to view documents and related information in a single view. To access documents and files, users browse indexes or use keyword search. In practice, field engineers and service technicians simply type in keywords, and then narrow down their selections out of the returned list screen. This powerful search tool provides Panasonic field engineers with instant access to the vast amount of repair documentation and related information across the company. VOE Search structures information using syntactic analysis, morphologic analysis and a dictionary tool (tautology or synonym), and displays the associated information ranked against the keyword. The application draws on documents, files and associated information from several databases. The interface supports analytic tools that allow the support engineer to drag a device and drop it into a chart to render an instant analysis of part failures over time giving him an immediate view into likely problems (see figure 3). This level of performance and data visualization saves considerable time and contributes to greatly improved productivity.

![Figure 3 - Chart showing failure rates of parts for a device](image-url)
Main functionality includes search for repair parts or technical documents, as well as bulletin boards to share the information and analysis views of repair processes. These discussion boards enable users to ask questions and get answers from colleagues and associates around the world. All correspondences on the bulletin board are searchable so it can be listed by the search. As engineers use the application, know-how or information are accumulated organically to speed the maintenance of information.

**Low Support Costs - Web Delivery**

Despite delivering native client performance and visualization the VOE application is delivered over the web. Curl supports client side data store, which allows the application high performance search without costly round trips to the server. Furthermore, through web delivery application support, costs are considerably lower. With Curl's flexible file-handling properties and standard APIs for external applications, documents can be viewed right within the system interface—there's no need to open new applications such as Excel or Acrobat. In addition, Curl's elastic technology allows users to adjust the size of documents as appropriate. Operations for changing chart type, targeting parts on and off, displaying above or below a certain point, were all designed and implemented to make the interface intuitive and convenient. Further, the application provides a “Repair Trend” view, primarily used by management, which enables them to track service activity by product, product category and date (monthly, quarterly, yearly, etc.) to better understand service issues and uncover potential problems.

**Summary**

Application modernization using RIA requires stringent requirements beyond what general RIA platforms offer. Particular attention needs to be focused on the performance, scale and security features of the chosen platform.

Application modernization offers considerable potential savings that can be realized through the use of an Enterprise RIA platform and Curl best meets the critical requirements described in this paper. Curl has over 400 customers, many listed in the Global 100 that have realized these savings.

**References**

- “The Application Management Continuum Offers CIOs A Contemporary Approach To Modernization”, Forrester Research Report by Phil Murphy, July 14th, 2008
- “How to Build a Business Case for Application Modernization” By Tim Pacileo, eWeek, November 30, 2008
EXECUTIVE SUMMARY

The technology needs of an industry evolve and mature unevenly — in the early years, companies replace technology frequently to scale in step with organic growth. As the industry matures, it reaches a leveling-off point where the need to gain and retain competitive advantage demands a more reasoned evolution of processes, culture, and technology. Information technology has reached this inflection point, and CIOs must recognize that modernization by means of technology replacement is no longer a foregone conclusion — rather, it is one of many options on the application management continuum.

CIOs MUST BREAK WITH APPLICATION MANAGEMENT TECHNIQUES OF THE PAST . . .

IT history is rife with new technologies that purported to be the saviors of their day: moving from batch to online; replacing VSAM files with database technology; replacing hierarchical database with relational databases; adopting client-server, O-O, and distributed computing; and replacing green-screen interfaces with GUI/Web/browser interfaces to name a few. The scorched-earth policies of IT past — where the next technology advancement advocates wholesale replacement of the previous generation of technology — are long gone.1 CIOs must adapt their modernization approaches to the times; the belief that we can replace all of technology X with technology Y and see massive improvements may be true in turnkey IT shops, but it’s a false hope in most other cases, because:

• **Technology now permeates the business.** IT is no longer a lone machine in the basement attended to by a small cadre of geeks — technology permeates nearly every part of the business, and the business has grown dependent on technology to compete.

• **IT’s complexity and integration have grown by several orders of magnitude.** For all of the faults attributed to monolithic technology, it was undeniably simpler. Far fewer integrated parts from far fewer vendors left CIOs with just a handful of modernization choices. That’s not to say that the choices were necessarily better, but they were certainly simpler.

• **Tactical modernization options ignore or conflict with portfolio improvement opportunities.** Today, the tactical technology-replacement decisions are oversimplistic modernization choices that, while still viable in certain cases, miss the greater need to address opportunities across the portfolio.
What’s Wrong With The Status Quo Of Application Management?

Today’s application portfolios are the cumulative result of years of neglect and under-investment. IT managers were confident that legacy applications would be long gone by now, but many remain as the transaction engines that process core business functions. Firms are grappling with a whole range of familiar, new, and emerging approaches to application management and are unsure of how to move ahead. Some of the issues companies are facing include:

- **Firms that don’t modernize anything stagnate.** Doing nothing isn’t an option — “nothing” is exactly what many CIOs did with their “legacy” technology in the late 1990s in the mistaken belief that it would all soon be replaced. Inaction has led us to the point where “lights-on” IT costs leave little room in the IT budget for innovation.

- **Blind action without guiding information leads to expensive, technology-centric decisions.** The historical answer to legacy modernization has been for CIOs to buy into the next technology hype cycle and allocate large sums of money in the belief that newer is better. The days when one-size-fits-all technology solutions were successful are largely over; IT needs more of a surgical-precision approach, which requires application triage information.

- **Simplistic information-collection efforts often fall short.** Manual, snapshot assessments can collect static information about applications, but much of it isn’t very interesting because it rarely changes. Dynamic information that is collected via snapshots quickly becomes out-of-date and loses its value soon after it is collected.

- **Automated collection is emerging, but tools and processes need to mature.** Application portfolio management tools can collect and display dynamic and static application information, but the cross-portfolio, dashboard-level views of rich management metrics that distinguish APM from application mining have yet to materialize, which has slowed adoption. In a chicken-and-egg syndrome, APM vendors have concentrated their efforts to date on application mining improvements requested by developer-level users, rather than the more robust dashboard features that will attract new management-level buyers. The net result is a slowing rate of adoption of APM tools.

- **Rationalization is badly needed but must be placed in a business-improvement context.** The trust and goodwill CIOs will generate by gaining control of runaway IT spending and reducing waste is alluring — CIOs want it, and services vendors are responding by recasting legacy modernization offerings as application assessment and rationalization offerings. But without information that shows the condition of existing applications, CIOs have difficulty making a business case for change.
Proactive, strategic planning remains an elusive CIO goal. For CIOs to move IT to being a more proactive and strategic partner, they must build transparency into the condition of existing applications and infrastructure (context). They must gain insight and provide input into the three-to-five-year strategic plans of the business to formulate a corresponding three-to-five-year IT plan (vision) and then use joint IT/business planning to execute only the work that takes the organization from context to vision (orchestration).

...and frame plans around the application management continuum

Increasingly, CIOs are looking beyond the traditional approaches to legacy modernization because in truth, many have successfully treated the symptoms, while failing to cure the root causes of the problem. Instead of thinking of “legacy modernization” as an activity that is distinct and separate from portfolio management, rationalization, and strategic planning, CIOs should look at these techniques as more of a continuum (see Figure 1). The “application management continuum” shows the progression of application management maturity. Each step in the continuum outlines the progress practitioners can expect against bloated portfolios and feeds the activities in subsequent phases of the continuum.

While the four phases of the continuum can be viewed as sequential, in reality it is more complicated. Legacy modernization is where most people start; however, modernization decisions can be made much more intelligently with the information developed in later phases. So although the phases are roughly sequential, in truth they are iterative and cyclical:

- Legacy modernization targets one or more applications and is often technology-driven. With the goals of eliminating obsolete technology, integrating with newer technology, and reducing the risk and cost of existing applications, modernization applies one of four fates to an existing application.

- Portfolio management develops intelligence about all applications in the portfolio. Similar to the transparency that project portfolio management (PPM) can bring to new IT investment projects — resource allocation and consumption, staff skills, and portfolio prioritization choices — application portfolio management (APM) develops intelligence about and brings transparency to existing applications by collecting metrics and other information that enable benchmarking, trending, and analysis.

- Rationalization streamlines the portfolio using intelligence from portfolio management. The rationalization process communicates the condition of applications in the portfolio to IT and business management to guide the legacy modernization work. The rationalization process trades off low-value modernization work, typically driven by parochial interests within a business unit, for work of high business value with a focus on decisions that will reduce waste, eliminate redundancy, and streamline the portfolio.
• **Strategic application planning puts applications in a business context.** Using capability maps to link key business functions with the applications that support them, IT management gains the opportunity to communicate IT activity and application/infrastructure status (context) in a way that makes sense to business leaders. This input to planning is vital because it prevents huge new expenditures against applications that aren’t fit for modernization and exposes the need for infrastructure improvements using a vehicle that both IT and the business can understand.

![Figure 1 The Application Management Continuum](source: Forrester Research, Inc.)
Don’t Stop Tactical Modernization In Cases Where It Is The Right Decision

As the preferred approach to modernization, rip-and-replace is almost universally a recipe for failure — almost because rip-and-replace may still make sense in large firms where the portfolio is basically sound but some of the applications are unsuitable for business use and reside on obsolete technology. Small and medium-size businesses (SMBs) with largely turnkey application platforms will look to wholesale replacement more often because the sheer size and scale of application complexity and integration are not as much of an impediment as in larger firms. Both large and smaller firms should look to these opportunities:

- **Large firms should look to shed isolated pockets of technology to save money and reduce risk.** Firms with small pockets of applications left on “burning” — hardware such as DEC, PRIME, Honeywell/Bull, and Unisys Clearpath; databases such as Adabas, CA-Datacom, and IMS; and languages such as PL/I, Assembler, VB 6, and PowerBuilder — may be well advised to migrate the remaining applications to reduce licensing and maintenance costs and mitigate skills issues. However, be prepared to outline a business case that shows the total benefit as outlined by the four pillars of Forrester’s Total Economic Impact™ (TEI) — cost, benefit, risk, and flexibility. Realize that in these cases, risk and flexibility concerns may carry more weight than cost/benefit opportunities.

- **Smaller firms can shift platforms and greatly reduce operational costs.** Firms on smaller mainframes — in the 1,000 MIPS range and below — are seeing huge reductions in third-party software costs by moving COBOL applications to UNIX and Wintel platforms. In fact, the COBOL often runs faster, although firms with complex batch processing and DBAs accustomed to mainframe operations lament operational maturity issues with the smaller platforms.

The blank check IT once had for technical migrations is no longer valid. Business leaders are pushing back on high-ticket, technically driven migrations that can’t articulate business value and are no longer willing to take IT’s word that an expensive upgrade or migration simply “must” be done. CIOs who want to improve IT credibility with business leaders should recognize the application management continuum as a path to streamline the waste and redundancy in IT, free more IT resources for innovation, and improve overall business/IT planning.

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**Recommendations**

**CHART YOUR PROGRESS AGAINST THE APPLICATION MANAGEMENT CONTINUUM**

The application management continuum brings IT’s lack of maturity in application management into sharp relief. While some of the immaturity is an understandable byproduct of history and the comparative youth of the IT industry, IT has reached an inflection point — the time for change is now. Chart your firm’s level of maturity on the scale, and take these steps toward improvement:
• **Stop making technically driven modernization decisions.** “Because IT says it is necessary” is no longer good enough justification for businesspeople to automatically approve technical migration/modernization efforts. Build a business case for change based on business value and communicated via the four pillars of TEI — cost, benefit, risk, and flexibility.

• **Chart your application management maturity based on the continuum.** Many firms have no activity beyond the modernization phase of the continuum. Others are flirting with APM, trying to understand what it is, defining what it means to them, or attempting rationalization without developing the metrics within the APM phase. Find your position on the continuum, and take steps to ascend to the next level on the continuum.

• **Leverage vendors, but realize their interests and yours may be different.** Large-scale modernization will require the assistance of modernization, migration, tooling, and services vendors. Favor them for a number of assignments: to work with your staff to help introduce new technology; for platform, database, and language migration expertise; and to manage large-scale projects. But realize that your interests — repeatable refinement of an application management mechanism — are not necessarily in sync with their goals — minimizing employee bench-time and maximizing revenues.

**ENDNOTES**

1 In the traditional approach to legacy modernization, services vendors locate the largest projects as their prime opportunities for revenue. Those projects aren’t necessarily a CIO’s top priorities, so the old model is broken. See the June 24, 2004, “The Legacy Transformation Business Is Dead” report.

2 Vision, context, and orchestration are the underlying principles of better planning that includes business plans, applications plans, infrastructure, and new project plans. See the February 4, 2008, “CIOs Must MAP A Strategic Application Plan” report.

3 Forrester recognizes four fundamental fates for an application — it can be left as is, modernized via several options, replaced through several options, or retired. See the January 10, 2006, “Got Legacy? Four Fates Await Your Applications” report.

4 Some services firms employ a model whereby the education of internal staff in the new technology is part and parcel of the engagement — the project is not a success unless the internal staff are an integral part of building it and learning the new technology on which it is built. See the April 14, 2004, “Modernizing Legacy Programmer Skills” report.

Forrester recommends that clients avoid attempting migrations without the help of firms experienced in the arcane knowledge needed for success. For example, to migrate from one database to another, internal staff would need expertise in the oddities that can occur with the old database, the new database, and moving between the two — information that will be costly to acquire and will rarely, if ever, be used again. See the August 7, 2002, “Don’t Tackle Legacy DBMS Conversion Programming Alone” report.