Answering the Custom Software Riddle

Executive Summary

Modern businesses need custom software applications more than ever before to operate efficiently, automate unique business processes, and stand apart from the competition. However, despite 40 consecutive years of coding language advancements and $85 billion in annual IT spending, the process of building custom applications remains light years behind. CIOs and business executives are forced to choose between two disappointing options: spend way too much time and money to develop the perfect application (which stops being perfect pretty quickly), or buy a commoditized, packaged application (that doesn't quite fit the business model without extensive, expensive customization).

What if there was a way to get the best of both worlds? Highly innovative software companies provide their customers with a platform to build their own, custom applications which instantly add value, and then seamlessly evolve to meet changing technology standards and business practices. However, a surprisingly low percentage of development organizations have adopted — or even seriously investigated — this kind of application platform technology. The loss of the laggards can be the gain of those that take action: there is a huge opportunity to revolutionize custom software development in the coming years.

Appian

Why Custom Software, and Why Now?

For better or for worse, software is the prevailing medium for running businesses. Mostly for better, companies document and automate operational processes through software; manage information and documents electronically; and interact with customers digitally through corporate websites, e-commerce, or mobile apps. Building these applications (not to mention connecting, upgrading, and maintaining them) is no small task, but the efficiency, interactivity, and engagement benefits far outweigh the up-front costs.

Theories and trends regarding how companies should acquire, build, and maintain their software applications have changed dramatically over the years, in an attempt to keep up with the quickly advancing technologies available, as well as the importance of software to businesses.

In the 1990s, Enterprise Resource Planning (ERP) systems rapidly became popular and brought with them widespread electronic standardization of data, reporting, and business processes across business functions (including HR, Manufacturing, Supply Chain, and Sales). Standardization made CIOs comfortable and increased organizational ability to comply with increasing regulation. It was touted to reduce operational risk and increase efficiency through adherence to "best practices" instead of "whatever they were doing before." Although ERPs have gone slightly out of fashion, the idea of buying multiple packaged business-purpose-specific applications with built-in interfaces, processes, and data structures has stuck around a lot longer.

The Software as a Service (SaaS) movement takes the same ideas about standardization, packages them up in shinier user interfaces with cuter product names, and rents them by the month in the cloud.

COOKIE-CUTTER AS A SERVICE

In fact, the Software as a Service (SaaS) movement takes the same ideas about standardization, packages them up in shinier user interfaces with cuter product names, and rents them by the month in the cloud. SaaS products come with obvious advantages in time-to-value, scalability, upgradeability, and often price; they remain a great option for many smaller, commodity applications that don't vary much by industry or organization.

Much like the United States Constitution, packaged software applications usually come with some means to be extended or customized, which customers make liberal use of to nudge the software to match their business a bit better or add necessary features. (For example, 59% of IT leaders surveyed by Forrester Research in 2014 felt that packaged software lacked sufficient functionality to meet business needs.) However, too many customizations can break an upgrade path, fracture user experiences and data sets, quickly eat up time and cost savings, and push the purchaser back to square one in terms of the original benefits of standardization or cloud delivery. (Multiply this process by every application in your enterprise, and you'll quickly see the ramifications.)

THE PENDULUM SHIFTS AGAIN

Major industry analysts such as Forrester, Gartner, and IDC – as well as everyone else you might talk to at a software conference -- believe that the enterprise software world is at a new inflection point. Call it The Age of the Customer or The Digital Business Revolution, the upshot is that now practically every business is online; everyone has some kind of CRM tool and a Facebook page for interacting with the world; and that's no longer enough. Brands can't just be modern; they need to be modern and different and memorable. In contemporary technological and economic times, businesses face increasing competition and exposure. Suddenly, everyone wants every opportunity to innovate, differentiate, and brand their companies. Whether it's how companies relate to customers, agents, suppliers, or their own employees, the challenge is to remain distinctive while gaining the benefits of automation and standardization, and of course, all while complying with thousands of different laws and regulations.

Packaged software could make them more efficient, but at the same time it would make them less distinctive.

An example: John Lewis, the largest retail department store in the United Kingdom, had a longstanding reputation for providing customized, fitted kitchen and home layouts for their customers. While their customer service was stellar, their reliance on manual operations for planning, executing and maintaining these orders was a constant challenge. The natural progression was to automate with software, but every existing application that might solve the approximate business problem did not allow John Lewis's desired level of made-to-order furnishings. Packaged software could make them more efficient, but at the same time it would make them less distinctive. John Lewis decided to build a custom application instead.

Forrester Research determined in a 2014 Global Survey that the demand for custom applications is now growing again, and they predict it will continue to grow in the future. Complementing the 59% of businesses who don't think packaged software can meet their needs, 50% of respondents felt that custom software was the key to being able to create a unique engagement experience with customers, partners, and employees. 34% specifically noted that their internal operations – which are only indirectly visible to customers – helped them achieve a competitive advantage and would therefore be highly reluctant to standardize or settle.

"What are your firm's motivations for developing business applications instead of buying packaged/standardized applications?"
(Top five responses shown)

Get the required functionality, which is not available from any software vendor	59%
Create a unique customer experience and engagement with customers, partners, and employees	50%
Protect our intellectual property and competitive position	38%
Achieve a competitive advantage in our internal operations (systems of records)	34%
Lower our total cost of ownership (TCO), as packaged software is too expensive for many tasks	34%

Base: 217 IT respondents from enterprise-size organizations in the US and Canada
Source: Forrester's Business Technographics Global Software Survey, 2014, Forrester Research, Inc.

While custom software only accounted for approximately 23% of Enterprise IT Spend in 2013[1], look for that number to increase as companies increasingly prioritize growth, engagement, and differentiation.

While custom software only accounted for approximately 23% of Enterprise IT Spend in 2013[1], look for that number to increase as companies increasingly prioritize growth, engagement, and differentiation.

Can't I Just Outsource This?
(And Other Easy-Sounding Solutions)

Custom software is vital to the continual success of many businesses. And here's the surprise: building custom applications has not yet been mastered. All of the obvious factors seem to be moving in the correct direction: a higher volume of talented coders than ever before; more powerful hardware infrastructure at the click of a button; and languages, frameworks, and services galore for everything from user interfaces to in-memory databases to biometric sensor integration.

However, with great power comes high expectations. Building applications that incorporate these newer technologies means more complex development using skills and methodologies that perhaps have not been perfected or formalized. Connecting systems and frameworks is itself an entire development project. Meanwhile, the scale of information and data grows larger, and the number of user interfaces to support grows larger as well. (User interface development is extremely time-consuming to begin with, and now has a multiplicative effect for each device.) Every time a new device platform or supporting technology is introduced, the development team must decide whether to update and retrofit existing applications, or risk them becoming obsolete.
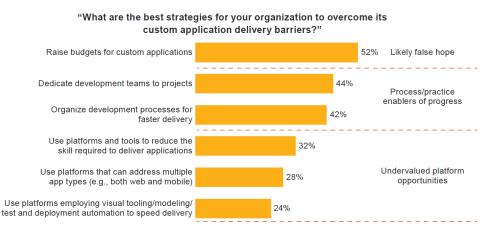
Businesses demand more from their IT departments than ever before, and change requirements more quickly as well due to various internal and external factors. Altogether, Gartner determined that application development productivity per full-time developer actually decreased 22% from 2010 to 2014.[2]

The longer and more complex a project, the more business and IT expectations will have diverged by the time it's complete.

Forrester interviewed developers and IT leaders in 2014 to understand the barriers they face delivering custom software, as well as paths to overcome or remove those barriers. 56% ranked "too many business priorities" as a top-3 problem. A 2012 McKinsey study on large-scale IT projects concurs: half of large projects with budget overruns could be traced to lack of business focus, unclear objectives, and shifting requirements as the primary cause. In general, the longer and more complex a project, the more business and IT expectations will have diverged by the time it's complete.

88% of those surveyed by Forrester indicated that their development lifecycle was too arduous or involved too much manual coding and infrastructure setup. Traditional development technologies and methodologies lend themselves to "high ceremony" deployments, with a lot of time spent on requirements validation, deployment, and testing. Finally 24% of responders indicated that siloed development platforms were a top- barrier: separate platforms and code bases for ERP, web, and mobile apps added significant time and complexity to application delivery.

When Forrester asked the aforementioned IT principals about strategies to speed up custom application development in the future, the most popular response (at 52%) was "Increase the Budget." Or, take the same technologies, operations, and processes that have faltered thus far, and perform them at a larger scale. (To paraphrase Forrester Analyst John Rymer, this is merely pouring the same bad wine into bigger bottles.) Not to mention, of course, that increased budget is both hard to obtain and frequently out of the control of the IT department.

"What are the best strategies for your organization to overcome its custom application delivery barriers?"

Raise budgets for custom applications	52% — Likely false hope
Dedicate development teams to projects	44%
Organize development processes for faster delivery	42% — Process/practice enablers of progress
Use platforms and tools to reduce the skill required to deliver applications	32%
Use platforms that can address multiple app types (e.g., both web and mobile)	28% — Undervalued platform opportunities
Use platforms employing visual tooling/modeling/ test and deployment automation to speed delivery	24%

Base: 50 IT and business directors involved with business application development decisions
Source: A commissioned study conducted by Forrester Consulting on behalf of Appian, November 2014

A promising 42% expressed interest in reorganizing development processes for faster delivery, which coincides with well-known industry trends around continuous delivery and agile methodologies; but only 24% of respondents thought that a low-code visual development environment – i.e. a High-Productivity application platform – would be a strategic asset moving forward. 28% were interested in the potential multi-device aspects of application platforms, to optimize delivery across web and mobile channels – a surprisingly low number considering the huge upswing in mobile application development over the past few years. All of these issues and viewpoints represent a huge undervalued opportunity for the 87% of custom application development projects using traditional coding languages (to the tune of $74 Billion in 2013 [3]) to immediately realize benefits from moving to an application platform approach.

There's an App Platform for That

The modern application platform allows businesses to reap the benefits of custom applications, while eliminating a significant portion of the friction, cost, and time required to create them. This is accomplished across a number of means and dimensions, so let's clarify some of the key features and benefits of a strategic, enterprise-grade application platform.[4]

MODEL-DRIVEN DEVELOPMENT

The first key capability is a level of abstraction beyond coding: application structure, business objects, business rules, user interfaces, and workflows should be represented and constructed in a visual environment. The platform should provide pre-built components and modules for abstracting out lower-level functionality (e.g. interface widgets, common integration points) but not make assumptions at a macro level about business practices.

The platform should provide pre-built components and modules for abstracting out lower-level functionality (e.g. interface widgets, common integration points) but not make assumptions at a macro level about business practices.

A common example of such a feature is a business process modeling paradigm for organizing application logic. "If warehouse inventory is low, order 1000 more units from the supplier, send a notification to the sales reps, and automatically request a contract renewal from Accounts Payable" can be represented very nicely and comprehensibly as a visual workflow, rather than a series of conditional code blocks. Furthermore, individual steps such as "query warehouse sensor," "invoke supplier purchase service," "send mobile notification, "and "request contract approval" are all modular components abstracted from the underlying code and services. Six months later, when the order quantity needs to change and the supplier adds a new step to their ordering service, it's an easy update to business rules and the visual process. This type of model-driven, Lego-block approach has several advantages over coding, while still maintaining a high level of customizability: lower development time, real-time feedback and validation, accessibility to a wider range of technical skills, and self-documentation. Business sponsors can quickly verify that the application logic and interfaces match their needs; the eventual application is far more likely align with actual business requirements and create value.

As a caution, certain low-abstraction products bill themselves as application platforms but are little more than moving traditional code into the cloud; this tactic could be useful for saving on infrastructure costs, but does not really transform or fix the major development paradigm.

BUILD ONCE, DEPLOY EVERYWHERE

Next, a modern application platform must enthusiastically accommodate multiple interaction channels. Customers, partners, and employees likely will need to use mission-critical or operational application from the web, along with a variety of mobile devices. For example, a complaint or order on a consumer-facing mobile app should instantly trigger internal operational processes, as well as be traceable and actionable on every system from an enterprise portal to a field rep's mobile device.

A smartphone is not just a mini web browser, it's also a camera, a GPS, a voice recorder, a signature pad, and a motion tracker. Native mobile apps are the gold standard for performance, usability, and device-specific functionality

Smartphone and tablet internet use continues to rise, along with rumors and promises of next-generation wearable devices that will also need to connect to enterprise systems. An ideal application platform will allow you to think about business applications, rather than web or mobile applications separately; and accordingly provide an interface-design tool that generates rich user experiences across all channels and devices simultaneously. Generating HTML5-compliant interfaces which are moderately usable on mobile devices is an intermediate step, but does not provide a true mobile experience or take full advantage of unique mobile features; after all, a smartphone is not just a mini web browser, it's also a camera, a GPS, a voice recorder, a signature pad, and a motion tracker. Native mobile apps are the gold standard for performance, usability, and device-specific functionality; yet should tie seamlessly into your enterprise systems rather than being another silo or separate development platform.

An application platform with a sophisticated multi-channel approach will drastically reduce interface development time in general, as well as ensure that mobile and embedded apps are connected to internal business processes.

THE FULL PICTURE: INTEGRATION AND INTEROPERABILITY

No application is an island, and an application platform can enable and expedite information flow across multiple systems. First, a set of pre-built connectors will create fast connections to service-enabled internal systems as well as external data sources and applications. Secure transport and authorization utilities can also help manage credentials, identities, and data exchange. A modern composite application will likely incorporate legacy or back-office data, sensor-type data from Internet of Things-enabled devices, and the many public data services provided by news organizations, government agencies, and API developers around the world. An application platform, for example, can make it easy to connect a wind farm field service app to a supply chain ERP, hundreds of sensors on each windmill, and weather forecasting web services.

No application is an island, and an application platform can enable and expedite information flow across multiple systems.

Once information is physically available, the next step is logically incorporating it into appropriate context to aid or automate decisions. Therefore an application platform should help transform and present information at decision-time: helpful capabilities for this include data transformation and virtualization, graphical reporting interfaces, and automated business rules.

Data transformation and virtualization allows multiple sources to be consolidated into business-friendly topics: a business-line executive wants to see the full picture of a customer, a complaint, or a product in one place rather than fetch information from individual systems, documents, and database tables and manually piece everything together. Reporting and analytics capabilities allow aggregation of large data sets into visual graphs that display meaning and trends. Automated business rules can take common decision patterns and evaluate them behind the scenes, leaving only the more complex choices and outcomes to busy end users.

Each of these components would take a lot of work to code individually, but an application platform that provides a built-in framework for these capabilities suddenly allows the production of extremely valuable, knowledge rich applications – and the re-use of legacy systems which store or process information and cannot be easily replaced. As a further benefit, the modern application platform can help an organization take full advantage of existing systems without the need to rip everything out and start fresh.

ENTERPRISE GOVERNANCE AND LIFECYCLE MANAGEMENT

One of the biggest misconceptions about application platforms, or any solutions that simplify development, are that they can't align well with complex application requirements or existing application development lifecycle processes. Organizations may think they have to choose between building hundreds of simple point-and-click apps with no oversight (the "citizen developer" model), or using entirely traditional development tools and methodologies in order to keep things under control. An application platform designed for strategic enterprise use helps bridge these gaps.

...the ability to reuse and integrate central assets is another key differentiator between an enterprise-grade application platform and a lower-impact one.

First, an application platform should provide a centralized governance and security model, delegating privileges across different users and departments. Therefore, depending on how the application development teams are organized, each department or function can control their own applications while still using central resources and utilities. Along those lines, the ability to reuse and integrate central assets is another key differentiator between an enterprise-grade application platform and a lower-impact one. Rather than departments writing separate applications in a vacuum, applications should share common user interfaces, data objects, and business logic where appropriate. To accomplish this, all artifacts must be version-controlled and be able to trace their dependencies and connections. Finally, a platform must fit into existing Application Lifecycle Management controls and processes, including the ability to port artifacts from development to test to production; perform automated testing; and roll back changes when necessary.

Appropriate change management and governance capabilities allow developers to incorporate an application platform into their best practices, rather than abandoning all oversight or control of a proliferation of mini-apps. With the right platform, each existing application will become more valuable as new applications are added to the portfolio, not less.

PORTABLE, SCALABLE ARCHITECTURE

An application platform should be available as a cloud service, an on-premises installation, or a hybrid of both, depending on the needs of the customer. An Application Platform as a Service (aPaaS) removes the infrastructure maintenance burden from the customer and allows for very fast ramp-up and deployment of new environments. In addition, the aPaaS provider should incorporate dynamically scaling cloud resources with a level of built-in automation and usage monitoring. (Simply telling the customer "Here is your Amazon EC2 server, now install our software and check the performance console" is not a true Platform as a Service.) As your need for multiple applications grows, your hardware allocation should grow accordingly – platforms with limits on business objects, workflows, or application complexity will force undesirable compromises of business value.

However, organizations that are not technically, financially, or legally ready to move certain transactions or operations into the cloud should still be able to take advantage of the other benefits of an application platform. An in-house Information Technology or Enterprise Architecture team should be able to install and host all components of the platform in-house on commonly used hardware and operating systems. Furthermore, an organization might want to take advantage of cloud and on-premises deployments simultaneously, so any applications generated from the platform need to be portable between environments.

All applications built and business data consumed must be the property of the customer, not the platform vendor, and should be movable to or from the cloud at any point. This helps minimize risk and infrastructure lock-in should IT priorities change in the future (which they most certainly will).

PUTTING IT ALL TOGETHER

Overall, the modern application platform is extremely valuable to deliver custom applications more efficiently and, just as importantly, to improve and evolve them to meet future needs. Once a "platform application" is built, it is much more efficient to test, validate, and update when business requirements change in the future; it is also easier to connect to other applications and systems for maximum value.

The correct application platform will innovate as rapidly as the market, and take all your applications with it.

A Custom Digital Future

Technology and business are evolving fast, and your customers are paying very close attention. How your organization uses technology to attack business challenges can either be a huge enabler, or a costly series of impediments. Gartner estimates that in 2014, businesses spent 49% of their enterprise software budget on supporting legacy systems: not innovating, not snagging new customers, just keeping the lights on and paying a king's ransom for applications that are probably cumbersome and technologically obsolete. On the other hand, a customer who purchased Appian Cloud in 2013 for application development would have paid exactly $0 extra for software upgrades, more attractive and personalized UIs, faster performance, better-organized data, and shiny new mobile features across every single application. The correct application platform will innovate as rapidly as the market, and take all your applications with it. Choosing an application platform and strategically incorporating it into an enterprise application development approach can revolutionize the way your business and your technology run, both today and far into the future.

1. IDC "Semiannual Software Tracker," May 2014

2. Source: Gartner "IT Key Metrics Data 2015," December 2014

3. IDC "Semiannual Software Tracker," May 2014

4. Validated by Forrester Research: "The Move Toward Modern Application Platforms," December 2014

Appian

As the market leader in modern Business Process Management (BPM) software, Appian delivers an enterprise application platform that unites users with all their data, processes, and collaborations — in one environment, on any mobile device, through a simple social interface. On-premise and in the cloud, Appian is the fastest way to deliver innovative business applications.

For more information, visit www.appian.com