

NINE ESSENTIALS TO CREATE AMAZING BUSINESS APPLICATIONS FASTER

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OVERVIEW

Our global marketplace today is a dynamic, interconnected and highly competitive arena, one where enterprises of every size struggle to win revenue share and new customers. Organizations that understand how to harness technology so they can quickly innovate, be more productive and efficient are well-positioned to gain new pieces of the pie. Technology has not only profoundly changed our professional lives, but our personal lives as well. The ubiquity of mobile devices and social media gives us an addictive, always-on capability. This ability to constantly connect to and interact with customers, employers, friends, family and the world at large means that all our interactions—personal and business—now flow into a single stream of communication.

TECHNOLOGY HAVES AND HAVE NOTS: THE GREAT DIVIDE

Technology is so embedded into business and customer transactions that it's now become the make-it-or-break-it differentiator for companies, empowering them to perform better in the market and become leaders, influencers and visionaries in their respective space. Here are a few examples of companies using technology in fresh new ways to meet the needs of customers:

- ▶ **Uber**, an app for requesting private car service is now disrupting traditional taxi services in more than 26 countries and 60 cities worldwide. It was recently valued by investors at around \$3.5 billion.
- ▶ **Airbnb**, which has booked stays for over 11 million guests in hosts' private rooms, apartments, castles, igloos, and tree houses, sees over 37% of its traffic from mobile devices.
- ▶ **Spotify** is one of several music sharing companies that have changed the way we consume music. Apple was forced to respond via their acquisition of Beats (after they had fundamentally changed the music world with iTunes).
- ▶ **Tesla cars** is disruptive in multiple ways – through the use of electric car technology, their approach to selling cars directly to the consumer, and offering customers the ability to download software over its cellular connection.

TECHNOLOGY TRENDS DEMAND A NEW APPROACH TO APP DEV

Cloud, mobile, social, big data are all hot topics today and are covered by myriad news sources, both technical and

nontechnical, every day. But underpinning all of these technologies is the application. Think about it: we use cloud as a deployment vehicle for applications, the value of our mobile devices are driven by mobile apps, and social is all about applications that spur collaboration, sharing, communication, and productivity. Big data technologies analyze the data and usage from applications, and provide analytics or other sources of data that are surfaced in an application.

This means modern enterprises need to adopt an approach for application development that:

- ▶ Enables the business with a nimble approach, delivering application functionality fast.
- ▶ Offers collaboration functionality, so users can share information and drive better business decisions through access to data they trust.
- ▶ Supports the organization so that it is able to rapidly leverage all available technology from cloud technologies (public/private), a mobile interface to support their workforce, and social channels.

CHALLENGES: IT/DEV OVERLOAD

Mobile devices and 24/7 connectivity have permeated every aspect of our personal and professional lives, blurring the lines between the two. As a result, users expect every application—business or otherwise—to offer a compelling user experience with rich functionality and an attractive and easy-to-use interface.

However, IT/dev teams are facing enormous challenges in terms of meeting increasing demands for rich mobile and web applications, including tighter budgets and resource shortages. At the same time, there is pressure from the organizational leadership for IT to innovate and differentiate the business. Another challenge is the explosion in data that needs to be managed and leveraged. Organizations need integrated and easy access to all their data sources, whether in the cloud or in-network, to get high-quality information about customers and the marketplace and proactively drive innovation and better business decisions.

The end result is that IT simply can't keep pace. A recent Vanson Bourne¹ study with 700 IT decision-makers from mid-sized organizations (100 – 1000 employees) backs this up. This global survey crosses all major industry sectors with survey participants stating that:

- ▶ 6 months: Average time to develop and deploy news apps

- ▶ 85% feel pressure from leadership executives, sales and marketing, and customers for faster delivery
- ▶ 88% want to deploy more frequently
- ▶ Only 18% say their current processes are agile enough to deliver apps as quickly as they like

NINE WAYS TO SPEED ENTERPRISE APPLICATION DEVELOPMENT

One way to address this problem is to adopt a rapid application development (RAD) approach by simplifying the development process so that 1) existing developers become more productive and 2) the current development pool is expanded, enabling technical business users to be more involved in the app dev process. Here are nine essential approaches to help your organization start building compelling business apps faster.

1. CAPITALIZE ON COMMODITIZATION: DON'T OUTSOURCE YOUR DIFFERENTIATION

Technology advancements have made it possible for IT/Dev Ops to focus more on building apps. Companies use web frameworks and automation to speed development. They use packaged apps and outsourcing to reduce or even eliminate the need to develop apps themselves. They use the cloud (SaaS, IaaS, PaaS) to speed delivery while reducing or eliminating the need to develop and manage the infrastructure (datacenter). The industry has started to use a commodity-based approach so that IT can deliver faster, which has two elements: infrastructure (including servers, networking and storage, virtualization, and databases) and applications. These trends are driven by cost-reduction initiatives, but another key consideration is revenue generation and fostering innovation.

Determine Your Point in the Commodity Curve

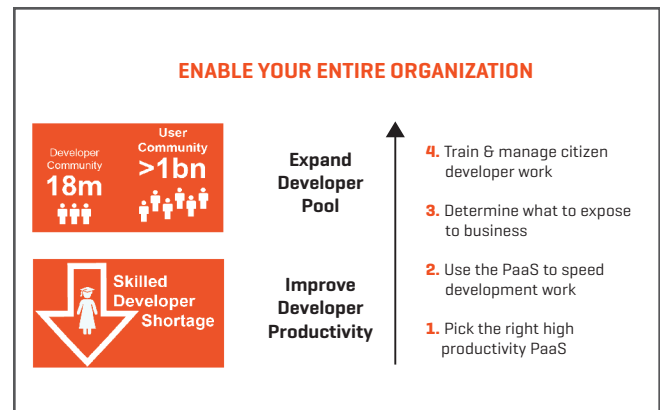
Organizations need to make decisions about where they fit on the IT commoditization curve. If they don't leverage commoditization effectively, they will spend money, time and resources on projects and initiatives that do not provide value. On the other hand, if they rely on commoditization or take a lowest common denominator approach, they risk outsourcing their differentiation or they risk squandering a potential competitive advantage.

On the application side, organizations need to consider which applications they should outsource as a commodity and which applications they plan to take ownership of to drive competitive differentiation and innovation. Most organizations will be well served to leverage packaged or SaaS-based solutions for basic functionality like HR, ERP and inward-facing CRM. However, when it comes to applications that drive the

customer experience or applications that provide process speed, business agility and business innovation – it may be to your best advantage to build and manage these applications more directly.

2. EMPOWER YOUR ENTIRE ORGANIZATION

Traditional organizations still look for the CIO/CTO to provide technology leadership. Forward-looking organizations want to engage the acumen of all their business users to increase their technology leverage. This relatively new way of looking at technology is reflected in the new chief marketing officer (CMO) role. In many cases, the CMO drives the technology agenda and increasingly drives the technology spend. And this makes sense because people entering today's workforce have grown up with technology integrated into every aspect of their lives, which means now there is much less of a clearly defined boundary between developers and non-developers.



Many companies are at the point where they need IT/developer resources to focus on higher value work and at the same time, enable their users. This means moving away from the IT ticketing concept, where a work request is opened followed by a long wait. So whether or not you embrace Gartner's 2013 prediction that 25% of new business apps will be built by "citizen developers"—it is certainly worth consideration.

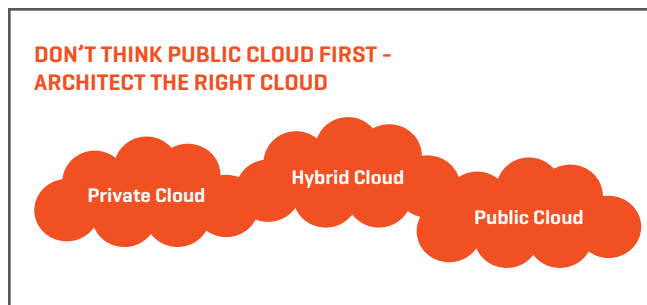
For example, think about the number of apps being built by non-IT types are out there already—from Microsoft Excel, Access and others to apps built around business intelligence (BI) and analytics tools, or built with Sharepoint, wikis or a high-level 4GL tool. If you don't have a comprehensive strategy in place, you can end up with a "shadow IT" problem such that you'll eventually be stuck holding the bag.

Instead of jumping straight to the citizen developer approach, a better way is to leverage cloud technologies and transition there via the development organization. Pick a high-productivity Platform-as-a-Service (PaaS) solution and let your developers use it. Let them learn the best way to use it and speed your more traditional development efforts. Next, determine which aspects of the platform make sense

to expose to technical business user types; pick a discipline and a role like marketing analyst, sales operations, financial analyst, and make it available to these citizen developer types. Train them and manage their efforts so that you make them more productive – and that you do so in a way that will not exacerbate your Shadow IT challenge. In other words, take a measured, step-by-step approach to growing your developer pool.

3. PICK A PAAS TO SUPPORT YOUR CLOUD IMPLEMENTATION: NOW AND IN THE FUTURE

While public cloud companies receive the majority of today's hype – whether it's Amazon, Google, Salesforce or some other – your organization likely started in the cloud with SaaS applications. Moving forward you need to consider how public, private and hybrid cloud capabilities factor into your overall architecture approach. SaaS has been so successful in the software arena, many organizations are now seriously considering using the same cloud-based approach to development with a Platform as a Service (PaaS) provider.



When it comes to PaaS, you should consider which of these deployment options work best:

Cloud options. Select application tools and infrastructure that provides you with choice in the cloud. While public-only options may seem appealing, they limit your flexibility. Beyond the lock-in approach, you lose the option to run your applications in your own datacenter or to implement your own private cloud using other publicly hosted options. And don't just plan for today because your business requirements may change, or you may have new or different customer, partner, legal or geographical considerations. Be sure to anticipate these kinds of changes as part of your architecture design.

Use a hybrid approach. Think about taking a hybrid approach to separate your dev/test environment from your production environment. Run your dev/test in the public cloud so that you have instant access to what you need, so you pay for only the resources you use—without the costs of provisioning. Make sure you have a solution in place and then run your production application on your private cloud instance. Make sure you have a solution in place that allows you to easily replicate your environments on different clouds and that your DevOps

process accommodates the move between clouds. This means what you deploy to your production environment will be the same as what you tested.

Determine scale. For app workloads that you run in your private cloud, determine how you are going to scale. For regular growth, it makes sense to scale your private environment. If your growth is fairly dynamic, you'll need measurement and notification capability to scale things effectively; eventually, you may want to pursue auto-scaling. But for seasonal or peak volume, you may need to architect so that your application bursts into the public cloud. This provides more flexibility and allows you to avoid adding physical capacity that will go unused most of the time.

The right type of cloud implementation requires the following considerations:

- ▶ Which app dev tools and infrastructure provide cloud choice
- ▶ What kind of mixed environment will best support your dev, test and production needs
- ▶ Does your private cloud app needs to burst to the public cloud
- ▶ Consider financial [CapEx costs, long-term ROI] and management implications

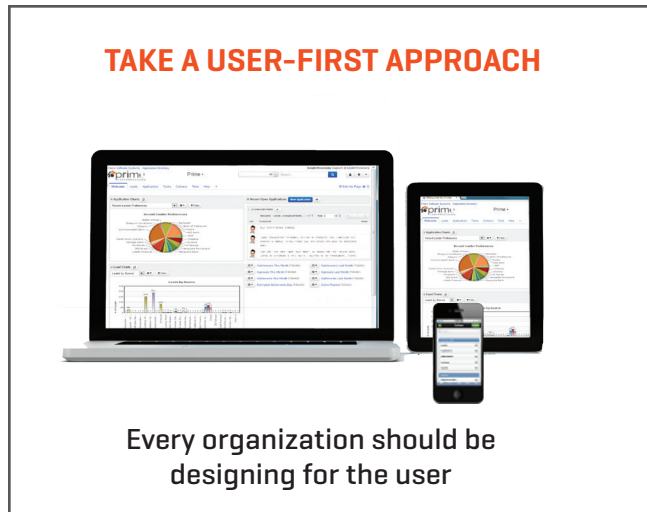
Determine ROI. Work with the finance team to determine the financial benefit / tradeoff of using the public cloud. Many organizations can benefit from the reduction in capital expense from diminished need of physical servers. Be sure to consider potential physical infrastructure [space, cooling, networking] and IT management cost reductions.

4. THINK "USER FIRST" IN YOUR APP DESIGN

An emerging trend is to drive the user experience from a mobile perspective called "mobile first." It's something of a misnomer because the philosophy behind it is to ensure that the design experience works effectively across the entire spectrum of digital devices. A more appropriate name for this approach might be "user first," where the experience is designed for the user based on his or her environment, the type of application, their work and lifestyle, and other preferences.

This approach is important because all of us at one time or another have had unsatisfactory experiences with apps. As a

customer, if we have a sub-optimal experience, we will likely quickly move to another option. This reaction has a direct and negative impact to the bottom line. For employees, the impact of a poor application experience can impact productivity, decrease employee morale and drive dissatisfaction. So, either scenario can have a negative impact on the business. Regardless of the deployment choices that you make, the user experience should be front and center in your design and architecture approach.



Designing for the user is complicated by multiple factors:

- ▶ **Device diversity.** There are a wide range of types of devices that need to be supported (Android, iOS, smart phone, laptop)
- ▶ **Screen size.** Different phones have different screen real estate sizes depending on the device.
- ▶ **Phone vs. Tablet.** In addition to screen real estate, smart phones and mobile devices are being used in different scenarios, which should be factored into the design experience.
- ▶ **Diverse usage.** People use their mobile devices in many locations—at work, at home, in the car, traveling, commuting, outside, and shopping in retail stores. You should consider these factors based on the relevance of your application.

From a technical perspective, you have even more challenges:

- ▶ **Integration.** You don't want your mobile app to be a silo so you need to integrate it into your existing environment, including existing apps and data sources.
- ▶ **Back-End Infrastructure Support.** Be sure to select the optimal back-end infrastructure to support your mobile apps to provide consistency across web and mobile apps. The right back-end infrastructure should let you

decouple the back-end from the different user interface requirements.

- ▶ **Native or Generic Web Browser Capabilities.** It's critical to ensure you have the right blend of native or generic web browser application capabilities. While native apps that are written for each device provide the ultimate experience, the cost is prohibitive for your typical enterprise business application. Often it makes sense to go with a hybrid approach that leverages a container-based approach that allows you to leverage specific platform capabilities (such as calendar, contacts, and camera) by writing code that is not device specific. Organizations should also consider platforms that allow them to develop, deploy and manage mobile apps visually, without having to write a lot of code.

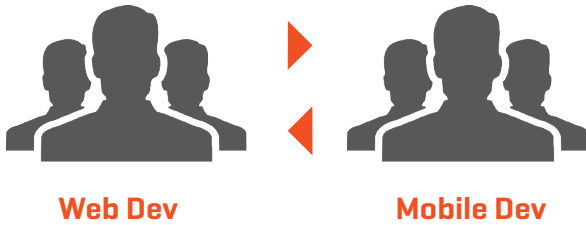
5. INTEGRATE YOUR MOBILE DEV EFFORTS

Silos exist in every business, even small ones. From an IT perspective, many organizations experience communication and alignment problems between IT and the business. Business is often not happy with the quantity, quality and timeline of apps, while IT views the business side as not knowing what it needs nor understanding the challenges IT must overcome. As you try to eliminate this disconnect between business and IT, you want to avoid introducing another silo between web and mobile development.

Considerations to avoid creating mobile app dev silos:

- ▶ **Leverage an "API first" approach.** The benefits of a service-based approach will help your mobile efforts. If you take an "API first" approach, the APIs can be used to support your mobile efforts, providing consistency and reuse of back-end business logic that can be used across your mobile and web apps. Some solutions even take a model-driven approach where the user defines the application model, and the solution automatically generates the server components. In addition to providing consistency, this helps reduce the development effort.
- ▶ **Deploy a combined web and mobile development environment.** If possible, think about leveraging a combined infrastructure to support your mobile and web efforts. While many PaaS solutions now offer mobile capabilities, not all mobile support is the same. Make sure that the PaaS solution provides the ability to develop a hybrid approach so that you can meet the user experience needs of your application.
- ▶ **Cloud-enable your entire app infrastructure.** While you are looking to re-platform your application infrastructure using cloud principles, it makes sense to leverage the cloud to support your mobile efforts. Cloud-based options bring the same economic benefits and flexibility benefits to mobile development that it does elsewhere. There is no reason not to leverage your PaaS to support mobile.

DON'T CREATE ANOTHER SILO – INTEGRATE YOUR MOBILE DEV EFFORTS



- ▶ **Use a hybrid mobile approach to decrease the need for scarce mobile dev resources.** While some applications demand native capabilities, such as gaming or highly interactive apps, most organizations don't have the wherewithal—or the luxury of time—to build custom apps for each device. A good compromise is a hybrid approach that allows you to develop compelling applications using standard development approaches. In fact, the best solutions will allow you to avoid code almost completely through the use of a point-and-click, drag-and-drop graphical development environment. To best integrate your development efforts, a single development environment that supports both web and mobile app dev efforts is key.

Some organizations choose to keep mobile separate at the onset, and then they work to integrate the development efforts after they have socialized mobile. In any case, it's critical to think about the integration points that are necessary to eliminate barriers to success.

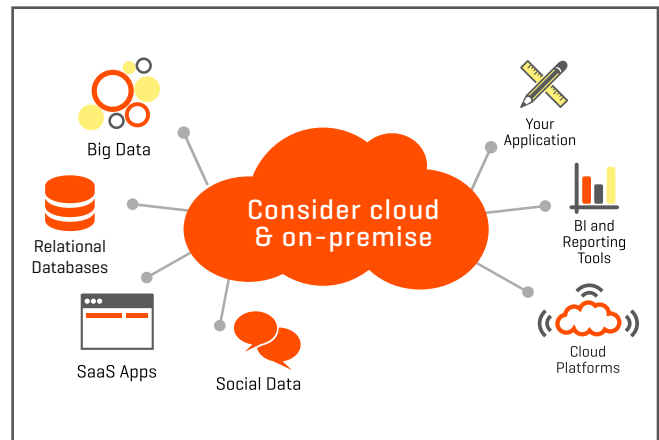
6. DON'T SEPARATE DATA INTEGRATION AND APP DEV – USE A COMBINED STRATEGY

The 2014 Vanson Bourne PaaS survey⁷ researched the data integration challenges that many medium-sized businesses currently face. The study showed that:

- ▶ Only 10% of all respondents said they require just a single data source for each new application created.
- ▶ Over two-thirds (68%) report that they require multiple sources to be integrated on half or more of these applications.
- ▶ For an average application, 81% require two or more data sources.
- ▶ Three in five (61%) do not have full access to each required data source.

This data is not surprising when you consider the heterogeneity that exists in many organizations, even small ones, and the explosion of data volume, variety, velocity and complexity.

As a result, application development efforts relating to integration take too long, lead to unanticipated costs, and involve too many manual steps. There are many different application types that are deployed differently. They can be deployed in the public or private cloud. And the same is true for data—it can exist on the on-premise network or in the cloud or both. To place the burden on the application developer to navigate this environment and to address all of the different app dev scenarios is a recipe for disaster. So it's important to consider how you will integrate all your data across your application development infrastructure.



The solution for this requires the ability for a public cloud app to access data in another public cloud or access on-premise data. And on-premise applications need access to other on-premise data sources as well as data in the public cloud. This all needs to happen securely, without opening holes through the firewall, and still retain optimal performance for real-time application support.

7. THINK ABOUT THE ENTIRE SUPPLY CHAIN

In the business application process, the focus is often on the development stage, in part because of the separation between Dev and IT Ops. But it is equally important to consider every stage of the software supply chain, including:

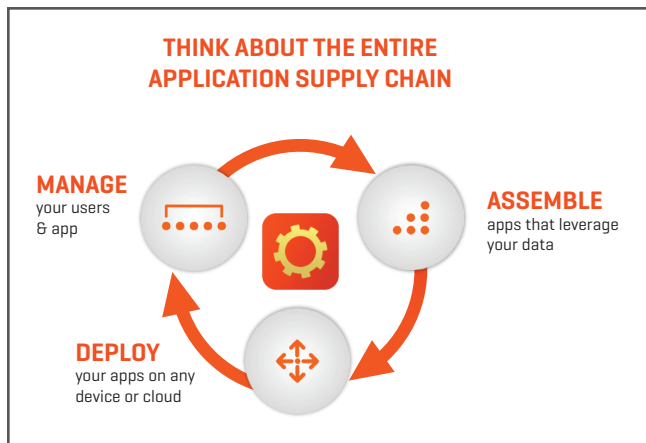
- ▶ Manage Your Users and App
- ▶ Deploy your apps on any device or cloud
- ▶ Assemble apps that leverage your data

It's important to think about the lifecycle in the context of the development approach that you take. For example, the approach that you need for applications developed by a 4GL developer or technical business user is different from applications developed by traditional coders.

PaaS solutions are high-productivity solutions targeting rapid development with minimal code that integrate the entire lifecycle into the PaaS solution. With PaaS, the business developer does not have to deal with version control for code,

build / compile processes and manage deployment because these activities are abstracted by the platform. This means the business developer is free to focus on developing the application model and user interface.

High-control platforms that focus on traditional coders are primarily focused on managing the DevOps process, but once the application is coded, the PaaS environment makes it easy to deploy, scale and manage the applications.



8. SAAS, IAAS OR PAAS—DETERMINE YOUR [X]AAS STRATEGY

To be successful, you also need a comprehensive XaaS strategy that considers all the requirements from the entire supply chain, which will in turn help you determine the best service approach. If you start at the infrastructure (IaaS) layer, you need to consider the following:

- ▶ Compute, storage (block and object), database services (relational, NoSQL and other types)
- ▶ Operating system and bandwidth (incoming and outgoing requests) considerations
- ▶ Regional support considerations
- ▶ SLAs, including uptime for compute and storage
- ▶ Load balancing & auto-scaling support
- ▶ Alignment with your hybrid or private “burst to the public” strategy
- ▶ Alignment with OpenStack or other preferred architectures
- ▶ Pricing

On the opposite end of the scale is SaaS. While there are technical and business considerations, your SaaS application selections will likely be dominated by the business team. They will likely take the lead in the application selection. While you may influence the decision, if your approach is too heavy handed, you risk alienating the users that you are trying to support. And like it or not, you’ll probably be stuck integrating

and governing the application so it’s wise to focus your efforts here.

Fully explore PaaS as a viable option. It may be your best route to help your organization leverage applications for competitive differentiation.

9. NOT ALL PAAS SOLUTIONS ARE CREATED EQUAL

Application infrastructure, including middleware and development tools, are available as a service in the cloud, which characterizes Platform as a Service. Gartner defines a PaaS that is designed to enable runtime deployment, management and maintenance of cloud business application services an application PaaS (aPaaS). Gartner further categorizes aPaaS as into High-Productivity and High-Control solutions described here:

- ▶ **High-Productivity solutions** manage the entire development, deployment and run-time aspects of an application. This starts with a model-driven development environment and continues with a deployment model that simplifies the typical build/deploy process and includes an application runtime that is cloud-based (both public and private).
- ▶ **High-Control solutions** focus primarily on the deployment and runtime aspects where developers use the tool of their choice to develop the code, and the High-Control PaaS then takes over with managing the deployment and run-time aspects of the application.

IT’S NOT HIGH-PRODUCTIVITY VS. HIGH CONTROL

Most likely your organizational requirements need High Productivity and High Control options. Just like technology heterogeneity is driven by different requirements, your PaaS selection needs to be able to accommodate different styles of development.

Consider these factors:

- ▶ **Different applications call for different technologies.** One-size-fits all technologies don’t exist, a key reason for the current heterogeneity. Application requirements should drive the type of architecture and technologies used.
- ▶ **Systems of records and systems of engagement.** Applications designed for stability and performance that are used to manage key business transactions mean different requirements than quick-turn applications that change dynamically.
- ▶ **Varying skill sets.** Development organizations are already segmented by skillset (GUI/web developer, back-end developer, DB). Your platform should provide capabilities that are mapped to your different developer skillsets (including citizen developer).

SUPPORT ALL YOUR DEVELOPER RESOURCES

To put it simply, organizations usually have multiple types of developers—and you need to support them all. PaaS makes it possible to support your more experienced, traditional coders who need the control platform to help them more easily manage code-based application development. It also empowers those technical business users (including 4GL or GUI type developers) who have identified a critical need for a specific application and need a productivity platform to get it out the door quickly.

The good thing is that cloud-based innovations have made it possible and even best practice to achieve support for both of these development patterns because of the following characteristics:

- ▶ Cloud / PaaS is an enabler. In the past, it was too difficult to support both development approaches. Now that these are available in the cloud, it is feasible for organizations to leverage both.
- ▶ Service-based approaches that leverage an API abstraction layer make it easier for applications developed with different technologies to coexist seamlessly.
- ▶ Data integration capabilities now exist within the PaaS environment that make it easy to integrate data that sits behind the apps.
- ▶ PaaS solutions that provide support for both approaches allow you to integrate efforts between your citizen developers and your traditional coders. It is now possible to create a single enterprise application or family of applications that leverage the best of both aspects.

If your organization does have a need to support both of these development patterns, you should consider a best-in-class PaaS provider that offers both control and productivity platforms.

High Productivity aPaaS

- ▶ Easy to use
- ▶ Fast, rapid results
- ▶ Includes development environment
- ▶ Targets GUI developers

High Control aPaaS

- ▶ Cloud-enables existing approaches
- ▶ Focused on DevOps / deployment
- ▶ Uses existing development tools
- ▶ Targets traditional Dev & IT Ops

IT'S ALL ABOUT CHOICE

You need to speed your custom development efforts – development efforts that span different applications, different developer skill sets and different technologies. You need to leverage technology that lets you capitalize on your data and deliver powerful applications that will take your business to the next level.

Progress Pacific includes a service-based PaaS that delivers the technology you need to develop and deploy apps faster, in either a high-productivity or high-control platform, or both, from Modulus, a Progress company.

At Progress we're providing the choices your business needs to thrive right now—and in the future. Progress Pacific PaaS provides a cloud-native solution to develop and deploy apps faster. Progress Rollbase, the rapid application development capability of Progress Pacific, gives you an intuitive, easy-to-use approach that removes the complexities of application development and data access, so developers and businesses can focus on solving critical market challenges and business problems. Modulus is a high-control platform that allows developers working with Node.js and MongoDB the ability to easily host, scale and manage Node.js applications. This means you free your developers to focus on building amazing applications and eliminate the work involved in their deployment and management.

Progress Pacific is an intuitive, easy-to-use platform where the complexities of application development and data access are removed, enabling developers and businesses to focus on solving their market challenges and business problems.

For Progress OpenEdge customers, Progress Pacific can help you extend the business logic you've invested in and take it forward into today's cloud-enabled, mobile-delivered environments. Pacific brings together all the benefits you've come to expect from Progress—rock-solid reliability. Flexibility in rapid development. Stable, reliable connections to critical data. All under one powerful platform and delivered with an amazing user experience.

LEARN MORE

For more information, visit progress.com/pacific or call us at 1-781-280-4000.

¹ From a 2014 Vanson Bourne study: "PaaS and the Future of Application Development."
Download a complimentary summary: <http://forms.progress.com/forms/art-PaaSforAppDev>



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