Low-code Platforms:

Paving the Way for Modern Enterprise Application Delivery

WaveMaker

Introduction

Marc Andreessen once famously said “Software is eating the world” to refer to the software-driven innovation revolution and the need for every company to become a software company. Software is delivered in the form of applications - IT’s home turf. Then, why is IT still struggling to enable enterprises steer through today’s challenges? Why haven’t CIOs been able to expand their role as leader of a customer-facing function? Because traditional application delivery is broken and cannot keep up with demands of the digital age. However, Low-code Platforms are emerging as key enablers to innovation by simplifying the development and deployment of custom enterprise apps. We explain how you can create an innovation sandbox with Low-code Platforms so that you can stay ahead of rapidly evolving customer expectations and digital disruptions.

Table of Contents

1.

The New Normal

The Internet, cloud computing, mobile and other technologies have catalysed the digital space beyond measure. Today, enterprises are cognizant of the power of software but have to be wary of the new trends that are changing the game forever. Many leaders continue to be in denial about the power of digital trends that are radically transforming the business landscape. But the adoption of agile, innovative and disruptive technologies is causing enterprises to break sweat in the way they operate forcing them to adapt or perish.
Businesses can no longer afford the status quo. The competition is constantly innovating, so standing still is equivalent to moving backwards. It is time to face this new dynamic and begin to plan for your organization's digital transformation.

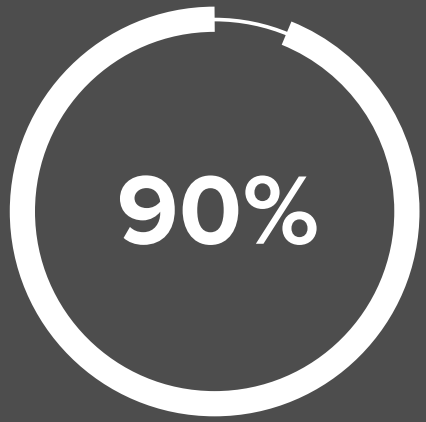
Trending to Upending

Here we have outlined the key trends that are impacting enterprise application delivery. Each of these trends is not an independent phenomenon but a group of closely related phenomena that not only influence, but also act as a catalyst for the others.

Mobility

In the last few years, not only have the number of mobile devices surpassed PCs, but users now turn to their mobile devices first. Ever since mobile apps entered the enterprise scene, they have ushered in new forms of collaboration, communication, and business efficiencies. The number of devices managed in the enterprise increased 72% from 2014 to 2015[1] and now, 3+ devices are used daily by an employee for work activities.[2] With the diversity of screens and form factors exploding, enterprise mobility has become the key strategy for every business to empower and manage employee mobility in order to meet security, agility and productivity demands.

Number of devices managed in the enterprise increased 72% from 2014 to 2015



90% of enterprises say that the use of consumer or individual services used for work is pervasive today

Consumerization

The distinction between expectations for consumer and enterprise applications has rapidly narrowed due to the impact of consumer-originated technologies on enterprises. 90% of enterprises say that the use of consumer or individual services used for work is pervasive today including Dropbox, Google, Skype, LinkedIn, Facebook and other social networking sites.[3] 49% of these sites are used with IT approval, and 41% are not.[4] To achieve the greatest user adoption and long-term success, there is a conscious effort to move away from a purely utilitarian approach to one that strives to deliver an experience for that meets the same standards evident in consumer products.

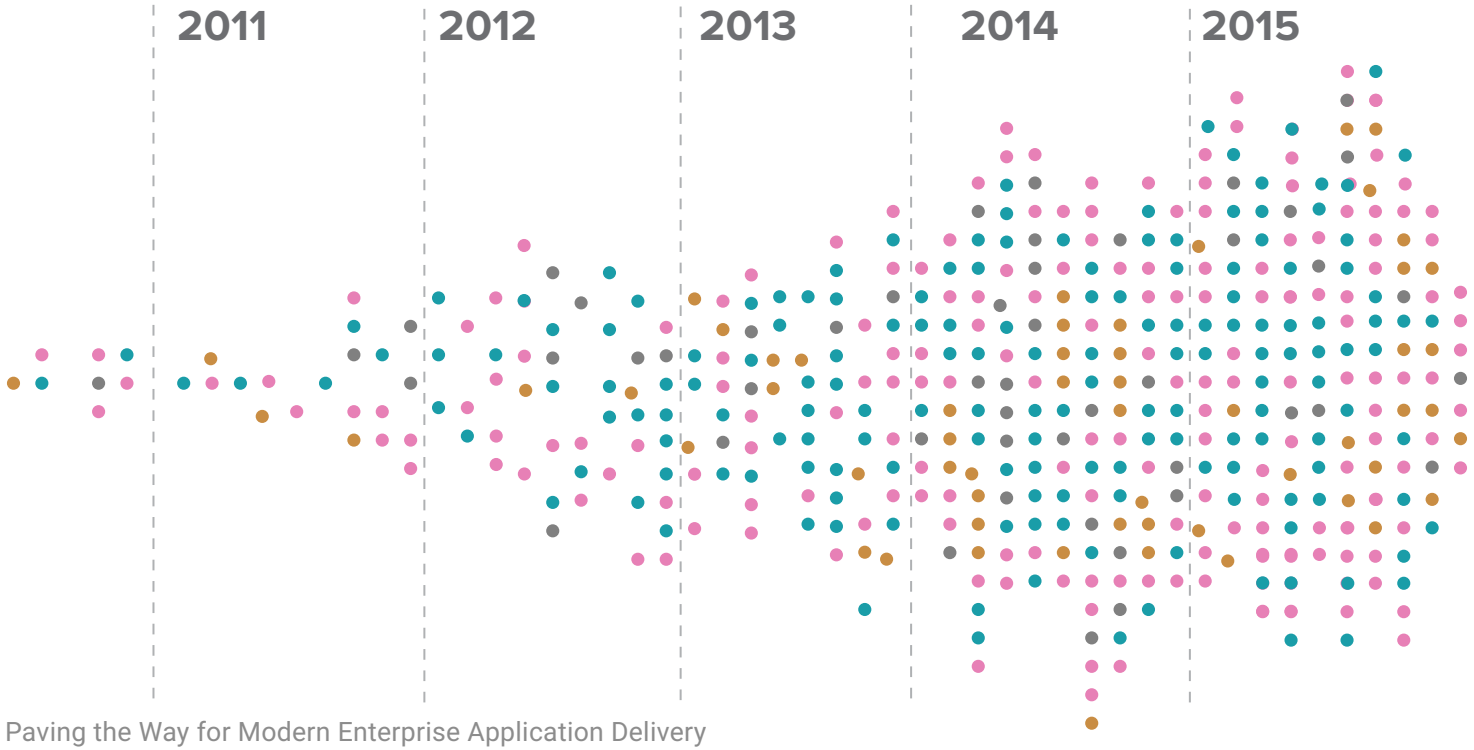
Containerization

Perhaps the biggest story in the development and DevOps circles over the past couple of years has been the explosion of containers, with Docker driving the path toward developer and enterprise adoption. Docker's express growth is already revolutionizing continuous delivery. The influence of containers continues to grow, beginning to move beyond mere optimization to transformation on the way IT builds and delivers applications.Several enterprises are looking at containers as an alternative to virtualization and cloud computing, at least for the needs of long tail business applications.

"The influence of containers continues to grow, beginning to move beyond mere optimization to transformation on the way IT builds and delivers applications."

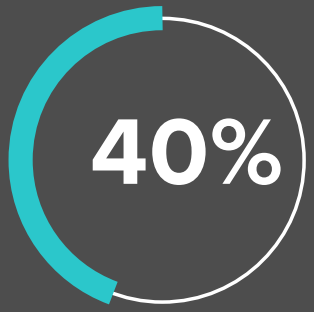
API Growth

With the dawn of cloud computing and proliferation of apps, companies are exchanging data and services at an ever growing rate. APIs can increase agility by de-coupling and exposing business processes. The past few years, however, have seen such explosive growth that the API space is evolving more rapidly than ever before. In 2015, as many as 40 APIs were being added per week to the Programmable Web directory, and the total number of APIs stood at around 15,000.[5] The key thing to consider here is that these numbers are based on publicly available APIs and do not reflect any private or internal API growth at all, which some estimate may even outnumber the public total. The future RESTful APIs will drive not only the exchange of data but also influence enterprise architecture.



Data Deluge

The amount of data being generated globally is growing at a rate of 40% per year.[6] Add to that the complexity of an ever-connect world of Internet of Things. Forecasts indicate that there will be 20.8 billion connected things (IoT) by 2020.[7] As enterprises capture more data from more sources, they are bound to experience greater growth rates for both structured and unstructured data. Since data forms the crux of business applications, enterprises will have to prepare to manage data integration from disparate internal and external systems.



The amount of data being generated globally is growing at a rate of 40% per year

Microservices

Microservices are small, single-purpose applications that collaborate using APIs to deliver services. Even though microservices have been used for a while, the increasing popularity of cloud computing, containerization, and APIs has made microservices more reliable. In many organizations developers are already employing microservices architecture whether management knows it or not. Early signs indicate this approach to code management and deployment is helping companies become more responsive to shifting customer demands. Microservices is poised to take scalability and continuous delivery to the next levels in the years to come.

What's keeping the CIOs up at night?

Trends are not an independent phenomena. They manifest into expectations, imperatives and challenges that organizations need to be cognizant of and take appropriate actions. Given the disruptions faced by several markets and industries due to some of these trends, CIOs are having sleepless nights thinking about how to deal with the new normal. Let us take a look at the following key manifestations of trends that impact enterprise application delivery.

Customer Expectations

Engaging Experiences:

Driven by experiences in the consumer world, users are demanding fast and engaging enterprise applications that go beyond providing merely a utilitarian experience.

Multi-device Availability:

Mobile has ensured that work is increasingly done on the go, beyond the traditional workplace. Employees are now using more than one device for their work and expect enterprise applications to work well across different form factors.

Seamless Integrations:

Employees and partners demand that data be free, regardless of the boundaries imposed by legacy applications or disparate systems. They expect a seamless integrations across applications due to API-driven experiences in the consumer world.

Business Imperatives

Speed Innovation:

Custom apps are key enablers to innovation and businesses are looking for a faster way to deliver apps by bridging the business-IT gap. At the same time, enterprises want to broaden innovation by making app creation possible for non-developers too.

Contain Shadow IT:

IT can rarely get to all of the custom apps that the business needs. This results in shadow IT or proprietary public cloud solutions. 81% of line-of-business workers and 83% of IT staff admit to using non-approved SaaS apps.[8] Enterprises wants to enable the business units to build their own apps but on technologies sanctioned by IT.

Do More with Less:

Many organizations are dealing with shrinking IT budgets due to the current economic climate and constant focus on increasing revenues—without additional investment. IT leaders are focussing on re-examining the application delivery ROI in terms of both, dollars spent and effort.

Execution Challenges

Talent Crunch:

The smorgasbord of front-end and mobile technologies is taking its toll on application delivery leading to a shortage of skilled resources. Meanwhile, developers themselves want to work with best-of-breed components that simplify application development.

IT Queue:

Agility in delivering enterprise applications and the ability to react to changing environment is a critical IT differentiator. Hence, IT teams are increasingly relying on the principles of DevOps, containerization, continuous delivery and microservices - upending the traditional application delivery model.

Legacy Modernization:

While it would be ideal for enterprises to use disruptive new technologies without too much disruption to modernize legacy application. But, overhauling legacy applications may impact long standing vendors who support legacy systems & planning or restructuring of resources.

Reusability and Maintenance:

Developers don't want to get locked into proprietary technologies or tools with dead-end functionality. Ultimately, they are responsible for maintaining and enhancing apps. Hence, they are relying on software that offers maximum reusability and requires minimum maintenance effort.

2.

All Hands on Deck

A phrase used by the boatswain to have the whole crew work collectively on a ship in times of emergency would apply in the IT industry as well. C-suite managers, technical architects, developers and business stakeholders are hustling together to break down existing IT challenges within the enterprise. But bolting new thinking onto old ways of working can leave you stuck. You need a fresh perspective to give you and your team a powerful voice in setting business direction. In the age of the customer, tech professionals must work with business executives to use technology to drive growth and delight customers.

Dare to grade your application delivery?

1. What percentage of your software projects would you say are successful - that is, they are delivered on time, within budget, meet expectations and do not require rework?

A. We don't want to brag but more than 80% of our software projects are successful.

B. We can do better but we got a good thing going with a success rate of more than 50%.

C. Less than 50% - a successful software project is an oxymoron.

2. Can non-developers create enterprise apps in your organization?

A. Yes, we enable business users to deliver apps using technologies approved by IT.

B. Yes but it is limited to some business units and is not entirely governed by IT.

C. No, in developers we trust, the rest have to join the IT queue.

3. How much time does it take to deliver a typical application after the business has expressed the need for it?

A. It takes just a few weeks to go from an idea to app.

B. It takes at least a month or two to deliver typical applications.

C. You'd be lucky if it is delivered in the same quarter, considering the IT backlog.

4. What word or phrase best describes the business stakeholder involvement during application development?

A. Collaborative with iterative feedback loops.

B. Not adequate. Unable to assert IT as a partner.

C. Too little, too late. Stakeholders provide feedback during acceptance testing, leading to delays and costly rework.

5. How would you rate the priority of usability and user experience in enterprise applications?

A. Critical. User experience is a major contribution to application adoption.

B. .Moderate. It is nice to have a good user experience but the lack of it wouldn't doom an application

C. As long as the application does what it is supposed to, the rest is just bells and whistles.

Results

Mostly A's:

You application delivery is led by a Chief Innovation Officer. You should continue to support the current processes and prepare for the trends and challenges outlined earlier.

Mostly B's:

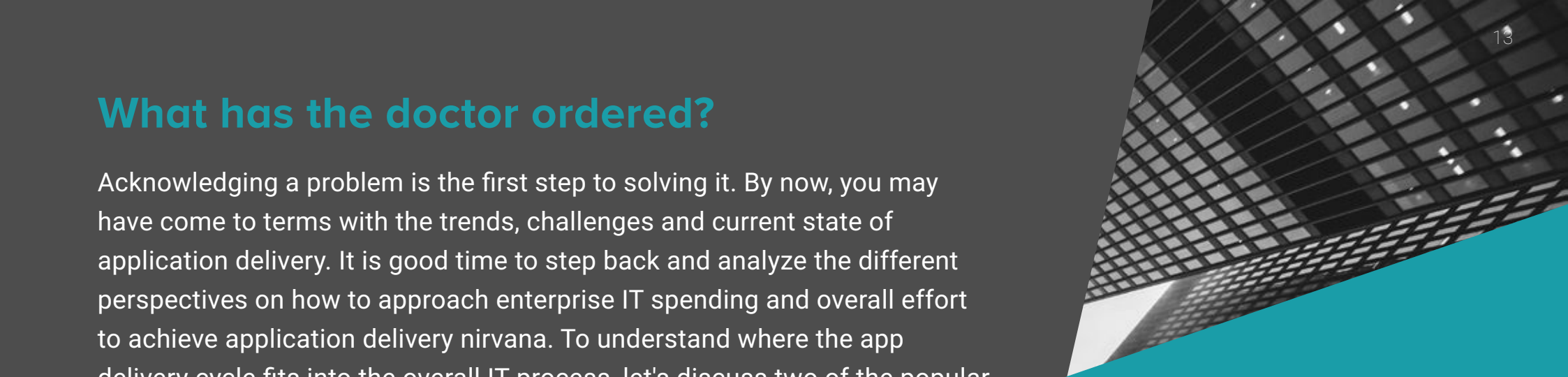
Your application delivery is led by a Chief Improvement Officer. Your organization is like most others on the right path but needs to improve the role of IT in speeding innovation. Read on for more.

Mostly C's:

Your application delivery is led by a Chief Impediment Officer. Your organization is not uncommon and still in the traditional IT mindset, which needs a reboot. Distribute copies of this ebook to your colleagues too.

What has the doctor ordered?

Acknowledging a problem is the first step to solving it. By now, you may have come to terms with the trends, challenges and current state of application delivery. It is good time to step back and analyze the different perspectives on how to approach enterprise IT spending and overall effort to achieve application delivery nirvana. To understand where the app delivery cycle fits into the overall IT process, let's discuss two of the popular strategic IT approaches suggested by experts and analysts.

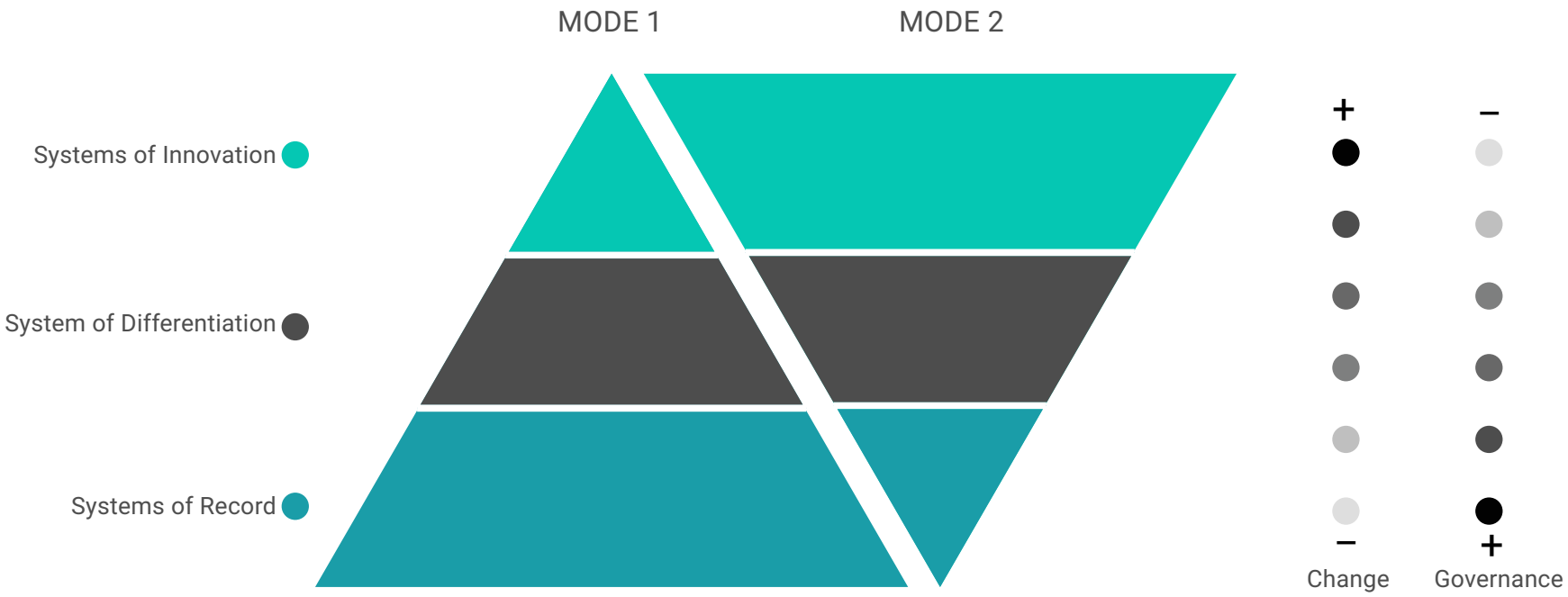


Gartner's Bimodal IT

Gartner proposes a Pace-Layered Application Strategy[9] along with Bimodal IT that can be used to deliver an effective IT and app delivery strategy for an enterprise. According to Gartner, "with bimodal IT, CIOs can help their departments meet the digital challenge, and ultimately bring the enterprise along."[10]

According to Gartner, IT organizations of the future will have two separate IT flavors: Mode 1 is traditional IT, focused on stability and efficiency, while Mode 2 is an experimental, agile organization focused on time-to-market, rapid application evolution, and, in particular, tight alignment with business units.

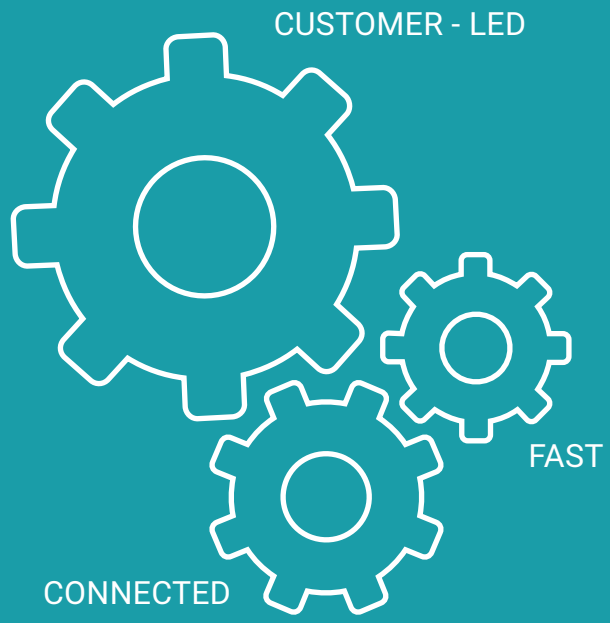
Ideally, by separating into two modes, IT teams can ensure that they have the right people, process, and technology to support business initiatives without impacting long-term maintenance projects. Also a point to note is that the pace layers of system of innovation and differentiation tend to have less governance and more changes. Those are the layers where the Mode-2 IT also is required to play.



Forrester Business Technology

Forrester advocates an IT philosophy, which revolves around three things that involve speed of delivery, data centricity and new age customer.[11] It suggests that enterprises move away from slow and dragging legacy technology based systems to systems that will be compatible with the modern mobile customer, who place a lot of emphasis on speed.

Forrester also advises that organizations should aggressively invest in systems that can crunch user data to serve them better. All the logistics surrounding such a change have to be put in place. This could involve investments in people with the required skills or processes that can speed up the innovation or new technology platforms that can aid in fostering this change.



3.

The Low-code Revolution

With demand for custom business apps soaring, traditional, code-based approaches have not been able to keep pace with the relentless demand to bring new apps to the market and the scarcity of application development skills needed to build enterprise-grade, cross-platform apps. Hence, many organizations have responded by using one of a growing breed of "low-code," rapid development platforms. Low-code Platforms can be defined as platforms that deliver business applications through a Rapid Application Development and Delivery approach, where the apps are created visually with a minimum of hand-coding and upfront investment in setup, training and deployment.

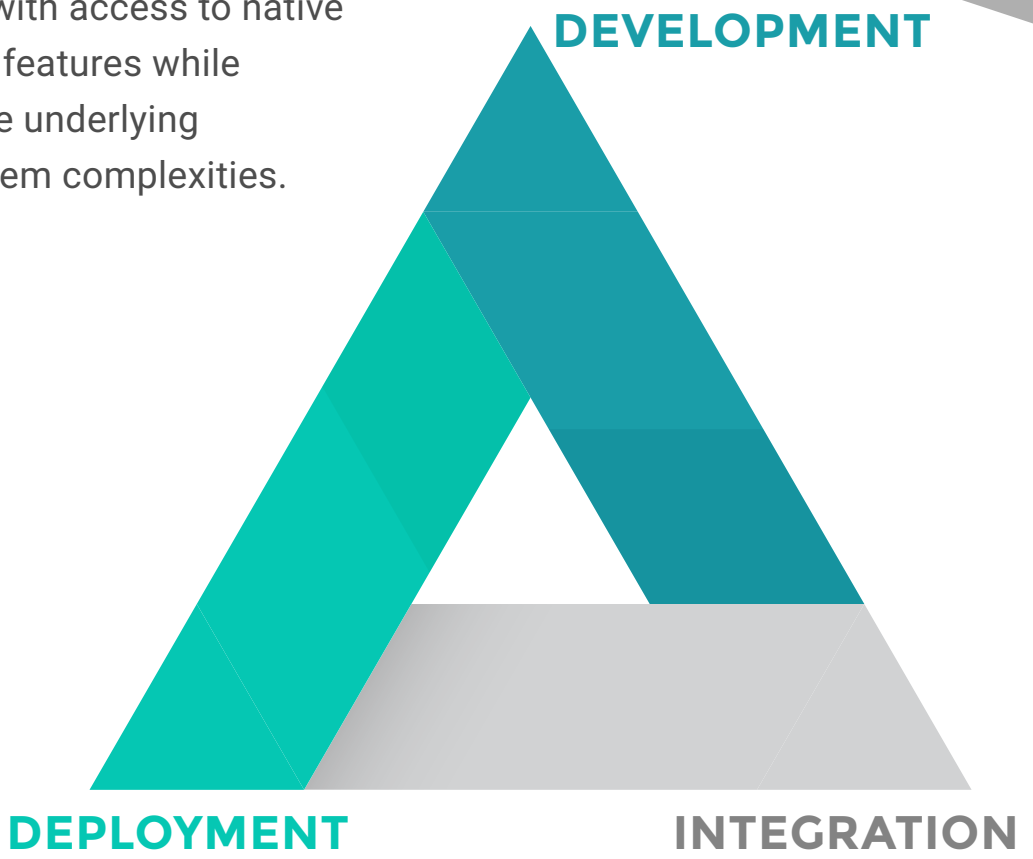
“Low-code Platforms can be defined as platforms that deliver business applications with a minimum of hand-coding and upfront investment in setup, training and deployment.”

Key characteristics of a Low-code Platform

We could also break the above definition down into the following key characteristics that an application development and delivery platform must exhibit to be called a Low-code Platform.

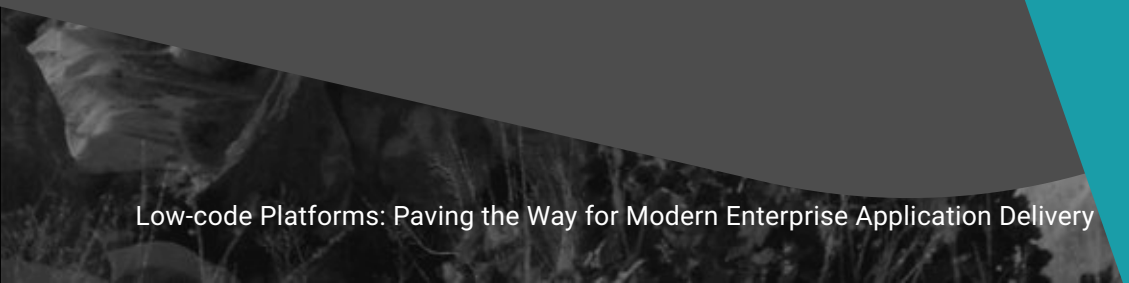
Visual Development:

The fundamental expectation from a low-code app development platform is to offer a WYSIWYG development environment where developers can drag and drop components to design responsive user interfaces that adapt to a device's screen resolution.Some Low-code Platforms go so far as to offer out-of-the-box templates for commonly used layouts and screens such as dashboards. The demand for enterprise mobile apps has meant that Low-code Platforms have also started to offer cross-platform mobile app development with access to native mobile device features while abstracting the underlying operating system complexities.



Simplified Integration:

Virtually every business application depends on data to create a meaningful application. But data is available from disparate systems ranging from proprietary enterprise systems to APIs from external entities and everything in between. Hence, data integration consumes an inordinate amount of time and resources during enterprise application development. A Low-code Platform is expected to provide a visual approach for developers to connect to these data sources and embed data elements directly into the application. Some platforms also allow professional developers to design data models and configure business logic directly inside the low-code app.



Instant Deployment:

Beyond the need to eliminate or reduce application coding, Low-code Platforms are expected to streamline and speed up the application delivery process itself. One key characteristic is the ability to instantly deploy an application with zero DevOps. Such platforms also offer a single point of control for app maintenance and updates. While other low-code app development platforms extend the capabilities to security, governance, version control, infrastructure autoscaling and more.

Benefits of Low-code Platforms

Business IT Alignment:

Low-code app development platforms enable close collaboration between developers, business analysts and subject matter experts. This greatly benefits enterprises as rework is greatly reduced and cost overrun is avoid to a large extent.

Clear IT Backlog:

The linear approach of conventional software development models presents significant opportunities to reduce waste and fast-forward delivery. Low-code Platforms streamline and speed up the development and delivery process, achieving substantial reduction of the IT backlog.

Democratization of App Delivery:

With the ever-rising demand for applications, enterprises are expanding their internal talent pools, for building noncritical or long tail apps using nontraditional developer talent like technical business users.

" Low-code Platforms streamline and speed up the development and delivery process, achieving substantial reduction of the IT backlog."

Consumer-grade Business Apps:

Today, customers and employees expect to access apps from a various devices, putting additional pressure on developers. Low-code Platforms with modern frameworks can provide consumer-grade applications using enterprise-grade technology at a fraction of the cost.

Speed Innovation:

Competitive advantage lies with companies that focus the most on ‘Systems of Innovation’. Low-code Platforms are ideal for such systems that require the most experimentation and experience the highest rate of change.

Cost and Effort:

Do more with less is a philosophy that CIOs have to live with these days. But, with low code platforms, CIOs come closer to achieving that. Enterprises can have the best of both worlds where they can build enterprise grade apps of the highest quality in a matter of days to weeks as compared to months in traditional approach to development.

Repurpose & Reuse Resources:

Whenever enterprises have a mandate to modernize, CIOs have a big dilemma in handling existing resources with legacy technical skills but with knowledge of the core business process. But with low code platforms, with their unique visual development approach, CIOs get an opportunity to reuse their existing resources and modernizing legacy projects without much issues.

Ideal Use Cases and Applications

Whether you are transforming application delivery or testing the waters with a pilot project, it is critical to choose the right business use cases and applications to achieve success with Low-code Platforms. Let us explore some of the key areas that will benefit greatly from using Low-code Platforms.

Digital Transformation

Using Low-code Platforms, enterprise can retool underlying business and operational processes and transform them to digital assets by developing custom applications. Enterprises can also accelerate the process of creating digital assets that can later unlock new business models.

Legacy Application Modernization

Migrating legacy applications to modern web and mobile based applications using visual drag and drop interface of Low-code Platforms can greatly reduce the steep learning curve for legacy application developers to develop modern web and mobile applications.

Enterprise Mobile Apps

Enterprises can develop, build, and provision mobile applications across multiple cross platforms using Low-code Platforms with a hybrid mobile application development approach. The resulting near-native app experiences can be delivered at a fraction of the cost of native app development.

Long Tail Applications

Due to the lack of resources and budget, long tail applications are built using non-standard technologies. Low-code Platforms obviate the problem of shadow IT by providing a visual drag and drop interface that allows business users to develop these apps within the purview of IT.

Rapid Prototyping

By virtue of their visual drag and drop rapid application development methodology, Low-code Platforms enable development of fully functional interactive prototypes. Ideas can be converted to prototypes and apps in a matter of hours or days.

Systems of Differentiation and Innovation

In general, applications that can be classified as System of Differentiation and Innovation[12] are ideal for Low -code Platforms due to the rapid rate of change and are generally executed by business stakeholders rather than technical developers.

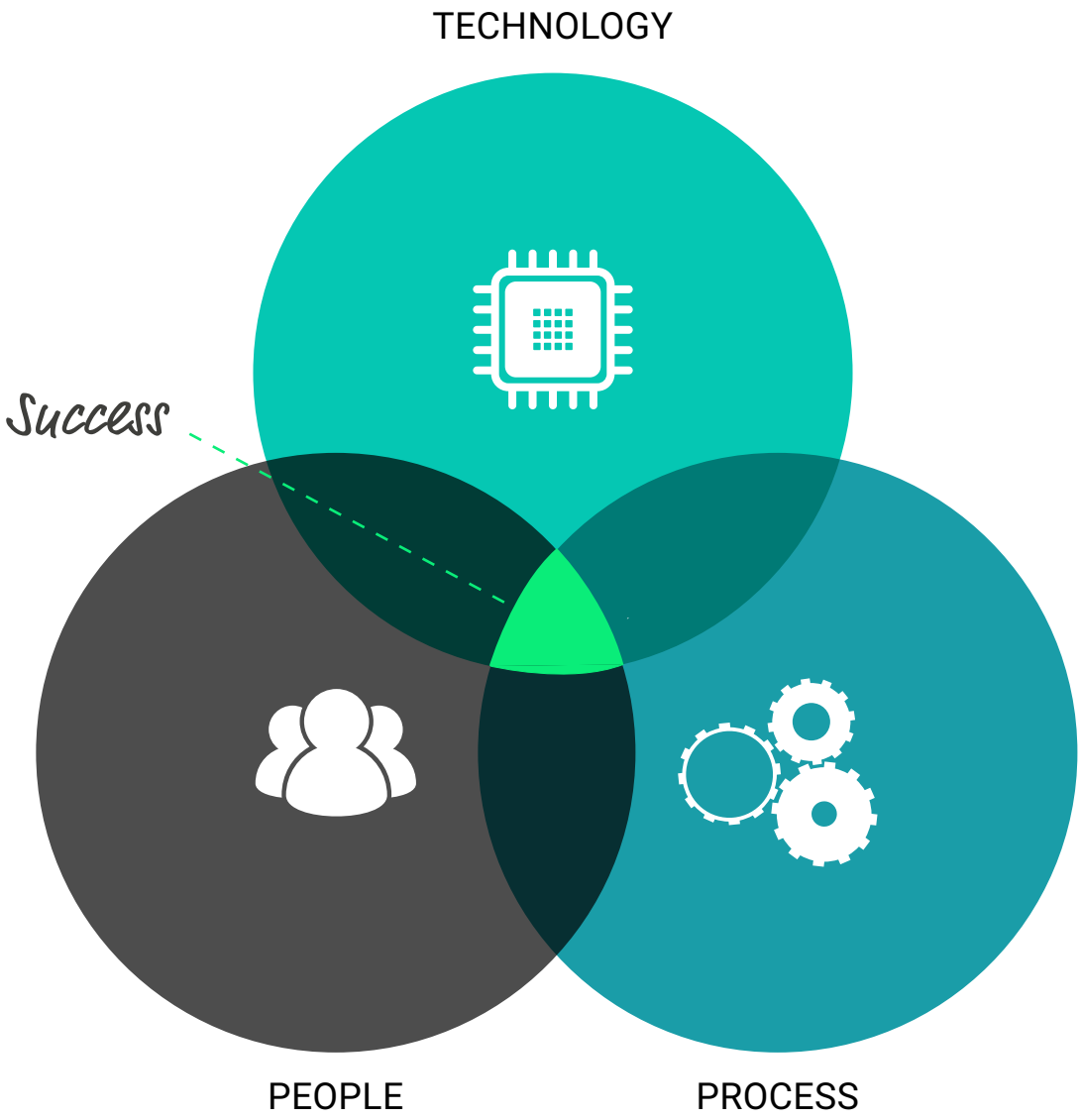
4.

Charting a New Course

The scope of Low-code Platforms is unique to every enterprise. Consequently, the endgame too will depend on the organization's alignment of stakeholders, appetite for innovation, and right technology partners. However, the fundamental tenet of transforming application delivery is essential to internalize right from the beginning. It is equally important to understand and align the entire ecosystem of people, process and technology. This extends to customers, partners and employees, as well as the interface between these groups and the technology you choose.

People, Process and Technology

Very often, organizations apply technology to solve complex challenges only to find that the technology multiplies the impact and visibility of the problem. While technology is the enabler and can be the basis for transformation, you need much more than a platform to succeed. It's the intersection of people, process and technology that can pave the way to success.



People: Align Key Stakeholders

Before charting on a new course, identifying stakeholders, champions and potential opposition. It is critical to engage your executive team early to get their input and support. The force of the C-suite office is required not just for budgetary reasons, but to also gain strategic organizational alignment and influential advocacy. Enterprises should also ensure continued stakeholder management, flexibility, and adaptability to changing needs.

Process: Imbibe Innovation

Creating a culture of innovation goes a long way in fuelling the modern application delivery machine. Innovation requires embracing risk, specifically, as part of your corporate culture. Failure often yields the most insightful learning that can encourage people to fail-fast, learn and iterate. It is also essential to define the benefits of the low-code initiatives to the organization in quantifiable terms and success metrics for process and technology alike.

Technology: Select Partners, not Vendors

A mindful approach to modern application delivery also requires a renewed approach to vendor selection. Enterprises would do well to seek partners who take a shared risk, are invested in your success, rather than vendors, who do not adopt a reward approach precisely because they're not in it for the long haul.

7 Things to consider before choosing a Low-code Platform

In the following section we provide the key consideration factors you need to map the delivery capabilities of future partners when choosing a Low-code platform

1. **Is the platform built on open standards?**
   While most Low-code Platforms claim “No Vendor Lock-in”, the reality is that most of them use proprietary technologies and application stack. Choose a Low-code Platform that is based on proven open source technologies in order to ensure an open and extensible approach to application delivery. Also, the platform should use best-of-breed application stack for developing full stack applications.

2. **Does the platform simplify external integration with inbuilt integrations?**
   While most vendors offer decent visual development capabilities, it is extremely important to look for features that ease external integration of data and services as most business data is stored in disparate, proprietary systems. Look for out-of-the-box integrations and verify whether custom integrations can be built and reused across apps.

3. **Does the platform offer cross-platform development?**
   The ability to create applications using a single code base that can adapt to any native platform or operating system (which could be iOS, Android, Windows Mobile, BlackBerry/RIM, etc) using a hybrid adaptive design enables applications to be run seamlessly on any device giving it cross platform capabilities.

4. **Does the platform handle scalability and cloud needs?**
   Ensure that low-code platform vendors don’t get away with merely providing a hosting and release management solution. Check for the ability to scale applications and handle private cloud needs. Look for solutions that allow for rapid and continuous provisioning, deployment, instant scalability and maximum utilization of resources. Verify whether the platform supports

building custom software stacks and deploying microservices-based apps, and orchestrates IT infrastructure effectively.

5. Does the platform make it easier to create, share & consume APIs ?

Today, APIs are at the front and center of business applications and architecture. Most Low-code Platforms support APIs at best. However, one must choose a platform that takes an API-first approach to application delivery. It should be easy to import data from any service and bind it to UI components. Moreover, the platform should allow developers to create, publish and discover APIs with ease.

6. Is it easy to maintain the code generated?

With most Low-code Platforms, even the most experienced developer would not understand the code generated by the platform. Maintainability is a critical aspect of application delivery and is overlooked by many these platforms. Verify that the code generated follows design patterns, is well-organized, uses standard naming conventions and generates documentation that developers can understand and maintain

7. How well does the application handle security?

Enterprise applications needs both coarse grained and fine grained security control mechanisms. The Low-code Platform must support flexible authentication and authorization mechanisms to secure users and various tasks within the application. Check for integration support for popular identity management systems like AD, LDAP, SSO and OAuth.

WaveMaker Low-code Platform

WaveMaker is a Low-code Platform that is built on the most open, extensible and flexible fashion to complement enterprise application delivery keeping in mind the requirements of a Software Developer, Citizen developer / business user, IT architect and CIO.

- WaveMaker provides a state of the art visual Rapid App Development delivers full stack web and mobile applications using the ease of drag-and-drop.
- Future-proof your applications with WaveMaker's customizable code based on open standards like HTML5, Angular JS , Spring, Java and Hibernate.
- With easy single click deployment via containers or WAR files, WaveMaker maintains its flexibility allowing the user to deploy apps to a private or public infrastructure.
- As a developer, you can make use of WaveMaker's continuous delivery allowing development, continuous integration, easy testing and deployment of applications.
- WaveMaker supports a composable architecture where you can auto-enable microservices and RESTful integration.
- From a financial perspective, WaveMaker offers a low TCO (Total Cost of Ownership) with a transparent developer-based pricing model that allows the you to create unlimited apps to be consumed by any number of end users.

Start a free trial of WaveMaker Low-code Platform at www.wavemaker.com/get-started

REFERENCES

1.Citirx:

https://www.citrix.com/articles-and-insights/workforce-mobility/jun-2015/7-enterprise-mobility-statistics-you-should-know.html

2. Citirx:

https://www.citrix.com/articles-and-insights/workforce-mobility/jun-2015/7-enterprise-mobility-statistics-you-should-know.html

3. IDG: http://www.idgenterprise.com/report/idg-enterprise-consumerization-of-it-in-the-enterprise-study-2014

4. IDG: http://www.idgenterprise.com/report/idg-enterprise-consumerization-of-it-in-the-enterprise-study-2014

5. ProgrammableWeb:

http://www.programmableweb.com/news/50-interesting-apis-added-to-programmableweb-2015/brief/2016/01/04

6. McKinsey Global Institute - Big Data: The next frontier for innovation, competition and productivity, June 2011

7. Gartner, Inc. http://www.gartner.com/newsroom/id/3165317

8. CIO Insight http://www.cioinsight.com/security/slideshows/shadow-its-growing-footprint.html

9. Gartner Pace Layering: http://www.gartner.com/newsroom/id/1923014

10. Gartner BiModal IT: https://www.gartner.com/doc/2798217/bimodal-it-digitally-agile-making

11. Forrester Business Technology: https://go.forrester.com/research/bt/

12. Gartner Pace Layering: http://www.gartner.com/newsroom/id/1923014