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GUIDE

Application Modernization

Using Low-code Platforms

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Abstract

Legacy applications form the backbone of many enterprises; yet, they are holding organizations back from leveraging new digital technologies – such as cloud, IoT, and mobile – which are required to create modern experiences for customers and partners. To address these challenges, IT teams need a way to both rapidly connect legacy systems to modern applications, and do so while minimizing disruption to these systems.

Becoming a Modern Enterprise

What is the prime focus of any enterprise? It is to make their products and services available in the market as quickly and efficiently as possible. For the digital-savvy users today, enterprises must create exceptional customer and employee experiences to derive competitive value. This requires them to continually adapt their business process and systems. But most of the enterprises function with legacy applications which are not built for providing such exceptional experiences and lacks the ability to adapt. Thus, the need for modernization arises.The objective is to maintain an agile IT infrastructure that can evolve and scale with the changing digital environment.

So, when old methods are failing to be productive solutions, it's time to look at other modernization approaches that drives value. There are a lot of new technologies being developed that are meant to help enterprises modernize their entire IT infrastructure. These new technologies – application development platforms – are proven and can be integrated with existing system seamlessly.

Winds of change

Today, enterprises are witnessing new digital trends disrupting the business landscape at an exponential rate. The Internet, mobile, cloud computing, containers and other technologies are forcing enterprises to renovate and rebuild the way they operate. These new trends are helping organizations modernize their legacy applications in a fast and cost-effective manner. Here is how the modernization journey is taking place.

Cloud Adoption

From taking baby steps towards adopting cloud infrastructure just a few years ago, enterprises today are moving massive amounts of their legacy application from expensive storage systems to hybrid clouds. A hybrid architecture includes both public and private cloud allowing an enterprise to move workloads between the two platforms. Sensitive data can be hosted on a private cloud for security while big data applications can be stored on public cloud for cost efficiency of their legacy application from expensive storage systems to hybrid clouds. A hybrid architecture includes both public and private cloud allowing an enterprise to move workloads between the two platforms. Sensitive data can be hosted on a private cloud for security while big data applications can be stored on public cloud for cost efficiency.

Containers

The emergence of containers has completely transformed the way IT builds and delivers applications. Containers solve the problem of running a software when moved from one computing environment to another. Containers wrap up an application in a complete filesystem that has everything it needs to run: code, runtime, system tools, system libraries. This enables it to run smoothly regardless of any environment. Wrapping up an application into containers increases its portability as it reduces the dependency on the underlying infrastructure service. Using containers, enterprises can optimize the benefits of a hybrid environment and reduce operating cost.

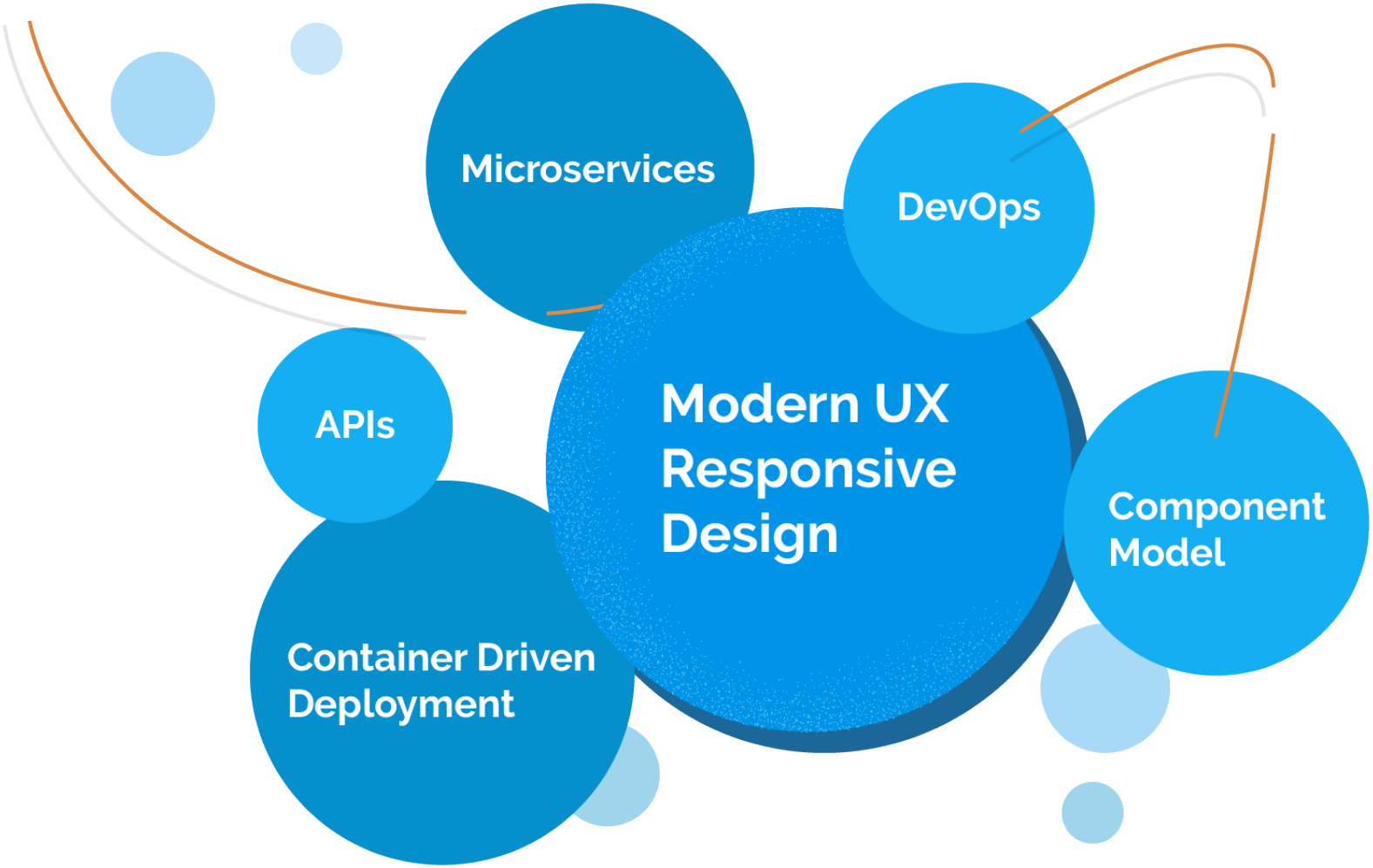
APIs

With passing times, number of SaaS applications are exploding leading to multiple software innovations. One such is the rise of API or Application Programming Interface.

APIs can empower rapid modernization for an enterprise by making their legacy data accessible to the world outside through multiple channels like cloud, mobile, web, etc. APIs are a set of tools that dictates how software must interact. They form the connective lines between applications, systems, and data. A well-managed API serves as a mechanism for enterprises to leverage its digital assets and build new products around its core capabilities.

Microservices

The monolithic infrastructure powering businesses for the last few decades are being replaced slowly by modular and distributed alternatives such as microservices. These are small, single-purpose applications that delivers services using APIs. Even though microservices have been used for a while, the increasing popularity of cloud computing, containerization, and APIs has made microservices more reliable. It is helping companies to better respond to shifting customer demands. Microservices is poised to take scalability and continuous delivery to the next levels in the years to come. alternatives such as microservices. These are small, single-purpose applications that delivers services using APIs. Even though microservices have been used for a while, the increasing popularity of cloud computing, containerization, and APIs has made microservices more reliable. It is helping companies to better respond to shifting customer demands. Microservices is poised to take scalability and continuous delivery to the next levels in the years to come.


Microservices
DevOps
APIs
Modern UX
Responsive
Design
Component
Model
Container Driven
Deployment

The Levers of Modernization

Enterprises depending on traditional application delivery system are not able to keep up with the demands of the digital age. And bolting new thinking onto old ways of working can leave you stuck. It's time to be an enterprise that is a fluid ecosystem of connected software services, devices and business logic that can be re-programmed continuously to changing market needs. Looking at the modern approaches to digital transformation, modernization within an enterprise is taking place across 3 levels.

Infrastructure

Enterprises are moving their workloads from siloed data centres to cloud for better efficiency in terms of scalability and cost considerations. Ever since mobile apps entered the enterprise scene, they have ushered in new forms of collaboration, communication, and business efficiencies. To better manage their applications on multiple platforms, enterprises are using a mix of private and public cloud computing environment with orchestration between the two platforms. Hybrid cloud gives businesses flexibility needed to deal with computing needs and costs change.

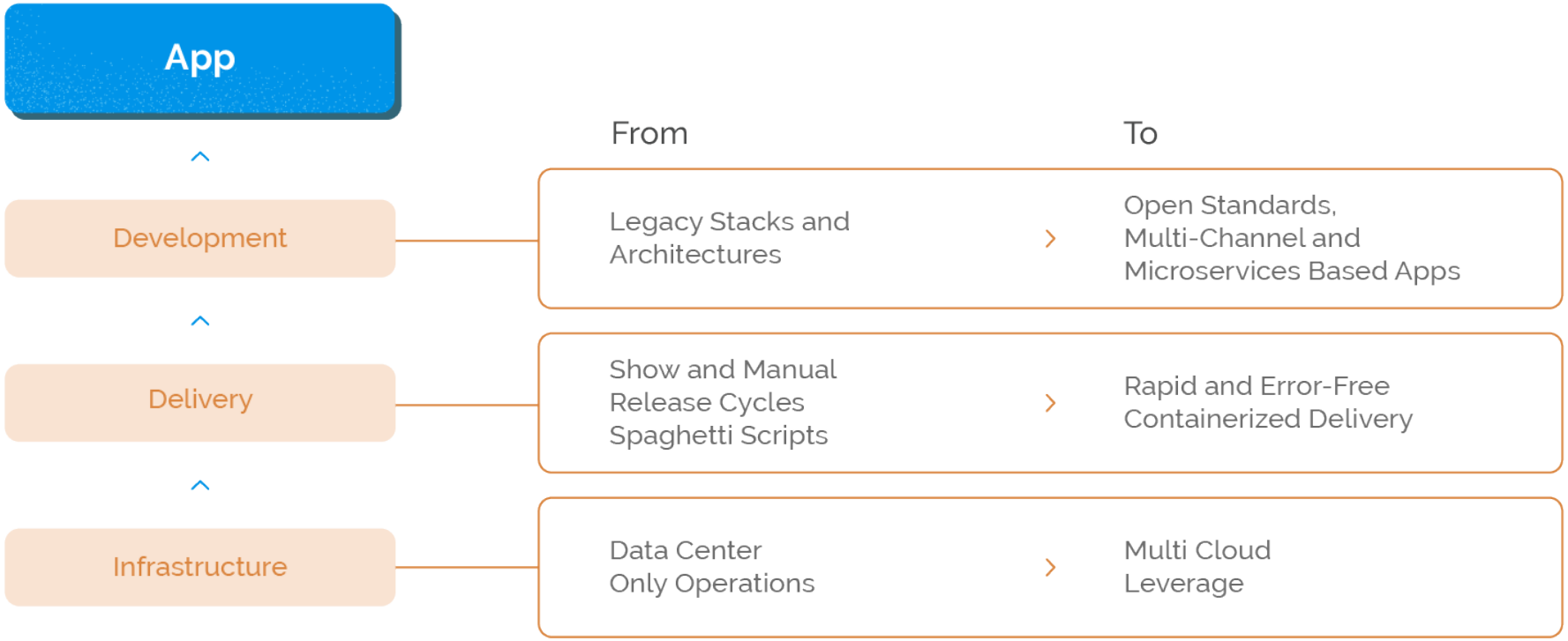
Delivery

Slow and manual release cycle is giving way to rapid, error-free and fast delivery of business applications. To manage the delivery and deployment of multiple applications on multiple platforms, enterprises are making use of containers – a technology that helps hosting applications inside portable environments easier. Containers allow applications to be broken into smaller manageable modules which can be run in any platform. It makes the DevOps culture agile as changes to one module of an application can be done without interrupting the rest of the app. This ensures continuous delivery of software updates.

Development

Decade-old legacy applications are getting modernized to be more open standard, multi-channel, hybrid, and responsive applications. The monolithic infrastructure that have powered businesses previously, are giving way to distributed and modular alternatives called microservices architecture. These are small, independent and single-purpose applications that collaborate using APIs to deliver services. Microservices, with the help of APIs, can ensure scalability and continuous delivery for enterprises.

The focus for modernization needs to be on finding the right technology that allows an enterprise transition across these three levels to become a modern digital enterprise.



Myths of Modernization

In today's ever-changing digital environment, enterprises cannot afford to let their applications stagnate – especially considering the fact that 90 percent of consumers would consider taking their business elsewhere rather than work with a company that uses outdated technology. But due to various reasons ranging from general organizational impedance to change to wrong expectations of vendor products and technology, there are several preconceived notions and fears about application modernization. However, many of these fears are commonly believed myths that can be overcome with the right approach to modernization.

Understanding the common myths surrounding modernization projects will help IT leaders shake off their concerns and identify the resources they need to update legacy applications while balancing risk, cost, flexibility, and speed.

Myth 1: "Refreshing UI counts as modernization"

Revamping an application's UI is simply not enough to cross modernization off an enterprise's to-do list. When it comes to anything but the most basic legacy applications, a fresh look is just a starting point. Most enterprise applications are extensive and have complex workflows, meaning that a UI facelift will not necessarily improve the end-user's experience or address a company's larger business goals. Projects must target the deeper tech layer of an application in order to result in meaningful modernization.

Myth 2: “Modernizing our application will be too disruptive to our business”

Minimally invasive modernization projects are within reach with the availability of new technologies and Rapid Application Development platforms. For example, wrapping is a process in which developers can apply a layer of API to a legacy system in order to refresh an application’s capabilities without touching the original architecture.Developers can also connect an API directly to the back-end of a legacy application, individually wrapping each system and eliminating the need to integrate local service data. Not all modernization scenarios require a painful platform switch – instead, APIs can be used to integrate new, fresh functionalities into the existing legacy system.

Myth 3: “Our IT team doesn’t have the resources for modernization”

In-depth technical knowledge is not a prerequisite for application modernization – there are many low-code platforms and services that offer templates, widgets, and other “drag and drop” features that can streamline IT teams’ time and resources. In addition to giving developers the tools to quickly and intuitively build and deploy new functionalities, Rapid Application Development platforms simplify the modernization process through automation. Features like automatic data integration, security checks, and cross-platform support can reduce the time developers must spend fixing basic, error-prone, and technical aspects of a project, freeing up their resources to focus on bigger picture business and functionality goals.

Myth 4: “We can’t afford a modernization project right now”

Taking the time to identify the top priorities for a modernization project in advance can keep processes affordable and financially strategic. IT leaders must closely examine their own business objectives as well as their existing application architecture in order to choose a focused path toward modernization that will be impactful, yet versatile enough to be a future-proof investment.

For example, many enterprises may find integrating open source software during a modernization project to be a productive investment that pays off in terms of cost efficiency and the long-term flexibility of avoiding vendor lock-in when future updates need to be made.

Application Modernization Roadmap

Applications are at the heart of every business. But even the most aggressive drivers of digital transformation are intimidated when faced with the herculean task of application modernization. Any organization looking to modernize their applications must clearly define the objectives at the outset and involve a broad group of stakeholders in order to succeed.

While the primary objectives of any application modernization initiative is to achieve improvements in business operations and a reduction in IT costs, every organization should define concrete, measurable goals that are relevant to them. A successful roadmap must also address the following key areas - business strategy, technical architecture, people and processes.

Here, we define the AMT Roadmap for Application Modernization - a three stage framework that strategically evaluates business applications, maximizes existing investments and bridges technical as well as functional gaps. The AMT Roadmap provides CIOs and IT managers with the opportunity to drive standardization into their business operations, as well as introduce innovation, cutting edge technology and better business processes across the organization. The roadmap consists of the following three stages:

Assessment: Classification of existing business applications based on their business and technology gaps from a business and technology strategy standpoint.

Maximization: Extending the life of applications that exhibit low business and technology gaps.

Transformation: Rebuilding applications with high functional and technology gaps using a low-code approach.

By following the AMT Roadmap organizations can analyze and transform their application portfolio, and generate a final effective rationalized application portfolio.

Assessment

Maximizing IT investment starts by understanding existing applications. At the Assessment stage, organizations need to evaluate and rationalize the portfolio and quickly determine whether the applications are functionally and technically healthy to support an organization's business strategy.

Assessment involves evaluating application on two primary dimensions - business and technology - consisting of various aspects.

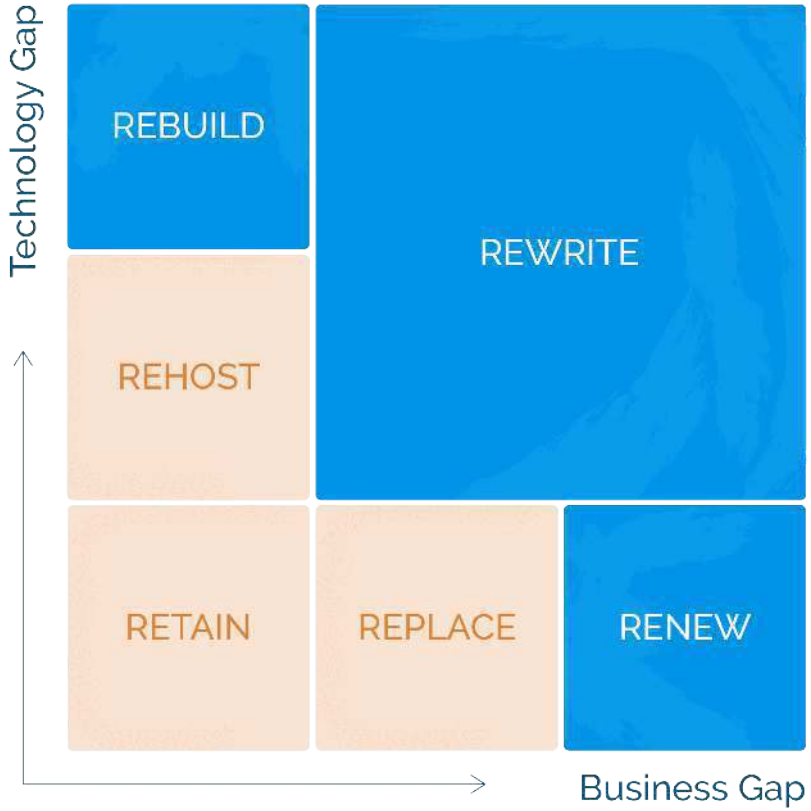
Business Criteria

- Business Fit
- Usability
- Consistency
- Reporting Capability
- Application Flexibility
- Compliance
- Automation Capability
- Process Support

Technical Criteria

- Design and Methodology
- Portability
- Stability
- Performance
- Maintainability
- Interoperability
- Data Management
- Integrity
- Maturity

Further, each of the business and technical criteria of evaluation is assigned a weight based on its relative importance. Individual applications are assessed on each aspect and placed on a 2x2 grid based on their functional gap and technology gap. The outcome of the Assessment stage is a grid with six quadrants to help IT leaders decide whether to retire, retain, replace, consolidate, migrate or rebuild applications.



Organizations need to continuously perform such comprehensive assessments and make strategic decisions on how to rationalize the application landscape, reduce cost of ownership and improve speed-to-market.

After assessing the application portfolio on business and technical criteria, the organization faces two broad choices:

- Maximize existing investment while managing the limited business and technology gaps.
- Modernize applications with budget allocations to address the substantial business and/or technology gaps.

The next few sections examine each of these options in detail.

Maximization

The decision to modernize application should maximize long-term benefits, taking into account time, costs, and user impact. A detailed portfolio assessment can result in some legacy applications having only limited business and technology gaps. Each class of such applications requires a different strategy with the aim of maximizing investments without incurring a substantial redevelopment effort.

Retire vs Retain

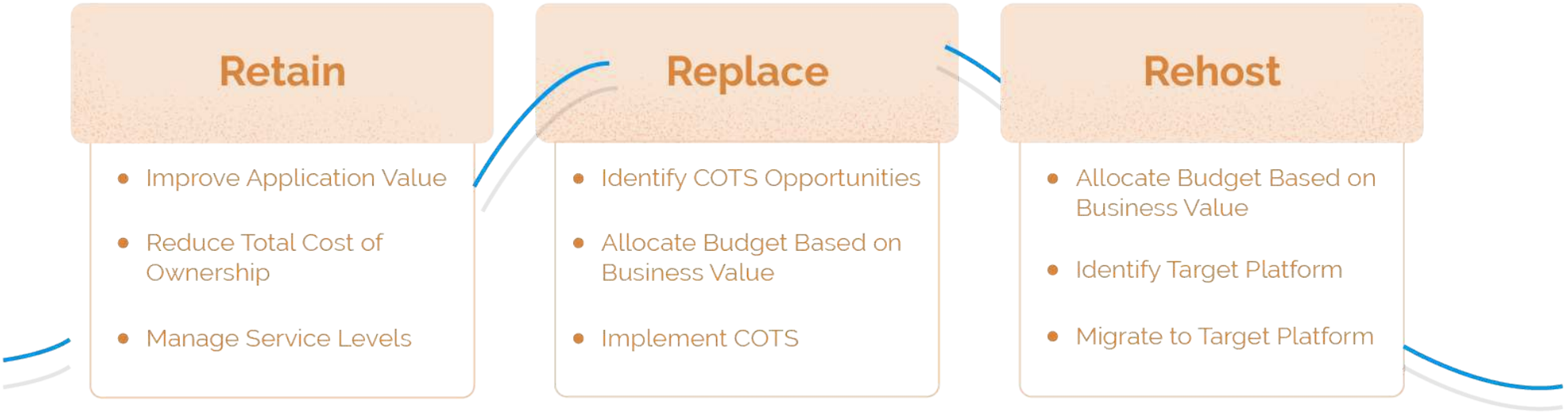
There are often times several applications that are no longer used but have been kept running. By retiring redundant applications companies can control technology sprawl. Care should be taken to ensure that the applications are decommissioned in a fashion that is in line with the organization's standard operating procedure of retiring applications.While sometimes it make sense to retain an application, doing so is only advisable in select circumstances. Enterprises should take into account the increased maintenance costs and the scarce organizational knowledge of legacy technologies. The total cost of ownership and application value of retained applications needs to be monitored at regular portfolio assessments.

Replace

For applications with substantial business gap but low technology gap, purchasing Commercial Off-the-shelf (COTS) software and retiring the legacy application is often a fast and effective strategy to leapfrog to the latest business software. Sometimes these COTS applications might not be as configurable as custom business applications.

Rehost

For applications with substantial technology gap but low business gap, it might be cost effective to simply port the legacy applications “as is” to a modern technology platform or “lift and shift” the applications to a cloud provider. Testing and minor configuration changes are often required, but the overall effort to rehost a single application is usually measured in only days or weeks. Although rehosting can be achieved quickly without modifying the application architecture, many of the technology benefits might not be fully realized.



Why Modernization Failed in the Past

In order to derive competitive value today, enterprises need to adapt their business processes to create exceptional customer experiences. As legacy applications are not equipped to deliver this, organizations added layers of functionalities to these apps, making them fragile and complex. To modernize, the two options available to them were to modernize their already strapped

internal resources or outsourcing modernization projects at a higher cost.

In taking the first option, enterprises allocated a large number of their internal resources to modernize mission-critical applications. The complex nature of these legacy applications needed the involvement of resources with in-depth knowledge of the application. The impact of this method was the unavailability of these resources for other projects. This created a backlog of deliverables.

This led organizations to outsource their modernization effort to relieve the demand on their internal resources. But these efforts also failed because – it is expensive, and outside resources lack the in-depth knowledge of the working of these critical applications. It resulted in costly overruns and delays as modernization efforts get trapped into the vicious cycle of trial-and-error process.

With lots of risk and little short-time return, modernization has been a challenge for many enterprises. Resource and cost constraints coupled with limited options have made this path difficult for them to tread. At the same time, they need to modernize to keep their mission critical legacy apps functionable.

A third way to app modernization might take the enterprises out of this flux. The emergence of low-code platform could just be the solution providing a hybrid approach to modernization.

Modernization - The Low-code Approach

Looking at where enterprises are at present in their journey of modernization, we have identified three ideal situations for low-code platform to deliver business value.

Renew

The enterprise needs to create modern user interface for their existing application without making any changes in the backend. The requirement is to completely refresh the frontend of their applications. In this scenario, renewing application is the ideal way to approach modernization.Modern application development platforms are aware of these requirements and have made efforts to ease the design input, in the form of out of the box templates, themes, and styles. You can also create custom themes specific to the branding and implement it into the application. The approach is to build once and run on any device.

Rebuild

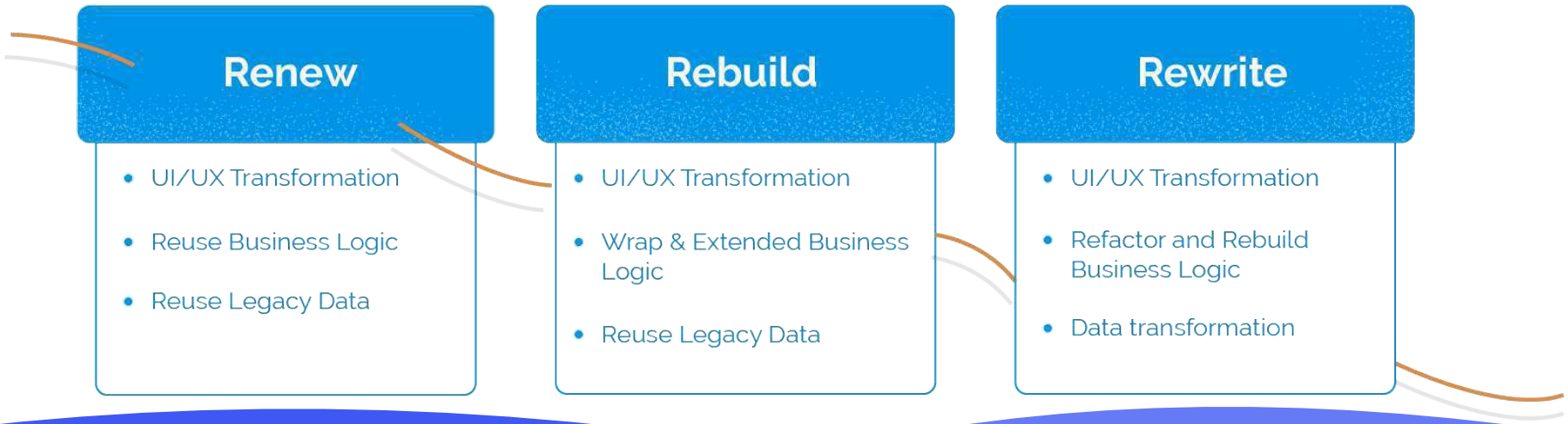
The requirement is to change the user experience and at the same time you want to wrap your existing services with modern APIs. This means transforming your backend operations so that it can be integrated with your modern UI. A low-code platform can help rebuild your applications by creating REST-based APIs for all your data and services.

Rewrite

This pertains to a use case where you want to completely transition your old legacy applications into new tech stack. This involves revamping the entire app architecture because you want to change the entire functionality, use case and work flow of your application. The need is for a modern system integrated with automated DevOps. For a complete overhaul of your existing system, replatforming is the way to do it and an appropriate low-code platform can help you do it faster.

The benefits of using low-code platform can be realised at the three layers of modernization within an enterprise that we have talked about earlier.

- On the application front, you get an improved end-user experience. The application gets an entirely modern interface and can be delivered to business users at a reduced cost.
- With automated DevOps, you can reduce or eliminate lot of the errors and complexities that are part and parcel of release management. This makes the application delivery process lot more transparent.
- Infrastructure-wise, moving to cloud from your data centre will reduce the overall IT cost.



Choosing the right Low-code Platform for Modernization

For a company or a business to choose the right low-code platform development tool, they need to weigh out what benefits / priorities are a good fit for their requirements. We have put together seven key questions that will help you make an informed decision while choosing the right low-code platform for you.

Is the platform suitable for professional developers?

Many low-code platforms out there are focused towards citizen developers. While it is great to cater to all facets of the developer community, enterprise apps have complex tasks that need to be performed in order to meet business needs. A low-code platform that is built on a developer friendly tech stack will allow them to perform repeatable tasks so that you don't have to invent new processes every time you built new applications. An easy-to-use platform will also have a very short learning curve, enabling your developers to learn and execute faster.

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.

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.

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.

Does the platform handle scale-ability 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 scale-ability and maximum utilization of resources. Verify whether the platform supports building custom software stacks and deploying microservices-based apps, and orchestrates IT infrastructure effectively.

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.

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.

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.

How well does the platform handle customizations?

Enterprise apps specific to each industry has unique, challenging and ever changing business needs. A low-code platform that you choose to build your apps needs to be flexible to allow customisations in the form of leveraging their existing systems or the ability to allow custom coding or integrations with modern AI and IOT based systems.

Is the platform future proof?

While investing in a low-code approach towards building an application it is important to consider whether the platform is future proof and minimize the risk. The low-code platform should have the latest tech stack that allows you to build a modern responsive UI in your apps. The platform should make it easy to move your workload, i.e your applications to multi-clouds. Modern technology available today to deploy your apps into the cloud is containerisation. So the apps are deployed as containers and there are orchestrators for these containers as well. This takes care of the app lifecycle management all the way to deployment. Furthermore, the platform should be flexible to integrating or adopting to newer technologies and trends entering the market.

Lessons from Customers

Case Study 1

Modernizing Microsoft app stack

Our client, a social security agency in Curaçao (A Dutch Caribbean island), deals with benefits for insurance like health, old-age, accidents, and unemployment etc.

Requirement

The client operated on Microsoft stack and had multiple internal and external .NET apps that were developed as an integrated system and were not web-based. Usage of earlier technologies like Silverlight, which aren't supported by browsers today, restricted the ease of transformation to a web-based system. The client was open to use Java and wanted to rebuild most of their applications

How WaveMaker helped

With WaveMaker, we seamlessly imported their legacy app database and reused business logic inside stored procedures. A wrapper function (API) was created for all common services and workflows (like login, password reset, logout, forgot password, email notifications, etc.). To ensure robust security, these APIs were made private and, additionally, calls to them were intercepted to filter out sensitive user data. To create a consistent look and feel for all applications, a common visual framework was developed, which included responsive layouts, page templates, widgets, and design patterns.

Impact

The database, API, and the interface together formed the core application shell. With this shell as our base — and using the drag-and-drop visual low-code development environment of WaveMaker — we were able to transition the client's .NET-based applications into a Java-based system at a rapid pace without compromising on application design, control, and security. The low-code approach using WaveMaker helped set the base for client's accelerated app transformation in the future.

Testimonial

> *"The WaveMaker team responded very quickly to our requests. Project execution was smooth and we are very pleased with the results."*

Franklin Prince – ICT Manager, SVB Curaçao

Case Study 2

Modernizing Oracle form based apps

Our client is a large textile manufacturer in South Asia, specializing in design and production of garments.

Requirement

The client was using an Order Management System built using Oracle Forms and Reports. While it met the functional requirements, the system could not keep up with modern day requirements around mobile workforce support, rapid changes as per business needs, and required specialized skills to maintain. The business was looking to invest in future proofing the technology. However, the existing application had two decades of important business assets that were needed to be reused in the new platform. This included business logic and application specific data.

How WaveMaker helped

With WaveMaker, the client was able to modernize their existing forms and report application. It enhanced the usability of the application that could support multiple form factors including desktop, mobile, and tablet interfaces.

The entire application - including UI and its integration – was developed using WaveMaker's visual drag and drop tools. All existing database logic and data were reused and integrated with the new application without any complexity.

This resulted in seamless reuse and faster development. By enabling quick setup and automated deployment of the developed application across various stages (dev, stage, prod, etc.), app delivery became error-free and efficient. Furthermore, containerization helped the client to move applications to any hybrid or multi-cloud environment of their choice.

Using WaveMaker's custom widgets capability, the order management application was able to incorporate functional logic within the pages. This, in turn, resulted in enhanced usability for the end users.

Impact

WaveMaker was able to provide a clear road map for the customer to transform their legacy order management application into a responsive application that is future proof and built for scale.

Case Study 3

Replatforming IBM AS/400 based systems

This client of ours is the oldest self-governing body in North America responsible for regulation of lawyers and paralegals. The organization sets standards for admission into the legal profession and works in the public interest.

Requirement

The client used a centralized member management system to manage their data which were stored in a built-in DB2 of IBM AS/400 system and were accessed via green screen applications.

Problems like lack of flexibility in handling changing needs in business processes, rising maintenance costs, hardware risks, and vendor lock-in crept in. The need was to move the proprietary systems onto standards-based platforms.

How WaveMaker helped

The client's member information was spread across 200+ tables. Since the schema wasn't designed for efficient operation at-scale, WaveMaker had to create a new schema without violating existing dependencies. The client's system leveraged multiple third-party APIs that were SOAP-based that had to be integrated. With WaveMaker, we were able to use existing SOAP APIs as they are and even generate a new API with the click of a button. This made the overall integration effort quicker. Leveraging its preloaded widgets and UI themes optimised for cross-screen compatibility, WaveMaker recreated the client's application screens, nullifying any project effort spent in creating front-end code.

Impact

WaveMaker is helping the client quickly re-platform their legacy system without any business disruption. With WaveMaker, their modernization efforts are becoming agile, flexible, and resilient. As we continuously engage with them, the platform shows greater potential to drive larger business values in the future.

About WaveMaker

WaveMaker is the most open, extensible and flexible Low-code Platform that complements your enterprise application delivery while keeping in mind the requirements of Software Developers, Citizen Developers/ Business Users, IT Architects and CIOs.

Start a 30-day, free trial today at www.wavemaker.com/get-started