ANALYSIS.TECH

WHITE PAPER

ARCHITECTING FOR ADAPTABILITY

IN THE AGE OF AI

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EXECUTIVE SUMMARY

Amid today's fevered artificial intelligence hype, experts assert bold claims about its transformative potential. Proponents suggest that conventional software development is on the verge of obsolescence, rendering tools like low-code and digital process automation (DPA) obsolete. However, Analysis.tech research indicates that while AI will undeniably reshape the development landscape, the critical next step is for organizations to establish a strategy and architecture to fully take advantage of AI opportunities while avoiding new siloed technical debt. One well-proven approach is to establish a multi-tier, metadata-driven architecture based on a low-code / DPA platform that allows rapid development of applications through orchestration and composability of any internal and external software assets, including emerging AI functionality.

TABLE OF CONTENTS

1 CRUCIAL AUTOMATION IMPERATIVE

BUSINESSES FACE A CRUCIAL AUTOMATION IMPERATIVE

Organizations face a massive challenge to drive automation at an unprecedented scale. In recent years, a multitude of factors have propelled this shift, including COVID and work from home requirements, environmental disruptions caused by fires, storms, and prolonged freezing temperatures, supply chain disruptions, labor shortages, and inflation. One clear lesson emerged from these challenges; businesses equipped with more advanced automation were in a better position to adapt. The strategic advantage gained by competitors who leverage automation to deliver superior and more cost-effective customer experiences is a primary concern to many businesses. The constant fear of "What if Amazon enters my market" is recognition that automation is a massive disruptor in and of itself. To survive and thrive, organizations must prepare to meet an Automation Imperative:

THE AUTOMATION IMPERATIVE

> "The necessity to digitize and drive existing business processes and functionality into on-line managed platforms at a massive scale requires a fundamental shift from legacy automation tools and practices. A critical element is deep involvement of business users that must become part of the organizational DNA."

WE CAN'T DO THIS THE OLD-FASHIONED WAY

The extensive requirements for enterprise automation have driven the need for development solutions well beyond the capabilities of standard software development. Enterprises cannot keep up with demand due to the cost and complexity of building and maintaining software 'the old-fashioned way' - with an army of highly paid developers taking on large risky projects. So, as the backlog grows, businesspeople find other ways to adapt with tools like spreadsheets and email. Meanwhile, the critical need to bring these "processes" into a managed platform to drive automation remains unmet.

2

GROWTH, CHANGE, AND AGILITY

ARCHITECT FOR GROWTH, CHANGE, AND AGILITY

In the dynamic landscape of software development, one major challenge remains in the architecture. Driving transformation requires tackling both the extensive long tail of development and the ability to compose applications and orchestrate processes across new AI assets. This includes emerging AI functionality, embedded features in Line of Business (LOB) applications, and existing data sources. The near-term advancements in AI development do not address or envision this complex task. These capabilities are rooted in an architecture that empowers a business to:

BUILD APP LOGIC THAT CROSSES ORGANIZATIONAL BOUNDARIES

A significant barrier to driving transformation is a legacy of investing in specific LOB applications to drive departmental efficiency. While these processes have proven invaluable in reducing cost and driving siloed effectiveness, we now must face the fact that business processes do not exist within organizational boundaries. To drive true change, organizations must have tools and strategies in place to build and maintain cross-organization processes.

DESIGN PROCESSES OUTSIDE OF THE CONSTRAINTS OF LOB SILOES

Highly aligned with the above process constraints are investments in LOB applications to support those functions. CRM, SFA, ERP and numerous other LOB applications provide robust, albeit generic, functionality. To truly differentiate an organization through automation, many opt for extensive customization. This creates three problems:

1. Customizations limit an organization's ability to upgrade their software, so they must continue using outdated versions or face expensive and complicated updates.
2. Since these LOB systems are designed to address specific business challenges, they are not designed to support the challenge of cross-organizational processes required today. Customizations are carried out within the application rather than across applications.
3. Customizing LOB applications requires specialized skills and licensing unique to each platform. These skills can be expensive, difficult to find, and different for each LOB stack. Licensing costs to customize can also be very high, especially when applied to each LOB application individually.

CREATE A LIBRARY OF REUSABLE ASSETS THAT CAN BE CONSUMED AT WILL

Process optimization is likely to require multiple technologies to drive optimal outcomes. This could include integration to legacy systems, accessing technical functionality like RPA, content management, decision-making, or incorporating external services. The ability to maintain a library of technical functionality that can be seamlessly integrated to construct, improve, and sustain application functionality is imperative for an adaptable and agile architecture. A metadata-driven architecture allows assets to be consumed into the application architecture when and where they are required without coding.

Your AI strategy must include an architecture that allows coordination and orchestration of AI assets through an architecture that more effectively drives your business outcomes.

LEVERAGE EMERGING AI ASSETS WITHOUT INCURRING DEEP TECHNICAL DEBT

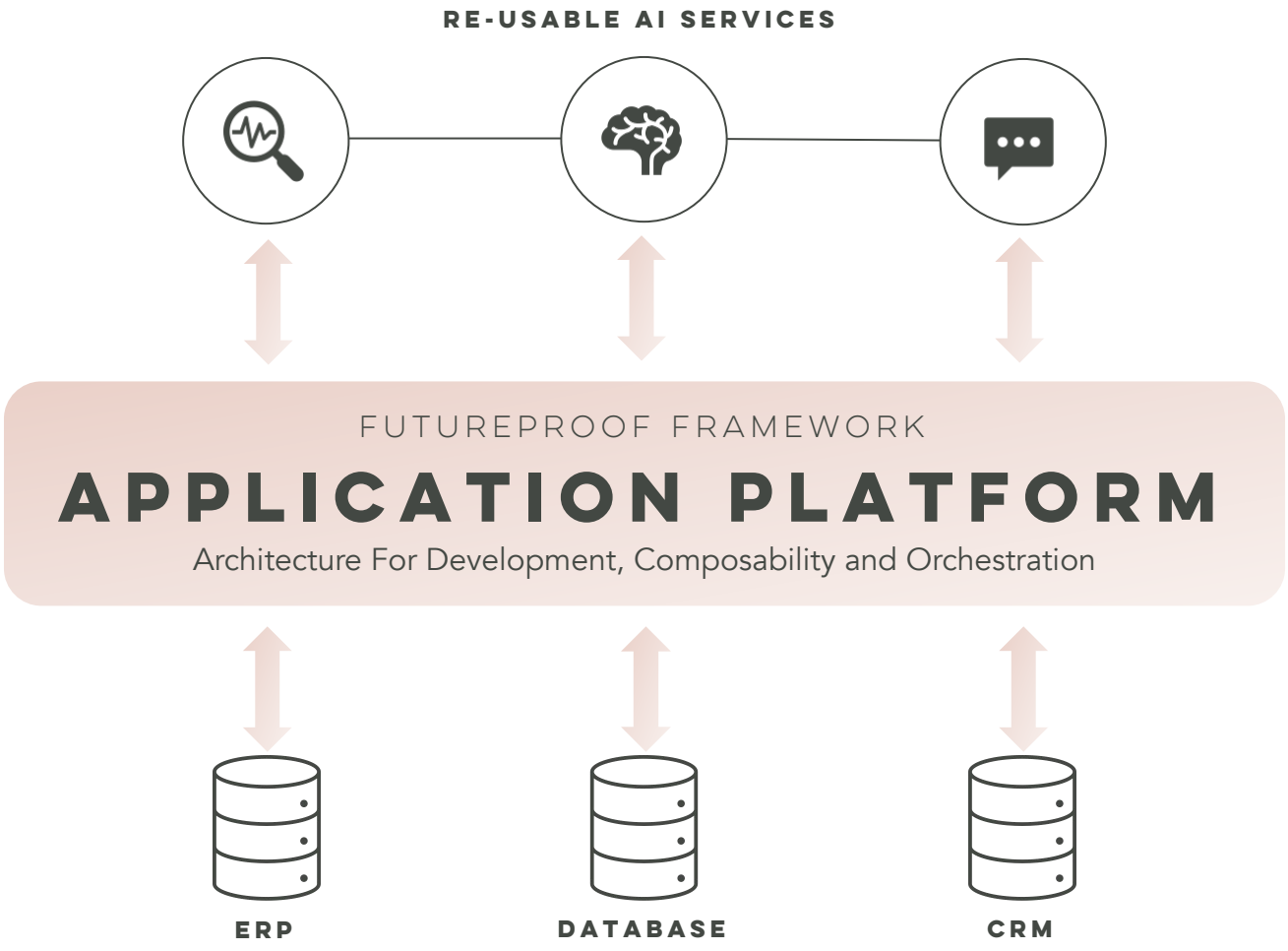
Among the assets described in the previous bullet are emerging AI assets that will either be developed or brought to your organization. These assets are undeniably crucial, but due to the rapid evolution in this space, they should be loosely coupled within an overarching application architecture designed to align with your business objectives. Otherwise, they risk evolving into sub-optimal silos with limited efficiency. It is critical to have access to the best AI services required to reach your business objectives with the ability to swap them in and out of a process orchestration engine through a composable architecture. Your AI strategy must include an architecture that allows coordination and orchestration of AI assets through an architecture that more effectively drives your business outcomes.

ORCHESTRATE ALL THESE CAPABILITIES TO DRIVE TANGIBLE BUSINESS OUTCOMES

To optimize business processes by integrating and leveraging the full spectrum of capabilities, a platform for modeling, orchestrating, adapting, and enhancing processes is essential. Orchestrating and maintaining processes across legacy systems, specific technologies, and evolving business requirements stands out as the most vital and challenging aspect of crafting a future-proof architecture.

FIGURE 1:

AN ARCHITECTURE THAT ALLOWS ORCHESTRATION ACROSS EXISTING AND EMERGING TECHNOLOGY INVESTMENTS



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AI TO TRANSFORM LOW-CODE AND DPA

AI ALREADY PLAYS A CRITICAL ROLE IN LOW-CODE & DPA

Beyond the core development of applications, AI offers a large and growing set of increasingly effective services that can be consumed from external sources into an application framework, either traditional or low-code. These types of services have been available for a long time and most utilize AI, but many are advancing rapidly in the age of generative AI. While they can be standalone applications, many also offer valuable services to drive more effective and efficient business outcomes as part of broader applications. Examples of AI driven functionality include:

CONTENT INTELLIGENCE

The ability to understand content and translate it from unstructured to structured data drives higher value and offers better opportunities for efficient, and in some instances, straight-through processing. This long-standing AI-based technology will become far more powerful with new advances.

DOCUMENT GENERATION

Once a primitive capability is based on templates and data extraction, document generation will transform in the age of generative AI. Richer and more contextually relevant content will be generated in-line to support business processes

RECOMMENDED ACTIONS

The ability to guide a user or system to provide recommended actions. These could vary from product recommendations to guidance on potential next steps in a sophisticated process. This type of functionality can also extend to specialized services like credit approval or fraud detection.

CHAT & VOICE INTERACTIONS

The ability to interact with an application through voice or natural language chat rather than a traditional application interface can provide powerful new capabilities and access models. These capabilities are well understood now and will continue to become more powerful, robust, and natural for users.

THE CRITICAL ROLE OF ARCHITECTURE IN MANAGING EMERGING AI ASSETS

With the rise of Generative AI, the level of investment and promise is driving a flywheel of innovation. While Analysis.tech research does not indicate an era of AI written software replacing current development platforms and strategies in the foreseeable future, it is imperative that smart organizations understand that many AI advances will offer significant business value.

Many of these new AI capabilities will offer extremely specific capabilities and represent incredible value point solutions. However, each new AI capability is another asset to manage and another silo of technical debt over time. The role of architecture mitigates this risk in three ways:

1 EMERGING AI ASSETS ARE MANAGED AS PART OF AN OVERALL SET OF ASSETS

Ideally, each new AI asset that enters the enterprise will provide discrete value. Much of that value is currently focused on understanding intent and generating artifacts to support a goal. This early low-hanging fruit is immediately valuable to building more effective and efficient business processes. The value increases if these emerging AI assets are managed and exposed as part of an application development framework. To do that, they must be part of an available, re-usable library exposed through metadata.

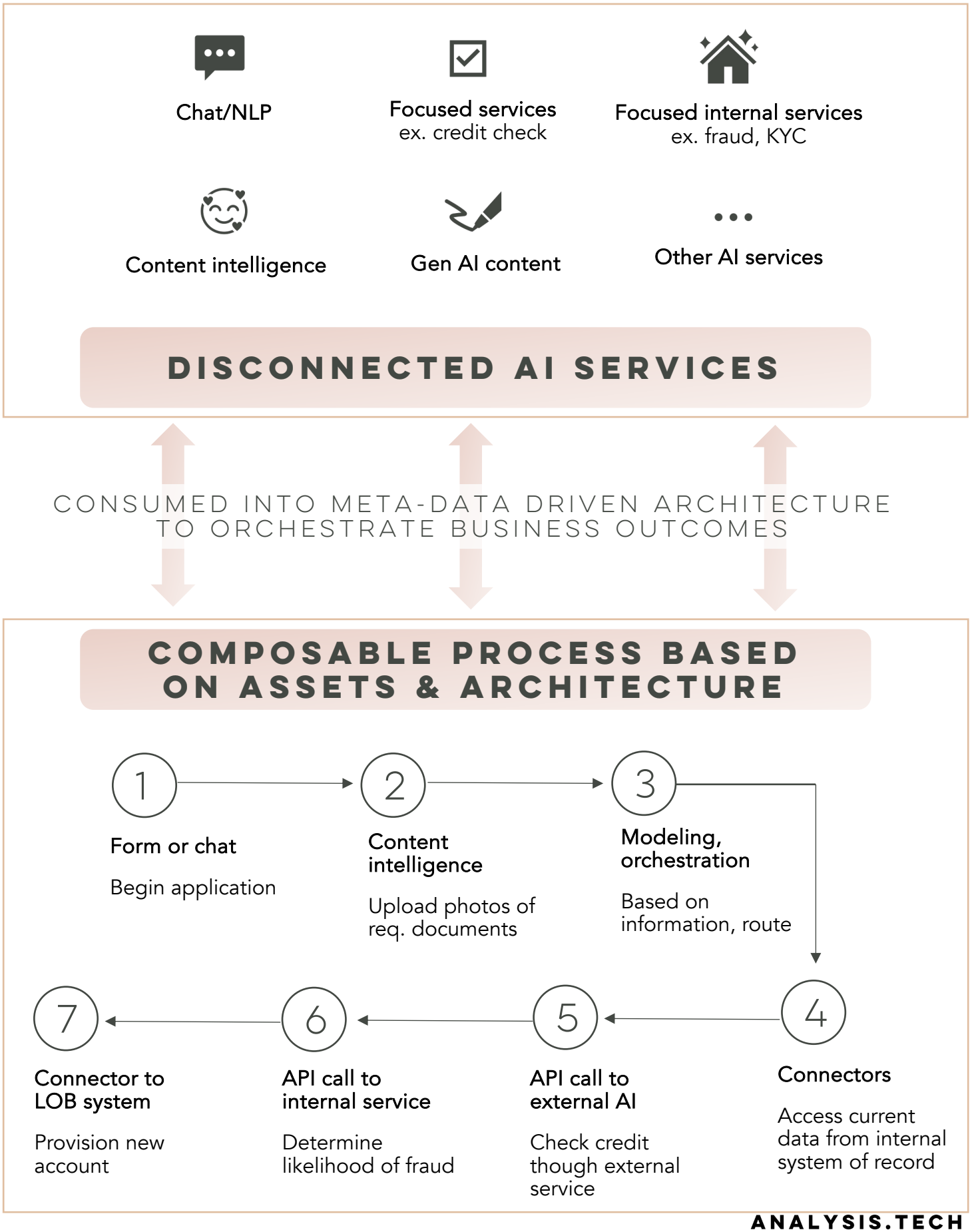
2 AI FUNCTIONS CAN EASILY BE SWAPPED IN AND OUT IN A COMPOSABLE ARCHITECTURE

The landscape of AI is rapidly growing and changing. Expect huge investments by vendors to continue, with large cloud platform vendors like Amazon (AWS), Google, IBM and Microsoft pouring to dominate the market. The result? This landscape will be shifting rapidly and the product you buy today may be outclassed by the competition tomorrow. By focusing on consuming AI functions within an adaptable architecture, you can swap in and out new functionality very quickly.

3 THE VALUE OF AI ASSETS IS MASSIVELY MAGNIFIED WHEN CONSUMED WITHIN A PROCESS.

When new AI services (or any existing, emerging services and system integrations) are exposed through metadata and consumable in an adaptive architecture, the value increases dramatically. The model drives greater visibility, efficiency as well as better business outcomes when aligned to critical business processes.

FIGURE 2: EMERGING AI ASSETS MANAGED AND CONSUMED IN A META-DATA DRIVEN ARCHITECTURE TO DRIVE OUTCOMES



A GLIMPSE OF LOW-CODE MEETS AI IN A FUTURE-PROOF ARCHITECTURE

Currently, there is significant disruption from the application of low-code and DPA in best practices for process optimization. Creating business solutions from visualization of the process to provisioning of an initial application to rapid iteration will all significantly evolve. Areas where AI could be applied soon include:

PROCESS BEST PRACTICES VISUALIZATION

By leveraging Large Language Models (LLMs), refined generic processes can be derived and presented to both developers and business stakeholders. Traditionally, achieving this involved employing static best practice templates developed by people with specific knowledge of the processes. The integration of LLMs has transformed these models into dynamic entities with a significantly broader scope. Now, any proposed process can be modeled on the fly. While the concept of application templates and accelerators is not entirely new, the ability to access an infinite number of these "templates" within minutes, based on comprehensive best practices, presents a novel and powerful capability.

PROCESS VALIDATION

Generative AI created best practice process maps based on LLMs represent a valuable starting point for designing and optimizing processes. However, for most organizations, this will only represent a reference point. Additional validation can come from sources like process and task mining solutions that increasingly leverage AI capabilities and can represent an objective 'as is' state. Additional input can be gathered from business stakeholders and documented in process modeling and documentation tools. With the combination of AI-driven capabilities and low-code, organizations are insured that processes are designed to reach their unique business goals.

APPLICATION VISUALIZATION

Using process models, AI can now generate user interfaces based on roles and data models to support the application. This working prototype serves as a potential starting point for iterative requirements gathering. Business users gain the ability to observe and react to an actual working version of the application, enhancing the collaborative and iterative development process.

BUSINESS-DRIVEN ITERATION

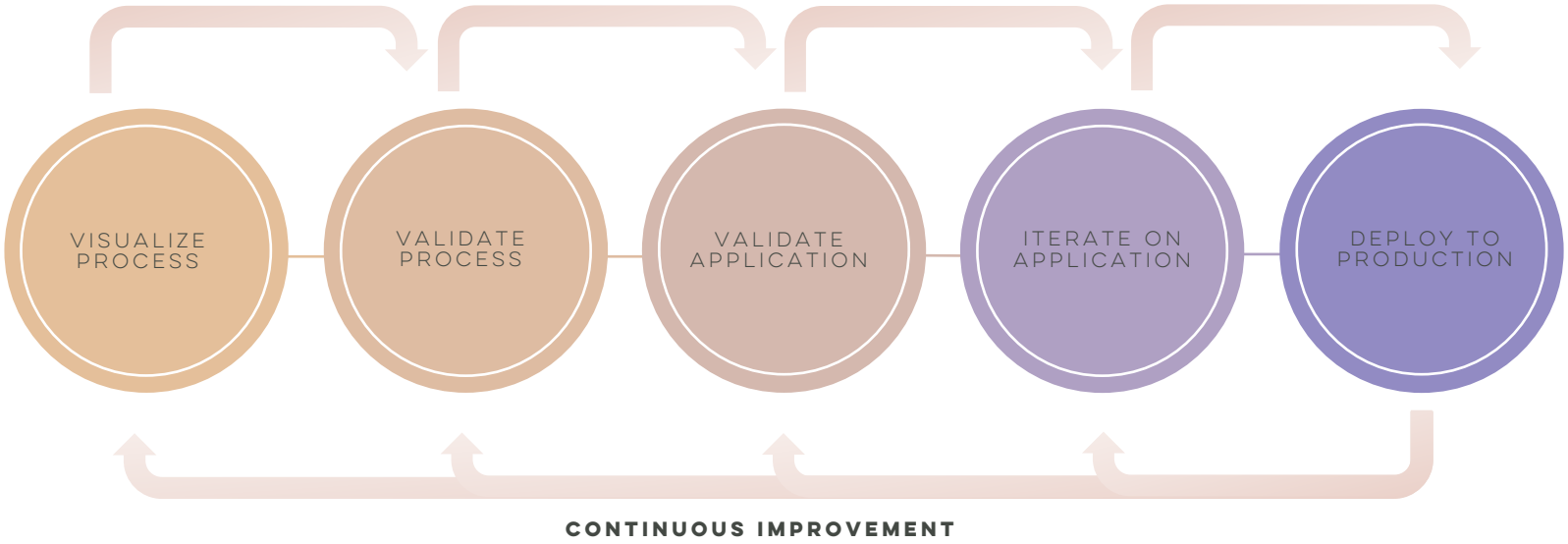
Empowered by working prototypes, business users can actively respond by modifying and enhancing the actual application. This marks a crucial distinction between AI-assisted traditional application development and AI-assisted low-code development. The business user's hands-on involvement in the actual design of the application allows for rapid iteration during the initial design phase. Moreover, it establishes a foundational approach that supports continuous improvement of the application and optimization of the underlying business process. This is also an area where new AI assets can be introduced into architecture and be made available as part of the composable architecture going forward.

CONTINUOUS IMPROVEMENT ENABLED BY THE PLATFORM

The synergy of AI and low-code introduces a key element – enhanced insights derived from applications, driving a virtuous cycle of continuous improvement. This plays a pivotal role in the iterative and potent nature of low-code development, empowering business users to monitor, enhance, and extend applications over time. Iteration and improvement can leverage any of the cycles described here.

FIGURE 3:

AI WILL DRIVE A VIRTUOUS CYCLE ACCELERATING DEVELOPMENT & APPLICATION ITERATION



VISUALIZE PROCESS

Best Practice Process Generated From LLMs

VALIDATE PROCESS

Best Practices Refined Through Process Mining, Business Stakeholders

VALIDATE APPLICATION

Application interfaces and roles provisioned

ITERATE ON APPLICATION

Business Stakeholders “Finish” the Application

DEPLOY APPLICATION

Iteration Through Real-World Feedback

4

MEETING AUTOMATION REQUIREMENTS

ARCHITECT TO MEET BUSINESS AUTOMATION REQUIREMENTS

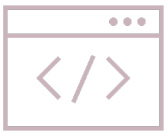
Business must evolve to embrace far more agile and adaptive software development practices. To meet the application development demands of the coming automation imperative, organizations will need to:

DEVELOP APPLICATIONS FASTER

Traditional software development is time consuming and resource intensive. Speed to value and responsiveness to business challenges and opportunities are critical requirements in meeting the automation imperative. When COVID required a move to remote work, organizations had to build or adjust automated solutions with no notice. Those that had a framework in place to respond immediately demonstrated far more business agility and resilience than those that did not. This was not an isolated business incident as future requirements will only increase in number and frequency.

BUILD SOFTWARE AT FAR LOWER COST

Expensive custom-built development is not required for all applications. Organizations will need to lower the cost of traditional development and create strategies that address the long tail of automation. The scope of this effort is daunting but imagine a world where much of the 'automation' that currently takes place in spreadsheets and email moves to managed software platforms.



LEVERAGE TOOLS THAT REQUIRE FEWER PROGRAMMING SKILLS AND LESS TRAINING

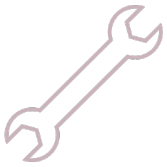
To tap into less costly development techniques, organizations will need to adopt tools that require less skills, education, and training. AI offers promise in both traditional and low-code development. There are two approaches to tackle this challenge: enhancing traditional developers' capabilities by reducing current coding requirements and embracing next-generation tools built for a class of developers who are not professionally trained programmers.

EMBRACE TOOLS THAT ENCOURAGE INNOVATION

It is difficult to rapidly innovate on both packaged application software and traditionally developed software. Packaged software options present a trade-off between a "one size fits all" solution or the high-cost and complexity of customization. Traditional software development is heavy on requirements gathering that gets in the way of rapid deployment, testing, and iteration. One example of supporting innovation through automation that surfaced in our research involved a defense contractor utilizing an automation platform initially designed for their payroll system to promptly construct a customized application supporting new product design.

PULL BUSINESS USERS INTO DEVELOPMENT PROCESS

Traditional development methods rely on skilled software professionals to interpret requirements and generate solutions, often resulting in a significant gap between business users and developers. To bridge this divide effectively, it is crucial to employ tools that empower business users to create and visualize applications. Additionally, the ability to iterate rapidly ensures that requirements are promptly addressed, facilitating a more meaningful integration of business users into the development process.

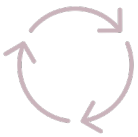


CREATE ARCHITECTURE FOR CONTINUOUS IMPROVEMENT AND AGILITY

Application requirements constantly change due to external factors like supply chain disruptions, geopolitical shifts, environmental obstacles, and the fast-paced business environment which demands swift responses to competition and opportunities. It is critical to deploy tools and techniques that allow for quick adjustments to business applications in alignment with growth, opportunities, and challenges.

BUILD SMALLER AND SITUATIONAL APPLICATIONS

A major challenge to meet the automation imperative is automating at scale. IT departments are typically structured to handle the most extensive and intricate business requirements. However, the multitude of smaller automation needs, often referred to as the ‘long tail,’ is left to individual business units to navigate. Frequently, they resort to using basic tools like spreadsheets and email. To drive true transformation, these smaller processes must transition to online, managed platforms. Yet, this formidable task is often beyond the capacity of most IT departments.

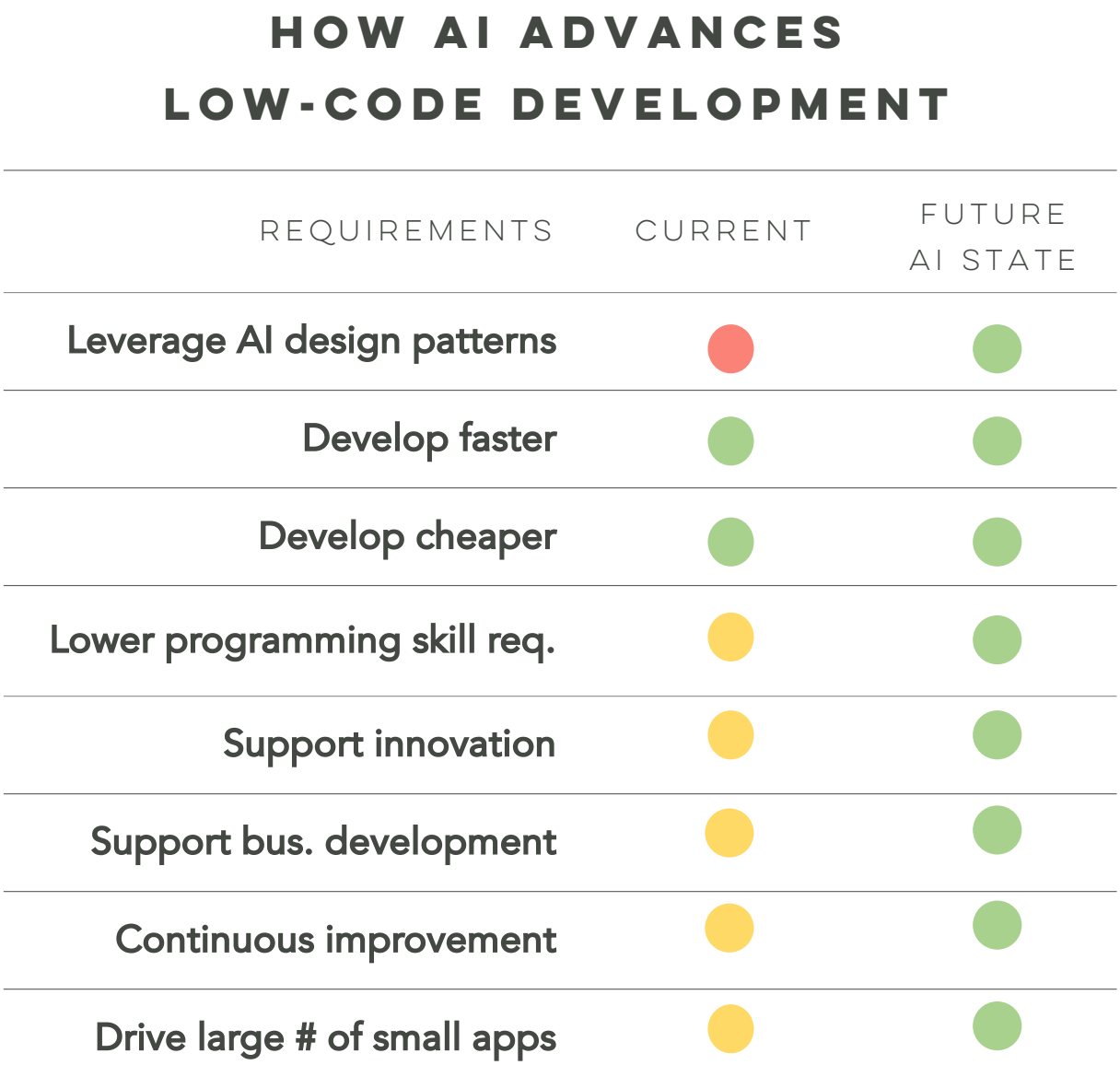


ENSURE TRUE CONTINUOUS IMPROVEMENT THAT ENABLES CLOSED LOOPED OPTIMIZATION

Consider each of the business goals in the section in the context of your technical architecture. To truly adapt, the architecture must model-driven and based on a fully metadata architecture. This allows it to adapt to in real-time without deploying new code or driving a new engineering cycle. A composable architecture based on a meta-data abstraction layer can change on the fly as requirements change and can adapt to new AI capabilities in real-time.

FIGURE 4:

AI WILL DRIVE CHANGE IN DEVELOPMENT, BUT LOW-CODE WILL REMAIN CRITICAL FOR TRANSFORMATION



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DEVELOP YOUR STRATEGY

DEVELOP YOUR STRATEGY FOR DEVELOPMENT IN THE AGE OF AI

ASSESS AI IN RELATION TO YOUR CURRENT AND FUTURE DEVELOPMENT REQUIREMENTS

Organizations face an unprecedented need to automate quickly. With AI on the horizon, there is a concerning level of hype that AI will write all the code you need. This narrative is not the case for the near future. Assess AI in the context of pragmatic and definable goals given the current reality and maturation rate, not the hype.

DESIGN AN ARCHITECTURE THAT GUARDS AGAINST NEW AI TECHNICAL DEBT

While AI magic code may not be the reality yet, there are new AI capabilities hitting the market every day that offer real enterprise value. Assess and embrace these where appropriate but understand each new AI capability represents an asset that must be managed in the context of technical debt. Consuming these assets into a meta-driven architecture allows you to not only quickly consume them in a business context but swap them in and out and dramatically lower technical debt.

PLAN FOR AI ASSETS TO BE CONSUMED IN PROCESSES WHEREVER NECESSARY

AI assets will offer dramatic business value, but that value is magnified as part of an overall process optimization effort. Design an architecture that drives constant process optimization that is accelerated by new AI capabilities that can be consumed and orchestrated in context.

DESIGN A STRATEGY THAT PULLS BUSINESS USERS INTO THE DEVELOPMENT PROCESS

The key to driving long-term automation success is including your greatest business assets. No, it is not AI. It is your business users. They need to be part of your automation efforts every day. Design a system based on a development environment that includes broad input from business users.

CONCLUSION

Every organization faces an automation imperative. Those that don't heed the call will face huge market headwinds and likely fail over time. Tools and techniques exist to meet this critical business demand, including powerful emerging AI capabilities. Now is the time to define a standard architecture that allows your organization to automate at scale, take advantage of existing and emerging enterprise assets in real-time to drive continuous closed-loop improvement.

ANALYSIS.TECH

AgilePoint has engaged Analysis.tech to research and document the effects of artificial intelligence (AI) on application development including traditional software development, low-code, and digital process automation (DPA). Analysis.tech did research on the current state of AI in development through product analysis, research through public sources and interviews with thought leaders on the topic, vendor sources and enterprise developers.