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The Only Way to Workflow

Leveraging Legacy Systems and Applications with **No-Code Workflow Solutions**

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Abstract

Legacy platforms and applications are still embedded in business and mission critical systems; however, they present a dilemma for achieving digital transformation initiatives: the decision to re-use or replace.

Contents

McKinsey & Company

"If the pace of the pre-coronavirus world was already fast, the luxury of time now seems to have disappeared completely. Businesses that once mapped digital strategy in one- to three-year phases must now scale their initiatives in a matter of days or weeks."

—McKinsey and Company, April 22nd, 2020

State of Legacy

Businesses have been pursing digital transformation initiatives for as long as a decade, but now more than ever need to see results. Digital transformation is no longer a luxury, but rather a mandate to implement fundamental and lasting changes to business operations and customer facing service functions.

Unfortunately, the reliance on legacy systems still presents one of the biggest hurdles to achieving digital success.

Gartner defines a legacy application as "an information system that may be based on outdated technologies but is critical to day-to-day operations". Legacy can refer to any piece of outdated technology that incumbers an organization's ability to grow, shift and adopt to changing business conditions. Legacy systems and applications are frequently business and mission critical, however, they present a dilemma in the decision to re-use or replace. Few organizations have the budget, time, or expertise to affect a wholesale replacement of every piece of legacy technology. Thus, leveraging legacy systems is more important than ever, but the universal challenge is how to accomplish this in a cost-effective, low risk, and time effective manner.

We start from the position that achieving digital transformation is more than a system update and that legacy technical debt is a real barrier to full modernization.

While "legacy" may be used as pejorative, replete with negative connotations, legacy systems are not all bad. Often it is the unchanged operation of legacy systems within a continuously changing business environment that is the root cause of distress. Regardless, there is usually a great deal of business value and transactional strength to be derived from legacy applications and the data they contain. The system-specific challenge is how to extract this value for the continuing benefit and advantage of the organization.

GAO

"To IRS' credit, it keeps these old systems running during the file season. But relying on these antiquated systems for our nation's primary source of revenue is highly risky, meaning the chance of having a failure during the filing season is continually increasing."

—Dave Powner, GAO
Director of IT Management

Legacy Success and Business Plan

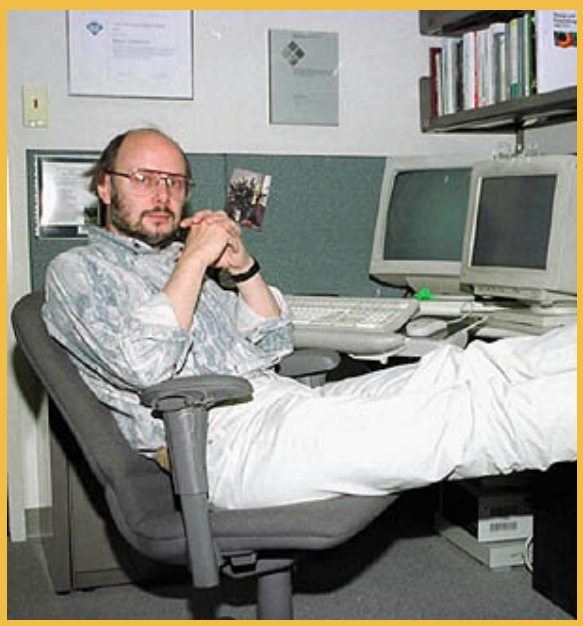
The Internal Revenue Service (IRS) still operates tax filing processes on legacy IT sysems, some of which are based on applications first developed in the 1970's. In the push to meet Y2K requirements many of these software applications were remediated and given a "new life", prolonging modernization efforts even further.

The point is that legacy systems and applications do work, and usually work exceptionally well. They have stood the test of time, and are usually good examples of excellent design architecture and the application of good design principles. Users may have built their careers upon them, the business may have built its foundations upon them, and certainly they represent a treasure trove of data and knowledge you could use elsewhere.

Within the success and longevity of legacy systems lies their Achilles Heel: they were built for a business environment which has substantially changed, at a time the pace of change was not what it now is, with technology that is not as flexible or powerful as today, and by people and knowledge which may no longer be with the business.

""Legacy code" often differs from its suggested alternative by actually working and scaling."

- Bjarne Stroustrup (inventor of C++) (Stroustrup n.d.)



Major Legacy Pain Points

There are numerous issues with operating legacy systems, and in our opinion the following represent the most serious:

1. **Forgotten Risk**
2. **Restricted Functionality**
3. **Obstruction of Business Change and Transformation**

1. Forgotten Risk

Forgotten Risk materializes suddenly, and usually with extreme results for the business, customers and senior management – including the CEO/CIO. Forgotten Risk is that risk which no-one knew of or appreciated until, like a long dormant volcano it erupts around us.

Until there is an incident, the business and staff go about their work routines, operating with a sense of complacency born from ignorance. The legacy system rumbles on, performing its function while those who have memory and understanding of how it does or should function are no longer available, leaving their successors in the dark, potentially at significant cost.

Extreme examples of the materialization of Forgotten Risk include:

Hacking: where a legacy system is hacked, and which either directly or indirectly leads to a major security breach and data loss. An example is the well documented hacking of the U.S. Office of Personnel Management (OPM) data resulting in the theft of over 20 million records, including military and intelligence personnel. If the data itself could have been encrypted, this would not have been such a serious incident, however the data was not encrypted due to it being stored within legacy systems that were incapable of modern encryption. OPM's director, Katherine Archuleta resigned in the wake of the scandal. (Chafetz 2015)

Break Down: where a legacy system ceases to function, and is a mission or business critical system, or supports other systems and applications which in turn are business or mission critical and cannot function properly without the underlying legacy system functioning as expected.

Common reasons for break down include failure to patch, or no patching available for deprecated or obsolete operating systems, the introduction of new libraries, Windows/Office updates, issues with third-party software (again, failure or non-availability of patches and support), and incompatible drivers. An example of a break down is the Tax Day 2018 IRS electronic filing system crash preventing processing of electronically filed tax returns. The IRS never specified the cause of the failure, but two of their systems were almost six decades old, a significant risk factor.

Less critical, but still very serious instances occur when your legacy system fail a security assessment, or you find yourself in breach of compliance or regulatory standards. In such cases, the financial and business consequences can be severe, however they hopefully occur before real harm is done to customers and the business. The purpose of auditing, testing and regulatory inspection is in part to ensure your systems are capable of meeting minimum standards, but this is itself no guarantee of reduced risk or calamity.

Most commonly, such instances revolve around the implications for security of the data held or processed within the legacy system.

An increasingly significant issue is when the organization must make changes to how it does business, requiring a fundamental shift in processes and organization. All organizations need to evolve and expand; whether to outperform competitors, improve the customer experience, increase mobility, or unlock big data. The pace of change has accelerated, putting increased pressure on legacy systems.

This problem is not simply one of difficulty in wrangling a legacy system to do something different, and in any event, it may be perfectly capable of undergoing change.

The big question is how do you modify the legacy system at all if the developers who created and ran it are no longer with your organization? Do you know what is actually in your legacy system? Can you afford to be invasive running the risk of breaking the legacy system?

Unless you have excellent documentation which is also up-to-date, the simple answer is you cannot modify the legacy system without the potential for high planned and unplanned costs, and in any event without a great deal of operational and business risk involved.

2. Restricted Functionality

Legacy systems may function very well, however, as the ability and skills to understand and modify them fades, so does their ability to adapt to new business demands. We believe four significant business demands are competitive edge, scalability, worker efficiency, and "Big Data" or data analytics.

Your legacy systems truly run your business. But as that competitive edge becomes harder to maintain over time, you need to be able to evolve your business process and trigger new parts of the process under certain situations – for example, when the banking transaction completes on a legacy system, spin off a fraud detection process in a more modern system, for transactions over a certain amount. This sort of change and extension to an existing legacy system can be very difficult due to the factors of Forgotten Risk that we noted earlier.

In addition, legacy systems were built for a level of scalability that fit contemporary business requirements, but as the business grows they become the bottleneck holding back growth. Some legacy systems are serial in nature and many lack the capability to scale horizontally and are therefore simply unable to increase capacity and handle greater transactional loads.

Worker efficiency is also an important business demand. A significant barrier to the efficiency of knowledge workers is the impeding of daily interactions, exacerbated by a poor user experience. If the software user interface is unintuitive or outmoded, new workers will find it difficult to learn and maintain mastery. For example, if a call center worker cannot quickly find what they need, valuable seconds will be wasted on each call. This will affect worker ability to complete tasks efficiently and sometimes even correctly. If your legacy system is the only user interface available, and you have no means of providing a new interface that is more intuitive, you won't be able to empower your workers to achieve efficiency nor accuracy gains to tighten ship and produce more with less...or more with more.

Finally, legacy systems contain a treasure trove of data you would like to use elsewhere in your organization. The importance of "Big Data" and data analytics goes beyond mere trend. Being able to quickly sense patterns and get business insights amongst large amounts of data – transactional data, customer service data, etc. – is more than vital if you want to stay ahead of your competitors – especially since they're already leveraging data analytics, too. However, due to many factors, such as forgotten protocols or proprietary data formats, the legacy system will not typically yield its wealth of insights except to the most tenacious and highly skilled.

In sum, your legacy systems contain significant value.

But in order to access and leverage that value, it is critical that you reduce dependence on – and eliminate the centrality of – legacy systems in your organization. This will indeed relegate them to transactional support, archival, and data storage. But routing your transactions through a flexible software infrastructure capable of interacting with legacy allow organizations to add the functionality required to grow and transform business operations. Flexible software platforms are less prone to impeding change as it will allows the introduction of new components and rearranging existing ones easily – whatever your business needs. In addition, along the routing pathways and at the junctures of the infrastructure, you will be able to audit changes for compliance, check security, capture data for analytics, and respond in new and innovative ways such as triggering a new part of the process or performing validation to catch errors early, while also shielding legacy systems from direct interaction with the outside world.

3. Delays and Obstructs Business Change and Transformation

A major issue associated with legacy systems is how they act as a barrier to business transformation, and in particular the move to a Digital strategy. Legacy systems reinforce traditional organizational models and independent data silos that left unchecked, undermine cross-functional collaboration critical to change. All industry segments face challenges in the process of exploiting digital technologies. Global crises like the COVID-19 pandemic or economic downturns only heighten the pace for digital transformation – any delay could be disastrous.

Digitization has rewritten the rules of business competition, and while legacy-based companies may be able to compete, they are increasingly at risk of becoming ineffective, if they are not already.

Sinur

"Many organizations are hamstrung with a legacy portfolio that they have invested in for decades. They are now challenged with moving forward to a new digital world without the drag of legacy affecting their progress."

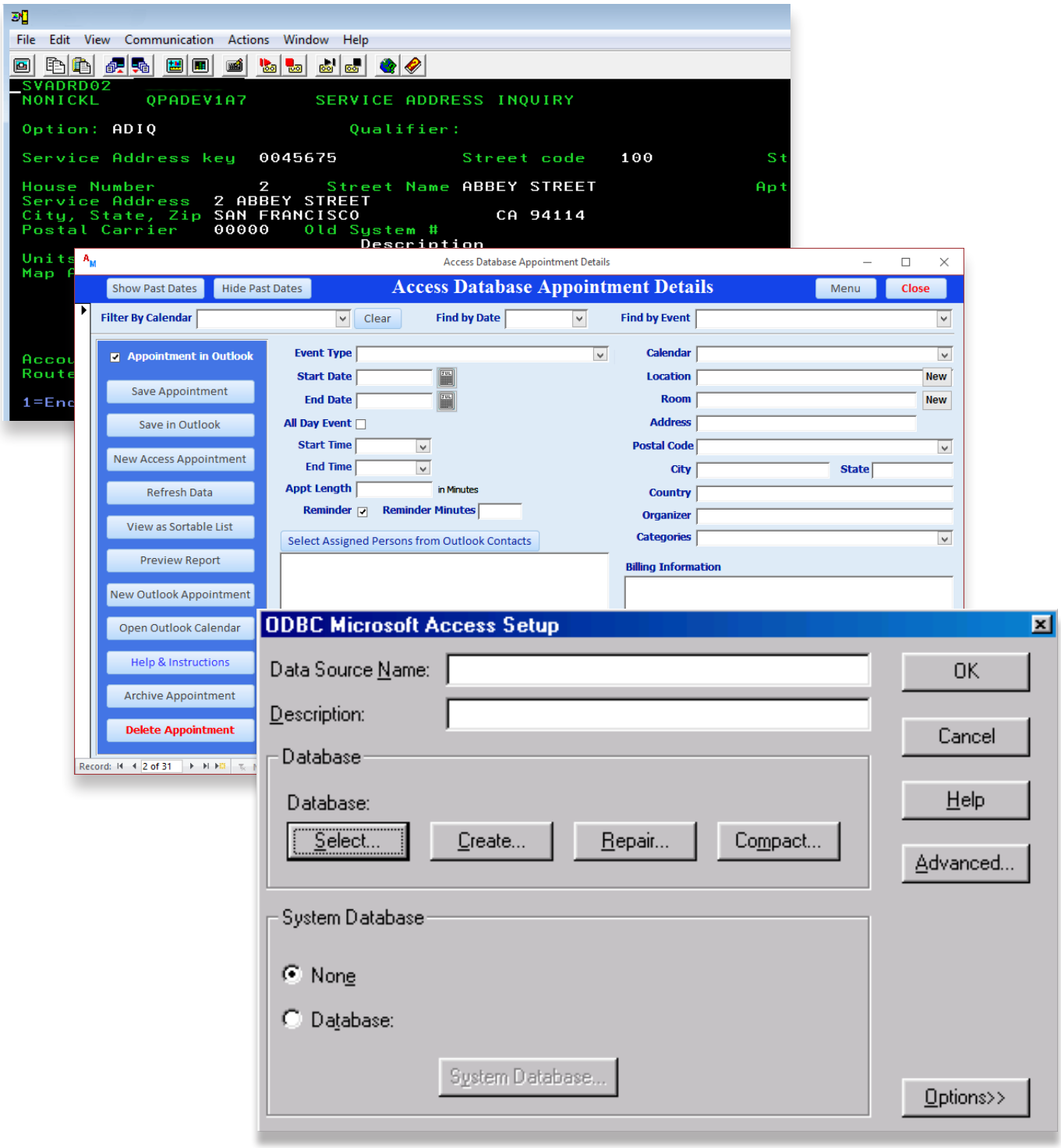
—Jim Sinur (Sinur, Top Five Non-Invasive Techniques for Leveraging Legacy 2015)

Ancilary Legacy Pain Points

There are many other issues with legacy systems, however, while these ancillary issues may still cause considerable business pain, they can be overcome though at ever increasing costs.

Two examples of anicellary legacy issues are:

1. **Platform Obsolescence**
2. **Maintenance Costs**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1. Platform Obsolescence

No system operates as an island in the real world, and legacy systems will exchange information and integrate with other applications and platforms. If the platform they are relying upon itself becomes obsolete, then this will have ramifications for the operation of the legacy system as well. For instance, if a legacy application relies on Windows XP to operate, and will not work on a more recent Windows Operating System, then the cessation of Windows XP support means the legacy system cannot run, or if it does, it will be exposed to significant security risks. (Williams 2015)

2. Maintenance Costs

There are three main cost components associated with legacy systems and they are:

- **Software**
- **Hardware**
- **Retraining & personnel costs**

Software costs include the cost of upgrading, patching and creating edge cases, while the cost of changing how they work, even in a relatively minor way, is both costly and inherently risky.
The hardware upon which legacy systems operate itself is also required to be maintained. More than this, hardware does not last forever, however if the server breaks or malfunctions, you may not be able to replace obsolete hardware, while the legacy system may not operate on anything else.

Finally, there is the cost of training and retraining personnel in order to maintain skills and knowledge of the legacy systems within the organization. This will become particularly acute where there is no readily available external resource upon which you may rely, and even if this exists, it is likely to command a premium in the market. This is also all based upon the precept that the skills and knowledge to modify your legacy system still exist at all, for instance in the case of a custom solution, for which the developers have long gone and the documentation is substandard or is no longer available.

These factors impact both operational and budgetary considerations as the US Government can attest — In 2019 80% of the IT Budget was spent on Operations and Maintenance.


2023
2022
2021

Proposed Solutions and Benefits

A digital transformation strategy must be led by top management to overcome the most significant barrier - the resistance to change. The process demands executive sponsorship with a commitment to breakdown the inherent organization silos that take root over time. Sharing of knowledge and collaboration among cross-functional stakeholders who have both an understanding of the legacy systems and new business process requirements are essential to success. Leadership needs to clarify and define common goals for what digital transformation means to the organization and how they will support high priority projects. Specific targets need to be defined and assigned to business functions collaborating with one another to execute across the organization.

There is no cookie cutter approach to apply, rather a number of solutions for tackling legacy applications and systems have emerged, and broadly may be divided into invasive and non-invasive techniques Considerable time and expense can be associated with traditional, invasive architectural approaches to legacy modernization. Point-to-point integration creates a dependence on specialized teams creating bottlenecks and rigidity, giving organizations less flexibility and dexterity in making future changes. In an era where change is the only constant, organizations need to protect the integrity of mission-critical applications while enabling future change.

The No-Code Solution

No-Code software allows non-programmers to create application software through graphical user interfaces and configuration tools instead of traditional programming. No-Code software empowers business users to rapidly build applications, accelerating digital transformation initiatives.

34% of low-code/no-code efforts in 2019 were business process or workflow applications, second only to customer-facing applications (mobile/web). [1]

Specific transformation categories are most ripe for no-code efforts, chief among them business process and workflow automation where the tools and capabilities have emerged empowering key SMEs to quickly build and deploy true enterprise-grade solutions.

The No-Code solution seeks to leverage legacy systems and applications in three major ways:

Legacy systems replacement

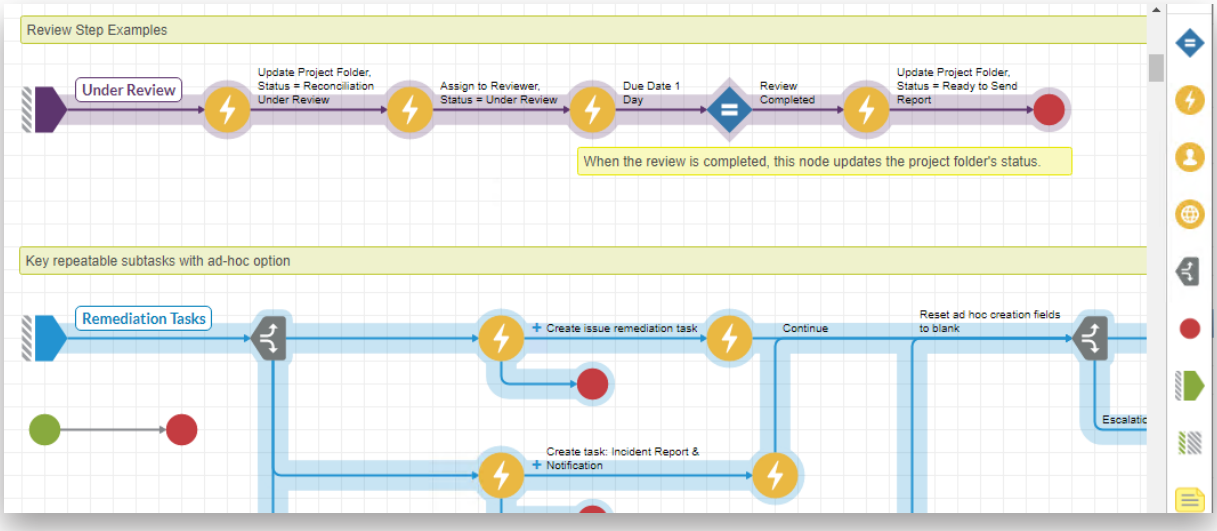
The reuse-v-replace cost ratio of 1:5 acts as a significant barrier to replacement. No-Code Workflow Solutions cost a fraction of traditional Business Process Management Solutions (BPMS), typically 20-30%, which significantly reduces replacement costs. The low TCO available from this new alternative solution class opens the door to serious consideration of legacy migration as a value proposition and to offsetting the impact of opportunity costs.

In addition, No-Code Solutions deploy much faster than low-code or traditional BPM tools, even with integration work factored in.

Systems integration

No-Code Solutions can act as what Craig Reid, of the Process Improvement Group, refers to as "Process Glue" (Reid 2015) and while they are fully customizable, they also typically function straight out of the box. This means you can allocate resources across time to opportunistically writing the code for the new components themselves, as individual pieces fail or become limiting factors. A modern No-Code Workflow Solution will be able to handle all of the "wiring together" of both legacy and modern transactional pieces through built-in workflow capabilities, API requests and so on, and this significantly reduces the overhead required for iterative migrations from legacy to modern platforms.

[1] 2019 Global Developer Survey, Forrester Research.



Reusable Application Program Interfaces (APIs) serve as the methodology for connecting data to applications allowing business teams to deliver complete applications without waiting for IT to custom code point-to-point integrations. By exposing legacy systems through API's business teams can create an infrastructure that makes retiring or modernizing systems much easier. Legacy applications can be extended through API's while new applications can be plugged in seamlessly.

No-Code Solutions also employ configurable user interfaces, and this means organizations can eliminate the development of one of the most expensive elements of system replacement. More than this, systems can be integrated across the organization with a common UI, providing a single, universal work platform that users can access with transactional and informational support coming from both legacy systems and modernized components, also delivered seamlessly.

No-Code workflow software also provides highly adaptable and modular approaches to systems integration enabling the addition, removal, or rearrangement of components on a trial basis, allowing you to see if the proposed configuration improves results as expected or not. If the new configuration provides no improvement, it is a relatively simple task to revert to a previous configuration, or quickly apply further modifications until optimal and measurable results are achieved, in real-time.

Data extraction and transformation

There are instances where you cannot integrate with a legacy system, and in this case migration of processes and data are required.

Extracting legacy data into portable formats such as CSV or more modern standards-based formats such SOAP/XML, REST, JSON, or others is a relatively straight forward task in many instances, allowing for the creation of requests, which a No-Code solution can then use to trigger workflows and tasks, which in turn acts as the trigger for a whole range of work routing or rich process-specific sub-tasks or events, such as intelligent alerts, automated emails, real-time reports, time-based escalations, SLA notifications, exception handling protocols, and so on.

The Umbrella

The ideal scenario, where possible, is to leverage legacy systems by layering them from above with more modern technology that both protects and aggregates the critical transactional and informational support of the legacy systems below. This "umbrella approach" also offers a means for seamlessly spot-upgrading underlying components while neither changing nor disrupting employee or customer experience. Additionally, this strategy can be accelerated both in terms of initial and ongoing efforts when as much of the management of these systems as possible can be completed by the human resources an organization already has available. This requires carefully selecting a solution that is genuinely targeted at the skillset an organization already has available, while also assuring scalability, security, and long-term extensibility.

The Benefits of Leveraging Legacy with a No-Code Solution

Correctly targeted No-Code Solutions tackle legacy issues in two major ways: firstly, by becoming the unified UI and platform integrating with legacy and non-legacy systems and applications across the business, and secondly, by its ability to use and share extracted data.

The major benefits of leveraging legacy using No-Code Workflow Software include:

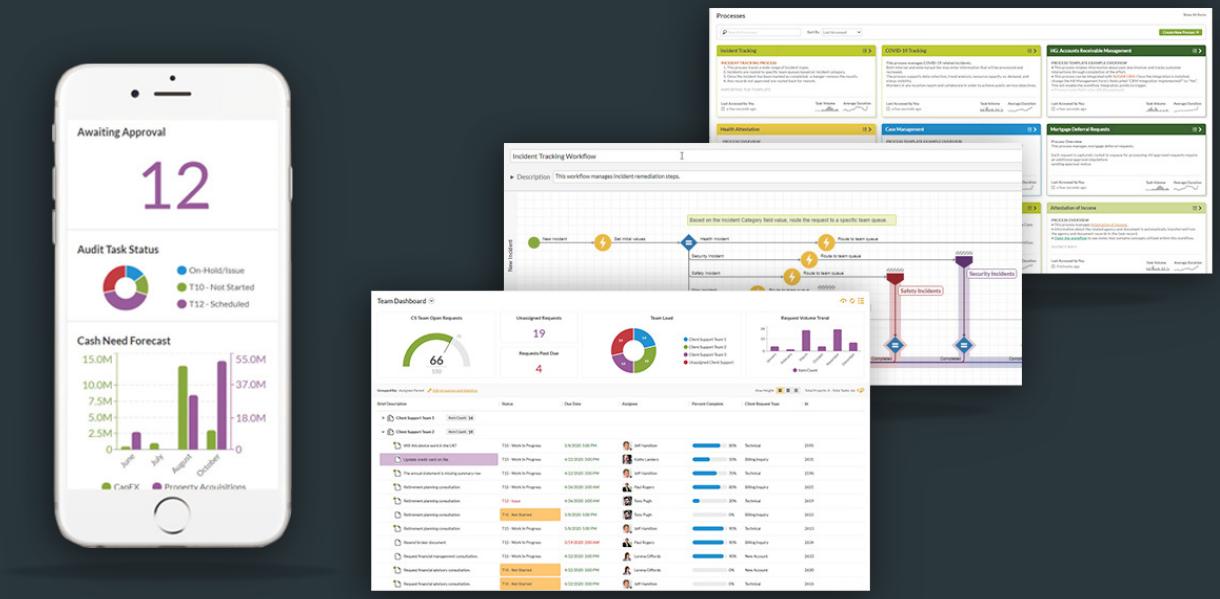
Enhanced Functionality — once data is within an effective No-Code Workflow platform, an organization may manipulate and use the data in any way they wish. The ability to search and sort data and subject it to analysis using modern tools and techniques along with the ability to share that data across the organization and with external users becomes simplified, and serves to break down business siloes constraining the use of that data and its value.

Opens the Door to Adopting a Digital Strategy — by adopting a modern, unified work platform you are immediately placed in a position where you can take full advantage of the opportunities offered by digitization. The effort to undergo change and transformation becomes reduced as the drag of legacy systems is removed, even where legacy systems must remain as part of critical infrastructure.

Transparent and known risk – a modern workflow platform which either replaces one or more legacy systems, or acts as a wrapper for them, provides the ability to secure against system breakdown through poor security or lack of maintenance. Risk is reduced, more quantifiable, and easier to mitigate in smaller segments.

Scalability — by either moving on to a modern work platform, or by wrapping legacy systems with a No-Code Solution layer, you are free to scale and globalize. Additionally, one of the largest costs of scaling solutions, that of integrating the legacy of business-specific process knowledge is also reduced and shortened by way of moving the ability to implement and improve processes closer to where the work is being done, facilitating parallel improvement efforts.

Agility – using a No-Code Solution platform allows businesspeople to create and modify business processes and workflows, and push them into the live operational environment, without the need for the IT department or specialized coding skills to be deployed.



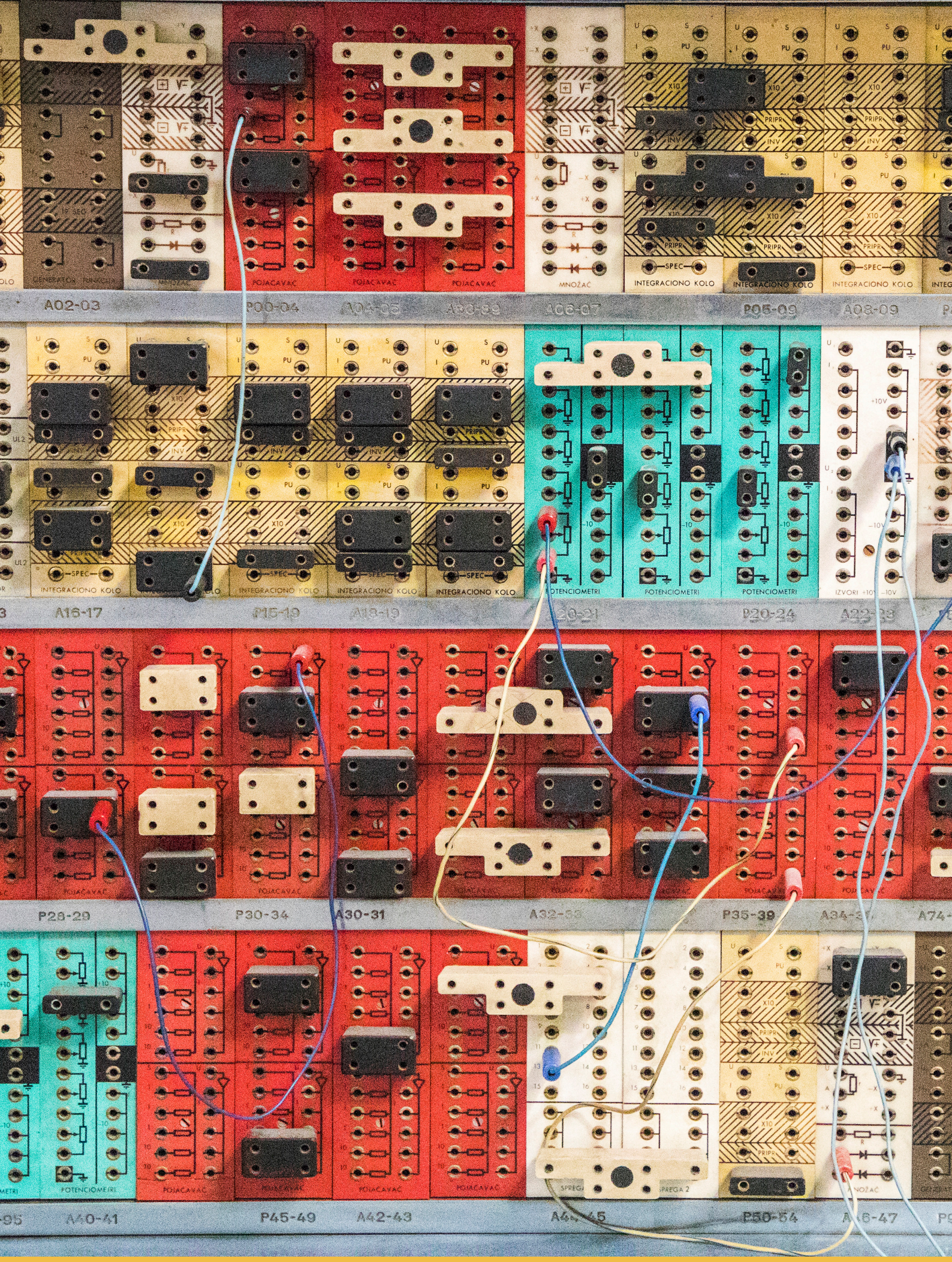
Security – moving to a No-Code Solution platform allows for modern security protocols to be used as a shield above legacy applications and data, including the use of more modern role-based permissions.

Regulatory Compliance — whether a legacy system is replicated through a No-Code Solution platform or wrapped up in one new and modified processes can be deployed more quickly. In addition, an Enterprise-Grade No-Code Workflow Software platform will include a full audit trail and non-repudiable compliance log, including all actions taken by users and admins upon the legacy system itself, by acting as the UI that provides access to it.

Cost — industry perception is that Legacy Re-use-versus-Legacy Replacement carries a cost ratio of 1:5. The low cost of a No-Code Solution platform greatly reduces this imbalance, bringing it within the 1:1 & 1:2 range. A No-Code Solution deployment over legacy systems will also greatly ease the short and long term costs of legacy maintenance.

Interaction and Customer Experience CX— No-Code Workflow applications are designed for business users without specialist coding or development skills. Business user can create and modify processes and push them into the live business environment without specialized help or support. This allows for an exceptionally rapid response to the changing business environment, especially for customer facing teams and departments faced with changing customer demands, and who now can make rapid process modifications to meet those demands, thereby improving Customer Experience.

Reporting — report creation and distribution may now be automated using the modern application. Using built-in role-based permissions, reports, alerts, and checkpoint notifications will only contain the data the recipient is authorized to have access to – a capability often difficult to deliver using legacy applications. This greatly reduces non-productive time spent on legacy report creation, while also providing the real-time reporting needed to enhance real-time decision making.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Conclusion

Legacy systems and applications have stood the test of time, and in practice, have worked well in delivering business value. Yet they were designed in a different business era and despite their heroic service, have now been identified as a major source of business pain, in particular by holding back business transformation and the more urgent than ever move to a digital strategy.

Legacy systems also represent a major source of risk, with unknown or poorly quantifiable risk due to a lack of transparency and understanding of them, combined with security and maintenance issues.

A well selected No-Code Workflow Solution package will allow for either cost-effective replication of legacy systems and extraction of the data they hold, or act as a protective and transformative layer above them. The low cost of a modern no-code workflow software dramatically cuts the ratio of reuse-vs-replace to below the 1:5 range, and in to a new lower range of 1:1 to 1:2, making a replacement or layering above legacy a more viable proposition, with reduced financial and time costs as well as providing a way to leapfrog over competitors caught in the quagmire of "forklift" replacement projects.

Moving to a No-Code Solution platform also provides the opportunity to accelerate Digital Transformation, to become much more agile and responsive to the business environment (customers, regulators, etc.) and also to enjoy the significant benefits of scaling, enhanced security, globalization, and overall enhanced business performance.

The No-Code Workflow Automation Platform

HighGear is the leading, visual no-code platform for business analysts to rapidly build enterprise-grade workflow applications. The world's leading companies depend on HighGear to manage work, improve visibility, streamline operations, meet compliance requirements and achieve digital transformation. **Your workflow awaits.**

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