



## Leveraging Legacy Systems and Applications with Lean BPM

### ABSTRACT

Legacy systems and applications are frequently business and mission critical, however, they present a dilemma for the decision to re-use or replace.

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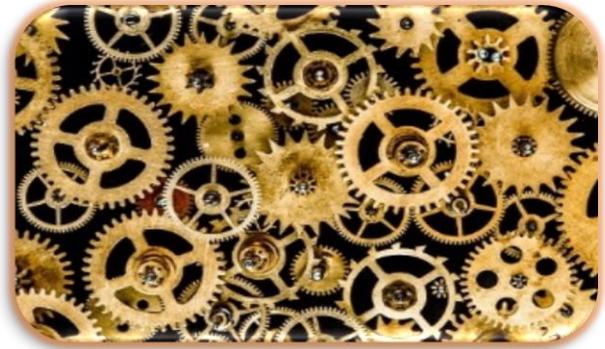
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## Leveraging Legacy

Businesses are changing and transforming at an ever increasing pace, and their business processes and systems must evolve and adapt, or become a straitjacket which stifles growth and progress. Legacy systems and



applications are frequently business and mission critical, however, they present a dilemma in the decision to re-use or replace. Leveraging legacy systems is more important than ever, but how can this be done in a cost-effective, low risk, and time effective manner?

We start from the position that “legacy” is not a dirty word: legacy applications and systems have demonstrated that they work, and worked well for lengthy periods of time (within our JobTraQ development team, several members have worked on systems more than fifty years old).

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 changing business environment which is the root cause of distress. We are not arguing that all legacy is good, as there are many cases where legacy applications have been in situ for years which are a terrible mess under the hood.

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Regardless, there is usually a great deal of business value to be derived from legacy applications and the data they contain, but the challenge is how to extract this value for the continuing benefit and advantage of the organization.

*[Matthew Rodatus](#) & [Karl Hindle](#)*

## Legacy Success and Business Pain

The NASA Space Shuttle program was built primarily on 1970's technology, though the last flight was as recent as 2011. Each flight component was rigorously tested, in a tightly controlled and exceptionally detailed set of processes. This guaranteed that by the time a modified flight component was incorporated into the operating program, it was already a legacy system.



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 Stoustrup (inventor of C++) (Stroustrup n.d.)*

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## 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

### 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 it are no longer available, leaving their successors in the dark.

#### ***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 recent 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

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such a serious incident, however the data was not encrypted due to it being stored on legacy systems which did not allow for 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 without the legacy system functioning.

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 break down is the ComAir debacle of Christmas Eve 2004, when legacy scheduling systems failed, stranding 30,000 passengers for three days over the busiest time of the year, resulting in a loss of 7% of annual revenues and a U.S. Federal government investigation. The President of ComAir resigned shortly after the incident. (Overby 2005)



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.



A further issue is when the organization must make changes to how it does business, requiring a fundamental shift in processes and organization. For instance, the regulatory directives and changes in consumer behavior which have so affected the banking and financial sectors in recent years.

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 be invasive and run 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 a lot of cost, and in any event without a great deal of operational and business risk involved.

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## 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 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 business requirements at the time but as the business grows, they become the bottleneck holding back growth. Some legacy systems are serial in nature and many do not even have the capability of scaling out horizontally to increase capacity to handle greater transactional load.

Worker efficiency is also an important business demand. A McKinsey and Co. article, Boosting the Productivity of Knowledge Workers (Matson 2010), suggests that the greatest barrier to the efficiency of knowledge workers is the impeding of daily interactions, such as technical barriers. If the software user interface being used is unintuitive or outmoded, new workers will find it difficult to learn and maintain mastery. For example, if a call center worker can't quickly find what they need, they will waste valuable seconds on each call. This will affect their ability to do their work 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 and accuracy gains to tighten ship and produce more with less...or more with more.

Finally, it's clear that 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.

In sum, your legacy systems contain a lot of 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 will allow you to add the functionality required to grow and modernize your business. This flexible software platform will be less prone to impede change as it will allow you to introduce new components and rearrange 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.

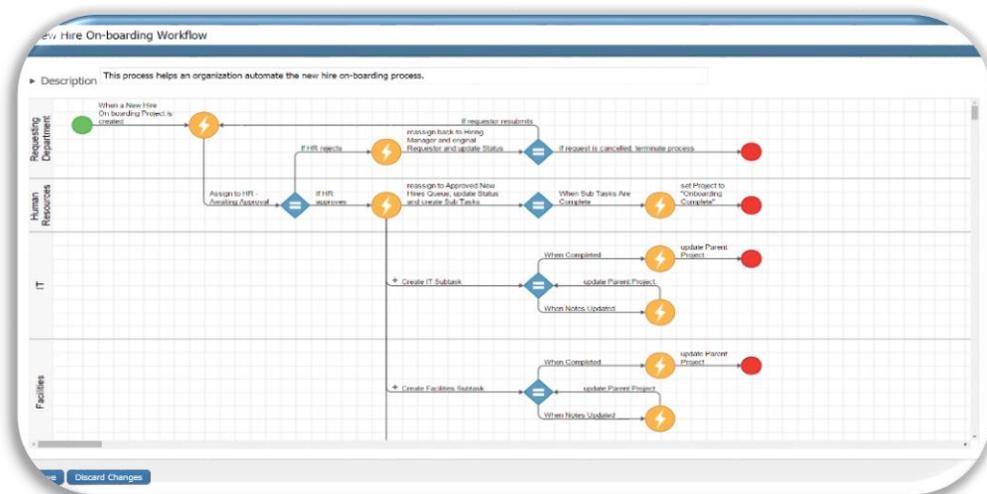
## Delays and Obstructs Business Change and Transformation

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.

PwC's CIO Global Banking Survey concluded that the biggest barriers to implementing digital banking channel strategy are the legacy systems forming the core of banking systems. The problem is a global one, with respondent banks based in North America, Europe and Asia. As reported for BankTech by Jonathan Camhi (Camhi 2013):

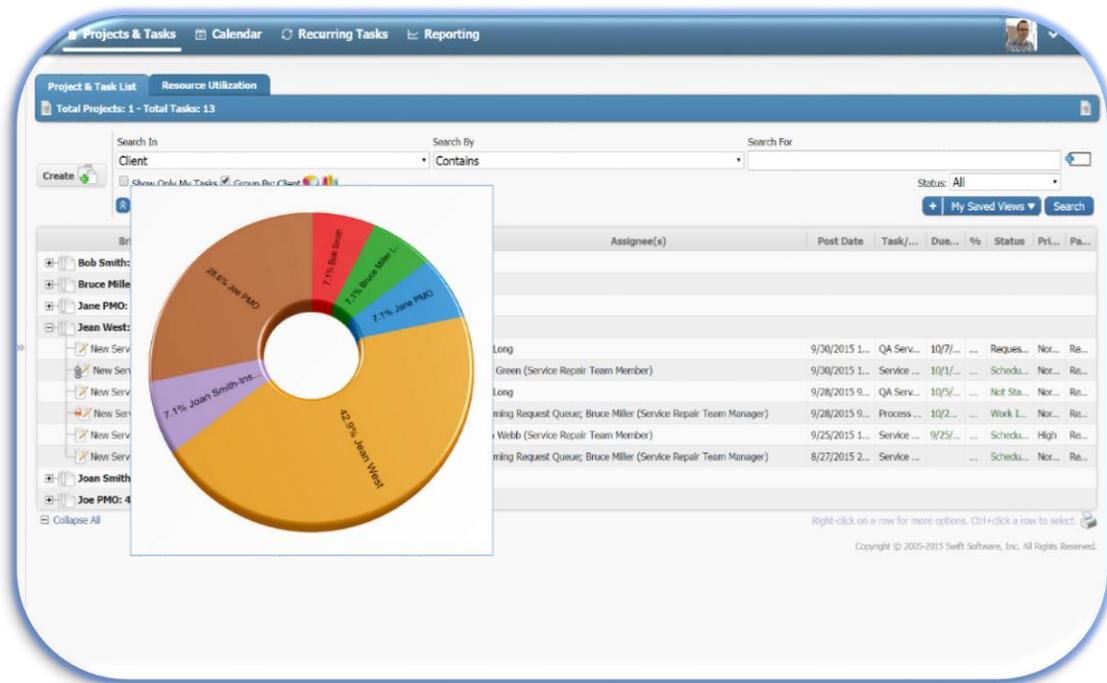
“Banks are facing a lot of barriers around their legacy environments that is definitely leading to a desire for new cores,” Julien Courbe, the financial sector technology lead partner at PwC, said. “There are technology challenges that you simply cannot circumvent without integration between the core and the online and mobile channels.”

To highlight the issue, legacy systems not only polled as the #1 barrier to be overcome by banks, but they also are deemed to be a greater barrier to change and growth than the regulatory environment, which has tightened substantially in the wake of the 2007-09 global banking crisis.



The problem is by no means restricted to the banking and financial services community. All businesses and organizations are affected. 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.

An illuminating analysis of the impact of legacy upon moving to a Digital strategy is covered in this McKinsey Quarterly article: Strategic Principles for Competing in the Digital Age (Hirt 2014).



“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)

## Ancillary 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 increased cost.

Two examples of ancillary legacy issues are:

- Platform Obsolescence
- Maintenance Costs

### 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)



## 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.

**“I say it's best to leverage legacy if you can't kill it or outsource it.”**

*Jim Sinur*

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

A number of solutions for tackling legacy applications and systems have emerged, and broadly may be divided into invasive and non-invasive techniques. Jim Sinur, a leading process thinker and BPM consultant, succinctly highlighted eight techniques for leveraging legacy which we reproduce here with permission:

- ***Non-Invasive Techniques for Leveraging Legacy*** (Sinur, Top Five Non-Invasive Techniques for Leveraging Legacy 2015)
  - Mobile Face Lift
  - Tapping Fast Data
  - Modeling for Legacy Leverage and Elimination
  - Mining Rules for Documentation & Analysis
  - Hybrid Mix of New & Legacy
- ***Invasive Techniques for Leveraging Legacy*** (Sinur, Top Three Invasive Techniques for Leveraging Legacy 2015)
  - Creating Explicit Rules for Change Hot Spots
  - Creating Reusable Code Snippets
  - Creating a New Interaction Layer That Leverages Old Logic

## The Lean BPM Solution

Lean BPM seeks to leverage legacy systems and applications in three major ways:

### *Legacy system replacement*

The reuse-v-replace cost ratio of 1:5 acts as a significant barrier to replacement. Lean BPM costs a fraction of low-code and traditional BPMS, typically 20%, which significantly reduces the replacement cost, typically to \$1:\$2 or less. The low TCO opens the door to serious consideration of legacy migration as a value proposition and the impact of opportunity costs.

In addition, Lean BPM deploys much faster than low-code and traditional BPM tools, even with integration work. This serves to reduce deployment risk, and speed to ROI much faster.

### *Systems integration*

Lean BPM acts as what Craig Reid of the Process Improvement Group refers to as, “Process Glue” (Reid 2015) and while it is fully customizable, typically functions straight out of the box. This means you can allocate resources to writing the code for the new components themselves, rather than wiring all the components together. A Lean BPM solution will handle all of the “wiring together” through its built-in workflow, web requests and so on, and this significantly reduces overhead.

Lean BPM also employs a configurable user interfaces, and this means you can eliminate the development of one of the most expensive items to develop in a replacement system. More than this, you can integrate systems across the organization with the UI, providing a single, universal work platform users can access.

Lean BPM solutions are also highly adaptable and provide a modular approach to systems integration. This allows for the addition, removal or rearrangement of components on a trial basis, allowing you to see if the proposed configuration works better or not. If the new configuration provides no improvement, it is a relatively very simple task to revert back to the old configuration, or change to a further modification.

### *Data extraction and utility*

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 in CSV format is a relatively straight forward task in such instances, and this allows for the creation of “contacts” off that data, which Lean BPM can then use to trigger workflows and tasks, which in turn acts as the trigger for a whole range of work and process events, such as alerts, emails, reports, notifications and so on. Real-life work output from the data held as a CSV file can include the creation of PDFs which act as invoices, requisitions, certificates or checks.



## The Benefits of Leveraging Legacy with a Lean BPM Solution

We have seen that Lean BPM tackles 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 extracted and share extracted data in a simple format (CSV).

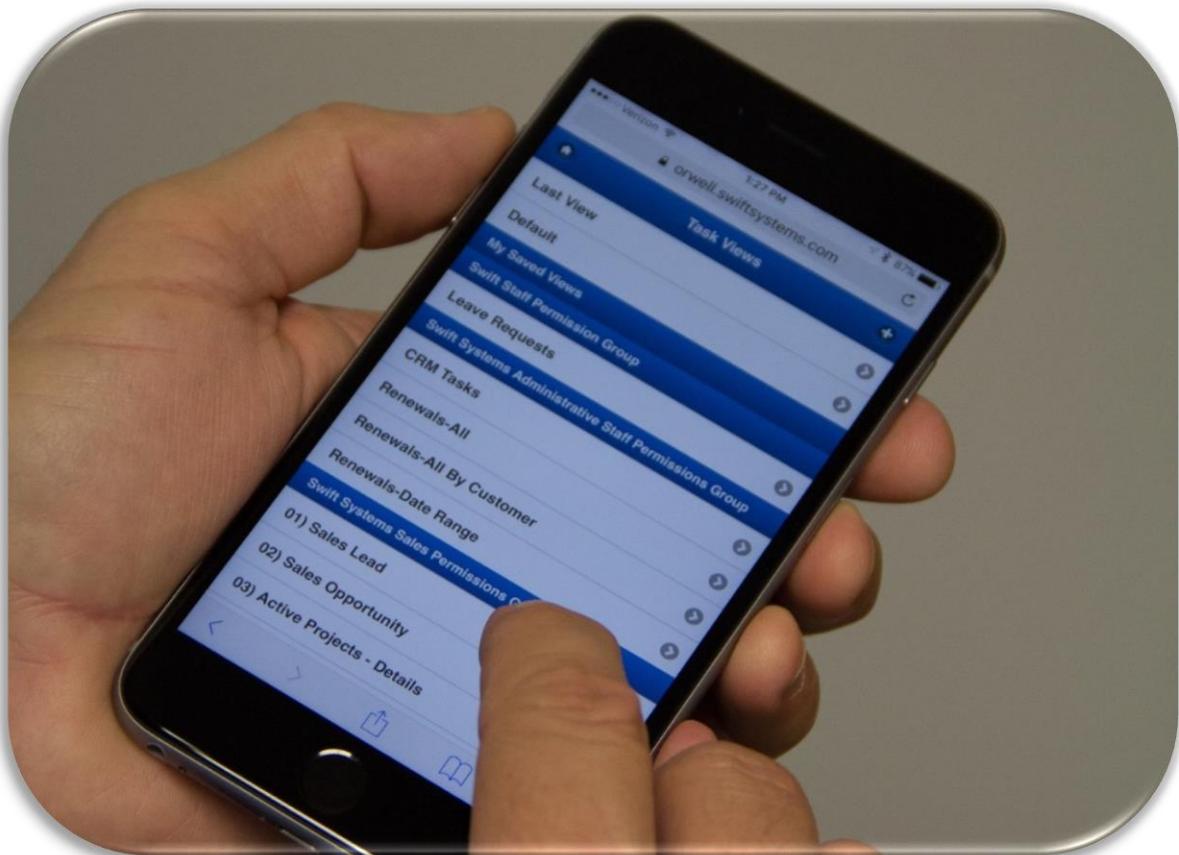
The major benefits of leveraging legacy using Lean BPM include:

- **Enhanced Functionality** – once data is within the Lean BPM platform, you may manipulate and use the data in any way you wish. The ability to search and sort data, subject it to analysis using modern tools and techniques, and 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 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 still remains as part of your infrastructure.
- **Transparent and known risk** – a modern work platform which either replaces a legacy system, or acts as a wrapper, provides the ability to secure against system breakdown through poor security or lack of maintenance. Risk is reduced and more quantifiable.
- **Scalability** – by either moving on to a modern work platform, or by wrapping the legacy system with a Lean BPM layer, you are free to scale and globalize.

- **Agility** – using a Lean BPM platform allows business people to create and modify business processes and workflows, and push them into the live operational environment, without the need for the IT department or specialist coding skills to be deployed.
- **Security** – moving to a Lean BPM platform allows for modern security protocols to be allowed to the application and data, including the use of role-based permissions. In addition, if the legacy system is wrapped up with a Lean BPM platform, this adds a further protective layer.
- **Regulatory Compliance** – whether a legacy system is replicated on to a Lean BPM platform, or wrapped up in one, new and modified processes can be deployed quickly. In addition, a Lean BPM platform will provide 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 a UI to gain 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 Lean BPM platform greatly reduces this imbalance, bringing it within the \$1:\$1 & \$1-\$2 range. A Lean BPM legacy deployment will also greatly ease the cost of legacy maintenance.
- **Interaction and Customer Experience CX** – a Lean BPM solution is designed for business users without specialist coding or development skills. And allows the business user to not only create and modify processes, but to push them into the live business environment. 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** – reporting creation and distribution may now be automated, and using role-based permissions, reports, alerts and checkpoint notifications will only contain that data the recipient is authorized to have access to. This greatly reduces non-productive time spent on report creation, while providing real-time reporting to enhance 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 service, have been identified as a major source of business pain, in particular by holding back business transformation and the 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 Lean BPM solution allows for either cost-effective replication of the legacy system and extraction of the data it holds, or can act as an additional layer around it. The low cost of a Lean BPM solution dramatically cuts the ratio of reuse-vs-replace to below the \$1:\$5 range, and in to a new lower range of less than \$1:\$2, making a replacement or layering of legacy a much more financially viable proposition.

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Moving to a Lean BPM platform also provides the opportunity to move much faster to a Digital strategy, to become much more agile and responsive to the business environment (customers, regulators, etc.) and also to enjoy significant benefits of scaling, enhanced security, globalization, and overall enhanced business performance.

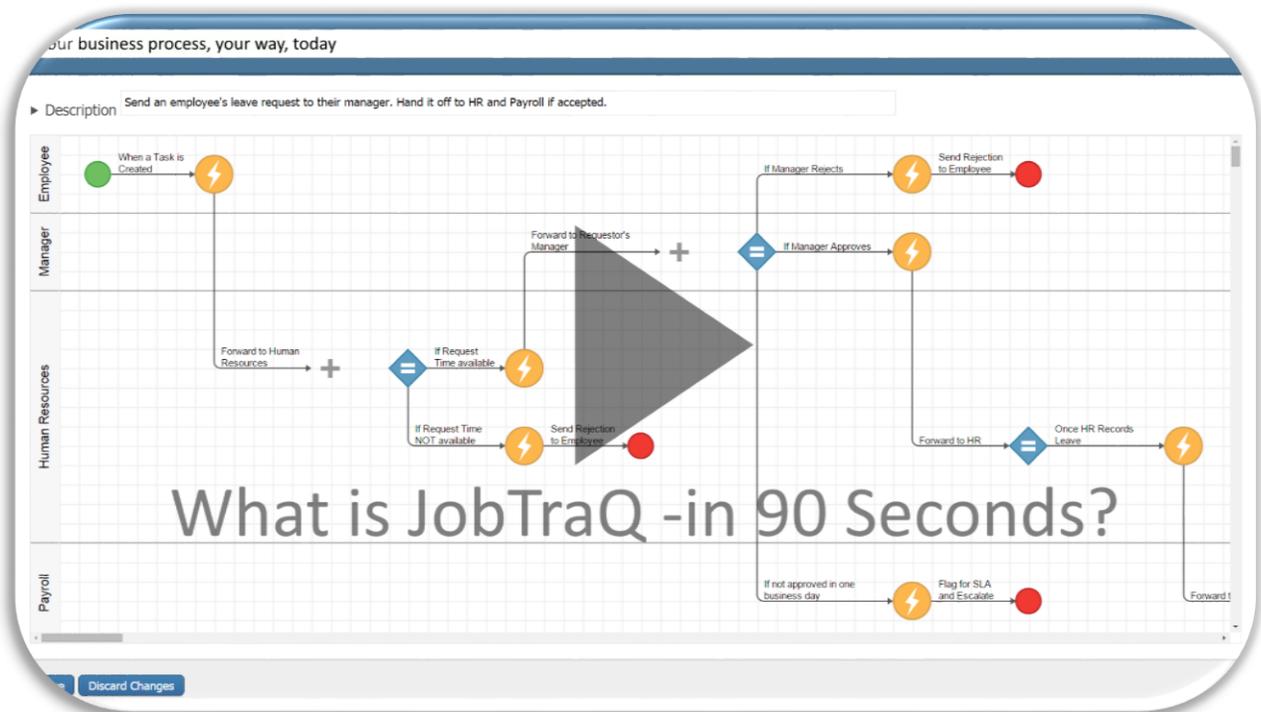
### Leveraging Legacy Webinar

*If you would like to learn more, we ran a webinar providing a practical demonstration of how JobTraQ can leverage a legacy process embedded in an Excel spreadsheet, with a live process replication and data migration, proceeding in to a brief demonstration of the abilities a Lean BPM work platform can deliver in a legacy situation.*

*If you would like to see the recording kindly click the image below, and the password to play the recording is “webinar21” (case sensitive & without the quotes):*



## JobTraQ in 90 Seconds



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MINIMUM ASSIGNEE LICENSES	10	25	50	100
MAXIMUM ASSIGNEE LICENSES	25	100	500	UNLIMITED
MAXIMUM NUMBER OF WORKFLOW PROCESSES	0	10	30	UNLIMITED
REPORTING AND BUSINESS INTELLIGENCE	BUILT-IN REPORTS + CONFIGURABLE DATA EXPORT	FULL BI (UP TO 50 REPORTS)	FULL BI + AUTOMATED REPORT DISTRIBUTION	FULL BI + AUTOMATED REPORT + CUSTOM DATA SOURCES
OUTLOOK SYNC	NO	YES	YES	YES
API	NO	NO	YES	YES
SWIFT PREMISE ADMIN TRAINING	DISCOUNTED IN-HOUSE ADMIN TRAINING	1 FREE IN-HOUSE ADMIN TRAINING	2 FREE IN-HOUSE ADMIN TRAINING	2 FREE IN-HOUSE ADMIN TRAINING
DATA STORAGE (GB)	10	100	250	1000

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Existing Clients



**TOTAL**



Online Case Study



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