



**ACCELERATE
LEGACY MODERNIZATION
& DIGITAL TRANSFORMATION**

INTRODUCTION

The speed and agility to pivot towards new opportunities, whether these opportunities are new customer experiences or innovative ways to enhance processes and products, will define the success of an organisation within the modern digital economy.

Unfortunately for many mature organisations the existence of core legacy systems and platforms makes transforming business models complex, slow and risky to operations.

Despite this, technology leaders from across the globe recognise and agree that modernization of legacy platforms is a necessary step in the successful execution of a future-proofed digital strategy.

More than half of the CIO's surveyed in the 2017/2018 Logicalis Global CIO survey indicate they intend to replace or adapt infrastructure as part of their digital strategy (Pratt, 2018). Digital transformation success hinges on the ability to modernize legacy platforms.

Gartner defines 'legacy systems' as *"an information system that may be based on outdated technologies but is critical to day-to-day operations"*.

This reinforces the importance of these platforms in nearly all organisations. For most businesses, these platforms have historically done an outstanding job managing mission critical processes, in some cases for more than two or three decades without any major changes to the platform's code base. They provided early automation and controllership of high-volume transactions, accurately applying relevant business logic and rules to transactions enabling more efficient and effective operations.

Though, in recent years the pace of change in both the expectations of customers, and the technology developed to meet these expectations has highlighted the previously hidden costs associated with legacy systems.

The modern digital landscape requires highly available and synchronised datasets with rapid development of new and innovative functional applications to enable truly optimised omni-channel experiences; something that legacy systems were just not designed to provide.

Also, many organisations are now finding the costs associated with just maintaining these legacy systems is accelerating more than other cost lines, primarily resulting from the reduced pool of developers with real experience coding within these platforms, and the increasing costs of maintaining on-premise architecture and security.

Furthermore, there is a ground-swell of new tech savvy entrants to the market offering mobile first digital experiences in consuming services. These new entrants are defined by their agility and low-tech debt, making them incredibly dangerous to the well-established incumbents. Research by McKinsey into the cost structures of the insurance industry have found the administrative cost ratios for new greenfield insurers is less than half of the incumbents (Freysoldt et.al. 2018). It becomes clear that the operational risk associated with a "do-nothing" approach to legacy systems is just not acceptable.

The window to solve these challenges is quickly closing, and those that do nothing will go the way of many organisations that failed to see the wave of disruption on the horizon (the well cited examples - Kodak, Blockbuster, Blackberry, Polaroid etc).

Even when a decision to embark on a digital transformation has been made, the path to modernizing these legacy systems is complicated by the many technology roadmap permutations. These complications are further amplified by the change resistance that will exist with any organisation; the bias towards status quo (be that processes, products, platforms or people/organisation) should not be under-estimated.

Many organisations also struggle with understanding what the future-state will even look like; transformation is not simply replicating what we do today in new systems.

Finally, the importance of legacy systems to core operations and the increasing expectations of boards and shareholders for fast realisation of benefits can breed an overly cautious approach, sometimes resulting in the dreaded “do-nothing” outcome.

At Codafication, we have a deep understanding of the risks and challenges faced when digitally transforming enterprise organisations. In fact, our technology has been developed with the goal of helping organisations flexibly start the transformation journey and break free of the “do-nothing” trap.

We believe that the right software can accelerate change rather than become a drag for transformation.

Leveraging best practices in cloud-based infrastructure architecture and software containerisation, we can expose and transform once unstructured data into a structured format ready for seamless integration with other functional applications. This enables organisations to take a measured, evolutionary approach to modernising their legacy systems, minimising operational risks and costs during transformation while delivering benefits faster.

MODERNIZING LEGACY, THE UPSIDE

By adopting a cloud-based model and exposing the datasets within the legacy systems, making them ready for integration with new applications, we can rapidly pivot towards and iterate new products, processes and business models resulting in the fast realisation of key benefits for the organisation.

Advanced analytics and information

The once unstructured silos of data across legacy systems can now easily be structured and exposed ready for joining with additional datasets. This gives the ability to rapidly enrich current data through integration of third-party information (GIS, Demographics, Digital Footprint, Asset History, IoT etc) and implement advanced data science to improve the organisations insight and understanding of their customers and operations.

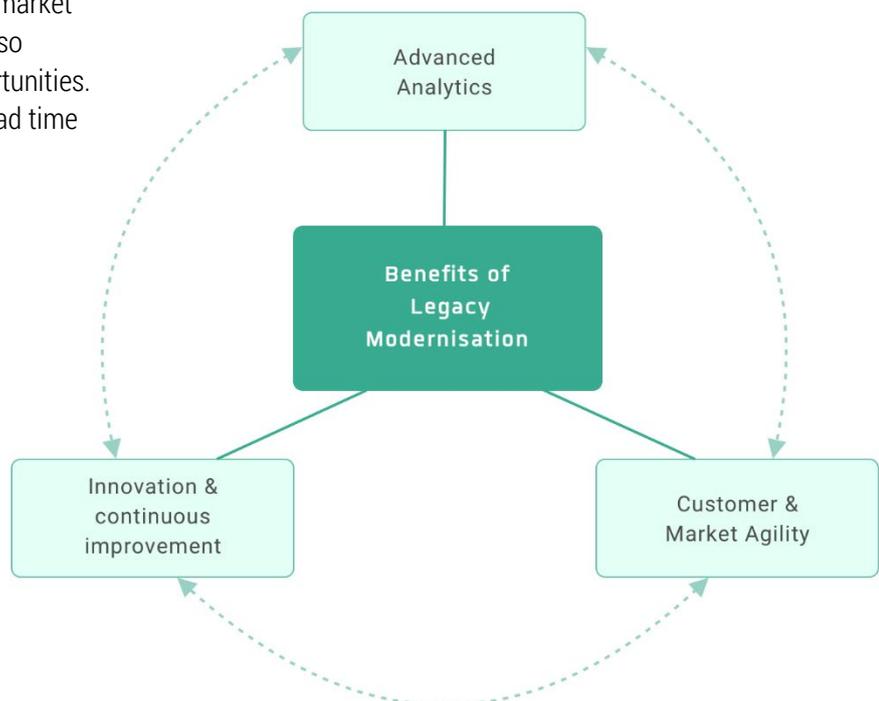
Customer and market agility

The ability to easily integrate new modules and functionality results in much faster time-to-market for new products. The organisation can respond to rapidly changing customer preferences and expectations creating truly customer-centric experiences. It can also defend against competitors' new innovations or shifting market conditions. Increased scalability and elasticity also maximise the profit capture from emerging opportunities. Accenture has found the product development lead time reduces by up to 30% (DeMaster, 2013).

Innovation and operational excellence

The innovation and continuous improvement constraints placed on the organisation through the current-state of legacy systems is often hidden and not well understood. Modernising these platforms unlocks a greater potential for innovation and true operational excellence, increasing profits through revenue growth or cost reduction. McKinsey has found the reduction in IT operations costs in the long term are between 30-40% (Bommadevara et.al., 2018) and Accenture have estimated between 20-30% (DeMaster 2013).

Furthermore, the lead time to realising commercial value is significantly reduced. Unfortunately, many organisations are struggling to successfully transform their legacy systems, forgoing most of the benefits above.



CHALLENGES FACED TRANSFORMING LEGACY PLATFORMS

So, if the benefits are clear, why do so many organisations struggle with implementing or even starting their transformation journey. Simply put, it is the challenges and risks associated with modernising legacy platforms, particularly when leveraging older approaches (eg. Extract, Transform, Load or full replacement of legacy with new system/s).

An interesting statistic shows 44% of CIO's surveyed in the 2017/2018 Logicalis Global CIO survey stated that the complexity of transforming legacy systems was their top obstacle (Pratt, 2018). Simply 'lifting-and-shifting' legacy platforms to the cloud should also not be confused for a transformation strategy, as pointed out by McKinsey research (Bommadevara et.al., 2018).

This approach will not unlock the desired benefits; the benefits are only realised when the applications and functionality within the legacy platforms are modernised. Many executives end up feeling confused and lost; we need to move forward with digital transformation, but struggle to resolve the challenges faced.



Change Management



Future-state vision



Unknown system dependencies



Operational risks



Different business triggers

Change management

Given the criticality of legacy platforms to your core business, there is going to be significant change resistance from many stakeholders to your organisation. Your staff (and customers, suppliers) are familiar with your current-state and system touchpoints. Even if the benefits of modernising are well understood and promoted, there will be a natural resistance. Furthermore, at an executive level there may be very different views on approach and expected benefits, as well as a stickiness to alter the business model to support new platforms and systems. There will also be a depreciation of legacy IP and assets which can be hard for many leaders to accept.

Future-state vision

Although we want flexibility to pivot direction, it is also critical to have a strategic vision for the future. Simply 'lifting-and-shifting' current-state is not acceptable, and many organisations get paralysed defining what the future will look like; hoping that some new technology will come along to solve their problems for them. What digital capabilities will your customers need, what data should you be developing for the future, what will your business model look like?

Unknown system dependencies

Large organisations with entrenched legacy systems inevitably will have unknown dependencies across their architecture. This often stifles transformation teams, as they fear breaking core processes.

Roadmap planning and decision making

With the large number of permutations to implementing legacy migration, it can become overwhelming trying to understand the optimal path (least risk with greatest benefit). The myriad of functionality and compatibility choices offered by a large number of vendors all claiming they can completely solve your problems makes decision-making and planning incredibly difficult.

Operational risks

Given the criticality of legacy platforms to core business operations, there is a natural and warranted fear of downtime. Also, boards and stakeholders are increasingly expecting fast realisation of benefits. The growing prevalence of agile organisations is evidence of the desire to realise benefits quickly. Traditional approaches to transforming legacy platforms are largely inconsistent with an agile approach and come with significant risk that often derail efforts to modernise.

Different business triggers

The triggers for action are often very different across businesses. Mergers and acquisitions, enhancing data with third-party information (AI, data sources etc.), regulatory and legislative requirements (such as open banking legislation), new products/processes are just a few of the common triggers. With each one of these examples there are very different requirements for the future-state, and they will have different optimal paths to transformation. This complexity poses a real challenge for organisations, as there is no one-size-fits-all approach.

GOALS TO ACHIEVE MODERNISING LEGACY SYSTEMS

Ultimately, the goal of modernizing legacy systems is to build a capability to respond in the shortest possible time to opportunities or threats arising from competitors, customers, and emerging technologies.

Gartner predicts that for every dollar spent on innovating digital business through to 2020, at least three times that amount will need to be invested in legacy platform and architecture modernisation (Moore, 2018).

Clearly it is critical to take the right approach to transforming these platforms.

There is a growing body of academic research into the theoretical approaches to modernizing legacy systems (Fahmedih et.al., 2017), however, despite the research providing great thought-leadership, our experience at Codafication has shown the most effective way to transform legacy systems is through a pragmatic, flexible and iterative approach.

This is backed up by many leaders in the field; given the uncertainty in business models and technology innovation, it is best to evolve the landscape of applications rather than go for the all-in-one approach (Libert et.al. 2016). This helps by minimising the operational risks, while maximising the support for change within the organisation.

Studying legacy transformations that have used this common-sense approach highlight some common requirements for achieving the modernization goal.

Modular, flexible and future-proofed pluggable infrastructure and software

This reinforces the philosophies of agile organisation. We can rapidly deliver iterative functionality and make informed decisions on the next steps. This reduces the risks to the business and enables faster realisation of benefits and flexibility to quickly pivot to realise new opportunities. These new technology solutions also allow for cloud, on-premise or hybrid configurations (that may be required due to data security requirements, sovereignty of data, or compliance with regulation).

Highly available, secure, distributed and structured datasets

One of the greatest challenges in transformation with legacy systems is the ability to read and write to the data within these platforms. To successfully modernise, it is necessary to expose this often-unstructured data to new integrations and then synchronise across core platforms. Leveraging technology such as cloud repositories, RPA, and ingress/egress datastores provides a foundation for future applications and integration. By exposing this data in new ways, we can take a truly evolutionary approach to digital transformation, iterating and learning as we proceed.

Agile delivery of infrastructure and functional components

As already highlighted, this approach ensures we can develop a roadmap that minimises risks while maximising benefits capture.

Minimal (or ideally no) technology skill-set silos

Developing technology solutions with future-proofed code and design, coupled with developer tools for inhouse teams to manage without necessary requirement for 3rd party vendors ensures the business is future proofed and not stuck in the trap we have with legacy systems today.



HOW NEW TECHNOLOGY ACHIEVES MODERNISATION GOALS

The modernisation of legacy systems can be simplified into two general categories:

- Infrastructure and hardware modernisation
- Software/application modernisation

Recent infrastructure and software innovations have significantly reduced the risks associated with legacy modernisation. Let's now look more closely at the two general categories listed above:

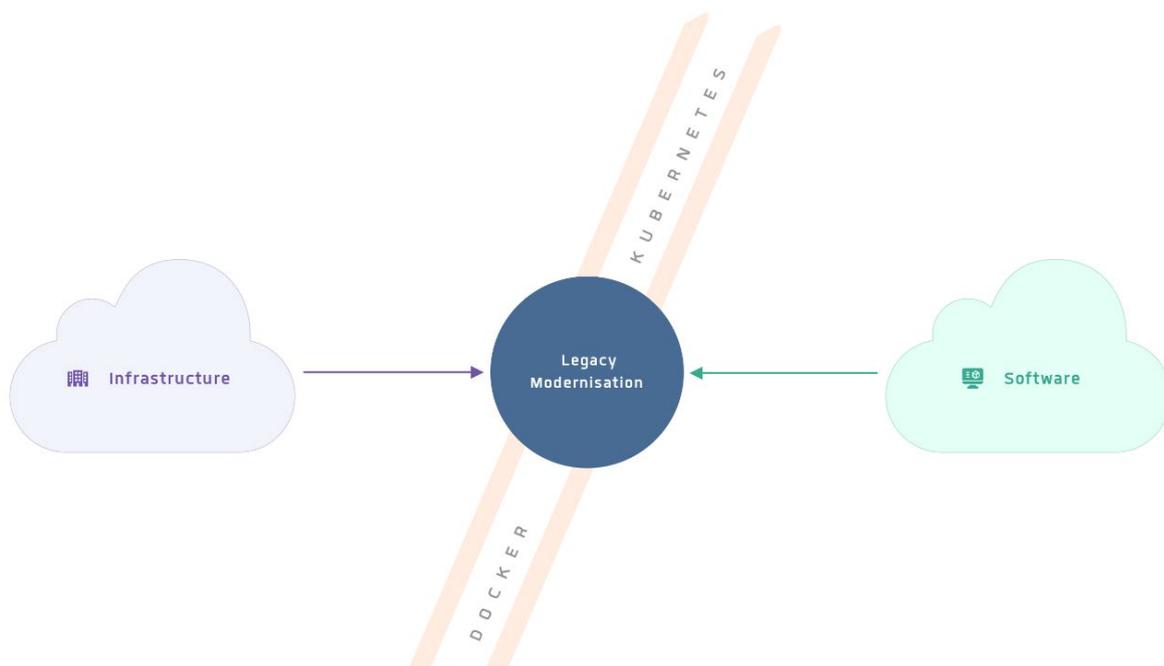
Infrastructure

When looking at the infrastructure supporting current legacy systems, the shift towards cloud technology is a critical step. Depending on your business' unique requirements, this may involve migrating your entire infrastructure to the cloud, or a hybrid infrastructure architecture (e.g. mixture of on-premise and cloud, often due to data sovereignty and privacy reasons).

The general benefits of cloud technology are well documented and will not be fully addressed in this white paper, however it is important to highlight the specific benefits related to legacy platforms transformation.

- Ability to easily provide multiple geographic points-of-presence, particularly when operating in global markets and/or multi-national corporations.
- Greater scalability and elasticity (i.e. temporary demand peaks and troughs can be easily managed without costly purchases of infrastructure to manage the peak loads).
- Increased business continuity associated with cloud technology.

By making the shift to cloud infrastructure (be that partial or full migration), the foundations for flexibly transitioning away from the current legacy platforms. It also provides the pathway for reduced IT costs over time



Software

At Codafication, we firmly believe the software to augment and/or replace the current platforms must incorporate pluggable, dynamic API's to quickly and reliably expose the legacy data sources and enable rapid integrations with new applications.

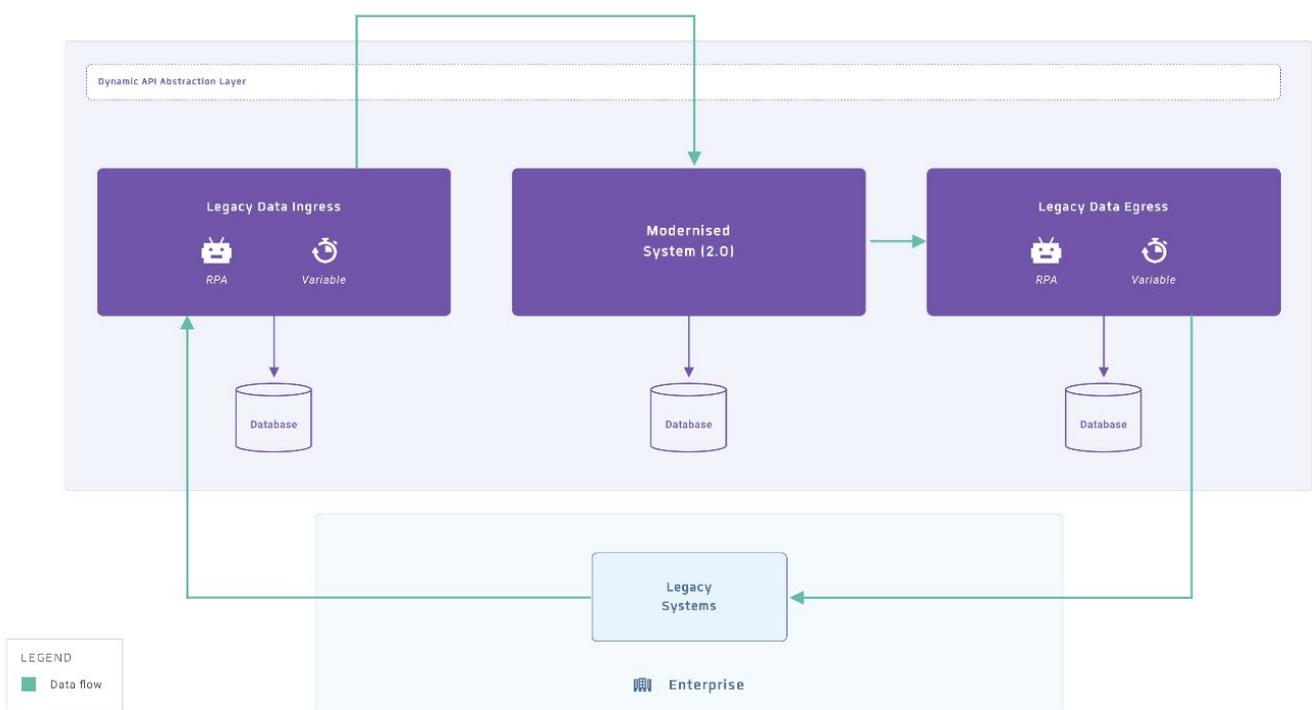
After extensive research and development, we have developed dynamic API's and user-interfaces leveraging pluggable GraphQL technology. This enables us to rapidly develop and customise API's to efficiently transfer only the information required for a given function or task, thereby simplifying integration for API consumers.

GraphQL speeds up the information transfer when compared with REST technology, as it delivers what is needed in one call, rather than requiring multiple calls to the multiple APIs.

To then seamlessly interface with the cloud infrastructure, we utilise Kubernetes container scheduling technology, enabling rapid deployment of configurations within code. It also has the added benefits of reproducibility across devices, isolation of conflicts between containers, security from external attacks, improved environment management, and continuous integration.

In circumstances where API development on the legacy system is not possible, too costly, or not appropriate, the use of robotic process automation (RPA), is an extremely effective approach utilised by Codafication.

We have extensive experience in this area, with proprietary RPA technology to extract required data from the legacy system into an ingress database. Dynamic API's are then leveraged to integrate this information into the application extensions as required. Once consumed, this is then passed via API to an egress database which again leverages RPA technology to synchronise the information back into the legacy system. By utilising ingress/egress datastores, we have an audit trail of data passed in-and-out of the legacy platform and a mechanism to conduct delta analysis to ensure accuracy.

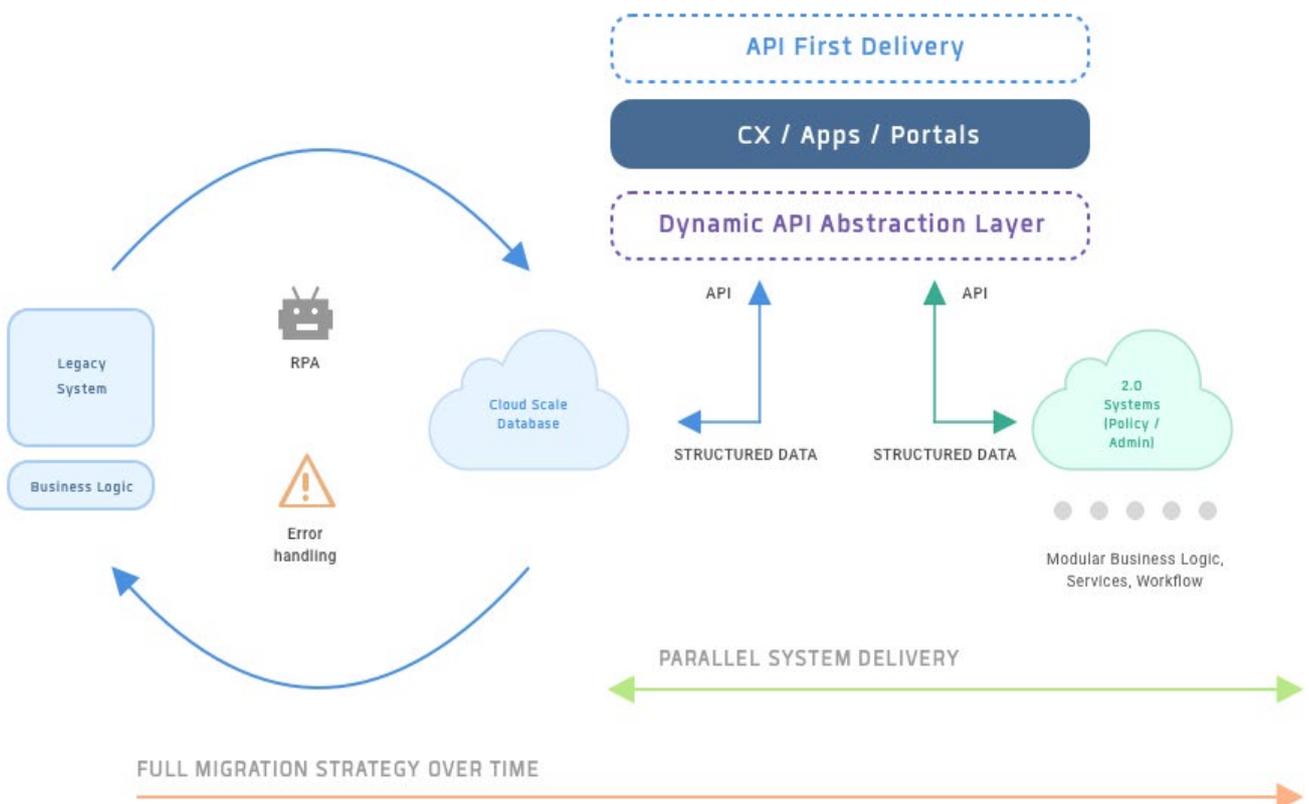


Software (Continued)

Through implementation of this architecture, a structured path to transformation is now possible. Decisions can be made over time to decommission or augment critical functions within the legacy system and replace with new applications and features. This technology also provides the flexibility to work with different infrastructure types (e.g. containers, serverless, hybrid on-premise), across any vendor, providing a mechanism to future proof your organisation. This now becomes the foundation for the next move, be that either data enrichment, data migration and decommission, or 2.0 digital platform implementation.

A 2.0 digital platform implementations pose many problems for enterprises organisations. the above approach enables the organisation to replicate business logic from within the legacy platforms into containerised modules.

This then enables an organisation to run the legacy platforms concurrently with these new applications modules until we are satisfied the new applications meet the business needs and workflow. At this point we can carefully decommission elements of the legacy system in a structured and staged manner.



TO SUMMARISE

As customer and market expectations continue to evolve, the need to modernize legacy systems has never been greater.

Many readers will be well versed in the significant benefits of successful legacy modernisation, however the same readers will also be acutely aware of the complexity and challenges in effective transformation, especially when dealing with legacy platforms.

Several approaches to modernizing these platforms exist, however at Codafication we believe an iterative evolutionary approach to transformation minimises risks while providing the agility to meet ever changing requirements of customers and markets.

The technology developed at Codafication supports this philosophy. By exposing once unstructured data stored within legacy systems, new applications can be easily integrated. Furthermore, this data can be egressed back into the platform providing flexibility for your transformation journey.

CONTRIBUTORS

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CODAFICATION

Codafication is a globally awarded digital services and software development company focusing on cloud native solutions and transformation for the financial services industry.

Codafication currently service Tier-1 and 2 Insurance companies, global brokerage firms and vendors in their related supply chains.

Codafication have built cloud based subscription service technology www.unitycloud.io which is an enterprise grade solution to the financial services industry (and beyond).

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