Is your mainframe keeping secrets?

Unlocking the mainframe to thrive on change.

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Like many organizations, you probably rely on your mainframe as the critical backbone of your IT, entrusting it with the processing of payments, customer interactions and the internal systems that keep your business ticking over.

But why then, does it struggle to share data that’s up-to-date? Why can it only give your customers their balance as of yesterday, when a competitor can do it in real-time? Why can we only see sales or manufacturing data after the fact – when it’s already too late to capitalize on the opportunity?

In this paper, we look at why your mainframe isn’t sharing as much with you as it should be, and how you can tap into the data held within this 50-year-old technology to unleash new innovation potential.
CHAPTER 1: What is your mainframe hiding?

Many enterprises believe that their mainframe is still the best piece of hardware to keep their business running, but is that really the case? Find out where your mainframe might be struggling to keep up.

Reading time: 8 minutes

CHAPTER 2: The move towards openness

Explore the changing customer trends that are pushing enterprises to re-think their core computing, and how they are increasingly adopting cloud to bring new agility to their businesses.

Reading time: 7 minutes

CHAPTER 3: Unlocking the secrets

Modernization is a daunting task, so where should you begin? Here, we look at why it’s important to have a vision for your modernization journey and explore the different routes to modernization.

Reading time: 9 minutes
CHAPTER 1

What is your mainframe hiding?
The mainframe is the backbone of traditional enterprise IT.
For large businesses, the mainframe is part of the furniture

If you work in a large organization, you probably have a mainframe. It’s as commonplace in a corporate enterprise as team-building exercises and innocuous PowerPoint presentations. And like most other large organizations, you’ll probably have had your mainframe for a long time; it’s a technology that had its heyday back in the 80s, tasked then, as it is now, with processing your organization’s most critical data.

With this in mind, it’s easy to view the mainframe as a piece of technology left over from a bygone era; but there’s a reason it has become so essential in big business: it’s very good at what it does. And what it does is process lots of data transactions at once, securely and reliably. This is why it is still favoured by financial institutions and others with large volumes of latency-sensitive transactions – for many, it’s still seen as the best tool for the job.

30 billion transactions are handled by mainframes every day.1
72% of customer-facing applications are supported by mainframe processing.2
92% of the World’s top 100 banks still use mainframes.3

1. IBM data; 2. Forrester Consulting on behalf of Compuware; 3. IBM data, 2017

DXC What is your mainframe hiding?
The reason mainframes are favoured for the most intensive largescale business transactions is that the language they use – COBOL code – is very good at describing business processes.

In the early days of business computing, organizations used it to translate their unique processes into tailored, reliable and heavy-duty programs that processed data in ‘batches’ at low capacity times (typically overnight) to ensure availability of the system. This is why mainframes have traditionally handled the core applications of the business: the financial transactions, the ERP programs and the programs that logged customer and sales data. Over time, these custom-built programs were modified and evolved to keep up with the needs of the organization. Programmers needed to find new ways to describe new policies and products in ways that the existing system would understand, adding in new layers of code to make sure closely interlinked systems and programs would continue to work together. All this results in a complex arrangement that’s unique for every business. Each business effectively owns its own ‘War and Peace’ of code.

But mainframes are a complex business
Mainframes have hidden issues

Of course, if the system works, why change it? On the surface, you might think your mainframe is still doing a good job. But the truth is, its very design is at odds with the way IT is approached today.

For starters, each mainframe is specific to its own business. The tasks performed by its programs are described in ways that make sense to that business, so programs that perform similar tasks in different businesses may be written in entirely different ways. This is because the mainframe was designed to work in a specific, siloed IT environment, with programs built to operate within that environment and data processed within a timeframe that worked for the business then – be that within a day, or a month.

But the way business IT works now is different. The mainstream adoption of cloud and 24x7 computing – which places much more emphasis on leveraging the innovation potential of the developer community, the integration between services and the sharing of data across them in real-time – has meant that computing code and the way it describes processes has become more universal and standardized.

Most modern programs have moved on from closed proprietary formats to Open Source ones, using sets of commonly recognized descriptions (know as Application Programming Interfaces or APIs) that can be readily understood by most modern platforms. Alongside allowing programs to interact more easily, this gives developers access to an ever-expanding portfolio of universally understood code components that they can use to build programs that will work just about anywhere.

The easier data sharing enabled by cloud has also changed our expectations on how quickly we should see data. We expect accurate data to be available instantly, and with more frequency. By contrast, waiting overnight (or longer) for data to be available seems outrageously slow.
The mainframe no longer fits with the IT model of today.
Complexity can cripple innovation

Open Source has allowed developers to work more collaboratively and iteratively; quickly building, deploying and testing new applications out of tried-and-tested components. You just can’t do this with existing mainframe code – it’s too deeply interwoven with the specific logic of the business.

For this reason, development of a mainframe application can take months, requiring personnel with not just knowledge of COBOL (now a seldom taught ‘legacy code’), but deep knowledge of the business’s processes. Sometimes, these applications were developed decades ago, and the code has become indecipherable to those outside of the bubble – forcing businesses to hire back their retired mainframe programmers at great cost.

This complexity can also cause cultural frustrations between different IT teams when applications need to be developed or adjusted. Mainframes aren’t readily compatible with modern Open Source development tools and younger developers often don’t have the necessary skills to work on them. They instead find themselves dependent on specialist mainframe teams who are used to working in very different ways and often end up faced with far longer and more complex development timescales than they are used to.
And issues don’t stop at development

In addition to the struggles with development, the mainframe has other issues. It’s an expensive piece of kit to run, with fees based on capacity, so the more data you have going through it, the more it costs. Doing anything to it – be that developing or simply maintaining it – requires specialist skills and experience, which are also becoming increasingly expensive.

Mainframes can also cause problems with IT consolidation, especially in businesses that have grown through acquisition. These businesses may have a whole jumble of legacy applications that overlap, with identical processes written in different ways. Unpicking these to create efficiencies as part of a consolidation process can prove to be cripplingly slow and very pricey.

And alongside the need for efficiencies, there’s also data access to consider. The growth of hybrid IT infrastructure means that businesses need applications that operate across a more varied environment, and for this to work well they need data to be available immediately – not just once it’s processed as part of a batch.
CHAPTER 2

The move towards openness
Although many organizations still believe their mainframe has a place in their IT infrastructure, it’s clear that it’s not the indomitable piece of hardware it used to be. For applications in need of development, the mainframe has become an unwitting roadblock to progress.

And progress is needed. Businesses are evolving to become more customer-centric: they want to respond to customer needs faster, placing fresh pressures on IT to develop new products and services quicker and harness more real-time data to help the business become more adaptive and innovative in the way it operates. This is how cloud-native businesses already operate; liberating the applications held back by the mainframe will help traditional businesses to better compete with their disruptors.
Cloud has changed the landscape.
Accelerating the speed of innovation with cloud

It’s not like cloud is anything new: 84% of enterprises are already adopting multi-cloud strategies. Its popularity is driven by a range of business benefits: infrastructure cost savings, high availability and seemingly infinite scalability, alongside access to a myriad of off-the-shelf business solutions and services.

Cloud is also a developer’s dream, allowing access to a range of quality tried-and-tested Open Source components to help them quickly build effective applications, alongside automated test environments to help them create quick iterations of new software.

Most businesses are already using cloud alongside their mainframes, gleaning information from the mainframe and pulling it into modern data aggregation and BI tools. But cloud does more than just add on new capabilities – it changes the very expectations that we, and our customers, have on our technology, in turn casting the shortcomings of the mainframe firmly into the limelight.

4. RightScale 2019 State of the Cloud Report from Flexera
How cloud has re-shaped expectations

Customer experiences
Unlike mainframes, which process sets of data in ‘batches’ within designated windows of time, cloud software can do it instantly. It’s the difference between waiting a few days to see a payment appear in your online bank statement, and seeing it appear immediately in an app. Customers experience these real-time capabilities in services they already use every day from cloud-native suppliers – they soon become expectations for everything they use.

Infrastructure costs
The very nature of cloud is infrastructure-light. It essentially lets new businesses have all the computing and storage power of large enterprises, with next to no infrastructure of their own. With this in mind, many larger businesses have capitalized on it as a way to rid themselves of owning expensive IT kit, and against this backdrop, the mainframe – with its weighty licensing, maintenance and development costs – has started to look unnecessarily expensive.

Business Intelligence
As data becomes the new currency of the world’s most successful enterprises, organizations are looking for new ways to harness it. It’s something cloud was designed for; the data travelling through it is already remotely centralized and accessible, allowing BI tools to easily pinpoint and act on efficiencies across even the most traffic-heavy applications. Although mainframe data can be extracted into modern BI, it is still subject to the mainframe’s batch processing methods – meaning it will not represent data in ‘real-time’.
In a recent survey, 64% of consumers and 80% of business buyers said they expect companies to respond to and interact with them in real-time.\textsuperscript{5}

\textsuperscript{5} State of the connected customer, Salesforce research, 2018
If you think about the data the mainframe handles against the possibilities of real-time cloud data analytics, you can start to see the potential of what modernizing it can unlock.

For retail banks, it lets them match the real-time customer account information and insights offered by younger fintech competitors. Their customers can get spend alerts, see real-time account balances and address fraudulent activity the second it takes place – all with a bank they already know and trust.

Real-time data can help retailers to create live inventories and provide live sales insights, allowing them to adapt to market fluctuations much faster and improve experiences for their customers, avoiding stockout scenarios and increasing revenue. And for manufacturers, real-time data makes just-in-time manufacturing possible – allowing for leaner production lines and cost efficiencies.
Businesses recognize that their mainframes hold data that is valuable for real-time analytics and have taken past action to try and access it. Many have systems in place to copy data across into cloud for analysis, however this method isn’t efficient: although they will get some level of BI, the output they pull from the mainframe must still be processed – like all mainframe data – as part of a batch in a specific window of time. It is still not real-time.

Others, especially in sectors such as capital markets and trading environments which rely on up-to-the-minute transactional data (usually processed by a mainframe), have bypassed batch processing and are using event-driven architectures and data-streaming technologies to plug the gap. Using these methods, mainframe data is recognized at the point of input (effectively, before it needs to be processed) and then identified using corresponding timestamps. It’s then processed when required as part of the 24x7 low-latency, digital world, and can also be identified and used in real-time in other systems.
Event-driven architectures aren’t a new thing by any means. They’ve been used for the last few decades to keep the mainframe relevant in the background and avoid the disruption of an expensive and complicated migration away from technology that’s been heavily invested in.

But continuing to work like this is in many ways simply patching up a system that no longer fits with the modern model. Keeping applications and data on the mainframe which should be run in the cloud - enabling data streaming technologies – especially when there’s no regulatory need to keep the data on-premises is an expensive way to do it. The organization will be paying for mainframe licensing and maintenance costs – roughly 30% higher than moving to even just more modern on-premises servers that emulate exactly what the mainframe does.

And rather than providing any huge benefit, the mainframe will inhibit the innovation potential of such applications. Any changes, as we’ve covered, will require a careful and time-consuming unpicking of mainframe code. To move forward, organizations must modernize their infrastructure: failing to do so will kill their ability to compete.
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CHAPTER 3

Unlocking the secrets
Starting the modernization journey

The reasons that businesses fail to modernize are obvious. It’s complicated. It looks expensive and time-consuming. Existing applications are currently allowing them to access the real-time data they need. There are naysayers in the business who are sceptical of cloud.

To build a strong business case, it’s important to take a pragmatic approach to modernization. Businesses need to think about what they want to gain from the process. They need to look objectively at the mess of applications they are using to figure out exactly where the best value can be achieved, and how they can release it quickly.

It’s also important to think about the destination. If you want to migrate off of the mainframe – where will you migrate to? What technology will best future-proof your business? What will satisfy data regulations? Any business undertaking modernization will need to have a vision of what they want it to look like and why.
Clarifying modernization objectives

Reduce costs
» Lower IT costs by migrating applications to a less expensive platform.
» Consolidate applications across inherited legacy systems.
» Avoid expensive specialist development and maintenance support.

Innovate more
» Harness real-time data to improve user and customer experiences.
» Improve developer productivity by adopting modern development practices.
» Shorten development time and improve speed-to-market for new products and services.

Future-proof infrastructure
» Move to Open Source architecture that’s more universally understood.
» Curtail mainframe skills shortages by moving away from the platform.
» Open-up core architecture to continuous development and improvement.
Application modernization treatments

So how does modernization actually work? It’s important to realize that the mainframe is not just one type of software; it’s not always as simple as just picking the applications up and dropping them somewhere else. Different applications need different treatments to be modernized effectively and have their value unlocked.

- Retiring
- Rehosting
- Replacing
- Re-architecting
Retiring
Retiring is one of the easiest ways to release value and the premise is simple: if you have three applications doing the same thing (usually as the result of previous mergers or acquisitions) then you don’t need two of them. We’ve found that doing this can immediately take roughly 30% of cost out of the mainframe.

Rehosting
If the application is still fit for purpose, it can be moved off of the mainframe, and re-hosted on a more modern platform. In this scenario, the legacy code is converted into a modern language, but the application still behaves in the same way. It means that it will still process ‘batches’ and won’t offer up real-time data 24/7, however costs will be reduced and the application will be opened up to modern DevOps and analytics tools. This approach is generally cheap, quick and high-value.

Replacing
As development knowledge has spread outside of walled IT environments, operational business programs such as HR systems, payroll and financial systems that were once unique to a particular business now work similarly for everyone. Businesses can therefore replace these unnecessarily custom applications with off-the-shelf solutions as a way to reduce costs and benefit from regular updates and modifications.

Re-architecting
Re-architecting is the most complex route – but it’s also the highest value. In this scenario the application is re-built from the ground up in a modern Open Source environment – be that an x86 server, private or public cloud. It will then work as part of event-driven architecture, eliminating the constraints of ‘the batch’ and allowing the access and use of real-time data, 24/7. Open APIs will allow easy integration with other systems (including real-time analytics software) as well as cloud-based development tools for ongoing evolution and refinement.
The secret to continuous modernization

The route you take to modernization will depend on a number of factors: what your IT estate looks like already, how fit-for-purpose your current applications are and what your strategy is for future business growth and competitive differentiation.

If the plan is to simply save costs quickly, you might choose to just port mainframe apps as they are (known as ‘lift and shift’) to a modern, Open Source, on-premises server. However, this should only be viewed as a short-term solution; to gain long-term advantage, you must modernize with cloud in mind. It is only with cloud that you will be able to develop and modernize continuously, alongside (and ahead of) the markets you operate in.

If market trends continue, enterprise use of public cloud will only grow. By starting strong – that is, bypassing a first move to on-premises and going straight to cloud – you have the advantage of defining from the outset how it will be run, used and managed as it evolves, allowing you to be more efficient and more strategic as your usage grows.
To gain long-term advantage, you must modernize with cloud in mind.
Mainframe modernization and application modernization shouldn’t be undertaken lightly. It’s essential that your business is aligned on exactly what needs to be achieved and why. If you don’t have the appropriate skills in-house, you must make sure that you bring in external support to help you plan and manage the process. This will also help you to move faster and minimize disruption to your business.

It’s also important that you start to see value quickly. Unlocking immediate value from less complex application modernization will help you to fund more complex transformation in other areas. For this, it’s essential that you undertake an initial assessment to pinpoint where this value can be easily released, for example, by consolidating identical applications in a legacy environment.

Of course, assessing your entire application portfolio can also take time. This is why specialist providers have created analysis tools to speed-up the process. For example, at DXC we use predictive analysis tools, powered by DXC Bionix AI, to quickly identify areas where you are likely to be able to quickly release value, based on an industry-specific typical model. It means you’ll ‘start smart’ and can easily scale your modernization efforts.
Modernization is not an end-state. It is a way of enabling your business to thrive on change.
Your mainframe has kept its secrets for long enough. The open IT landscape of today has no time for siloed technologies and bibles of indecipherable code. The organizations who thrive will be the ones who don’t just patch-up and gloss-over – but who fundamentally change the architecture of their IT to open it up to continuous change.

Mainframe modernization is not the only step. But it is an important one. This is where the business can evolve the very foundations that it is built on to make the leap from legacy to evolution. This is how it can truly embrace all the opportunities of cloud innovation. This is how it can truly thrive on change.
Smart steps to unlocking your mainframe

**Analyze**
Look at your current application portfolio to determine the best way to approach modernization. Think about the business outcomes you want to achieve and build a destination roadmap to think pragmatically about how you will move forward.

**Optimize**
Start creating efficiencies by archiving and decommissioning redundant apps, consolidating duplicated ones, and migrating specific apps off of the mainframe to reduce to cost of infrastructure ownership and build the foundations for continuing evolution.

**Innovate**
Increase your agility and improve your competitive advantage by re-architecting applications for modern platforms, adopting cloud DevOps and analytics capabilities to boost developer innovation, increase speed-to-market, and harness data-driven insights.
If you’re battling with your legacy technology but are worried about the disruption a largescale modernization program might cause, DXC can help.

As the largest independent mainframe service provider in the world we understand the unique business challenges that come with modernizing this critical piece of infrastructure. We make sure that you get your modernization off on the right foot— helping you to start smart and scale fast to start seeing business value quickly.

Our work is focused on helping you to thrive on change by optimizing your legacy mainframe technology and harnessing the full potential of hybrid cloud.
We understand your industry
We manage a vast number of mainframes worldwide and understand the unique challenges of infrastructure across a wide range of sectors including healthcare, banking, insurance, travel, transport and government.

We use specially developed technology
We use our patented DXC Bionix technology and a tried-and-tested approach to make sure your application modernization is fast, consistent and scalable, using AI and automation alongside strict governance for the most efficient result.

We will work out the best solution for you
Our proven tooling and vendor-agnostic approach let us look at your portfolio objectively and focus on modernizing solely to achieve the best possible value for your business. We work completely end-to-end to make sure no part of your journey is left to chance.

If you’d like to talk to us about your legacy transformation needs, please contact us at modernization@dxc.com