# Unlocking the value of your Mainframe

SOPRA STERIA'S APPROACH TO MAINFRAME OPTIMISATION





The world is how we shape it

# Introduction

In this whitepaper Sopra Steria's mainframe experts cover the approaches to consider when optimising your mainframe environment.

Mainframe optimisation involves understanding the resources running on the mainframe, the associated cost, troubleshooting inefficiencies, enhancing code and optimising batch schedules. Mainframe optimisation helps IT departments do more with less budget required, and ensures the business can exploit their legacy technology estate alongside implementing the latest innovation plays.



# The Mainframe is still the backbone of financial transaction processing

#### "Mainframe needs replacing", is a common misconception heard in many IT teams today as the mainframe is still at the heart of the Global Financial landscape.

In fact the mainframe still forms the backbone of many of the world's banking and insurance platforms and represents a considerable investment each year just to keep it running.

However change is on the horizon. Over the past 12 months perception of the mainframe has switched from being a 'revenue supporting' platform to a key piece of infrastructure in terms of 'revenue generation'.

#### The reasons behind this change in mindset can be summarised by the following:

- The mainframe is still the No. 1 platform for highly transactional, latency-sensitive workloads such as Banking and Credit Card
  processing. UK High Street Banks are all built on mainframes as the Banking Package providers do not provide the same
  level of functionality or level of throughput.
- In 2019, 64% of financial services organisations vs 57% in 2018 will be running more than half their business-critical workloads on the mainframe, supporting analytics, blockchain, web and mobile activity according to Forrester.
- From SHARE's perspective, mainframes are an indispensable asset for businesses of all kinds mainframes host critical core IT for 92 of the world's top 100 banks, 23 of the top 25 airlines, the top 10 insurers in the world, and 71% of Fortune 500 companies.
- Mainframes run on average 30 billion transactions per day, hold 80% of the world's business data and handle 90% of all credit card transactions. Mainframes process more transactions daily than Google (1.3 million/second on CICS vs. 68,542/second on Google), including 55 percent of all enterprise transactions.
- Applications already running on the mainframe are experiencing growth due to new demands, new data, and new buying
  patterns.

## IDC in their 2016 whitepaper - The Business Value of the Connected Mainframe for Digital Transformation identified the following findings from organisations that embarked on a mainframe optimisation programme:



## How did the mainframe end up being seen as an IT cost instead of a revenue generator?

First of all it's important to understand that legacy infrastructure and mainframe are not the same. For example did you know that Java is nearly 25 years old and there are still many legacy Java applications? Companies are now looking to replace older versions of Java with modernised Java offerings and other programming languages / platforms.

Longevity of a system is actually a good characteristic; it means you have a solution that works and is 'fit for purpose' provided the system has been well maintained and documented. However, in the UK in the late 90s there was frequently a management view that system knowledge was unimportant and availability to write the next piece of code on any system was; this in combination with poor practices and cost-cutting in programme delivery have led to a disconnect between knowledge, documentation and applications.

Because of the above reasons it led to testing being perceived as difficult. A lack of testing and documenting of systems meant IT teams did not understand the interconnected nature of their systems, the business functionality required or the technical secondary and tertiary impact of making changes. Compounding this is the fact that many mainframe systems are poorly optimised, with business applications having been built organically to support business processes.

This then resulted in the cost of change becoming typically high due to a lack of knowledge of the interdependencies between applications and data, and a resulting 'fear of change' which then resulted in 'workarounds' and lengthy regression testing.

As if this wasn't enough Financial Services organisations have often failed to keep pace with the advances in mainframe tools, modernisation approaches and connectivity.



# What can we learn from the way mainframe changes have been handled in recent history?

Organisations need to go back to first principles of IT Development. Documentation needs to be brought up to date and people who are experts in the systems and the business arena need to be seen as valued employees.

If this is implemented, recruiting new developers is more streamlined due to the availability of documentation to refer to and this prevents experienced programmers having to reverse engineer code which in turn reduces the risk of not having the skills to manage the mainframes in the future. In what is often a Key Person Dependency environment with ageing workforces (without documentation trainees do not stand a chance). With comprehensive documentation comes improved confidence in test coverage, reduced risk, and moreover developers and test teams understand the total impact and defined scope of code change and tests.

Then we can start to think about mainframe Programmers such as COBOL and Assembler, the job market now has these skills in high demand with salaries being offered in the £100k mark. The value demand is so high because it's against a diminishing ageing workforce – companies need to invest in training the next generation internally to reduce risk of having to sustain these types of salaries. Companies should look to use one of the most valuable but often overlooked resources within their business - the **SMEs** - to overlay the Business context on top of the technical context to bridge the gap. E.g. What happens when you change an interest rate? Where are the impacts to the Customer, Business Operations and the secondary and tertiary impacts on supporting applications?

IT and operational teams may view releasing code from a legacy platform as a risk (fear of change), and as such may choose to always complete full regression testing. With complete documentation comes the confidence that there is no need to test the whole system, you can test the individual components. Test the modules not the application!

Sopra Steria have teams of experts in Mainframe Applications and Operations, with a proven track record of delivery, application development support and change management. This has allowed us to develop our proprietary Mainframe Optimisation toolset and methodology called MOAT.

# Sopra Steria mainframe optimisation methodology

## Before we get into the practicalities involved in mainframe optimisation a universal integrated approach to making a mainframe run more efficiently and effectively must be in place.

Only by having the right methodology in place can businesses truly gain improvements from simplification, and via an API eco-system unlock business functionality to generate new revenue opportunities through digital transformation programmes of work. Using the Sopra Steria **Mainframe Optimisation Analysis Toolset (MOAT)** IT teams can be provided with a comprehensive review of the current state of the mainframe and from there make recommendations in the following areas;



# Understanding the key business and technology challenges around the mainframe

Businesses with mainframes usually fall into one of the two following camps, either

1. They have a mainframe, are unclear of its capabilities, are worried about Key Person Dependencies, a diminishing resource pool and are therefore considering its strategic future.

#### OR

2. They are confident of its platforms, data and security but simultaneously they have a fear of lagging behind the competition in the race of transformation that fall into the following areas.



In the next section of the paper we will discuss each of the areas identified in the above diagram.

## Exploiting your customers data

- Data is king in the competitive marketplace, without it, operational efficiency, customer journey improvements and product personalisation is difficult.
- Data is the key to unlocking additional products and services and therefore new revenue streams.

Exploiting your Customer data

Organisations need to get to grips with the data they hold, some organisations don't even have something as basic as a data dictionary, without this how can you understand your Dataflow?

How does the data you hold drive your customer journeys and operational processes, what's the extent of the technology stack that delivers the services for you? Is there data duplication and therefore inefficiencies and repetition in your data processing and data storage?

### **OPPORTUNITY IN LEVERAGING DATA**



**2.5** quintillion bytes of data are created every day

With regards to data, traditional banks if they get their mainframe strategy right, can hold an advantage over newer players to the market such as Fintech companies as they have access to larger pools of data. By taking the time to understand the data held on a mainframe any organisation which processes financial transactions can:

- Undertake marketing activities targeted to individuals specific behaviours
- Build customer profiles that reflect people's habits and preferences e.g. tailored products and services, share data with customer to understand their spending behaviour
- Create and launch innovative products and services
- Identify unmet market demand for certain products
- Track product performance and customer satisfaction
- Cross sell non-payments based products and services
- Increases revenue from existing customer base through machine learning
- Reduce identify fraud
- Prepare and sell statistical reports



## **Industry Innovation and Regulation**

- **Open Banking** Critical data is often contained within the mainframe environment. Integration services are required in order to expose the data to 3<sup>rd</sup> party products and services, for example Open Banking TPP's (Third Party Providers). This can be turned into an advantage and possible revenue stream.
- The move to the **New Payments Architecture** and **ISO 20022** transaction methodology in 2022 will require organisations submitting payments to confirm their Payments Processing is 'fit for purpose' as much of it is based on Mainframe technologies.
- Lack of agility / flexibility Some Organisations have what is known as a 'Closed Mainframe'. Creating a connected mainframe by introducing the use of APIs to standardise data access and transfer mechanisms across the IT estate both In House and with Cloud hosted solutions can enable the mainframe to become more responsive to regulatory reporting needs and unlock areas for business innovation to take place.
- A key theme from the **Regulators** is that Firms will increasingly be challenged by rising regulatory expectations for their resilience to operational failures, including cyber-attacks.
- The European Central Bank (ECB) will roll out maturity-based expectations for the cyber resilience of Single Supervisory Mechanism (SSM) supervised Eurozone banks.
- Recent high-profile **IT outages** will prompt UK authorities to accelerate the development of their "impact tolerance" framework for firms' operational resilience.

### **ISO 20022**

#### How will ISO 20022 impact you?





BANK OF ENGLAND

Industry

Innovation

and Regulation

## **Current Industry Initiatives**





- The NPA has been created by Pay.uk
- Payuk is the new single operator for Basc, Faster Payments and the Cheque and Credit Clearing Company
- Payuk are regulated by the Payments Systems Regulator

#### Quote from Chris Hemsley PSR Managing Director 09/19

"Our role is to support innovation and improve competition in payments. But also protect users of payment systems which means promoting a good choice of how to pay which meets the needs of different people. And, of course, it means that these systems must be resilient and reliable."

"This is really exciting time to be involved in the world of payments. The speed of change in our sector is breakneck!"

## Ability to understand Impact of Change

- Application portfolio visibility quite often there is a lack of current detailed documentation aligned to Business context.
- Due to lack of detailed Application documentation and dependency mapping this introduces risks for any migration activity as the complexities of the estate are unknown.

Ability to understand Impact of Change



- Key Person Dependency has become critical for accurate Impact Analysis. Many of these key personnel are part of an ageing workforce in sight of retirement age.
- Because of poorly understood dependencies and lack of business knowledge, successful de-commissioning of systems required to reduce TCO is very difficult to achieve.
- Lack of dependency mapping covering schedules, data and function.
- Process inefficiencies built over a number of years through workarounds and acquisitions.

- Skills shortage Over the past five years, mainframe-powered organisations have lost 23% of their mainframe workforce and only replaced one of every three experts lost, according to Forrester's study.
- People & Process small number of COBOL, Assembler and Mainframe Operations experts.
- Inertia and a cultural 'devaluing' of the mainframe due to a lack of understanding of its true potential to support the Digital journey and be a 'revenue generator'.

## **Other Inhibitors**

- Inability to execute at pace due to disparate nature of the Technology Estate and the coordination across IT systems that needs to happen in order to Release code changes. Organisations need to optimise their Change and Release Management process.
- Mainframe utilities are locked into a limited number of Vendors.





## **Customer Expectations**

#### Legacy systems need speed and flexibility of delivery to keep up with the ever evolving industry

#### Legacy challenges for Organisations?

- Do we rip and replace legacy systems?
- Which systems do we modernise first?
- How do we design the architecture to connect to anything anywhere?

Financial institutions need Payment Processing Systems that are *scalable, compliant and transparent* to help them *manage large transaction volumes at lower cost.* Whilst *delivering excellent customer service* and keeping pace with *industry innovation.* 



According to the FCA 2018 and 2019 saw an unprecedented number of major IT failures at UK banks resulting in customers losing patience!

# Sopra Steria Discovery and Assessment Approach

As an organisation that runs a Mainframe you are likely to have encountered a number of issues and are unsure as to how to begin to address them. Example issues, our approach to addressing them, and some examples of solution options are illustrated below.



Sopra Steria offer skills, knowledge and experience across the delivery lifecycle, mainframe application estate, and operational, test and run IT environments. Using the proprietary MOAT (Mainframe Optimisation Analysis Toolset) and Sopra Steria Smart Application Modernisation (SAM) approach, we will provide solutions for your hot spots, ensure your Mainframe is optimised to deliver business value and take advantage of integration with your channels and 3<sup>rd</sup> party products.

We can work with your IT and business teams to take a holistic view of your Business Priorities overlaid on top of your IT metrics and commercial arrangements. Sopra Steria will analyse business functions, SLAs and processing 'cut-off' times alongside analysing jobs that are run on the Mainframe, their dependencies and their interconnectivity. Our analysis will include the following:

#### Application Optimisation

**Schedule Optimisation** 

Commercial

Identify utilities that can be used to optimise and increase efficiency of Mainframe applications

processing which will provide options for parallel

Analyse CPU usage to identify spikes in

processing and prioritisation of jobs

**Integration and Interface Analysis** 

Interfaces to external systems and

what other system are impacted

Assess commercial models the

organisation is operating under

Map your data to determine usage,

formats, quality and optimal storage



**Testing Service** 

test tools

API Development Develop API's to standardise services and expose underlying business functionality to support your digital transformation journey

Testing capability using market leading



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Performance Optimisation Code improvement and removal of redundant code



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Capacity Planning Assess storage and resources usage to enable efficient utilisation



**Knowledge Transfer and Training** Post Implementation service



Data Quality and Storage

Analyse and document the code, working with the business to apply the context



#### **Connectivity Assessment**

Assess the current and implement a connectivity solution to external 3<sup>rd</sup> parties, cloud service etc.



# Sopra Steria MOAT

### Sopra Steria Initial Assessment Tools and Processes

Sopra Steria has developed a reusable toolset that will explore your Mainframe estate, collate and analyse data, and help you to understand your Mainframe application environment.



#### MOAT Methodology: Asset Collation

In order to analyse your Mainframe IT estate, Sopra Steria will lead (supported by Client SME's) the collection of the source data for an agreed scope of Program Source Code, Copybooks, JCL, Database Schemas, Scheduler Extract and performance metrics. These sources can either be collated and toolsets run in house or there is an alternate option in that we can transfer to a secure Sopra Steria Environment in order to run and populate the Sopra Steria Mainframe Analysis toolsets and databases. The relevant parsers will be run against the supplied sources to populate the Mainframe Optimisation Analytics Toolset which will then be used in the preliminary analysis phase.



#### Data Analyser - Data Analysis Dashboards

The Dashboards that are supplied with MOAT allow the user to query the collected data. Using the Sopra Steria analysis and output gives you the ability to Auto-generate graphs, charts, spreadsheets and reports using the available data in the form of MS Excel, MS Visio, MS Word and visualisations produced by other graphing tools. The output can then be used to inform options and the decision-making process.



MOAT then provides the ability to query collated data via a User Interface. Queries include but are not limited to the ability to;



#### **Parser Generation**

A key component of data from Sopra Steria's MOAT Methodology are Parsers built from schemas to extract key application data such as;



MOAT works using schema rules which allow you to divide code into small components that can then be analysed. MOAT is flexible enough to cope with most mainframe tools, schedules languages and report formats.

#### The parsers are illustrated in the diagram below.



# **CPU Example Output**

A client wanted to understand activity on their mainframe to ensure SLA's were met and to reduce mainframe operating costs. Sopra Steria used the MOAT toolset to analyse the Job Scheduling, Timings and CPU Usage to determine if there were options for cost savings.

An example of a CPU profiling graph is shown below. It's split into daytime working hours and overnight hours and has a R4HA (Rolling Four Hour Average) overlay. R4HA is one of the common methods IBM use for charging for mainframe CPU usage.

The graph demonstrates that although there were short, very high spikes in the overnight batch the removal / reduction of these spikes would have had very little effect on the R4HA figures. Drilling down on these spikes showed they were a result of a batch database update job which was critical to the rest of the overnight batch.

The graph also shows a relatively consistent recurring pattern with peak daytime activity in the morning, reducing in the afternoon. This was seen as a result of a combination of peak customer contact times and colleague working practices, where more complex or longer duration requests arriving in the afternoon were deferred until the following morning. In the daytime the significant spikes were found to be the result of requests to retrieve archived documents from a third-party content management solution – this was reduced by throttling the maximum number of concurrent retrieval requests.



## Sopra Steria Infrastructure Analysis

By using our MOAT assessment tool we can also help the IT department to analyse the existing IT estate and determine if there are opportunities to re-host applications. This will give the organisation an opportunity to decommission infrastructure and remove the associated costs for example, hardware, licencing and support costs.



# **Final thoughts**

As we have discussed in this paper everyone wants a faster, more responsive, value adding, cheaper to run mainframe. But without the right investments being made into the mainframe how can IT teams expect to truly unlock the value of data stored on the mainframe, de-risk applications, and fill the ever widening skills gap? One answer is to invest in a mainframe optimisation programme aligned to what your business wants to achieve.

Mainframe optimisation starts with understanding what resources are on the mainframe, how are they being used, and what potential value can be unlocked from data stored on this crucial piece of infrastructure.

Only by answering these questions can IT teams truly start to understand the potential value currently locked away. At Sopra Steria we believe mainframe optimisation is an ongoing process. To unlock new efficiencies you must employ a range of techniques underpinned by a solid strategy, the right delivery approach and correct methodology for your business.

For more information about Sopra Steria's Mainframe Optimisation tools, methodologies and assessments please email **pscomms@soprasteria.com** and one of our Mainframe experts will be in touch.

