

# Industrializing Banking Technology

## INTRODUCTION

“It doesn’t feel like a billion dollars’ worth of technology” remarked the banking CIO as we reviewed his technology portfolio. That was eight years ago, and I’ve remembered the moment vividly because it spoke to the vast quantity of technology required to run a bank and the expectations carried upon that technology investment. — John O’Hara, CEO Taskize Ltd.

Has the situation improved? The fourth quarter of 2012, another CIO at another bank considers the challenge of halving the number of applications while still delivering innovation in today’s even more challenging environment. That challenge is not just cost control and facing the rising tide of regulation, but also managing technology delivery functions scattered to outsourcing partners with the concomitant lack of direct control. Then there are the potential competitors; they may be without the depth of capability, but they are free of the associated technology legacy and modes of working. Might competitors use technology more effectively as a competitive differentiator?

Now it is time to be different. It is time to industrialize banking:

*“We are much more focused today on operations and technology and being a low-cost provider than we would have articulated about ourselves 10 or 15 years ago”.*

— Lloyd Blankfein, CEO Goldman Sachs November 2012

## HOW WE GOT HERE

Before we examine how to improve the situation, it is useful to understand the forces that led to the current problems in banking technology. To date, banks have focused on rapid growth which led naturally to fragmented operating models where each kind of financial product has its own, duplicated, processing functions. As firms developed new profitable instruments the priority was to have tactical systems in place quickly, ready to take on business and manage market risk. Margins were excellent;

efficiency and integration were therefore low priorities. But this profitability phase for each new instrument was relatively short-lived as competitors caught up and margins were eroded, sometimes in less than a year. Consequently continuous innovation was required. This has resulted in the creation of thousands of poorly integrated systems which are still running today:

*“It is vital that the IT architecture is flexible enough to support the increasingly complex requirements... and the urgent need for same-day trade processing... The characteristic problem of bank IT systems – a fragmented architecture composed of many unrelated systems that communicate with each other poorly and suffer from a lack of automated interfaces and consistency checks between them – pose challenges for this ideal state. Yet addressing these issues is an important aspiration”.*

— McKinsey & Company, Getting to grips with counterparty risk, 2010

## THE INDUSTRIALIZED BANK

What does an industrialized bank look like? We are embarking on a journey already undertaken by many other industries as they matured. Using the automotive industry as an example, we see:

- Use of technology and lean processes to drive down costs
- Reduction in end-product complexity
- Increased regulation for a safer industry
- Extensive technology cross-licensing and shared development costs

- Shared manufacturing infrastructure
- Massive standardization and use of common capabilities

Financial services are entering this next phase of maturity and must increase the strength of their IT in preparation for the journey.

A strong technical core is lean, it flexes and integrates. It has a strong integrity for both business process flows and data. It operates with predictability and efficiency, and it is less complex.

## INITIATING THE CHANGE

Industrialisation does not happen quickly, it needs to be instilled in the culture of the firm. This is as much a political change as a technological one, and requires robust and determined leadership with the ability to persist in their chosen course.

However, the approach to simplification of technology can be laid out plainly, as it should mirror a simplification of the business processes the technology is supporting:

- Clearly define the firm's core capabilities
- Define the value-chains and processes supporting each capability
- Define the essential information assets, transactions and roles used in the processes
- Organize the people to better perform the processes
- Organise the technology to support the people – systems follow people
- Obsessively manage each of the above
- Bring on-board fresh thinking either through key hires or partnerships to help accelerate change

To parallel the automotive example, transactions, processes and information are akin to products, production

lines and supply-chains. In the manufacturing environment where margins are exacting and the material

wastage of failure is highly visible, it is natural and obvious to obsess over these things.

In banking these things are virtual, but no less real. We need to learn to obsess over our virtual financial factories. If a manufacturing plant were to cost \$1Bn we might expect it to last for decades, we should demand the same of our software assets.

## IMPROVEMENT METHODOLOGY

Incremental improvement is the low-risk approach most often favoured. To achieve this, a firm can start out by industrializing and adapting its core software assets and it can develop information models for some well understood part of the business which will quickly yield visible benefits from the effort.

Since moving to industrialised banking is a difficult process, it is important to identify early wins to encourage the organisation.

The structural objective, as far as possible, is modularity and encapsulation.

Encapsulation is the technique of containing regions of complexity behind a simple façade.

Modularity is defining a scheme that enables these capabilities to be combined to achieve broader goals. The following diagram illustrates the major business functions present in an investment bank. Each of these functions must be performed for every asset class the bank can deal with.



Figure 1: Investment banking functions

Our aim is to achieve sharing of functions across asset classes in order to reduce processing costs. The functions closer to the top of the diagram are those which are likely to need to be tailored to a given market.

The functions closer to the bottom relate to more back-office and control functions and are a good place to begin rationalisation efforts.

A co-ordinated effort might:

- Anchor the effort with data management
- Define service oriented and event driven architectures for core capabilities
- Deploy common exception management
- Take a factory approach to analytics
- Commoditise integration technologies
- Leverage the technologies of 'cloud' for cost effective data centre management
- Differentiate a 'solid core' from an 'innovative edge'

Today this process is greatly assisted by some of the standards which have accompanied industry regulation; for example

emerging Legal Entity Identifiers (LEIs) offer hope for improved counterparty data, and the maturation of FpML, FIX and ISO 20022 provide a basis for common representation of deals and order lifecycles.

The process is also helped by the fact that there are mature, open, modern technologies which deliver depth of functionality unthinkable a decade ago.

In the following sections we will expand on each of these areas to show how you can begin this journey.

## MODULAR BUSINESS TECHNOLOGY

The goal of industrialisation is to deliver each business function optimally; this may be interpreted as doing each once. Firms therefore structure into divisions and departments and strive to streamline their processes.

These businesses develop a common language of their own which they use to communicate what needs to be done. We need to do the same with the systems which support the business.

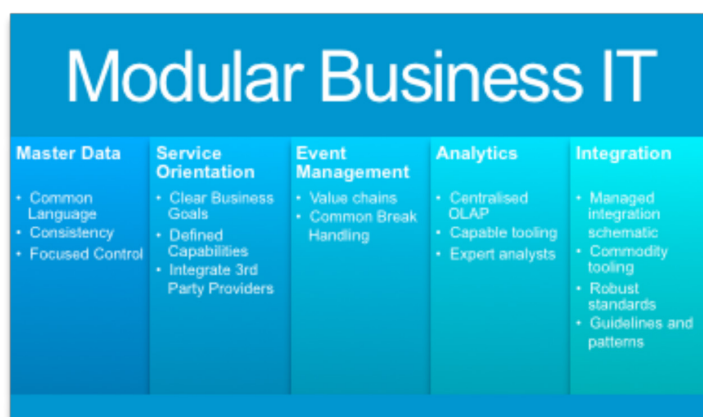


Figure 2: Elements of modular business technology

## DATA MANAGEMENT

Data management is the most important issue facing today's banking CIO:

*"Effective data management has been elusive for the banking industry, and with good reason. Technology silos and exploding volumes of data make this a daunting effort."*

— Deloitte, Banking industry outlook 2012

There are three essential kinds of data in a business:

- Master Data is also known as Reference Data or Static Data. It is the common language for the business data that is communicated between functions. This begins with widely used slowly-changing information: customer lists, business locations, calendars, financial instruments and continues to as fine a level of detail that yields value.

- Transaction Data is the next kind of data, and describes the flow of business that is being done. Transaction Data flows into, through and out of the firm. Transaction Data is the data that most often needs to be integrated between systems and businesses.
- Reporting Data is derived from collections of Transaction Data, often retained over a long period of time and analysed for control and strategy purposes.



Figure 3: Kinds of business data

When some level of Master Data is in place and maintained, it eases the flow of transaction information across the firm.

In larger organisations you will often find that Master Data is federated. There will be a common core lexicon but there may be also nomenclature specific to a division. For example, 'customer identifier' may be firmwide, but 'product grade' may be specific to commodity trading. The data management architecture needs to allow for this layering of data.

The benefits to an organisation which can achieve good master data management are a reduction in process breaks and the associated manual interventions, increased accuracy, improved reporting, and an established basis for optimising the business.

Credit Risk Management in particular benefits greatly from master data, and optimising credit and collateral is an emerging competitive differentiator for banks.

## SERVICE ORIENTATION

Service Orientation is about identifying well-defined business outcomes which can be invoked with a relatively simple interface. Consider for a moment the complex technologies enabling the 'Play' button on a modern media player or the logistics which move into action upon using Amazon's 1-Click Shopping.

The separation of value delivery from how it is achieved is the key to a flexible enterprise. Service Orientation benefits greatly from

sound Master Data, but does not depend on it. Both remediation strategies can proceed simultaneously.

With a common interface to value delivery in place there is opportunity for improvement. Reviewing the player example above, we may upgrade from tape to digital and rethink the interface from mechanical to touch-screen. The experience from the outside is the same value being delivered, but better.

Service Orientation can be thought of as providing service on demand; it suits end-user applications in particular.

## EVENT DRIVEN ARCHITECTURE

EDA is the lights-out variant of Service Orientation, where business events are propagated in a productionline like manner through business processes and value-chains to achieve outcomes. Critically, business events often do not require a response to the sender; rather they are a signal to perform an obligation.

These events are routed through an organisation based on its business rules to achieve the desired outcome.

Because of the flow-like nature of EDA, it can result in very scalable and flexible systems and is well suited to core-processing applications.

## COMMODITISE INTEGRATION TECHNOLOGIES

Service Orientation and EDA are both integration styles suited to the day-to-day business process. There is a third major class of integration style: the batch feed.

While an Event Driven enterprise is the aspiration for all modern firms, especially those hoping to achieve same-day processing (T+0), there remains a place for batch processing in the End Of Day checks and balances which take place. Reconciling between systems at known check points is a critical control to ensure that errors do not go undetected in the business processes. Batch transfers can also be helpful in ensuring that the necessary data is brought together from different systems into various reporting and analytical hubs.

These techniques and technologies are pervasive in an efficient enterprise and industry leaders have already commoditised, standardised and deployed these capabilities uniformly to ensure that there is never an excuse for poorly-flowing data and processes..

*“Where to focus investment (e.g., core back office vs. customer delivery) should become less of an issue if silos are stripped out and system connectivity runs throughout the organization”*

— Ernst and Young, Global banking outlook 2012

## DEPLOY COMMON EXCEPTION MANAGEMENT

No matter how automated a business process, sometimes things can go wrong. Problems can arise from any part of the firm, and it makes sense to specialise and rationalise the process of problem resolution itself.

Having a core business exception management capability is expected of the modern bank. This is a facility where breaks and issues are collected, sorted, and routed to human operators for correction. This can be a large system in its own right given the complexity and volume of financial transactions. A large firm may expect thousands of process breaks requiring manual intervention each day.

## A FACTORY APPROACH TO ANALYTICS

General reporting, analysis and retention of data is an expensive business, requiring copious amounts of storage and compute power and possessing an insatiable appetite for inbound data transfers.

Businesses understandably balk at the charges such facilities incur and shy away from them. However, the resulting smaller ad-hoc data stores which result, and the lack of specialised data management can actually generate higher costs than a centralised facility while yielding poorer quality results. Instead a firm should create a reporting factory, equipped with the right machinery and software for the job and staffed with skilled analysts. Business should also accept the necessity of the several copies of data that are often made during reporting data preparation.

Centralising, and bringing together data from across the enterprise – preferably underpinned by common master data – will deliver better answers at a lower cost and give business leaders the information they need to steer their organisation.

## LEVERAGE CLOUD TECHNOLOGIES

Cloud computing is just another word for facilities management taken to consumer levels. For financial institutions it is not yet acceptable to use consumer grade computing – the risks to confidentiality and business continuity are too great at this point in time.

However, in delivering computing at the price point necessary to enable cloud offerings the technology industry has created some outstanding data centre management technologies. These technologies can be acquired and harnessed to transform costs in a traditional financial services data centre.

Virtualization techniques enable once underutilised servers to be sweated by reliably hosting dozens of business applications per server. New techniques for disaster recovery and continuous operations can move a running system from a server in one data centre to a remote data centre with no downtime, and no application changes. The same technologies can greatly reduce the amount of redundant equipment purchased for disaster recovery sites. Additionally, the ability to dynamically compress server foot print during quiet hours and power-off unused machinery can lead to energy and emissions savings.

These techniques are starting to be deployed by the early majority. Where there is resistance, it is often from the political structure of infrastructure providers clinging to old techniques and the supporting organisations which have no place in this virtual future.

Ask your infrastructure providers if you could be benefitting more from these capabilities by re-engineering technology delivery processes.

## SOLID CORE AND THE INNOVATIVE EDGE

Where does innovation fit in this picture? Despite the attractions of technologies in the early stages of the

Gartner Hype Cycle, it is critical to remain focused on building a fit technology capability and being selective of which technologies and providers form the strategic foundation of the firm's core.

Early stage innovations should happen outside the core. By recognising young technologies as experiments which may or may not pay off they can be safely positioned at the periphery of the banking machinery. The innovative efforts may leverage the strength of the core and thereby be more successful, but they must not taint the core before they have matured enough to become part of it.

## WHOSE TECHNOLOGY STRATEGY?

The process of transformation will result in a hybrid enterprise consisting of the bought and the built, and combined with Software as a Service (SaaS). SaaS is packaged software delivered from the cloud. The financial industry is very used to working in this way; one can think of exchanges, settlement and clearing and market data services as SaaS. This trend will continue as firms vie to get us to buy software by the hour.

The implications are tremendous. There will be the expected challenge of combining packages, internal solutions and external services hosting core data. There will also be surprises as businesses by-pass IT departments and go straight to service providers.

These providers are attractive, and raise the bar for IT departments. But there is a problem in that the firm's data and process assets can quickly become scattered. One can rapidly lose control of IT Strategy and find it in the hands of vendors.

The techniques outlined above can empower your firm to benefit from innovations whilst retaining the control that differentiates it.

'Wrapping' external providers' services and packages to make them compatible with your SOA/EDA and master data is the key technique.

See the box for the Newedge case study which outlines a successful strategic program which used these techniques.

## CONCLUSION

Banking is following in the footsteps of many industries before it; higher customer expectations, lower margins and the relentless competitive pressures that drive efficiency.

Hard decisions must be made now in order for banks to survive in this competitive landscape:

*"Looking forward, 55 per cent of banking executives think it is likely their institution will be involved in a merger or acquisition either as a buyer or seller over the next two years."*

— KPMG, Banking and Finance Industry Outlook, 2012

Defining and executing the strategy will require strong leaders, capable managers and engineers and creative partnerships brought to bear to realise the transformations necessary in the technology capability which defines the successful bank.

## ABOUT THE AUTHOR:

John O'Hara has over 20 years' experience leading large technology transformation and re-engineering programs for global clients most notably 15 years at JPMorgan. John is also the inventor of OASIS AMQP, a member of the Apache Software Foundation and frequently called on to speak at industry events.

John founded Taskize as a vehicle to create innovative solutions for the Investment Banking industry bringing together experts in financial services technology, innovation, standards setting and delivery who share a passion for excellence.



## NEWEDGE CASE STUDY

Formed by Société Générale and Crédit Agricole as a joint venture, Newedge is a leading multi-asset brokerage offering of clearing, prime brokerage and financing services and providing access to more than 85 exchanges across 16 countries.

Some time ago Newedge realised that its technology was not going to keep pace with its rate of business expansion and set about strategic re-engineering.

Internally, Newedge devised a strong vision centred on service orientation and core data. They determined that they would take existing packaged applications which were serving the business well and ‘wrap’ them so that they could be re-used, combined with and enhanced by new services. Newedge leadership evaluated the vision and supported it.

After due process, Newedge selected VMware as a partner to accelerate delivery. VMware has a reputation for innovation and industrial strength engineering. The vFabric division of VMware is home to the successful Spring open-source application suite and the commercial Gemfire data-fabric solution. In addition to virtualisation and application development technologies, VMware has a professional services group with a global delivery capability. VMware’s combination of solid open source expertise and deep delivery capability from a recognised vendor met the Newedge criteria.

By the end of 2012 VMware and Newedge had completed a program of system modernization across their global post-trading architecture while meeting the strategic goals of leveraging existing packaged software, building differentiating capabilities upon an open source foundation and deploying a service oriented architecture that underpins their business today.

*“We have successfully implemented the most advanced post-trading platform of the clearing industry. VMware vFabric enables us to abstract technology from the business layer providing us with a consistent global, multi-asset platform.”*

— Alain Courbebaisse, CIO Newedge

### NEWEDGE HIGHLIGHTS FOR THE BUSINESS

- A single, global platform to handle same-day trade processing for derivatives and equities.
- Improved client on-boarding and client service.
- Cradle-to-grave visibility of all trades in real-time.
- Repair and replay capability independent of IT.
- A single source for Master Data.
- Business regained ownership of key processes.

### NEWEDGE HIGHLIGHTS FOR TECHNOLOGY STRATEGY

- Based on open source standards with no threat of future technology lock-in.
- Synchronized global workflow based off an Event Driven Architecture.
- Cloud-ready with no single point of failure.
- Data fabric for propagation of Master Data.
- Consistent message transformation to industry recognized formats.

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