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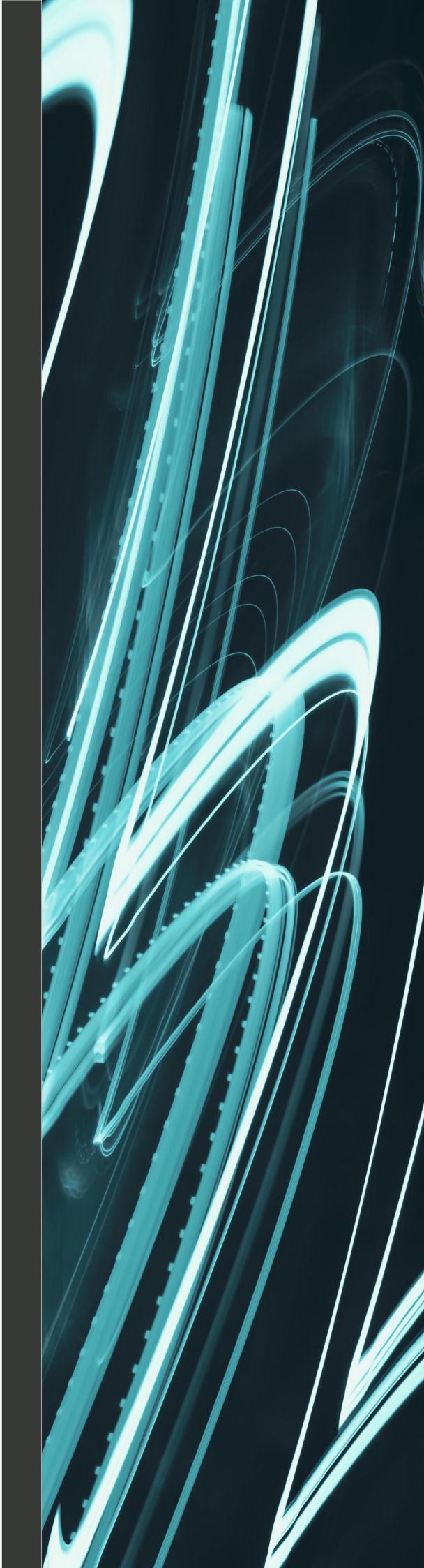
WHITEPAPER

Digital-SOA: Funding Models for Digital and Enterprise Architectures



Preface

Integration of enterprise systems has been a challenge for many years. Initially systems operated as islands of automation, connected only as an exception. Integrated systems are now a primary requirement and Service Oriented Architecture (SOA) is a preferred style. SOA promises re-use, location independence, and the benefits of mediated integration. Determination of scope and behaviour that should be provided by an "SOA interface" has regularly undermined the expected value from SOA.

Digital-SOA takes the SOA model to a new place, one designed to accommodate bi-model IT, Omni-channel, declarative interfaces, mobile technology, and customer-centricity at its very core.

This paper looks at the challenges of extending the basic SOA architecture to accommodate the new demands of Digital platforms. Specifically, it considers what additional capabilities are essential to properly support a digital enterprise.

Intended Audience

This paper is intended to support executive and leadership teams in **consumer-focused companies** to understand what Digital-SOA and Digital economy really mean, and how they must be addressed.

Disclaimer

Observations and recommendations documented in this white paper are based on our opinions, experience, and research. They are as objective and representative as we can reasonably be, however Responsiv makes no representation as to accuracy or fitness for purpose. Once you have chosen a course of action, it should be thoroughly evaluated to ensure its fitness for purpose.

About the Author

Richard Whyte is an accomplished IT architect with a proven ability to innovate and focus on customer requirements to deliver simple, effective solutions. He has demonstrated thought leadership based on a breadth of technical and project experience spanning Investment Banking, Retail, Manufacturing, and Aerospace, delivering sustainable technology to some of the world's largest companies.

Richard has a degree in statistics and computing and a master's in business administration. He is a Fellow of the British Computer Society (FBCS), Chartered Engineer (CEng), Chartered IT Professional (CITP), and Fellow of the Institute of Engineering and Technology (FIET).

About Responsiv

Responsiv Solutions is a UK based company that specialises in delivering business integration across the enterprise, including API management, Business Process Automation, and Digital-SOA platforms. We work across many industries, including Retail, Financial Services, and Government.

Responsiv can provide fully commissioned solutions that include all the software and professional services needed to deliver an integration platform to support your business plan and grow with your business.

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Executive Summary

Consumer access to advanced technology is disrupting all consumer industries at an accelerating rate; the ability to respond to customer demand quickly and efficiently has never been more central to the health and wellbeing of the organisation. The accelerating rate of change affects our IT investment decisions, ever reducing time to achieve a return on investment, and increasing the volume of change expected to be absorbed and enacted by our staff.

Flourishing in a changing and highly competitive situation requires innovation; it requires adoption of new risks and new ways of thinking; the creation of an enterprise that is willing to try new things and be unafraid of failure. Such an enterprise must have an IT environment that supports and encourages the new culture.

Without a significant shift in thinking and technology provision, many companies will fall behind in the battle for hearts and minds. The consumer marketplace is attractive to firms that are not currently competitors; for example, Google, Apple, Amazon, and investors in boutique digital-only companies. Customers are more willing than ever to switch loyalty for a better deal or enhanced access to company value leading to increased cost of churn and acquisition.[1]

Investment in Technology is not Enough

You must compete with companies operating with a lower cost-base that is maintained by constraining their offerings and changing the way they interact with their (your) customers. High value products, including loans, e-payments, and electronic goods, are primary targets for new entrants. They are not the only targets. Amazon are delivering groceries, and ALDI are providing a low cost good-enough alternative to the traditionally dominant retailers.

Technology advances alone are too easy for competitors to copy and prone to customer whim. Building a "killer" mobile app is a short-lived victory; what you need is a platform that can deliver new apps at any time, accommodate new trends and new devices as soon as they are released.

To establish a sustainable lead, you must invest in a platform that supports cost-effective change to digital experience and launch or change of products quickly and with manageable and acceptable risk. Achieving this requires simplification and acceleration of the developer journey, simplification of interface development, and centralised control of security and other corporate functions.

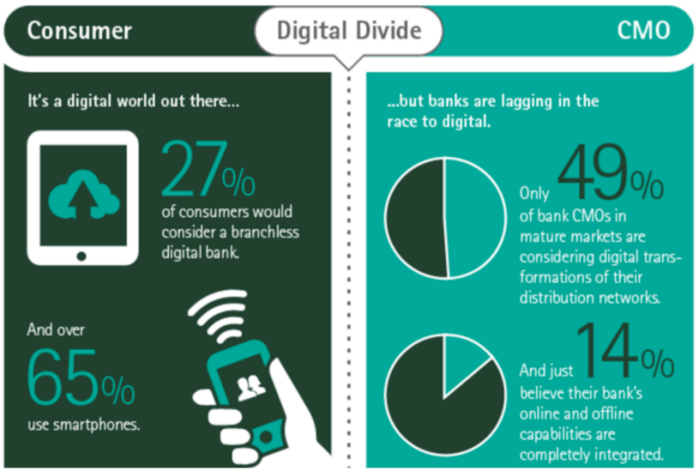


Figure 1; Digital divide (source: Accenture)

[1] For example, in the retail banking industry 73% of Millennials would be more excited about new offerings from Google, Amazon, PayPal, or Square than from their own bank. The same study indicates that one in three are open to change banks in the next 90 days. (The Millennial Disruption Index, a three-year study by Viacom)

Staff Needs Cannot Be Overlooked

Launching new products and services without excellence in the management and processing of those products will undermine staff morale and reduce customer trust and confidence.

New products, offers, and changes to process must be communicated and implemented as quickly as the new platform allows the launch. This necessitates Process Automation technology to control and govern, as well as monitor business activities. Automated decision technology in the form of business rules or the emerging Cognitive technology can be used to deliver self-service, centralise decisions, and impose decision logic into automated processes that once relied on human insight.

The ability to respond to the needs of your customers, staff, and regulators is utterly constrained by the ability of technology organisations to deliver quickly, accurately, and with relevance.

Staff experiences must keep pace with changes to customer offers and interfaces. A suitable technology foundation and new development disciplines will enhance the traditional engineering approach and embrace the new agile delivery models; empowering staff creates a combination of IT and human excellence that is difficult to emulate and that puts your company on an equal footing with its competitors.

Digital Society – A New Battlefield

It is highly likely that "the Internet" was not relevant, or hardly relevant when your company was established. Its systems and processes were originally established for a very different environment. But they coped with what appeared to be a radical shift – surely, they can do it again?

Unlikely.

It has taken around ten years (1990-2000) from Netscape Navigator, JANET, and the other "geek infested" networks to evolve to a platform accessible to all those with a dial-up modem and patience. A further five years brought new ways to define websites, better search engines, and e-Commerce. Consumers began to trust their cash to websites and WAP mobile moved to 3G but with poor handsets and coverage the best was still out there. Between around 2005 and 2010 the handsets got better, and the website builders got slicker, and the infrastructure for 4G was rolled out to the country. Networks became impossibly fast and in 2017 we have it all.[2]

That is; we have a consumer base that is happy to bank and spend money electronically, we have a mobile infrastructure that can support high performance websites, and we have the EU Digital Single Market pushing us to create a new Digital Future.

Given that we started with nothing how long will it take to make the next step when all the infrastructure and technology enablers are already in place?

For the retail banks, customers were once relieved simply to be allowed to open a current account. Working practices and controls protected the bank and its customers for decades. Competitors were maintained at arm's length, even building societies inhibited from first class membership to the banking fraternity. Now we have banks that did not exist five years ago who can open an account in minutes while it still takes many days for the traditionalists.

For the retailers, home delivery was a novelty, now it is expected. Being out of stock is not tolerated in the same way as before, and the competitive scene for all high street retailers is made uncomfortable by your customers' ability to find cheaper on the net while using your in-store WIFI.

[2] A potted history from memory. Dates and times may be rather inaccurate

The Digital Society Changes Everything

Traditional retail banks, grocery, electronics, and DIY retailers will all become irrelevant if they do not establish sustainable, low cost, fast ways to respond to and lead this cascade of innovation that targets its customers daily.

Your technology must support delivery of new products and new user experiences fast, accurately, and consistently in the short, medium, and long term. Developers must be supported to deliver improved interfaces using speech, video, and responsive forms, design new channels to market through social media and third-party applications. Developers must also be provided with improved security models and unobtrusive controls. Specifically:

Fast Time to Value

Accelerate development of user apps by reducing their unseen functionality[3] and behind the scenes responsibilities. Provide tooling that understands data and automates integration. Reduction of responsibility with a unified security model and containerised deployment

- Separate concerns for data-resilience from user experience (UX) and functional capabilities
- Aggregate cross system data for big insights and consistent regulatory reporting
- Consistently apply access and confidentiality policies leveraging your integration (SOA) investments

Explicit Bi-Modal Technology Support

Use containers to encapsulate and control different risks, testing regimes, and release schedules. Employ principles such as Separation of source systems from business processes, and user experience (UX) from integration.

This means that your UX apps are no longer responsible for security – the platform does it. They are not responsible for integration – the Digital-SOA does it.

Big Insights - Knowing Our Customers As Well As They Know Themselves

Known oil reserves do not always lend themselves to exploitation, either because of cost, complexity, or lack of technology solutions. Data and by extension information held in disparate systems around your organisation illustrates a similar problem; aggregation was a challenge, and analysis a lifetimes endeavour. This is no longer the case.

New techniques and technologies combined with cheaper storage and compute allow information to be extracted and analysed in real-time and offline.

Security and threat analysis, market insight, and efficiency measures (KPI) can all be analysed and acted upon in a timely and efficient manner; what's more, our competitors know this and are acting on it too.

For the banks: centralisation of regulatory reporting removes cost from other systems and applications; analytics and highlighting breaches and exceptions reduces the need for teams of people to analyse reports.

For the retailers: deeper insights and customer centric organisations build stronger relationships, improve lifetime values for customers, and avoid stock overs for reasons that could have been predicted if you could read twitter or Facebook.

Integrity & Security – Technology Transparent Unified Security Model

You may already contact your customers and partners through different channels, technologies, and markets.

Users play many roles at the same time and throughout their lives.

[3] Unseen functionality includes functions and responsibilities that are not directly linked to the reason for the app to exist. For example: security, scaling, error recovery, and understanding the topology of your systems to find data.

The rising tide of sophistication in fraud and other attacks makes security a central pillar to any technology landscape, not only to protect but to demonstrate protection; and to investigate possible historic breaches when a new attack becomes known.

A platform that separates security from applications can provide dynamic and appropriate levels of authentication to simplify user experiences. It can consistently, regardless of channel, protect data confidentiality and integrity. Adding the ability to continually self-asses allows your organisation to demonstrate and measure its level of security, to assess its ability to detect and thwart attacks, and to simplify user experiences with regards security.

- Authentication of an individual and their device is separate from delivery of banking services
- Users have one identity against which they authenticate and many roles to determine permissions
- The context of a user and risk of security failure must be available to enhance usability

Responsiveness - Delivering The Promise Faster, Better, Cheaper

As the retail industry is broadening to include new entrants and partnerships, the introduction of new propositions, ideas, and challenges simply accelerates.

You need a technology platform that can support agile deployment of new features and products while protecting assets and satisfying the authorities.[4] Pushing technology support on a platform intended for a different era is fundamentally limited. It ensures delivery of suboptimal solutions that are expensive, difficult to maintain, and that contribute to future cost of change. The approach increases cost and complexity out of proportion to benefits.

Extensive use of containerisation separates applications that require development and release agility from those that need good engineering practices. It separates security and other corporate functions from applications intended to be disposable. Analysis of runtime behaviour (another aspect of big-insights) underpins response to problems, and targets markets more effectively.

Your technology must embrace and structure its platform and operational organisation to reflect today's challenges. It must properly separate core systems (traditional engineering, deep testing, and certification) and practices from those that must change rapidly to match customer sentiment (agile, low risk, disposable).

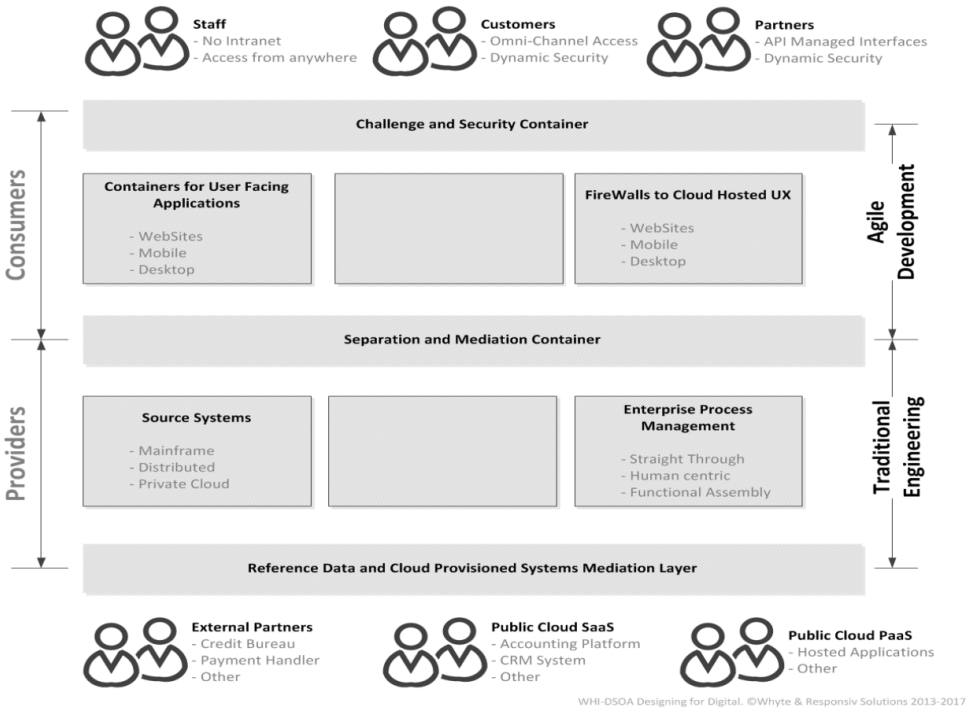
Digital-SOA Fixes Everything

(almost)

It is proposed to build a platform that reduces operational cost by containerising the effects of change, and by avoiding any contention between agile methods and waterfall engineering practice. Applications located in isolated containers can be managed and financed according to their ownership and needs.

Applications that present to users, whether customers, staff, or partners will be placed in containers that provide a single point of access to enterprise information and functions. These applications do not contain data, have no responsibility for security or audit, and can be developed, tested, and released without risking enterprise assets or data.

[4] For example, the new General Data Protection Act (GDPR) affects all industries that maintain information about EU citizens; that means staff, customers, directors, and shareholders. The fines for breaching the act can be as much as 4% of your WW revenues.



Source systems present their interfaces to a single mediator that forwards them to applications as a consistent set of services that are properly secured, audited, and consistent. The culture of engineering discipline and risk-managed change is encouraged and managed to ensure availability and data integrity is maintained.

A line of technology that separates source systems from applications delivers mediation. It translates data from source-specific to a generic format, imposes confidentiality and protection, and audits interactions. Centralising corporate controls improves consistency and reduces complexity elsewhere in the platform. The separation controls how change and dependencies are transmitted across the platform.

Delivering the Future - Conclusion

The technology landscape has been and will be a critical part of the well-being of any institution. At the beginning the technology ran payroll and stock handling. It was not visible to customers and could be clunky and difficult; that's what your staff were paid to handle. Not anymore. Your customers will not tolerate slow apps, difficult to navigate screens, inaccurate deliveries, or cumbersome security.

A suitable platform is one that can be developed relatively quickly and deployed as an independent "bubble" within your existing environment. This isolation allows new rules and work practices critical to its speedy delivery and new innovations. It is also, I am sure, critical that its deployment does not unduly affect business as usual.

We propose building an independent platform using public/private cloud infrastructure and new techniques. The Digital-SOA platform design allows it to be built in iterations and in parts that can be independently refined and deployed. Minimum viable product capable of supporting a mobile application should be deployed to production inside a year.

CSF: Initial Build Activity And Agile Development Must Be Separated From Mainstream

The introduction of innovative and agile methods can be a giant leap that will seriously challenge the culture and processes currently operating. Once new approaches are established, a parallel culture and established practices can coexist in the enterprise; until then they must be separated, protected, and nurtured.

CSF: Sustaining The New Platform And Focusing Attention Requires A New Funding Model

Use of shared infrastructure and re-usable assets requires a new funding model and metrics that support management and timely investment. Failure to do this will result in shared components being underfunded or lacking capacity and applications being maintained beyond their useful life.[5]

[5] See Funding models for Digital-SOA White paper

Digital Society – A New Battlefield

With no shortage of innovative ideas and clever ways to improve corporate life and customer experiences; how many of those great ideas make it to reality?

The number of ideas that get to the consumer versus those shouted in a moment of frustration and taken no further is generally pitiful. It is an almost universal truth but is increasingly an inhibitor to the growth and wellbeing of many retailers.

Customer Empowerment is Key

The role of help desks and the power of human relationships must not be underestimated as we rush toward a future that increases communication at the same time as isolating individuals.

The need for continuity and empathy in relationships is as important to call centre representatives as it is to customers. How do we create personal relationships between customers and help desks? How do we build trust between people that have never met?

Customer centric operations will rely on personalisation and personal information, including consent becoming an enterprise asset and not an island of information attached to a UX package. By allowing your staff and customers to add photos, attach to Facebook, twitter, and other interests you create a closer and more accurate and complete understanding of your customers.

Imagine combining this information with transactional data to deliver insights and targeted offers. Perhaps use the new information to determine whether this week end really is BBQ central – or everyone is staying in and watching the Rugby. Perhaps your customers will allow marketing once a week but every day if it's a particular type of offer. Where do you store such information?

If your call centre representatives create their own profiles algorithms can be used to match customers to call centre staff according to their personalities: Reduce frustration and avoid situations.

Omni-Channel Is Not Just A Fad

Partially completed applications and documents can be continued on a different device or shared with the help desk, which can also proactively follow up partially completed forms. Achieving Omni-channel is not simple; it requires user preferences to be shared across channels, and for the data being input to be shared in a meaningful way that does not create so many dependencies that further innovation becomes impossible.

Modern design techniques and technology allows applications to be built using "responsive design". The idea is that a user interface is developed to respond to its environment, adapting to screen size and orientation for the best effect. For the corporation responsive design means that applications can be developed once without really distinguishing between desktop or mobile devices.

The problem is that not everyone likes the same things; perfect for one set of customers is unacceptable to others. The purpose of a "great" application is to become "sticky", to ensure that customers maintain their business with your company.

Improving Agility Of Mobile Development

Competition for the hearts and minds of mobile customers is fast moving and subjective. Developer assistance and containerisation make application development fast and reduces risk. Simplified data discovery and access further accelerates application development and protects company assets.

Traditional mechanisms to provide security must be reconsidered; use of mandates is challenged by simpler to configure applications that do not require setting up.

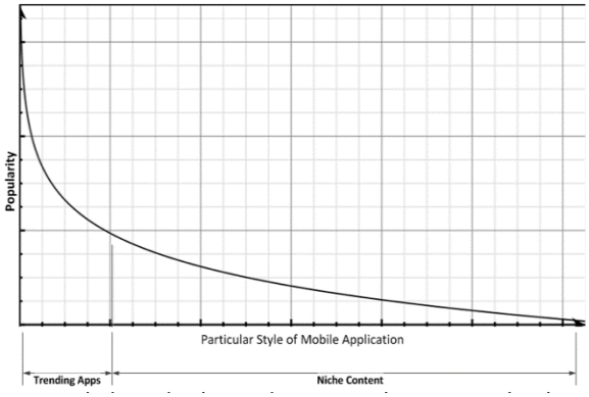
Protect your mobile investments; Build "starter" applications that can be safely heavily customised (rebuilt) by customers themselves.

A fully functional application with a toolkit allows users to configure the layout and behaviour of fields and buttons. Users can invest their time and emotions into building their favourite application; one that does exactly what they want from downloading transaction data to paying the bills. You maintain control of the application runtime environment to ensure security, control, and quality while allowing inventors and users to develop new ways to work and access your data.

Always-On Personal Devices

Mobile devices are smarter and more accessible than ever before, and while previous performance is not a guarantee of future performance it is a very strong indicator. The expectation is that new mobile devices, communications technology, and the convergence of technology to a single device will create opportunities that are not yet obvious and that will change the way people live their lives and access banking.

While this is no big surprise it is difficult for the bank to access these opportunities. For example, the fact a mobile device is always on is not fully utilised for fraud detection, notification, or second factor authentication. While isolated projects do exist it is not a ubiquitous enterprise capability that can be extended and changed to match new technology innovation.



Geo-Fencing

A geo-fence outlines an area of interest on a map. It can be used to mark where we expect a person to use credit cards or access accounts. Check proximity between an AT/POS terminal and a phone and offer new ways to secure websites and payments.

Notifications

Pushing notices to a personal device involves people with business processes and helps them manage personal finances. Providing profile management features delivers control to customers and staff about how and when information is pushed to them.

Biometrics and Machine Data

Phone sensors and identifying information can contribute to authentication decisions and build a profile of how individuals access their finances. Hiding this complexity from individual applications and applying it across the enterprise improves security for everyone.

Combining Geo-Fencing, Biometrics, and Push

Synergies available from combinations of features are endless; Improved security based on increased insight into fraud patterns and customer behaviour, and immediate communication with affected individuals to rapidly resolve issues and avoid inconvenience.

Customer in Control

Providing a single point of control to users about notifications of different types are combined, formatted, and delivered will improve customer expectations and place RBS ahead of the market.

Extending Mobile to Cross Channel

To properly support a digital enterprise SOA must be extended so that the platform itself supports sharing of user profiles, and a mechanism to both support Omnichannel and support cross channel notifications. These mechanisms must by their nature also deliver significant support for consent management and data protection.

Cross Channel Profile Management

The ability to provide programmers with personalisation information about a user (staff or customer, system, or partner) is central to supporting Digital. Such a capability allows any application, regardless of channel to know what it is authorised by the user to do with their data, and how they wish to be interacted with.

A profile management solution that allows automated business processes to notify users of an outstanding action, and to interact with a specific process is great. What about one that also remembers the last few activities and the results? Now we can support mobile connection failures and recovery to a different channel.

Marketeers love to mix information provided by a customer with the transactional evidence of their buying habits. A welcome side effect of the Digital-SOA platform.

Cross Channel Park

A facility to park your work and return later is a welcome addition to any website, however in the Omni-channel world the recovery of work may be on a different device with different security or display characteristics. A parking service that is capable of actively supporting the movement of partially completed forms from one channel to another, and to support helpdesk active chasing of partially completed work provides the enterprise with the ability to support Omni-channel without undermining agility in the channel.

Digital Payments

New technologies that may replace cards with connected devices and new sources of real-time security data make new security models and approaches to risk viable and appropriate. Many of these new models would have been pure fiction only a few years ago.

Clearly these innovations benefit the banking sector, however the same techniques can and perhaps should be used by retailers to protect loyalty cards and protect against identity theft.

Supporting 3rd Party Developers: WebAPI

Demand for the bank to expose application programming interfaces (API) to the public is increasing, however while a transport service can safely release bus location data it is more difficult to release access to payment APIs or customer details.

While the API is secured the application is not. Details can be skimmed from customers by a “legitimate” banking application, or by a Phishing application using materials from the bank. Calling the banks own security interface checks that the user has entered correct details…

The application development toolkit allows us to ensure a chain of custody for customer information through the application and enforce signed components are used for each button or field. The bank controls the data, but creative individuals are allowed managed access.

The Digital Society is a Moving Target

For many industries, innovators, and competitive forces are pushing the digital society to change and develop at an incredible pace. It is impossible to predict what the next big leap will be or who will release it to the market. With every change the ideas and baseline of what is acceptable changes for banks and for their customers; what was cool and amazing quickly becomes old and tired.

The technology platform must deliver the ability to change and refine the way users experience their offering; it must provide these capabilities across all channels and to all parts of the technology landscape.

Big Insights

As customer contacts become predominantly electronic and across different channels and parts of your organisation their analysis will become increasingly important to allow resources to be properly allocated and to delight customers.

Regulation, audit, and security needs all add urgency as does competitive activity.

The authority of analytic results increases as the completeness of data improves; usefulness of insights diminishes with delay. Real-time analytics and combining data from across all channels is no longer a luxury.

Threat Detection and Response

Real-time detection of threats based on data from across the enterprise is more effective and provides better coverage than a series of independent attempts specific to channels or applications.

Cost and overheads for protection reduces margins and impacts business viability; the need for an unobtrusive yet ubiquitous security and security insights capability has never been stronger and will increase as the digital society adopts new technologies and ways to utilise capabilities. This cannot be done by individual application; it must be an enterprise-wide platform capability.

Satisfying the Regulator

Cost of regulation is increasing along with the penalties for failure. The financial services sector has lived with this reality for decades; however, retailers and other industries are now going to feel the pinch of new regulation. Digital Single Market regulation alone will cost British industry millions of pounds to implement and operate.

It is not sufficient to be compliant; one must be able to demonstrate compliance simply and effectively. Conflicting regulatory reports and thousands of pathways to access data do not support confidence. The organisation needs an IT landscape that from its very structure simplifies demonstration of conformance and control, centralised reporting from a trusted source, and chain of custody for important data.

Managing Data

Traditionally operational systems maintain their own reporting and data archive. They integrated with other systems to get data simply to properly report, for example reference data. Data is duplicated across many systems and big insights are hindered by the distribution and quality of data. By building a consistent audit and capture mechanism into the very foundation of the IT environment nothing is left to chance. Consistent data is stored once, operational systems have no need to maintain histories, and reference data duplication is reduced.

> It is said that if you know your enemies and know yourself, you will not be imperiled in a hundred battles; if you do not know your enemies but do know yourself, you will win one and lose one; if you do not know your enemies nor yourself, you will be imperilled in every single battle.
>
> Sun Tzu

Insight for Anti-Money Laundering and Fraud

Distributed attacks on financial organisations are increasing; for example, multiple uses of the same debit card from locations around the world within a few seconds, cards stolen from different people that have a merchant in common. But what about retailers? They are not immune to those wanting to steal customer details or use fraudulent means to gain goods and services.

A unified security model combined with big insights can give your company opportunities to detect and respond to these attacks. A person that stops their debit card should automatically become higher risk on all other cards and devices; users that report a stolen phone should be flagged for potential card fraud too.

Visual representation of the big picture as well as detailed patterns will likely become invaluable in the fight against this type of crime.

Customer Insight: One Size Never Fits All

Improving our understanding of existing and potential customers and staff is the first step to efficiently exceeding their expectation and allows a company to quickly respond to their changing needs.

Only large volumes of data from across the organisation (and beyond) can provide the accuracy and confidence to focus proper attention on to individual customers as a matter of course, to allow systems and processes to be constructed to respond and understand individuals.

A technology landscape constricted around the customer must provide a simple and extensible way for customers to record their preferences, likes and dislikes. This information must be available for combination with behavioural and transactional information as well as to operational systems and processes to influence their behaviour, and to the customer.

Security and Integrity

Integrity is basis of mutual trust and respect and is about honesty and doing the right thing.

For an organisation to gain integrity requires the staff and technology to work together in a supporting way so that processes, offers, responses to concerns, and marketing all communicate the moral strength and direction of the firm. Integrity is also about coherence and the avoidance of exceptions and conflicts; the technology environment must be capable of self-protection and demonstration of its integrity if the picture is to be completed.

Empowering individuals and providing them the principles and tools will go a long way to executing on a strategy to build trust and confidence in a company. Technology can deliver, through process automation and big insights, the transparency and evidence of behaviour and consistency.

Impact of Breach

The impact of a breach or loss of data is often difficult to quantify in terms of undermining reputation or even financial loss. Often organisations cannot even determine whether the attack has happened before or how long the vulnerability has existed.

Breaches can result in system unavailability, loss of data, or corruption of data. By generating data from the security solution that can be combined with data from Big-Insights many of these questions can be answered.

Disruption and Denial of Service

There are many malicious ways that external entities can reduce the capacity of an organisation to respond to their legitimate customers. Malicious attack is a far bigger conversation, however there are innocent behaviours that can lead to reduced capacity or significant cost to the organisation; one example is when every customer simultaneously wants their balance, another is when everyone wants to take advantage of an offer.

The technology must be able to prioritise requests and, in some cases, throttle them to protect core.

Security

Your technology platforms must be capable of protecting themselves; a forever changing challenge that is increasing in urgency and breadth. Ten years ago, the idea of a virus disabling mobile phones was laughable, the idea that the same virus might use the phone to crack your loyalty scheme or gather home deliveries information, or card details was simply not a consideration. It is now.

We don't know what attacks or opportunities might be created by new technology in the future. We do know that the structure of an IT landscape and discipline associated with control and access is a major influence on its security.

> Protection that is intrusive and complex will create barriers to customers and legitimate users

Barriers that significantly reduce the utility customers achieve from you may drive them elsewhere. Complex or multiple passwords are written down or lost causing customer calls to help desks and disruption to their lives.

A security solution that **quietly protects** with a suitable and appropriate level of protection to all parties is clearly the answer. Such a solution must be implemented consistently across the enterprise such that its veracity can be demonstrated on a continual basis to limit the impact of undetected intrusion.

Demonstrating Integrity and Security

Demonstrating that the organisation has control of its business and assets is as important as having that control. The ability to detect inappropriate use, for example money laundering or fraud as well as demonstrating good practice during a sales cycle.

> "To stay relevant to our customers we must become an expert innovator; fleet of foot and embracing risk; delivering what customers need where and when they need it. As a company we must demonstrate prudence, control, and maturity at our core."

Responsiveness

Being "responsive" is not about pandering to every desire, being the first to market, quickest to respond, or first to fail.

Poor responses to circumstances cost time and affect the brand. Considered responses, accurately and efficiently, executed time after time, build brand and demonstrate integrity and operational excellence.

To be responsive requires insight, control, innovation, and capability. Establishing a foundational platform that supports fast and accurate development of new capabilities seems to be an obvious strategy to delivering change and innovation in a timely and accurate manner.

Insight is about having the right information but also about the way that information is presented. Accessible and timely information is key to understanding trends and immediate threats or opportunities.

Motivated people are undermined when their priorities and environment are unpredictable. Operational staff tend to revert to their first understanding of a process when under pressure, customers will not invest time and effort learning new site layouts and procedures every month.

Automate IT Processes to Coordinate Change Across the Enterprise

Include staff and customers as well as technology in the change process. Isolate parts of the IT landscape in containers to allow parallel changes and change to be properly managed and categorised according to risk, impact and audience. Plan and coordinate delivery of changes that modify user experiences; the enterprise must, if it wants to achieve ubiquitous customer satisfaction, be joined up in its thinking and approach. This means oversight, which can provide control and avoid duplication, but can also become a bottleneck and create new work.

Technology that focuses on helping customers and staff to "remember" a process, and that manages hand-off between departments will introduce consistency that crosses departmental boundaries. Formalised processes will improve the consistency of enterprise behaviour toward its customers. Business Process Management (BPM) implemented properly can also provide a rich source of insight into how the organisation operates and where the issues lie.

Process Automation Is For IT As Well As Business

The IT landscape must support process automation and be tolerant of high levels of change. It must support multiple changes at the same time while it protects itself from errors and honest mistakes.

To understand and constrain the impact of change it must automate operational and technology processes, as well as business processes. It must create an environment where the application and innovation pipeline is visible and predictable. For some this falls under the banner of DevOps.

Political Delays Are As Destructive As IT Lead Times

A lack of agility in the IT environment has in many organisations overshadowed questions about the true agility of customers and staff. The ability of staff and managers to absorb change and new ways of working is limited and variable. If changes are associated with failures and other frustrations, then productivity and quality of outcomes quickly suffers. If the IT landscape is changed quickly and simply, then the emphasis will shift to the human and business management.

Building for the Enterprise

> "People know what they know and can often be blinded to other possibilities by that knowledge."
> Henry Ford

An enterprise platform, created as a foundation for the future, must focus on your future needs rather than current challenges. A platform that supports fast response to change is rendered useless when the process to authorise or agree the change is slow.

Separating applications based on their changeability, business alignment, and ownership simplifies decisions and reduces business and political delays. Designating some applications as "disposable" means that they can be built and thrown away quickly and efficiently without reference to others that might be referencing them. The platform must consider re-use and build it into the foundation where appropriate; sometimes it is both counter-productive and expensive.

Bimodal IT is a term coined by Gartner Analysts to emphasise the necessity for organisations to accommodate conflicting ways of thinking about and building technology solutions. It suggests that two modes of working are sufficiently important and different from one another to warrant separation. By separating mode 1 Marathon runners (core systems and traditional engineering) from the mode 2 sprinters (user experience, web and agile) both become more efficient.

Further separations are also desirable to reduce the cost of ownership and accommodate the large enterprise parallelism.

We assert that this bi-modal nature of the organisation must be reflected in any efficient IT landscape to provide an efficient interface and associated contract between the competing approaches. This desire leads to containerisation.

This proposal seeks to balance today's challenges with creating a solid foundation for tomorrow's opportunities.

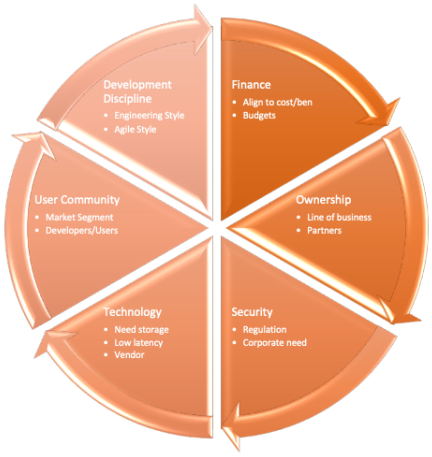
Different perspectives are shown in the next figure. As is demonstrated the technology solution to sustainable business requires the right capabilities to be woven into a suitable structure. Both structure and parts are as important as one-another; individually they deliver improvements but together they deliver excellence.

Proposed Digital-SOA Platform

The proposed platform focuses on delivering **accelerated time to value** for new capabilities and applications while reducing the total cost of ownership and improving use of data-assets and enhancing security. A major focus is to create a platform that can evolve as required to meet business imperatives while delivering significant opportunities for innovative product offerings and ways of working. The three major structures in this platform are: Containers, Consistent and Mediated Integration, and Centralised Control.

Using Containers

Containers are used to control the scope of change, prevent contagion from errors or security attack, and for convenience. They can be arranged to separate systems and applications based on their technology or other characteristics.



Applications that do not require storage (stateless) might be separated from those that do in order to reduce operational cost. Perhaps Microsoft based applications are separated from Java to simplify operations.

Benefits of containerisation include reducing business delays gaining agreement to changes or investments, avoiding contagion between containers from failures and the effects of change, or simply to clearly mark lines of responsibility with clear hand-off between groups.

Containers are created using structural components to fence them from other parts of the environment while simplifying communication (integration) between them. These mediation points provide convenient locations for implementation of corporate concerns in a way that is separate from consumers and providers.

Containers for customer facing applications are suitable for agile development practices and can be deployed to cloud containers with limited recoverability and data retention features; this facilitates reduced cost elastic scalability for highly compute-intensive tasks.

CHARACTERISTIC	DESCRIPTION		
ISOLATED NETWORK INSIDE CONTAINER	VLAN or physical separation of the network prevents illegal connections and simplifies intrusion detection etc.	Network checked: illegal protocols	✓
		Hidden topology	✓
		Controlled access through a gateway	✓
BRIDGED BY A SECURE GATEWAY	The secure gateway can be implemented in many ways but should isolate at the application layer as well as transport etc.	Protocol isolation (Inc. App level)	✓
		Temporal (async/sync) isolation	✓
		Syntax, Symantec, dictionary	✓
MANAGED FROM A CENTRAL LOCATION	To reduce costs and ensure that the overall platform operates as a single unit	Gateway includes DevOps support	✓
		Local control as well as remote	✓

Using Mediation

Mediated integration is delivered by creating a single point of consumption for all applications to access enterprise data and functions. At the enterprise level the ESB performs this role and should completely separate consumers (above) from providers (below). This particular line of separation also demarcates agile (above) from traditional engineering (below) to support the bi-modal IT element of the platform.

Each container should then have a smaller bridge or gateway on its boundary to allow the container to effectively hide its internal composition, and to ensure that only the APIs explicitly exposed can be used outside the container.

Separation and mediation is provided to deliver a single point of control and consumption for enterprise data and functions. Finally, source systems and process management logic are protected from unwanted attention and managed/developed using iterative engineering techniques.

Mediation includes enforcing security, audit, and raising events for notification, as well as routing, transformation, and isolation.

Using Centralised Control

Centralised control is implemented to allow operational staff to oversee the entire environment efficiently and effectively. It ensures that deployment, certification of components, and all changes are performed in a synchronised and consistent way and should be part of the DevOps design.

Central control does not imply centralised location for functionality, or that the same capability should be collocated.

Overview

All external users and partners access the platform from above. They are all subject to the security barrier that gathers evidence that security policy is working as intended, that no attack is being conducted, and that all users entering the platform are identified and have correct credentials.

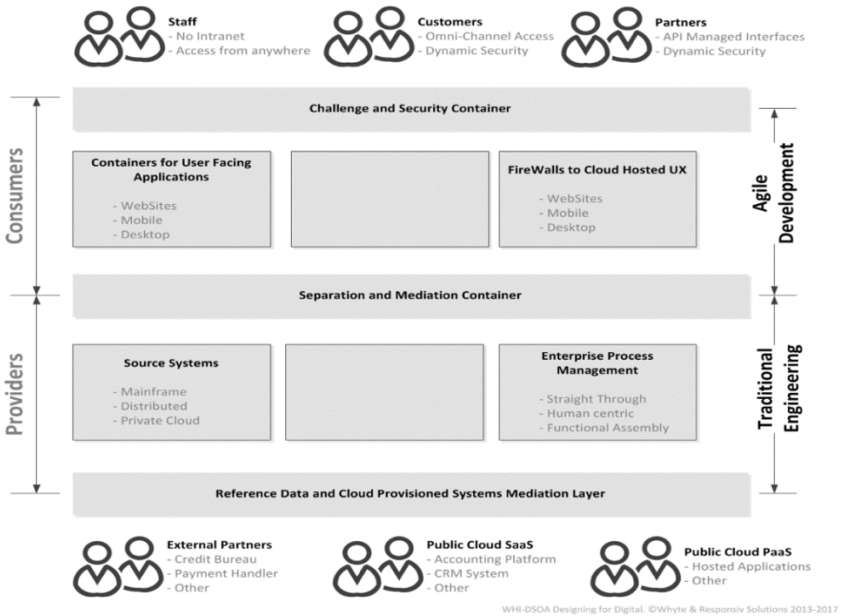


Figure 2; IT landscape overview

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