

Migrating to the cloud: Views from the UK's first cloud-based bank

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Abstract The cloud is the future of banking technology and it is just a matter of time before all financial institutions move their technology to it. This paper explores OakNorth Bank's journey to the cloud; the process of getting the move approved by the regulator; why they chose Amazon Web Services (AWS) and the benefits the bank is realising through the use of cloud technology. It outlines some considerations that businesses should bear in mind before moving to the cloud or choosing a provider to partner with, as well as highlighting a number of common factors that help maximise the chances of a successful cloud migration. It argues that in order for financial institutions to take advantage of the opportunities technology creates, and manage increasing cyber security risk, they need an IT infrastructure that provides them with greater flexibility at a lower cost. Now that a precedent has been set in the UK, and the Financial Conduct Authority (FCA) has published its final guidance on cloud computing, we will see more financial institutions migrating to the cloud over the next few years.

KEYWORDS: cloud, banking, regulation, collaboration, FinTech

INTRODUCTION

Much of the banking headlines over the last half decade have been dominated by news of customers being unable to access their accounts online, make transfers, withdraw cash or being left temporarily out of pocket as a result of hacks into banks' IT systems. In addition to leaving banks with hefty compensation bills, fines or the need to cover trading losses, these legacy IT issues also tend to have a detrimental impact on banks' reputation and their customer loyalty. The challenge, particularly for traditional

banks, is that they have been built up over decades through mergers and acquisitions, and therefore have complex essential systems that have been patched together over several years.

According to research from Celent,¹ European banks will spend an estimated £46bn on IT in 2017 but only £10bn of that will be on investment in new systems: the remaining £36bn will be spent on maintenance to keep the existing technology running. In January 2017, a large high-street bank issued a profit warning due to

'mounting IT costs'. Legacy IT is one of the reasons more and more financial institutions have been looking to the cloud — globally, 86 per cent of companies are spending at least part of their IT budgets on cloud services.²

In May 2016, OakNorth became the UK's first bank to fully operate its core systems in the cloud. The initiative was described by the media, industry experts and other important stakeholders as a 'landmark move' for the industry³ and came after months of working with Amazon Web Services (AWS) and the regulator to drive the development forward.

THE RATIONALE

In addition to wanting to avoid the time-consuming and costly disruptions mentioned earlier, there were a number of other reasons why we wanted to move to the cloud:

- **Flexibility:** When a bank buys its own infrastructure, it is forced to decide what it wants upfront and then it is stuck with it. With the cloud, however, banks can be a lot more flexible and change settings as they go along. As a new bank, we wanted the freedom to experiment and continuously evolve our offering in line with customer needs and expectations, so the ability to do trial and error, test and experiment is a huge benefit. Added to this, we are able to take advantage of the latest updates in technology at the click of a button without waiting to depreciate existing investments.
- **Speed to market:** Being on the cloud means we are able to make changes to our systems much more quickly than most banks — often in days rather than weeks.
- **Adaptability:** The cloud can handle rapidly increasing workloads — it does not matter if OakNorth on-boards 10

or 10,000 customers, the AWS cloud eliminates the need to try and approximate our infrastructure capacity needs. We can access as much or as little resource as we need, and scale up and down as required within a few minutes.

- **Security:** It is now possible to be more secure in the cloud than on-premises. AWS invests a huge amount in security and has achieved a number of internationally recognised certifications and accreditations, demonstrating compliance with third-party assurance frameworks, such as ISO 27001, ISO 27017 (cloud security), ISO 27018 (privacy), in addition to AWS PCI and SOC 1, 2 and 3 certifications. This enables us as a bank to build secure applications for our customers.
- **Focus:** Using AWS enables us to invest our time, money and energy into those areas that are of greatest benefit to the business — through the time and money saved as well as the fine-grained cost transparency of our use of the underlying services.
- **Cost:** Being on the cloud also dramatically reduces our expenditure on hardware, software and related manpower as it makes it much easier for us to instantly deploy the latest updates to our IT infrastructure.

In 2015, the Cloud Security Alliance conducted research⁴ into banks' perceived benefits of moving to the cloud (Figure 1). Flexible infrastructure capacity was cited by over two-thirds (68 per cent) of banks, while reduced time for provisioning was cited by 63 per cent. Interestingly, only a fifth (19 per cent) of respondents would move to the cloud because they think it offers better security. This was an important reason for us — AWS has dozens of data centres across the globe, which are continuously monitored and strictly maintained.

Primary reason for adopting cloud computing

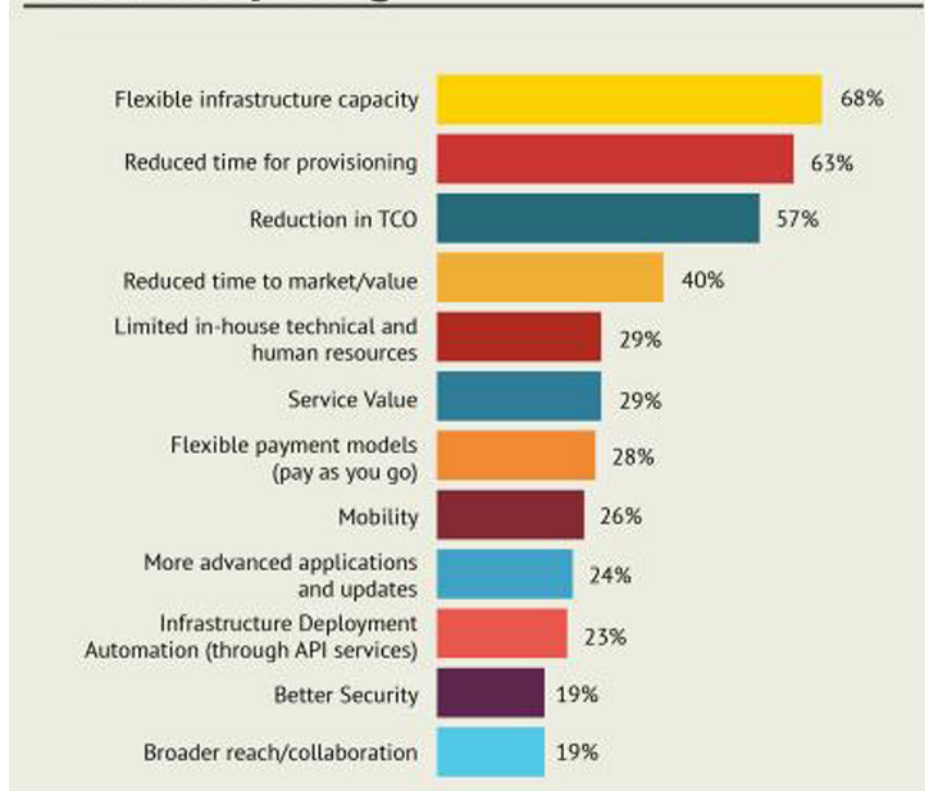


Figure 1: Financial services institutions' primary reason for adopting cloud computing

THE PROCESS

To properly meet the needs of entrepreneurial growth businesses in the UK, we knew that we needed a radically different approach to customer service than what was available from traditional banks. This meant merging the best practices of commercial and retail banking with the technical flexibility and dexterity of an online digital disruptor — we chose Mambu. Like us, Mambu was a start-up, which meant they could be fast and flexible, working with us as we built our technology stack. The platform was developed for cloud, which was helpful as we knew that was where we eventually wanted to be.

When we obtained our licence in March 2015, we wanted to launch on the cloud, but there was no regulatory policy in place so we were unable to launch on the cloud. When we launched six months later, we did so with Mambu (knowing that it was a system that could be easily migrated), and picked up conversations with the regulator again. Over the next six months, with the help of AWS, we worked with the Financial Conduct Authority (FCA) on policy items around data protection, access to data, security and business continuity. As illustrated in Figure 2, these are all areas of concern that are delaying other banks from moving to the cloud.⁵

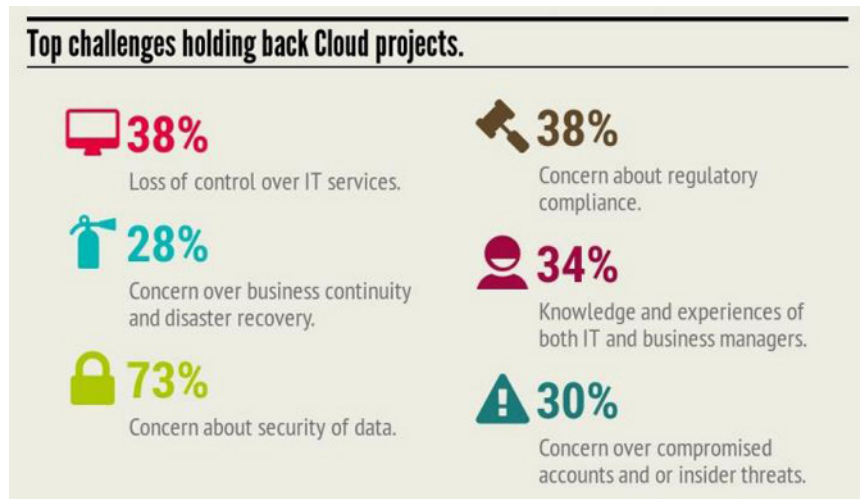


Figure 2: Top challenges holding back businesses' cloud projects

Perhaps unsurprisingly, concerns around data security are the primary reason for many providers delaying moves to the cloud. Financial services companies are constantly under attack from hackers trying to steal sensitive data. According to research report,⁶ 'IT professionals see the top security issues facing their organisations as malware (63 per cent), advanced persistent threats (53 per cent), compromised accounts (43 per cent), and insider threats (42 per cent)'. In January 2017, a big four bank's digital services were impacted for more than 48 hours after a cyber attack from an international criminal gang flooded the bank's website with traffic in an attempt to disable it.⁷ While no customers incurred a financial loss, many were temporarily unable to view their balance or make transfers. The attack came just months after the highly publicised cyber attack of another bank, which resulted in the provider having to pay out £2.5m in compensation to 9,000 customers who had their money stolen.⁸

From a technology perspective, the FCA paved the way for the UK's banks, insurers and other financial services companies to take advantage of cloud computing when it published its proposed guidance on outsourcing to the cloud and other

third-party IT services in November 2015. Two months after we moved to the cloud, it published its finalised guidance and we provided a real-life example of how an FCA-regulated entity could operate in the cloud.

The finalised guidance noted that use of the cloud can provide businesses with increased flexibility, which in turn can lead to more innovation and ultimately benefit the business, its clients and the wider market. It cautioned that with these benefits comes the need to identify and manage the operational risks involved, in particular those around data security. This is because customers will ultimately have less control over where their data is stored — for example it could be in multiple servers around the globe rather than in one physical entity. The guidance therefore outlines a number of areas that firms need to consider as part of their cloud outsourcing or migration process. These include: a clear business case for the decision; risk assessments that identify relevant risks and identify steps to mitigate them; and clarity on the service being provided and where responsibility and accountability between the firm and its service provider(s) lie(s).

The FCA was not the first regulator to give cloud banking the go ahead however — the

Dutch banking watchdog, *De Nederlandsche Bank* (DNB), approved the use of AWS several years ago,⁹ and in the US, cloud banking guidance was published in 2012.

WHY WE CHOSE AWS

We chose AWS as our cloud provider for a number of reasons. When we compared AWS to other cloud providers, they were the only ones able to meet all of our requirements for operational performance and security. This meant AWS was the only option on which we could meet FCA regulatory demands.

In addition, the breadth and depth of AWS' services and their pace of innovation enables us to deliver new services more quickly to customers and take advantage of the latest and greatest technologies as they become available. We are also able to benefit from state-of-the-art infosec at a cost our scale would not otherwise warrant. As a bank, security is our top priority, so this was essential.

Working with a large, international provider like AWS would also give us a geographical scope of servers that we would be unable to replicate on our own (eg servers in Singapore and later in India for our team there, and servers in Ireland for our team in the UK). As mentioned earlier, we were attracted by AWS' cost structure, which gives us the flexibility to scale at our own pace: we pay for the products and services we are using right now, rather than paying for things we think we will need in the future. This is very important because as a new bank, we are consistently reviewing and developing our offering, bringing new products to market and trying to appeal to a broader customer base. In the last quarter of 2016 for example, we launched four and five-year fixed rate bond accounts, as well as easy access accounts, so having the flexibility to scale up and down at a speed has been hugely beneficial. Finally, we simply found that AWS offered the best customer service out of the providers we liaised with.

THE OUTCOME

So far, the experience of moving to the cloud has been very positive; on the retail side, we have raised over £280m from more than 7,000 retail investors, and we have been able to launch several new products without any issues. On the lending side, our loan book has grown to £370m, with almost all of our clients commenting on how quick and efficient our processes are.

In addition, in August 2016, we broke even and began making profit achieving this in less than a year after launching. This is a significant achievement for any business to accomplish within a year, but particularly so here given that banks traditionally carry high overheads. Our ability to do this was largely driven by our technology cost savings and I am in no doubt that had we delayed our move to the cloud, we would not have moved into the black as soon as we did.

The most exciting benefit that has come out of our move to the AWS Cloud so far, however, is what it has empowered and unleashed in the IT team. They are able to benefit from creative freedom at a low cost because the cost of projects not progressing has been significantly reduced. The team can now test and experiment with new products and services and if it does not work, they can just turn it off and there are no assets costing money, or any risk that the usability or security of our platform will be jeopardised.

OUR ADVICE TO OTHERS

Due to the nature of cloud computing, traditional supplier engagement models can be misaligned with a cloud service provider and it can sometimes be a struggle to figure out how to interact or follow existing processes. Having gone through this process ourselves, we think it is important to pick a provider that uses simple contract structures that are easy to understand and update. It is also essential to carry out appropriate due diligence on all providers you are considering. This includes looking into:

location of services, service performance and usability, existing customers (references), data location, processing, portability and recovery, security, business continuity and reputation. In this regard, we found AWS met all our requirements.

Having a clear understanding as to which party will be responsible for data privacy obligations, including data security, is essential. Typically, providers tend to be more willing to take on responsibility for network integrity, while trying to avoid taking ownership for the security of the data itself. In recent years, data protection laws have increased significantly so cloud service providers have been improving their privacy offerings.

Finally, if you are a regulated entity like we are, you will need to take account of relevant regulatory guidance — in the UK, this is the FCA's final guidance published in July 2016.

SOME COMMON SUCCESS FACTORS

Stephen Orban, Head of Enterprise Strategy at AWS, outlined several factors for the successful adoption of cloud computing in a blog he wrote for the company in 2015.¹⁰ AWS has kindly agreed to let us use the blog's content for this paper as follows:

- **Executive Support:** Top-down support is essential for creating meaningful change — whether that change be technical or cultural. It means providing clarity of purpose, and aligning business and technical objectives on desired outcomes. *At OakNorth, we had the full support of the board and the move to the cloud was led by our Chief Operations Officer, Francesca Gandolfo.*
- **Educate Staff:** People tend to be afraid of what they do not know. When they are afraid, they are more likely to cling to what they are comfortable with. In some cases, this can create roadblocks in your journey. Equipping your staff with new skills is a great way to mitigate their fears. Acquiring new talent with the appropriate skills is great, but this method is unlikely to scale on its own. Giving those with institutional knowledge an opportunity to learn and participate will accelerate your journey. You have to get these people to accept change and not fear the worst.
- **Create a Culture of Experimentation:** The cost of experimenting in the cloud pales in comparison to that of on-premises environments. There are little to no upfront costs in the cloud, and no commitments to weigh you down if something does not work out. Some enterprises will start with a single project in a single part of IT; others will tackle many projects at once. Whatever strategy suits your organisation, make sure to celebrate successes and institutionalise what you learn from failures. Coupled with the right executive support, you have an opportunity to create an ongoing culture of experimentation.
- **Create a Centre of Excellence:** With the cloud taking away much of the heavy lifting associated with traditional infrastructure, and being heavily driven by code and automation, the line between operations and development teams is blurring. Moving to the cloud creates an opportunity for organisations to rethink these boundaries and the protocols between them. Most organisations that have moved swiftly through their cloud journey have created a Cloud Centre of Excellence to institutionalise best practices, governance and automation throughout the organisation.
- **Do not rush it:** When migrating to the cloud, it is important to start small, moving over less critical applications such as CRM before going on to essential business applications. *At OakNorth, we started off by moving our ancillary services and once we were happy and confident with the transition, we moved our essential systems over too.*

CONCLUSION

Cloud has the potential to drive business growth without compromising on security, compliance and governance of corporate data. The greater transparency that online banking and the digital economy provide also lead to greater competition between banks, as well as disruption from new entrants. The so-called 'challenger banks' are constantly being questioned as to how they are actually challenging and what they are challenging. Technology is a way in which they are doing this. App-based banks all leverage technology (the smartphone) to deliver a new banking experience to customers. Being cloud-based enables us to bring new products to market faster and at a lower cost.

Now that the FCA policy is in place and a precedent has been established, we are seeing more providers publicly announce their move to the AWS Cloud. For example, in the retail banking space, HSBC has been using AWS for the majority of its new product testing and development.

Not only has moving to the cloud enabled us to achieve much more as an organisation, but it has also given other financial institutions in the UK the

opportunity to follow suit, and they will do this with the reassurance that it has already been considered and approved before with OakNorth.

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