Banking in the cloud: from hype to reality

We believe there are compelling reasons to think that all banks will be forced to move their infrastructure to the cloud within the next ten years. One such reason is that banks are becoming online retailers, where their differentiation will be in the front office and where core banking will run in the middle and back offices as a commodity.

Estimated saving to the banking industry from moving core applications to the cloud

$109bn
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Summary

This document is intended for those in banks responsible for building information systems. That is, the people in the bank that manufacture, distribute and service the bank’s products. The aim of this document is to convince you that, within ten years, either your information system will run on Infrastructure as a Service (IaaS) or your technology costs will be too high. As a consequence, only the largest banks will run their own banking platforms and only the biggest of them will run their own IaaS, while the rest will buy their technology infrastructure from providers, such as Amazon Web Services. Most banks will not even run their own banking platforms, but will use a Software as a Service (SaaS) platform provided by a service provider.

There are two technical reasons and two business reasons why this is so. The technical reasons are that servers are about to stop getting cheaper; and the number of transactions a bank processes is about to increase dramatically. Together, these mean that banks will have to ensure that they remain cost-competitive by reducing their costs per transaction without relying on technology improvements.

If the banks didn’t face competition the technical reasons above would not be disruptive, but there are business reasons to believe that competition may be about to heat up. These are that regulators want to lower the barriers to new banking entrants; and retail customers are no longer loyal.

Together these four reasons for change are enough to force banks to separate their technology infrastructure from their information systems and to run that infrastructure in the cloud.

How that might look for a small retail bank, a medium retail bank and a large retail bank is shown at the end of the paper.

Cloud Savings

According to Deutsche Bank, IT will cost financial institutions, excluding insurance, $460 billion in 2013. Not all of that can be saved by moving to the cloud. About 30% of that is spent on ‘change the bank’ rather than ‘run the bank’ according to the Deutsche Bank report, reducing the $460 billion to $322 billion. Also, only about 50% of those costs are data center costs, reducing the infrastructure cost to $161 billion. According to the Bank for International Settlements there are 1.2 billion deposit accounts. Assuming that deposits and payments are 80% of the costs of the bank, those accounts cost $128.8 billion for a cost per account per year of $107.

We believe you can offer a profitable cloud-based banking service for 1 euro per account per month, $16 a year. So putting all of banking onto that cloud service would cut the cost from $128 billion to $19 billion, saving the world of banking $109 billion a year. Not chump change.

“You wouldn’t think that in an information age the biggest victim would be purveyors of information. But there you go. Newspapers are getting wiped out in part because they didn’t realise they were in the information business—they thought their business was about putting ink onto paper and then physically distributing those stacks of paper with fleets of trucks and delivery people. Papers were slow to move to the Web.”

Daniel Lyons - A Decade of Destruction - Newsweek
Reasons for change

There are changes in process now that will radically alter banking, especially for the large banks currently still running their core banking systems on mainframes and with a branch accounting architecture. These four changes are described in this section.

Servers are no longer getting cheaper

The world changed in 2004. After twenty years of servers and desktops getting twice as fast and halving in price every year, they stopped getting faster, as shown in the diagram below.

This change is not, as often stated, because Moore’s Law has stopped, but rather because Dennard Scaling has failed. Moore’s Law continues, with chips getting denser but not faster.

The chip industry has taken advantage of the continuing Moore’s Law by building chips with multiple cores. But even that strategy looks doomed to fail. By 2020 we will be well into the era of ‘dark silicon’; that is, it will not be possible to run more than 10% of the cores on the chip at once (by 2020 chips should be capable of incorporating 300 cores).

So in 2005 chips stopped getting faster and by 2020 they will stop getting cheaper – no more ‘as cheap as chips’. If just the first change was enough to create Amazon Web Services, imagine the impact of the second change.

There is a specious argument very commonly used when discussing IaaS. It is an argument by analogy. It points out that if you only buy one or two seats on an airplane it is cheaper to have someone else run it. However, if you buy every seat, it is cheaper to run it yourself. So if you have a need for many servers, you might as well run them yourself.

This argument is probably not true even of airplanes. But it is certainly not true of computers. To be able to run your own shared infrastructure you have to spin off the technology infrastructure part of your IT department as a profit centre. This is probably as big a change as moving the workloads to IaaS. What we are seeing now in the battle between Amazon, Rackspace, Microsoft and countless others, is that you have to be open to competition to keep your prices down. An in-house data centre would abuse its monopoly position and charge too much without this competition. Finally, the scale of IaaS is a crucial factor in making it cheap, and no one bank could ever achieve the kind of scale Amazon and the others are attaining. So the profit-centred data centre would have to offer its IaaS to third parties to be open to competition and achieve scale. It would effectively become IaaS, albeit owned by the same holding company as the bank.

References
1. Moore’s Law - chip density doubles every 18 months
2. Dennard Scaling - as transistors get smaller they get faster

Microprocessor clock frequency over time
Increasing number of transactions

Banks are moving from being high street stores (bank branches) to becoming online retailers (websites). The aim for the banks is to move from tellers assisting customers with their financial transactions (transferring funds, making deposits) to the customers doing them for themselves. This greatly reduces the cost to the bank of transaction. Banking is not the first large scale industry to move from professionals assisting the public to the public doing it for themselves. The travel industry moved from travel agents to booking engines like Expedia over a decade ago. What the travel industry discovered was that while professionals have a ‘look to book’ ratio – the ratio of read-only requests to update transactions – of about 5 to 1, members of the public on engines like Expedia have a ratio nearer 1000 to 1. That is, a 200 fold increase in the number of read-only requests.

Banks that have implemented Web banking sites are experiencing a look to book ratio nearer 50 to 1 but the experience of mobile banking is closer to the 1000:1 ratio of travel booking engines. This compares to a ratio for tellers that is more or less 5 to 1 as for a travel agent. So as mobile banking becomes the norm for banking transactions, the banks are going to experience an increase in the number of enquiry transactions approaching 200 times.

There are two consequences of this for banks. The first is, like the global distribution systems in travel, they are going to have to change their architecture to support this number of enquiries, both technically and in business terms. Technically the banks will need new databases designed for high volume query against transaction data. In business terms, banks that provide better quality data will be much more attractive to customers than those that, say, can only show two months of transactions with no aggregation or personal financial management.

The second consequence is that being in an environment where there are 200 times as many enquiries as today for the same amount of business is going to force banks to have the lowest possible costs per enquiry to stay profitable. Even if today’s low interest rate environment moves to higher interest rates, this change is going to make cost per enquiry a crucial metric for profitability.

Lowering barriers to banking entrants

If there were no new competitors coming into retail banking it would not be a problem that banking architecture and implementation needs to change to accommodate higher transaction rates. However, it is becoming clear that regulators are keen to allow new entrants into the banking market. This requires the regulator to lower the barriers to entry which are largely their fault. This includes granting banking licenses more easily and allowing use of IaaS to reduce the up-front capital needs to start a bank.

“As for the film industry, Apple now offers movie studios the same Faustian bargain it made with music companies: ‘You just focus on making movies, and let us take care of digital distribution’.”

Daniel Lyons - A Decade of Destruction - Newsweek
Retail customers are no longer loyal

It has been an article of faith among retail banks for some time that a customer with a current account, a debit card and at least one loan will not move bank no matter how poor the service. If this were still the case, it wouldn’t matter that new banking entrants offer better service, better products and lower costs because the existing customers would not move to the new competitors. However, there are signs that the customers are no longer as loyal as they were. Partly this is because regulators are requiring banks to make it easy to transfer direct debits and standing orders to other banks when customers move their prime banking relationship. Partly too it is because with the information transparency of the Internet, customers are much more likely to look for the best rates for both loans and savings. And partly it is because, in the developed economies anyway, people are much more likely now to have banking relationships with multiple banks, for credit cards, mortgages and savings.

R.I.P.

Companies that didn’t react fast enough to the Internet.

These companies are either gone, going or downsizing. For instance, Amex Travel is just a loyalty driven booking engine for individuals.

Shifting loyalties: banking consumers’ propensity to switch is on the rise

<table>
<thead>
<tr>
<th>Country</th>
<th>Likely to switch</th>
<th>Unsure</th>
<th>Total unsure and likely to switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>70%</td>
<td>33%</td>
<td>12%</td>
</tr>
<tr>
<td>Germany</td>
<td>49%</td>
<td>13%</td>
<td>62%</td>
</tr>
<tr>
<td>India</td>
<td>47%</td>
<td>12%</td>
<td>60%</td>
</tr>
<tr>
<td>Spain</td>
<td>45%</td>
<td>11%</td>
<td>57%</td>
</tr>
<tr>
<td>Mexico</td>
<td>45%</td>
<td>6%</td>
<td>56%</td>
</tr>
<tr>
<td>UK</td>
<td>34%</td>
<td>7%</td>
<td>40%</td>
</tr>
<tr>
<td>US</td>
<td>31%</td>
<td>5%</td>
<td>38%</td>
</tr>
<tr>
<td>Canada</td>
<td>31%</td>
<td>5%</td>
<td>36%</td>
</tr>
<tr>
<td>Australia</td>
<td>28%</td>
<td>5%</td>
<td>33%</td>
</tr>
<tr>
<td>France</td>
<td>26%</td>
<td>5%</td>
<td>31%</td>
</tr>
</tbody>
</table>

Data Source: From Capgemini Worldwide Retail Banking Report 2012 (Worldwide)
As you can see, a very large number of bank customers are unsure or likely to switch banks in the next six months.

Likely to purchase their next financial product from their current provider 20%
Customers who purchased an additional product from their bank in last 12 months 7%
Customers who say they are satisfied with their bank 11%
Customers who would be willing to recommend their bank to friends or family 6%
Customers who complained about their bank in the last 12 months 3%
Customers who switched one or more products from their previous bank 2%

Data Source: http://thefinancialbrand.com/18822/accenture-uk-banking-satisfaction-study/
What banking will look like

Different banks will take different approaches to building their information systems which manufacture, distribute and service the products they sell to their customers. Although we do not expect all banks to follow the approaches shown here, we believe that the majority of banks will end up looking this way.

Small retail bank

We believe that smaller banks will find SaaS increasingly attractive. By smaller banks we mean all but the top 1,000 banks worldwide. These smaller banks include regulated deposit takers, community banks and micro finance banks. There are perhaps 50,000 of these worldwide.

Basic service

The bank pays for a service that manufactures the bank’s products, distributes the products and services the products. In this model the bank buys a core banking service on an ‘account per month’ basis. That is, the bank pays say $1 per account per month. This service provides loan and deposit account creation and servicing. It provides configurable interfaces for front and back office services and standard payment schemes (SWIFT, ISO 8583, ISO 20022). This basic middle office service is shown in the diagram below.

Front office

Retail banks need front office services as well as the core banking service. It would be natural for the banking SaaS provider to offer these as well. These front office services include self-assisted channels such as Internet and mobile, assisted channels such as Teller and Advisor for branch and call center, channel interfaces for ATM and POS and front office services for workflow, document management, case management and reporting. This additional front office offering is shown in the diagram below.

The diagram shows that the bank is responsible for its own front, back and middle office services and is responsible for interfacing them to the SaaS core banking. The only user interfaces offered are for configuration, monitoring, product definition and product deployment.

The basic banking SaaS would not be country specific though the user interfaces would be available in local languages.

The SaaS provider would offer a branded Internet channel and a branded mobile channel for bank customers. The channels would be Internet, phone and tablet based so no server is needed in the bank, the branch or the call center.

For product origination the SaaS offers interfaces to local credit bureaus and fraud services.

The SaaS provider may also provide other front office banking services on a business process outsourcing basis. These might include statements, card manufacture, chequebooks and passbooks.
Middle office
The bank would most probably buy credit card processing from another SaaS provider as is typically the case today. The banking SaaS would need to provide extra interfaces for card schemes ('Base I' message processing) and for card clearing ('Base II' message processing). The SaaS provider might offer standard scheme interfaces as an additional offering. For product servicing it also offers country specific interfaces to local payment schemes for low value payments, high value payments, direct debits and standing orders.

The payments service adds the ability to route and format payments as part of a full payment capability.

The SaaS provider might offer additional BPO for ‘four Rs processing’ – processing financial transactions that do not go straight through (the four “R”s - Rejects, Returns, Refunds and Reversals).

Back office
The bank has to manage its own brand, risk and compliance in addition to running its banking lines of business. So there would be interfaces back to the bank’s own business systems (which may also be running in SaaS) for these areas, typically a Risk interface, a GL interface (for finance) and a Data Warehouse interface (for marketing).

The SaaS provider provides interfaces for local tax and regulatory bodies as an extra offering. These are usually regional or country specific.

The SaaS provider might offer additional BPO for reconciliation of transactions.
Complete service offering
Putting all this together, we see a picture of a small bank being a set of clouds providing all the information systems the bank needs to do what it does. This is shown in the diagram below.

The diagram shows all the software services, all the user agents, all the B2B interfaces and all the BPO.

The diagram shows that Temenos builds all of the services but does not necessarily provide all the products. The platform itself is built by Temenos partners (and may be accessed as Platform as a Service). The clearing, settlement, payments and core banking are provided by Temenos as are most of the user agents. However, three of the user agents are implemented in partner BPM user interfaces.

The model bank is the common element across this and all the other Cloud offerings. In this case Temenos implements all the model bank capability across the Temenos modules and user agents as well as across the complementary offerings (Workflow, CRM etc), the interfaces and the BPO.

In addition to these services, country model banks add in the following:

- Language translations
- Country specific products (AA configuration)
- Regulatory reports and interfaces
- Country Accounting and Tax requirements
- Country specific payment interfaces (clearing schemes) such as SEPA for Europe
Medium retail bank

Of the top 1,000 banks worldwide, we believe that all but 250 of them will find it very cost effective to build their banking information systems using a Platform as a Service (PaaS) offering. PaaS provides a complete enterprise environment in the cloud, but the bank buys, installs and integrates the banking and non-banking modules to provide to the business domains. This means that the bank is responsible for selecting, installing, operating and maintaining all the software products that go to make up the banking service offered to its employees, customers and regulators. The bank will also configure the middleware, though it will not have to select, install, operate and maintain the middleware. The set of middleware it will need to buy is shown in the diagram below.

The diagram shows twelve different middleware services. The banks will not need all of these, though we do expect banks to need most of them. The essential services are the Application Server, the B2B Gateway, the B2C gateway, the Row service and the Column service. The ESB is needed to implement a multi-point integration architecture which is pretty much a requirement now. The ETL and Reporting is needed for business intelligence. The ODS and DWH are needed for heterogeneous reporting. Finally, the HDFS, MDM and CEP are needed for specific domain services such as fraud.

A bank that builds its own platform may be able to offer PaaS and SaaS services to other banks.

Large retail bank

The largest 250 banks worldwide will, we expect, build their own platforms. They will have to convert their data centres into IaaS providers running as profit centres within the bank and supplying computer, network and storage services to both their own users and also to third party users. This is done to ensure that the service utilisation is high and so at the lowest possible cost. Also, by competing with services from other IaaS vendors, such as Amazon Web Services and Microsoft Windows Azure, they will be forced to offer a competitively priced service. In this case, the bank has to select, install, configure, operate and maintain their own middleware. A bank that builds its own IaaS can also consider offering PaaS and SaaS to other banks.
Conclusion

We believe there are compelling reasons to think that all banks will be forced to move their infrastructure to the cloud within the next ten years. These reasons are because banks are becoming online retailers, where their differentiation will be in the front office and where core banking will run in the middle and back offices as a commodity.

Running transaction processing on IaaS looks to be about ten times cheaper now, and is getting cheaper just as data centre operations are becoming more expensive. Within ten years, servers will have stopped getting cheaper just as they stopped getting faster in 2005. For banks to compete for customers on mobile and Internet without these economies of scale will become harder with each year that they don’t make the move to technology infrastructure as a utility.

References


Author

John Schlesinger, is responsible for the direction of the Temenos products given the company strategy, and in particular for the non-functional capabilities of the products and their suitability for all banks, from the smallest to the largest. Previously, he worked in Enterprise Architect leadership positions at Atos Consulting and Capgemini, and in various product and development related functions in a variety of companies, including IBM for 15 years. John has a degree in Physics and Philosophy and a postgraduate diploma in Software Engineering, both from Oxford University.
About Temenos

Founded in 1993 and listed on the Swiss Stock Exchange (SIX: TEMN), Temenos Group AG is the market leading provider of mission-critical software systems to retail, corporate, universal, private, Islamic, microfinance and community banks, wealth managers, and other financial institutions.

Headquartered in Geneva with 59 offices worldwide, Temenos software is proven in over 1,500 customer deployments in more than 140 countries across the world. Temenos’ products provide advanced technology and rich functionality, incorporating best practice processes that leverage Temenos’ expertise around the globe. Temenos customers are proven to be more profitable than their peers: in the period 2008-2010, Temenos customers enjoyed on average a 30% higher return on assets, a 46% higher return on capital and an 8.5 percentage point lower cost/income ratio than banks running legacy applications.

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