

Banking on the Cloud

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Banking on the Cloud

Cloud computing is one of the hottest technology and business topics today, and the market for cloud services is expected to skyrocket in the next few years.

At its most basic, cloud computing can enable banks to reuse IT resources more efficiently—whether they are purchased up-front or rented without any long-term commitment. According to research firm Gartner, this market for cloud services will increase from \$36 billion today to \$160 billion by 2015. Gartner also says 20 percent of companies will be using cloud computing for significant parts of their technology environment by 2012¹.

However, cloud computing is much more than simply renting servers and storage on-demand to reduce infrastructure costs—as many believe. Furthermore, it's not simply a technology issue. In fact, the cloud offers a host of opportunities for banks to build a more flexible, nimble and customer-centric business model that can drive profitable growth and, as a result, should be something that non-IT decision makers at banks understand and appreciate.

So what does the future of cloud computing look like for banks—both in the near and long term? The pundits tend to overestimate the impact of a technology and paradigm shift in the short term and underestimate what happens in the long term. In this paper, we explore some forward-thinking uses of cloud computing in the banking sector and discuss ways we believe innovative banks will be leveraging the cloud for competitive advantage in the next five years.

What exactly is Cloud Computing?

Accenture defines cloud computing as the dynamic provisioning of IT capabilities, whether hardware, software or services, from a third party over the network. Although the term "cloud computing" is relatively recent, elements of the concept, such as timesharing and virtual machines, have been around for several decades. What makes cloud computing real now is the pervasiveness of the Internet and Internet technologies, virtualization, hardware commoditization, standardization, and open source software. A key catalyst is the success of major Internet companies such as Google, Amazon and Microsoft. The highly global and scalable infrastructure these companies have built to power Internet search, electronic commerce, social networks, and other online services forms the core of cloud computing. In tandem, a cadre of capable, credible pure-play firms has emerged—Salesforce.com and Workday among them.

Characteristics of cloud services include the following:

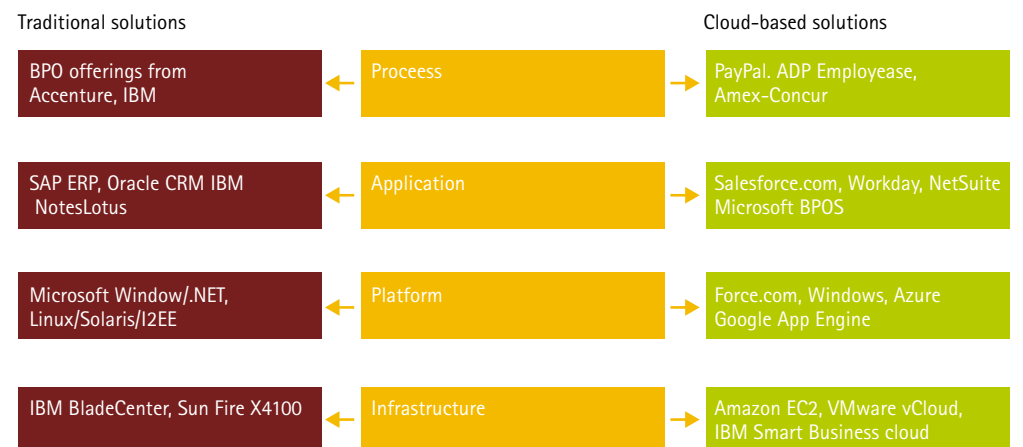
- Little or no capital investment required
- Variable pricing based on consumption; buyers "pay per use"
- Rapid acquisition and deployment
- Lower ongoing operating costs
- Programmable.

Clouds can take two forms: private and public. For most banks, the first major foray into cloud computing will be via private clouds. Indeed, in a survey of IT executives at tier-one banks, 83 percent of participants saw private clouds as their first priority². Private clouds are built within a company's data center and are designed to provision and distribute virtual application, infrastructure and communications services for internal business users. These service components are highly elastic, and expand and contract as needed to meet service-level requirements.

In comparison, public clouds extend the data center's capabilities by enabling the provision of IT services from third-party providers over a network. For example, software-as-a-service, platform-as-a-service and infrastructure-as-a-service—all of which offer virtualized solutions based on a variable, pay-as-you-go pricing model—are emerging as important elements of next-generation IT service capabilities. The increasing importance of cloud computing derives from its fit with current business priorities: It provides the capabilities businesses need on a flexible basis, helping them cost-effectively respond to changing conditions.

By combining virtualization and one-to-many architecture with a pay-as-you-go business model, cloud computing represents a new paradigm that will significantly impact the way IT infrastructure, platform, application and business processes capabilities are procured, delivered and supported (Figure 1).

(Figure 1) Infrastructure, Applications and Processes in the Cloud



At the *infrastructure* level, companies have already begun to source raw computing resources—processing power, network bandwidth and storage—from the outside on an on-demand basis. In most cases, these resources are used to augment rather than replace existing in-house infrastructure, which itself is increasingly virtualized. Unlike traditional hosting services, which provide dedicated hardware to customers, infrastructure cloud providers draw from a pool of shared resources and dynamically expand and contract to accommodate fluctuating demand from different user organizations. As a result, they provide far greater elasticity, economies of scale, and cost advantage compared to standalone datacenters.

At the *platform* level, cloud-based environments provide application developers similar functionalities as in traditional desktop settings. Specifically, these include tools and other support for development, testing, deployment, runtime libraries, and hosting. The emergence of such platforms allows independent software vendors (ISVs) and IT staff to develop and deploy online applications quickly using the third-party infrastructure.

At the *application* level, the first wave of cloud-based services (also known as software-as-a-service or SaaS) falls broadly into the areas of CRM, human capital and financial management. The second wave focuses on desktop productivity tools, including word processing, spreadsheets, e-mail and Web conferencing. Today, application clouds span all major enterprise solution areas, from procurement to enterprise resource planning and content management. These applications run on the third-party infrastructure. Organizations subscribe to these services based on the number of users or seats. Because these services are available via standard browsers, they support device independence and anywhere access.

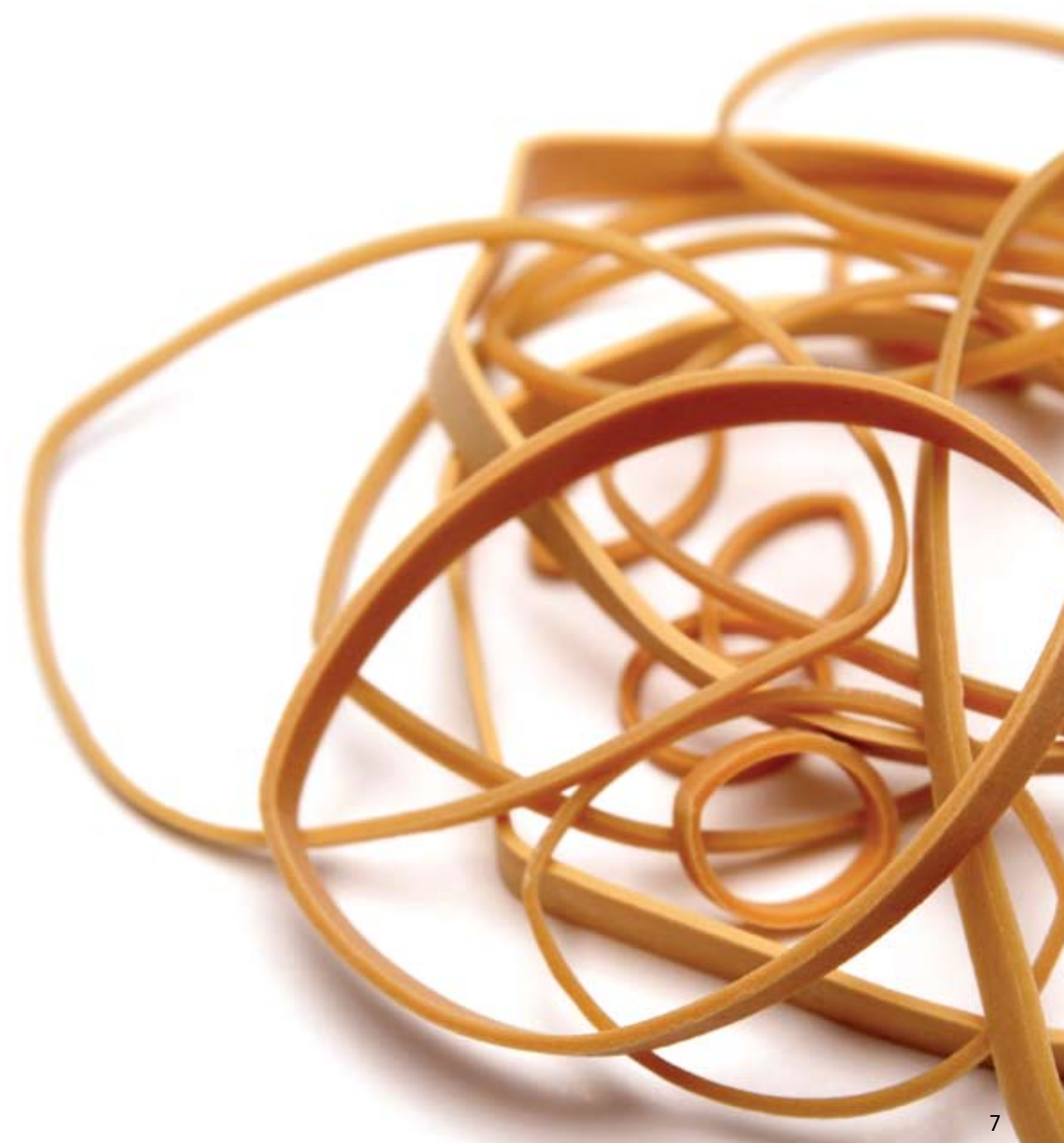
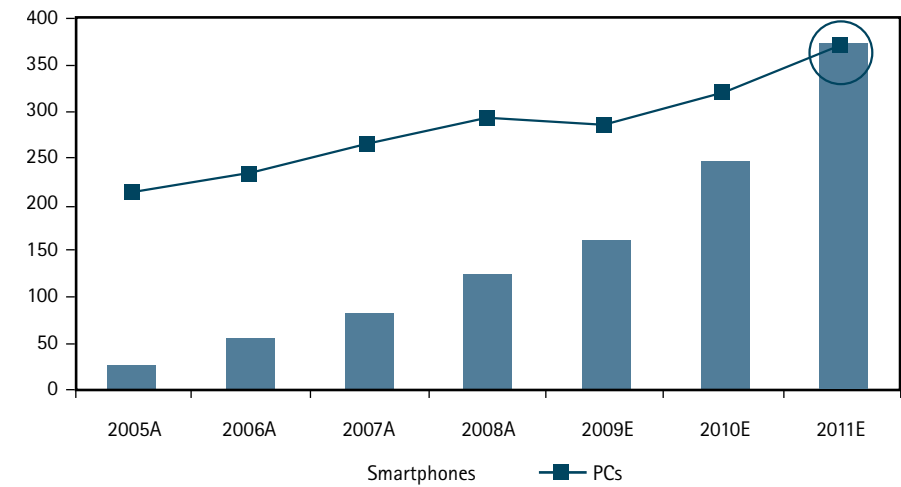
At the *business process* level, cloud-based solutions, also known as business process utilities or platform-based business process outsourcing (BPO), offer an Internet-enabled, externally provisioned service for managing an entire business process, such as claims processing, expense management or procurement.

Unlike traditional BPO, which often requires the service provider to take over an existing software installation, the process cloud uses a common, one-to-many platform to automate highly standardized processes. It differs from application clouds in that it provides end-to-end process support, covering not just software but also processes supported by people, such as contact centers. These processes are typically priced on a per-transaction rather than per-seat basis.

An adjacent technology trend that is most affiliated with cloud computing is mobility. The mobile phone is an information access device that can be easily injected into the value chain to deliver cloud-based services and, indeed, soon will pass the PC in popularity (Figure 2). Smart-phones are increasingly versatile, acting as a wallet or security token. For instance, mobile payments vendor BOKU enables consumers to completely bypass the traditional banking system by enabling them to purchase virtual goods—such as weapons on the “Mob Wars” app in Facebook—by charging the transaction directly to their wireless account instead of a credit card³. In this new world order, there are many avenues to a given piece of content, and devices—in different shapes and sizes—are simply doorways. A key principle of the new paradigm is that users will tend toward whatever access patterns maximize their own convenience and productivity, whether this means reading a transcript of a voicemail on a tablet computer, making a dinner reservation using a video game console, or approving a purchase order by touching the screen of a phone.

While the trend of accessing information and making payments via a mobile phone is not new, cloud computing allows for new entrants that can grow without the massive capital costs. Start-ups can grow very quickly and support a massive influx of customers by scaling on an infrastructure cloud without dealing with any of the legacy system baggage of traditional financial institutions. For example, mint.com brought personal financial management services to its sizable community (1.5 million users as of 2009) using a software-as-a-service business model and offering.

(Figure 2) Smartphone sales to beat PC sales by 2011



Finding cost savings in the Cloud

Indeed, one of the benefits of the cloud—especially in the short term—is lower costs. Accenture, for example, estimates its own IT organization could save up to 50 percent of its hosting costs annually by transferring most of its applications to infrastructure clouds. Bechtel's CIO benchmarked the company's internal data center and storage against those of Google, Amazon and Salesforce.com, and concluded he could greatly reduce his per-unit costs by creating an internal cloud⁴. At the platform cloud level, Bank of America is using Force.com as a way to eliminate many local application servers that are hosting departmental applications.

The cloud also can substantially reduce the time it takes for banks to roll out new applications. For example, SunTrust Bank rolled out its Salesforce.com CRM application to 2,000 employees in just over two months instead of the six to 12 months a typical non-cloud CRM solution would take to implement⁵.

But bank executives should not take cloud savings as a given. They should seek rigorous ROI case studies based on actual cloud usage, rather than estimates of anticipated savings. Hardware, after all, is a relatively small component of data center costs. Executives need to uncover the hidden management, transition, and usage costs that reveal themselves only when organizations start to work with the

technology. They need to evaluate the pricing models of different kinds of cloud services. And they need to work with the finance department to develop a consistent and acceptable approach to measuring the costs and return from clouds. Only then can they reliably estimate the savings.

In addition, a number of factors can play an important role in determining how much money a bank ultimately can save by using the cloud:

- Adopting common standards that make data sharing and movement easier.
- Using standard, "fit for purpose" service levels as much as possible, according to requirements of the specific application.
- Applying security and data privacy restrictions appropriately and, again, standardizing the number of different levels as much as possible.
- Overcoming any departmental ownership issues so as much work can be moved to the shared cloud as possible.
- Taking care to maintain flexibility around procurement to avoid being locked into specific supplier arrangements.

What opportunities does the Cloud create for banks beyond cost savings?

While saving money can be attractive, we believe there is much more to cloud computing than cost reduction. We see four areas in which cloud computing can create significant opportunities for banks to create new business models that are more customer centric and nimble and, consequently, can help banks grow more quickly and more profitably.

Building a Frictionless and Flexible Ecosystem

Cloud computing's most compelling use case for banks likely will be in the way innovative services can be created. The cloud gives banks an opportunity to break apart their own value chain—be it credit approval or back-office fulfillment. A bank can re-configure its business in-real-time by dynamically sourcing from several service providers. For example, an e-invoicing company called Tradeshift allows for dynamic invoices that "pay themselves". The service constantly monitors exchange rates and then automatically sends out an order to withdraw funds or to make a purchase when the process is cheapest.

Cloud services extend into the back office as well. Paypal, while relying on both banks and credit cards in its system, wants to streamline the way money moves. Paypal is not alone. Amazon Web Services and Microsoft Azure are enabling a new cadre of up-starts to think differently about how to stitch together the banking value chain. Twitpay, Zong and Square are new entrants into the payments and transaction processing business and all are aiming to reduce fees and accelerate the movement of money. Nimble application developers are conjuring up the latest cloud services that seek to bypass any entity that slows down steps in both the front and back office.

Another example: Banks will be able team up with other parties (such as telcos and post offices) that can provide the "last mile" to consumers with whom the banks have no existing relationship and who can be difficult to reach. In supporting such teaming, the cloud can offer banks in the future an alternate growth strategy—i.e., a bank will be able to provide wholesale banking services outside of its core geography without having to create a presence in the new region by acquiring an established brand.

One company that already is using the cloud to push the limits of traditional banking transactions is

Britain-based Zopa. According to Zopa's website, the company "is a marketplace where people lend and borrow money to and from each other, sidestepping the banks. It's a smarter, fairer and altogether more human way of managing your money, where both borrowers and lenders get better rates."⁶ While plenty of questions remain about Zopa's business in terms of the maturity and viability of these new models to move money, Zopa is demonstrating the "art of the possible" in using cloud computing to orchestrate business processes outside the firewall.

Consumer Cloud Computing

Banks also will be able to provide a more engaging and relevant customer experience that will enable customers to more easily access and use banking products and services and, thus, help attract and retain customers. For example an application that consumers might find useful on a smartphone and that could be supported by traditional financial services that are now made available by the cloud is "Split the Bill." This would enable consumers dining out together to easily divide the bill among each other. At its heart, such functionality is still the same basic transaction enabled by just a bit of clever logic that sits within the application, plus the required security. But it's afforded by banks' willingness to accept messages in a certain way with a certain level of security around them from a mobile device, and enables consumers to conduct their transaction completely differently (and in a way that is convenient to them).

One of the cloud-based avenues in which banks can engage their customers is social media, which is growing in prominence and popularity by the month. Consider that between March and September 2009, the average amount of time spent on social networking or blog sites increased from one in 11 minutes to one in six minutes^{7,8}. These figures clearly illustrate the rise of what we call the Conversation Economy, the next logical step in the evolution from the Information Economy and Attention Economy. With consumers spending considerable time having online conversations, banks will need to determine how to monetize the time that is spent on these conversations.

Another benefit of the cloud is giving consumers 24x7x365 access to their banks. Process clouds and collaboration clouds can allow experts to

connect to any branch location and become virtual advisors to answer questions about products and services—around the clock and entirely independent of location. Such ability to respond to customers means a bank will never have to say no, maybe or later to a request. Automated and human-directed avatars could further extend the reach of the branch in terms of time, location and product expertise. Collaboration technology will be mandatory to make customer information available at the best point in time and to combine the know-how of multiple experts across multiple banking locations. It all adds up to the ability of branches to create a more compelling customer experience.

Applications When You Need Them

There is a compelling simplicity to a platform-as-a-service and the velocity to drive innovation. The benefits of platform clouds such as Azure, App Engine and Force.com exist mostly within departmental IT. These complete platforms are changing the way software is written. Instead of complex and highly rigid systems they encourage visually compelling and data driven applications.

We believe that in the future, a considerable portion of a bank's applications will be candidates for migration to one or more of the cloud models. New applications certainly will be developed more collaboratively and with the input of business users. However, core banking in a legacy sense will likely have a long shelf life due to legal, risk or regulatory compliance considerations. There will emerge a new

crop of corporate and customer-facing applications that will take advantage of parallelism, new programming languages and the efficiency of the cloud's bandwidth growth potential (Figure 3).

Social networks are themselves a platform for application development and are a key venue for a bank to reach its customer base in different ways. The applications built for these social platforms can be used to enhance a bank's brand, advertise banking products and services and inform and engage customers.

Alternatively, a "private" social network can be developed to enable employees and partners to nurture innovation and the creative process. Applications built using enterprise social software are already available and can be used without any software download. For instance, Confluence—a collaboration tool from software developer Atlassian—now supports the OpenSocial tool, allowing users to pull in gadgets to check Salesforce.com contacts, Gmail, Google Calendar and other items.

In short, banks will need cloud skills to help them choose among platform providers and determine the "glue" across these loosely coupled systems. At the very least, applications in the cloud will be a boon to productivity through the use of cloud data storage and Web frameworks.

The Rise (again) of Analytics

Analytics has always been a differentiator for companies looking for ways to personalize interactions with customers as well as their products or services. Yet many companies still lack mature analytical capabilities, whether it's because they lack appropriate tools or have difficulty sharing, integrating and storing vast amounts of data for analysis.

Cloud computing has the potential to render such shortcomings obsolete. In fact, analytics is really tailor made for the cloud for several reasons:

- The cloud enables banks to store an enormous amount of data and put dormant data to work.
- It provides a cost-effective platform for developing analytics models, reports and driving business intelligence.
- It can enable a bank to work with historical as well real-time or transaction information from a variety of sources.
- It enables banks to churn through vast amounts of data and decipher patterns and anomalies—not only in the past, but also project into the future—much more quickly, efficiently and cost effectively

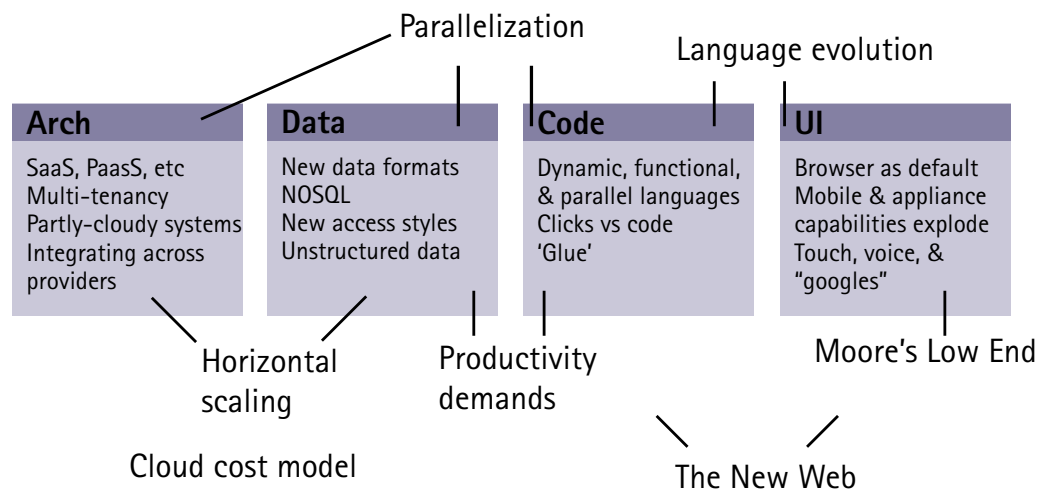
Indeed, cloud computing as a virtually unlimited repository of data is a current reality. Organizations can lease computing power as they need it from Amazon Web Services, Microsoft or Google, or turn to vendors that have built analytics applications on these platforms, to sort through lots of data quickly to make time-sensitive decisions — for example a bank can calculate the risk to its portfolio of currency transactions or analyzing customers' spending, usage and other behavior to identify propensity to switch providers or lucrative cross-selling opportunities.

A number of financial institutions already are capitalizing on today's cloud-based analytical tools. For example, Zions Bancorporation, a Salt Lake City, Utah-based institution with \$53 billion in assets, faced the dilemma of how to rein in the dozens of data marts proliferating around the company. The bank ultimately decided to build a private cloud, based on a data warehouse platform from San Mateo, California-based Greenplum, on which all the distributed data marts will be consolidated. User will still be able to conduct complex data analysis on demand, but will do so in a way that enables the IT function to maintain control over the overall environment. Zion's head of data warehousing and business intelligence expects the new arrangement to reduce maintenance and support costs while giving users a common way to find, access and analyze important corporate data⁹.

Visa, the credit card company, is conducting a trial with Hadoop (a free software that allows the crunching of data in parallel) to dig through two years of test records (73 billion transactions) and 36 terabytes of data to build fraud models. By switching from in-house processing to Hadoop, Visa cut the time it takes to build a fully functional model from one month to around 13 minutes¹⁰.

Banks also can use the cloud to help design their Web personalization engines, customer behavior analyses and data mining algorithms with dual goals in mind: seeking the fastest result and maximizing the return on investment in the use of infrastructure. For instance, Maybank Berhad was recently recognized by research and advisory firm Financial Insights for Innovation in Analytical CRM for its efficiency in using advanced data mining that is enabling the bank to analyze, understand, predict and influence customer behavior throughout the customer life cycle.

(Figure 3) Loosely coupled systems



Having confidence in Cloud Computing

For good reason, security and data privacy remain prime concerns for cloud implementers in the banking sector, according to several studies¹¹. The fear of having their data “in the cloud” is the single greatest hurdle that banking leaders must overcome to build trust and gain the benefits from cloud computing. Indeed, especially given that the cloud is a true “multitenanted” environment, CIOs are concerned that their data could be stolen or compromised by hackers, mixed with data from their cloud providers’ other customers, or released by mistake.

Many banks today have very specific challenges in areas of security and data privacy. Their existing IT estates consist of highly fragmented landscapes of security and data privacy approaches and policies taken across different functions or business lines. This in turn carries a lot of risk and cost. Using the move to cloud computing to drive more

consistency and automation in security and data privacy may actually provide a catalyst for driving greater security and reduced costs.

Banks need to adopt a very practical approach to security and data privacy in the cloud. Most banks tag data with different levels of sensitivity, from low level (published widely with no restrictions) to ultra secure (only accessible by top decision makers). In the same way, banks will need to design their cloud to have similar and appropriate security built in, through a managed combination of both private and public clouds. So, for example, low level data and access may well be suitable to go onto a public cloud infrastructure service with simple password access, whereas highly sensitive data may require dedicated servers housed in ultra secure data centers with strong authentication required for access. There will be several different levels of security in between.

Making the Move to the Cloud

It will take time for banks to make the transition to cloud computing. Executives are still grappling with its risks, possibilities, and the cost of writing off current IT investments. As well, the thorny issue of integrating existing legacy applications that will remain in house with those sent to the cloud is one that needs to be addressed.

Still, a transition to a hybrid of cloud and conventional computing is underway. The capabilities and potential savings from clouds are too great to ignore. In addition, software developers and venture capitalists will be drawn to this new market. The low development cost, short development cycle, and quick return on cloud services are irresistible. This means future IT advances and innovations are much more likely to be based on clouds than conventional computing. The critical issue isn't whether cloud computing will become a fundamental technology in the next decade. It is how successfully banks will profit from the capabilities it offers.

As they plan their migration to cloud computing, bank executives should consider the following actions.

Ask hard questions and demand data-based analyses regarding cost savings. Don't assume automatic and substantive cost savings. Do an ROI analysis. Consider conversion and ongoing costs as well as savings. Don't be intimidated by the jargon. Experiment or pilot on low-hanging fruit such as workgroup applications, or on a non-mission critical, nonintegrated application. Then be ready to scale once you've proven the benefits are worth it.

Understand the condition and scope of your entire application portfolio and create a prioritized list of which should go to the cloud and when. Security and regulatory concerns undoubtedly will play a major role in determining which applications can move to the cloud and which likely will always have to remain in house. However, another determinant is the lifecycle of the application. If, for example, a bank knows that one of its applications is due for a major upgrade program in two years, that could well be the trigger point to move it to the cloud because it would be worth the investment to recompile the application onto a new platform. Thus, it's helpful for banks to create a sort of decision tree around their application portfolio,

that includes identification of interdependencies among them, that is based on the lifecycle of all applications—when each will require an upgrade or replatforming due to age or functionality. In other words, a very measured, longer-term evolution, rather than a mass migration, of applications to the cloud makes the most financial sense.

Establish a clear governance structure for cloud computing. Many organizations have rules and structures in place that govern how IT decisions are shared between departmental leaders and IT executives. Use them (and if they don't exist, create them) to decide who inside and outside the IT organization should be engaged in decisions on cloud computing, and what decision making rights and responsibilities they have.

Inspect what you expect. When dealing with the cloud, service-level agreements are crucial because cloud computing entails reliance on third parties. Thus, choosing a service provider that meets a bank's SLAs is vital. Furthermore, SLAs are important because cloud services are more measurable and can be shared and orchestrated. For instance, a bank can replace one service provider with another, depending on its business and IT requirements, and will be able to manage demand and capacity in a very granular level with a flexible sourcing strategy.

Keep cloud efforts on track. Make sure cloud computing receives the focused thinking, planning and follow-up it requires. Identify and address both immediate and longer-term business needs and opportunities that lend themselves to cloud computing, develop a plan for using public and

perhaps private clouds, and gain the capabilities the plan requires. Make sure the organization senses and responds appropriately to the impact clouds are having on their operations.

Set the standards for success. Provide the necessary oversight to the IT organization. Make sure goals and deliverables are well understood, and projects are well aligned with business needs. Clarify how the value from cloud computing is to be determined: which quantitative and qualitative benefits are sought? And consider what else constitutes success besides value achieved and projects completed: skills developed, partnerships established, and risks addressed.

Provide the necessary support. Besides financial resources and technical talent, support other activities that will underpin the success of cloud initiatives. For example, organizations may benefit from a community of practice or a cloud program office to develop the skills and share the experiences of people engaged in cloud projects.

Buy cautiously, appraise frequently. It's too early to predict who the major cloud providers will be in a few years, what capabilities they will deliver, when they will deliver them, and how well. So when selecting cloud providers, carefully consider whether they have the potential to be a desirable partner in the future. Even after they are chosen, evaluate your partners on their financial stability, as well as their ability to improve functionality and service levels, to integrate data across different technology platforms and cloud services, and to deliver on their promises.



A journey not a destination

Despite banking executives' current reluctance to embrace the cloud, we believe cloud computing offers banks enormous potential to not only substantially reduce the amount of money they spend running IT, but also to dramatically improve how they attract and retain customers and expand the markets they serve.

Security is a major and legitimate concern. However, it is clear that cloud providers are investing in capabilities that will allow them to adhere to higher standards of security and data protection—and in the future those standards will likely meet or exceed those held by internal operations.

The important thing for bank executives to remember is that cloud computing is a journey, not a destination, and that it alone does not render sustainable competitive advantage. Like any new technology, early adopters do gain some advantage over those taking a "wait and see" attitude. But that initial advantage is fleeting, lasting only as long as the rest of the pack catches up. Banks that generate lasting advantage are those that capitalize on the cloud's lower costs, unlimited capacity and flexibility to continually develop innovative products, services and channels.

About the authors

Daniel Benton

Daniel is responsible for Accenture's Systems Integration and Technology consulting businesses in EALA. He leads Accenture's financial services industry group and provides insight into the use of technology capabilities in support of FS client priorities. He works with multi-national clients to shape and deliver their technology agendas across their business lines.

Previously, he has held leading roles in the delivery of large IT-enabled business transformation projects for FS institutions in the UK and South Africa.
daniel.benton@accenture.com

Walid Negm

Walid is Director of Accenture's Cyber R&D group and is based in Washington DC. He is a member of Accenture's Technology Labs and has global responsibility for the creation of cyber and cloud security offerings. He has deep experience in managing risks across complex IT systems with a focus on the impact of emerging technologies for government and critical infrastructure clients.
walid.negm@accenture.com

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