Innovating financial services with improved digital customer experience
The market for financial services is shifting with globalization and consumers’ embrace of digital technologies. New channels threaten traditional incumbents, with competitors entering into financial services with new approaches such as online-only banks. There are alternate payment approaches, such as wallets and smart credit card processors, as well as online lending providers and automated investment advisors that are using new business models to compete. At the same time, customers’ expectations are rising across the board, demanding a more personalized relationship similar to the ones provided by fully digital companies.

It’s no wonder that Gartner’s 2017 survey ranked digitalization as the top business priority for financial service providers. Financial services firms are embracing digital as an opportunity to innovate with new customer-focused service lines and alternate business models. They need to unify their complex and often multinational networking environment, the result of mergers and acquisitions as well as organic growth. Software-oriented approaches, including software defined networking (SDN), software defined wide area networking (SD-WAN) and software defined security (SDSec) will give them full visibility and control of any legacy and virtualized network elements. Pairing software-defined connectivity with a multi-cloud architecture for hybrid and distributed cloud functions creates a single “infrastructure as code” software stack that encompasses both open source and big data. This new, rich stack can be fully leveraged by DevOps methodologies to create innovative new applications and services. Their cloudified, software-defined network becomes a foundation for innovation and a more personalized customer experience.

Nokia and financial services
At Nokia we are a global leader innovating the technologies at the heart of our connected world. We understand that smart, dynamic, application-friendly networks will be the foundation for the digital transformation of society, including our financial services sector. The Nokia Bell Labs Future X architecture is a connected, digital platform that supports and fosters new applications and services enabling innovation, and richer, more enhanced experiences.

As a leader in mission-critical communications, we believe that providing this dynamic, connected platform is the best starting point for achieving smarter, more flexible development environments for the rapid creation of the services offered by financial services companies. It is the architecture needed to drive tomorrow’s agile, software-defined-everything IT environments. We are committed to providing the technology, know-how and partner offerings needed so that finance companies can realize their goals and take their business to the next level.
The market for financial services is expanding with new online players, competitors from adjacent sectors and new business model options. Digital customers are more demanding and less loyal. Some countries are mandating the exposure of financial data to third-party aggregators, so that consumers can monitor more than one account held with different financial institutions or seamlessly instruct their bank to make a payment through a third-party online payment application. These and other changes are opening the market to purely online providers and putting revenue from the most lucrative services, such as payment processing, at risk. These and other changes related to the digital transformation of the financial services sector are driving organizations to make digital service innovation a priority. In the past, financial institutions have benefited from the inconvenience of shifting accounts to retain customers. They now have to match the convenience and customer-focused approach of online providers. This includes unifying the customer experience across branches, mobile applications and online, as well as using personalization to make more relevant and timely offers.

Innovation in financial IT systems and software development, in particular, has been restrained by legislation. Since most financial services companies are still using networks and systems built decades ago, legacy modernization is uniquely on the top 10 list for financial services as compared to other industries. Gartner reported that financial service providers will expend 31 percent of their budget on digitalization in 2018, up from 21 percent in 2016.

Increasingly, financial services firms have to embrace rapid, agile methods for software development, such as DevOps. Used in the online world, DevOps is a method for innovating new services that can be released and developed incrementally without long, internal testing and, often, recoding before being placed into production. Features that are not embraced by users can be changed quickly and more popular ones just as quickly expanded and improved.

The top 3 strategic business priorities in financial services

1. Digital business/digitalization
2. Customer focus
3. Growth/marketshare

Total budget banking and financial services will spend on digitization in 2018. Up from 21% in 2016.
Insurance will spend 26% in 2018 up from 18% in 2016.

1 Source: Gartner webinar “Driving Digital Innovation in Financial Services”, 2017
2 Source: Gartner 2018 CIO Agenda Survey
One of the barriers to achieving this kind of agility in the traditional world of financial services is the complexity of their networks. Along with the longevity of systems and protocols, there is often a crazy quilt of legacy systems from mergers and acquisitions. This complexity creates a barrier to execution of DevOps style innovation. Fortunately, SDN can provide a unified or converged overlay to all the legacy systems and provide developers with a single environment from the data center (DC) across the WAN to branch offices and public clouds. It is even possible to provide a consistent network environment across a variety of WAN providers and physical media such as fiber, copper, cable or wireless. And software-defined architectures, such as the Future X architecture, emphasize modern, consistent APIs — an item that is uniquely on the top 10 technology list for financial services per Gartner.

Security also poses issues for this new software-defined financial services model. Perimeter security has long been sufficient given the closed system nature of financial networks. With IT innovations, such as virtualization and container approaches, multi-tier application architectures and public/private hybrid clouds, the attack surface for intrusion has grown geometrically. In addition to hacker and insider threats, distributed denial-of-service (DDoS) attacks on mobile and online services can significantly impact financial services firm revenues. To counter all these threats requires a multi-layered approach to security that protects all applications, devices and infrastructure (including voice). Protection must start at the initial network connection, even within the hypervisor, and extend all the way to the most remote WAN or public cloud server. Ideally security software can detect changes to the device accessing the service and provide dynamic security in real time. This software-defined network from DC to branch office and cloud provides an agile platform for developing financial services quickly and securely.

“Digital transformation and its related technologies, such as APIs, are more important for banking than for other industries,” said Pete Redshaw, managing vice president at Gartner. “Banks and other banking and investment services organizations clearly recognize that the status quo is not sustainable, and they must disrupt themselves before it is done to them.”

Gartner 2018 CIO Agenda Survey

First priorities for various industries⁴
(by percent of companies surveyed)

<table>
<thead>
<tr>
<th>Priority</th>
<th>Banking</th>
<th>Average for all industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital/business transformation</td>
<td>26%</td>
<td>17%</td>
</tr>
<tr>
<td>Artificial intelligence</td>
<td>8%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Source: Gartner 2018 CIO Agenda Survey
The Nokia Bell Labs Future X architecture for financial services provides an intelligent, dynamic network and cloud-based platform as the foundation for more agile development of consumer-centric services. This smart platform will interconnect all of the individual systems, processes and activities, and provide integrated analytics, machine learning and digital support for innovative new applications and business lines.

At the deepest level of the Future X architecture lies dedicated universal broadband connectivity, both wireless and wired, making every kind of communication and information exchange possible if needed to supplement existing networks. It uses SDN and virtual network functions and orchestrates all virtual and physical network elements to provide a dynamic mesh fabric.

Cloud is essential to the Future X architecture, ensuring the flexibility, scalability and universal availability of both data and intelligence. The architecture can leverage any mix of private and public clouds across the WAN for both cost...
efficiencies and the ability to provide “burst” capacity for very large but infrequent workloads such as monthly statements.

Built into the Future X architecture are data processing capabilities and analytics, including machine learning and artificial intelligence systems. These play a critical role in improving reliability, identifying and even predicting outages and better managing and maintaining assets. The platform includes analytics, device management, digital operations and machine learning; together they provide a digital value platform that can be leveraged by many financial services applications such as those shown.

We believe that the Nokia Bell Labs Future X architecture will help financial services companies to meet the challenges and opportunities of digital transformation. It will also help to unify their operations, increase efficiency, lower costs and improve asset utilization. Most importantly, it will provide a single, consistent software platform for accelerating service innovation, supporting third-party integration and creating a more all-around customer-centric experience.

The Future X architecture provides a single, consistent software platform for accelerating service innovation, supporting third-party integration and creating a more all-around customer-centric experience.
Public-private hybrid clouds
Financial services firms typically have multiple DCs with semi-independent operations along with links to one or more public clouds. The resulting environment, even if optimized at the DC level, can still be unwieldy and costly to manage. That’s why IT organizations are often caught between matching public cloud capabilities in-house and being able to afford or secure operations on the public cloud. The Future X architecture overlays even the most complex enterprise environment and transforms it into a best practices cloud without forklift upgrades. By federating this unified environment across DC and the WAN, even the most complex enterprise environment is transformed to a best practices hybrid cloud.

Unified operations
Financial services firms typically grow organically and via acquisitions. As a result, within the firm there can be multiple DC, WAN and public cloud environments, each with their own complexities and strengths. Typically, IT teams struggle with ongoing operations challenges and often do not have the time to redesign, migrate and replace the entire environment. The Future X architecture overlays even the most complex enterprise environment without forklift upgrades, providing globally consistent operations. By federating this unified environment across DC and across a unified WAN environment, each subsidiary, DC and application can get fast and reliable performance worldwide.

DevOps
Financial services firms have complex environments that make it difficult to develop a globally consistent experience for customers and partners. While operational silos provide operational efficiencies or isolate a network environment for an acquired company, they get in the way of full digital transformation. IT organizations face a quandary — how to transform operations without a complete rip and replace of each silo. The Future X architecture aggregates operational silos under a virtual software-defined network layer that leverages best-of-breed commercial and open-source products. Broad environment support includes multiple virtualization approaches, such as VMware, KVM, Xen, and containers and cloud management systems, such as OpenStack and VMware. All of the above helps transform legacy to a global DevOps cloud – without rip and replace.

End-to-end security
Cloud, webscale and distributed application architectures geometrically increase the security exposure surface. Virtual machines and containers increase east-west exposures within the DC, while physical taps are a constant threat. And, the more layered the architecture, the greater the exposure. As complexity rises, it’s increasingly hard not to make errors that hackers can exploit. The Nokia Bell Labs Future X architecture combines multi-layered security with cutting-edge networking technology to deliver a cloud infrastructure that protects mission-critical communications and operations while reducing costs. Each security component is entirely cloud-ready to handle the complex multi-layer and multi-site needs of cloud-native applications and to manage high and variable scalability.

Use cases for financial services
To prepare for another century of progress, the Bank’s mission was to become the world’s “Go-To” bank for a wide variety of financial services. To address its strategic goals, it had to deliver an integrated online financial presence for all customers and trading partners. Built around six datacenters (DC) worldwide, the architecture had to support all applications and environments currently in use, including multiple cloud management systems and hypervisor platforms, as well as bare metal servers and applications. Requirements included the ability to scale to a very high number of virtual machines spread across a substantial number of hypervisors for high elasticity to handle both periodic and unpredictable demand spikes — all with the highest levels of security and compliance.

The Bank built an entirely new architecture with the help of Nokia and other strategic partners. It transformed tasks formerly accomplished by special purpose hardware into software-defined network (SDN) services based on the Nokia Bell Labs Future X architecture, which overlays and unifies the entire cloud. From an orchestration perspective, the open source project OpenStack provides overall coordination over the private cloud. While KVM is the hypervisor chosen, the ability to implement multiple hypervisors is of high value. Overall, the private cloud fabric unites the six DCs, and all applications and services will be migrated to this environment. Over three years, migration efforts and organic growth will result in a 300 percent increase in the number of supported virtual machines, without requiring any re-architecting of the design.
Solutions for agile financial operations and services

As a leader in financial services communications networks, we believe that the Nokia Bell Labs Future X architecture is the best starting point for achieving advanced digital transformation of financial services IT. Nokia is well placed to support financial service providers with six of the top ten banks worldwide as customers.

Complementing our portfolio of financial services solutions, Nokia also contributes its professional services to help you leverage your technology platforms for significant transformation and growth. Bell Labs Consulting will help you with planning for the future and understanding the business case benefits of new technologies using a structured methodology for establishing quantifiable outcomes for your digital operations.

networks.nokia.com/industries/financial-services
About Nokia
We create the technology to connect the world. Powered by the research and innovation of Nokia Bell Labs, we serve communications service providers, governments, large enterprises and consumers, with the industry’s most complete, end-to-end portfolio of products, services and licensing.

From the enabling infrastructure for 5G and the Internet of Things, to emerging applications in virtual reality and digital health, we are shaping the future of technology to transform the human experience.

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