

OPTIMIZING HIGH PERFORMANCE APPLICATIONS:
WHAT YOUR BUSINESS CAN LEARN FROM THE
FINANCIAL SERVICES INDUSTRY

Stratecast

F R O S T  S U L L I V A N

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INTRODUCTION

Businesses of every size and industry are racing to adapt to the new digital economy. They are changing their processes, operations, and even products and services, to leverage the torrent of new business-enhancing technologies, including analytics, artificial intelligence, Internet of Things, and mobility. The stakes are high: businesses understand that those who fail at “digital transformation” will likely not survive. In a 2016 Frost & Sullivan survey, over half of CEOs worldwide cited the threat of competitive disruption as their top business challenge. At the same time, 54% say they lack confidence in their organization’s ability to keep pace with escalating customer demands for innovative solutions.

In the digital era, responsibility for achieving urgent business goals (e.g., agility, speed to market, security and compliance, and innovation) falls largely on the IT organization. Forward-looking IT leaders understand that it’s no longer sufficient to invest in a technology solution; they must also invest in a flexible infrastructure foundation that will support the fast-paced future.

No industry is more attuned to the opportunities—and threats—posed by digital transformation than the financial services industry. Financial firms are embracing innovative technology solutions as a hedge against competitive disruption. The most critical solutions may leverage mobile access, advanced analytics, automated processes, integration tools, and sophisticated management capabilities.

At the same time, IT and business leaders in financial firms must address escalating expectations from customers, shareholders, and regulators. All applications and workloads (not just new ones) must be configured to:

- Comply with increasingly stringent regulatory mandates that vary by geography, and that may change at any time.
- Protect sensitive customer data, as well as their own intellectual property, from the growing risk of loss or breach.
- Ensure that increasingly intelligent customer-facing and internal applications are always available, consistent, and fast.
- Respond quickly to competitive and market conditions.
- Meet business needs for cost-effectiveness.

As new, complex, and high-performance applications and databases proliferate, they can overwhelm traditional data center and cloud infrastructure. Therefore, IT leaders in successful financial service firms are investing in a next-generation hybrid infrastructure foundation: one that is flexible, agile, intelligent, and cost-effective.

Of course, such needs are not limited to financial services: firms of every size, in every industry, rely on critical applications to run their business. Few businesses can avoid the pressures of competition and cost; and nearly all understand that the way they implement technology can mean the difference between success and struggle.

In this paper, we share infrastructure best practices utilized by forward-looking financial services firms, with a checklist that can guide data center decisions by any company in any industry that wants to prepare for the future.

ON-PREMISES DATA CENTER VERSUS PUBLIC CLOUD: WHAT FINANCIAL SERVICES FIRMS KNOW

When the public cloud first burst into the market, financial services firms were slow to adopt the new model. In a 2011 Frost & Sullivan survey of IT decision-makers, only 7% of financial firms said they utilized the public cloud—about half of the adoption rate of all businesses. Furthermore, 36% of financial firms that year said they had no plans to adopt the new model. Firms cited concerns about security, compliance, application performance, and data center resiliency as their primary restraints.

Today, financial services firms have caught up with other industries in terms of public cloud adoption, with just over 50% of financial firms using public cloud for one or more workloads in 2017. But financial firms are showing no signs of displacing the on-premises data center. Even as they place more workloads in the public cloud, financial firms continue to invest in their private data centers at a higher rate than most other industries. In a 2017 Frost & Sullivan survey, 43% of financial firms say they plan to significantly increase capacity in their on-premises private clouds, compared with just 35% in other industries.

Financial services firms have also edged past their colleagues in other industries in hybrid cloud adoption. Thirty percent of IT leaders in financial firms say their company has adopted a fully functional hybrid cloud strategy (defined as multiple infrastructure environments, including on-premises and multiple clouds, integrated via a common management platform); whereas just 21% of firms across all other industries have done so.

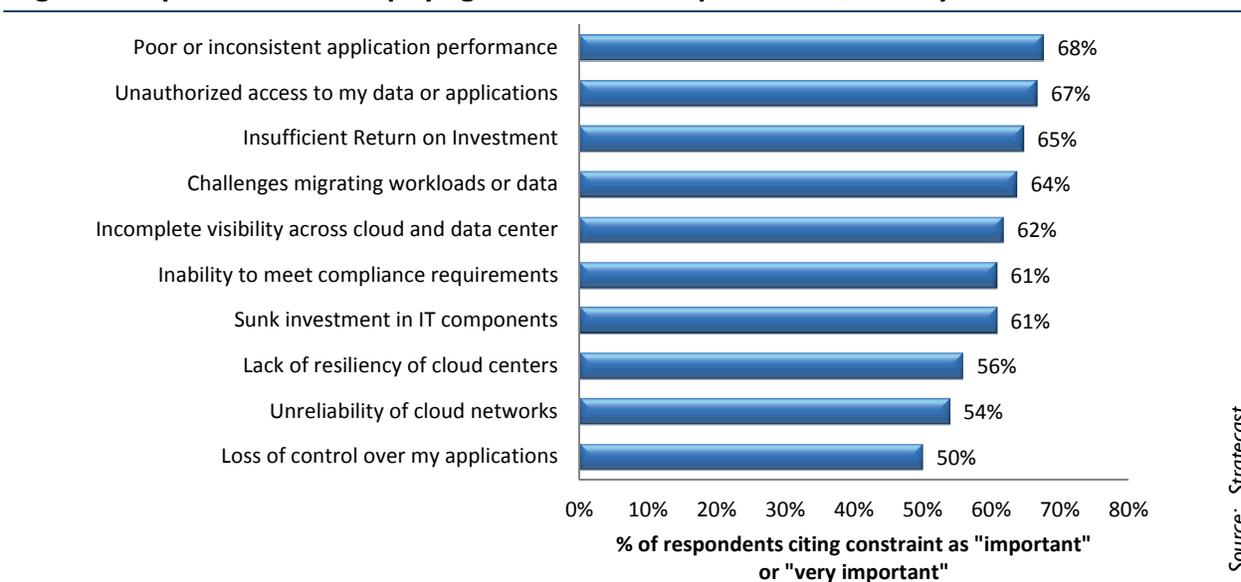
What do forward-thinking financial firms know about the cloud—and optimal deployments on premises—that other firms may not?

Why Financial Firms Reject Public Cloud for Critical Applications

As financial firms deploy their hybrid environments, they tend to be very conservative about deploying critical workloads in the public cloud. In fact, just 5% of financial services firms surveyed by Frost & Sullivan entrust their proprietary platforms to a public cloud environment.

There are a number of reasons financial firms decide *not* to deploy a workload in the cloud, as shown in Figure 1.

Figure 1: Top constraints to deploying a workload in the public cloud, cited by financial services firms



The extensive list of “important” constraints indicates that financial services firms perform extensive due-diligence in assessing workloads for optimal infrastructure placement. Criteria they consider include:

- **Application performance:** Topping the list of constraints to public cloud deployment is application performance, cited by 68% of financial services firms (but just 58% of firms in other industries). For performance-sensitive applications—from algorithmic trading platforms to customer-facing mobile and online banking apps—savvy IT leaders understand that the public cloud introduces latency and inconsistency that can be engineered out of on-premises data center configurations. In the public cloud, application performance is always “best effort,” since it is impossible to know which other users and workloads are contending for server resources at any given time.
- **Security and compliance:** 67% of financial firms cite concerns about data breaches (“unauthorized access to my data”) in the public cloud. In a multi-tenant cloud environment, ransomware or other types of breaches can potentially be introduced by any tenant sharing the infrastructure. Without control over the server infrastructure or the “neighbors” sharing it, financial firms can be limited in their ability to guard against malware. Similarly, 61% of financial decision-makers cite concerns about complying with a host of evolving and region-specific regulatory mandates regarding data handling and storage. Although cloud service providers have increased the number and scope of compliance certifications in recent years, financial services firms understand that, according to the law and public opinion, the customer—not the service provider—bears responsibility for security incidents.
- **Unreliability of cloud centers and networks:** For applications that require high availability and consistency, many financial firms are unwilling to rely on the best-effort Internet and public cloud. More than half of survey respondents cite “lack of cloud center resiliency” and “unreliability of cloud networks” as playing an important role in the decision not to deploy a workload in the cloud.
- **Return on Investment (ROI):** All IT leaders factor costs and value into their workload placement decisions. Often, when due-diligence is completed, decision-makers understand that a high-performance workload makes more financial sense in the on-premises data center than in a cloud center. Sixty-five percent of financial firms cite “insufficient ROI” as an important reason not to deploy a workload in the public cloud; and another 61% point to a preference to continue to leverage existing data center infrastructure.
- **Loss of Control:** In determining optimal placement of critical or high-performance workloads, many of the criteria for rejecting public cloud come down to lack of control. Half of financial firms cite “loss of control over my applications,” and 62% cite “incomplete visibility” as reasons to avoid the cloud. With limited visibility into infrastructure and processes, and very few tools to “tweak” configurations, financial firms are reluctant to place blind faith in the cloud service provider’s infrastructure and processes. In contrast, by placing their most important workloads in the on-premises data center, IT technicians can install the optimal infrastructure solution, configured and honed to deliver the needed level of service for each workload.

What All Firms Can Learn from Financial Services about Cloud

Don't approach your hybrid cloud strategy as a journey that will end in public cloud. Instead, assume your hybrid IT environment of the future will comprise a range of on-premises data center and public cloud resources. With a range of deployment options at your fingertips, be sure to conduct due-diligence to assess the optimal environment for each workload, based on business priorities and workload characteristics. For example, you may utilize public cloud services for test & development or low-impact applications, but deploy critical and high-performance applications on premises.

BUILDING A DATA CENTER THAT OPTIMIZES APPLICATION DELIVERY: A CHECKLIST

IT executives in leading financial services firms understand that the right data center infrastructure is essential to optimizing application delivery and maximizing business value. The data center needs to be flexible, to optimally support a wide range of applications with diverse needs; scalable; adaptable to dynamic business conditions; and efficient, to maximize system utilization and costs.

But data center infrastructure is not a “one size fits all” purchase; nor is it reasonable for any firm to do a rip-and-replace overhaul of the entire data center. Instead, IT leaders in successful financial firms consider the characteristics and requirements for each workload, and deploy them on infrastructure that optimizes delivery and performance.

IT organizations in every industry can benefit from a best-practices approach to infrastructure selection and application deployment. Start by identifying **top priorities** for each application, based on **workload characteristics** and **your own business goals**. Then, identify the best infrastructure configuration to deliver on the goals. The following checklist can help you get started:

Transaction speed and consistency: Performance-sensitive applications require fast, consistent processing, with minimal latency and jitter. In the financial services industry, such applications include algorithmic trading platforms; in other industries, examples might include data analytics, artificial intelligence, and real-time monitoring and control.

- ✓ **What to look for in an infrastructure solution – to support high frequency, high performance transactions, insist on:**
 - Servers engineered to support the latest-generation processors, such as Intel® Xeon® Scalable Processors, for fast, consistent processing of transactions.
 - High-performance, low latency network interface cards and switches.
 - Next-generation flash storage, which delivers consistent, fast throughput to support high-speed analytics and data processing.
 - Scalable software-defined networking to maximize throughput for latency-sensitive applications.

High availability: In the digital era, most businesses operate 24x7, and downtime for critical applications presents a business risk. Financial firms often support round-the-clock mobile and web transactions. In other industries, any critical customer-facing portal (e.g., e-commerce or e-care sites) requires high availability.

- ✓ **What to look for in an infrastructure solution:** Choose next-generation infrastructure that is designed to be resilient, resulting in a low failure rate. The right solution also is easy to maintain (thus minimizing planned downtime), and offers automated bursting and failover, as needed, to maintain availability. Consider flexible composable infrastructure, which enables dynamic allocation of infrastructure resources via intelligent software-defined functionality.

Speed to market: To stay ahead of competitors, financial firms must continually deliver new products to the market (for example, new asset classes for capital markets; innovative pricing and bundling for retail banking). But in the digital era, the need to be prepared to respond quickly to competitive and market conditions, and to be first-to-market with disruptive products and services applies to businesses in all industries.

- ✓ **What to look for in an infrastructure solution:** The right infrastructure supports automated development and delivery, enabling your business to quickly and regularly launch new and updated software into the market. Look for a sophisticated management and orchestration platform that incorporates intelligence and automation into your infrastructure. You can extend your time-to-market competitive advantage when your infrastructure provider supports a broad partner ecosystem, giving you access to best-of-breed integrated solutions.

Continual optimization and innovation: No workload is static. Firms must ensure that their most critical workloads are designed, built, and deployed with flexibility and intelligence in mind, enabling them to innovate using the latest technologies.

- ✓ **What to look for in an infrastructure solution:** Build and deploy your applications on flexible, software-defined platforms that support modern development and delivery approaches (e.g., Dev/Ops, continuous integration and delivery). The right infrastructure allows you to quickly and easily enhance your applications with best-in-class functionality from a wide range of sources, via APIs and microservices.

Security: Financial institutions are subject to rigorous oversight concerning handling of customer and financial data. But they are not alone: every business handles sensitive customer and financial data; and every business has a stake in ensuring the data remains secure and accurate. Furthermore, attacks by bad actors are moving beyond application and operating system to deploy attacks such as ransomware directly from the server firmware.

- ✓ **What to look for in an infrastructure solution:** Be sure the infrastructure provides end-to-end security embedded into the hardware platform and processor; contains cryptographically signed firmware; and that the security features extend through to the network. To protect your business, incorporate multiple dimensions of security processes and solutions (software and hardware). To maintain application performance and ease of use, look for “embedded” or integrated solutions, rather than software that is “bolted on” and can introduce delay. For example, insist on the latest generation platforms from reputable vendors like Intel, with resilient firmware that resists breaches.

Data resiliency: Financial firms rely on many data-intensive workloads, such as market research and pricing platforms. Other industries also utilize increasing volumes and types of data to support digital business operations, including Internet of Things, artificial intelligence, and advanced analytics workloads.

- ✓ **What to look for in an infrastructure solution:** Critical data workloads require storage solutions that ensure high data availability and integrity. Look for all-flash storage with integrated data protection capabilities that combine storage, backup and recovery. Through a combination of snapshots and full replication, such functionality enables data to be replicated and restored cost-effectively, ensuring that applications have access to full data sets as needed.

High performance analytics: Increasingly, financial firms are utilizing sophisticated analytics software for a range of functions, including minimizing business risk (e.g., risk analytic platforms for trades) or maximizing customer value (e.g., predictive analytics for customer behavior). Similarly, in other industries, analytics and artificial intelligence have been integrated into many business functions, including supply chain, inventory control, and targeted marketing. Such functions require consistent, high speed processing to support analysis of massive and growing volumes of data.

- ✓ **What to look for in an infrastructure solution:** Applications with embedded analytics require flexible, scalable, fast-performing infrastructure. Assume that, in the future, analytics will play an even greater role in company decisions, and that most business process software will include analytics functionality. Start investing now in infrastructure designed to handle the rapid throughput and large quantities of data required for analytics workloads.

Scalability with consistency: As workloads become more complex—integrating functionality and data from multiple sources, on demand delivery, exponentially increasing or variable numbers of human and machine users—it is harder to maintain consistent performance. For example, a community bank may enhance its consumer portal by integrating third-party budget management or credit analysis tools; firms in other industries may rely on volumes of unstructured public and private data, such as social media feeds, to perform sentiment analysis. With these and other cases, applications must scale to support dynamic workloads without degrading performance.

- ✓ **What to look for in an infrastructure solution:** Infrastructure solutions must be able to handle disparate data sets with high throughput and ingest rates, and be able to stream and analyze data in real time. Look for solutions that support exascale-level computing.

Hybrid integration: Few workloads today are wholly stand-alone. Most applications connect to or integrate resources from multiple data stores, applications, and microservices to deliver their functionality. Furthermore, applications may be split across environments for optimal delivery: for example, a commercial bank may deploy the consumer-facing banking portal in the public cloud, where it benefits from cost-effective scalability and ease of access; but maintain sensitive customer account information securely on premises. To handle seasonal traffic or dynamic workloads, firms in any industry may choose to burst from a premises-based solution into the public cloud.

- ✓ **What to look for in an infrastructure solution:** When workloads are split across environments, the IT organization must have sufficient visibility and control across all components to ensure that the overall application performance is sufficient. Look for solutions that support hybrid cloud configurations, enabling both traditional and modern applications on a single, shared infrastructure.

Cost-effectiveness: In financial services firms and other forward-thinking companies, IT is no longer considered a cost-center, but a valuable enabler of business goals. As such, IT leaders are working closely with line of business colleagues to understand and measure the business value of technology-driven initiatives; for example, to manage margins or determine the profitability of a program. This requires granular visibility into costs and usage associated with technology, on a departmental or program basis.

- ✓ **What to look for in an infrastructure solution:** The right infrastructure solution will provide optimal price/performance for your various workloads. To lower total operating costs, select infrastructure that is optimized for space and power constraints, and is designed to reduce labor costs (e.g., for installation and maintenance), thus resulting in low total cost of ownership. By focusing on business value associated with your critical workloads, you can lower TCO and improve ROI.

THE LAST WORD: WHAT YOUR FIRM CAN LEARN FROM FINANCIAL SERVICES ABOUT DATA CENTER INFRASTRUCTURE

In the era of “software-defined everything,” it’s easy to think that hardware doesn’t matter; that any generic x86 server is good enough to run your applications. But in fact, the infrastructure foundation is what makes the difference between applications that run optimally and those that just run. In the digital era, when margins are tight, competition is tough, and disruptors threaten to grab your customers and market share at any moment, “good enough” application delivery may no longer be “good enough” to keep you in business.

When it comes to your data center, it’s smart to take your lead from the financial services industry. To support your company’s critical applications, invest in infrastructure that enables optimal security, performance, flexibility, and cost-efficiency.

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