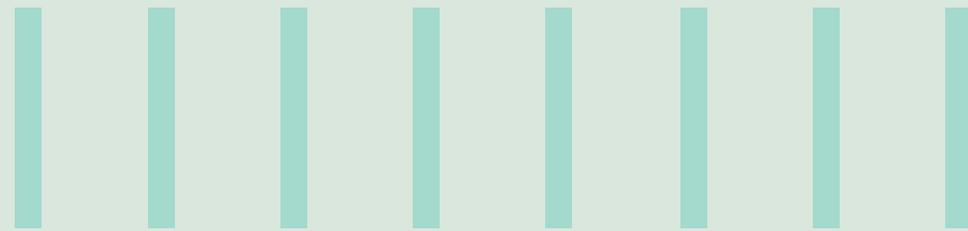




THE CLOUD ADVANTAGE IN CAPITAL MARKETS

Invest in cloud services for a lifetime of value



Abstract

The capital markets industry has several moving parts and unknown variables. Firms must be responsive to stakeholder needs, be it real-time access to data or compliance with regulatory mandates. In such a state of flux, capital market firms must adopt technology that increases their agility and reduces costs. Our experts trace your cloud computing journey from making a business case to realizing tangible benefits.

Owing to market volatility and increased compliance requirements such as the Dodd-Frank Act, Markets in Financial Instruments Directive (MiFID), and the Sarbanes-Oxley Act (SOX), capital market firms are gravitating towards cloud computing to reduce upfront capital expenditure and ensure sustainable growth. According to CEB Tower Group, financial services companies will increase their cloud computing budget from US\$4 billion in 2010 to more than US\$27 billion by the end of 2015. Advanced services offered by cloud services vendors help capital market companies adopt cloud computing across functions and asset classes. Cloud services will enable capital market firms to save almost 30 percent of their IT budget.



A structured approach to adopting cloud services

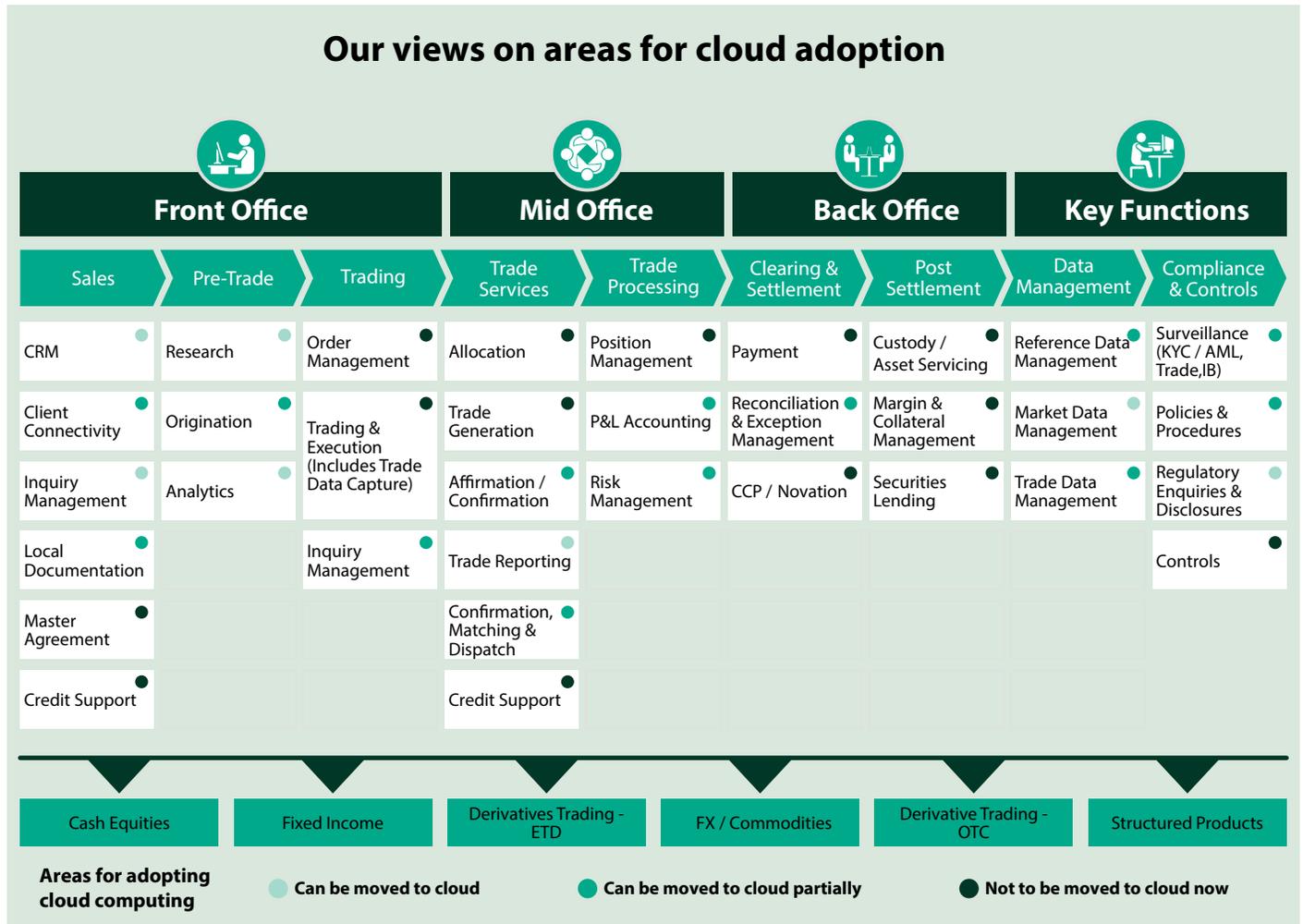
Our survey of capital market firms reveals that approximately 70 percent of firms either seek to adopt new cloud services or replace their existing legacy systems with a cloud computing environment. However, firms face challenges before embarking on their journey:

1. **Deciphering the cloud:** A majority of capital market firms do not realize the benefits of cloud computing because they do not understand its potential. Successful adoption of the cloud requires a deep understanding of the characteristics and deployment models of cloud computing. Selecting the relevant cloud deployment model and the appropriate cloud service will harness benefits of cloud computing. At an organizational level, your cloud architect, cloud engineer, and cloud security advisor need to perform their respective roles. Capital market firms must build a knowledge base and skills with the help of cloud consultants, cloud service providers, and cloud integrators.
2. **Focus areas:** Capital market firms seek to identify areas to make a compelling business case. Firms are apprehensive about the impact of the cloud on their current system architecture. A firm can adopt cloud across areas, but as a starting point, the firm must identify areas that will deliver immediate return on investment (ROI) as well as address compliance requirements.
3. **Security:** Perhaps, the biggest apprehension of capital market firms for non-private cloud deployments is security. Data, applications and infrastructure are located remotely and can be accessed only through the Internet. Users are skeptical about their data being exposed, lost or leaked due to security breaches. Cloud services can be safeguarded by deploying stringent security encryption and authentication mechanisms, physical security of data centers, firewall, and malware. In addition, capital market firms can maintain tags and differentiate sensitive and non-sensitive data. Sensitive data can be hosted on the private cloud while non-sensitive data can be stored on the public cloud.
4. **Interoperability and portability:** Vendor lock-in is a recurrent problem for capital market firms that outsource their operational processes. Since cloud services have matured, you can enter into agreements with cloud service providers for industry standard APIs / interfaces to transfer data smoothly to and from the cloud.
5. **Service level agreements (SLAs) for the cloud environment:** Capital market firms seek an acceptable level of service. Financial data is critical for decision-making and needs to be stored and shared in a format that complies with regulatory norms. Consequently, an implementation plan for SLAs is mandatory. SLAs must be incorporated in the contract with your cloud services provider.

Contours of trading on the cloud

Our survey of capital market firms offers pointers to areas suitable for cloud computing. These areas have been identified based on responses to business imperatives:

- 1) What is the ease of adoption?
- 2) Is a mature cloud service available?
- 3) Is it an existing legacy system or a new system / upgrade?
- 4) Is it a strategic or a generic system?



A structured approach to cloud implementation



Core cloud team: Your team must get initiated into different aspects of cloud-based solutions such as cloud services, deployment and service models. Significantly, cloud architecture and security must be well understood for seamless integration of cloud services. The team can identify business functions across front, back and middle office where cloud computing can be adopted from a business and regulatory perspective for buy-in from senior management.

Cloud adoption strategy: The core team must evaluate business processes that can be migrated to the cloud based on technical as well as business considerations.

Technical criteria include security, compliance and performance. Front office functions such as CRM and market data applications can be migrated to the public or hybrid cloud environment where rich APIs can be provided to cloud services firms. Back office functions involving sensitive data can be migrated to the

private cloud.

Business criteria include reduction in headcount, vendor selection (for superior service at lower cost) and ROI. You must evaluate vendors on key parameters such as:

- Capability to deliver cloud services through industry standard APIs to facilitate a change in the vendor
- Mechanism for quick and easy data migration and data extraction. For instance, the NYSE community platform provides easy access to historical data
- Levels of security and performance
- Track record

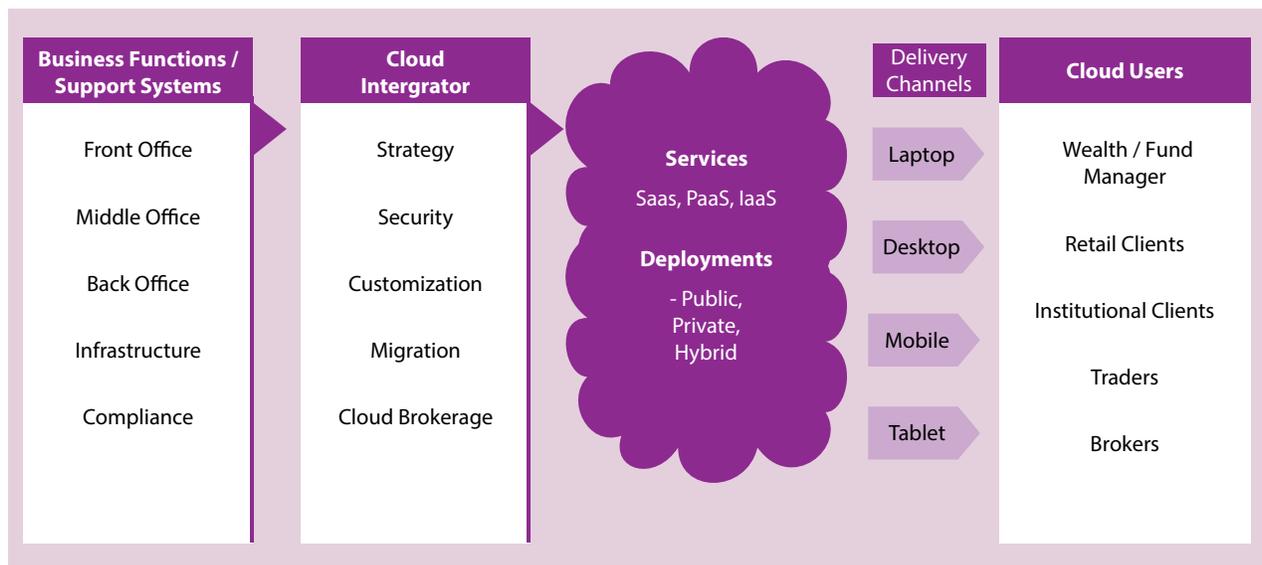
Prototyping: It is prudent to identify and migrate sample applications rather than the entire suite of applications to the cloud. A starting point for cloud implementation can be a new application request from a business line (social media capability for your asset manager) or non-core applications (account reporting or market data distribution). Such deployments

will provide your team with a better understanding of various aspects of the cloud and inspire confidence for future implementations.

Implementation: Capital market firms can identify core business processes and sensitive data applications after successfully migrating sample applications. Core processes can be hosted on a private cloud for enhanced security.

Steady state: Your core team must co-manage data, applications and cloud solutions with the cloud vendor. You need to delineate responsibilities of the core team and the vendor.

Cloud integrator: Capital market firms must partner with a vendor to integrate cloud services. The integrator can provide skillsets to select, implement, customize, and support cloud services to meet specific business and security requirements. The role of the cloud integrator spans business functions and end users, as illustrated below.



Cashing in on cloud computing

Can you free up resources for strategic initiatives?

Increasing agility to focus on strategic initiatives is a business imperative for capital market firms. The cloud provides an opportunity to reduce head count, IT infrastructure investment, as well as software development and application support cost. You can off-load infrastructure requirements to a cloud services provider, while your IT team retains oversight to maintain data security requirements and further free up IT resources. It will reduce IT and operational costs. In addition, you can avoid capacity planning for sudden spikes or month / year-end infrastructure requirements since cloud services are available on-demand. Boutique capital market firms adopt the cloud to build and consolidate business:

- *Merrill Lynch adopted the cloud IaaS strategy to build and evaluate risk analysis processes*
- *Morgan Stanley adopted the cloud PaaS strategy for recruiting applications*

Do you seek a competitive edge by deploying products and services faster and more efficiently?

Capital market firms are geared to adopt on-the-shelf products and services such as CRM products (SaaS) or secure platform (PaaS) available on the cloud architecture. By implementing cloud-based services, firms can launch new products or services within weeks / months rather than years. When you partner with a cloud vendor, you can plug in and configure cloud services without procuring hardware or developing applications.

- *The NYSE Euronext capital markets community platform offers a range of cloud-based services. Financial service firm can directly plug in and use cloud-based services without developing services locally.*

Can you innovate and adopt new business models?

Cloud computing helps you focus on superior functionality to end users and devise new services and mechanisms of service offerings. For instance, an investment or wealth manager can keep in touch with clients via social media through a portal. The firm pays only for services rendered without owning the social media portal.

Boutique capital market firms that could not offer rich functionalities due to uneconomical IT infrastructure and application support expenditure can now capitalize on cloud service models to reduce operating costs. The cloud provides a competitive edge for boutique firms to compete with established players.

- *The FlexCloud solution from FiberMedia provides buy-side and sell-side firms with a platform to deploy market data on the cloud. The company also partners with firms to design solutions that enable trading on the cloud.*

Have you felt the need for a common architecture across locations?

Capital market firms are challenged to offer a unified view of the enterprise. It is a consequence of process modifications to suit local markets or noncompliance of processes after a merger or takeover. The common architecture of a cloud vendor can reduce duplication effort for technology implementation across locations, while providing an enterprise view. In addition, a cloud environment enforces development lifecycle standardization across your enterprise since team members access the cloud through a common interface.

- *Citibank transformed its application development by utilizing spare server capacity on the cloud. The bank adopted standard IT infrastructure to improve resource utilization.*



Are you empowering wealth managers and clients with access to information, everytime and everywhere?

The dissemination of financial data is critical in the capital market ecosystem. Prompt and accurate information helps your wealth managers, traders and consumers take informed decisions. The exponential growth in the use of smartphones and devices makes access to information, anytime and anywhere, a business imperative.

Bring your own device (BYOD) computing ensures that cloud services can be

accessed from the web on any smart device. Users can access critical information such as trade quotes, trade processing information, or email hosted on the cloud.

- *DGX, a cloud-based data, news, chat, and analysis platform, delivers a wide range of cash and derivatives market data in real-time to the users' desktop, iPad or mobile device.*
- *CME partners with Xignite to offer on-demand access for end-of-day OTC settlement, volume and open interest data.*

Are you exploring environment-friendly solutions?

Capital market firms churn out voluminous data from trades, client reports and audit information, everyday. Analytics powered by big data drives demand for more IT infrastructure. Cloud computing ensures optimal use of infrastructure and reduces the recycling of equipment. The cloud offers a cost-effective, sustainable and eco-friendly solution through smarter infrastructure utilization and energy consumption.

A capital markets galaxy on the cloud

The cloud delivers computing in a utility or service model. Cloud computing is transforming infrastructure and application development, deployment and delivery processes. A parallel can be drawn to personal computers replacing mainframes and smartphones, or tablets reinventing the mobile industry.

Capital market firms must harness the benefits of cloud services. However, the cloud presents security and compliance challenges that need to be addressed. Capital market firms must select a cloud integrator with proven expertise.

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