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Waters (ISSN 1068-5863) is published monthly (12 times a year) by Incisive Media. Printed in the UK by Wyndeham Grange, Southwick, West Sussex.

Beware the Bleeding Edge

Capital markets firms, by virtue of the competition they face, are constantly on the lookout for new technologies to provide them with a temporary monopoly—or competitive advantage—to help them increase their operational resilience and efficiency, and reduce their overheads through automation. From a technology perspective, capital markets CIOs have been well served over the years: For at least a decade now, there has been no shortage of cutting-edge technologies available to them, either expressly developed for specific capital markets use-cases, or generic hardware and software that can be tweaked with the minimum of fuss to address an explicit challenge.

But too much of a good thing is not a good thing, and this is especially pertinent to financial technology. CIOs are familiar with this fact, given that one of the most demanding issues they face when evaluating emerging technologies pertains not to the products they choose to implement, but rather the ones they opt to jettison. In many instances, multiple technologies will adequately suffice for most use-cases, making the decision that much more vexing.

CIOs must make watertight business cases when evaluating new technology before considering the vicissitudes and idiosyncrasies of its implementation. Once this hurdle has been negotiated, the real work starts, which must be driven in a disciplined and objective fashion if the project stands a chance of delivering on its promise. In this context, "disciplined" means different things to different CIOs, but any implementation—especially when it comes to a new and potentially untested technology—needs to be managed accurately and incrementally, with an experienced hand on the tiller. In this respect, the stage-gate or phase-gate model provides the way forward, requiring project teams to formulate well-defined mini projects within the overall implementation, allowing for regular "stock takes" to ensure objectives remain clear and any scope creep is nipped in the bud. This toe-dipping procedure has a number of benefits, but the most often overlooked is its ability to help CIOs identify instances where it's more beneficial to walk away from the project than to see it through to its conclusion. Breaking up is hard to do, but sometimes it's crucial to call it quits and pull the plug on the project, irrespective of how far down the line that decision comes. After all, new technologies represent something of a double-edged sword to those firms adventurous enough to implement them: Get too close to the leading edge and soon it becomes a bleeding edge, where firms hemorrhage time and money in pursuit of little more than a pipedream. ■

Victor Anderson
Editor-in-Chief

Inside Market Data Inside Reference Data Buy-Side Technology Sell-Side Technology
waterstechnology

Evanston Capital Management Jumps Into Gravitas Cloud

Evanston Capital Management (ECM), an Illinois-based fund of hedge funds, has migrated its core servers and applications to the Gravitas Private Cloud, a project completed in less than six months.

ECM faced an impending upgrade and replacement of its in-house datacenter, and made the decision to migrate to the cloud. The project centered on relocating ECM's computing infrastructure to Gravitas-linked data centers in Chicago and New Jersey to support production and disaster recovery.

"Migrating to the Gravitas Private Cloud allows us to replace significant recurring capital expenditures tied to on-site infrastructure with a predictable monthly operating expense for hosting and monitoring of all our systems," says Kenneth Meister, ECM president and COO. ■

IVP Launches Compliance Platform

New York-based Indus Valley Partners (IVP) has introduced IVP Raptor cloud, enabling alternative asset managers to meet their global regulatory reporting needs from a purpose-built cloud platform.

IVP Raptor (Regulatory Analytics Portfolio Transparency Operational Reporting) includes coverage for all major regulatory filings required by US-based alternative asset managers, including Form PF, 13F/D/G, CPO-PQR, CTA PR, Form ADV, Form 3, 4, 5 and the upcoming AIFMD for Europe. In addition to automating regulatory filings, IVP Raptor, already implemented with over 25 clients, supports risk and exposure reporting in the Opera format for investors and fund allocators. ■

Imagineer Partners with Abacus

Abacus Group, which provides hosted IT solutions to hedge funds and private equity firms, will host Imagineer Technology Group's Clienteer software platform in the AbacusFLEX private cloud. AbacusFLEX clients will be able to access the Clienteer customer relationship management (CRM) platform.

The Clienteer platform is built specifically for the buy side and allows users to centralize all of their contact, account and fund information. Through this alliance, fund managers' notes, meetings and emails will be stored in the AbacusFLEX cloud, allowing managers to access that information using Clienteer's search engine, also available on a mobile platform. ■

Etrali Rolls Out Mobile Voice Recording in Japan

Etrali Trading Solutions has extended its mobile voice-recording service to Japan. It will partner with Natterbox to help banks in the region comply with record-keeping requirements. Etrali's SIM-based solution, will give Japanese banks an integrated service to record and securely archive their calls, and comply with the Japanese Financial Services Agency (JFSA) record-keeping requirements. It will also allow European and US banks present in the region to adhere to UK Financial Conduct Authority (FCA) and Dodd–Frank Act demands on voice recording. ■

FSMLabs Unveils Cloud Time-Sync App

Precision time-synchronization solution provider FSMLabs has released TimeKeeper Cloud, a version of its TimeKeeper platform running on Amazon Web Services that ensures consistent timing between distributed trading applications for effective trading and latency monitoring. TimeKeeper Cloud delivers reliable, sub-millisecond time management for cloud computing resources and virtual clusters, and provides a traceable log for due diligence and data analysis. ■

Taking Trader Voice to the Cloud

With cloud computing usage rapidly growing within financial market firms, it was always a matter of when—not if—voice would migrate to the cloud. By Anthony Tassone

In 1874, Alexander Graham Bell was working to disrupt the monopoly of the telegraph provider Western Union, which had reigned supreme for the prior 30 years with its dot–dash Morse code protocol. Bell was convinced that the telegraph could be modified to handle multiple messages being sent and received. In 1875, to Bell's surprise, he heard the sound of clock springs come across his wire during the experimentation of a new technique call "harmonic telegraph." The first words spoken were: "Mr. Watson, come here, I want to see you."

Approximately 140 years later, trader voice is a generic name given to a set of voice communication capabilities specifically designed for brokers and traders. It is a critical tool that enables market participants to communicate with one another on secure, recorded lines that span the globe. Traditionally, communication takes place on hardware devices called turrets, equipped with microphones and speakers that sit on traders' desks, awaiting various buttons to be pushed that instruct the voice data where and how to be carried. To date, trader voice has been carried through a mesh of legacy servers, switches, lines and protocols on private networks that are expensive to purchase, exhausting to maintain, and which provide little flexibility.

Launch

In 2013, Green Key Technologies launched Trader Voice Box, a suite of voice over IP (VoIP) technology applications leveraging cloud telecom and storage capabilities. Trader Voice Box enables global financial market participants to rapidly set up and instantly speak on private, secure voice networks without hardware. Communication takes place using a downloadable software client that is installed on users' PCs connecting over the internet into Green Key Technologies' cloud telecom infrastructure. This hosted VoIP solution was designed to unshackle brokers and traders from their telecom hardware devices and free them to communicate with their customers from anywhere in the world with the same level of security and privacy without sacrificing functionality.

> **Considering the regulatory landscape now mandates that voice is recorded from any device and that operations continue to run 24/7 despite unforeseen events such as weather or acts of terror, the market's move toward a more mobile, flexible telecommunication platform seems inevitable. In addition, the recent emergence of the SIP protocol, the now de facto communication standard which allows other data types like chat and video to be sent down the same channels, will only encourage more firms to think of their telephony as an application that needs to be integrated into the ecosystem rather than as standalone infrastructure.**

Considering the regulatory landscape now mandates that voice is recorded from any device and that operations continue to run 24/7 despite unforeseen events such as weather or acts of terror, the market's move toward a more mobile, flexible telecommunication platform seems inevitable. In addition, the recent emergence of the SIP protocol, the now de facto communication standard which allows other data types like chat and video to be sent down the same channels, will only encourage more firms to think of their telephony as an application that needs to be integrated into the ecosystem rather than as standalone infrastructure.

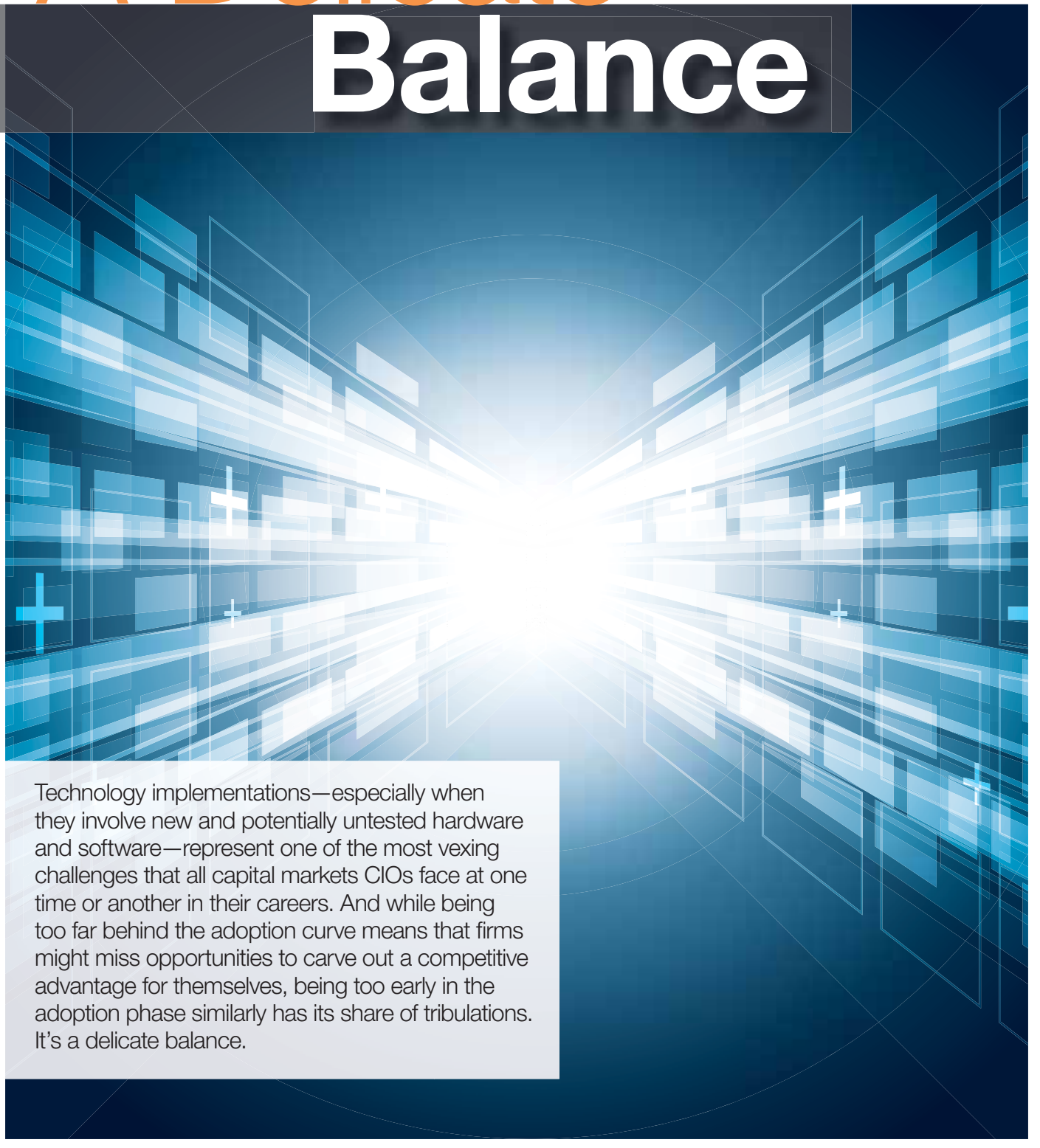
Unification

As telecommunication becomes more application-based, especially after the adoption of SIP, look for a more "unified communication systems" to emerge. At Green Key Technologies, we are committed to providing our customers with a toolbox that allows them to rapidly set up, and enable their relationships to connect with them in a secure, private cloud-based environment in which voice, video and data can be shared, monitored and stored. The move to a managed voice environment will allow for unprecedented flexibility in terms of provisioning users and routing calls, and will encourage an entire industry of call tracking and metrics to flourish. In addition, the trader voice networks and directories of tomorrow will reflect a more open environment similar to that of social media, where users can be searched and connected to by a user rather than the closed, dark networks of today where providers maintain tight control over provisioning.

Almost 140 years ago, Alexander Graham Bell asked Mr. Watson to "come here, I want to see you." Today, Mr. Watson doesn't need to go anywhere. He can be heard and seen, as well as share files, all through the same connection, with Green Key Technologies. ■

Anthony Tassone is CEO of Green Key Technologies, a Chicago-based provider of voice software and a click-entry platform, designed to allow capital markets firms to trade off-exchange.

A Delicate Balance



Technology implementations—especially when they involve new and potentially untested hardware and software—represent one of the most vexing challenges that all capital markets CIOs face at one time or another in their careers. And while being too far behind the adoption curve means that firms might miss opportunities to carve out a competitive advantage for themselves, being too early in the adoption phase similarly has its share of tribulations. It's a delicate balance.

Q Which technologies that you see in the capital markets do you believe fall under the "emerging technologies" moniker?

Carol Dow, principal, Vanguard Information Technology: Technology innovations continue to emerge at a rapid pace and we at Vanguard see some great opportunities to take advantage of these changes to enhance our service model. Today our main focus is on leveraging cloud-based initiatives, big data, mobility, unified communication, and virtualization.

We see cloud computing—infrastructure-, platform-, and software-as-a-service—as a key technology initiative that will enable IT to lower its capital expenses through more efficient utilization of hardware and software infrastructure, and reduce its labor costs through the self-servicing and automation of the environment provisioning and deployment processes.

Big data solutions such as crowdsourcing, data fusion and integration will help us efficiently process large amounts of data within tolerable times. Visualization technologies will help us better communicate complex information in understandable terms. This can aide in decision making as well as better communication to our clients.

Vanguard's Enterprise Mobile Program ensures Vanguard Crew (our term for employees), clients, and prospects have secure access to Vanguard resources anytime, anywhere, from any device. Enhancements in mobility provide Crew with greater flexibility in the way they perform their responsibilities, so they can better serve our clients.

Unified communications (UC) is the integration of real-time communication services, such as instant messaging, presence information, telephony, video and web conferencing, and data sharing, along with variety of collaboration platforms. UC is not necessarily a single product, but a set of products that provides a consistent, unified user interface and user experience across multiple devices and media types. Enhanced communication techniques are an enabler of our global efforts.

Virtualization provides sufficient, cost-effective technology and workspace recovery solutions by implementing a centralized architecture, providing mobility by accessing data anywhere, addressing security concerns by having no data in-office or on end-points, and, lastly, improving performance for offices with latency challenges.

> "The pros are that more data can lead to more information and new financial products. The cons are that stably transitioning to new technologies can be a challenging process. For the Maxeler Risk Analytics and Low-Latency Trading Solution, the pros are that more information can be included into trading decisions, leading to more stable trading behavior and less risk in the short term and long term for the operation. The cons are that a transition to a combined trading and risk installation can take some effort and requires risk and trading teams to work closely to integrate the solution."
> **Oskar Mencer, Maxeler**

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Oskar Mencer, CEO, Maxeler Technologies: There is a recent initiative driving the deployment of a new kind of computing—spatial computing—via an industry standard, led by the Chicago Mercantile Exchange (CME) Group. For more information, see openspl.org, and the video under What-is-OpenSPL.

There is also convergence of trading and risk, as described in this article: openmarkets.cmegroup.com/7372

Todd Gottula, executive vice president and CTO, Advent Software: Companies have realized that running their own hardware is too expensive and carries too much risk, which is driving them to explore ways to get out of their datacenters. This trend translates into firms more actively pursuing cloud adoption for both legacy and new solutions.

A second category of emerging technology comes from a similar attitude of "not in my house." For traditional productivity applications, companies no longer want to manage all the upgrade installations, data privacy, or the compliance aspects as locally installed software. This push to outsource has gotten firms that have historically wanted to keep everything in-house to start to adopt basic cloud technologies.

Finally, there has been a continued decline in firms wanting to build their own technology; they want to buy solutions from trusted technology providers. When they buy solutions, they're looking for easy, flexible, and configurable technologies, and as a provider we have to make sure we still give them the freedom to make the solutions that they want without having to build them themselves.

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Patrick Angeles, chief architect, financial services, Cloudera: The success of Apache Hadoop—initially in internet-scale companies such as Yahoo and Facebook—has now drawn the attention of big, established players from the financial services industry. Big data exists in virtually every industry, and capital markets is no exception. Increasingly, large financial institutions are adopting the Hadoop platform for capturing and storing all kinds of data and to work with it in more ways. Hadoop can run a wide range of sophisticated, powerful analyses to extract insights and information from data at a scale that was simply unavailable using any other prior technology.

Cloudera has driven more capabilities and power into the Hadoop platform than any other company. Cloudera-powered enterprise data hubs (EDHs) based on Apache Hadoop are in production in 65 percent of the Fortune 500 in finance, telecommunications, retail, internet, insurance, energy, healthcare, biopharmaceuticals, networking, and media.

> "To be competitive, companies must focus on growth and keeping costs balanced. But they must also innovate. New technologies offer views into customer behavior, sentiment, and historical trends. The companies that have discovered how to mine those insights across all of their data first, and have operationalized these capabilities, will be the ones to leapfrog their competition and model their businesses to drive new revenue streams. New technology resets the playing field. Is there risk? Always. That's why it's important to choose wisely to avoid investing in a technological dead-end." **Patrick Angeless, Cloudera**

David Saul, chief scientist, State Street: The cloud as a foundational technology has been maturing and the piece that I've seen that has been changing over the past year—and I expect we'll see even more of it over the next two years—is people viewing the cloud not just as a low-cost hardware platform, but also looking at the benefits that it provides to agile development. The cloud is a natural match for agile development. I don't think you can really do agile development if you are having to stand-up a traditional server environment.

Anthony Tassone, CEO, Green Key Technologies: Paying for shared resources based on usage has been around for decades, but cloud computing in its current form has just emerged. Although admittedly biased, I believe hosted VoIP in particular is dramatically changing the way brokers and traders communicate. VoIP for business is becoming more application-based, transitioning from clumsy analog hardware systems to software in the cloud. Application-based telephony allows for much greater flexibility that improves turn-up time, mobility and disaster-recovery capabilities. I believe the next stage in telephony evolution is for hosted PBX and VoIP to co-exist, which will allow voice, data, video, chat, file-sharing and screen-sharing to run on a single application, simplifying the traders' work flow and providing a much more integrated ecosystem.

Oommen: While we are past the point of classifying cloud as an emerging technology, we expect our clients will continue to transition to a cloud-based model. As such, we have focused our development efforts around cloud IT consumption.

Over the past few years, the focus in capital markets has largely been on software-as-a-service (SaaS) and infrastructure-as-a-service (IaaS), but we think platform-as-a-service (PaaS) is a very interesting framework for cloud consumption and deployment as well. Our clients are looking for rapid development of native cloud applications, reusable components and modules eliminating redundancies, and standardized application programming interfaces (APIs), all of which help them drive down costs and reduce time to market. Through a series of investments in technology, people and resources, we believe CenturyLink Technology Solutions is well positioned to respond to the needs of our clients and emerging technologies. CenturyLink Cloud supports an industry-leading range of development frameworks, leveraging Cloud Foundry and Iron Foundry.

Longer term, we think the concept of application-defined infrastructure is hugely compelling. We are working with some very interesting firms in this arena that share our view that infrastructure is a necessary component to enabling their applications and data, and allowing those applications to invoke and shape infrastructure and resources is the wave of the future.

Q What are the drivers spurring capital markets firms to deploy technologies to address the business and operational challenges around, for example, big data, supporting firms' mobile strategies, and migrating certain parts of the business to the cloud?

Saul: The cost of entry to experiment with some of the other technologies, particularly in the data, mobile and social networking spaces, is very low. That cost has come down because of the cloud, to the point where you can try out a lot more things that you wouldn't have done if you had to make a long-term, high-cost commitment to hardware and infrastructure. Speed is clearly a competitive advantage for everyone, and the ability to satisfy client requirements and deliver products and services quickly, is a competitive advantage. The cloud is an enabler for that.

Mencer: We see demand for cost savings in finance, especially on the operations side, as well as consistency and simultaneity for financial transactions.

Tassone: Much of 2013 was about putting in place the necessary compliance processes to comply with all of the new regulations. The marketplace has been forced to make new compliance purchases during a time of lower volumes and revenues. Out of necessity, the market has moved toward cloud providers as a way of meeting compliance mandates, such as disaster recovery capabilities, without incurring additional infrastructure costs.

However, these same customers are now scaling their cloud services because of the greater business agility cloud computing affords them in this very uncertain business environment. In addition to the regulatory drivers, businesses are moving to the cloud in order to manage their capacity in real time, which better illuminates resource allocation inefficiencies.

Oommen: We continue to see drivers around technology that are also common across most industries, such as new, on-demand models of IT consumption that are massively scalable, operating vs. capital expenditures, open source and flexible, to name a few.

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However, within capital markets, regulatory changes and the erosion of profitability continue to add pressure, pushing firms to rethink their legacy architecture and business models.

> "Unfortunately, most enterprises maintain massive legacy systems, which often make migrating away from them a difficult and complicated proposition. In addition, network connectivity has become a major concern to capital markets firms since elastic workloads and data sets require lots of bandwidth with relatively low latency between computing centers. We have been investing heavily in 100G fiber connectivity between all 55 of our datacenters, customer facilities, and other key datacenters."
> **Roji Oommen, CenturyLink**

The low cost and flexibility of cloud-based IT enables new market entrants with disruptive business models; companies like Uber or Square simply could not have existed in the pre-cloud world. As barriers to entry lower, firms are exposed to increased competition, which requires them to rapidly evolve their business models to survive. Big data is a good example. Software will inherently become more sophisticated over time, driving down the cost of both data storage and building an analytics capability. We believe this is a key driver in deploying technologies in the most cost-effective and timely manner.

Angeles: We are an increasingly digitized and connected society. Our activities leave a data trail that, because of the network effect, grows at an exponential rate. Specific to capital markets, increased market participation and the rise of algorithmic trading have led to the creation of voluminous transaction data. At the same time, or perhaps consequently, the need to monitor, analyze, and report on market activity has never been so important. Regulatory compliance, in the face of big data, requires new solutions, and Cloudera's technology has been prolific in addressing a number of these big data compliance problems. Beyond regulatory compliance, market participants are also using Cloudera to improve operational efficiency by offloading from—or in some cases completely replacing—legacy systems that are no longer a fit for the data volumes of today.

Gottula: The buzzwords in the industry continue to be cloud, big data, and mobile. When it comes to mobile, for capital markets firms and their employees, it's all about getting access to their data wherever they want it, whenever they need it. Mobile is serving as a major driver of cloud adoption, but it's just the tip of the iceberg in getting firms to move to the cloud.

We're also seeing a big push toward cloud deployment among the trading community as big data has found its place in algorithmic firms. There are now more efficient ways to get through immense volumes of data that was previously much too difficult to consume locally, like historical tick-by-tick market data. This driver has always existed in the world of trading, but now there are novel ways to solve the challenges of big data without having to spend millions of dollars, and one of the enabling technologies for this is cloud deployment.

Dow: One of the major drivers is staying competitive, scalable, and cost effective. These technologies also bring the opportunity to have more informed decision-making and enhanced collaboration and communication among the investment teams. These initiatives will help capital markets be better, faster, and cheaper, which in turn allows more focus on the clients and employee engagement.

Q **What are the challenges that need to be addressed when capital markets firms consider implementing emerging technologies, such as those that address the challenges around big data, the move to mobile working, and cloud-based initiatives? What are the pros and cons that firms must weigh up when evaluating such products and services?**

Oommen: We think the single biggest obstacle for capital markets firms is to migrate away from legacy applications. What we hear most in the market is that most new applications are built, whenever possible, to be "cloud friendly." Unfortunately, most enterprises maintain massive legacy systems, which often make migrating away from them a difficult and complicated proposition. In addition, network connectivity has become a major concern to capital markets firms since elastic workloads and data sets require lots of bandwidth with relatively low latency between computing centers. We have been investing heavily in 100G fiber connectivity between all 55 of our datacenters, customer facilities, and other key datacenters.

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Finally, we expect that many private IaaS cloud initiatives will fall by the wayside in the medium term. Despite the advantages of internal deployment, seeing first-hand how applications behave and giving internal business users exposure to an elastic environment, we think this model is only viable for the largest and most sophisticated firms. Over the long haul, we think the economies of scale for external service providers will continue to improve as cloud adoption increases, putting tremendous pressure on purely private models.

> "Companies have realized that running their own hardware is too expensive and carries too much risk, which is driving them to explore ways to get out of their datacenters. This trend translates into firms more actively pursuing cloud adoption for legacy and new solutions. A second category of emerging technology comes from a similar attitude of 'not in my house.' For traditional productivity applications, companies no longer want to manage all the upgrade installations, data privacy, or the compliance aspects as locally installed software." **Todd Gottula, Advent Software**

Mencer: The pros are that more data can lead to more information and new financial products. The cons are that stably transitioning to new technologies can be a challenging process for large financial organizations.

For example, for the Maxeler Risk Analytics and Low-Latency Trading Solution, the pros are that more information can be included into trading decisions, leading to more stable trading behavior and less risk in the short term and long term for the operation. The cons are that a transition to a combined trading and risk installation can take some effort and requires risk and trading teams to work closely to integrate the solution.

Gottula: The technology landscape is more complex than ever, with a growing pool of emerging technologies and start-ups. At the same time, decisions involving building and selecting technologies require major financial and time commitments. One of the biggest challenges is the significant risk associated with

building solutions in-house, including licensing, buying, and implementing technology components yourself.

A second significant challenge facing capital markets firms is security and data privacy concerns. Moving data and allowing access to data sets that normally would have been highly protected inside the firm means that firms now have to worry about how that personally identifiable data is encrypted and protected, and ensure it is securely stored and audited wherever it goes.

Both these challenges are driving firms away from becoming "builders" and toward becoming "buyers" who reach out to providers like Advent to make those technology decisions and certify the security of the data for them. Across the capital markets industry, firms are rethinking the way they traditionally solve their own problems because there is so much inherent risk involved in going it alone.

Dow: Challenges include security and the maturity of the technology. With cloud-based technologies, one of the primary concerns is data security. It is important to understand the security risks around cloud and how those can be mitigated or avoided. Another challenge to consider is the maturity of the technologies. For example, with unified communications, the goal is to have a "Swiss Army knife" of communication technologies; however, a key consideration is whether different vendors are compatible with one another. It is important for firms to weigh up whether these solutions have a place in the firm, which will make them more competitive.

> "Firms usually go wrong when they only focus on the current state. It is important to focus on where to scale for the future. Often, the number one factor in evaluating technologies is cost. However, it is important to remember that these technologies could have a significant return on investment. Firms need to set specific goals on how they want to improve their business and marry that to certain emerging technologies." **Carol Dow, Vanguard**

Saul: The big challenge that I see—and this applies to the cloud, to data, to mobility, and social networking—is information security. It always seems to lag the base technology itself. For security, the cloud needs to improve when it comes to identity. When you're running in the cloud—unlike running on a traditional environment where you pretty much know who's running there because of their physical location—that model doesn't work in the cloud. I think my greatest fear is that we'll have some kind of data breech in the cloud that will set us back because in their haste to gain the benefits, people haven't spent the necessary time on information security, risk management, and compliance. That's the greatest risk. But I'm a glass-half-full person. There are technology solutions to guard against that, but they just don't have the immediate financial return of some other technologies, so they tend to come second.

Angeles: One of the fundamental challenges is addressing the communications gap around big data between IT and the C-suite. IT is seeking a solution to the business challenge of storing massive amounts of data and the C-suite values solutions that have an immediate impact on corporate performance. Hadoop is seen as a common denominator because it can be used to store all types and amounts of data and be used to extract meaningful insights. Hadoop is increasing awareness, building understanding, and bridging the gap between IT and senior business executives.

Within IT there are challenges as well. The move from legacy technologies to more innovative technologies, such as Hadoop, has created a skills gap among IT professionals. Legacy environments require a unique skills set, while new emerging technologies have given rise to data scientists. The deficit of skilled professionals that can help companies make use of big data to available positions across every major industry is growing. Cloudera is actively addressing this skills gap and making data technology education more broadly available.

To date, Cloudera has trained more than 40,000 developers, administrators, analysts, and data scientists on the Hadoop platform.

Ensuring that stakeholders are equipped with the right knowledge, education, training and tools, is imperative. Additionally, so is ensuring the security of the information as new technologies are put in place. Greater access to information at all levels—by users and IT, requires greater oversight and greater security. Governance and compliance needs to be a key consideration.

Tassone: I think it's important to test your assumptions in a very isolated environment and create a plan to migrate toward production in incremental stages. For example, a mobile workforce may seem exciting for a sales team but could be a nightmare for compliance departments. It is important that the

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> "The benefits of emerging technologies, such as hosted VoIP, have the potential to provide better business services for less cost. The increased agility provided through infrastructure reduction and the ability to scale up and down give firms confidence and the tools to step into new markets. This ability to manage capacity in real time is astounding and would have made Henry Ford glow with enthusiasm." **Anthony Tassone, Green Key Technologies**

technology is secured and processes put in place prior to allow employees to begin to communicate outside the walls of the office. There have been major regulatory initiatives that now mandate voice recording, trade capture, and trade-retention capabilities. It is critical that employees operate within a framework that allows for the necessary data to be captured and retained remotely as well as internally.

Q Where do capital markets firms typically go wrong when it comes to evaluating emerging technologies? How do they arrive at a final decision as to whether they will adopt a certain emerging technology?

Tassone: I think a firm can go wrong when it enters the discussion with a rock-solid preconceived notion of how something works rather than being open to how something could work. Interestingly, there is a lot of fear out there that reducing infrastructure through cloud adoption will lead to job cutting. Often times, this leads to the precarious situation of legacy hardware purchase decisions being defended at all costs. It is also difficult to perform apples-to-apples comparisons between on-premises hardware and datacenters to that of cloud infrastructure that is offered as a service.

Therefore, I think it is vital for the decision to adopt cloud technology be agreed at the highest levels of a company, then implemented incrementally with the return on investment measured side-by-side with their local hardware installations. The result is that management has a compass for further scaling, in addition to a fact-based guide when making future technology decisions, and employees have the confidence the boat they are sailing in is heading in the right direction.

Angeles: Going it alone is never a good idea. Companies that do, miss out on lessons learned from others that traveled the same road of new technology adoption. Companies can usually avoid costly mistakes by seeking out partners and practitioners that have demonstrated success—providing a solid foundation to start from. It's also important to recognize the nuances across industries. For example, a financial institution has vastly different requirements surrounding its data than a healthcare agency or educational institution. Seeking out best practices from the right experts offers unique insights and specialized learning. You would never ask a Ferrari dealer for advice on what truck to buy—that same careful thinking should apply to your IT decisions too.

Above all, don't rush headlong into change. A company's data is one of its most valuable assets, so moving forward with a proof of concept or pilot project may yield important insights and results. Many companies have implemented Hadoop distributions, and by exploring its unique capabilities, they have then integrated additional components that were best suited to meet their objectives.

David Saul
State Street

Saul: The biggest mistakes people make are being too conservative and not experimenting enough. You need to try things out because not everything is going to work and not everything is going to match your environment. In financial services we have historically been very conservative, which is not surprising because we're dealing with people's assets. But that shouldn't always extend to being conservative with trying new technologies. And being too late, you've lost your competitive advantage.

Another big mistake people make is not being capable of turning off a project when they recognize that it isn't going to achieve its objective. All too often people throw good money after bad. The successful innovators are the ones who try things and then recognize when something is not going to deliver value and cut it off.

Carol Dow
Vanguard

Dow: Firms usually go wrong when they only focus on the current state. It is important to focus on where to scale for the future. Often, the number one factor in evaluating technologies is cost. However, it is important to remember that these technologies could have a significant return on investment. Firms need to set specific goals on how they want to improve their business and marry that to certain emerging technologies. Another area of caution is rapidly changing technology solutions. The pace of change with emerging technologies is quick. The technology solution that looks appealing today can be surpassed by other technologies by the time a large firm completes a roll out. To ensure a viable solution, it's important to do swift yet thorough research not only on emerging technologies, but also on suppliers.

Gottula: When firms evaluate emerging technologies, they can go wrong in one of two major ways. On one hand, they can select a technology that is so cutting-edge it hasn't been proven or tested, which means it could end up being a dead-end solution with no future development or innovation. On the other hand, firms can also be too slow to adopt an emerging technology, allowing their competitors to accelerate past them.

Those two points are driving capital markets firms to increasingly rely on trusted providers—those who are closer to the technologies as they emerge and have the budgets to stay up-to-date to make those decisions on their behalf and manage this risk for them.

Mencer: The world is not easily split into right and wrong. By missing out on early adoption of new technologies, there is a risk of missing out on potential gains and competitive advantage. There is also a risk of paying more attention to the large technology companies and missing out on innovation from small and innovative firms that can be a lot more efficient than their large counterparts.

Oommen: Given the constant pace of technology change, attempting to make medium-term—let alone long-term—predictions can be tricky. That said, capital markets firms generally have a strong track record in utilizing new technology to their advantage. Clearly, the power of emerging technology is a tremendous differentiator between the most innovative and aggressive, and the laggards. Amid an environment of both regulatory and economic pressures wreaking havoc on business models, this gap may be costly for those firms not willing to adopt change. We believe an approach mixing both direct trial and experimentation, in conjunction with leveraging strong partners also on the forefront of technology adoption, affords the best chance of success.

Q What are the risks and benefits—both anticipated and unforeseen—that emerging technologies present capital markets firms?

Gottula: Changes in development tools and deployment methods like virtualization and cloud have really accelerated the development-to-implementation lifecycle. What used to take years now takes months. Firms that are willing to take the risk of adopting these new technologies are experiencing more deployment, getting features more quickly, achieving faster iteration cycles, and seeing solutions where mobile is baked into the technology itself.

The related risk here is that because the whole market is moving so quickly, the wrong choices have twice as much impact; the time you spend undoing mistakes is time a competitor can use to move further ahead of you.

> "Technology innovations continue to emerge at a rapid pace and we see great opportunities to take advantage of these changes to enhance our service model. Today, our main focus is on leveraging cloud-based initiatives, big data, mobility, unified communication, and virtualization. We see cloud computing—infrastructure-, platform-, and software-as-a-service—as a key technology initiative that will enable IT to lower its capital expenses and reduce its labor costs." Carol Dow, Vanguard

Mencer: Emerging technologies bring different flavors of risk. Risk is very individual and offerings, which allow for customization to particular finance client needs, should be preferable to off-the-shelf, one-size-fits-all solutions, especially given the competitive environment in finance.

Tassone: The benefits of emerging technologies, such as hosted VoIP, have the potential to provide better business services for less cost. The increased agility provided through infrastructure reduction and the ability to scale up and down as opportunities present themselves give firms a sense of confidence and the tools to step into new markets. In fact, this ability to manage capacity

> "The cost of entry to experiment with other technologies, particularly in the data, mobile and social networking spaces, is very low. That cost has come down because of the cloud. You can try out a lot more things that you wouldn't have done if you had to make a long-term, high-cost commitment to hardware and infrastructure." **David Saul, State Street**

in real time is astounding and would have made Henry Ford glow with enthusiasm.

The biggest risk I see in the short term is firms standing on the sidelines, waiting for the opportunity to appear less risky. The problem with that approach is you are not learning while your competitors are. In addition, cloud computing dramatically lowers barriers to entry in many industries, inviting a wave of competitors who suddenly no longer need any infrastructure to compete, but can rather focus purely on selling with little or no overhead. It is important to plan and implement a cloud policy no matter how small it is to your business if for no other reason than to better understand your current IT strengths and weaknesses.

Although I am a proponent of cloud computing, I would encourage any firm considering the migration to walk before they run. Incremental adoption, along with a financial model blueprint, are key to a successful migration that will achieve organizational buy-in.

Oommen: We think the benefits are clear: an IT cost base that's reflective of the broader economic realities of the business. A more agile platform allows the business to respond quickly to rapidly changing conditions and to their competitors. In the near term, regulatory harmony across jurisdictions is a pain point, though we expect it to come together in the medium to long term.

Competitive differentiation will continue to be a big challenge for firms—technology aside—and as lower costs reduce barriers to entry, it will be harder for many firms just to scale their technology to remain competitive.

Angeles: To be competitive in today's global business environment, companies must focus on growth and keeping costs balanced. But they must also innovate. New technologies are available today that offer views into customer behavior, sentiment, and historical trends. The companies that have discovered how to mine those insights across all of their data first, and have operationalized these capabilities, will be the ones to leapfrog their competition and model their businesses to drive new revenue streams. New technology resets the playing field. Is there risk? Always. That's why it's important to choose wisely in order to avoid investing in a technological dead-end.

Hadoop, which is open-source software for reliable, scalable, distributed computing, is broadly recognized across the industry. In today's hyper-connected world where more and more data is being created every day, Hadoop's breakthrough advantages are a perfect jumping-off point. ■


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