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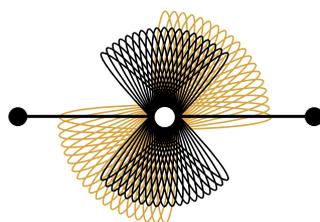

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by Erik Linask

Cloud Innovation – A Whole New World

Over the past few years, we've witnessed an evolution in technology that has transformed the way we live and work. Cloud computing has driven incredible efficiency in the business world and has allowed businesses to merge into a highly mobile and flexible era. Indeed, there are few applications and services in either the business or consumer world that aren't touched by cloud in some capacity.

But, in addition to creating new models for delivering traditional services and capabilities, cloud has created massive opportunity for not only new players, but entirely new markets. Wearable tech is one of them. It has very rapidly become the focus of many in the media and has spawned an entire community of tech innovators, collaborators, and users.

Google stole the early spotlight with Glass, but failed to truly capitalize on it. The health and wellness market, on the other hand, has seen significant uptake. Not only are most products accessible to the general market, but their focus is an area that can easily be applicable to nearly every individual or family – health.

Take myfitnesspal, an easy to use, personalized exercise and food consumption tracking site. It's just one of many such sites available, but it's also one that has become highly popular thanks to some of its cloud-enabled features, including accessibility through mobile apps (though only iOS at this point) as well as Web browsers, and a crowdsourced database model that allows users to add food items with calorie counts.

Also consider Fitbit, which makes wireless activity and sleep trackers, with an attractive, user-friendly UI that tracks and displays steps, calories burned, distance walked, activity levels, and more. For advanced users, much more is available via a membership. It, too, is accessible via Web or mobile app.

Both of these sites allow anyone to monitor and manage their health and fitness at whatever level they would like – from the casual user to serious trainers. And both have many

similar features but, each has its strengths: myfitnesspal is great for monitoring caloric intake, while Fitbit automates activity tracking.

Thanks to cloud, however, users are able to connect the two systems, allowing them to cross-pollinate data, further simplifying the entire process. Myfitnesspal integrates activity data from Fitbit and factors it into daily goals and achievements, while Fitbit receives consumption information from myfitnesspal, adding it into its measurements and dashboard.

While it may seem extraneous to have to use and manage two apps for one purpose, the truth is most users are already using a broad selection of apps to manage their daily lives. The addition of one more, given the ease of use achieved through the combination, is hardly an obstacle.

The point is that cloud is having a profound impact on our daily personal and business lives. The applications, features, and ecosystems that are emerging in cloud environments are changing not only how we communicate, but how we live. If you take a moment to think about how many times a day you use the cloud for your activities, you'll be amazed.

As for the wearable tech space, it promises to grow exponentially through the rest of the decade in almost every market. New use cases are being rapidly developed across a broad range of markets and most, if not all, will be leveraging cloud computing. We'll be talking about this exciting cloud-enabled market, from enterprise wearables to fashion – from sports to audio and sound – this July 22-24 at Wearable Tech Expo in New York. Come join us to see some of the amazing innovation that is enabled by cloud computing (www.wearabletechexpo.com).



by Rich Tehrani

Why Google and Apple Should Fear the new Microsoft

In decades of covering Microsoft, I don't recall the company enjoying so much positive press at one time. They are literally transforming before our eyes. Here's how:

Expanding its mobile presence: Office is universally used by hundreds of millions and finally making it available on iOS/iPad is a smart move, which came many years late. Perhaps the most important takeaway from this evolution is that Microsoft finally gets it – they have lost in the mobile OS war and had to buy Nokia as a last-ditch effort to not totally lose out on this space. They are finally making the right moves to be relevant in a mobile world.

Expanding software offerings to win: Microsoft, through its Office on iPad success, has learned that software is the key to getting into new markets and expanding its reach. Certainly Google knows this and has a wealth of apps and services which are fantastic – allowing it to entrench

in the speech market since pre-2000, if you count their TellMe acquisition. It has some of the best tech in the world, yet it hasn't really pushed it beyond Xbox. Finally, Cortana has been released as the company's Siri-killer.

MS "gets" ecosystem now? Microsoft has tried for a long time to tout its ecosystem – it tied its Xbox platform to its mobile devices, which didn't have the effect it hoped for. By bringing Office to iOS, it seems to understand the importance of the ecosystem is greater than the platform.

The cloud is the ecosystem: It's true that Microsoft's OneDrive (a product changing names too often) and Office 365 are wonderful central services to help drive the

It took many years for Microsoft to acknowledge that Google and Apple know what they are doing... Now it seems to have both companies in its sights.

itself in a user's life like no other entity. If Microsoft is reading the world correctly, it understands it has to do the same thing.

Finally, Windows is free... sort of: This is in part why the company has decided to give Windows away for free on devices smaller than nine inches. It really is hard to compete in this highly commoditized space – especially when you are fighting with Android, which is essentially free. It is worth noting MS recently cut the price of Windows 8.1 and Apple has stopped charging for its OS – the pay for OS market seems to have a limited shelf life.

Finally, the world learns Microsoft is a major speech player: In fact, it has been

company's entire strategy. One caveat, I felt like I was being robbed having to pay a significant amount for software I had already purchased on other devices, but Office is so much better than the alternative that there was really no choice.

In closing, the company is on the right track. These recent moves shows leadership finally understands cloud, mobile, ecosystems and how to leverage the brand's key strengths. The good news for users is more software choices. It took many years for Microsoft to acknowledge that Google and Apple know what they are doing... Now it seems to have both companies in its sights. Your move, Apple and Google. 



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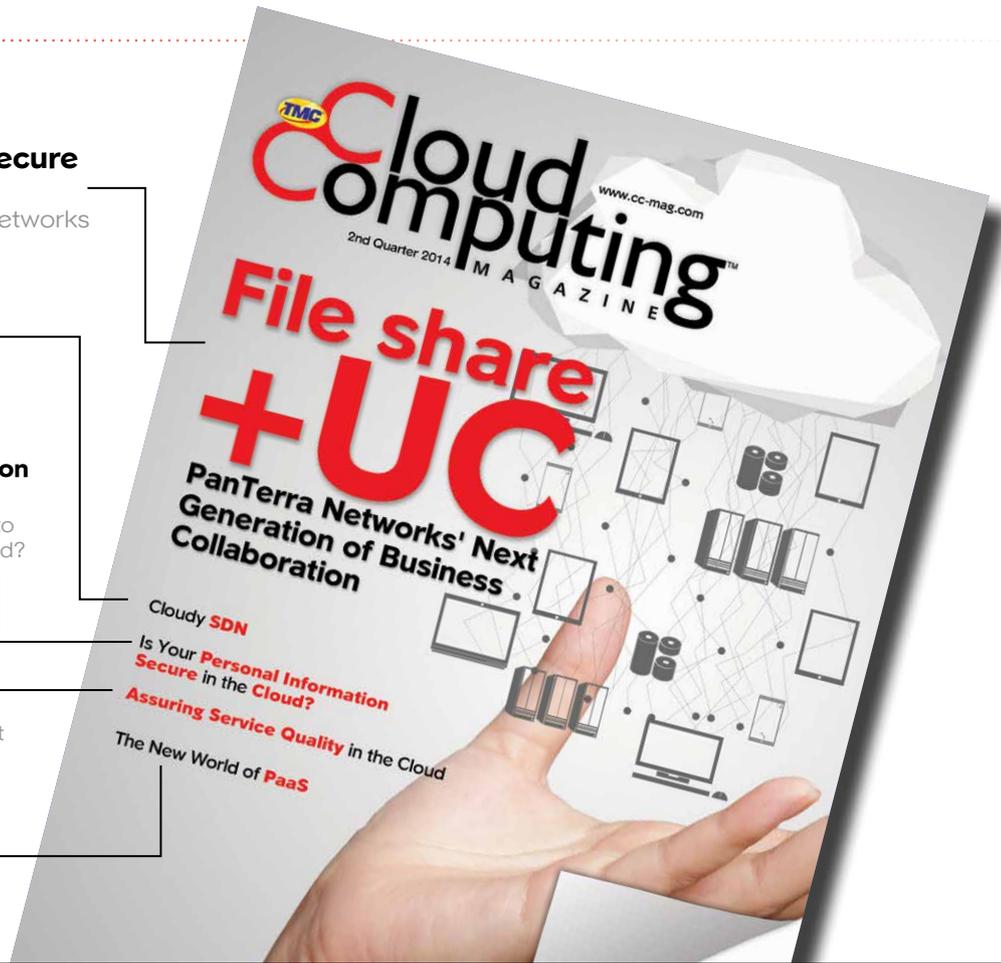
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Managing Hybrid Cloud

As we enter into 2014, we only need to look back a few weeks to the holiday shopping season to form a compelling argument for extending applications into the Cloud/Hybrid Cloud to address the need for fast, flexible capacity. According to comScore, \$42.8 billion was spent online from desktop devices, an increase of 10 percent compared to a year ago – a clear example of web-based systems temporarily needing extra capacity, while having the same needs for security and control. Hybrid Cloud is a powerful architectural concept. Properly managed, it can help IT organizations smooth capacity requirements, even in the face of large fluctuations in demand. But while it can be relatively easy to implement, Hybrid Cloud-based distributed applications aren't so easy to manage. New visibility issues and increasingly complex applications create the potential for Hybrid Cloud Applications to actually perform worse than those that only run in the data center.

The challenge of ensuring application performance is making Operations teams reluctant to evaluate new Hybrid Cloud environments, and subsequently, slowing deployments. Firms are interested in gaining the benefits, but are hesitant to move forward. Everyone is nervous about introducing this great new technology into their operational environment because of one word – visibility.

Performance and availability management live on visibility. Proper visibility allows application problems to be found and fixed quickly. Operating without that visibility is the equivalent of driving without a dashboard (or a clear windshield). Eventually, you're going to run into something, and it will grind everything to a halt.

End-to-end Transaction Visibility

So what is the proper visibility for distributed applications? Taking a service-oriented approach, the IT Operations team responsible for maintaining application performance has to focus on the delivery of business services:

- 1) Are they running?
- 2) Are they responding in a timely manner?
- 3) Are they acting correctly?

Answering these questions for business services requires end-to-end transaction monitoring, with hop-by-hop visibility across every server / machine within the application infrastructure. Only then can IT Operations understand where Transactions go, where they get stuck, and why. Complete Transaction visibility also allows Operations teams to solve many application problems without calling on technology silo experts to dive into code.

In Hybrid Cloud environments, the need for end-to-end Transaction visibility actually increases, even as Operations teams intuitively think that they have fewer systems to worry about. Ultimately, they must still deliver proper business service performance, which now run on systems both in the data center and in the public cloud.

It's a New World

For IT Operations, the key to performance management in Hybrid Cloud environments is being able to tie actions in the Public Cloud-hosted systems with the connected actions in the data center. With a host of "Cloud Management" tools to pick from, this one function is the most critical for ensuring performance and availability.

Step 1: Map and monitor transactions in the Data Center

The first step is to make sure you have a view of transactions in your own data center (or "on premise") systems. The dynamic nature of distributed applications means that tools should be able to adjust their transaction maps automatically – updating as individual application components are added and dropped from the overall system. (Most experienced IT Operations professionals will tell you that manual mapping efforts will be out of date before the Visio diagram finishes printing.)

Step 2: Map and monitor transactions in the Cloud

Remember, IT Operations is still responsible for Business Service Delivery. Just because a server resides off-premises, the responsibility doesn't change. Visibility of Cloud-based systems is absolutely necessary for Operations teams to maintain control.

Step 3: Tie them together

This is actually the most difficult part of the Transaction Management equation. There are some tools that can track transactions in the data center and some tools that can track transactions in the Cloud, but for IT Operations to understand the end-to-end performance of a complete business service, they must be able to stitch a "Login" Transaction that started in a Public Cloud-based Web Server with its specific "Login" counterpart over in the data center.

With an end-to-end transaction view, IT Operations have the ability to see everywhere transactions go, know whenever they get stuck and isolate the location of any problem (whether in the data center or the Cloud) quickly and accurately. Only with this capability can IT Operations support the Hybrid Cloud distributed application environments that will continue to grow and change. 

Vic Nyman is the co-founder and COO of BlueStripe Software.



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Consuming OpenStack:

Two Choices for Enterprise Success

Organizations that have been successful with OpenStack in production are those that possess significant technical sophistication. Service providers, like Comcast and Rackspace, and carriers, like AT&T, are great examples.

Enterprises, by comparison, do not invest in the same kinds of in-house technical skill sets. To be sure, there are some exceptions, such as Fidelity. But, most enterprises want to consume products, not projects. They want someone else to take responsibility for making sure the stack functions as expected, with toothy SLAs that give them some assurance that everything works as advertised.

Like any open source software project, OpenStack is not a product. It's not a cloud operating system. Rather, it's akin to the Linux kernel – a set of critical and capable core components one can use to form the

Let's take a closer look at the two models of OpenStack deployment. Neither is right, and one is not necessarily better than the other. Each has advantages and disadvantages. It is critical that you contemplate the differences and select the option with the highest probability of leading you to success in production.

DIY OpenStack

PRO:

DIY OpenStack works great if your IT team is culturally committed to a few open source projects already. If your team contributes code and speaks at open source conferences, that's probably a good sign.

If you need OpenStack to support a very specific workload that has unique infrastructure requirements, DIY might make sense.

anything other than evaluation scenarios and DevTest, you're going to need more time... Possibly a lot more time.

Also, DIY means you're building an island for yourself, and you'll be responsible for maintaining the deployment through semi-annual OpenStack code updates. Your documentation has to be spotless, because the people who build your cloud are going to be tempted to take a better offer, as the OpenStack hiring environment is red hot.

Consuming an OpenStack-Based Product

PRO:

Consuming an OpenStack-based product reduces risk and generally moves you into production faster. A vendor takes on the responsibility for adding all of the pieces to OpenStack necessary to build a complete cloud, and also commits to maintaining it as each update rolls out at six-month intervals.

CON:

Products require support and maintenance contracts. Since lock-in can be thought of as a continuum, there is some degree of commitment to a particular vendor, even if you hold the source code. Finally, choosing a product means making some compromises, since it's unlikely you'll find a product with precisely the combination of features you're looking for.

Conclusion

Some enterprises split the difference: they take on a DIY project strictly to evaluate OpenStack and become better educated to know what to look for when they choose a product for production. There's no wrong way to get going with OpenStack. But, you should fully evaluate the pros and cons of the two major deployment options before opting for one or the other.



Consuming an
OpenStack-based
product reduces risk and
generally moves you into
production faster.

framework of a cloud operating system. This is the core reason why you've not seen a great deal of enterprise adoption of OpenStack yet. Products built on OpenStack are only now maturing to the point that enterprises can reliably and confidently consume them to achieve specific business goals.

Also, DIY a good option if you really need to understand the code at an intimate level.

CON:

DIY is slow. Yes, you can download OpenStack and spin up a cloud quickly. But, if you want that cloud to scale and support



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One Reason to Choose Cloud Services

Speaking with a client today, he was discussing outsourcing some NOC services. The main reason was to get 24/7 support without burning out his best talent. Outsourcing talent makes sense because it saves the human resources department work while stabilizing the budget.

Cloud software works very similarly to outsourcing labor. During a discussion with AMDOCS about its software and solutions for the global cellcos, one thing became clear: no one carrier would have built the AMDOCS CRM and call center solution. The carriers get a multi-million dollar software package for a fraction of the cost of building one.

Salesforce is a far better CRM system than ACT was. ACT was inexpensive to buy. To get the capabilities of Salesforce, companies would have needed something like Siebel or Oracle. In addition, someone would need to tend to the software – install it, back it up, update it, etc. Today, Salesforce – or any of the others like NetSuite or Zoho – take care of all that for a monthly stipend.

Really, the reason to buy cloud services is to get enterprise grade applications outsourced for your company at a fraction of the purchase price.

When a company of 50 employees buys Office 365 subscriptions, it gets more than just Word, Excel and PowerPoint. It also gets Lync for the office domain with the ability to see who is available (Presence) and IM/chat (and screen share). The license management goes away. The updating disappears. The searching for the CDs to install, fix or update the software vanishes.

In place of the discs, users can log on to the service from almost any computer. Any user can access the software from almost any device since many (not all) cloud apps are browser based. No more worry about what version of Windows or can it support Apple.

The mobility, the software maintenance, the licensing and the functionality of the software are all handled by outsourcing the app to a cloud service provider. That's the reason you choose cloud services. 



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Cloudy SDN

SDN enables what cloud providers have in the data center. Or does it? Where does SDN end and cloud begin?

Even though Cloud is older, technologically, than SDN, there still remain many misconceptions regarding what, exactly, a cloud comprises. Cloud is, at its core, about the abstraction of resources that can be provisioned and managed programmatically. Whether we're talking IaaS or PaaS or even SaaS, Cloud requires the use of software-defined techniques to achieve the agility and cost-savings attributed to it.

SDN - Software Defined Networking - has at its core similar tenets. It is software-defined, using APIs to programmatically provision and manage abstracted network resources. The separation of control plane from data plane is an abstraction, turning the network fabric into a programmatically controlled set of resources that enables agility and, through operationalization, cost-savings.

The relationship between cloud and SDN is, well, cloudy primarily because of the focus on the use of SDN architectures to dynamically manage traffic. Poor network conditions such as congestion or connection faults can be remediated through what may sometimes be referred to as self-healing networks. But this capability is only realized because of the abstraction inherent in SDN architectures, and the ability to automate modifications to the forwarding tables used by switching and routing infrastructure - whether software on commoditized servers or traditional, purpose-built hardware. The automation, the operationalization if you will, of the network is achieved via a common, abstracted and programmatic interface: an API.

If you consider what you need to build out a cloud environment, you'll recognize that you'll need to abstract the network, the application service network, the compute, and the storage. Each of these sets of

resources must be able to be automatically provisioned and managed via some sort of common programmatic interface. There are a variety of ways in which you can abstract the network, one of which might be the use of SDN technologies. To enable cloud computing, you have to be able to dynamically provision the network, a task at which SDN is eminently suitable. That is, after all, what's happening under the hood when a forwarding information base is updated on a switch. A network service - routing or switching - is being provisioned. Key is that this provisioning occurs programmatically, via an API, as that means you can orchestrate the provisioning of network resources and services as part of the overall process.

Cloud providers, obviously, have already achieved this level of automation and programmatic control. Consider what's happening under the covers when you provision a virtual machine in a cloud environment. There are IP addresses that must be assigned, routing and switching tables that must be updated, and firewall rules that must be put into place. That's all happening via software. There's no bank of operators on the other end that manually execute these processes. It happens via software, via APIs. One of the enabling technologies can certainly be called SDN, as it fits the basic definition of what an SDN is: programmatic control over abstracted network resources. Separation of control from data planes.

Whether they've done so using commoditized or commercial products is irrelevant because the components from which the network services are derived are abstracted and integrated into a larger automation and orchestration framework that ultimately creates what we, on the outside, would call a "cloud." The same is true at other layers of the data center stack. Application services - load balancing, acceleration and optimization, and application security - must also be abstracted and managed programmatically. Virtual machine management enables program-

matic control over abstracted compute resources. Every layer of the data center stack is abstracted and programmatically controlled, enabling an automated provisioning and management system to orchestrate the data center.

What About OpenStack?

Where do technologies like OpenStack fit into the picture? OpenStack and other cloud management platforms enable a software-defined environment. That is, they enable through programmatic interfaces the ability to automate and orchestrate the provisioning and management of data center resources. Some might refer to the resulting environment as the Software-Defined Data Center (SDDC) due to the use of software to provision, configure and manage data center resources.

SDN can fit quite well into such environments. Most enterprise-class network elements already provide a programmatic interface (API) through which they can be managed and controlled. This API enables integration with cloud management frameworks like OpenStack either directly or via a more localized controller (the SDN controller, if so enabled). It is the cloud management platform that pulls together the various data center components - from storage to compute, from application services to network services - and provides the means to manage them all holistically via software.

It's important to not get caught up in current tendencies to focus only on the run-time aspects of SDN. While SDN is certainly capable of adjusting the network in real-time to mitigate a variety of network-related issues that may impede performance or availability, it is not the only capability SDN enables. It is also well-suited to enabling the programmatic provisioning and management necessary to implement a cloud computing environment. ☞

Lori MacVittie is senior technical marketing manager at F5 Networks.



The Cloud Ecosystem Journey

“It’s all about the ecosystem. There is a lot of innovation to come.”

That outlook came from Amazon CTO Werner Vogels in 2011 at the Cloud Connect conference. Prophetic? Maybe. But coming from the man behind Amazon Web Services, I see it as just well-reasoned thinking about the cloud’s ecosystem. Then, and now.

In a profound sense, the cloud has been a journey of innovation all along — perhaps more so than any technology we’ve

actually had to shift to an ecosystem drawing from various contributors.

Well-reasoned thinking, and point taken.

When you look at the cloud ecosystem today, it literally is “Everything as a Service.” Innovations from Salesforce.com to the iCloud have made the cloud a global commodity. There are public clouds, private clouds, personal clouds, clouds for contact centers, clouds for analytics, clouds for disaster recovery, clouds for markets like manufacturing and health-

not eliminated. Organizations increase flexibility and control to scale users and add functionality. Deployments are faster. IT requirements are fewer, falling almost entirely to the cloud provider.

The next phase of the cloud ecosystem? The technology is now becoming increasingly distributed in nature — it will soon provide a virtually seamless and infinite environment for computing, communications, analytics, Web and mobile services, and other business and consumer uses. Cloud solution deployments and management functions will

It will soon provide a virtually seamless and infinite environment for computing, communications, analytics, Web and mobile services, and other business and consumer uses.

ever experienced. Yet like any technology’s progression, developing the ecosystem for cloud technology has required shifts in thought at critical junctures. It has also continually required people and businesses to re-think their view of the cloud and its uses, often for the better.

In fact, Werner Vogels signaled one of the cloud’s more significant shifts in his keynote at Cloud Connect three years ago, when he reexamined the “metaphorical pyramid” of Infrastructure as a Service, Platform as a Service, and Software as a Service. It was a model, he said at the time, that restricted the way we viewed the cloud, and that even-

care, and branded multi-cloud services for customer care.

With a growing collection of services from a growing list of providers, cloud brokers even provide and support all that the cloud has to offer. Vital to the ecosystem, these brokers are actually playing greater roles as channel partners and business partners.

The cloud ecosystem benefit model, specified years ago to help ensure cloud success, also has taken hold. With most cloud solutions now available, upfront capital expenses are largely minimized, if

become ever faster, and simpler. The cloud’s cost and benefit model will become more attractive and available to more users. And with more far-reaching means and greater efficiency, organizations will improve collaboration between employees and make more personalized connections with customers.

Because the cloud’s potential still remains vast and largely untapped, the cloud ecosystem will continue to be a journey. We should all look forward to where that journey takes us. 

Jason Alley is solutions marketing manager at Interactive Intelligence.

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Three Tips for **Evaluating and Deploying IaaS** for High-Performance Apps

As organizations become increasingly comfortable with putting business-critical apps in the cloud, many – particularly Internet-centric startups – have completely bypassed making in-house infrastructure investments.

However, while virtual public cloud services can enable business agility with lower upfront costs, no capital spending and pay-as-you-go pricing, these organizations often encounter performance and cost challenges as they begin to scale out their applications.

As infrastructure and operations teams face these more complex, large-scale cloud deployments, the question is not whether a public cloud can support performance-sensitive applications but how to ensure they choose and deploy the right cloud solution. To this end, here are three suggestions:

Investigate bare-metal public cloud as an option

Applications and workloads that require more performance and processing power can put stress on traditional, virtual clouds. Performance degradation stems from the introduction of a hypervisor layer and the multi-tenant nature of virtualized public cloud platforms. While the hypervisor enables the visibility, flexibility and management capabilities required to run multiple virtual machines on a single box, it also creates additional processing overhead that can significantly affect performance. Also, when too many virtual machines compete for server resources, they become “noisy neighbors,” restricting I/O for data-intensive workloads, and resulting in an inefficient use of physical resources.

Bare-metal cloud has emerged as a way to complement virtualized services with a dedicated server environment that eliminates the performance constraints of virtualization and the hypervisor without sacrificing the elasticity benefits associated with the cloud. A true bare-metal cloud combines the high performance of dedicated, single-tenant servers with instant scalability, on-demand self-service and programmability via an API.

Bare-metal and virtualized clouds are not competitors. They are simply different flavors of IaaS technology that allow customers to meet a wide range of workload and application requirements.

In fact, establishing a mixed cloud environment is often an ideal approach. With this setup, companies can choose how to

best support each of their core applications and services on an individual basis, thereby reducing capital costs, maximizing operational efficiency and establishing a foundation for innovation through adaptable hosting models.

Take a hands-on approach to comparing IaaS offerings

When choosing a cloud solution for a high performance, business critical application, don't write an RFI/RFP/RFQ – these are all methods for learning about what the post-sale experience will be like. Instead, spin up some infrastructure with a few providers, and turn it off when you're done.

Taking this hands-on approach will allow you to gain a more in-depth understanding of what the offerings provide in terms of performance, availability, customer service and ease-of-use, among other criteria. Your staff will get invaluable hands-on time, and you'll likely spend less time and money than you would in a protracted sales process. This type of evaluation will give you a real-world view into how well a provider's infrastructure will support your specific applications.

Set the right expectations for your first high performance app deployment

When you're ready to begin your public cloud deployment for a performance-sensitive or data-intensive application, set realistic expectations.

Deploying your first application will require training. Don't forget incentives during this process, including your own. Establish achievable metrics and objectives, but don't create an artificial roadblock by placing too much emphasis on setting “perfect” goals at this point, or you'll never get started. Most importantly, don't be shortsighted – stay focused on long-term goals and results.

Inevitably, there will be issues that arise, and everyone will be quick to blame the infrastructure, so focus on an application that is robust and has a supportive user community. The real key is to start the process and prove to your organization that it can be done, which sets the stage for a more comprehensive application migration strategy. 

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Cloud Storage as We Know It Has an Expiration Date

Ten years after the birth of the cloud, Box, Dropbox and other early cloud-based platforms are starting to reap the rewards of their efforts. Box just filed for its IPO and looks poised to take on the enterprise giants of the Fortune 500, while Dropbox is basking in a \$10 billion valuation.

While it may look like the glory days for the cloud, these early movers have likely peaked and may go the way of video stores and compact discs if they don't evolve. They simply weren't designed to handle the volumes of data that assault businesses today and, according to storage provider SanDisk, business data is growing faster than ever, doubling every 1.2 years.

A new abstraction layer is poised to reform the cloud space, bringing integration, workflow and intelligence to these legacy systems. After struggling to extract ROI from the first-generation cloud, users will see payoff from the next iteration—and it's about time.

Hunting for Files, Folders and ROI

Cloud storage today doesn't address the most fundamental need that users have: how to get the most out of existing information. The ability to stash content in folders and access it anywhere spurred initial adoption, but now users are scratching their heads as to how these systems provide real ROI. IT arm-wrestles with uploads and permissions, content drowns inside of systems not designed to scale, and teams must cross-navigate different repositories in order to find a single document.

As it turns out, cloud storage simply virtualized the overflowing file cabinet. Despite having access to several file systems at once, workers still can't find anything. The typical user wastes up to 10 hours per week searching for information or reinventing content that is already stored somewhere else, according to research by IDC. Each document repository comes with a different user interface, a unique way of storing files and folders and different permissions — all of which amounts to time wasted.

The root of the problem is that cloud storage systems are designed with hierarchical file systems. These archaic structures are fundamentally unaligned with the quantity of content that exists today. They were built for a time when information overload came from singular events, like adding a large new customer, not the unrelenting data streams that assault the business today. With an influx of structured and unstructured data from sources

such as video, social media, sensors and mobile devices, the volume of business content is staggering.

Everyone keeps using cloud storage because it's sticky, and thus far, few good alternatives have been presented... until now.

Say Goodbye to the Hand-Cranked Cloud

The time is ripe for the cloud to grow another layer of abstraction. This layer will add intelligence to the cloud, enabling users to drive more economic value out of existing storage investments. Cloud players and third parties will innovate up the stack in order to solve the "I can't find it" problem that costs enterprises thousands of hours per year. Workflow, business intelligence and social add-ons will let users streamline how they process documents.

This new cloud will grow the ability to think for itself. No longer is the ability to simply store files online an entirely revolutionary proposition. Instead, burgeoning cloud services must fulfill the promise of the cloud to truly scale, both in storage and capability. Current file structures and practices are not scalable, at the most basic level, and need to be left where they belong—in the past.

We've already seen the promise of the cloud fulfilled in other realms. Services like Heroku take legacy structures, such as the servers running apps, and virtualize them. They take the job of provisioning and managing servers and turn it into automated tasks. Push a key, and your server power is doubled, in real time.

While the same could be said for cloud storage — you don't need to bring on new physical drives — the real problem point here is not storage, but access. What good is it to offer unlimited file storage when you can't ever find what you need?

The next step in the business of cloud storage will be to give users a way not to just expand storage limitations, but to free them entirely from archaic file structures and provide intelligent tools to help them surface content and extract true value.

Businesses must recognize that the frustration of the current cloud is a limited phenomenon. They may have to settle for less now, but not for much longer. 

Alex Gorbansky is CEO and Founder of Docurated



Personal Information in the Cloud, is it Secure?

In today's economy, we all shop online and use credit cards to some extent. Do you ever wonder what happens with your personal data after you hand it over? How do the vendors entrusted with this information protect it? What is done to keep financial data secure? How about medical information? Given several recent newsworthy security breaches, consumers ponder where all their personal information is processed and stored – and how safe it is.

These are valid questions. Consumers do not see what companies do with their personal information. Companies often outsource their technology operations, development or monitoring along with their data to third-party vendors. If they employ the cloud to store that data, they might outsource to a cloud service provider.

For their customers' sake, companies entrusted with personal information must maintain strict security protocols. But what about their third-party vendors? How are they validating vendor security posture? Are they using an audit trail? Are they monitoring for breaches? And, what are the third parties doing to ensure that certain customer data is kept separate from others? This is the multi-tenancy factor and involves data stored at any type of hosting provider. The answer to these issues lies in gaining an understanding of the technical security posture of the third-party vendor.

Coming back to cloud, there are steps that must be taken to examine whether data stays safe through its lifecycle. To ensure this, you must:

- Understand network, compute, storage and application resources;
- Realize how you are controlling access to different resources;
- Grasp virtualization and how security is orchestrated between data sets;
- Know how the data is aligned to all applicable regulations to ensure compliance;
- Determine how the stored data stays safe, no matter the technology challenges the third party faces; and

- Ensure clear separation of duties exists and that they are closely monitored.

All this must be done to promote strong security and it can be overwhelming. Therefore, it is not surprising that security is one of the top concerns today for both companies and consumers.

It's time for organizations to make sure they can answer essential questions their customers have about their data. Here are key questions consumers would expect company representatives to know about their personal data and how secure it is:

- How do you grade the security posture of your internally hosted data centers and your externally hosted data, including cloud service providers?
- What do you assess and how often (i.e., network, applications, cloud computing operation, IT organization, others factors)?
- Do you understand, from a technical standpoint, how the third-party handles security in the cloud and the dataflow of personal information?
- What type of application security controls and validations are in place?
- Do your third-party vendors perform background checks of technology and security personnel?
- What is needed to continue to ensure that your environment remains secure?

Companies also must recognize that the cloud provides a platform for them to run their applications or leverage an instance of an application to provide additional value to the consumer. They must determine how the cloud service provider adheres to a strong security lifecycle analysis so security is not just a point in time exercise. To do this effectively and efficiently, companies should focus their security efforts on the applications that host or manage their business' most critically relevant and sensitive data. Consumer questions were identified above, so now let us review questions what companies should ask their prospective third-party vendors when selecting or implementing cloud:

- What should be built into SLAs that pertain to terms and conditions and expectations about security and adhering to regulator rules?
- Holistically, how does the third party measure its resilience across a heterogeneous IT environment that might include a public and private cloud and a data center?
- What is the vendor's incident response plan and accountability if something does go wrong?
- What security solutions and controls are "out of the box"?
- What additional security solutions can be embedded to further increase protection?
- What proof is there that the third-party vendor has a history managing complex applications and sensitive data in an available, recoverable and secure way?

With so many questions to ask it can be overwhelming. However, it is now mandatory (under the Payment Card Industry Data Security Standard) for service providers handling credit cards to provide consumers with tightened security and proof of security controls and understanding. These include more comprehensive security approaches built on shared responsibility, improved traceability and clearer acknowledgement of responsibility between the company and its cloud service provider. Standards are in place, driven by organizations such as the Cloud Security Alliance, to help companies gain a better understanding of all the security issues that pertain to cloud.

In the end, it matters who you partner with and, during these times of security uncertainty, companies should find safety among cloud providers that have long histories protecting data. And they should always strictly validate their comprehensive security posture (internal data centers, external data centers, cloud service providers and applications) through thorough third-party assessment and review.

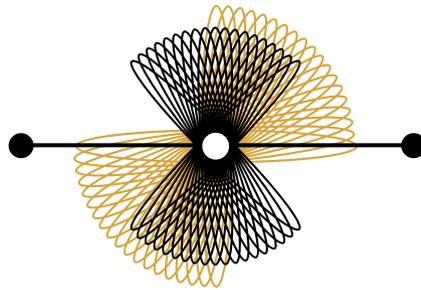
Matt Goche is a Sungard Availability Services security consultant.

experience



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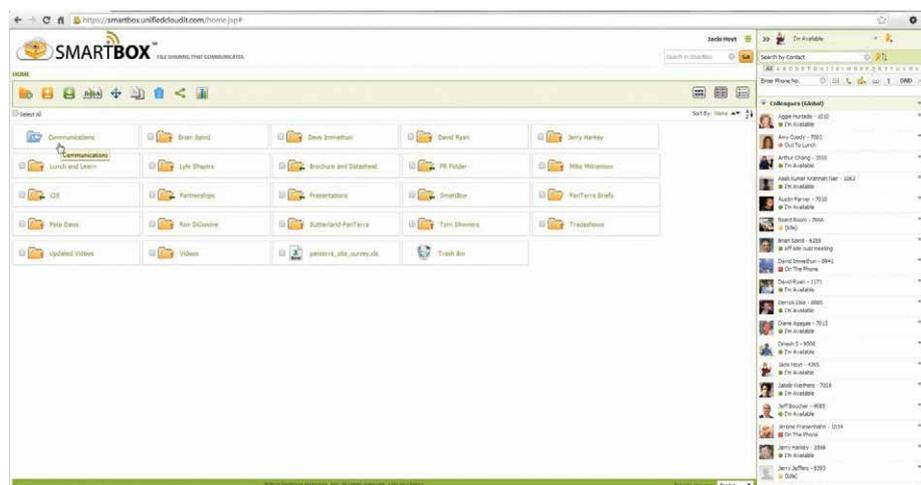
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SmartBox - Simple, Secure Cloud File Sharing

PanTerra Networks is probably the most innovative unified communications and file sharing cloud-based service provider you've never heard of, until now. TMC Labs was somewhat familiar with PanTerra Networks, but even we were surprised by the sheer number of UC and file sharing features built into their WorldSmart product suite when we took it for a test drive. WorldSmart's unified cloud services delivers just about every form of file sharing, communications & collaboration - voice, video call, IM, email, desktop sharing and fax. The WorldSmart suite includes two major components, CloudUC and the just launched (Jan 2014) SmartBox, which PanTerra calls, "the world's first file sharing service that communicates."

The entire WorldSmart suite is delivered from the cloud through a 100% browser-based UC client, leveraging HTML5 (previously Java) and eliminating any premise-deployed hardware or software. TMC Labs tested the entire WorldSmart suite, but the focus of our review is the recently launched SmartBox. SmartBox enables enterprise customers to securely share, sync and store files while seamlessly communicating and collaborating with users. In its most basic form, SmartBox is like Skype meets Box/Dropbox, but with many more enterprise-level features. In the more advanced version, SmartBox can replace an enterprise's existing communications infrastructure (PBX, conferencing, web meeting, etc.) while also providing



cloud-based file sharing services. Targeting mid-market enterprises 50 to 2,000 users, they built most of the technology and certainly the core technology themselves with thousands of customers currently running on their solutions.

The big differentiator between SmartBox and the other cloud-based file sharing players in the market is the integrated communications capabilities, including VoIP, video calls, voicemail, faxes, IMs, and call recordings, creating what TMC Labs will call "UC+" because it's much more than traditional UC. If, for instance, you share a document with John, Sally, and Sue, when you view this document you can instantly launch a group IM session, desktop share, voice or video conference with these three users. Essentially, all of your files are communications context-sensitive allowing you to launch directly into the communications channel of your choice with the relevant parties. No more looking up email addresses, phone numbers, or sending out a calendar invite to join a hosted web meeting session. Com-

pany colleagues and imported contacts are visible in a side panel with real-time presence. You already have the pertinent users listed and can have an ad-hoc meeting instantly. SmartBox combines file sharing, communicating, and collaborating all on a single solution, which is a huge productivity enhancer and helps reduce TCO.

SmartBox comes in two flavors – SmartBox Guest and SmartBox Enterprise. You would think the free Guest version would be fairly limited, but it surprisingly comes with a huge set of features including 2GB of storage, simple and secure file sharing, multiple share privileges, IM conference rooms, HD video calls, HD video conferences, as well as mobile applications for both Apple iOS and Android devices. It also includes the softphone allowing you to make calls, transfer, conference, record, and listen to voicemail. Both versions also feature full presence status of WorldSmart users such as when they are on the phone, in meetings, away from their desk or idle. All calls to other WorldSmart users are free from both SmartBox Guest &



Enterprise, but if you need outbound calling to PSTN numbers you'll need one of PanTerra Networks' calling plans. Additional communications services such as digital fax integration, DID numbers and call center queues can also be added to any seat.

Share permissions for both SmartBox Guest and Enterprise include owner, co-owner, editor and viewer for files and folders. One important capability is that you can share files and folders with non-SmartBox users using the same share interface. You simply enter in their email addresses and they are invited via email to register for a free SmartBox Guest account. PanTerra Networks tried to make it as frictionless as possible, so users who do not wish to register for a SmartBox Guest can still download the file, but they won't be able to modify and re-upload it. Once content is shared with a user or group, it automatically shows each individual's real-time presence and notifies you when a user downloads, views or modifies the file. This can be a huge advantage to sales teams that send out proposals since they'll know when a proposal has been viewed and can follow-up with a web-based VoIP call, IM, video call, invitation to an ad hoc web meeting, etc.

Main interface for communicating with contacts, plus uploading, downloading, & sharing

One of the main advantages to SmartBox is its ability to synchronize your files across multiple devices – laptops, tablets, mobile phones, etc. If you choose a file you want to have for offline viewing, the platform will automatically download it in the background and keep it synchronized. Currently, SmartBox downloads the entire file in the background and doesn't do any byte-level delta changes, which TMC Labs would like to see in a future release to improve performance and lessen bandwidth utilization.

Another nice feature is its Outlook plugin, which allows you to send attached

files from within an Outlook composed email thru SmartBox instead of sending the file itself.

The file is uploaded automatically into your SmartBox and only a link to the file is sent in the email. This eliminates "bounce backs" when the recipient's email won't accept large files and gives you much more control over the file.

For example, you can update the file after sending the email and the recipient will automatically get the updated version. It also allows you to import all your Outlook contacts into SmartBox.

Each SmartBox Guest user gets 2 gigabytes while SmartBox Enterprise users have access to unlimited storage. It has quota management and reporting built-in. It supports subfolder sharing with permission levels that can be completely different from its parent. This is a very useful feature. So for example, you can share a folder called HR with lots of subfolders that all executives have access to. Then you can change the permissions for a single subfolder, let's say 'Compensation' and grant access to only the CEO and CFO. The ability to have different permissions for subfolders is something that Box and Dropbox don't support. This allows companies to organize folders and permission levels the way people think and not have to resort to workarounds that often result in accidental disclosure / access to employees that shouldn't view certain data. The platform also lets you view at a glance how things are shared visually.

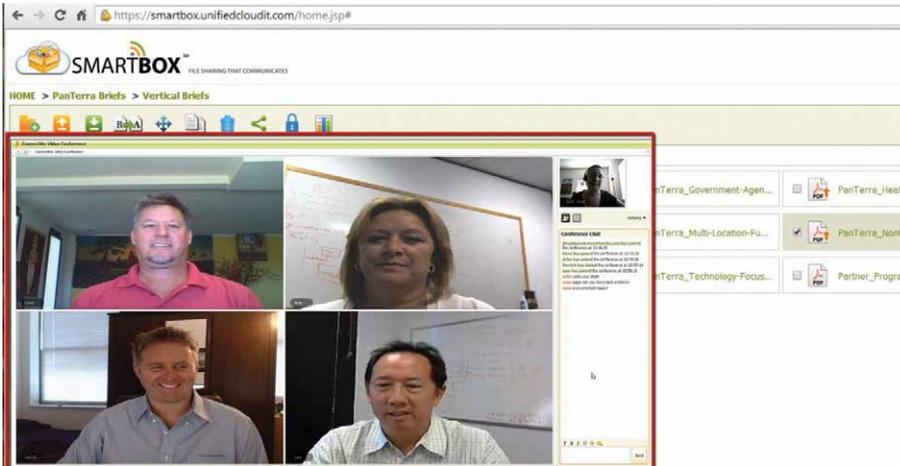
SmartBox combines file sharing, communicating, and collaborating all in a single solution, which is a huge productivity enhancer and helps reduce TCO.

You can see what's been shared in, what's been shared out, what has a custom permission share, a default share (inherited from parent), what files are locked/unlocked, and what files are synced to any device.

Currently, it has 4 permissions (Owner, Co-Owner, Editor, Viewer), plus a 5th permission (Previewer) coming soon that will only allow you to preview the file in the browser and won't let you download it. The owner and co-owner share permission levels and allows each to assign shares, take away shares, and of course the co-owner can take away all share level access except for the owner share. Editors can't do any of that, but they do have the ability to update/delete/modify subfolder content within the shared folder.

Separate Work & Personal Sync

The big cloud storage providers synchronize all your files to all your devices, whether you want it to or not. So for instance, if you install Dropbox on your mobile phone, tablet, work PC, and home PC, it's going to sync your personal and work files to all the devices. The risks are self-evident. SmartBox on the other hand lets you independently sync whichever folders you choose to whichever devices you choose. For instance, you could sync your "Home folder" only to your home computer, but configure your "Work folder" to sync to



your work desktop PC, your corporate tablet, and your mobile phone.

Security

SmartBox is integrated into PanTerra Network’s administration portal, which provides authentication of all devices accessing SmartBox, as well as access levels. It also provides remote management (block and wipe) and control of all access devices, should a device be lost or stolen. Also, they use 2-phase authentication for all devices. So if someone hacks or finds out the username and password, they still can’t gain access to the system. File transfers are encrypted during transit (RC4-128 by default) and all stored data is encrypted with AES-256 encryption. Similarly, all communications, such as instant messaging, are also encrypted.

For VoIP and video calling, it leverages HTML5 & WebRTC when available, which is supported in Firefox and Chrome. Mobile OS Android supports these as well, but Apple iOS does not. Both Android and iOS currently have standalone apps that get around the WebRTC restrictions to deliver voice and video calling. Using a PC browser, TMC Labs made some test HD video calls and both the video and audio quality were superb. We also did a desktop share session and the performance was also very good.

Multi-party video conference

PanTerra Networks told TMC Labs, “We guarantee access to our cloud. If we miss an SLA metric, we’ll credit you. We offer guaranteed 30 second response time to a support issue using our own secure instant

message, 24x7x365. We offer 99.999% - 5 nines of reliability and availability. You won’t even find an availability number from a cloud file sharing provider.” They use their own high available soft-switch for hosted SIP/PBX capabilities and tightly integrate it into their offerings. We inquired about potential last mile issues with jitter and latency. They told us that you can use your own data circuit and they have peering agreements with the major carriers to ensure quality. On the higher end, they can sell you one of their own circuits which they purchase at wholesale from the carriers and they’ll completely install and manage it for you giving you a full managed service solution. PanTerra Networks explained, “We’ll even sell you the hardware – the IP phones, the router, the switch, the circuit, the service – everything can be completely ‘white glove’ managed by us. That’s the only way, as you know, you can truly ensure and guarantee QoS all the way down to the end devices.”

They added, “When you’re delivering multiple cloud services over the same pipe by separate providers you will inherently experience inter-provider service collisions, inter-provider problems. Good luck in getting any of those vendors to solve that problem. With our solution, we own all the services coming down the pipe and in many cases we even own the pipe. So not only can we monitor inter-service interactions, but we are developing inter-service communications such that the services will automatically prioritize them-

selves when necessary to ensure QoS. For example, if you’re uploading 2TB worth of files into the cloud storage at the same time your company is doing a video call or multiple audio conference bridge calls, we can re-prioritize such that the real-time communications takes a higher level of priority. You can only do that if you’re a unified cloud service provider delivering those services yourself.”

Pricing

\$15 per month per user for unlimited secure cloud storage, file sharing and unified communications.

Ratings	Score
Installation	★★★★☆
Documentation	★★★★
Features	★★★★★
Usability	★★★★★
Overall	A+

Conclusion

Offering full end-to-end management of its unified cloud services, including last-mile bandwidth and associated networking equipment, is pretty unique. By controlling the full end-to-end infrastructure, PanTerra Networks can offer superior availability, reliability, security, scalability, QoS, Service Level Agreement (SLA) and support. It’s worth mentioning they offer 24/7 30-second live support. SmartBox is a very feature-rich collaboration, communications, file syncing, and file sharing platform that truly redefines what unified communications and file sharing means - enabling enterprise users to engage with each other and their customers using everything from file sharing to IM, VoIP to video. TMC Labs has seen many unified communications and file sharing solutions, so we aren’t easily impressed, but PanTerra Networks’ SmartBox has carved out an entirely new aspect of unified cloud services by combining cloud-based file sharing & sync along with traditional UC features such as VoIP and video, and for that we bestow our Editors’ Choice Award. 

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Managing Migration to the Cloud

A recent study featured in ComputerWeekly, found that more than 40 percent of IT professionals surveyed confirmed that their company's operational efficiency improved after moving to a cloud environment. According to the study, taking IT to the cloud helped businesses adapt to market changes and target new customers. The survey also reported that robust cloud adopters are 117 percent more likely to use the cloud to make better, data-driven business decisions. More than half the companies relying upon the cloud concluded that their information infrastructures improved because the technology enabled them to have quick access to data and knowledge, without the headaches of capacity constraints. They stated that with cloud, they have the power to build up revenue streams and target new markets.

Despite the proven cost saving and business advantages offered by cloud computing, CXOs are still wary about making a move to the cloud. While they are aware of the obvious benefits of an enterprise shift to cloud computing technology and how it drives innovation and business growth, what worries them are the potential challenges that come with such a migration.

Relying on cloud for critical storage could leave organizations vulnerable in the event of a network outage. When moving to cloud, security of crucial information is another key concern that comprises information theft, computer hacking, as well as unauthorized access to organizations' sensitive data.

Despite these concerns and because of the net benefits offered by moving applications to the cloud, the cloud computing market is expected to grow from \$40.7 billion in 2011 to \$241 billion in 2020. Therefore, CIOs must find ways to efficiently manage their move to cloud. They need to evaluate what should be moved to cloud, how to structure the relationship with their cloud service provider, and how to manage risks while operating in a cloud computing environment. CIOs should also take into consideration various security and application risks and process complexity along with the degree of customization required. Moreover, they need to identify potential deal breakers during migration to the cloud.

There are several factors IT teams must consider as they move their organization to a cloud ecosystem.

Is organizational data too sensitive for the cloud?

CFOs and CIOs are usually unsure about placing their organizational information off-premises or in the cloud. For them it's easier to control something that is physical and more tangible. An evaluation of the data can help them make the right decision about which data to move and which data to manage internally. For example, CIOs need to ask these questions before moving their data to the cloud - Should personal data including information like social security numbers, bank account information, HIPPA regulated health data, etc. be moved to the cloud? Are there restrictions upon the geographic location of company's cloud servers? How would cloud applications interface with native desktop applications to provide the right blend of functionality, accessibility and security for the needs of the company?

Determine what type of cloud can best serve business needs

Be it public, hybrid or private cloud computing model, each offers unique benefits for different businesses. A public cloud would be a good choice for those looking to replace a service or application that is currently running on-premise. Switching to a public cloud model provides additional features that an onsite upgrade cannot offer. Some motives to consider the public cloud should be:

- If hardware or software is approaching End of Life (EOL) and upgrading it is too costly
- If business needs exclusive features that it can't get from an onsite solution
- If servers and specialized applications are not centralized
- If the aim is to obtain high-availability for only one or two solutions

On the other hand, a hybrid cloud solution can prove beneficial if an organization has already made investments in software, hardware and solutions, but are still thinking of augmenting their IT network. Companies should consider migrating to the hybrid cloud model in case of the following situations:

- Already have centralized IT resources, but need to add a critical feature to them that is better delivered via hybrid cloud
- Business demands secure server backups or a data archiving solution

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- Business works around high-risk data governed by regulator controls such as HIPAA, PCI or FISMA
- Organization has complex legal requirements, requiring enhanced logging or secure access to sensitive data

Know your cloud service contract

It is important to review the cloud service contract carefully before moving ahead with a migration. A contract may contain terms from vendors, such as, “The SaaS vendor can suspend your right and license to use services, or terminate the agreement in its entirety for any reason or no reason, at its discretion at any time, with, at most, 60 days’ notice” OR “You bear sole responsibility for adequate security, protection and backup of your data, even though the other party is hosting it.” (Computerworld - “*Best practices for scaling up SaaS*”). Such terms will need to be evaluated in the context of the company’s requirements.

Before entering into any contract, make sure that the service provider’s incentives and governance are in place. Among other considerations, there are key contract areas that CIOs need to pay attention to, which include - Does the service provider offer an evaluation period to test its cloud services? In the case of potential system failure, what back-up plans will be provided by the vendor? If the cloud service provider ceases its operations, what process should be followed for operationalizing the company’s information hosted in the cloud?

Avoid the ‘Vendor Lock-In’ and ‘Technology Lock-in’ situation

Many organizations are rightly concerned about being fixed to a single vendor or a technology that may be hard to upgrade. To accurately gauge the risks of vendor and technology lock-in, CIOs must look at different factors, like whether the service provider uses industry standard APIs, if a shift to another vendor is taking place, will the existing cloud service provider promise quick data extraction? Can

the services offered by the current vendor be controlled by third party control panels?

Pick the right vendor

1. Research well - While selecting the cloud service provider, the choices will range from established companies to unknown startups. To assess a vendor’s reliability, it is essential to ask them to provide customer references, talk to the companies they serve and do some online research as well. Remember, the vendor picked should have a strong track record for both performance and customer service. For example, CIOs should check for latency (i.e., if the vendor is slow in dealing with the arising problems, the response time to customers is likely to suffer, adversely impacting business performance).

2. Cost Visibility: CIOs should have a complete sense of what amount they will be charged for different cloud services they avail from the selected vendor. If they don’t have a clear visibility into how the cloud service provider charges them, they can expect a huge bill at the end of every month. There are many free tools to help manage cost visibility. CIOs should not jump into the cloud without them.

3. Security in the cloud – Security of enterprise data and applications is a huge concern. CIOs should only engage with the service providers who adhere to industry standards, like Security Assertion Markup Language (SAML). This will ensure the highest levels of security when moving data to the cloud.

4. Compliance – There are several compliance requirements that must be met when moving to a cloud environment. This changes according to the requirements and IT infrastructure of each organization. Some of these include PCI, GAAP, HIPAA, SOX, and IFRS. CIOs should fully appraise their organizations’ compliance requirements, and evaluate to what extent the vendor meets those requirements.

While creating a migration strategy, some of the other elements that CIOs often overlook are the bandwidth cost of moving significant amounts of data to the cloud, the time taken to transfer data in the migration process and the downtime, training etc. involved in the process.

No doubt, the complexities involved in the cloud migration are numerous, but delaying a move or poorly executing the migration process could impact organizations’ competitiveness. CIOs that follow a disciplined approach to cloud migration end up finding unprecedented levels of business efficiency and growth. Those who rely on a haphazard methodology might find themselves steering their organizations into risks for which it is difficult to find a way out. By strategizing a path that smoothly manages the cloud transition costs and risks, CIOs can end up with the best business outcomes. 

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Scale-Out **Virtual Environments** and the Future of **Storage Infrastructure**

International research firm IDC recently found that more than 50 percent of all server workloads today are implemented in a virtual machine (VM). Due to the capabilities of virtualization technologies, there has been a clear paradigm shift in data center infrastructure and management. Virtualization has become a mainstream technology used by data centers and service providers alike.

Yet the rising popularity of virtualization is demanding unprecedented levels of storage, since virtualization allows organizations to simultaneously run a significant number of applications at a given time. This jump in storage demands has instituted a renewed focus on storage strategies that can deliver sophisticated management, efficiency and flexibility.

A Lot to Offer

The increase in demand for virtualization solutions can be attributed to the benefits of flexibility and cost savings they have to offer. Significantly, virtualization lets organizations make more efficient use of the data center's hardware. Typically, the physical servers in a data center are idling for the majority of the time. Organizations can enhance the use of server CPUs and hardware by installing virtual servers inside the hardware, a solution that optimizes the benefits of virtualization and saves money.

Another notable benefit of virtualization is its ability to allow for more flexibility. Having virtual machines in the organization's infrastructure is far more convenient than physical machines. For example, if an organization needs to change hardware, the data center administrator can simply migrate the virtual server to the newer hardware, achieving enhanced performance at very little cost. Prior to the use of virtual servers, administrators were required to install the new server and then reinstall and migrate all the data stored on the old server; a much more complex process. It is substantially easier to migrate a virtual machine than it is to migrate a physical one.

Virtualization for All

Data centers that host a significant number of servers – somewhere in the range of 20-50 or above – are looking

to transition these servers into virtual machines. For one, these organizations will be able to realize substantial cost reductions and increases in flexibility. Additionally, virtualized servers are far easier to manage. The sheer physical challenge of administrating several physical servers can become quite cumbersome for data center staff. Virtualization equips data center administrators with the ability to run the same total number of servers on fewer physical machines, easing their workload substantially.

Keeping Up With the Demand

Due to the growing trend towards virtualization, there is considerable stress being placed on traditional data center infrastructure and storage devices. In a sense, the problem is a direct result of the popularity of VMs. Initial VM models made use of local storage found within the physical server, making VM migration between physical servers impossible for administrators. Introducing shared storage – either a network-attached storage (NAS) or a storage area network (SAN) – to the VM hosts solved this problem, thereby paving the way for stacking on more and more VMs. Eventually the situation matured to today's server virtualization technology, where all physical servers and VMs are connected to the same storage.

The challenge? Data congestion.

A single point of entry becomes a performance bottleneck very quickly, and with all data flowing through a single gateway, data can get congested during periods of heightened activity. The number of VMs and quantity of data are projected to grow exponentially, setting the stage for a shift in data center infrastructure design.

Lessons to be Learned

Early adopters of virtualized servers have already encountered this issue and are taking steps to reduce its impact. As other organizations transition their data centers towards virtual environments, they will run into this growing challenge as well.

There is hope for a solution yet for organizations opting to virtualize while evading the data congestion challenges caused by traditional scale-out environments. By eliminating the single point of entry, they can ensure that their storage architectures are keeping up with their rate of VM usage. NAS or SAN storage

solutions today inevitably have a single access that controls the flow of data, leading to congestion when demand spikes. Rather, organizations should pursue options that have various data gateways and distribute information evenly across all servers. That way when several users are accessing the system at once, it can sustain optimal performance and reduce lag time.

Although this approach represents the most direct solution, the upcoming generation of storage architecture is offering another alternative.

Unified Computing and Storage

To meet the storage challenge of scale-out virtual environments, an entirely new approach is taking shape. Running VMs within storage nodes (or running the storage inside the VM hosts) – thereby turning it into a compute node – is quickly becoming the future of storage infrastructure.

Ultimately, this flattens the entire infrastructure. For example, if the organization is using shared storage in a SAN, usually the VM hosts from the upper-most storage layer, essentially transforming it into a solitary storage system with a single entry point. In order solve the data congestion problem this approach creates, organizations are transitioning away from the traditional dual-layer architecture that has both the virtual machines and the storage operating on the same layer.

Moving Forward

The growing trend of infrastructure virtualization is not slowing down anytime soon, nor are the benefits associated with it. In the same IDC study referenced above, research showed that consumers were anticipating hardware utilization rates of 60-80 percent. Undeniably, more and more companies will implement virtualization and will subsequently run into the performance lag issues described above. However, by following in the footsteps of the early adopters and adhering to the best practices they created, organizations can develop a successful scale-out virtual environment that optimizes performance and keeps infrastructure expenditures low.

About the Author:

Stefan Bernbo is the founder and CEO of Compuverde. For 20 years, Stefan has designed and built numerous enterprise scale data storage solutions designed to be cost effective for storing huge data sets. From 2004 to 2010 Stefan worked within this field for Storegate, the wide-reaching Internet based storage solution for consumer and business markets, with the highest possible availability and scalability requirements. Previously, Stefan has worked with system and software architecture on several projects with Swedish giant Ericsson, the world-leading provider of telecommunications equipment and services to mobile and fixed network operators. 



The New World of PaaS

As with any emerging technology, cloud computing has taken on multiple identities, in terms of usage, implementation, and uses, as time passes. From the generic concept of cloud computing, we've now reached what can best be described as an Anything-as-a-Service world, where nearly any traditionally locally deployed technology can be delivered through public and/or private clouds. Security, DR, Storage, Communications, Testing, and nearly any software package businesses require is readily accessible through cloud services. But, at the heart of all of these lie IaaS (Infrastructure-as-a-Service) and PaaS (Platform-as-a-Service), which enable the agility and flexibility cloud "business" boasts.

Of the three main cloud service layers, PaaS is, perhaps, proving to be the most useful. Certainly, IaaS delivers the scalability required to meet peak demands and growth expectancy, but the rapid development and migration of applications and services with PaaS has the potential to significantly reduce time to market, a key consideration for businesses in a highly competitive market.

Sitting between the SaaS and IaaS layers, PaaS provides an agile development platform for not only developing applications, but testing and preparing them for cloud deployment, and then migrating them into production environments.

Mendix, for instance, has designed its PaaS offering for agility, basing it on what it calls a "no code" principle. Instead, its visual model simplifies app creation and migration. The result is significant reduction in time to market, allowing IT teams and business leaders to collaborate on building effective applications.

"We enable companies to dramatically cut down the time it takes to build business apps," says Johan den Haan, CTO, Mendix. "What used to take large IT organizations months, or even years, can now be done by small teams in days and weeks."

Steve Harris, senior vice president of products, CloudBees, agrees that businesses need help developing and deploying apps. They need to be able to focus on their core businesses rather than spending exorbitant time creating cloud-ready apps, especially at a time when the cloud, itself, can be leveraged to simplify the process.

"It's about helping people build, deliver, and manage their apps in the cloud," Harris says. "There is nothing to install; you go to the website, sign up, and you have a complete environment to create, build, test and deploy applications. The result is reduced time to market, higher quality, faster delivery, and reduced risk."

Models can vary, but that's part of the attraction of cloud – businesses have options when it comes to PaaS options for their app development needs. They can use private or public cloud, or a hybrid alternative, for developing, testing, and ultimately deploying apps. They can even develop in the cloud and deploy on premises. Recent data and security breaches aren't doing vendors using the public cloud any favors, not surprisingly.

"One of the biggest hurdles for PaaS adoption remains security," says den Haan. "Companies don't want to have their data in the public cloud, which is why the private PaaS play is a necessary option."

Despite that, Mendix has a near-even split of public and private cloud users among its customers, and at least some of that is dependent upon the nature of the customer, and whether it can meet compliance standards in the public cloud. But what many businesses neglect to consider is, not only do they have the same vulnerabilities in their own data centers, but cloud providers have at least as much to lose, if not more and, therefore, are likely to ensure strict security measures are in place.

Continuous Development Model

While it's easy to see the draw in being able to launch applications more quickly thanks to an efficient development platform, the greatest benefit of PaaS platforms may lie in their ability to support a DevOps model of continuous development. Rather than build, test and deploy a finished product, the idea is to create a constant cycle of enhancement and improvement. It's a strategy that is gaining momentum in a market in which time to market has become the dominant metric for success.

den Haan says this is the beauty of PaaS. Recognizing that the complete application lifecycle includes a live testing and feedback element, platforms like Mendix are critical to this new methodology, where it's become acceptable to publish imperfect apps, knowing the ability for continued tweaking and enhancing exists. In the spirit of entrepreneurs, the model creates a market of equals, allowing businesses to focus on their products and not the technology used to create them.

“End users can give feedback easily on ideas and functionality that can all be managed as new requirements, then a new version can be built and deployed easily because the agility is built into the platform,” den Haan says. “There are more and more people adopting this way of thinking, and PaaS will help level the playing field and make it a market of business models and product and service, instead of those that have the best technology.”

The continuous development approach is reaching mainstream businesses, which are gaining confidence in the model. These PaaS platforms address everything in the development process: writing, storing and connecting source code; building and testing the apps; moving apps into staging areas and preparing them for production; pushing them into production environments; and collecting feedback and starting the process over to create enhanced products.

“DevOps is really about pushing out changes all the time and having confidence that it won’t negatively impact experience,” explains Harris. “It isn’t just the app – it’s the configuration and the deployment and the new culture associated with the process that has been a business driver for us.”

The only way to reasonably go engage in a continuous development process is through the cloud, as the elasticity allows for different parts of the process to be scaled up and down quickly and easily. For instance, a business has been working on an app for the better part of six months and is finally ready to put it through a rigorous load testing process, which requires much more compute capacity than the team has available. Cloud makes it possible. It also builds confidence in cloud, driving more and more cloud utilization in the process.

“Companies see the way they build and test apps and want to understand how to take advantage of cloud resources for their build and test environments,” notes Harris. “As comfort levels increase, they start to see how they can use cloud in their production environments, and just do it, connecting to existing back-end systems that they aren’t going to move to the cloud.”

Anyone who has downloaded mobile apps knows well how frequently

apps can be updated. It can be a nuisance, but it tends to be much more desirable than the two-year release cycles that were once the norm. App development has become a highly incremental process, which serves multiple goals. Not only does it allow for continuous improvement, but it shows users that such work is being undertaken for their benefit, and it works as a branding exercise – each time an app is updated brings the brand to users’ attention.

Internet of Things Impact

Among the growing areas in tech that will likely have a profound ability to leverage PaaS is the growing host of IoT developers. Not only will applications be pushed out rapidly to take advantage of early opportunities, but the scalability that will be required for IoT applications will exceed anything most businesses will be able to provide internally. In fact, IoT is less about the devices and more about the apps. Devices are merely a conduit for passing information between users and devices. It’s the apps that turn masses of data into actionable intelligence. And it’s PaaS platforms that will enable the apps to be developed quickly to take advantage of emerging trends.

“Yes, we can see it already,” says Harris. “It’s really a good affinity with what we are doing. And what happens is potential exists for things to be connected that will be providing information at massive scale. Many of these startups need scalable resources to handle success of their apps, which is a great fit for cloud and PaaS.”

Is PaaS the Right Choice?

Given the state of the market and the need for ever-faster development and deployment models, combined with a growing acceptance of imperfect apps in production environments, the answer to the above subhead is a resounding yes. In fact, to compete, it’s hard to imagine not moving to cloud and PaaS. In a software-centric world, anyone can become a competitor, small or large. It’s when the largest players become competitors to smaller ones that the market dynamics change, so smaller operations, in particular, must stay ahead of the curve.

Adoption is going through the roof, says den Haan, as businesses and developers start to understand the benefits of PaaS, and are coming to terms with cloud. IBM’s announcement that it will invest \$1 billion in PaaS will undoubtedly help drive the market, and Cloud Foundry’s growing success on the open source side will help build even greater momentum.

“I don’t think there is a choice,” den Haan predicts. “Businesses will either disrupt or be disrupted. Every company is becoming a software business – it’s the only way to survive – and PaaS is the way to compete effectively and ensure you have the ability to support the needs of the business.” 

Businesses will either disrupt or be disrupted. Every company is becoming a software business – it’s the only way to survive – and PaaS is the way to compete effectively.

Challenges of **Assuring User Service Quality** in the Cloud

With seemingly “E”verything moving to the cloud, a significant amount of attention has been paid to what can and should be moved, when, where, why, how and by whom. However, not much has been written about the challenges associated with the actual user experience posed by moving information and apps from a dedicated resource to a shared one. After all, many of the benefits of cloud from scalability to availability to cost savings are rooted in increased sharing. However, with sharing comes the potential for service degradation caused by latency, packet loss, jitter and a host of other issues.

This degradation is a significant issue for service providers as they look to meet their SLAs and use performance as a means for competitive differentiation in hotly contested markets. It could portend challenges with cloud adoption rates down the road which could be successfully dealt with based on appreciation of pain points and by taking appropriate steps to eliminate them sooner rather than later.

How to maintain service quality in the cloud is the subject of an insightful new book by Randee Adams, Consulting Member of Technical Staff, and Eric Bauer, Reliability Engineering Manager, Alcatel-Lucent entitled, *Service Quality of Cloud-Based Applications*, and a recent TechZine article that highlights key findings and recommendations of the authors exhaustive analysis of the issues.

I spoke with co-author Bauer, who walked me through why the entire cloud ecosystem needs to understand the realities of cloud-based service degradation and how to address them.

“Let’s start with the fact that, first and foremost, customers’ expectations are that, regardless of where their applications reside – in the cloud or on traditional native hardware – their experience is of the highest quality. The user does not care about infrastructure. He cares about things like availability, reliability, responsiveness, retainability (for instance in streamed video sessions) ease-of-use, security, and utility. This is why getting the cloud-based user experience to meet or exceed expectations is non-trivial,” Bauer noted.

He added that, “Realizing that, from a customer experience perspective, there are multiple Key Quality Indicators (KQIs) that need to be recognized and standardized in order for service providers to have metrics for the quality of experience they are delivering, which vary depending on the application invoked, is critical. This is not just for service providers, in terms of monitoring performance or remediating issues but, obviously, also in terms of their ability to meet Service Level Agreements (SLAs).”

The unique challenges of service quality and the cloud— impairments to QoE

The new book builds on the authors popular 2010 and 2011 works (*Beyond Redundancy*, and *Reliability and Availability of Cloud Computing*) to concentrate on quality of experience (QoE). It concentrates the complexities of cloud-based QoE, which is influenced by such things as virtualized compute, memory, storage and networking resources delivered by the cloud service provider that hosts the execution of the application software. It is also influenced by the cloud-based technology components that contribute to the application service.

As Bauer said, “These resource-facing capabilities bring additional impairment risks into play. An application may have to contend with inconsistent infrastructure resource delivery due to resource contention or virtual machine (VM) failures such as stalls and premature releases. These impairments can impact customers by degrading application service quality.”

The big risk to service degradation in the cloud is infrastructure service latency. In non-virtualized applications, the fastest and slowest query response times aren’t markedly different. However, the same app executing on virtualized infrastructure, “often experiences a knee in the service latency distribution and a tail after which operations have significantly greater service latency. Users who encounter particularly slow response times in the distribution’s tail may lose patience with the virtualized application.” Another way of saying this is that they have exceeded their KQI threshold.

This latency impairment is demonstrated in the graphic below.

As Bauer explained, “Latency is not the only issue that creates impairment issues when moving to the cloud.” Others include:

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Impairments created by shifting accountabilities

A cloud service provider may bring together software, networking and as-a-service components from multiple vendors to realize an application service, making tracing problems and determining responsibility for fixing them problematic. These can be addressed through standardized cloud infrastructure service quality metrics to keep everybody honest and accountable.

Impairments created by new partnerships

In addition to application software, application instances executing on cloud infrastructure rely on critical components provided through partnerships to deliver acceptable QoE. These components include: virtual machines, connectivity-as-a-service (which are vulnerable to packet loss, packet latency, packet jitter and unavailability impairments), and technol-

ogical components offered as-a-service, which can shorten an application's time to market and reduce operating expense. The authors add that capabilities like Database-as-a-Service (DBaaS) and Load-Balancing-as-a-Service (LBaaS) allow cloud service providers to 'buy' a mature technology component service rather than 'building' private and application-specific instances. However, these offerings are vulnerable to service reliability, latency, quality and unavailability impairments as well.

Architect applications to minimize the impact of cloud infrastructure impairments on end customers. In addition, test applications with likely infrastructure impairments to ensure that customers consistently receive acceptable service quality.

Recognize that good fences make good neighbors. Agree on SLOs (Service Level Objectives) for all cloud infrastructure KQIs so that fault isolation can be expedited when applications encounter user service quality impairments. Better definition of service boundaries and requirements will make it easier to pinpoint problems and determine who has ownership for fixing root causes.

Bauer also noted that, in an effort to help service providers deal with the challenges cited, ALU, in partnership with AT&T, has proposed that the industry (e.g., ETSI NFV, QuEST Forum) standardize quantitative KQIs for application-facing services

The user does not care about infrastructure. He cares about things like availability, reliability, responsiveness, retainability (for instance in streamed video sessions) ease-of-use, security, and utility. This is why getting the cloud-based user experience to meet or exceed expectations is non-trivial.

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Help and hope are available

While the book contains over 150 illustrations of problems, for readers, the good news is the authors also provide recommendations as to how the challenges they present can be overcome.

Understand that different applications have different customer-facing service quality sensitivities relative to cloud service provider impairments.

exposed by IaaS/NFV infrastructure to accelerate maturation of cloud infrastructure service quality across the industry.

Bauer concluded by highlighting the fact that, "Increased utilization means somebody waits. It is a time-shared system and not dedicated access. The task at hand is to assure that waiting is imperceptible to the user or they will go elsewhere."

A good way to look at how to assure quality of service in the cloud is to think of what are three pillars for either avoiding impairments completely, or mitigating their impact as fast as possible. Visibility, metrics and accountability are all part of the solution for achieving a QoE glide path that can be a win/win for all members of the cloud ecosystem and their users. We may be early in the learning curve how best to optimize impairment issues, but reading the book and getting involved with the ALU/AT&T efforts with ETSI is a way to stay informed and help shape the future. 

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by Peter Bernstein

CSPs Need to Offer Bundles of Traditional and Cloud Services

Conventional wisdom has been that small and mid-sized businesses (SMBs) are the “low hanging fruit” for cloud services. In fact, the market has validated this. However, an interesting question has been whether or not SMBs would be willing to use their existing communications service provider (CSP) for some combination of traditional and cloud services.

New global research done by Coleman Parkes Research for customer experience systems and services solutions provider Amdocs sheds some interesting insights on this subject. The findings are encouraging for CSPs if they recognize the opportunity and act.

Plenty of opportunity if bundling is done right

The research surveyed 1,311 SMB decision makers from North America, Europe, Latin America and Asia Pacific. Key findings include:

- 66 percent of respondents said cloud-based services are very important to their business
- 57 percent already use cloud-based services
- 44 percent of those not yet using cloud-based services are actively considering them
- They consumed cloud services for storage and backup (72 percent), computer networks (48 percent) and office software (41 percent)
- SMBs engage three different vendors on average for cloud-based services
- Only 45 percent said they get cloud-based services from their primary CSP
- 74 percent prefer to receive cloud-based services from their primary CSP

- 41 percent believe they can get better deals from independent cloud vendors
- 32 percent did not ask for or receive information about cloud offerings from their primary CSP
- 31 percent do not believe their primary CSP offers cloud-based services
- 68 percent said they are more likely to select a service provider that offers cloud-based services over one that does not

revenue opportunity for service providers who choose to capitalize on this. Those who become a one-stop-shop for all SMB communication needs, focusing on what SMBs consider essential such as bundles with cloud-based and traditional services, as well as a unified bill, will be most successful.”

The fast take on the survey is that there remains plenty of low-hanging fruit to be picked. The target audience is aware of and interested in cloud-based services. There is also an inherent call to action to traditional CSPs that if they have not gone into the cloud business, or if they have not upgraded their OSS and BSS systems to be able to bundle traditional services with cloud services as SMBs migrate more and more to the cloud, this is the traditional CSPs’ market to lose.

The message to primary CSPs is clear. If you are not in the cloud-services market you are late.

- 44 percent said they will switch from third-party cloud services providers to their primary CSP if offered bundles of traditional and cloud services
- 80 percent said they want to receive one bill for all the communication services they consume

“The research validates that there is increasing need and adoption of cloud-based services by SMBs,” said Ian Parkes, managing director at Coleman Parkes Research. “The research identified that service providers are considered a viable and even preferred source for cloud-based services, representing a big

In fact, the two last findings are the most important. SMBs do have a comfort level with their primary CSP but it only goes so far. They would switch if enticed with a reasonable value-proposition. Plus, a big driver of the willingness to stick with a primary CSP is the desirability of having, depending on your perspective, “one throat to choke” or “one hand to hold.”

The message to primary CSPs is clear. If you are not in the cloud-services market you are late. This is not fatal. However, there should be some sense of urgency on action. The window of opportunity for consideration is closing.



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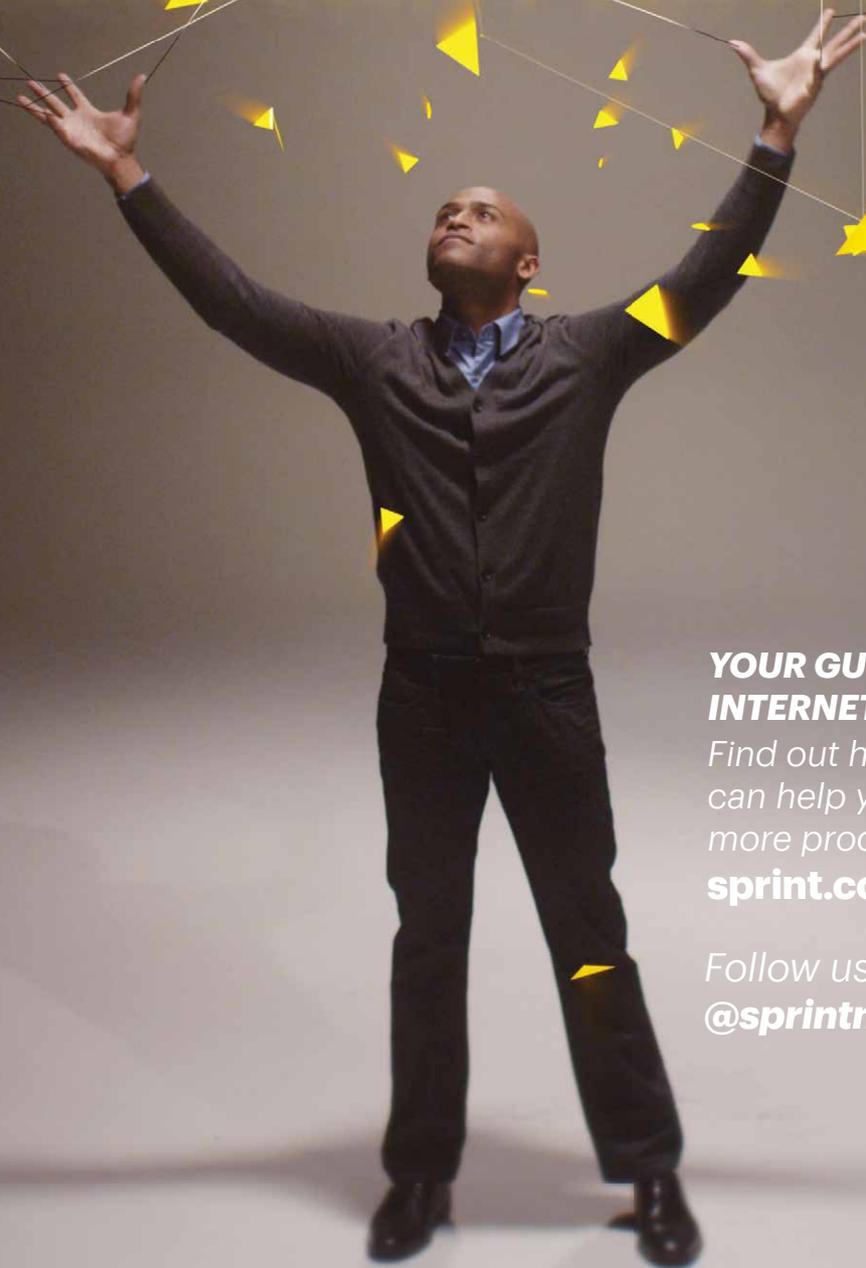
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