

#### **SPECIAL REPORT**

# The cloud v. data center decision



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## CLOUD V. DATA CENTER: KEY TRENDS FOR IT DECISION-MAKERS

#### **BY CHARLES MCLELLAN**

Cloud-based compute, networking and storage infrastructure, and cloud-native applications, are now firmly on the radar of IT managers—be they in startups, small businesses or large enterprises. So much so that, whereas a few years ago the question facing CIOs was "Which workloads should I move to the cloud?", it's now becoming "Which, if any, workloads should I keep on-premises?". While most organisations will probably end up pursuing a hybrid cloud strategy, it's worth examining this turnaround, and the reasons behind it.

The general background, as ZDNet has explored in recent special features, is the competitive pressure for organisations to undergo a digital transformation based on cloud-native applications and methods such as DevOps, in pursuit of improved IT and organisational performance.

However, it's unlikely to be all over for the enterprise data center just yet: businesses still need to 'keep the lights on' while modernising their app portfolios, and there are plenty of legacy applications in use where migration to the cloud is difficult and/or expensive.

## DATA CENTRE TRENDS

The Uptime Institute (part of the 451 Group) publishes an annual Data Center Industry Survey, examining the trends driving the IT infrastructure market. The most recent published survey is for 2016, and the 2017 results are imminent (at the time of writing). The Uptime Institute's survey population includes respondents from both enterprise IT and service providers (including cloud and colocation vendors). The results for the

last few years support the view that the focus is moving from on-premises to third-party data centres.

This graph shows that around half of enterprise IT departments have seen budget increases, whereas the figure is considerably higher for colocation vendors (averaging 75% over the last four years).



DATA: UPTIME INSTITUTE/IMAGE: ZDNET

No surprise, then, that colocation vendors have consistently built new data centres at a higher rate than enterprises, although there is evidence of a slowdown.

Still, it looks as though the migration of enterprise IT assets to third-party data centres still has a long way to go. Here's a summary of respondents' asset-location estimates from the Uptime Institute's 2016 survey:



DATA: UPTIME INSTITUTE/IMAGE: ZDNET

There's no doubt about the general trend, though, which is towards more public and private cloud, and less traditional on-premises IT, as IDC's estimates of worldwide expenditure in the IT infrastructure market show:



IMAGE: IDC

"In 2017, spending on IT infrastructure for off-premises cloud deployments will experience double-digit growth across all regions in a continued strong movement toward utilization of off-premises IT resources around the world. However, the majority of 2017 end user spending (57.9%) will still be done on on-premises IT infrastructure which combines on-premises private cloud and on-premises traditional IT. In on-premises settings, all regions expect to see sustained movement toward private cloud deployments with the share of traditional, non-cloud, IT shrinking across all regions," said the analyst firm.

## CLOUD TRENDS

What's driving the move to the cloud? A rich source of data is RightScale's annual State of the Cloud survey, which has tracked the cloud-related activities of enterprises and SMBs for the past five years.

When it comes to the perceived benefits of cloud-based computing, the main attractions have consistently been 'faster access to infrastructure', 'greater scalability', 'higher availability' and 'faster time-to-market'. Note also that there's a rising trend for citations of the four key cloud benefits (41-53% in 2013 v. 51-62% in 2017):



All of the perceived cloud challenges in 2017 are cited by 25 percent or fewer of



DATA: RIGHTSCALE/IMAGE: ZDNET

respondents, headed by 'lack of resources/expertise', 'security' and 'managing cloud spend'. There's a noticeable drop in most challenges—'managing cloud spend' and

Wet X TechRepublic.

'governance/control' are the exceptions—between 2016 and 2017, with 'performance' now an outlier, cited by just 11 percent:



DATA: RIGHTSCALE/IMAGE: ZDNET

Given the general prevalence of cloud benefits over cloud challenges, it's no surprise to find that RightScale's 2017 respondents run a high proportion of workloads in the cloud -- 79 percent (41% public, 38% private), leaving just 21 percent running on non-cloud infrastructure:



DATA: RIGHTSCALE/IMAGE: ZDNET

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The figures also show that small businesses are keener on public cloud than enterprises, which—as you might expect—run a higher percentage of workloads on private cloud or non-cloud infrastructure.

RightScale's survey data holds no surprises when it comes to patterns of public cloud adoption, with long-time market leader Amazon Web Services (AWS) well out in front, followed by fast-rising Microsoft Azure with Google Cloud Platform in third place. The fact that companies like Rackspace, HP and VMware have bowed out of the public cloud market indicates the dominance and competitiveness of the leading vendors:



DATA: RIGHTSCALE/IMAGE: ZDNET

Similarly, VMware's dominance of the private cloud is no surprise, the company taking first place with vSphere/ vCenter and third with vCloud Suite, separated by Red Hat's OpenStack in the runner-up spot. Both of Microsoft's private-cloud solutions—System Center and Azure Pack/Stack are on the increase, although still only deployed by 16 percent and 14 percent of respondents respectively:



DATA: RIGHTSCALE/IMAGE: ZDNET

#### Wet 🛛 🏹 TechRepublic.

Our final extract from RightScale's data concerns the initiatives that respondents expect to implement in 2017 compared to the previous year. As the graph shows, the focus is largely on moving moving more workloads to the cloud (particularly the public cloud) and optimising the cost of the ones already residing there:

Significant showings for 'implementing a cloud-first' strategy' and for DevOps-related initiatives ('expanding use of containers' and 'implementing CI/CD in the cloud') also indicate that cloudnative apps are uppermost in IT decision-makers' plans.

There's plenty more data and analysis to be found in RightScale's State of the Cloud surveys. A recent webinar from the company exploring detailed cloud price comparisons for compute between AWS, Azure, Google and IBM is also worth a look. And don't forget to check out Tech Pro Research's survey results, summarised in this special report.



DATA: RIGHTSCALE/IMAGE: ZDNET

## MULTI-HYBRID CLOUD IT

What's clear from surveys and analyst reports is that organisations are in a transitional phase between largely on-premises and largely cloud-based IT, with some form of flexible multi-hybrid cloud arrangement the likely optimal solution for most workloads in the long term.

In conversation with ZDNet's sister site Tech Pro Research earlier this year, Kamal Anand, vice-president of A10 Networks' cloud business unit, summed up the current situation like this:

"There are two things going on here. First, the cloud providers are building more and more services, because they want to keep customers on their platform—and once you get sucked in, sometimes the cost starts spiralling up. But most of the larger application guys don't want to get too tied to particular infrastructure; they want choice—if nothing else, to negotiate better prices. So having an infrastructure that spans across clouds is a critical requirement.

"A second trend we've seen, which is kind of interesting, is there's a bunch of companies that have gone to the cloud, and then they're finding—especially as they increase scale that the economics are in favour of moving the application back to the private cloud. What you see is, the core predictable capacity is coming back to the private cloud, but they're using the public cloud for excess capacity or bursting on an as-needed basis. I think the jury's out: I don't think it's all going to be public cloud, nor are companies saying it's only going to be traditional data centres—it'll be a mix of different clouds for different workloads and use cases. We [A10] are big believers in multi-hybrid clouds.

"My thesis is that, in the next year or so, the major cloud providers—Amazon, Google, Azure—will move towards similar offerings, at least at the core. There will be some spikes—more analytics here, something else there, but the core infrastructure will be similar from a price and capability perspective."

On the question of why many workloads—in enterprises, in particular—are still running on-premises, often in 'traditional' architectures rather than private clouds, ZDNet recently sought some pointers from Ashesh Badani, vice-president and general manager of OpenShift at Red Hat. Badani recounted a customer conversation that doubtless rings many bells: "The CIO of a large credit-card company said to me: 'I have 700 applications, and a dozen or so can be done in cloud-native style—but what am I supposed to do with the other 680?" When it comes to modernising legacy applications, there's a lot involved, as Badani illustrated with a customer example from KeyBank, a regional bank in the US:

"They [KeyBank] had this big monolithic digital banking application with quarterly update cycles and a multi-step approval process before any change could be made to the app. They said: "This is crazy, this is not DevOps, we can't update a digital app once a

quarter—we need to be able to do it, if not daily, then weekly'. So they went through a process, asking: 'How can we take this monolithic app and see what parts of it can be broken into microservices; how can we introduce this notion of DevOps; how can we introduce more automation—how do you have more trust in the system so not everyone has to sign off for the app to get pushed live?' They did that for a few months, and we [Red Hat] provided the platform [OpenShift] to make all these things easier—to run containers in a hybrid cloud, support developer productivity, manage it operationally, and so on. But ultimately the behavioural and process change needs to come from within the organisation—although Red Hat can can help via our professional services team and our Open Innovation Labs."

## OUTLOOK

IT may be moving towards a scenario where cloud-native applications are developed and deployed rapidly on a flexible mix of private and public cloud infrastructure, with the optimal combination determined on a per-app basis by factors such as performance (latency), cost, security and compliance. In this scenario, CIOs will increasingly become trusted brokers of IT resources for business units, allowing the latter to put innovative ideas into practice quickly and reliably. In the meantime, though, there's a lot of modernisation work to do on legacy enterprise application portfolios, which will keep the traditional on-premises data centre around for a while yet.

# INFOGRAPHIC: CLOUD USE IS GROWING, BUT THE DATA CENTER ISN'T DEAD YET

#### **BY AMY TALBOTT**

When Tech Pro Research surveyed IT professionals about cloud v. data center use at their companies, the majority (58%) said they use a hybrid approach. Only a small group said their company has everything in the cloud, while just over a third said their company keeps everything in the data center.

The big concern about the cloud still seems to be security. It was the number-one issue selected by respondents from companies that don't keep any applications in the cloud. Even respondents from companies that do use the cloud seem to have reservations in this area. When asked why they chose to keep some apps, most notably ERP systems and financial apps, in the data center, security was the number one reason. But when asked what cloud apps they planned to move back to the data center, about half of respondents in this group said, "none."

While IT departments may once have needed to justify cloud use to company executives, this appears to be changing. When asked who's leading the push toward



IMAGE: ERIK UNDERWOOD/TECHREPUBLIC

the cloud, many respondents said the effort was initiated by executives.

This infographic contains other findings from the survey. For more detailed results, plus analysis and recommendations for companies deciding what to keep in the data center and what to move to the cloud, download the full report, Research: Cloud vs. data center adoption rates, usage, and migration plans.

# UNDERSTANDING THE PROS AND CONS OF FIVE CLOUD TYPES

#### **BY CONNOR FORREST**

Cloud competency is a critical trait for today's business leader, whether in IT or not. As enterprise cloud adoption continues to grow, it affects everything from update cycles to business expense models.

Some 93% of organizations are using cloud services today, according to a report from security solutions provider McAfee. In examining specific verticals, 99% of financial services organizations have adopted cloud technologies. The business world isn't far off from full cloud ubiquity.



Understanding the impact of the cloud starts with cloud infrastructure. Here are five types of cloud infrastructure options available, and what they can provide for your business.

## 1. PUBLIC CLOUD

Public cloud is what most people think of when they think of the cloud. With a public cloud approach, a service provider offers all of the resources necessary for an organization to get into the cloud, typically with a multi-tenancy environment.

The pay-per-use revenue model is one of the defining factors of public cloud, according to Forrester Research analyst Lauren Nelson. This model allows customers to scale capacity as needed, such as during high-traffic seasons. It also allows businesses "to take on many risks without as many sunk costs," Nelson said.

The public cloud model also offers widespread availability and very broad reach in terms of geographic distribution, 451 Research analyst Carl Brooks said. This could make it easier for businesses to get into new markets and to provide better access there. Brooks also noted that this model represents "the easiest way to consume IT resources these days," in that you can simply take your credit card and purchase what you need. Public cloud provides "scalable, elastic, and programmatic" access to storage and compute, Brooks said. There are also common frameworks and best practices available for utilizing this model. However, there is also a de facto lock-in to the public cloud provider you choose, and as such you'll need to focus on their APIs, platform, and services.

"When you pick one, you're basically stuck with it, and all of your data is also stuck with it too," Brooks said. "Workload mobility is not really a thing at this point, it may be in the future."

## 2. FULL PRIVATE CLOUD

A full private cloud is one that is fully owned and operated by the business or organization that is using it. In essence, the goal of a private cloud deployment is to take factors of public cloud like automation and self-service access and apply it to your own data centers, Nelson said.

A full private cloud gives the user full control over how infrastructure is provisioned or deprovisioned, Brooks said. Security is easier to engage, and potentially more effective, whereas with public cloud, you often don't have any control over the hardware or security tools available.

"The pros to owning and operating your own private cloud are that you have uncontested control over the environment and infrastructure, including the software, so you have a much higher likelihood of compatibility and ability to architect and work within the systems of the organization that already exist," Brooks said. Private cloud is a more expensive option, as a business has to build out the infrastructure to support it, and must hire or train employees with the proper expertise to run it. Brooks said that it also requires "a commitment to operating IT as opposed to consuming IT. It's back to cooking your own dinner versus eating out."

It also requires many more resources, and takes longer to ramp up to its full potential.

"You can have public cloud resources and be using it, have developers productive on day one," Nelson said. "With private cloud, that is a multi-year journey to get that going."

## 3. HOSTED PRIVATE CLOUD

Hosted private cloud sits somewhere in between the public and internal private cloud, as it is a separate private cloud that is hosted and sometimes managed by a service provider. In a way, it provides the best of both worlds, Nelson said.

"You get to use the expertise of a service provider, so you don't have to do that," Nelson said. "And, it's someone else's data center, so you don't have to spend time fixing what you've got."

Hosted private cloud is the most attractive option for many enterprises for this reason, Brooks said, as the service provider is usually more efficient at running the infrastructure than the business. Forrester analyst Dave Bartoletti said that he has noted a distinct increase in demand for this cloud model among businesses. Using a hosted private cloud, businesses will have some options for customization, but they won't typically have the scale or resources of major public cloud providers, Brooks said.

Additionally, Nelson noted, hosted private cloud is often split between two approaches. Some providers see it as "we will build a private cloud for you," but others see it as a mini-public cloud where they separate and segment resources specifically for you. "Pretty much everybody is at hybrid today. The question is, what does it mean to hybrid?" —Lauren Nelson

## 4. HYBRID CLOUD

Hybrid cloud is a generic term for any combination of the different types of cloud models. Nelson argued that "hybrid cloud" is primarily a marketing term, but it could refer to a deployment of public + private, public + public, or private + private clouds. Some companies think of it in terms of bursting capabilities, while others think of it simply as a central management experience.

"Pretty much everybody is at hybrid today," Nelson said. "The question is, what does it mean to hybrid?"

For the most part, Nelson said, when companies mention a hybrid cloud strategy, they are trying to describe and address the challenges they have in their particular organization.

One of the primary reasons companies begin working in hybrid cloud, Brooks said, is "because businesses still have computers." This model can provide a stepping stone to a full deployment one way or the other, but it's often used to complement existing IT investments and to cover the specific security and compliance needs in a given company, Brooks added.

Many companies have a sliding scale of what it and is not crucial, Brooks said. So, certain aspects of the business aren't as valuable, and can easily go straight to the public cloud. However, others require more control, and are better suited to a private cloud environment.

## 5. CLOUD-BASED SERVICES

Brooks described cloud-based services as "things you don't require a cloud for, but you need to have interacting online." This can be a database and/or data tools, or other tools such as disaster recovery as a service.

Perimeter-aware services such as Internet of Things (IoT) and mobile device management (MDM) solutions are often leveraged as cloud-based services as well, Brooks said. Vendors are also now offering online platforms to manage those projects for businesses in a plug-and-play model.

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Many companies exited the public cloud market because they couldn't make the margins they expected, Nelson said. This led many of them to pursue cloud-based services as a business model.

"If you can provide value on top of a platform, through services, that is a high-margin opportunity," Nelson said. "It just takes a lot of bodies to be able to do that, and it takes a lot of very specific expertise today."

The big four management consulting groups have all been working in the space of complex cloud usage, especially in companies trying to migrate applications to the cloud. Businesses can also consider the concept of managed public cloud, "where vendors will provide a management layer on top of Amazon, to make it easier to use and manage AWS," Nelson said.

While cloud-based services can provide more management capabilities for your cloud infrastructure, or an ad hoc way of getting pieces of your organization to the cloud, it's important to note that they can be limited in scope and capability with complementary tools.

# FIVE MAJOR PITFALLS TO AVOID IN A CLOUD MIGRATION

#### **BY ALISON DENISCO**

Enterprise cloud adoption is on the rise, but implementation remains a struggle for many IT leaders.

Some 95 percent of IT professionals surveyed by SolarWinds said they had migrated critical applications and IT infrastructure to the cloud over the past year. However, only between 5 percent and 7 percent of the world's workloads have moved to the cloud, according to Constellation Research.

"Most organizations have cloud applications in use, but those applications represent less than 10 percent of their portfolios, and in most organizations, less than 10 percent of their total budget," said Ray Wang, principal analyst and founder of Constellation Research. ClOs say their number-one strategy to modernize their application portfolio in the coming years is moving applications to the cloud.

C-suite members must understand that moving and managing applications in the cloud will be increasingly important for doing business in the future, said Tom Coughlin, an IEEE senior member and founder of data storage consulting firm Coughlin Associates. "Their competitors and customers are going to be moving and managing content in the cloud, so they need to develop a strategy about the opportunities the cloud offers them, and mitigate any potential risks."

Here are five common pitfalls to avoid during a cloud migration.

### **1. SELECTING THE WRONG MIGRATION APPROACH**

CIOs say their number-one strategy to modernize their application portfolio in the coming years is moving applications to the cloud, said Dave Bartoletti, a principal analyst at Forrester serving infrastructure and operations professionals.

However, many enterprises do not spend enough time studying different cloud migration approaches. "There are lots of different paths to moving a particular app to the cloud," Bartoletti said. "If you pick the wrong one, you can spend a lot of money and not get the payback you want."

Business leaders should consider the cloud as an engine for delivering better customer experiences, Bartoletti said. Then, members of the C-suite can frame questions to IT based on customer needs, and then allow IT to determine which platform cloud or otherwise—offers the best solution.

## 2. MOVING EVERYTHING AT ONCE

"Most organizations often assume that they have to move everything at once," Wang said. "The reality is that hybrid models are here for a long time, as it's very hard to move some workloads."

To determine what processes to move first, it's key to run a strategic portfolio analysis, Bartoletti said. "The old adage that the most important part of strategy is deciding what you're not going to do holds for cloud migration," he added. Businesses must choose a reasonable number of applications for a first migration, and examine application profiles to determine if they are highly customized and integrated, as costs to move different types of applications to the cloud vary widely, Bartoletti said.

Organizations also need to remember that not every system needs to be moved to the cloud, said Jeffrey Kaplan, managing director of THINKstrategies, Inc. "It's about trying to figure out which aspects of your business would benefit by using cloud services," he added.

For example, if you have a stable, ongoing process in which there isn't a need for change due to innovation, competition, or customers, you likely do not need to prioritize moving that process to the cloud, Kaplan said. However, if some of those stable services are very costly, there could be some cloud alternatives that are more economical.

## 3. UNDERESTIMATING THE WORK INVOLVED IN INTEGRATION

Many companies underestimate the work involved in cloud integrations, said Krishnan Subramanian, founder and chief research advisor at Rishidot Research. "[Businesses] think it will be relatively easy, especially lifting existing apps and putting them in the cloud," Subramanian said. "I would say not to undervalue integration. It's one of the biggest reasons for failure."

Although the cloud has been promoted as a simpler, less risky alternative to traditional on-premises solutions, its deployment adds another layer of complexity, Kaplan said. Many organizations are layering cloud solutions on top of legacy systems and software, so it's key to ensure that the solution chosen is able to be integrated with your existing systems.

Moving systems to the cloud requires an investment in this integration, Wang said. "In these hybrid models you have to remember to have an overall architectural design," Wang said. "Then you have to figure out what's owned, accessed, and borrowed." And don't discount the code changes that may be required to make the move, Bartoletti said. "It's not just about moving virtual machines—code might not work the same way running in the cloud, and you might need to make small or deep changes," Bartoletti said. For example, if your app requires a local file system, you will have to rewrite it to leverage cloud storage once you move it there.

## 4. FAILING TO BUILD A REASONABLE BUSINESS CASE

Enterprises need to assess the value of a cloud migration before starting it, Bartoletti said. This means determining what you expect the company to gain after you migrate: is it primarily cost savings, or will it open up new business opportunities?

"We're seeing people putting more focus on agility and the ability to enter new markets and reach new customers faster using cloud technologies, rather than justifying it completely on cost savings from shutting down the data center," Bartoletti said. "You might find that once you get to the cloud, you don't save much money on infrastructure costs."

## 5. NOT TRUSTING THE CIO TO LEAD THE MIGRATION

CIOs should lead the cloud migration process, Kaplan said. "They should be instrumental in the education of the business decision-makers, and they should act as advisors and consultants to those business decision makers, helping them select the right kind of services to meet their needs, and verifying that those services can do the job," Kaplan said.

But shadow IT can be a problem with cloud solutions, as chief marketing officers or sales directors can potentially purchase SaaS solutions on their own. "The smarter CxOs are recognizing that they can't make those decisions and move or adopt those kind of services without the help of a CIO," Kaplan said.

CIOs should also act as the project managers for the migration process, Kaplan added. At the back end, these tech professionals should continuously evaluate the performance of the cloud service provider to ensure they are fulfilling their promises, and monitor how the businesses uses the service to make sure it is providing the best ROI. In some ways, this shifts the role of the CIO from a technology manager to a vendor relations manager, Kaplan said.

## MULTI-CLOUD IS A MESSY REALITY, BUT THERE'S HOPE

#### **BY MATT ASAY**

Never mind the risk of lock-in: However much you want to go all in on a particular cloud vendor, the rest of your organization... does not. Or has not. This is the ugly truth of all enterprise architecture, a truth that the cloud has not improved: It's a mess. That mess isn't a product of incompetence, but rather of enterprise infrastructure springing up to solve particular needs at particular times.

As such, though CIOs may dream of unified infrastructure standardized on one or two strategic vendors, the reality of enterprise infrastructure is that applications will be split between disparate public clouds, old-school on-prem resources, and private clouds. While managing this morass of apparently conflicting infrastructure can seem daunting, there is hope for CIOs living the multi-cloud dream/nightmare, one that can deliver "diversity in [an enterprise's] underlying fabric but uniformity at the app layer," as Red Hat CMO Tim Yeaton explained it to me.

At least, that's the promise.



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## BROKERING THE HYPE

Multi-cloud is a strategy for some, perhaps as a way to improve disaster recovery/failover, or perhaps as a way to optimize workloads based on a particular cloud's strengths, but it's a reality for all. In a world driven by developers, no CIO can dictate a monogamous cloud relationship. So IT is left to minimize collateral damage and try to unify infrastructure resources.

Into this maelstrom of resources step the cloud brokers, whether technical (delivering a coherent view of performance across clouds) or business "Often a right platform abstraction can help to tame the complexity in multicloud environments. Right abstraction not only reduces the ops overhead but also plays a critical role in developer productivity." — Krishnan Subramanian

(managing billing, paperwork, etc., associated with multiple vendors). Early on, cloud brokers were touted as a "must have" for enterprises. Today, that recommendation smells a bit fusty and overly idealistic. As Danny Bradbury has written, "It's a utopia to imagine that a cloud customer will be shifting containers around on a minute-by-minute basis between AWS and Rackspace."

Even if it were possible/feasible, Redmonk analyst James Governor has cautioned, "If organisations are adopting multi-cloud for portability reasons, rather than to take advantage of the respective strengths of particular clouds for particular apps and workloads, they're going to have a tough job justifying the management overhead for anything outside the most basic Infrastructure as a Service workloads." That management overhead is real, and it is brutal. Small wonder, then, that popular blogger Cloud Opinion calls the notion of moving workloads between different clouds based on shifting dynamics like pricing "a pipe dream and vendor marketing."

Compounding this problem is the increasing richness of cloud services, following on Governor's point. In a world awash with basic compute and storage, it's relatively easy to move workloads between providers. This, however, isn't the world we live in.

Enterprises increasingly embrace different clouds optimized for different services. While each of the clouds is a solid choice for machine learning, for example, Google generally gets the nod as the frontrunner. Many enterprises will turn to Google for machine learning, AWS for Lambda, Microsoft Azure to modernize their legacy applications, and so on.

Such cloud differentiation makes the likelihood of multi-cloud management ever harder. As cloud luminary Bernard Golden told me, "While it appears attractive to use a management tool that encapsulates the individual

cloud providers and provides a single management framework, since it promises to reduce costs by amortizing training and employee costs across a greater breadth of applications, in practice it typically means using a lowest-common denominator application management approach, which often forfeits use of functionality that resides within a provider's IaaS/PaaS offerings."

In other words, if you want the best of AWS, Microsoft Azure, and Google Cloud, it's going to be hard to manage that "best" in a central, cross-cloud tool. This leaves enterprises in the semi-portable workload world they inhabited long before cloud promised to fulfill their wildest dreams.

Abandon portability hope, all ye who enter the clouds...?

## BROTHER, CAN YOU SPARE SOME PORTABILITY?

Not necessarily. At least, not completely. As Rishidot co-founder Krishnan Subramanian told me, "Often a right platform abstraction can help to tame the complexity in multi-cloud environments. Right abstraction not only reduces the ops overhead but also plays a critical role in developer productivity."

One way to achieve this abstraction is through a PaaS tool like Red Hat OpenShift or Pivotal's CloudFoundry. Indeed, Yeaton showcased the ability to give developers a unified app platform even as the underlying infrastructure gets abstracted away. In a subsequent discussion with Red Hat product management director Chris Morgan, he advised, "You need to have the means of abstracting away the things that make your code unique. I shouldn't have to care where the infrastructure is coming from."

The problem, however, is that some things aren't easily abstracted away. For example, each of the major public cloud vendors has introduced services that are exclusive to them, even if the general idea (e.g., AWS Lambda) can be found on rival platforms. "With great power comes great lock in," Governor rightly warned, hitting on the idea that the more developers embrace the unique aspects of a cloud platform, the tighter they're wedded to it.

Along the way, they'll build data silos that are arguably more difficult than the services lock-in to escape. As developer Bryan Leroux told me, "Lock-in [is] not at the function level. (Shim is trivial.) [It] happens at the data layer: DynamoDB, etc. are inherently non-portable."

Which brings us back to the essential difficulty of successfully navigating a multi-cloud world: data gravity. Unique services encourage developers to build on multiple clouds, and the costs associated with moving data between clouds, or even between different regions within the same cloud provider, make it prohibitive to dig oneself out of the multicloud hole.

## SERVICE BROKER SAVIOR

This is a hard problem to solve, with no magical solution. If I have app nodes running across clouds but in the same cluster, I have two different networks. How do you resolve that? How do I ensure an app is using data local to the nearest cloud resources? In our conversation, Morgan suggested that the right answer is to "Focus on how the community is resolving these problems."

Enter the Open Service Broker API.

While no silver bullet, CloudFoundry recently open sourced its Open Service Broker API, hoping to create an industry standard that allows a developer to run non-containerized services outside a cluster and use them as if they were part of that cluster. Red Hat and others have quickly climbed aboard. Google's Jay Judkowitz has argued that the Open Service Broker API "is exactly what our customers need and will be a key building block for successful multi-cloud adoption." Not everyone is convinced, of course.

By embracing this API, Red Hat, for one, hopes to expand the reach and richness of OpenShift, a platform it already characterizes as "the new Red Hat Enterprise Linux." In other words, as Red Hat's Daniel Riek has posited, "By expanding RHEL from the traditional binary application runtime on a single server into a scalable platform for orchestrated, multi-container applications and micro-service architecture, OpenShift delivers the common runtime for traditional and cloud-native containerized applications across the hybrid cloud infra-structure options."

Take Red Hat out of the description, however, and you get a sense of how the open source community wants to tackle this multi-cloud problem (and opportunity). Open source is all about fostering choice, not limiting it. As such, the idea of neutering rich and unique services from AWS, Microsoft Azure, and Google Cloud is not a winning strategy. Rather, the open source community is trying to provide common APIs and platforms on top of this rich and variegated infrastructure, whether open or closed, so that developers can get more done.

"Convenience," Governor says, "is the killer app." To date, that convenience has come from building on individual, silo'd clouds. Going forward, the open source world wants to bring all these clouds together with existing on-prem and private cloud resources, making the convenient... even more convenient.

# SIX REASONS WHY COMPANIES HANG ON TO THEIR DATA CENTERS

#### **BY MARY SHACKLETT**

In its Global Cloud Index (PDF) report, Cisco predicts that cloud data center traffic will exceed 14 zettabytes in 2020, an increase of 262% from 2015. It is no secret that organizations of all sizes are moving to the cloud—for strategic, financial, and operational flexibility and scalability.

But does this mean an end to company data centers? Hardly.

Researcher Uptime Institute reports that 50% of enterprise IT data center budgets have been either flat or shrinking over the last five years and that 55% of enterprise server footprints have



been flat or shrinking as well. But it also reports that as of 2016, more than 70% of enterprise workloads were still running in corporate data centers, with colocation data centers hosting 20% of systems and only 9% of systems in the cloud.

My own observation as an IT consultant is that the move to the cloud is more aggressive in companies than the Uptime survey reflects—but there is one undeniable fact that I observe whether I'm visiting a large enterprise with a multimillion dollar data center or a small shop with its phone system, communications bank, and a single applications server in a little "data center" closet: Nearly everyone has some type of in-house computing.

So why are businesses hanging on to their data centers?

## 1: CONTROL

If you've ever stood in front of your board of directors as a small company CEO or as the CIO of a larger company, and you've had to explain why your systems were down or how your network got invaded by malware, you understand why companies are hesitant to let go of all of their systems and data to third parties.

Having direct management of your mission-critical IT assets is still best practice in companies.

"The biggest risk is giving up control of your data to someone else using different data centers in remote places, « said Gavan Egan, managing director of cloud and IT solutions for Verizon. "What happens in the event of a disaster? You're also putting your data next to someone else's."

## 2: SECURITY AND GOVERNANCE

In highly regulated industries like healthcare, insurance, and finance, when your industry examiner visits and asks you about IT security--and you tell them that you're using third-party cloud-based systems—they're going to ask you whether they can look at the cloud provider's third-party audit report.

With the plethora of cloud offerings available in today's marketplace, not every cloud provider conducts formal (and expensive) outside audits of its IT, so the provider may not have an independent third-party audit it can furnish you as a customer. The result is that you receive a lower IT security rating from your own examiner, who is likely to feel that you are exposing yourself to more risk than you should.

These worries about cloud security and governance aren't unfounded. This is a major reason why many companies using cloud services opt for colocation, which gives the company access to the cloud vendor's building, cooling, power, bandwidth, and physical security to save on data center costs, while the company installs its own servers and storage—and maintains direct control over its systems.

# 3: LACK OF DIRECT RELATIONSHIPS WITH VENDORS

What happens if you subscribe to a cloud-based software service and the vendor of the service doesn't fully own and operate its own data centers? It's not a problem unless there is an outage at your cloud provider's data center provider, and you don't have a direct relationship with that data center provider. In contract law, this is called "lack of privity." In other words, you lack a direct contractual agreement with the underlying data center vendor for your cloud-based software, so you have no leverage to enforce a contract when the fault of the outage lies with the data center and not your primary vendor.

This also means that you have increased liability exposure and business risk.

When companies choose to colocate their IT with cloud vendors and contract directly for the cloud data center services and maintain their own IT, this risk is reduced. It is also a reason why many companies, when they shop for cloud solutions, ask prospective vendors on their RFPs whether the vendors own and operate their own data centers.

## 4: SAFEKEEPING OF INTELLECTUAL PROPERTY

Even if your cloud vendor performs in an exemplary fashion with respect to system performance and DR/failover, there is still the worry that the underlying hardware and software at the cloud vendor's data center will not stay in exact sync with the hardware and software you are running in your own data center.

Most cloud-based vendors in the business applications space run multi-tenant computing models where hundreds or even thousands of clients share a common business application (e.g., ERP, CRM, sales). The application system is upgraded continuously, quarterly or annually, based on the enhancement requests that come into the vendor from clients. Most of these vendor application systems also offer opportunities for companies to customize—but the caveat is usually that companies must share their new custom code development with other clients. For companies that develop custom applications that are highly proprietary and contributory to competitive advantage, this can be an unacceptable computing model. Instead, they opt to keep these mission-critical systems (and their intellectual property) in-house.

## 5: UPTIME AND DR

Cloud vendors have made progress since the days of outages and weak governance that gave corporate IT pause when it came to using the cloud for failing over systems for disaster recovery, 24/7 uptime, and premium system performance. But some of these performance challenges are still there. Even if your cloud vendor performs in an exemplary fashion with respect to system performance and DR/failover, there is still the worry that the underlying hardware and software at the cloud vendor's data center will not stay in exact sync with the hardware and software you are running in your own data center. These small differences in hardware and software and software can cause degradations in system performance.



## 6: INTERNAL SKILLSETS AND SUPPORT

Your internal users might grouse about slow IT responses to open help desk tickets, but few will deny that it feels a lot better to pick up the phone and call someone who is down the hall in the IT data center instead of making a call to a cloud provider support center that is half a world away and uses an automated phone or chat system. For companies in industries where it is vital that systems stay up 24/7 with rapid response times (e.g., hotel and airline reservations), supporting your own systems with your own people is vital. Many of these companies have also fine-tuned their systems for speed and resiliency. They did it with the help of seasoned pros on their own IT staffs who know the ins and outs of their applications—a level of expertise that a more generic cloud-based service simply can't provide. Companies like these choose to either maintain systems in their own data centers or to co-locate systems in the cloud—with their own staffs running these systems.

## FINAL REMARKS

Gartner predicts that the public cloud services market alone will grow by 18% in 2017 to total of \$246.8 billion. This affirms the strength of cloud computing in corporate IT plans. But as companies migrate more of their computing to the cloud and data center investments either recede or stay flat, there are many reasons for companies to maintain critical IT assets on prem. That is not likely to change anytime soon.

What has proven advantageous for today's IT decision makers is that they can really have the best of both the cloud-based and on prem worlds. They can do this by engaging in a hybrid cloud computing strategy that combines elements of private cloud, public cloud, and on-premises computing in a total enterprise IT infrastructure. This is why 85% of companies in 2016 said they were using multiple clouds for their IT. Just as pivotal to the strategy is maintaining an internal data center presence.

# HAS IT'S DEFAULT SETTING SWITCHED FROM DATA CENTER TO CLOUD?

#### **BY CONNER FORREST**

It's clear that the cloud is no longer the unknown technology that it was a few years ago. In fact, cloud infrastructure and services are table stakes in some organizations and verticals.

Advances in security, compliance, uptime, compute options, and more have made the cloud an attractive option for even the most demanding enterprises. But, has the cloud come far enough to take the place of on-premise data centers as the default option for IT projects?

The answer isn't simple, and the nuance starts with the age and culture of the company. When it comes to tech startups, "the default is certainly cloud," according to Gartner analyst Lydia Leong. When dealing with companies that already have infrastructure in place, though, it comes down to culture, leadership preferences, and other factors, she said.

Some companies become cloud-first, Leong said, leaning on the cloud unless there is a really good business reason not to. Some simply add cloud technologies to their IT portfolio, while others see the cloud as a last



resort, when there are no other good options. "The faster-paced the business and the more forward-thinking the CIO, the more likely it is that the company will have a greater bias towards cloud," Leong said.

The question of cloud-first also must take into account which cloud migration option fits the particular aspect of enterprise IT a company is considering moving. Forrester Research analyst Dave Bartoletti said one of the first considerations is cloud applications--whether a company will upgrade software or move to a SaaS product. About four years ago,



Bartoletti said that a shift began toward cloud applications so that, now, most of the businesses he works with are cloud-first or cloud-only when it comes to apps.

"I think we're getting very close to cloud-first mentality in most mid-sized and large enterprises, where you have to make a strong business case for why you would deploy something on-prem when there are so many options for the cloud," Bartoletti said.

When it comes to modernizing business applications, 68% of the businesses surveyed by Forrester said their No. 1 priority was migrating those applications to the cloud. Cloud migration used to be much more difficult, but there are better migration tools and more options for businesses today, Bartoletti said.

The data center, however, is a different story. On-premise data center investments continue to decline, and have been doing so for the past few years, Bartoletti said, but they're still in transition.

"Today, about 40% of infrastructure is still running in transition, on-premises mode," Bartoletti said. "That's going to decline about 10% over the three to four years."

Those numbers are fairly close to the predictions of 451 Research as well. "In two years, the majority of organizations' workloads will be running in some type of cloud environment--37% public cloud (IaaS and SaaS) and 23% private When it comes to data centers, there is a balance between getting the most out of your current infrastructure, while also modernizing your infrastructure so you have better access to next-generation technologies like containers.

cloud (on-premises and hosted)," said Melanie Posey, an analyst with the firm.

When it comes to data centers, there is a balance between getting the most out of your current infrastructure, while also modernizing your infrastructure so you have better access to next-generation technologies like containers, Bartoletti said.

Carl Brooks, also of 451 Research, said that development in the cloud has at least become a "default consideration," if not a default choice. But, the path can shift.

"It is routine to pilot development on public clouds but very often that effort then returns to the enterprise IT shop; just as often it will be expanded into public cloud environments or sent into the hands of managed infrastructure providers that host a cloud environment for the enterprise," Brooks said. "These outcomes are roughly equal right now, and the deciding factor is arbitrary, based on the business needs."

Right now, Brooks said, companies still have a lot of physical machines, so there is no "headlong rush into public cloud." Instead, it's "more like a leisurely stroll, as the need and benefits are perceived," he said. Enterprises still want the control involved with choosing the best option for each individual workload.

When asked what needs to change in order for most companies to be all-in on the cloud, Bartoletti said that businesses need to shift their thinking away from waiting until it's completely secure for all of their workloads before moving to the cloud. If you wait for someone else to make it secure for you, Bartoletti said, you're too late.

One example Bartoletti gave was Capital One in banking. The company decided that the cloud was a good investment for their future, so they began working with regulators to make the cloud secure for their workloads. And, they're first in many ways in their market, Bartoletti said.

In addition to simply modernizing infrastructure and applications, pursuing the cloud can also help companies attract younger developers and project managers fresh out of school. There's a war for tech talent, and these would-be employees "expect the cloud," Bartoletti said. Companies will need those environments to compete for that talent.

# HOW HYBRID CLOUD IS STRENGTHENING FITNESS FIRST

#### **BY DANNY PALMER**



There's never been a better time to start a business: whereas in the past you'd have needed to build your own data centre and fill it with IT infrastructure, now major cloud service providers like Amazon, Microsoft and Google can provide you with all the services you need to run an online business. To take just one example, Airbnb runs many of its services on AWS.

But what about more established enterprises? It's not viable for them to suddenly pack up all their data centres and move everything into the public cloud. But there is a happy medium: hybrid cloud. This approach enables

organisations to take advantage of cloud services while also harnessing the power of on-premises platforms in a way that provides enough flexibility to deal with any sudden demands.

One organisation that has opted for this hybrid approach in an effort to modernise and improve their IT strategy is Fitness First, the gym and health club operator. Founded in the UK in 1993, Fitness First has grown to become one of the largest fitness brands in the world, with over one million members across 370 clubs in 16 countries.

But in the 24 years since Fitness First began operating, technology has changed dramatically, and so have the needs of the business. That's why the company decided to examine its infrastructure and how it was used—especially as the cost of physical servers escalated as the firm expanded. "We wanted to change to IT being more of an enabler rather than a reason for things to be slow. We'd really hit a roadblock." —Jon Forster

## IT AS AN ENABLER

"The issue the organisation faced is that it has historically gone down a physical server, physical data centre setup—a lot of investment over the years into tin. What it ended up with was a lot of hardware which was now getting out of date," explains Jon Forster, Consulting Senior IT Advisor at Moray Limited, the holding company that owns the Fitness First Group.

The company was beginning to struggle with the flexibility required in order to make make changes while also managing costs. "We wanted to change to IT being more of an enabler rather than a reason for things to be slow. We'd really hit a roadblock," says Forster.

It's for that reason that Fitness First looked towards hybrid cloud, to provide "that flexibility to increase or decrease the computing power you need at that moment in time," he says.

For example, tasks such as application development or work around the website and coding only need to be powered at very specific times; the rest of the time the servers dedicated to these tasks are doing nothing. "They have no value until you want them back," says Forster.

So Fitness First began looking for a hybrid cloud provider that did all this and also tied into its Microsoft Azure-based infrastructure. One of the key demands of the new service, explains Forster, was the ability to be "flexible within your own environment without additional tin." Discussions with colleagues in the industry led Forster to enterprise cloud provider Nutanix.

"They deliver what we want; it's tied into Microsoft and I can have no real gap between where we host things and there's no need for multiple technologies," Forster says.

So Fitness First opted to work with Nutanix and set up a hybrid cloud server in a matter of weeks. Forster was impressed enough to expand the relationship after just a few months.

"They worked with some of our guys and set it up very quickly. In fact within about 10 weeks of buying the first three blocks, it was going to well I bought another one in order to put everything on Nutanix," he says.

By shifting towards a partially cloud-based model, Fitness First has "completely changed" the way it does back end development, says Forster. "It suddenly becomes really quick. It changes so many ways—having to look up backups has just gone away as you push it all up into Azure and it just tells you where and how it worked".

## ON-DEMAND FLEXIBILITY

The ultimate benefit to Fitness First is that it's now able to spin services up or down in reaction to increases in demand—be that during a day-to-day basis or at the times of year when there's a surge in new members.

"The business runs in peaks and troughs. But now it's got enough compute power which you can wind back whenever you want, so when we have those peaks, it's absolutely fine, it doesn't slow down," says Forster.

The new setup also enables Fitness First to build new features of alter existing ones much more quickly than was previously possible, he explains.

"It's now quick so it's not a case of asking for something and getting it 12 months later; it's much quicker. You can give anyone the ability to get on and do it straight away and not be held back. That's helped everybody".

## COST SAVINGS

Naturally, switching to a cloud-based model has also saved Fitness First costs in terms of running and operating physical data centres.

"It's much cheaper than we had before. Before we had about 18 racks of kit and now we have two half-racks—that's it. In terms of cost of space, of power, that's totally collapsed," Forster says, adding that those funds can be used to improve customer service and feed into the bottom line.

So what's the main thing organisations looking to invest in hybrid cloud infrastructure should be doing? It's important not to be nostalgic about your old physical data centres, and to look to move forward, according to Forster.

"Take a step away from what you have and don't base everything on that—base it on the need for the future. Don't just keep slowly changing what you have, or it'll end up costing you a lot more money," says Forster. 🕰 Net 🛛 💭 TechRepublic.

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