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White Paper

Extend the Cloud to the Data Center with Hybrid IT

Jason Bloomberg

President, Intellyx

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Combine on-premises IT assets with public and private cloud environments, and you get *hybrid IT*.

However, hybrid IT is more than simply a mix of different deployment environments. It represents a workload-centric approach to managing diverse IT assets across the enterprise.

Making hybrid IT a reality in practice requires many elements, from hyperconverged infrastructure (HCI) that helps abstract disparate hardware and virtualization contexts to DevOps, the cultural and organizational transformation that fosters greater collaboration across application development and the IT effort at large.

The big picture here is *cloud native computing*: an architectural approach that brings cloud best practices to the data center, delivering a hybrid multi-cloud experience that breaks down technological and organizational silos in order to deliver better customer value as part of ongoing enterprise digital transformation.

What is Hybrid IT?

Heterogeneity has always been a reality for enterprise IT – for better or worse. For decades, large organizations have struggled under the burdens of multiple hardware platforms, infrastructure technologies, operating systems, and applications.

Such heterogeneity typically led to intractable integration challenges, multiple disparate views of the truth, and a management and governance landscape that focused more on internal battles for resources and control than aligning with the needs of the business.

Today, the world of enterprise IT has unquestionably changed for the better.



We still have heterogeneity to be sure, including the burgeoning number of on-premises and cloud-based environments, but new terminology reflects the progress enterprises have made.

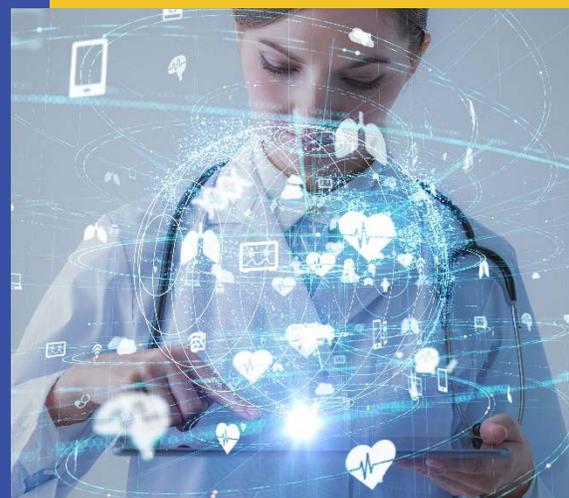
Hybrid IT has arrived. Today, heterogeneity is *on purpose*.

Hybrid IT reflects the multiplicity of environments that the cloud has brought to the table: one or more public clouds, private clouds that might be located in a third party hosted facility or on premises, as well as on-premises virtualized and legacy environments – or any combination thereof.

Within this complex combination of environments, hybrid IT centers on *workloads*, which represent all the moving parts that make up a running application.

One important goal of hybrid IT is to provide the best environments for each workload the organization wishes to run. In addition, hybrid IT may offer workload portability from one environment to another should the need arise.

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How to Get Started with Hybrid IT

Chances are, your organization is already well on its way to adopting hybrid IT already. Remember, while there are many options, hybrid IT can begin simply, for example, by adding virtualization to a legacy on-premises environment.



Of course, when people say hybrid IT, the assumption is that one or more clouds are involved – and to be sure, most hybrid IT deployments are cloud-centric in one way or another.

The sequence of steps that a particular organization might take to adopt hybrid IT, however, varies dramatically depending upon the needs of the company.

Perhaps there's a need for a single public cloud, and then the organization wishes to connect it to on-premises resources.

There must be a single architectural strategy that unites the various cloud and on-premises options in order to support coherent governance and security, while simultaneously focusing on the diverse, dynamic needs of the workloads such enterprises must run.



Or perhaps there's a requirement for both public and private cloud, what people are increasingly referring to 'multi-cloud' or 'hybrid cloud.' Motivations for such multi-cloud deployments range from compliance issues like data sovereignty to cost issues, as public cloud pricing can become excessive as usage expands.

In other cases, multi-cloud consists of more than one public cloud, for example, AWS and Azure. Perhaps executives simply want to avoid the 'all eggs in one basket' risks, but it's more likely that there are particular features or capabilities in each public cloud offering that meet particular needs of various business units.

It doesn't take long, however, for IT leadership – and in particular, the architects that support them – to realize that simply having a motley collection of environments isn't going to address the increasingly dynamic IT requirements of the organization long term.



Instead, there must be a single architectural strategy that unites the various cloud and on-premises options in order to support coherent governance and security, while simultaneously focusing on the diverse, dynamic needs of the workloads such enterprises must run.

Implementing such a strategy results in the hybrid multi-cloud experience that is at the heart of hybrid IT and requires a careful consideration of the infrastructure technology that must be in place to achieve it.

The Role of HCI in Hybrid IT

CIOs love talking about unified IT strategies, and architects get excited about the abstractions that support them, but the fact still remains that what's really going on under the covers of hybrid IT are multiple different configurations of compute, storage, and network – the hardware that the software runs on.

Connecting the dots between this hardware reality and the abstracted promises of hybrid IT is *hyperconverged infrastructure* (HCI).

Whereas the earlier generation of converged infrastructure sought to combine compute, storage, and network onto the same physical servers, HCI brings a virtualization-based abstraction to the hardware story (the 'hyper' prefix of HCI referring to 'hypervisor').

In the context of hybrid IT, organizations can deploy HCI in several ways. It may simply help organizations provision and manage their on-premises infrastructure. Or HCI may form the core architectural foundation of a private cloud, either on-premises or hosted – leading to a rethink of the definition of HCI as *hybrid cloud infrastructure*.

To an increasing amount, HCI is playing an expanding role within public cloud environments as well – not to abstract their hardware (the public cloud providers excel at that task by themselves), but rather to support the unified architecture vision of hybrid IT.

In other words, when an application that makes up part or all of a workload needs to put an object into storage, for example, the application shouldn't have to care whether that storage be an Amazon S3 instance or a hard drive running in the corporate data center.



Instead, HCI is what provides the essential abstraction layer that enables such an app to simply write to whatever storage is appropriate as a matter of policy.

If workloads can't tell whether the underlying environment is on-premises or running in one cloud or another because of the HCI layer, then an interesting thing happens: *on-premises environments look and work like the cloud*. This phenomenon is at the heart of the multi-cloud experience.

In fact, you could say that in an important way, the vision for hybrid IT is the vision for *cloud everywhere*.

This notion of 'cloud everywhere,' in fact, is part of what we now mean by '*cloud native*.' Originally, cloud native software consisted of applications that people developed in cloud environments – but today the meaning has expanded.

When we say that software is 'cloud native' today, we mean that it follows the best practices of the cloud, including scalability, resilience, and other cloud-centric characteristics, *regardless of where it was developed or where it's running*.

Cloud native software, therefore, might very well be running on-premises – but only if the architectural principles of the cloud extend to such on-premises environments. HCI-empowered hybrid IT best practices are what make this possible.

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Containers Drive the Application Development of the Future

The virtualization at the heart of HCI has now become an established, nearly ubiquitous part of the IT infrastructure landscape – and in fact, it essentially gave birth to cloud computing.



In the cloud, all resources – network, storage, and compute – are inherently virtual. Spin them up when you need them, spin them down when you don't. In other words, cloud resources are *ephemeral*.

Today, containers take the notion of ephemerality to the next level. Whereas a virtual machine may take minutes to spin up and then remain active for months, containers take milliseconds to come to life, and might serve their purpose in hours or minutes.

Now that open source container orchestration platform Kubernetes has turned a corner – it's in use at over half the Fortune 500 already – containers have become a central part of the cloud native story for hybrid IT.

In fact, *cloud* best practices are in large part *container* best practices. Horizontal scalability, resilience, and rapid response to change belong to the cloud world, and containers extend and further establish these practices, both in the cloud and on-premises.

Since Kubernetes is still immature, early adopters of the technology must take steps to avoid Kubernetes itself becoming a technology silo. The hybrid multi-cloud experience for Kubernetes must therefore empower companies to run it wherever they like, either on premises or in their choice of public or private clouds.

Bringing such multi-cloud practices to on-premises environments sounds good in theory, but technology like containers are only a part of the story. The key to making this vision for modern IT a reality is to *transform the way organizations create software*.

The cloud native, hybrid IT vision is about breaking down technology silos, and thus companies must break down their organizational silos as well. It's no coincidence, therefore, that DevOps is a critical enabler of hybrid IT.

DevOps is an organizational and cultural transformation of the broader application development organization that seeks to leverage greater collaboration across individuals in multiple roles, while leveraging automation to deliver better software faster.

While the 'dev' and 'ops' roles give DevOps its name, DevOps impacts testers, security engineers, database specialists, architects, and the full diversity of ops personnel, including network, data center, and storage specialists – among others.



Without this kind of collaboration, enterprises are unlikely to achieve the promise of hybrid IT.

Remember, hybrid IT centers on workloads independent of the particular deployment environment. The DevOps effort, therefore, should focus on workloads and the applications they support – a task that would be nearly impossible if the organization managed cloud-based appdev teams, virtualization-centric appdev teams, and on-premises, legacy appdev teams as separate organizational silos.

Instead, the DevOps-centric appdev effort should consider the different customer requirements for different types of applications – where ‘customer’ may include employees, partners, or anyone else who gets value from the software.

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Perhaps customers require certain applications to be continually updated, while others are more static, needing weekly or monthly updates. The team should also consider the various compliance and security requirements that apply to the software as design constraints.

Without the cross-environment abstraction that HCI can provide, coupled with cloud native best practices and a DevOps organizational approach, achieving this level of customer focus with enterprise software can be difficult or impossible to achieve in practice.



What Hybrid IT Means for Your Customers

It may seem that this discussion of hybrid IT centers on IT infrastructure, but in fact, it must center on the *customer*.

From the customer perspective, good customer experience is more than a front-end challenge. All of IT, and in fact the entire enterprise, must step up to the plate.

True, we've layered on abstraction after abstraction, as technologists have been doing for decades in order to deal with increasingly complicated technology in a simple, straightforward manner.

That being said, it's easy to get lost in the weeds. There are so many buzzwords to keep track of – cloud native, hybrid IT, HCI, multi-cloud, DevOps, and more – that losing sight of what the business is trying to accomplish happens surprisingly often.

To regain this lost perspective, focus on the needs and desires of the customer – including employees and others, as appropriate.

For example, today's consumers are increasingly tech-savvy, and expect high performance, consumerized experiences from the companies they do business with – and performance depends primarily on the infrastructure, whether they be accessing banking from smartphones or enjoying a retailer's omnichannel customer experience.

B2B customers and employees of your organization similarly expect a consumerized experience. After all, we are all consumers, and the simplicity and power of the technology we interact with daily has spoiled us.

This consumerization trend has implications across all of IT, as the performance at the interface depends upon the end-to-end performance of every element of technology in the IT landscape.

In fact, this vision of the software-empowered but customer-driven enterprise is at the heart of what we mean by *digital transformation*. Enterprises must align both their technology as well as their people to better meet the changing needs of their customers.

Such realignment represents an end-to-end business transformation. For many enterprises, therefore, digital transformation requires a hybrid multi-cloud strategy.



Conclusion: Who is the Winner?

What, then, does this end-to-end digital transformation have to do with the hybrid IT story? The answer: *everything*.

There's no arguing with the fact that hybrid IT is *inherently* complex. But with great complexity comes great power, flexibility, and in the end, business value.

In fact, you can think of hybrid IT as representing the culmination of many trends within the IT infrastructure world over the last few decades: virtualization and cloud computing. HCI and containers. DevOps and digital transformation.

For the people running the IT infrastructure, the rise of cloud native computing signals a new era in power, simplicity, and speed. Legacy technologies no longer represent shackles on innovation.

Instead, we're bringing the cloud to every corner, where the distinction between on-premises and cloud-based becomes little more than an implementation detail.

The true winner of digital transformation, and thus of the hybrid multi-cloud experience of hybrid IT, is the *customer*. When organizations are better able to leverage vast, complex technology resources to better serve the needs of individual customers, everyone benefits.

For the companies that serve them, delighted customers mean increased market share, lower customer churn, and increased profits.

The enterprises that get hybrid IT right are going to be the ones that survive – because getting hybrid IT right means having a better hybrid multi-cloud experience, thus aligning technology with customer preferences and behavior better than the competition can and in the end, providing the strategic differentiation essential for success in the digital era.



About the Author: Jason Bloomberg

Jason Bloomberg is a leading IT industry analyst, author, keynote speaker, and globally recognized expert on multiple disruptive trends in enterprise technology and digital transformation.

He is founder and president of Digital Transformation analyst firm Intellyx. He is ranked #5 on Analytica's list of top Digital Transformation influencers for 2018 and #15 on Jax's list of top DevOps influencers for 2017, the only person to appear on both lists.



Mr. Bloomberg is the author or coauthor of four books, including *The Agile Architecture Revolution* (Wiley, 2013).

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