White Paper

It's Not Public Versus Private Clouds - It's the Right Infrastructure at the Right Time With the IBM Systems and Storage Portfolio

Contents

About Ziff Davis B2B

Ziff Davis B2B is a leading provider of research to technology buyers and high-quality leads to IT vendors. As part of the Ziff Davis family, Ziff Davis B2B has access to over 50 million in-market technology buyers every month and supports the company's core mission of enabling technology buyers to make more informed business decisions.

Contact Ziff Davis B2B

100 California Street, Suite 650
San Francisco, CA 94111
Tel: 415.318.7200 | Fax: 415.318.7219
Email: marty_fettig@ziffdavis.com
www.ziffdavis.com

Executive Summary

A growing number of IT decision-makers are realizing that the best solutions for their application deployments, data processing needs, and storage requirements no longer fall into neat boxes of "private clouds" or "public clouds." Even those who have found ways to utilize both on-premises data centers and public cloud infrastructures are looking for new ways to intelligently integrate the two into true hybrid cloud environments that dynamically respond to shifting workloads and changing needs within their organization.

In fact, the era of the hybrid cloud is here with an unprecedented array of powerful on-premises hardware, hosted cloud infrastructure, new service models, and innovative software to seamlessly connect entire ecosystems of computing and storage. This paper focuses on both the state of the art in dynamic hybrid cloud deployments as well as the IBM Systems and Storage Portfolio that represents a complete set of hardware, software, and hosted offerings to meet the needs of the modern enterprise and emerging Cloud Service Providers.

Introduction

There remains a substantial schism among IT professionals. In spite of the cost of maintaining a large data center, many still believe that "if it ain't in my data center, it ain't secure." While this viewpoint may be extreme, there are many cases in which on-premises solutions are both appropriate and necessary. At the same time, a growing number of IT decision-makers are leveraging public clouds, taking advantage of their inherent scalability, potential cost savings, and the flexibility and speed of cloud deployments.

However, public and private clouds don't need to be mutually exclusive. Operators don't need to compromise on speed, security, flexibility, scalability, or even economics. Hybrid solutions allow enterprises to enjoy the best features of both public and private clouds and to combine them in truly innovative ways.

There is also a growing awareness of the critical nature of infrastructure. Whether organizations are evaluating service providers, vendors are developing solutions for clients, or businesses are building out their own data centers, underlying hardware has a direct impact on access, speed, and availability.

Private clouds – Powerful tech, new solutions

The enterprise data center is evolving rapidly, as organizations look for ways to:

- Both cope with and leverage big data
- Rapidly deploy applications to employees, partners, and customers
- Adapting rapidly to deal with dynamic workloads
- Maximize the effectiveness and efficiency of virtualized environments

Infrastructure Matters

The term "infrastructure" can have many definitions in enterprise IT. We could be talking about software platforms, unified communications infrastructure, networking equipment, directory services, and even physical plant considerations. More often than not, though, we're talking about hardware: the compute nodes, storage arrays, switching devices, etc., that make a data center tick.

Many vendors are taking a "race-to-the-bottom" approach, relying on commodity hardware to achieve the lowest possible costs. Data centers are expensive to build, expensive to scale, and expensive to run and the temptation to look for short-term savings on capital expenditures is strong.

However, an organization's infrastructure choices have a lasting impact on its ability to deliver lasting value, ongoing insights, and highly available applications. Perhaps more importantly, finding a trusted partner with a portfolio of infrastructure products that is both broad and deep ensures that the most suitable hardware can be rapidly deployed to meet an organization's specific needs.

Virtualization, in fact, is driving many of the infrastructure investments that both service providers and enterprises are making today. Virtual machines tend to accumulate rapidly as developers spin up machines for testing and deployment and operators build out virtual environments for clients. Mainframes and clusters of high-end physical servers allow data center administrators to consolidate workloads for easier management and improved resource utilization.

At the same time, enterprises are adding storage systems optimized for virtualization. Storage Area Networks (SANs) can be implemented in integrated appliances, deployed over Ethernet networks with new converged network infrastructure, or managed in traditional racks with ultra high-speed Fiber Channel connections. In any case, operators now have access to nearly limitless storage scalability that can be flexibly integrated in existing data centers or deployed to meet particular needs in greenfield data centers.

This sort of flexibility and scalability is critical as enterprises are facing new data challenges while still dealing with traditional workloads. Storage technologies need to be able to deal with structured and unstructured data from the growing world of new era workloads, particularly social and mobile applications. Because analytics has become a fundamental business operation, both storage and compute infrastructure need to support near real-time access to high-volume, high-velocity, heterogeneous data.

New data requirements go far beyond accessing and analyzing a wide variety of data. There are increasing demands for high availability, disaster recovery, and data protection capabilities while exponential increases in data volume require organizations to pursue tiered storage strategies. Being able to match storage performance and cost characteristics to the data life cycle, including archival, is key to managing overall data economics.

Data center administrators also have turnkey options with integrated storage, networking, and compute clusters. These integrated solutions allow operators to deploy additional resources quickly and easily when and where they are needed. They can even be rolled out in branch offices and distributed environments. The bottom line for organizations is that on-premises computing and powerful internal architecture can now accommodate high availability services and deliver the absolute lowest latency for demanding applications. Unifying compute resources into private clouds makes the modern data center easier to manage and better at delivering the right capabilities when and where they are needed. For some organizations, private clouds also represent the only choice for specific types of data and applications, depending on regulatory and security requirements.

Public clouds – Infinite flexibility and scalability

This isn't to say, though, that private clouds are the only viable solutions for many organizations. A growing number of service providers offer enterprise-grade public clouds or deliver mission-critical applications and platforms as a service. One of the greatest advantages of using public clouds is the ability to rapidly and cost-effectively deploy applications. Using public clouds in

this way is fairly transparent to developers and users and allows organizations to avoid the capital expenses of developing private clouds, instead paying for the compute and storage that they use in a service model (Infrastructure as a Service or IaaS).

IaaS carries several potential advantages for many businesses in specific situations:

- IT costs are shifted to operational expenses and businesses only pay for what they need
- Robust Internet connectivity for delivering externally facing applications becomes the burden of the service provider
- Organizations can scale compute and storage capabilities very quickly without waiting to purchase and deploy new on-premises hardware
- IT workloads related to provisioning, networking, and hardware deployments can be substantially reduced

These advantages come with some caveats, though. Security and/or regulatory requirements may dictate specific chain of custody procedures or data segregation standards that are better served by on-premises hardware. From a practical perspective, organizations that have already made substantial infrastructure and data center investments will often want to fully realize returns on those investments before looking to IaaS providers.

Most importantly, infrastructure still matters. It is incumbent upon IT decision makers to fully evaluate a service provider's infrastructure to ensure that it can meet an organization's needs for access, availability, and speed. This evaluation must also happen in the context of a multitenant environment, making the service provider's choice of infrastructure even more critical.

Can a service provider's infrastructure support the service level agreements (SLAs) required by my business?

Does the service provider have the flexibility and scalability to meet my organization's needs, regardless of future growth or the magnitude of workload bursts?

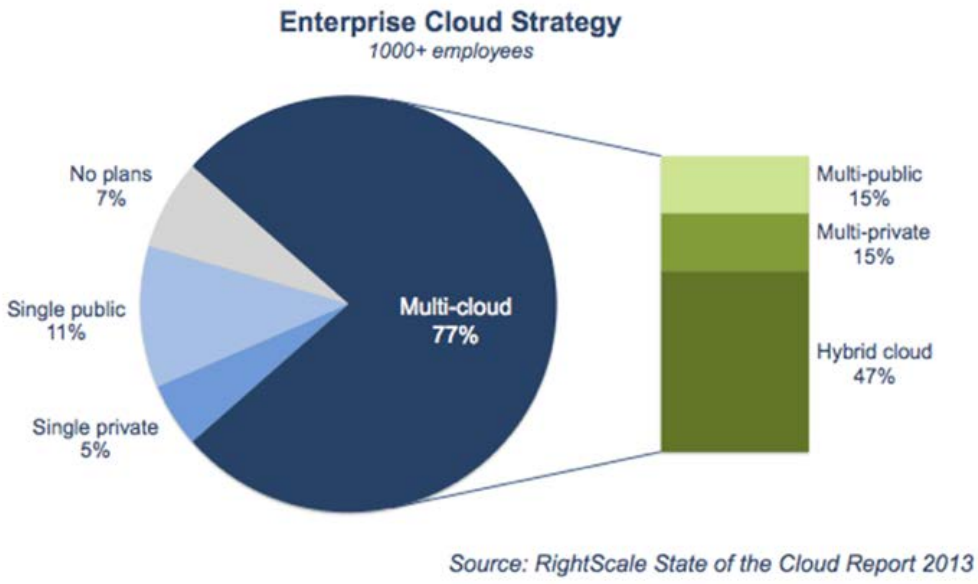
Can the service provider host low-latency private clouds or deliver bare metal resources to support the most demanding applications?

How are resources allocated to service provider's clients?

Can my organization afford to share resources with other clients?

Hybrid Clouds - Selectively mix Private with Public to combine the best of both

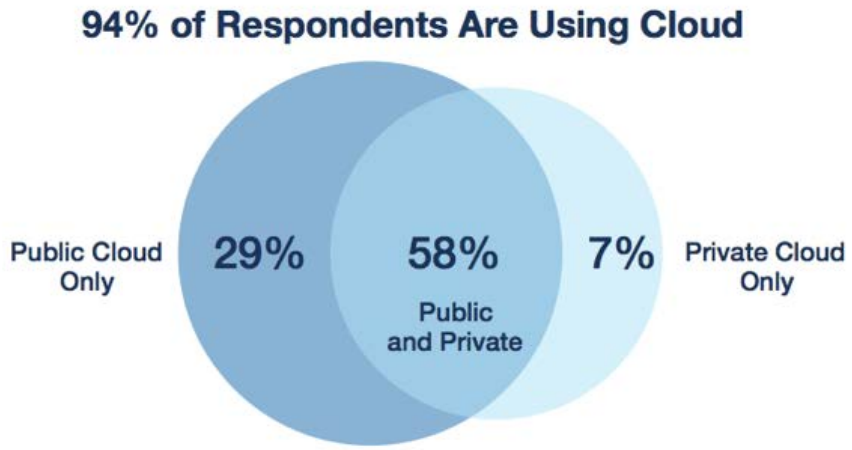
As with many things in information technology, one size doesn't fit all, nor is the choice between private and public cloud infrastructure black and white. Many enterprises require some degree of on-premises infrastructure but can save money and improve flexibility by using public cloud for specific needs. A **2013 study by RightScale** revealed that 47% of large enterprises surveyed include so-called hybrid clouds in their cloud strategies, with fully 77% looking to integrate multiple cloud infrastructures, whether public, private, or hybrid.



Source: RightScale State of the Cloud Report 2013

Hybrid clouds have the distinct advantage of allowing organizations to realize cost savings and benefit from immediate, on-demand scalability available from public cloud infrastructure. At the same time, they can host applications and data in private clouds when performance, security, regulatory, or logistical issues make on-premises infrastructure more appropriate.

Clearly this hybrid strategy is taking hold in the enterprise. When **RightScale surveyed enterprises** a year later in 2014, hybrid adoption had jumped significantly, with organizations moving from strategy to implementation.



Source: RightScale 2014 State of the Cloud Report

What does a hybrid dynamic cloud look like?

While a hybrid model may strictly rely on segregating workloads and storage between public and private clouds, the greatest value is often derived from a dynamic connection between the two. Hybrid dynamic clouds enable organizations to, for example, deploy applications on-premises and either fail over or scale out to public clouds as the need arises. Advances in management and integration technologies allow enterprises to define networks, manage virtualization, and connect infrastructure in software to make the interplay of public and private clouds transparent to users.

There are three key elements to a transformational hybrid cloud deployment that provides organizations with agile, scalable computing resources:

- On-premises infrastructure with high-performance, low-latency hardware for demanding workloads best suited to private clouds

- A trusted IaaS provider that pays strict attention to the quality of their own infrastructure, and therefore can ensure availability, access, and speed for workloads deployed in a public cloud
- Intelligent management utilities that allow enterprises to see across public and private cloud resources and deploy workloads seamlessly, regardless of physical location, virtualization platform, etc.

Example deployments – Hybrid clouds in the enterprise

Hybrid clouds can take many forms, with organizations building out and/or outsourcing infrastructure in whatever configurations provide the most flexible, cost-effective solutions to meet their particular needs. The following represent common examples of potential use cases for hybrid clouds:

- Big data analytics: Big data from social, mobile, SaaS, and other applications is often hosted in public clouds due their ability to effectively cope with high-volume, high-velocity streams. However, analytics workloads are often deployed on-premises to meet performance requirements, particularly as increasing numbers of end users engage in exploratory analysis and run complex visualizations.
- Disaster recovery: Off-site backup is no longer adequate for high availability and fast recovery from disaster in always-on, 24/7 environments. Instead, increasing numbers of organizations are replicating private clouds to public infrastructure for nearly immediate failover to backup virtualized systems.
- Regulated environments: Many organizations working in regulated environments, from banking and finance to healthcare, face requirements for maintaining data on secure, on-premises infrastructure. However, maintaining a 100% private cloud solution for all compute and storage needs can be prohibitively expensive. Using public infrastructure for specific SaaS applications, web hosting, desktop virtualization, and other unregulated activities while keeping regulated data and applications securely in private clouds.

From DevOps to Hadoop – Deploying workloads in the right environment

The list above is hardly exhaustive. As the RightScale data diagramed earlier shows, the number of organizations finding innovative, flexible solutions with hybrid clouds is growing rapidly. Where hybrid clouds offer the greatest business value, though, is in their ability to accommodate diverse workloads in the right environment.

Within hybrid environments, private clouds can be used to deliver Platform as a Service (PaaS) computing models that extend automation capabilities across developer and operational workflows. New efficiencies benefit both developers and IT and cloud technologies, with extensive underlying automation and orchestration tools, are hallmarks of the DevOps movement. Applications can be deployed faster with fewer IT bottlenecks; scaling to public

cloud infrastructure is seamless, accelerating time to market and freeing IT resources for strategic initiatives.

Yet hybrid clouds aren't just about creating conditions favorable to agile development practices. The elastic interplay between on-premises infrastructure and public clouds is a powerful enabler of many different technologies. For example, Hadoop, a platform for managing and analyzing very large unstructured datasets, runs best on physical server clusters. There are cloud-based and SaaS implementations that work well, but for organizations looking to build out Hadoop capabilities, on-premises or co-located data centers give administrators maximum control of infrastructure.

Analytics applications that can leverage the Hadoop cluster can then be deployed in a private cloud running on infrastructure in the same facility to maximize performance and minimize network overhead associated with transferring massive datasets. To best support big data analytics like this, IT may strategically shift other applications to public infrastructure, freeing on-premises compute resources for Hadoop and analytics.

The exact proportion of private to public infrastructure and the choice of which applications to deploy on-premises or in public clouds is up to the individual organization. The dynamic hybrid cloud model simply gives organizations the flexibility to define the right environments for their computing needs. IT can base decisions on performance, security, workflows, cost, and future growth and build infrastructure (or buy it as a service) appropriately.

Hardware, software, and public cloud infrastructure – Bringing it all together

The IBM Systems and Storage Portfolio is unique in its ability to deliver complete ecosystems of hardware, software, cloud platforms, and software offerings for enterprises with widely varying needs and requirements. Just as public clouds or private clouds alone often aren't enough for any given business, so too is a single, one-size-fits-all solution inadequate for businesses operating at different scales, in different environments, and with different goals and objectives. Because the IBM Systems and Storage Portfolio is so broad, IT leaders can select the best set of solutions for their organizations while giving Line of Business leaders the flexibility and capabilities they demand.

IBM data center solutions

IBM's data center solutions range from x86-based rack servers to Power Systems for Linux and Unix applications. IBM also offers mainframes for massive workload consolidation and specialized storage solutions. Specifically, their data center infrastructure products include:

- PureFlex: Integrated blade chassis, compute nodes, networking and storage capabilities that can be deployed fast in a variety of environments, allowing operators to build out virtualized environments half a rack at a time

- PureApplication: Integrated systems that leverage PureFlex hardware and advanced automation and orchestration tools for rolling out PaaS and cloud architectures far more rapidly than separate blade or server configurations
- System z: Mainframe systems built on decades of experience that can consolidate analytical and virtualization workloads with unified management and long-term savings in terms of maintenance and energy consumption
- Power Systems: RISC-based rack systems and blades that deliver extraordinary performance for mission-critical applications with open operating system choices
- System x: Industry-standard x86-based rack systems and blades supporting the widest range of hypervisors and applications, from Windows and HyperV to Linux and VMWare.
- Storwize: Integrated storage appliances with powerful SAN management utilities and massive, zero-impact scalability

In all cases, IBM solutions offer innovative, high-availability infrastructure suitable for both enterprise private clouds of any scale and service providers offering public clouds and co-located hardware. The performance and reliability ensure that end users, customers, and partners have access to applications, big data solutions, and number crunching in near real time to make better decisions faster and deliver applications regardless of location or workload.

IBM Platform Computing

IBM Platform Computing offers businesses a complete end-to-end hybrid cloud implementation, enabling seamless bursting of analytics and technical computing workloads to the SoftLayer cloud. IBM Platform Computing provides workload management software that allows existing, on-premises private clouds and compute clusters to be dynamically integrated with hosted private clouds. The hybrid cloud implementation also includes the SoftLayer infrastructure with dedicated bare metal resources, addressing the security and performance concerns typically associated with running technical computing and analytics workloads in the cloud.

This sort of flexibility ensures that organizations can securely scale their infrastructure to address user demand within mere hours for applications requiring dedicated bare-metal servers (such as data management and analytics with Hadoop). Instead of forcing businesses to choose between on-premises private clouds and public infrastructure, organizations can create true hybrid environments unique to their particular needs, existing investments, and short- and long-term requirements.

Software Defined Storage and IBM's General Parallel File System (GPFS)

The IBM Storage Portfolio includes a broad set of hardware infrastructure. IBM adds additional infrastructure value through "Software Defined Storage" as well. The IBM Software Defined Storage portfolio introduces new levels of data flexibility, agility, and responsiveness – all delivered and managed through software. This same software ecosystem also maintains the security and reliability that are critical for your data systems. In particular, software defined storage is workload aware, leverages storage virtualization across heterogeneous systems, and incorporates high degrees of automation to ensure the right types of storage are available when and where they are needed.

A key building block in IBM Software Defined Storage is IBM General Parallel File System (GPFS), a large-scale parallel file system designed to manage and deliver high performance for the petabytes of data and billions of files used in big data, analytics and cloud environments. GPFS removes data-related bottlenecks by providing parallel access to data, eliminating single filer choke points or hot spots. GPFS also simplifies data management at scale by providing a single namespace that can be scaled simply, quickly, and infinitely by simply adding more scale-out resources – eliminating "filer sprawl" and its associated headaches. In addition to simplifying storage management, GPFS also includes advanced data protection and built-in encryption that supports HIPAA, Sarbanes-Oxley, and compliance with international privacy regulations.

For users with hybrid cloud environments, GPFS can cache data or stage data to/from customers' sites, tier data between multiple storage technologies and replicate data to other sites for disaster recovery. Geographically distributed organizations can access data with much lower latency because GPFS places critical data close to everyone and everything that needs it, no matter where they are in the world.

When integrated with IBM Tivoli Storage Manager (TSM) or IBM Linear Tape File System (LTFS), GPFS can uniquely manage the full data life cycle, delivering geometrically lower cost savings through policy driven automation and tiered storage management. GPFS manages data, files and objects across a scalable storage cluster with automation to move data among flash, disk and tape, potentially driving down overall storage costs as much as 80%.

Managing hybrid clouds with IBM

While the underlying infrastructure is absolutely critical to performance and scalability, it is the ability to dynamically and, in many cases, automatically, define a computing environment that will maximize the utility of and return on infrastructure investments. IBM infrastructure purchases and deployments don't end with delivery of pallets on a company loading dock. The entire PureSystems Family of hardware, for example, is strongly differentiated by its built-in intelligent management software while IBM SoftLayer provides a single self-service portal and APIs to manage public cloud deployments.

Neither public nor private clouds need to represent a compromise in terms of any aspect of computing. Rather, the right layers of software ensure that hybrid clouds provide the best of both worlds with single pane of glass management that makes their use and integration transparent to both users and operators.

Conclusion: Public cloud? Private cloud? How about the right infrastructure for the job?

No other company delivers as broad and deep an ecosystem of infrastructure products as IBM. Their Systems and Storage Portfolio can speed hardware deployment with integrated hardware and operators can be running applications within hours instead of days or weeks due to powerful management, automation, and orchestration solutions.

More than any other element of data center operations, infrastructure matters. Basing procurement and deployment decisions on cost alone with race-to-the bottom commodity hardware simply can't ensure the access, speed, and availability necessary to successfully build out dynamic hybrid clouds. Instead, deploying the right hardware, in the right environment ensures lasting business value, delivers ongoing insights with analytics and big data solutions, and will ultimately be more cost-effective than simply taking a lowest bidder approach to building out critical infrastructure.

To learn more about the IBM Systems and Storage Portfolio, visit:
ibm.com/systems/cloud