

Private cloud in the hybrid cloud era

The critical choices driving business value and agility



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Executive summary

Private clouds have become a major catalyst for business growth and differentiation while supporting organizations' need to manage highly sensitive information. Along with public clouds, they are leading the way to a far more agile, open environment for development and innovation, providing developers with unbridled access to the resources they need to design, build and deploy differentiating products and services faster than ever before. They are also leveraging automation more extensively than ever before to solve problems and improve operational efficiencies, and they are churning out substantial cost savings in the process. And these benefits are just the beginning. As cloud computing moves into the hybrid era, the business impact is expected to broaden exponentially in ways that have yet to be fully understood.

Private clouds help lay the essential foundation for hybrid computing by putting in place much of the workload and management automation that will be needed. While an increasing number of private cloud products are providing turnkey functionality right out of the box, optimal business agility depends on making the right service and technology choices. Capitalizing on the transformative potential of private cloud requires leveraging the differentiators that will drive exponential value down the road—differentiators like:

- Standardized private cloud builds with the automation to deliver fully functional private clouds in days or weeks
- Platform as a service (PaaS) models that dramatically speed application development and time to market
- Self-service catalogs that provide the modular flexibility, easy scalability and customization to address rapidly changing needs
- Open cloud architectures that enable hybrid cloud interoperability and provide a path to collaborative innovation
- Automated private cloud management that provides infrastructure-wide visibility across cloud and non-cloud environments
- Fully integrated security and resiliency management, with the ability to recover rapidly in the event of an outage
- Analytics that can identify the best private cloud opportunities and delivery models, and facilitate the development of a holistic cloud strategy.

This paper looks at these and other private cloud differentiators, examining what they mean for the business and how best to incorporate them into your environment, based on the latest research, technologies and solutions.

Defining the cloud models...

The National Institute of Standards and Technology (NIST) uses the following definitions:

- **Private cloud** is a cloud infrastructure provisioned for exclusive use by a single organization, comprising multiple consumers. It may be owned, managed and operated by the organization, a third party or some combination of them, and it may exist on or off premises.
 - **Public cloud** is a cloud infrastructure provisioned for open use by the general public. It may be owned, managed and operated by one or more organizations, a third party or some combination of them, and it may exist on or off premises.
 - **Hybrid cloud** is a composition of two or more cloud infrastructures (usually public and private) that remain unique entities, but are bound together by technology that enables data and application portability.
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Private cloud today

Today's private clouds are delivering on every bit of cloud's speed and agility promise, beginning with the myriad of deployment options they make available to adopters. Whether deployed onsite or offsite, individually or as part of a hybrid cloud, hosted or managed by a third party, private clouds are fundamentally changing the economics of the data center and, in the process, driving extraordinary value and competitive advantage for the business.¹

Early apprehension about the high cost and complexity of deploying and managing private cloud, which inhibited adoption in years past, is fading and being replaced by a newfound understanding of private cloud as the logical next step beyond data center virtualization. As private clouds

have matured and become easier to implement and use, early concerns have been quashed by the strategic advantages, especially for mission-critical workloads, including security, privacy and lower network latency. And the business value of these advantages is only just beginning to be tallied.

Large enterprises in particular are coming to realize that they can utilize their existing infrastructure to build and run a private cloud economically—at or below the cost of public cloud. Technology advances and growing commercial interest in cloud computing have led to an abundance of solutions that have simplified and lowered the cost of private cloud. Organizations need to sift carefully to determine what's going to work best in their environment and optimize the return for their business. For most, that will mean leveraging legacy systems in the best possible way. The good news is that open cloud standards and architectures are providing organizations with the flexibility to do just that. They can leverage legacy data center resources (from bare metal to hypervisors to portals) and be assured of near seamless interoperability, portability and management.

Such success also depends on a holistic cloud strategy. Cloud computing affects the enterprise on multiple levels operationally, technologically and organizationally, and a holistic strategy takes these multidimensional impacts into account. It helps ensure the most advantageous cloud technologies and delivery models are used from the outset.

More and more, analytic tools are helping organizations assess the existing environment and planned applications to determine where cloud can drive the greatest differentiation for the business (see sidebar, next page). These tools not only help identify the business areas and applications that will provide the best cloud opportunity, they compare the viability of specific cloud delivery models. This means they go beyond suggesting

private or public clouds. They assess, for example, whether a private cloud should be deployed on premises, hosted and managed externally, and if external, whether it should be dedicated or shared. They also assess the potential platform choices from among infrastructure as a service (IaaS), platform as a service (PaaS), software as a service (SaaS) and business process as a service (BPaaS) to determine what makes the most sense (see sidebar, at right). The best of these analytic tools also spell out the impact of cloud migration, making it possible to determine what will be needed for a smooth implementation.

Competitive business advantage via the cloud

IBM's 2013 global cloud study found business leaders becoming increasingly aware of the business value of cloud computing. Over the next three years, cloud's strategic importance to business users is expected to double from 34 percent to 72 percent, even surpassing its importance to IT users.

Organizations that have deployed cloud broadly are realizing 1.9X higher revenue growth and 2.4X higher gross profit than their more cautious peers. These companies are:

- 136 percent more likely to use cloud to reinvent their relationships with customers
- 170 percent more likely to use the cloud extensively for analytics
- 79 percent more likely to leverage the cloud for collaboration and expertise.

But the greatest distinction is in their cloud strategy. Cloud leaders are also way ahead of their peers with more comprehensive cloud strategies. They are nearly 4X as likely to have an enterprise-wide cloud strategy and 83 percent more likely to use hybrid cloud to capitalize on the strengths of both public and private cloud.²

As business leaders continue to realize the transformative value that cloud can provide to the business, their enterprise cloud strategies are focusing less on cost reduction and more on achieving the business agility to enter new markets, improve customer interactions and transform current business models. To be truly effective, cloud strategies must also address any legacy processes and organizational silos that are not in sync with the automation and self-service requirements of the cloud. Processes must be adapted for cloud standardization and chargeback, for example, to benefit fully from automation. Often times, breaking down existing silos and integrating current processes across the enterprise can be a major challenge, and the most forward-thinking, holistic cloud strategies include the steps to overcome it.

Defining the service models...

Four types of IT resources can be delivered on demand and as a service by the cloud—infrastructure, platform, software and business processes:

- **IaaS** solutions provide the infrastructure resources required for computing: servers, storage and networking
 - **PaaS** solutions provide the cloud-based environment—operating systems, middleware and infrastructure—needed to support application development and delivery
 - **SaaS** solutions provide application software in the cloud that is owned and operated by others and that connects to users' computers via the Internet
 - **BPaaS** solutions provide business processes and industry solutions via the cloud to improve an organization's operational efficiencies and customer relationships.
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The road to hybrid computing

With a majority of enterprises and small businesses already invested in public cloud and many edging their way toward private cloud, organizations aren't choosing sides in the public-

versus-private cloud debate. The notion that a single cloud model can effectively meet all of the enterprise's application requirements is just not practical. Some workloads are simply better suited for private or public clouds. Consider legacy business applications which require compatibility with existing systems and need to be configured for the cloud ("cloud-enabled workloads") versus mobile, social and web applications which are built to run on the cloud ("cloud-native workloads"). The latter applications are a natural fit for public cloud; the former for private cloud.

Even among workloads designated for private cloud, some are better suited for on-premises deployment while others are better suited for off-premises hosting and management by a third party. The point is that workload-specific security, scalability, economics and other requirements are directing organizations to select a mix of cloud types and delivery models for their environment. These companies are seeing the benefits of using multiple cloud models and coming to realize that the future of cloud computing is not solely in public or private cloud, but somewhere in between—in the hybrid space.

In fact, 76 percent of respondents in a 2013 survey expect hybrid clouds to be the core of their cloud strategy, overtaking public and private clouds in the next five years, with usage expected to grow to 43 percent, up from 27 percent today.³ Hybrid clouds allow enterprises to have the best of both, providing an integrated solution for cloud-enabled and cloud-native workloads while handily addressing the management needs of the business. Hybrid clouds allow them to retain control of their IT environment with the security and privacy to protect proprietary systems and data, maintain regulatory compliance and ensure service levels. But they also address the organization's rapidly escalating scalability and processing demands in a way that private cloud by itself cannot. As volatile web applications and the increasing thirst for business analytics

and innovation exceed private cloud resources, linking to public clouds to accommodate the unpredictable peaks cost-effectively is a logical path for organizations.

In the textbook hybrid scenario, a private cloud can quickly reach out to a public cloud to get needed resources when its own capacity becomes overwhelmed. These virtual resources move fluidly back and forth between cloud models, without exposing the private cloud to a public breach. In the event of a private cloud service disruption, the public cloud can also provide backup resources or a failover site, enabling organizations to avoid the capital expense and management burden of maintaining standby capacity or a secondary site. This ability to burst into the public cloud when needed, so-called "cloudbursting," has made hybrid cloud a destination architecture.

Private cloud: the core differentiators for your business

Agility is the primary reason organizations are moving to the cloud. Being able to respond quickly and cost-efficiently to unpredictable demands has become a competitive necessity for modern business.

Organizations are turning to private clouds to capture the same agility internally that they've achieved with public clouds externally. They want the same speed, dynamic scalability, flexibility, optimization and efficiency, while addressing the need for exclusivity and compliance. All of these attributes can drive transformative value for the business, making them core differentiators for any private cloud deployment and an essential part of the business conversation around private cloud. Weighing their merits for your own environment in the context of your requirements and objectives can help ease the transition and optimize the strategic benefits for your business.

The remainder of this paper examines these core differentiators in detail, sharing IBM's view on how best to deploy them to augment the benefits for your business in the hybrid cloud era.

Speed

Competition in the fast-paced, globally connected world demands that services be delivered faster and that end users and developers have access to the resources they need whenever they need them. New private cloud technologies are making that possible by:

- Automating the deployment of fully functional private clouds in weeks or less
- Enabling organizations to leverage PaaS models that automate middleware provisioning and increase workload automation
- Ramping up users' self-service capabilities.

In addition, emerging open cloud architectures will advance the speed of the enterprise, streamlining cloud deployment and new development by enabling interoperability with legacy infrastructures and future technologies. These architectures are discussed later in this paper.

Automating private cloud deployment

Private cloud needn't take months or even years to implement anymore. Standardized private cloud builds eliminate the need to build a private cloud from scratch, leveraging automation to drastically simplify deployment and reducing the average time frame to days or weeks. The builds typically handle server, storage and network provisioning and configuration, and the installation of management systems in a manner consistent with security and operational policies.

Automated scripts are used to install application software, operating systems and middleware, simplifying new server deployments and disaster recovery. But the benefits of automated deployment go beyond speed and efficiency.

Organizations are able to start small and scale up their private cloud incrementally, deploying the cloud they want, when they want it and adding physical nodes and virtual servers on a timetable aligned to their operational and economic needs.

Extending automation with PaaS

PaaS clouds are creating a substantial revenue opportunity for the enterprise by providing a simplified, agile environment for application development, integration and management. PaaS extends automation to the platform layer, allowing developers to provision operating systems and middleware with the same speed and ease that they provision infrastructure resources. According to IDC, this automation toolset will be an important differentiator for the business over the next few years, fueling a wave of innovation and commercial application development and creating strong allegiances among the developer community.⁴

A recent IBM study found that PaaS "pioneers"—those companies at the forefront of PaaS cloud adoption—rolled out applications faster and operated more nimbly than companies whose PaaS adoption was minimal or non-existent. They were six times more likely to use cloud for new development and three times more likely to use it for analytics. Moreover, they were getting in front of customers more quickly, getting feedback more rapidly and applying that knowledge in new initiatives.⁵

With PaaS clouds, best practices and expertise for operating systems and middleware are codified, creating reusable, standardized "patterns." The patterns are used by IT administrators to provision new cloud hardware or by developers to provision capacity resources for a new project. Patterns replace complex development tasks like database configuration with a simple download. This can speed the whole application development lifecycle. Instead of starting with a blank slate each time they need to create a new application, developers can choose from a rich set of tools in the PaaS private cloud. They can assemble applications very

quickly and efficiently, without a major technology investment. Moreover, they can be first to market, which is critical to business leadership.

PaaS clouds also enable higher levels of workload automation, because the patterns specify what capacity and platform resources are needed to run workloads at desired performance levels and transaction rates. They automatically direct what happens, for example, when workloads start to peak and saturate private cloud resources.

Though IaaS private clouds have historically dominated the private cloud market, PaaS cloud benefits have led to a marked increase in deployment. PaaS clouds are now growing at a faster rate than IaaS clouds. According to 451 Research's Market Monitor, PaaS is expected to realize a compound annual growth rate (CAGR) of 41 percent from 2012 to 2016 compared to 37 percent for IaaS.⁶ Furthermore, IDC predicts that IaaS clouds without PaaS capabilities will become a "dying breed" as companies continue to recognize the differentiating value that PaaS brings to development and innovation.⁷

Ramping up users' self-service capabilities

One of the basic tenets of cloud computing, self-service, shifts control of IT services and resources to users, allowing them to request what they need from online catalogs. New private cloud technologies streamline the process even further. Developers using a PaaS private cloud, for example, can request a web server without worrying about the configuration or platform details. They can develop and deploy applications without having to install, configure or integrate the requisite middleware, operating systems or hypervisors. The complexities of the cloud architecture are abstracted or hidden, allowing developers and other users to do their jobs faster.

Self-service catalogs give the enterprise a way to deploy and reinforce the use of standard service offerings. These offerings can drive down or eliminate the need for ad hoc requests by allowing companies to maintain fewer images, configurations

and versions. Standardization can also simplify and accelerate system management while reducing the total cost of operations.

Catalog efficiency depends on a seamless workflow with all of the components involved, including configuration management databases, change management tools and the service desk. Integration is key, and it can be especially challenging with prebuilt vendor catalogs that use services and delivery systems that are incompatible with those used by the organization.

Dynamic scalability and flexibility

The business landscape is constantly changing. Private clouds that are dynamically scalable and flexible enable organizations to respond to new demands as they happen without incurring significant cost and risk. But certain private cloud capabilities can increase organizations' responsiveness to change while enabling them to run private clouds on their own terms, with the infrastructure and services they choose:

- Open standards and reference architectures
- Modular services and customization.

Open standards and reference architectures

Portability in a hybrid cloud environment depends on adherence to open standards. Open standards allow application workloads to flow seamlessly between cloud models and hypervisors, while enabling organizations to avoid the risks of proprietary software and vendor lock-in. In that way, open standards increase the long-term viability of cloud investments.

Open standards-based computing platforms like OpenStack are designed for interoperability and the development of sustainable applications for cloud. The underlying reference architecture provides a comprehensive framework for constructing and managing open cloud infrastructures and preventing unnecessary architectural complexity.

Open cloud architectures offer significant application development advantages, providing a platform for collaborative

innovation and enabling developers to focus on development. Developers have the flexibility to choose the infrastructure and middleware components that they are most comfortable with while being assured of interoperability. With open architectures, they can select from thousands of application programming interfaces (APIs) and they can extend them either through their own or third-party capabilities without compatibility concerns. Applications can be developed and delivered much faster—in days instead of weeks or months. Furthermore, if the organization decides to change cloud providers later on, developers don't have to rebuild the entire application, which can be hugely expensive and impractical.

Open cloud architectures and technologies also simplify management, enabling organizations to use the same set of tools for managing cloud and non-cloud environments inside and outside of the data center. Open source interoperability breaks down information silos and increases opportunities to collaborate and share data and to generate high-value business analytics across traditional and cloud resources. It helps to lay the foundation for hybrid computing.

Modular services and customization

Private cloud solutions that are built on a modular framework allow organizations to implement and expand their private clouds by selecting infrastructure and service modules from a catalog. These pre-integrated modules can be plugged in quickly and easily, reducing the time it takes to deploy the cloud.

Modular frameworks make it easier for organizations to implement the services they want when it is most advantageous. They can begin with a small number of virtual machines and scale up as their resource needs change. The expandable modules are designed to accommodate server, storage and network requirements. Desired management and security capabilities can be implemented by choosing from available service modules. However, modular frameworks do not preclude the need for customization.

Organizations that are hesitant to move to private clouds often cite the lack of customization opportunities. In fact, IDC's 2012 CloudTrack Survey found it to be the leading concern inhibiting private cloud adoption.⁸

Having the ability to customize vendor-provided platform tools or develop alternatives is critical when a vendor's out-of-the-box features don't fully address enterprise requirements. But customization can be time-consuming and expensive. Leading private cloud platforms are getting around this and helping to reduce the need for customization by expanding the number of choices in the service catalog. They are including extensive service libraries, increasing the likelihood that organizations will find the platform and application services that meet their requirements, with little or no customization necessary. When services do need to be customized or created, organizations can add them to the library so they are available for future development projects.

As the demand for hybrid computing escalates, workload capacity controls, analytics and other advanced cloud services are being made available. Having a modular framework makes it easier to assimilate and deploy these services.

Optimization and efficiency

Much of the appeal of private cloud is economic since it enables organizations to address rising infrastructure and management costs. Private cloud optimizes infrastructure performance and drives efficiencies that help lower costs, and these improvements can be transformative for the business. But the degree to which an organization achieves them depends on:

- Having the option to leverage existing data center resources
- Automating private cloud maintenance and management
- Selecting the right applications for private cloud.

Having the option to leverage existing resources

By the time most organizations decide to adopt private cloud, they have already made a significant investment in their IT infrastructure. Private cloud platforms that offer the option to leverage this infrastructure enable them to get the most out of that investment. But salvaging legacy systems can be tricky. As this paper has alluded, many cloud platforms are built on technologies that inhibit their ability to support legacy systems. Moreover, some existing environments are so fragmented and heterogeneous that they are difficult for private cloud platforms to support—even the most open platforms.

Compatibility with legacy hardware and operating systems should be determined for each private cloud platform under consideration. Self-service dashboards can facilitate integration with legacy systems by simplifying access to APIs and other required resources. Platforms should be extensible and enable API customization for non-supported systems.

Automating private cloud maintenance and management

Most companies spend an inordinate amount of time and money on IT maintenance and management—upwards of 70 percent of the IT budget. Still, routine tasks like software updates and security patches are often an afterthought, or skipped altogether because the associated manual procedures can be so time-consuming and difficult to carry out.

According to IDC's 2012 CloudTrack Survey, the desire to reduce IT staff headcount was the number-one reason IT and business leaders cited for deploying a private cloud.⁹ Automation is eliminating much of the manual labor and labor-intensive management tools that can drive up operating costs and headcount, whether those functions are handled by in-house staff or outsourced to a third-party provider. Designated users execute desired IT support and monitoring functions

via a self-service dashboard and catalog of management services, including server reboots, operating system reloads and load balancing as well as failover and recovery functions. Automation also facilitates the use of management analytics and can trigger corrective action or optimization.

Besides automation, business leaders want infrastructure-wide visibility and control over cloud and non-cloud environments. They want to consolidate management systems to reduce complexity and facilitate the transition to hybrid computing. Leading private cloud platforms provide the means to do that with a single point of control for managing hardware and systems across both infrastructures.

Selecting the right applications for private cloud

Organizations need to give careful consideration to the applications they want to move to private cloud in order to address regulatory issues, required service levels, usage patterns and integration with other enterprise applications. More importantly, they need to consider the business benefits—the tactical and strategic value of moving those applications.

While extensive coding changes can be required to enable legacy applications to run in the cloud, new private cloud platforms are making it increasingly advantageous to migrate these applications by providing the necessary value, flexibility and deployment speed. Still, potential business gains must be weighed against deployment challenges for each legacy application under consideration. Some applications may be so highly optimized for the current environment that there is little to be gained from a move to private cloud. Others may be so costly to run in the current environment that a move to private cloud has the potential to provide considerable financial benefit.

Sophisticated analytic tools are taking the subjectivity out of cloud deployment decisions and should be used to identify

the most suitable applications for migration. Using criteria like data sensitivity, support costs, dependencies, migration complexity and peak processing requirements, applications are assessed against potential cloud models. Algorithmic analysis is used to identify the costs and impact of moving applications to the cloud, helping organizations to decide the best candidates for migration.

IBM on application selection and maximizing cloud value

IBM's own first major cloud initiative was aimed at achieving cost and operational efficiencies and increasing business agility. But with a list of more than 9,500 potential applications for cloud, the first step was narrowing the field. This led to the development of an analytic-based application workload analysis tool and methodology that enabled us to prioritize just over 200 applications for initial migration to cloud.

We have since migrated several fundamental IT workloads to private clouds, and we have witnessed major efficiency improvements while capturing some impressive savings in capital and operations:

- IBM's development and test cloud has virtually eliminated IBM's testing backlog, speeding new development and enabling applications to launch much sooner. Development teams have seen server provisioning and configuration drop from five days or longer to as little as one hour.
- Organizations across IBM tap into our centralized analytics cloud, Blue Insight, for tools and business intelligence aggregated from hundreds of information warehouses. The business value of these analytic insights is estimated to be more than US\$300 million for the top 20 projects alone, out of approximately 300 active projects. In addition, Blue Insight put an end to the six-figure funding required for new business intelligence projects.
- Our storage cloud cut the cost-per-byte of data stored by nearly 50 percent at each of the IBM facilities in which it was implemented. This has allowed these facilities to accommodate the explosive growth in storage demand—

25 percent or more annually—without increasing their total storage budget, and they are expected to be able to do so for four straight years.

- Our social software platform in the cloud, known as IBM Connections, has dramatically increased workplace collaboration, productivity and innovation, while enabling us to build awareness of our products and services. The cloud currently supports over 50 million web conferencing minutes per month.¹⁰
-

Security and resiliency

Dedicated private clouds have gained traction by minimizing the risks associated with multitenant cloud environments. Still, business-critical, highly sensitive workloads running on a private cloud demand fully integrated security and resiliency that is up to the standards of conventional physical and virtual environments.

In general, private cloud platforms are distinguished by their ability to manage security and recover rapidly in the event of an outage. The ideal platform offers proactive security monitoring and end-to-end coverage for the private cloud infrastructure, applications and data, as well as identity and access management, intrusion detection, vulnerability assessments and incident management. It includes tools for business resilience and continuity: managed backup protection, rapid failover capability, and content management to facilitate data archival and retrieval. Organizations should be able to select desired security and resiliency services from a broad menu of available options, allowing them to satisfy their risk tolerance as well as their budgetary constraints.

The private cloud architecture should also provide sufficient governance oversight, with a detailed view of security and current threat levels and alert notifications as required. It should provide a security-rich environment for creating applications and using cloud services without hindering productivity.

Finally, private clouds should have some provision for verifying compliance with corporate security policies and industry and federal regulations. This includes monitoring the cloud infrastructure and workflow to see that policies are upheld. Maintaining compliance also requires organizations to do proper due diligence to understand data protection laws in each country in which they operate and to assess the risks of migrating particular workloads and services to the cloud.

IBM expertise in the cloud

With more than 5,000 engagements in the private cloud space alone, IBM has the expertise to help satisfy the increasing appetite for this cloud model. Today, our private cloud services portfolio is one of the broadest in the industry. IBM was named an IaaS, PaaS and SaaS value leader for private cloud—with a higher solution impact than any other vendor studied—in Enterprise Management Associates' 2013 Radar Report.¹¹

IBM understands that cloud environments must accommodate many different types of applications, with vastly different workload requirements. Our continuum of private cloud deployment models alone enables us to meet those needs, ranging from a low-cost, fully managed multitenant private cloud to a security-rich dedicated private cloud. We offer cloud solutions that are fully integrated and automated across infrastructure and platform layers, making it easier for organizations to deploy applications—but also to build and manage them in the cloud. This is just one of many things we do to increase the value of the cloud for our clients.

Our private cloud consulting services help organizations identify and prioritize cloud opportunities with a focus on creating new revenue streams through business model improvement. Our infrastructure and managed services solutions enable rapid deployment on premises and off, and they facilitate the interoperability required for hybrid cloud.

Clients can leverage our cloud infrastructure or their existing infrastructure investment—including both IBM and non-IBM products. They can retain management responsibility or offload that responsibility to IBM. We simplify IT management by providing integrated solutions for cloud and non-cloud infrastructures.

We continue to invest in our enterprise cloud vision, with tightly integrated services that support private, public and hybrid cloud models. We have led the way in embracing new cloud technologies, including IaaS and PaaS private cloud services, SoftLayer hybrid architectures, expert integrated systems like IBM PureSystems®, and IBM SmartCloud® Orchestrator, an open cloud management platform for hybrid environments.

We are helping to define the new era of open cloud computing, leveraging our considerable open source experience in enterprise IT. We understand firsthand that an open, vibrant ecosystem is the key to success for the enterprise. It is the essential foundation for cloud adoption, but also for the collaborative innovation that will continue to drive strategic differentiation.

IDC names IBM a worldwide leader in Cloud Professional Services

“Through its broad portfolio of consulting, application, platform and infrastructure services for cloud, IBM has helped thousands of clients adopt cloud models and manages 5.5 million cloud-based transactions every day. IBM helps clients in more than 18 industries build their own clouds or securely tap into IBM cloud-based business and infrastructure services. IBM uniquely brings together business consulting, industry and process knowledge, and a broad portfolio of cloud solutions, including its own software, hardware, and IBM Research innovations.”¹²

Conclusion

Private clouds don't exist in isolation. They are part of a larger ecosystem that is driving hybrid activity with public clouds and the rest of the data center infrastructure. Today the big question for executive decision makers is not when to embrace private cloud, but how.

Making the right private cloud choices comes down to understanding the core differentiators that will drive the greatest agility and value for the business—speed, dynamic scalability and flexibility, optimization and efficiency, and security and resiliency—and taking advantage of the private cloud technologies that can help you achieve them.

For more information

To learn how IBM is helping organizations succeed with private cloud, please contact your IBM representative or IBM Business Partner, or visit:

ibm.com/services/private-cloud

ibm.com/cloud/think

ibm.com/privatecloud

ibm.com/cai/paas

ibm.com/services/cloudservices

^{1,2} IBM, “*Under cloud cover: How leaders are accelerating competitive differentiation*,” October 2013.

³ North Bridge Venture Partners and GigaOM Research, “*The Future of Cloud Computing: 3rd Annual Survey 2013*,” October 2013.

⁴ IDC, “*IDC Predictions 2014: Battles for Dominance and Survival on the 3rd Platform*,” IDC #244606, December 2013.

⁵ IBM, “*Exploring the frontiers of cloud computing: Insights from Platform-as-a-Service pioneers*,” October 2012.

⁶ 451 Research, “*451 Research analysis of the cloud computing market points to a 36% CAGR through 2016*,” August 14, 2013.

⁷ IDC, “*IDC Predictions 2014: Battles for Dominance and Survival on the 3rd Platform*,” IDC #244606, December 2013.

^{8,9} IDC, “*Enterprise cloud public and private end-user adoption signals continued shifts in IT spending*,” IDC #237171, Volume: 1, October 2012.

¹⁰ IBM, “*Success in the Cloud: Why workload matters*,” July 2013.

¹¹ Enterprise Management Associates, “*EMA Radar for Private Cloud Platforms: Q1 2013: Report Summary & IBM Profile*,” March 2013.

¹² IDC, “*IDC MarketScape: Worldwide Cloud Professional Services 2013-Vendor Analysis, doc #242401, Volume:1*,” August 2013.



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Route 100
Somers, NY 10589
U.S.A.

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