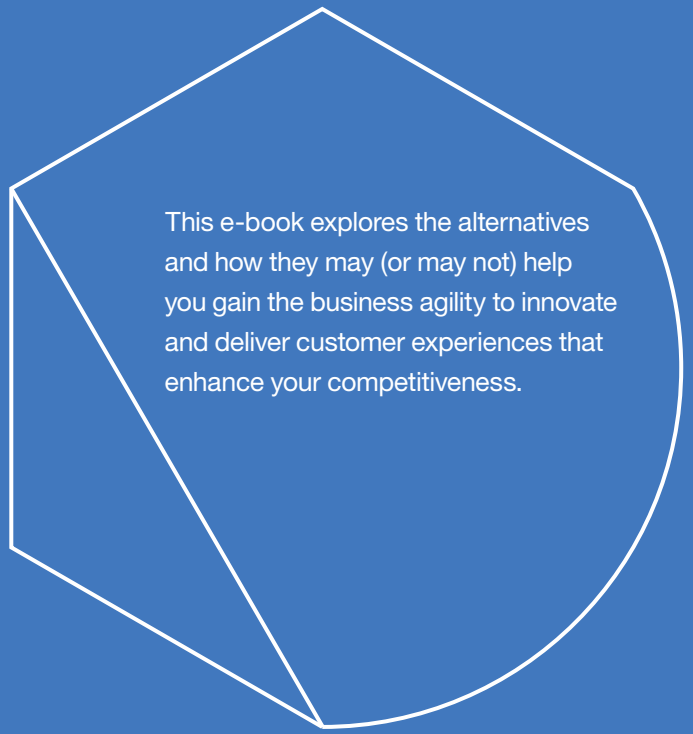
Clearing the air

What you really need to know about hybrid cloud

IBM Cloud

Talk with vendors today and you'll hear widely divergent points of view on how cloud can and should be used to support your enterprise. That's an essential discussion to have, because which cloud strategy you adopt—and how you implement it—can be a deciding factor in accelerating business results.



The view of cloud is changing

For most of the last decade, IT-driven cloud strategies have been led by economics, perceived simplicity and speed of deployment. This can result in discrete pockets of cloud implementation that may address an immediate need, but are not necessarily part of overall business strategy.

That's changing, as cloud becomes a standard way of doing business. Leading enterprises are looking to the cloud as a tool for innovation and business transformation. Those that successfully use the cloud to achieve growth have a mature, strategic view of how best to implement and integrate it across the organization.

Why cloud? Because it helps CxOs get where they need to go.

_80% of enterprises are experimenting with, or considering, new business models

_70% expect to expand their partner networks

_54% are looking to access innovation from outside sources

Learn more >

Source: *Redefining Boundaries: Insights from the Global C-Suite Study*. IBM Institute for Business Value.[1]

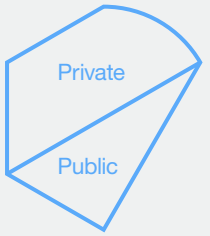
Business value drives cloud adoption

Cloud leaders outpace peers

1.9x the revenue growth

2.4x the gross profit growth

50% expanding into new markets and offerings with cloud



61% of enterprises will be using a hybrid environment this year

Toward a more powerful cloud

A majority of cloud leaders...

_Integrate data across applications

_Use cloud-based analytics to make better decisions

_Prioritize open cloud environments

_Seek platforms without borders

Source: *Under cloud cover: How leaders are accelerating competitive differentiation.* IBM Center for Applied Insights.[2]

Heavy users of the cloud are more likely to have a cross-organizational cloud strategy (43%) than light users (12%), among whom the most common approach is a cloud strategy "for certain functions." High cloud maturity organizations are also more likely to have experienced revenue growth.[3]

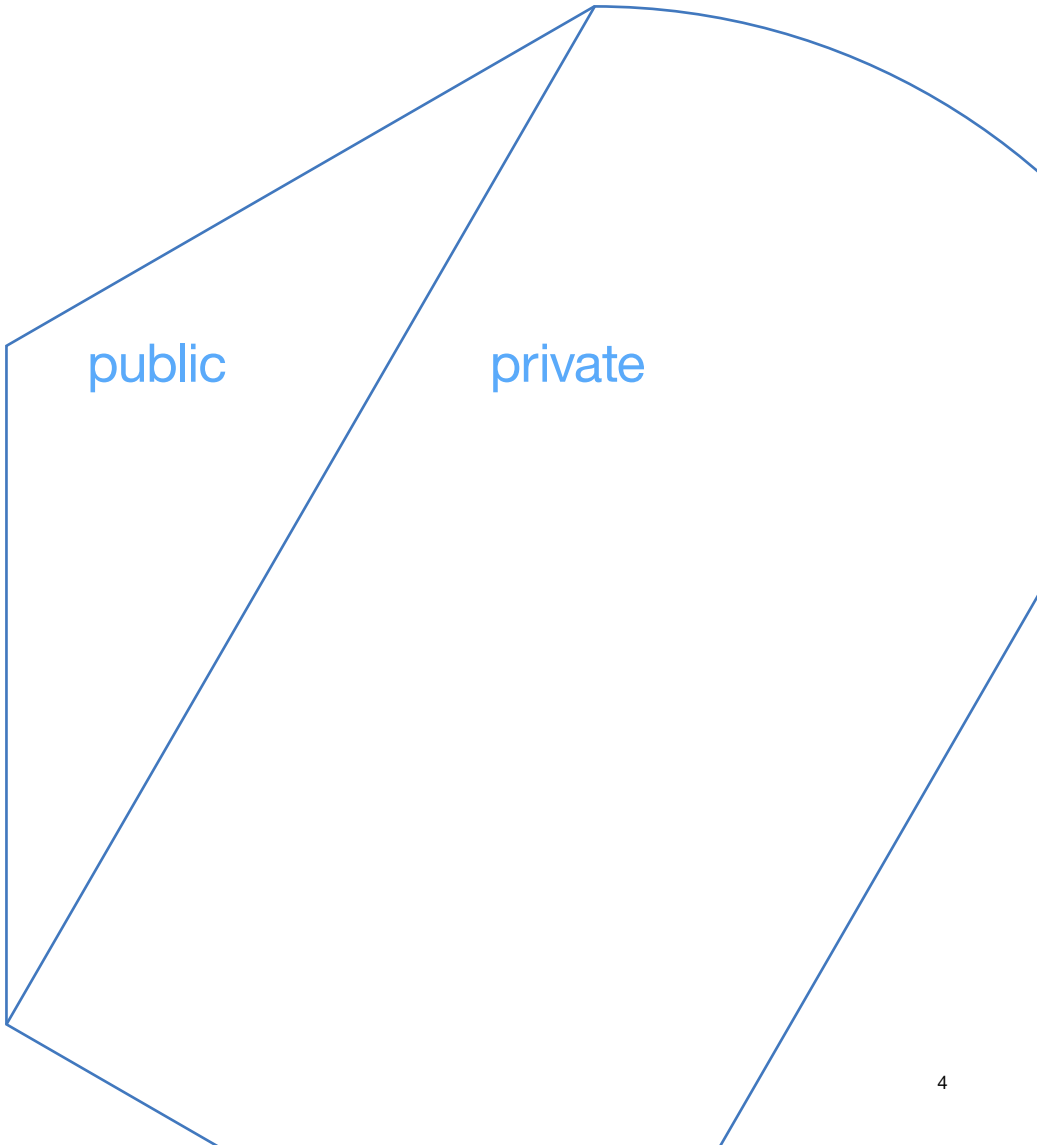
Time to choose a course

All approaches to cloud have advantages. There's the straightforward simplicity of third-party **public cloud** services, versus the increased security and control of a **private cloud** behind your firewall. There are also **hybrids** in which public or private clouds, or a combination of the two, are fully integrated with traditional IT and centrally managed through a single platform.

As cloud strategies mature and the business benefits of implementing cloud throughout the organization become clear, hybrid cloud has emerged as the consensus choice to support business growth. Nearly half of enterprises already use some form of hybrid and 72% of enterprises are expected to pursue a hybrid strategy.[4]

But the decision of which cloud strategy to adopt is only part of the equation. Equally important is how the plan gets implemented – whether the cloud can be integrated, secured, managed and leveraged to deliver its full potential.

"Even those companies with a hybrid cloud strategy don't have defined steps for implementing cloud-native applications (73%), application migration (64%) or even a cloud management platform (63%)." – Forbes Tech blog[5]



Hybrid cloud
A strategic tool for business success

Business leaders who use cloud across the enterprise frame technology discussions differently. They're thinking of how to become more agile, transforming the business to deliver better customer experiences and support new business models.

Strategic adopters of hybrid clouds are seeking accelerated business results through:

- Increased business agility – What makes a difference to business leaders are choices that help them adapt to change quickly and become more proactive. A consistent, seamlessly integrated environment that's open and transparent empowers the enterprise to dynamically innovate with new services and create new business models to gain market share and enhance customer retention.

- Greater responsiveness – Productive development based on insight is the cornerstone of rapid response to market shifts and customer demands. Hybrid cloud provides the tools and platform for the entire enterprise to engage collaboratively and efficiently in value creation, speeding innovation and reducing time to market.

- Lower total cost of ownership with faster ROI – With the cloud, it's about much more than initial economics – it's about making smarter investments for the long term. A hybrid approach makes it easier for the enterprise to experiment and optimize infrastructure use, thereby enhancing the value of IT investments beyond day one.

- Improved customer experiences – Customers expect applications and services to be fast, responsive and secure. Through high levels of control, reliability, availability and performance and the optimal deployment platform for each workload, a true hybrid cloud can help the enterprise to meet these demands consistently.

- Faster, more accurate decision-making – Analytic insight can fuel every employee interaction, decision, application and process to differentiate and disrupt. Combining analytics with the cloud enables the business to compete in new ways, by revealing hidden trends and correlations in data from both within and outside the enterprise.

High cloud maturity organizations are more likely to agree with this statement:

"Our cloud efforts start with stating business problems, then we find cloud services that will help us tackle them."

Learn more >

Source: *Mapping the cloud maturity curve: Adapting to the new era.* The Economist Intelligence Unit.[5]

What you might hear in the marketplace

The cloud story coming from many vendors sounds much the same – an end-to-end cloud that delivers a consistent platform across your enterprise. When you look more closely, however, you'll find that there are real differences in what they're saying.

There is no shortage of providers promoting hybrid cloud solutions, all making competing – often contradictory – claims.

With so many different opinions, how do you cut through the fog?

"You should put all your workloads on our public cloud."

"With us, you can keep using the tools you already have and know as you transition to a cloud-first, mobile-first strategy. You should build your solutions using our ecosystem."

"Our virtualized environment provides seamless development and production environments between local and public clouds . . . and it's simpler, too."

"Information is at the center of your enterprise. Our solutions in the cloud let you extract maximum value from it."

What you might hear

“You should put all your workloads on our public cloud.”

Some cloud providers may suggest that their public cloud architecture is the answer for every requirement.

They promote the economics and performance of their solution and how easy it is to access their services. For vendors like these, all roads lead to the public cloud.

Their point of view is that if you move all your workloads to their data center, you can reduce cost and focus on business challenges instead of infrastructure. If the enterprise needs anything beyond what the public cloud vendor can provide, third party solutions will be required—and that means additional layers of complexity as the enterprise tries to manage a parallel environments.

Public cloud warrants closer scrutiny to determine whether this one architecture is flexible enough to address all of your business imperatives. Limiting deployment to an environment dictated by the provider can make it impossible to place workloads strategically. For the enterprise looking for security behind the firewall and control of a private cloud or automated management that allows data and workloads to be easily moved across the infrastructure, these limitations can have a serious impact on productivity, service levels and security.

With public cloud vendors making the case for simplicity and low cost of entry, businesses should consider what those claims mean in the context of a world that's moving toward hybrid cloud. Some considerations outweigh cost. For example, with some workloads, deployment on bare metal or in a private, hosted cloud might be more appropriate in order to achieve greater performance, visibility, control and security.

What could stand in your way

Viewing public cloud as the only choice puts potential roadblocks in the path of an integrated, cloud-based business strategy:

- Difficulty aligning the cloud with business strategy – A cloud that does not offer freedom of choice could hamper the ability to seamlessly align data, cloud resources and traditional IT with business processes. As a consequence, the enterprise may find it harder to implement new business models and respond with agility to market shifts, competitive threats and customer demands.
- Inability to innovate with speed – The speed of change brought on by many new business models makes it essential to select an environment suited to each workload. Public cloud, with its ability to be brought online quickly, might be the preferred choice for production workloads like mobile apps that require rapid scale. However, sustaining speed across the full cycle of development, testing, deployment and maintenance often requires management and platform options beyond what a public cloud vendor can deliver. Relying on a single deployment platform could slow down adoption of new technologies and innovations from the open-source community.

"Most enterprise IT departments now manage applications across multiple environments in a dizzyingly complex overall IT architecture. They also must constantly reevaluate their unique mix of on-premises, private cloud and public cloud infrastructure to meet new business goals and determine how applications can be migrated to the public cloud in a cost-effective way. This is no small feat." – *Cloud Tech News*[7]

- Barriers to integration – The need to integrate heterogeneous environments that include multiple clouds and legacy IT is a business reality. If cloud is implemented in isolated pockets, infrastructure, data and workload management can be challenging. That lack of integration can create disjointed silos of content that impact business agility and customer engagement – enterprise systems of record that do not leverage new social and mobile applications, for example. To eliminate these barriers, the infrastructure needs to be dynamic, orchestrated and transparent not just within the public cloud solution, but across the whole organization.

- Higher total cost of ownership – Low initial entry cost is a key selling point for public cloud. Vendors often promote advantages in performance and price per virtual machine. What matters, however, is price-performance with actual workloads and the total cost of ownership related to deployment, integration and licensing as the solution scales.

"As businesses become increasingly dependent on cloud, IT leaders have the responsibility to ensure that the business derives the maximum value for each cloud workload. The workload must be aligned with the appropriate cloud deployment option – single-tenant or multi-tenant, virtualized or bare metal, on-premises, hosted, or hybrid." – Frost & Sullivan, *The New Hybrid Cloud*[8]

The IBM counter

Choice with consistency is what you want

Accelerating business results depends on access to not just *any* cloud resources, but those that enable speed and innovation.

With a hybrid cloud that seamlessly integrates public and private clouds with traditional IT, nothing stands in the way of development or deployment of innovative business models.

Public cloud has the advantage of simplicity. And, for some workloads such as customer-facing applications that need to scale quickly, it may be the most appropriate deployment option. This makes the public cloud an important part of a hybrid cloud strategy. However, where public cloud as the sole approach imposes limits, IBM delivers choice that removes barriers.

The IBM hybrid approach delivers choice with consistency through a unified, open environment that fosters business agility across the enterprise. It's about implementing and managing any combination of cloud – public or private, on- or off-premises, hosted or self-managed, virtual machines or bare metal – and combining them as needed with the hardware, software and applications you already have.

Your business. Your choice. Orchestrated by IBM.

Integrating and orchestrating a diverse cloud infrastructure is not simple. Public and private clouds can be implemented alongside traditional IT, but if the enterprise is unable to bring them all together, achieving business agility will remain a challenge. The IBM cloud is open and transparent with robust security to offer not just options, but the ability to use them with confidence, free of limitations and inefficiency.

IBM has long championed open standards such as OpenStack, with choice as the driving force behind the IBM cloud portfolio. We believe no one deployment, computing, or development model can meet every need. Unlike providers focused exclusively on public cloud, the broad spectrum of IBM expertise and offerings enables you to implement a complete, integrated hybrid solution, delivering visibility and control from end to end. The result can blend everything – from cloud services (including off-premises, virtualized public cloud) and infrastructure to open development platforms and consulting services.

The freedom to choose

Where some vendors emphasize a narrowly defined cloud model, IBM focuses on business flexibility. It's about choices – but what does that really mean? With IBM, you can:

- Accelerate business results by consistently leveraging cloud throughout your enterprise, with the industry and cloud expertise of IBM Cloud Services.
- Optimize performance and responsiveness with the reliability, availability and scalability of IBM System z,® or the flexibility of IBM Power Systems™ – fully integrated with the cloud.
- Speed innovation with IBM Bluemix® platforms, OpenStack-based IBM Blue Box® and IBM Bluemix DevOps Services, with ready access to resources from the open source community.
- Enable a dynamic mobile strategy by consuming a rich set of mobile offerings as individual services on the open IBM Bluemix platform, or inside a Docker container on the IBM SoftLayer® public cloud.
- Increase productivity by tapping into the global SoftLayer public cloud infrastructure or an IBM Cloud Managed Services™ private cloud to pick the runtimes and deployment options best for each workload, from containers to virtual machines, Cloud Foundry, bare metal or SaaS.
- Manage spending strategically with flexible IBM SoftLayer pricing – metered by usage or by the hour for public and dedicated clouds as well as bare metal, with the ability to scale up and down without penalty.
- Manage cloud services across providers with IBM Brokerage Services
- Move massive files and data sets across public, dedicated and local infrastructure at high speed with IBM Aspera.

"Hybrid cloud environments give IT the opportunity to choose the best environment in which to deploy applications or services....Ultimately, the right hybrid enables customers to both quickly and easily access beneficial cloud services, and extend existing investments into the cloud." – Frost & Sullivan, *The New Hybrid Cloud*[9]

The economics of choice

Using the cloud to support your business strategy is not just a matter of low entry cost. It's about investing in a solution that offers flexibility and value across the enterprise. With a pure public cloud approach, the long-term economics may cancel out the initial cost appeal.

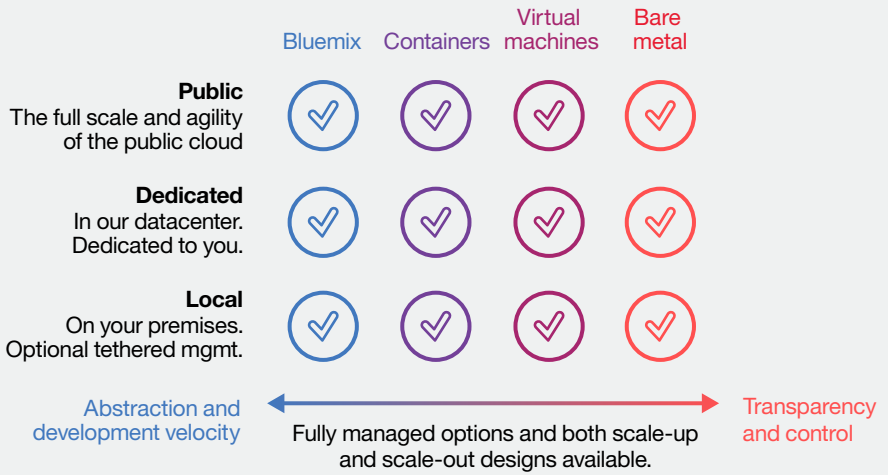
Total cost of ownership is about more than initial cost of the cloud – it includes the ongoing cost and utilization of all your resources. There's the cost of vendor support and licensing as the cloud scales – costs that can mount rapidly. There's also the question of whether the public cloud architecture can deliver adequate price-performance for the desired workload.

Public clouds might seem less expensive from entry cost point of view. However, when the price-performance benefits of other deployment options like private cloud and bare metal are put into the mix, the true cost of a public cloud-only strategy become clear.

"Some businesses that chose a cloud service provider based on low published rates are experiencing higher costs than expected. Others are fielding complaints about unacceptable application performance. Still others are realizing they have no idea whether they are paying too much or too little for what they are getting." – Frost & Sullivan, *The Truth About Cloud Price-Performance*[10]

Choice with consistency

Runtime and delivery models to meet the full spectrum of enterprise needs



Choice delivers flexibility – the flexibility to drive innovation by developing and deploying in the way that best meets your needs across the enterprise.

Tapping the agility of cloud to predict buying behavior

Find out how **Delhaize America** demonstrated the link between weather and product sales by using IBM SoftLayer to deploy a sophisticated analytics proof-of-concept – 75% faster and at half the cost of traditional IT.[11]

Learn more >

Public cloud vendor price-performance claims:
The numbers don't lie.

Workload type	Test scenario	**Test scenario results** **Price-performance vs. competitor** For workload and environment compared using two comparably configured environments, pricing based on 3 year TCA*	Implementation
CPU intensive	Web application: Virtualized	23% faster performance 1.6X better price-performance 25% lower cost	SoftLayer VMs vs. competitor VMs
	Web application: Non-virtualized	35% faster performance 2.5X better price-performance 47% lower cost	SoftLayer bare metal vs. competitor VMs
Storage intensive	Analytics	1.9X more throughput per processor 3.3X better price-performance 3.0X lower cost *Pricing excludes database software license costs (identical for both providers)*	SoftLayer bare metal vs. competitor VMs
Network intensive	Messaging	36% faster performance 2.4X better price-performance	SoftLayer bare metal vs. competitor VMs
Consolidation (moving workloads to the cloud)	Hosted private cloud	44% lower cost per VM	SoftLayer bare metal vs. competitor VMs

*Based on IBM internal studies, results obtained under controlled conditions testing resources of a publicly available cloud infrastructure. Customer applications, differences in the stack deployed, differences in data center locations and options, and other systems variations or testing conditions may produce different results. Pricing based on published US list prices available for IBM and competitor data center location tested as of 01/13/2016 and calculated by projecting costs measured over a fixed testing period to a 3 year TCA, including compute, network, storage, software, data transfer, and support charges. Pricing excludes client labor costs. Available options and pricing vary by data center location, data center locations chosen based on availability of offering. Option for non-virtualized servers not available in competitor environment.

What you might hear

“You can keep using what you know as you transition to a mobile-first, cloud-first strategy.”

Some cloud providers hold up their platform of cloud-based applications, software, development tools and public cloud services as the preferred way for customers to achieve business results.

They promote a mobile-first, cloud-first strategy built entirely within that platform. Their premise is that, since nearly every enterprise already uses one or more of their products, it makes sense to stay inside their ecosystem. To that end, they’ve tied their extensive set of offerings closely together so that they add value to one another—provided the enterprise doesn’t stray from the portfolio. Their cloud strategy is built on familiar languages, operating systems and development environments.

That's good for those who want to stay within their comfort zone, with an easy cloud on-ramp that leverages existing skill sets. It's also good if all that's needed are incremental advances. But for those who want to disrupt their industry and make quantum leaps in productivity and innovation, the platform can ultimately stand in their way because of its relatively narrow and contained set of standards and tools. That can be a serious drawback if the enterprise's "mobile first" strategy demands more than the platform can provide.

With robust DevOps practices, the enterprise can quickly and efficiently place workloads and data where they'll deliver the optimum business value. With a closed platform, that can be an issue, and not only for technical reasons. The vendor may create powerful incentives to encourage the exclusive use of its offerings and public cloud through restrictive licensing agreements. This effectively limits options because it could become too costly to move data off of the vendor's cloud.

What are the potential pitfalls of staying within a single platform?

The core argument for exclusive use of the vendor's ecosystem is that its offerings are built to work well together. However, this restricted approach creates some inherent challenges:

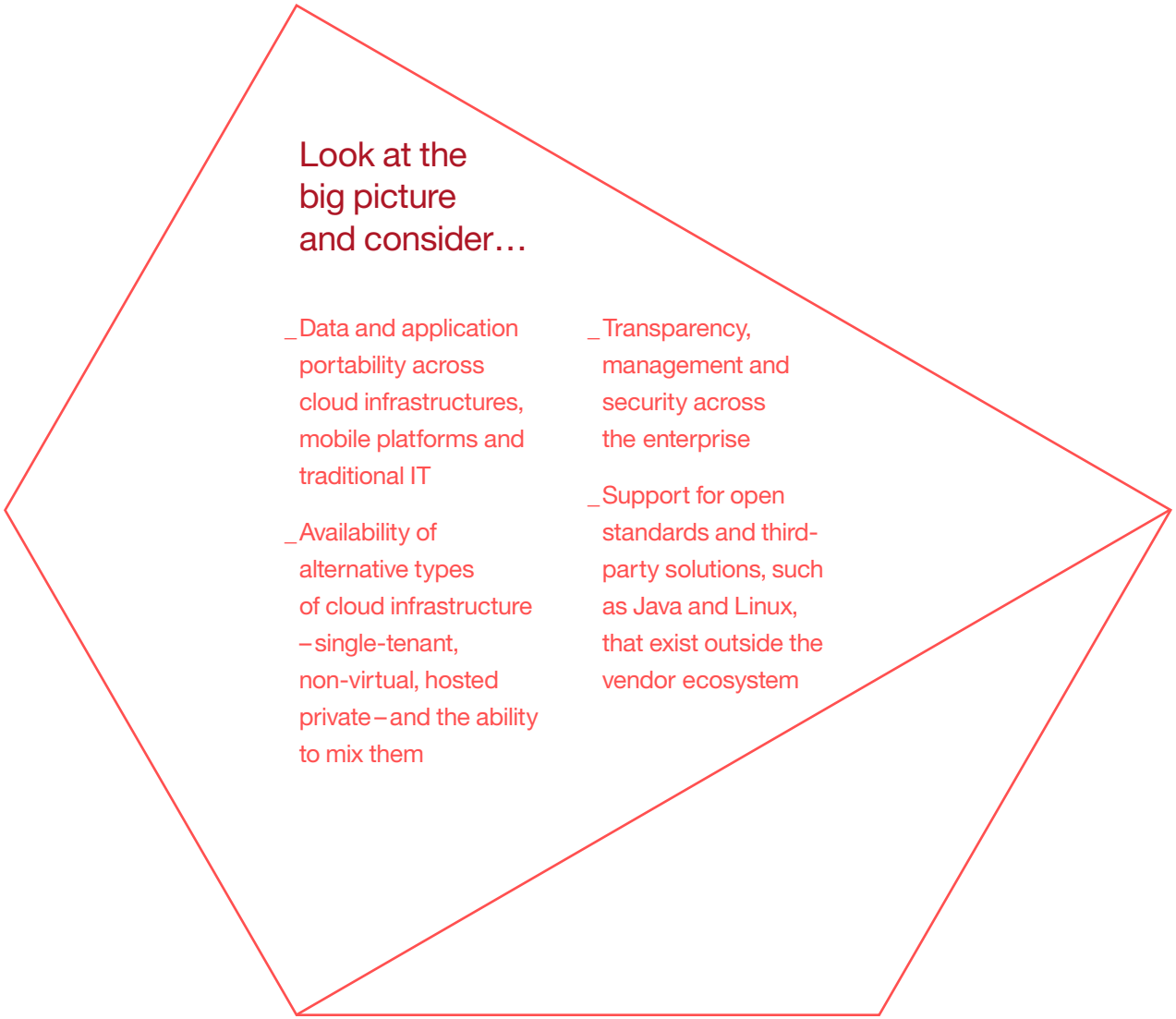
- Limits defined by the platform – The vendor delivers a familiar "toolkit" that customers use to build their own solutions in its cloud. This may not deliver the flexibility that the enterprise needs for agile development as the "toolkit" is based on a limited set of programming languages, operating systems, services and APIs. New capabilities are delivered following the vendor's timetable for updates, which may lag behind the enterprise's needs and the dynamic pace of the open source community.

- Reduced ability to integrate cloud with the enterprise – Tight connections between a vendor's development tools and its public cloud can steer the enterprise away from using the environment best suited for the task at hand. For example, the enterprise may need to meet compliance mandates by placing sensitive data on a private cloud. Or, it might require coordination of application development with legacy systems and data that are not housed in the vendor's cloud.

> "Platform and other infrastructure components should operate on an accepted set of standards and protocols. Doing so allows applications and data to move easily between different cloud environments, enabling extreme scalability and flexibility of a total cloud environment."
>
> – Frost & Sullivan, *The New Hybrid Cloud*[12]

- Increased complexity – An all-on-my-cloud approach may not enable the enterprise to fully leverage heterogeneous infrastructures that mix multiple public and private clouds along with existing IT. Managing those hybrid environments and coordinating business functions is left for the enterprise to handle – an added burden for those looking to adapt rapidly to changing business needs.

- DevOps efficiency and operational challenges – Centering development on the provider's platform and cloud architecture could impact workload and data portability, hampering productivity and continuous delivery that are the hallmarks of DevOps methodologies. The vendor's control, security, price-performance and scaling are optimized only for its cloud environment, making it difficult to align workloads with business needs.



The IBM counter

Open development in an industrialized hybrid cloud fuels innovation

As the world is rewritten in code, many enterprises are thinking holistically about how they deliver improved customer experiences.

Thanks to the rise of the open API economy, not every solution needs to be built in-house, on one cloud platform, or using a specific set of tools. That can be a critical enabler of mobile growth.

Citi: Changing the way diners split the check[13]

Citi has embarked on a digital banking transformation using IBM Bluemix. By opening a secure gateway into their hybrid cloud, Citi is able to collaborate efficiently to create disruptive new social applications. An example of this open approach to innovation, 2014 Citi Mobile Challenge winner JoinPay brings together location-based content from third parties like Yelp and combines it with the Citi Wallet e-banking app to transform how diners pay for meals.

Learn more >

For enterprises like Citi, openness and integration are woven into the fabric of digital transformation. JoinPay is just one way the bank can leverage connections to developers, partners and content beyond the enterprise.

Using the open development platform in IBM Bluemix, Citi has created an environment not just for development, but collaborative innovation. Consistency is the key – they use the ability to easily step beyond platform boundaries as a competitive advantage.

What an open approach means

As businesses start to connect different systems and external resources together to power innovative business models, they face a new challenge: the need to coordinate development, releases and data across the infrastructure as well as beyond it.

Orchestrating, securing and managing everything can be very difficult, making the case for open platform and integrated hybrid clouds to enhance DevOps productivity.

In contrast to vendors that funnel the enterprise toward one specific set of tools and cloud architecture, the IBM cloud is open by design – an industrialized hybrid cloud based on choice and integration across the enterprise, with a high degree of automation and total visibility and control. It's about a transparently managed, seamless environment where the enterprise can freely select the development tools, APIs, open technologies, platforms and cloud deployment models that accelerate business results. The result? a shorter path to innovation and business differentiation.

"Our challenge for 2015 was how to update our digital properties to adapt to a mobile-first world."

Find out how IBM helped the organization behind the famed **Wimbledon** tennis championship create a uniquely responsive digital experience through natural-language analytics and a dynamic, open hybrid cloud.[14]

Learn more >

DevOps: Value creation for the whole enterprise

Providers that emphasize development only within their own platform may see DevOps as ancillary. This contrasts sharply with IBM view of DevOps as a fundamental best practice that fosters innovation and agility across the enterprise, not just within the cloud.

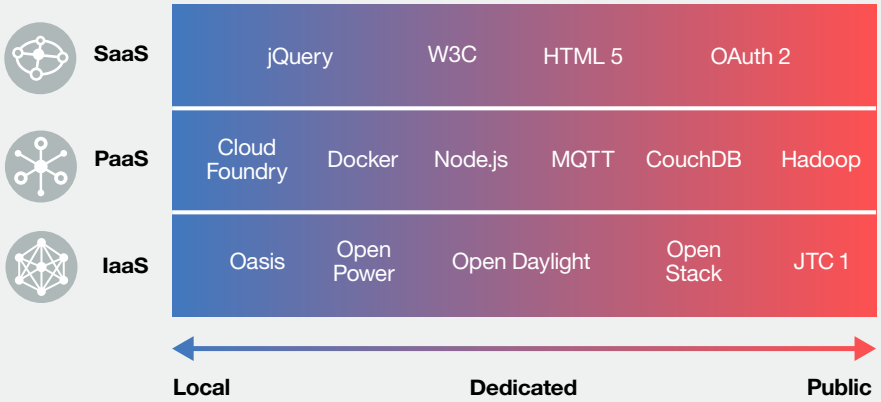
In many enterprises, there are well-established, mission-critical systems running alongside new, constantly evolving cloud-based mobile applications. This creates a two-speed IT landscape – systems of record where stability and security are paramount, and systems of engagement that demand agility and continuous delivery of new innovations. Coordinating development across these systems is critically important to maintain service levels. That is why, unlike platforms that prioritize development only on the vendor's cloud, IBM delivers collaboration and automation across the entire hybrid environment.

Optimize price-performance by opening the cloud

An open hybrid cloud enhances development agility by offering freedom of choice in platforms and infrastructure. Access to alternative cloud technologies – options such as bare metal or hosted private clouds – also opens the door to far greater price-performance, enhancing the value of investment in the cloud. The enterprise need not give up the speed of dedicated IT to gain the cost and flexibility advantages of the cloud.

With IBM SoftLayer, IBM Blue Box private cloud-as-a-service and IBM Cloud Managed Services, those alternative technologies are fully integrated with the cloud and readily available when needed. The result is an environment that can deliver dramatic advantages in cost, performance, raw throughput and the ability to integrate cloud with traditional IT.

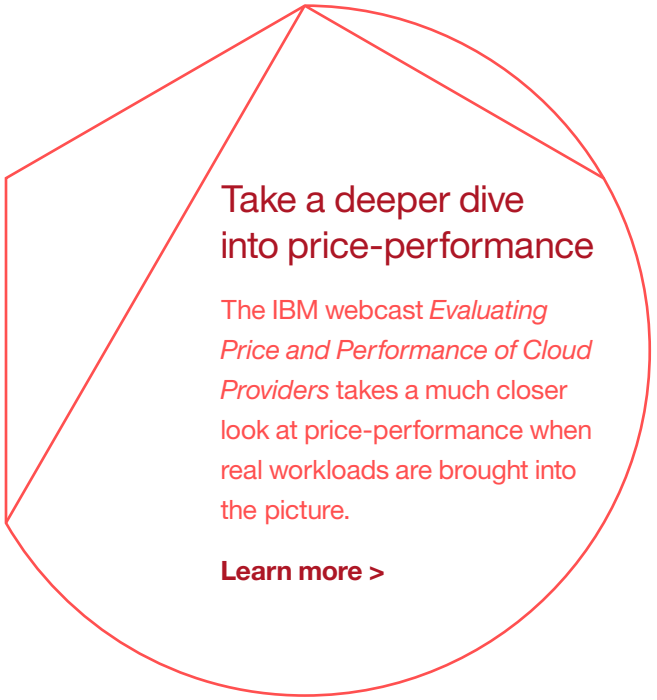
Open by design



The benefits of the IBM open cloud approach

Achieving flexibility demands visibility and control over multiple environments into one borderless cloud with robust security – an industrialized hybrid. The IBM cloud portfolio can address the entire spectrum of cloud implementation:

- Achieve development agility by integrating cloud with cloud, as well as cloud with traditional IT through API management with IBM Bluemix and IBM Cloud Builder.
- Expand cloud options beyond the public cloud with OpenStack-based IBM Blue Box private cloud-as-a-service.
- Align infrastructure with business strategy by orchestrating and automating deployment across a diverse infrastructure with IBM UrbanCode™ Deploy.
- Boost productivity by creating a consistent development environment spanning public, private and dedicated clouds with IBM Bluemix Local.
- Reduce time to market by taking a consistent, integrated holistic approach to mobile applications through the IBM MobileFirst™ Platform.
- Optimize customer experiences by placing mobile workloads on the architecture best suited to meet both performance and regulatory requirements, including options from IBM SoftLayer and IBM Cloud Managed Services.
- Maintain operational visibility and unified management across your hybrid environment with IBM Cloud Orchestrator, with security addressed at every touch point.
- Integrate and manage an end-to-end hybrid infrastructure with IBM Integrated Managed Infrastructure Services.



What you might hear

“Our virtualized environment provides seamless development and production between local and public clouds…and it’s simpler.”

Infrastructure virtualization offerings based on x86 architecture are very popular in enterprise data centers.

Virtualization providers suggest that, since their hypervisor technology dominates the market, it’s an easy on-ramp to the cloud. The resulting environment, while it does perform well within the parameters of a virtualized x86 architecture and a single proprietary hypervisor, presents some challenges for the enterprise.

Most notably, there can be a lack of flexibility in choosing and managing the most appropriate environment for a given workload. The offering is designed to simplify workload portability between the vendor's cloud and the enterprise's virtualized data center, but little more. Few capabilities are available to support DevOps management and developer enablement across a diverse cloud infrastructure.

How robust is the vendor's portfolio?

Because such providers are focused solely on extending their data center virtualization into the cloud, there are gaps in capabilities that must be filled by third parties. The vendor uses partners for offerings such as managed cloud, platform-as-a-service, infrastructure-as-a-service and data recovery-as-a-service, all powered by the core virtualization technology but not necessarily running in the vendor's data centers.

This reliance on others for critical capabilities could lead to service and resiliency issues. There are more potential points of failure when it comes to integrating a complex ecosystem of vendors into a cohesive hybrid strategy. Those third parties may not be able to live up to expected standards of performance and data integrity. This can have a limiting effect on the value that the enterprise derives from its investments in the cloud.

Another important issue for global enterprises is compliance at the local level. Regional regulatory requirements often call for data to be housed near where it is consumed. A provider with relatively few data centers of its own – and heavy reliance on third parties – may limit the ability to place data where mandates require it to be.

How dedication to virtualization technology impacts DevOps

Today, speed is becoming a critical competitive differentiator. That's why more and more enterprises are turning to DevOps to enable the continuous cycle of delivery that today's applications require.

Effectively employing DevOps to achieve continuous delivery of application updates requires a strong development platform that leverages a diverse hybrid infrastructure – something that a virtualization-focused cloud provider may not be able to provide.

That matters, because DevOps management is most productive when to the enterprise has the tools to transparently and automatically tie the whole infrastructure together. It's a matter of choice – developing, testing, deploying and managing workloads on the most appropriate platform at every stage. Relying on one virtualized architecture puts constraints on the freedom, integration, automation and seamless management that DevOps in the cloud demands.

By 2017, 35% of new applications are expected to use cloud-enabled continuous delivery and DevOps lifecycles for rolling out new features and business innovation more quickly. – IDC[15]

The borders of a virtualization-driven strategy

Virtualization vendors deliver one technology, which brings a key question to the fore: is that technology the correct choice for your needs? It may be, but there are implications:

- Lack of deployment flexibility – With no choice other than the vendor's virtualization technology, the enterprise is not free to use architectures such as alternate hypervisors, or bare metal in the cloud that might align better with workload requirements. That can have a significant impact on efficiency and speed as the enterprise responds to new business needs.
- Cost and performance – The vendor's cloud solution may not deliver the best scalability or price-performance. Other architectures could deliver better results, even running the vendor's own virtualized environment.
- Limited manageability – The vendor does not offer customers a view into the underlying virtualized infrastructure. That can seriously impact total cost of ownership because it is difficult to control how efficiently the environment is deployed and managed.

"Given the true multi-platform nature of today's enterprises, with the presence of mobile, cloud, distributed, and mainframe applications – all of which need to be created, integrated, deployed, and operated – the need for the efficiencies, streamlining, and collaboration that DevOps provides is becoming a key competitive differentiator."

– DevOps for Dummies[16]

The IBM counter

A cloud that delivers flexibility spurs productivity

Accelerating business results requires continuous improvement and delivery of new applications.

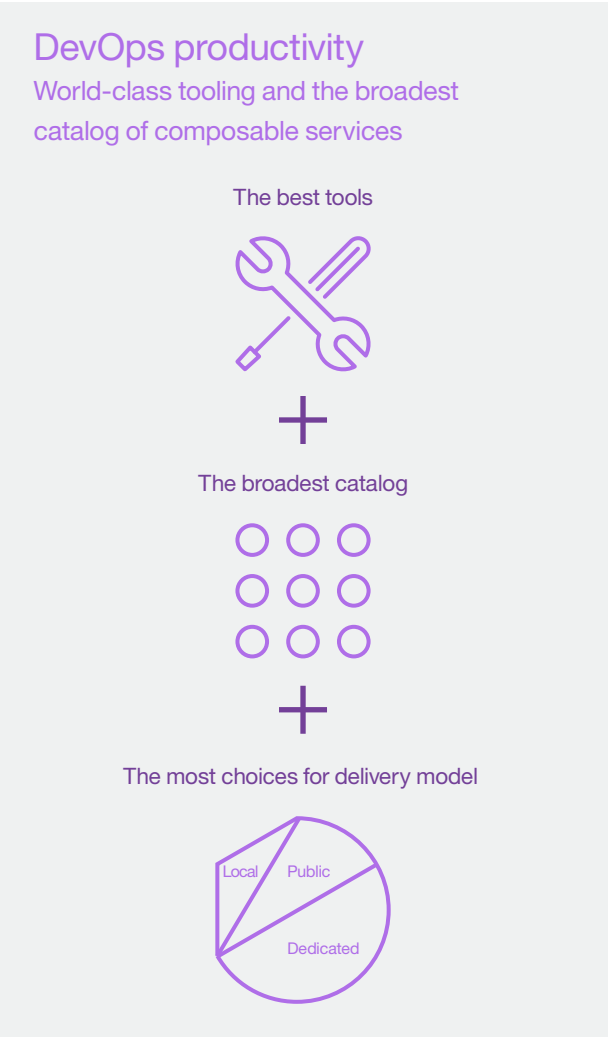
An enterprise with access to the proper tools, services, APIs, runtimes, solutions and delivery models at every stage – all backed by a cloud that delivers flexibility, performance, scalability and cost-effectiveness – is more productive by far. Where virtualization vendors emphasize optimal, simple deployment of a single technology as the basis of cloud strategy, IBM approaches the cloud from a different point of view. The IBM strategy is based on flexibility, visibility and control, backed by the experience, expertise and portfolio to execute on that vision.

Unlike vendors that rely on others to fill capability gaps, IBM can support enterprise cloud strategy from end to end:

- IBM delivers public and dedicated cloud services through a resilient and transparently managed global data center network with robust security that places data where enterprises need it to be.

- The IBM cloud opens up infrastructure and platform choices not available from virtualization providers. This is critical for mobile application development and support. The IBM hybrid cloud enables applications to be automatically deployed where they'll deliver the greatest value, on whatever hypervisor and technology the enterprise chooses. With the ability to seamlessly manage hybrid cloud infrastructures with full visibility and control, IBM can help the enterprise achieve better productivity by aligning resources outside the virtualized environment with the cloud.

- Where virtualization vendors focus only in infrastructure, IBM delivers all the tools and resources needed to accelerate business results. IBM embraces the open API economy by giving developers a unified platform and rich catalog of services tuned for their needs. Testing, feedback and optimization are enhanced with automated, real-time analytic insights on application performance – on any platform, at any point in the DevOps cycle.



Differentiating the business using the cloud is about getting to market faster and continuously delivering better customer experiences. That takes much more than virtualization technology and limited cloud services. With IBM, enterprises can access a broad set of choices, delivered consistently across the cloud spectrum.

Implement a more productive cloud with IBM

With the IBM cloud, you can:

- Achieve agility by choosing the virtualization environment most suitable for the workload, with support for open hypervisors including KVM and XEN – as well as proprietary virtualization vendor hypervisors
- Deliver better customer experiences by matching workloads, infrastructure and cloud configurations to business requirements through a variety of architectures – virtual machines on x86, IBM POWER® and IBM System z as well as private and public clouds
- Drive DevOps productivity by automatically deploying workloads across public and private cloud environments using IBM UrbanCode, and take advantage of proven management practices freely available through IBM Bluemix Garage Method
- Reduce time to market by rapidly assembling cloud and mobile applications through the open IBM Bluemix platform's tools, APIs and services along with IBM MobileFirst
- Improve efficiency by maintaining control and operational visibility down to the machine level through unified management in the cloud with IBM SoftLayer

What you might hear

"Information is at the center of your enterprise. Our solutions in the cloud let you extract maximum value from it."

According to some vendors, one of the quickest paths to business success is to deploy their enterprise software in the cloud.

Their overall strategy is largely based on a traditional concept – that the information contained in enterprise systems delivers most of its value through activities such as SCM, CRM and business intelligence. Their vision is one of cloud as an extension and enhancement of those same functions.

This conservative approach ignores one of the most important developments of recent years: cognitive analytics in the cloud and its power to transform the business.

In contrast to the fundamental shift to cognitive computing, those that lean towards a conventional view of information frame analytics as a tool for operational efficiency and decision support. Even as they expand their cloud offerings, they tend to lead with enterprise computing solutions – a set of software products built on top of a proprietary database. While they might be banking on the ongoing need to perform those core functions, buying into that approach can constrain enterprises that seek to explore beyond the limits of existing enterprise software.

The implications of a narrow focus on enterprise functions

For some vendors, the central role of the cloud is to extend what the enterprise is already doing. While they might offer a development environment and claim that their platform delivers many of the agility benefits of the cloud, there are inherent shortcomings that become evident when the enterprise wants to go off-script:

- Inability to tap the transformative power of data – Traditional business analytics based on a proprietary enterprise database cannot readily leverage curated, open and third-party input – such as unstructured data – to deliver the customer experiences to capture a large market share.
- Barriers to innovation – The vendor's platform is built on its own application server and database, encouraging development only within that environment. The lack of access to open APIs limits the ability to incorporate third-party innovations and disruptive technologies into new applications.
- High costs associated with moving off of the vendor's platform – Vendors with a significant vested interest in software licensing revenue tend to make it expensive to deploy new business models and technologies such as cognitive analytics. While the enterprise may not be locked in, the economics might make the vendor's more limited offering the only viable option.

"Cognitive computing will change our relationship with information. We will go beyond using search and BI for the information we need and look to computers to generate and evaluate evidence-based hypotheses from which we can make better decisions. We will expect them to provide actions that are more likely to work in a given context."

– Toolbox.com[18]

Look at the big picture and consider…

_Alignment of vendor enterprise solutions with current and future business strategy

_Ability to derive value from unstructured data outside the enterprise

_Support for open standards and third-party APIs, tools and solutions

_Economic implications of long-term software licensing

The IBM counter

An open cloud built for cognitive business

Where a platform built on traditional enterprise software can tie you to that vendor's vision, an open approach allows you to chart your own course.

Nowhere is this more significant than in the power of data to transform customer experiences, delivered through new, cognitive applications. That's why IBM has made cognitive computing and deep analytics a cornerstone of its open cloud strategy, by providing the tools to embed insight in everything the enterprise does – including core enterprise functions.

The Weather Company: A business built on advanced analytics

The Weather Company has based its business model on nearly every conceivable source of weather information connected to the net. That includes the Internet of Things – planes, trains, automobiles, satellites and more than 135,000 personal weather stations – in addition to official weather feeds. Analyzed in the cloud, that data underlies customized, near real-time forecasts made available to thousands of clients through the company's open API. It will also soon become part of the vast ocean of information that feeds into IBM Watson.™

Learn more >

The vast majority of data is unstructured and not available to conventional business analytics – data like that found in audio and video files and emails. IBM Watson cognitive computing in the cloud is the key that unlocks this data to expose patterns, connections and insights ranging far beyond what's possible within the contents of enterprise databases. It's about much more than decision support – it's a new kind of processing that allows applications to be aware of, and learn from, a dynamic and fast-moving world.

The Weather Company's experience stands in stark contrast to the idea that the primary value of information stems from enterprise data. Far greater business value can be derived from *global* information via transformative new cloud-based prediction platforms built on deep analytics. That model and its data can become the genesis of predictive applications for other industries such as health care, agriculture, retail and energy, among others[19] – any organization affected by the weather. This is an example of how innovation can create new business value far beyond its source.

IBM brings cognition to the open, integrated cloud

Entering this expansive, analytics-driven world takes vision that extends beyond the walls of the enterprise, coupled with a cloud that allows it to become real. What's needed is the access to data, analytics and cognitive computing resources that IBM provides and that other vendors cannot.

> "Cognitive computing is starting to emerge as a real opportunity and threat for many businesses.... If we embrace and harness the power of cognitive computing, we can help our clients positively disrupt their businesses and industries. It may even hold transformative potential for [our own] businesses." – Deloitte, *Disruption Ahead*[20]

Development is a prime example of why moving beyond traditional approaches is important to drive the innovation and business transformation. Historically, applications were built in isolation. But we now live in an API economy where external data, services, analytics and third-party innovations are accessible with a few lines of code. In this new world, openness – the ability to quickly and easily employ cognitive analytics as a simple service, anywhere it's needed – is essential.

With a portfolio that embraces open standards, IBM cloud strategy aligns closely with this approach to value creation. Open, flexible and integrated by nature, the IBM cloud is the basis of a far more agile enterprise – one able to break free of existing limitations.

"Providers with robust hybrid cloud offers will enable the integration of application programming interfaces (APIs) from anywhere in the IT ecosystem, whether traditional or cloud-based, and regardless of whether the component is its own or from a third party. Well-organized service catalogs become key components of the dynamic, hybrid cloud, as they allow the business's developers to choose, at the click of a button, new services to deploy to help build a new application or service." – Frost & Sullivan, *The New Hybrid Cloud*[21]

Make every cloud an open, cognitive cloud

There's no denying that conventional ERP, SCM, CRM and similar business activities are essential, and can be made more efficient in the cloud. But what happens when you broaden your vision? With the IBM cloud, you can:

- Power innovative new business models by building cognitive computing into applications that learn and think, with a growing number of Watson APIs and services accessible via the IBM Watson Developer Cloud
- Generate real-time, actionable insights by considering all relevant data, regardless of source, using Spark streaming analytics
- Deliver contextual experiences for mobile users in real time by coupling location awareness with analytic insight, using the IBM MobileFirst Platform
- Accelerate business results by integrating enterprise workloads in the cloud with traditional IT and third-party applications, eliminating the barriers and licensing costs imposed by proprietary enterprise environments
- Achieve agility through enhanced application portability, using open standards by developing on the OpenStack-based IBM Bluemix platform
- Architect an IT infrastructure tuned for cognitive workloads with expertise from IBM Global Technology Services

A cloud that accelerates your business. We can give you an edge.

Without a doubt, implementing a hybrid cloud is complex. It requires a business vision, the ability to architect the optimal hybrid cloud solution and the expertise to bring it all together. That takes the breadth and depth of expertise in cloud and industry solutions that only IBM can offer.

Our approach stands apart. Where most cloud providers narrow their focus, IBM adopts a wide-angle view on the cloud's role in digital business. It's about flexibility and openness – a cloud that adapts to new challenges, adding value from across the enterprise and beyond its borders.

The IBM cloud offers what today's enterprises need most

_ Choice with consistency – Embracing open standards and interoperability, the IBM cloud lets you choose the infrastructure, tools and services that are right for you, without being locked in to a narrow technology path.

_ Industrialized hybrid cloud – Infrastructure and cloud offerings that integrate with the rest of the enterprise in a seamless, secure and highly automated way. One environment, managed as a whole to give you unmatched business agility.

_ DevOps productivity – The open platform, best-practice methodologies, expertise and education to enable all builders to participate in agile cloud development. The IBM cloud makes continuous delivery of new innovations a reality.

_ Powerful, accessible analytics with cognitive – From built-in analytics that help to optimize infrastructure and application performance to the transformative power of Watson, IBM makes every cloud a cognitive cloud.

Ready to transform your business?

The IBM team of business consultants, technology experts and cloud specialists can tell you much more about how the IBM hybrid cloud approach can help accelerate business results. Contact your IBM representative or visit ibm.com/cloud-computing.

Infrastructure >

_ IBM SoftLayer: A secure, high-performance global cloud infrastructure. Unmatched flexibility, with dedicated, public and bare metal options

_ IBM Cloud Managed Services: Highly scalable private cloud infrastructure and management in data centers around the globe

_ IBM Blue Box: Dedicated Private Cloud as a Service powered by OpenStack

Platform >

IBM Bluemix: The powerful, open-source alternative that expands your options, Bluemix is single, integrated cloud platform across public, dedicated and on-premise deployment models

Solutions >

Accelerate results with fully developed cloud solutions for:

_ Mobile
_ Analytics
_ Big Data
_ DevOps
_ Enterprise app deployment and infrastructure
_ Business Solutions
_ Human Resources
_ Hybrid Integration
_ IT Service management
_ Marketing
_ Cloud Security
_ Social and email
_ High-speed Big Data transport

Services >

Tap IBM business, industry and technology expertise to support your digital transformation:

_ Plan
_ Operate
_ Optimize
_ Design, build and run
_ Secure and manage

Built on Cloud >

More than 100 ready-to-use applications and services for the front and back office, from IBM and its Business Partners

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