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The Enterprise Guide to Cloud Migration

Migrate apps to the cloud for better IT agility

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INTRODUCTION

The role of cloud as a valid IT delivery platform is now widely accepted by CIOs, IT directors and IT organisations, who see it as offering clear advantages. Arriving at this point has been quick and driven mainly by the Business Units (BU) rather than IT, and that brings challenges that need to be addressed.

The BU sees cloud as a cost saving because of the way it is purchased and priced. The CIO and IT department might agree with this but are all too aware of the complexity of IT and new technologies. They are also concerned as to how IT will be integrated when it is moved outside of the organisation. Businesses must understand:

1 What applications go where

2 What type of cloud deployment model is most appropriate

3 The migration paths to the cloud

4 What the service requirements for cloud are, and

5 How to assess the return on investment

Enterprises can enjoy substantial benefits from the effective use of cloud. However, these benefits, like all infrastructure changes, need to be understood, planned and valid goals need to be set to ensure that they do deliver on their promise.

CLOUD ENABLES IT AGILITY

Enterprises rely on cloud IT to create new products faster, improve customer engagement and enter new markets more quickly.

Crucially, the cloud offers the agility enterprises need to respond to changes in customer demands. For example, if customer usage for an application spikes in one far-away geographic region, the cloud allows an enterprise to scale resources locally much more easily than if they were deploying the app from an in-house facility.

The cloud also offers cost flexibility in reducing CAPEX and OPEX costs, and applications deployed closer to the end customer can also perform better, with less latency and more reliability. Still, fears persist that deploying applications in the cloud and away from a company's main IT estate is a security risk.

The most effective way to achieve the benefits of the cloud while addressing security concerns is to design a mixed IT environment, with some applications deployed from the cloud and others from a private data centre, in a strategy known as the hybrid cloud.

DATA CENTRE AND CLOUD LOCATION

One of the key elements for an enterprise looking to build its own cloud infrastructure is finding a trusted data centre partner that can provide a flexible network-neutral environment. Network-neutral colocation data centres offer a wide choice of carriers to source services from. This range of carriers allows enterprises to reduce service latency. The way in which these neutral data centres bring together "communities of interest," including systems integrators, cloud providers, carriers and enterprises, is fundamental in the successful delivery of hybrid cloud solutions.
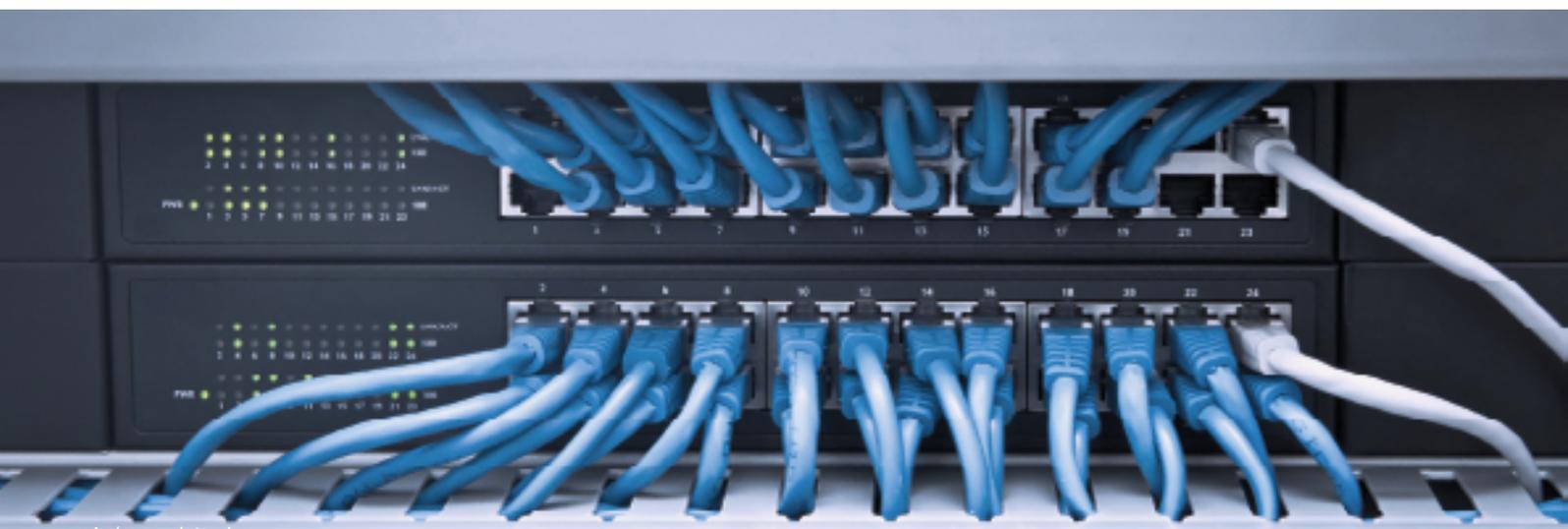
WHAT APPLICATIONS GO WHERE?

Not every application is suitable for cloud deployment. Decidingwhich applications should be deployed in or out of the cloud can be complicated.

Preparation for cloud deployment of applications provides an ideal opportunity to review the application landscape that is in use. All organisations will have a mix of new, old and unused applications. There will unquestionably be a mix of versions of applications, often caused by the length of time it takes to roll-out updates and new versions. Another issue is unauthorised applications that have been brought in by users or departments to deliver business functionality that isn't provided by the IT departments.

Reducing this application pool to a reasonable size significantly reduces the threat landscape from unpatched software. There are further significant savings to be made from the reduction in required software licences. In recent analyst briefings from IBM and HP, both companies have seen a 60% reduction in the application landscape as part of the planning for cloud.

Application rationalisation will also provide an opportunity to decide which applications are business-critical and which applications can be deployed to the cloud. Whether to locate an application in the cloud or keep it local can be a complex decision:

1. Is the application data business sensitive?

2. Where will the data be held: locally, or in the cloud with the application?

3. Can the location of the data be determined to ensure that compliance is adhered to?

4. Is the application business-critical?

5. Does the cloud provider offer better disaster recovery capabilities than you currently use?

6. How is data secured?
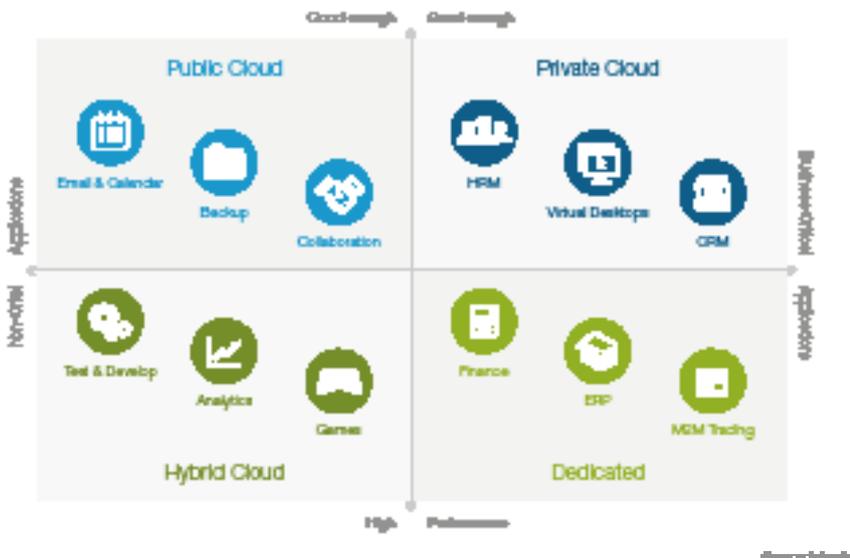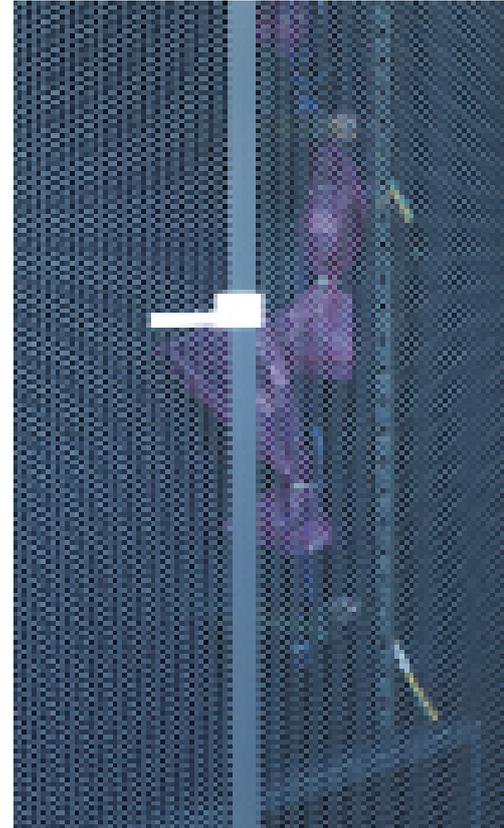
The diagram demonstrates how cloud, location, performance and applications can be brought together. General applications such as e-mail and collaboration are not high performance and can be placed on public cloud. At the other end of the spectrum are applications that are business-critical, highly sensitive and require high performance systems, such as ERP, finance and M2M trading. These are best run on dedicated systems where the business can provide security and risk analysis.

CLOUD DEPLOYMENT MODELS

There are three key deployment models that underpin the right cloud migration path to take.

Deployment Model Definitions

Cloud Provider		Cloud Customer
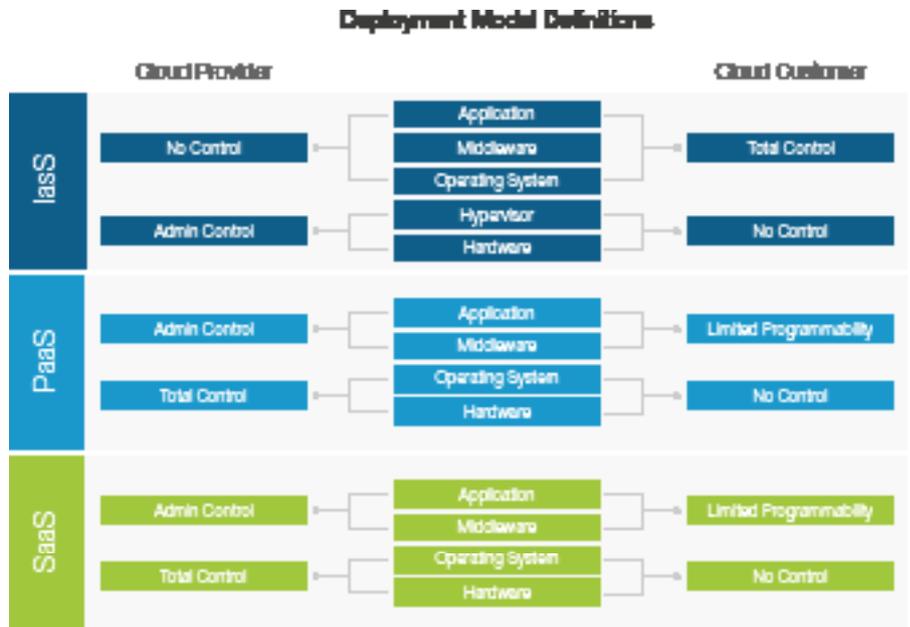
Infrastructure as a Service (IaaS):

IaaS is a basic cloud service. It provides resources such as virtual machines (VM), network load balancers, storage and connectivity. To take advantage of this model, computing resources such as CPU, memory, storage and network are added to a VM and then an application is deployed into that same VM.

While the underlying platform is managed by the cloud provider, the user of the platform is responsible for maintaining their applications and taking backups. Some cloud providers may offer a backup option for the VM to another location to provide a level of disaster recovery but the user still has to consider if they should be taking off-site backups.

Platform as a Service (PaaS):

PaaS is a computing platform, with operating systems, databases and applications delivered by the cloud provider. Customers deploy onto, and developers write code for, the PaaS.

This is often a highly automated and scalable environment. The management tools ensure resources are provisioned when demand reaches a given level. The cloud provider maintains the platform and patches the operating systems, web servers and databases.

Software as a Service (SaaS):

The application software is installed in the cloud and accessed by the user only when needed. The cloud owner manages the software and owns the licenses and effectively rents the software to the users, which means they make significant savings by only paying for software when they are using it.

CHOOSE YOUR MIGRATION PATHS TO THE CLOUD

According to Gartner, there are five key migration paths to a fully enabled cloud environment: (1) re-host on IaaS, (2) re-factor for PaaS, (3) revise for IaaS or PaaS, (4) rebuild on PaaS, (5) or replace with SaaS. Each has their pros and cons.

Re-host on Infrastructure as a Service (IaaS)

Applications are migrated into virtual machines (VM) and then deployed on IaaS. This offers a quick win for IT, with immediate cost savings and access to additional resources. There are times when data may be a problem here. Regulatory requirements may demand data is held within a geographical area for security. Application access to data that is kept locally and not uploaded into the cloud could well pose a challenge in terms of available bandwidth.

Pros

Speed: Applications can be easily moved from physical to virtual using a variety of tools, and the application can then be uploaded directly to the cloud provider's environment.

Cost savings: No local hardware to buy and no power or cooling costs.

Cons

Scalability: Customer is responsible for adding or removing resources, which can lead to a delay in incident response.

Maintenance: Customer is still responsible for the maintenance and patching of their virtual machines.

Distributed applications: These require careful checking to ensure that all relevant elements of the application have been captured in the VM, otherwise the applications will fail.

Backups: If data is uploaded, there must be off-site backups by the customer.
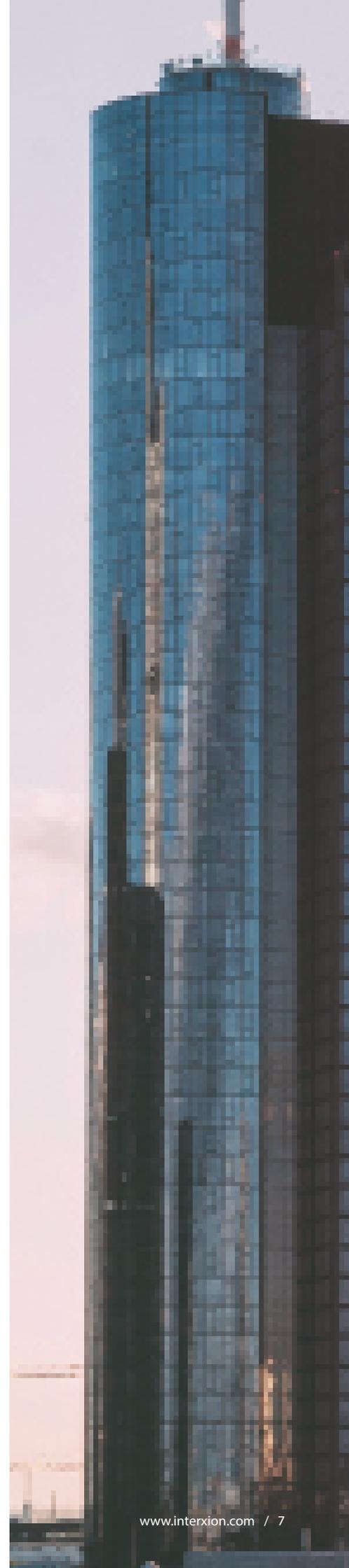
Re-factor for Platform as a Service (PaaS)

Applications run natively on the PaaS rather than being installed in customer VMs. This leads to a better level of integration between the applications inside the PaaS and allows the customer to focus on applications rather than the platform. One challenge that must be overcome is the integration of applications on PaaS and those kept on-premises. Issues over data security and bandwidth are the same as for IaaS.

Pros

Familiarity: Developers are using the same languages and tools that they currently use.

Integrated management: Operations teams are using a single management tool to manage local and cloud based systems.

Savings: No need for retraining the IT department to learn new management tools or languages.

Scalability: As more resources are required, they are dynamically allocated ensuring that systems keep running. As the demand dies down, resources are re-allocated.

Cons

Lock-in: There is a risk of lock-in when the developer embeds access to other services from the cloud provider. This can be avoided by sticking to the capabilities of the generic languages and frameworks.

Missing capabilities: Only those features supported by the cloud provider will be available in the development and support frameworks. This may mean that early in the cloud provider's deployment, there could be limitations on what can be achieved.

Revise for IaaS or PaaS

Revising for IaaS and PaaS is ideal for customers who want to extend existing applications to the cloud as part of a distributed application landscape. Developers take advantage of the applications delivered in the PaaS and extend on-premises applications to take advantage of new features. The major challenge is for the developers to understand the issues involved in writing distributed applications.

Pros

Performance: Application extensions that are written to perform natively on the cloud platform will run faster and take advantage of features that may not be available on the existing platform.

Faster time to market: Writing new front-ends to legacy applications means delivering quick wins to Business Units.

Integration: Highly integrated applications will make it easier for business units to take advantage of IT systems and the data they contain.

Cons

Slower time to market: If the entire application is to be moved to the cloud and then extended to take advantage of new services, it could take quite some time before benefits are available.

Rebuild on PaaS

As cloud matures, developers will begin to treat it as a first-class deployment platform. Applications are architected to take advantage of cloud services and interoperate with core systems. This is a complex integration challenge that builds on the integration lessons from "Revising for PaaS".

In addition to the revise path, the customer can make significant savings from no longer supporting large scale legacy applications. Getting the service levels and disaster recovery processes right is essential.

Pros

Performance: Applications that are written to perform natively on the cloud platform will run faster and take advantage of features that may not be available on the existing platform.

Savings: Moving from large legacy hardware estates that are often expensive to maintain and run will result in significant cost savings.

New platform features: Taking advantage of the new features inside the cloud provider's platform will save the IT department having to add those to existing applications. As a result, this should generate a higher ROI than the Revise option.

Cons

Lock-in: Once applications have been tightly integrated with the service provider's platform, it may be difficult to move from that platform to an alternative supplier.

Replace with Software as a Service (SaaS)

SaaS offers major savings by lowering the cost of using applications. Users rent rather than buy application licences. When the application is no longer needed, the licence is handed back. For flexible workforces or where contractors are used, the savings are at their highest.

There are challenges with SaaS. The first challenge is that the applications need to be designed for cloud delivery. The second is whether the data should reside locally or in the cloud. This third is ensuring that the software manufacture is willing to license their software for delivery through SaaS. There are many examples of SaaS-ready applications in the area of office productivity, CRM, databases and data analysis tools.

For some mid-sized organisations, SaaS offers an exciting opportunity by providing access to applications that were too expensive to be justified previously.

Pros

Cost savings: No local hardware, no software licences and no power or cooling costs. This is virtually the same as an outsourced solution with the benefit of flexible resource allocation for workload flows.

Access to high-value enterprise software comes within the reach of SMEs who can now afford to deploy software that can offer a competitive advantage.

Scalability: This is handled automatically by the cloud provider through their SaaS platform.

Cons

Lock in: For commodity software, such as office-based applications, this is not an issue, but where the software needs significant customisation, any breakdown in the business relationship between the business and the cloud provider could be a problem.

WHAT ARE THE SERVICE REQUIREMENTS FOR CLOUD?

When engaging a data centre or cloud service provider, enterprises will enter a Service Level Agreement (SLA) with that provider. This is one of the most important aspects of cloud service delivery. The SLA must reflect the change of business process inherent in moving applications and data to the cloud, and the subsequent risk to enterprises if they are not able to access those applications or data. It's important to keep the factors in mind when evaluating SLAs.

Realism: Expecting 99.9999% uptime is unrealistic. Only an extremely small number of organisations get close to this figure with their on-premises solutions. For cloud, where there are many more variables that will impact performance, this is a wholly unrealistic target. Rather than use unobtainable numbers, it is important to work with a provider to identify key and realistic metrics for the SLA.

Latency: If the application is latency sensitive, it is critical that the data and application are located in close proximity, ideally within the same data centre.

Performance Baseline: Metrics only work if there is something to compare them with. Part of cloud migration planning should include application profiling. This will provide an indication of how applications use resources and what levels of performance are currently being achieved through on-premises installations. This data is ideal for setting base metrics and then deciding on what additional levels of performance are required.

Certification: The enterprise must confirm that their cloud platform provider conforms to a range of international standards for data centre operations. These range from power efficiency to security standards. Organisations looking to take on cloud services should ensure that their partner is, at the very least, meeting the same standards as they do. Those that meet the most stringent standards will attract a premium price for access to their facilities and services.

Resolution: With any service-based agreement there is always the potential for failure. There should be a very clear approach to how any dispute will be resolved. This should start with the SLA, which will detail response times and how an issue is notified. The more business critical the system, the shorter the response time, and therefore the more important it is that there is a clear, unambiguous and effective process to escalate any issues.

Compensation and Cost: Compensation levels should be clear and at the front of the SLA. The provider should identify what can be expected should the SLA be breached and how any compensation will be applied. Transparency is important.

Always On: Disaster recovery and business continuity are still challenges for enterprise IT. Part of a premium SLA will show what the process is for ensuring business continuity, and how the disaster recovery process can be invoked.

HOW TO ASSESS THE RETURN ON INVESTMENT (ROI)

The key ROI for cloud is often seen as savings related to CAPEX. This is a very limited objective and ignores other costs, savings and benefits. It also assumes that the OPEX of moving to cloud can be kept within existing financial budgets.

The real ROI for cloud is about the costs that it would take to deliver the same level of service internally. This includes hard and soft metrics such as uptime, user experience, cost of hardware / software, integration, cost of bandwidth, data centre power and cooling costs, and staff costs.

To some degree these are the same basic metrics that are applied to all IT projects. The key to establishing an ROI on cloud is to look at what a cloud solution enables that could not have been achieved using existing IT systems or platforms. This should be thought of as a cloud premium.

The most effective way of determining the cloud premium as part of the ROI is to compare the business case with what cloud offers. When doing this, consider what it would cost to deliver this using existing IT infrastructures and tools. This will help clarify what is cloud premium and what is simply a benefit from more flexible processes.

Business Case	Cloud Premium
Reducing the cost of development and testing environments:	• The speed with which a testing environment can be provisioned • Ability to do more intensive and extensive testing of applications • Access to high-value test tools on demand via SaaS • Access to test professionals in different locations
Scalability:	• Ease of adding additional compute, network and/or storage resources on demand • Ability to shrink resource pool when not required
Competitive advantage:	• Faster time-to-market for new applications and solutions means new market opportunities can be quickly explored • Speed of identification of trends and designing competitive solutions • Lower cost of IT releasing more money for other parts of the business

FINDING A COLOCATION DATA CENTRE PROVIDER

Enterprises have numerous factors to consider when it's time to decide exactly how and where to build their cloud. They could choose to provision and maintain their own global network of data centres, or work with a third-party data centre provider in an arrangement known as colocation.

Colocation offers numerous benefits over a private data centre strategy. The most obvious is cost – acquiring, stocking, staffing and maintaining private data centres in every required market is a major investment for an enterprise. Instead, they could lease space in their target geographic locations from a provider that has already built the required infrastructure and that handles facility security, maintenance, power and cooling.

Colocation enables several other benefits, including:

Agility

If application demands peak in a private data centre, the enterprise would have to invest in more resources to support that surge. That might mean adding additional compute resources, hiring more staff, or even acquiring a new facility and outfitting it with the appropriate equipment.

In colocation, scaling resources is comparatively faster and easier. Often it involves simply logging into a provider's partner portal and adjusting compute resources as needed. Enterprises can also choose to lease more space for servers and equipment as needed.

A central management console offers the enterprise full visibility and control of their cloud IT estate, which empowers them to match IT spending more appropriately to consumption.

Community

The location of the colocation data centre influences two important factors: service quality and access to expertise.

In terms of service quality, working with a colocation data centre provider allows enterprises to find facilities located in the heart of the community they serve. For example, an enterprise looking to deploy an application to German customers can not only find an in-country data centre, but also one that's located in an ideal city – say, Frankfurt – to reach as much users as possible with the best quality performance.

In terms of access, there are community or specialist clouds where enterprises can deploy their cloud in close proximity to other businesses in their shared area of expertise. For example, a financial services firm deploying applications in a data centre shared by their peers would easily be able to collaborate with those other firms on operational or commercial tasks. That offers additional efficiencies and access to shared IT knowledge.

Security

The data centre provider is responsible for physical protection of the facility, including 24-hour on-site security staff, video surveillance and multi-layer physical security. The provider can also ensure that security between the cloud and the enterprise's internal systems is part of the whole solution.

It is important that the provider conforms to the best international security certifications. These make a significant statement about the commitment to protecting customer data. With regulators introducing ever tougher rules on data protection and privacy, colocation data centre providers that deliver a highly secure cloud will stand out from those who do not.

Connectivity

A major reason for moving to cloud-based IT is to get a higher level of reliability. Enterprises should opt for data centre providers that offer a range of choices for carriers, internet service providers, Internet Exchanges and other network service providers. With more choice, the enterprise can arrive to the connection solution that offers the lowest latency and widest reach for their application. Third-party data centres also build in redundancies to ensure low latency, continuous service delivery and guaranteed performance, with service level agreements offered to keep the provider accountable.

Performance

A network-neutral data centre allows enterprises to build a fault-tolerant, high bandwidth cloud. To help link customers' existing data centres and cloud-based services, the provider can sign agreements with carriers to provide leased lines. This increases performance, reduces latency, adds security and strengthens the SLA.

Expertise

Colocation data centre providers have the expertise to create an efficient IT environment that minimises operational costs, including cooling, power, and maintenance, while maximising the quality of service delivery to customers. Enterprises can often tap into that IT expertise in the form of support services. This is particularly valuable for an enterprise that has leased space in a far-away data centre, as the provider's local IT staff can be called upon to provide additional support by request.

Colocation data centre providers are also constantly investing in improvements to their facilities, and the benefits from those investments filter down to each enterprise that leases space in the facility. Sustainability is one important example – an enterprise that prioritises having a low carbon footprint should look for a data centre provider that continually and demonstrably invests in renewable energy and other sustainable data centre practices.

CONCLUSION

Cloud offers enterprises a huge opportunity to gain the financial flexibility and operational agility needed to create new products, better serve customers and improve service quality.

Transformation of business models requires a bold approach. Companies like Apple, Amazon and Netflix transformed their business models a years ago. Since then, record stores, book shops and video rental companies that failed to spot the trend have ceased to trade. Even those still around are struggling to adapt to the changes brought about by Apple, Amazon and Netflix.

Cloud now gives other enterprises that same opportunity to change their business model and transform their business. While others in IT are building out infrastructure, enterprises can tap into strategic partnerships with trusted data centre providers to design an adaptable cloud model that allows seamless growth into the cloud.

About Interxion

Interxion (NYSE: INXN) is a leading provider of carrier and cloud-neutral data centre services in Europe, serving a wide range of customers through 45 data centres in 11 European countries. Interxion's uniformly designed, energy efficient data centres offer customers extensive security and uptime for their mission-critical applications. With over 700 connectivity providers, 21 European Internet exchanges, and most leading cloud and digital media platforms across its footprint, Interxion has created connectivity, cloud, content and finance hubs that foster growing customer communities of interest. For more information, please visit **www.interxion.com**.

Data Centre services across Europe