An Architect’s Guide to Building, Managing and Optimising Multicloud Environments

Adopting a multicloud strategy is a complex endeavour. This guide explores what providers are best suited to what, key considerations for planning and how to plan for the road ahead.
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In the early days of cloud adoption, choosing a strategy involved one key consideration – public or private? But the advent of hybrid cloud has encouraged greater adoption, innovation and even experimentation as organisations assign different workloads to public, private and on-premise infrastructures.

According to the Insight Intelligent Technology™ Index, 89% of organisations invested in cloud services over the past year, with 38% migrating between 40% and 60% of all workloads. Meanwhile, 28% of large enterprises have moved between 61% and 99% of their workloads off-premise.

But there’s an increasing recognition that not all public cloud services are equal. Using different platforms for specific instances might be more efficient and result in better outcomes than staying with one vendor.

The term multicloud applies to any digital environment where applications are deployed across more than one cloud platform. It can include any combination of public clouds like Microsoft Azure, Amazon Web Services (AWS) or Google Cloud Platform (GCP); private clouds such as those powered by OpenStack; or dedicated servers.

* 89% of organisations invested in cloud services over 2017.*
The Changing Nature of Cloud

Fundamental changes in the cloud market mean that multicloud is becoming the new norm for most enterprises.

There are a myriad of reasons for adopting a multicloud approach. Intense competition between public cloud providers means that organisations with a flexible multicloud strategy will be able to benchmark each vendor based on cost and suitability, as well as be able to seamlessly move certain workloads to maximise the savings on offer.

But vendors are also competing regarding features, not just price. Being flexible means there’s no risk that a business might miss out on a game-changing service that could deliver a significant competitive advantage. Multicloud also prevents vendor lock-in, which can eliminate some of the cost-saving potential.

There’s also a recognition that some cloud platforms are better fits for certain types of application. Some have superior Artificial Intelligence (AI) capabilities, while others might have more security certifications for a certain industry like health or finance.

These are just some of the factors causing IT decision makers and enterprise architects to re-think their cloud-first strategies in favour of multicloud strategies, even if they don’t plan to implement multicloud immediately.

Analysts at 451 Research believe that 69% of enterprises will have multicloud or hybrid IT environments by 2019, while IDC predicts that the majority of European organisations will soon adopt multiple cloud services.

“69% of enterprises will have multicloud or hybrid IT environments by 2019.”

451 Research
How to Select the Right Cloud Services Provider for Your Organisation

Concerns over security and data sovereignty have, for the most part, been addressed by the big three public cloud vendors AWS, Microsoft Azure and GCP. This has fuelled an Infrastructure-as-a-Service (IaaS) market which is forecast to grow by 35.9% in 2018 to reach $40.8 billion according to Gartner, Inc.

To date the market has been dominated by AWS since Amazon started offering cloud services in 2006. In February 2017, Synergy Research put AWS’ market share at 40%, with Microsoft, Google and IBM combined share at 23%. However, under the leadership of its “mobile-first, cloud-first” CEO Satya Nadella, Microsoft has quickly gained ground and is well on the way to building its own global cloud network. Google has also been expanding its public cloud services and IaaS business under the GCP.

Deciding between vendors will depend on the requirements of each customer and the workloads they are running. Different providers have different value propositions and one provider may be better suited for one workload, while another provider will work better for a different workload.

AWS, GCP and Azure all offer similar basic capabilities around flexible compute, storage and networking. They also offer the common elements of public cloud, that is self-service and instant provisioning, autoscaling together with security, compliance and identity management features. Aside from this, there are some differentiating factors to consider.

“Infrastructure-as-a-Service (IaaS) market is forecast to grow by 35.9% in 2018.”

Gartner, Inc.
Microsoft Azure had a slow start but has gone from strength to strength under the leadership of CEO Satya Nadella and his ‘cloud first’ strategy. Microsoft is already a partner for businesses of all sizes, making it an attractive choice.

**Strengths:**

- **High availability:** Microsoft promises an uptime level of at least 99.95% for its cloud services.
- **Hybrid cloud support:** Azure’s support for hybrid cloud environments is notable, allowing organisations to use a mixture of public cloud, private cloud and on-premise technologies. It also offers Azure Stack, which delivers the features of the public cloud to private environments through dedicated appliances.
- **Microsoft integration:** As you might expect, Azure works well with legacy on-premise Microsoft applications like Windows Server and Active Directory.
- **Global footprint:** Azure has more regions than any other cloud provider, boosting resiliency and making it ideal for organisations with data sovereignty requirements.

**Factors to consider:**

- **Outages:** Despite its solid reputation for availability, Azure has been the victim of several high-profile outages in recent years.
- **Compatibility:** Azure does tend to work better with Microsoft environments but it has become more open in recent years. Support for Linux was a historic move by the company.
Amazon Web Services

AWS was first to the market, commercialising the cloud platform that underpins its online retail business. Its first-mover advantage has established it as the market leader and it remains an attractive choice for organisations.

Strengths:

- **Services**: There’s no escaping the huge range of services and options available to customers, making AWS ideal for most organisation’s needs.
- **Openness and flexibility**: AWS supports a wide range of operating system and programming language.

Factors to consider:

- **Complexity**: Choice can be a good thing, but it can be difficult to understand the sheer volume of options that Amazon offers. Some might value the levels of customisation, but it can exacerbate the issue of complexity in a multicloud environment.
- **Maintenance**: AWS makes it easy to get started but it can be difficult to maintain once you get going.
Google Cloud Platform

GCP is a relative newcomer to the public cloud space, bringing the infrastructure that powers its own range of services to a wider audience. It has been an aggressive entrant into the market, looking to compete on price and it has expanded its range of services and regions significantly over the past few years.

Strengths:

- **Digital nous**: GCP has proved popular with cloud native and digital-first businesses, with Spotify a notable customer.

- **AI capabilities**: Given Google’s investment in AI, it’s unsurprising that its public cloud platform compares favourably with the competition in this regard.

- **Big Data**: GCP’s BigQuery analytics service allows massive amounts of data to be crunched in a short period, making it ideal for big data applications.

- **Containers**: Google’s experience with containers (it open sourced the Kubernetes platform) means it is well suited for such deployments.

Factors to consider:

- **Enterprise**: Although it’s making strides forward, GCP isn’t as widely adopted by large enterprises. It has however made some improvements in a bid to attract more large customers.

- **Product range**: Although GCP has closed the gap regarding global footprint thanks to the launch of several new regions, its rivals lead the way in terms of service choice.
What Providers to Use for IaaS, PaaS & SaaS

There are three main models of cloud service – Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). All three share common components with the key differentiator being the level of service abstraction. With on-premise infrastructure, everything is managed by the IT department whereas SaaS is a fully-managed service. IaaS and PaaS sit in between these two extremes.

According to the Insight Intelligent Technology™ Index, the two most popular investments over 2017 were in SaaS (66%) and IaaS (52%).
IaaS, PaaS or SaaS?

Deciding between an IaaS, PaaS or SaaS model for an application depends upon several factors as well as architectural patterns of the application. Typically, the adoption of PaaS heralds a higher upfront investment to ‘transform’ but returns longer term efficiencies and benefits. An IaaS ‘lift & shift’ approach is typically cheaper upfront, but long-term can cost more due to the decrease in flexibility and agility. Where possible, to achieve maximum benefits of cloud, Insight recommends the adoption of either PaaS or SaaS technologies.

### IaaS

IaaS provides a model whereby all the underlying hardware is managed and provided by the vendor, and the consumer manages the operating system up. In this model, the customer still has the overhead of managing the operating system from an administration perspective, including patching and management as well as the installation of applications and data.

### PaaS

PaaS increases this abstraction as the operating system, middleware and runtime are all provided by the vendor (in addition to the IaaS components), with the consumer managing the applications and data. PaaS offers a key advantage over IaaS in that it removes the extra burden of having to manage the underlying operating system, instead of providing direct access to the service you require. PaaS components are architected to provide scalability and agility to support cloud applications. This is an evolution from IaaS which requires the architect or engineer to build the scalability and agility using traditional techniques at the infrastructure level, i.e. load balancers, traffic management, scale-sets, etc.

### SaaS

SaaS sees the platform provider manage the entire stack and provisions access to the “software” as required by the users of the organisation. In this model, the organisation has a lot less control within the infrastructure and the application tier, and instead places more trust in the vendor. Ultimately this is the cloud nirvana, as typically SaaS products are ‘born in the cloud’ and can usually be considered truly ‘cloud-native’.

### Top providers to use for SaaS:

The main benefit of SaaS is that you don’t need much technical expertise as the provider takes care of all the maintenance. Examples of SaaS applications include Microsoft Office 365, Box and Salesforce. Many of these applications can be delivered using the vendor’s own infrastructure or using another public cloud platform. Once you have determined your specific application needs, the most important considerations for infrastructure should be resiliency, availability and data sovereignty.

### Top providers to use for PaaS:

When choosing a PaaS provider to build your cloud applications, there are a number of options. AWS offers Elastic Beanstalk, Google offers App Engine, while Azure offers several PaaS options such as App Service, Azure Search and Azure Content Deliver Network. Salesforce, SAP, IBM and CloudFoundry are also competitive in the market.

### Top providers to use for IaaS:

The IaaS market is dominated by a few major players. Gartner deems AWS, Microsoft Azure and GCP to be ‘leaders’ and Oracle, IBM and Alibaba Cloud as ‘niche players’ in its 2018 Magic Quadrant for the market.
Key Considerations for a Multicloud Environment

Despite the hype, adopting a multicloud approach is a complex endeavour and should not be undertaken lightly. You should consult the following when developing your strategy.

☑️ **Do you have the correct skills and expertise?** Adding new services and environments into your stack might require new skill sets. It may be necessary to retrain existing staff or to recruit new employees.

☑️ **What is the impact on operational costs?** Every new service introduced increases the operational burden on your IT team. This can make staff less productive and adding new services and clouds just for the sake of it could make you less efficient than before.

☑️ **What tools will be needed?** Each environment has its own tools and technologies that must be mastered. There are few management tools that support multicloud environments currently available, meaning that enterprises must adopt and manage multiple management consoles, support structures and SLAs. Once again, beware of unnecessary complexity.

☑️ **How will this affect your security strategy?** Having multiple secure cloud services doesn’t automatically guarantee a secure multicloud. It requires a single secure enterprise network that includes the data centre and all the public and private clouds an organisation subscribes to.

☑️ **How will you manage governance?** Governance becomes increasingly challenging as organisations deploy multicloud strategies because they must govern not only the consumption of cloud by the provider, but also consumption across cloud providers.
The Road Ahead

Multicloud adoption is not a one-off exercise. The cloud market continues to evolve and mature at a rapid pace so it’s essential for organisations to continuously evaluate providers against their workload requirements and to strategically plan for ongoing deployments.

Different organisations will be at varying stages of their journeys and this is likely to restrict adoption in the short term. IDC reports that just 10% of organisations have taken sufficient steps for a “fully fledged” strategy while 34% of European firms have no present plans to move workloads from their current providers.

Start with just one public cloud provider, ensuring you can build, deploy and maintain applications on its infrastructure first. If your IT team encounters challenges with one vendor, it makes absolutely no sense to introduce another platform into the mix.

As the technology industry concentrates on a few key technologies that make it easier to transfer workloads across different platforms, it’s worth noting that applications may not behave the same on a different service. Any difference in latency, availability or security can also have an impact, as can your IT team’s familiarity with a particular service. This would negate any cost benefit.

If you are ready to introduce a new service, make sure you have identified a clear benefit that offsets the additional complexity. A flexible strategy will make this easier, and having the right skills and tools in place will help minimise teething problems.

Having the right partner to identify the most suitable technologies and ability to support you is also critical. Public cloud vendors have hundreds and thousands of products to offer customers, each with varying feature sets and price models.

If you would like to discuss your multicloud strategy, Insight can help, by offering the best solutions and advice for your IT infrastructure.

To learn more please visit uk.insight.com/cloudhub