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# How Cloud Connectivity Neutralizes Cloud Migration Challenges

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# About the Author

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# How Cloud Connectivity Neutralizes Cloud Migration Challenges

In just about a dozen years, cloud computing has gone from a concept mentioned at industry conferences to the way more and more companies run their information technologies. In fact, nearly 70 percent of enterprises have now migrated at least some of their business-critical apps to the cloud environment.

Along the path from then to now, there have been challenges — concerns about cloud security, safety, reliability, data vulnerability, operational disruption and more. For a long time, these served as obstacles that delayed many companies from transitioning their more critical workloads to the cloud. Steadily, each of these objections have been overcome as technologies and providers emerged to resolve most of cloud computing's challenges.

One challenge that has been with us from the beginning — and is still a vexing question for those seeking to leverage the many advantages of cloud computing — is the transport of data to and from cloud data center facilities. The global public internet was for many years data transport's default standard mode but given its sheer enormity and the inconsistent latency caused by its "probabilistic" underlying technologies, large enterprises rejected the public internet as a viable solution for their workloads, preferring dedicated private circuits leased from major carriers. While these leased lines gave them adequate speed and met their privacy demands, the

approach required significant investments in communications infrastructure and maintenance… just the things that were driving businesses to the cloud in the first place.

More recently, another option has emerged — an alternative that not only delivers the highest speed and security between companies and the major cloud providers, but also enables the creation of multi-cloud environments in which users take fullest advantage of the best features of each cloud provider's respective offerings. Best of all, this cloud connectivity requires no additional infrastructure investments to create connections, redefining the way in which cloud migration and related transitions can be accomplished.

To fully appreciate the opportunities created by this new level of cloud integration, we begin by examining how integration has grown over the past several decades.

## Making Cloud Work: How Did We Get Here?

During the earliest days of microcomputer-based computing in the 1970s, the concept of "integration" — combining best-of-breed products from various manufacturers — emerged to produce superior solutions at a much lower cost. The challenge was making all these components work well together. This accelerated the development of standards, drivers and many other hardware and software solutions focused on enabling integration.

As the industry matured, it became clear to the integrator community that several things needed to change:

- First and foremost, the ongoing operation of networked IT had to be removed from the client's premises: few customers wished to be in the business of operating networks.
- Capacity had to increase to keep up with the accelerating scale of businesses.
- Costs had to come down to respond to client demand.
- Service, support and reliability had to improve significantly.

Removing IT from customer premises at first proved challenging, but the introduction of server virtualization changed the game, making it possible to host many "tenant" clients on each server. Soon, a dozen clients could share one server and pay for their portion of the operating costs. This launched the rise of cloud computing.

Concerns about cloud computing quickly followed, however. While the internet was cost-efficient, there were questions about the security of data and the impact of relying upon an internet connection to maintain access to the applications and data required to continue business operations. While smaller companies were comfortable with the security and reliability of internet transport, mid-market and large enterprises saw too much risk; though some embraced cloud protocols privately, their preference remained fast, low-latency, private, protected leased lines operated by major carriers. But leasing a line to the nearest internet point-of-presence still resulted in their traffic crossing the internet. Which was just not acceptable. (Yet.)

Enter cloud-based services. Some were simply software applications that users could run in their browser as a service (SaaS). Others promised to replace one's own servers and storage with similar resources operated by professionals in a cloud data center, providing infrastructure as a service (IaaS). Developers flocked to platform-as-a-service (PaaS) functionality. Before long, just about anything IT was offered from the cloud as a service.

So, it was no surprise when — as with computer hardware and software years before — opportunities emerged to improve performance by combining services from multiple cloud service providers (CSPs): productivity suite from one, cloud backup from another, cloud-based security from yet another and still another for communications across the cloud. The challenges were the same as well. Each cloud service used its own set of protocols, standards and conventions. Interoperability could only be achieved by coding middleware or building workarounds — each of which created more and more complexity,

especially when any of the technologies underwent an upgrade.

Achieving interoperability required intelligent integration. The cloud integrator was born.

Responding to demand from corporations seeking a solution that combined the safety, privacy and reliability their data required with the removal of operational burdens enjoyed by users of the cloud, major IT industry players created private cloud platforms including Amazon Web Services (AWS), Microsoft Azure and Google Cloud Platform, each offering varying competitive advantages and differentiated features. The new breed of integrators quickly identified that each of these major private cloud platforms excelled at some things and lacked in others. They found that provisioning, configuration, capacity management and other specifications in each platform made them preferable for various applications. And it became clear that more complex solutions might require the services of several cloud providers.

To obtain best performance at the lowest cost, large corporations would need to integrate them to create multi-cloud environments that took advantage of the best features of each. Soon, multi-cloud enabled cloud integrators to combine the best features and greatest advantages of a wide variety of cloud computing providers to create far superior solutions for customers.

## Multi-Cloud Interconnect: What's Old Becomes New Again

The desire to put these platforms to work brings us back to the problems facing public internet as the primary transport for cloud computing services. Though these platforms were private, many users still accessed via the internet. Large enterprise customers could provision private leased lines to each platform in their multi-cloud environment, but speed and expense would continue to be issues.

> "Multi-cloud interconnect promises to unlock the true value of cloud comuting for any organization, regardless of size. It will radically change the way we manage information, opening the door to new innovation, new applications and new functionality — some we have not even envisioned yet."

The large CSPs responded with new, native and private connectivity capabilities which made it possible for clients to create a fast, low-latency private connections using network fabric with plentiful bandwidth to achieve even the highest throughput goals. However, AWS Direct Connect, Azure ExpressRoute, Google Cloud Interconnect and others still required some on-premise and remotely owned infrastructure, including routers with cross-connects, VPNs and specific peering capabilities. They also incurred additional data egress and other transfer fees. Connecting directly to each of the services in their multi-cloud environment was still not a cost-effective solution.

Which brings us to the multi-cloud interconnect.

Some larger companies did continue to create their own private interconnects. In some cases, carriers provided leased lines to facilitate connection. Smaller companies were still confident their ever-improving IPSec-based security measures provided the protection to transport data across the public internet. Multi-cloud connectivity solutions — offered by providers who establish their own private global network fabric with multiple connections to AWS, Azure, Google and others — cost-effectively provide the required bandwidth for combining these services.

Multi-cloud interconnects not only make migration between on-premise networks and various cloud platforms much easier, but also facilitate the hybrid co-existence that must be maintained during transition. The agility enabled by connecting to all platforms through one common junction makes it far less complex to manage and operate all manner of hybrids and combinations. Perhaps most important, corporate data never crosses the public internet, which eliminates latency and improves resilience.

Say a large corporate client acquires a private, direct, high-speed connection to the multi-cloud interconnect provider's network which, in turn, provides a private connection across the fabric to the major CSPs that are also connected. An organization with bandwidth-intensive applications to transfer large volumes of data enjoys immediate savings from its direct connection. At the same time, the client only pays for what it uses with direct connections, making the ability to throttle capacities up or down a major benefit.

Multi-cloud interconnect also creates a truly private network between the corporate client and all connected CSPs. Cloud integrators are free to mix and match functionalities from each to achieve optimum cost-efficiencies without concern for data backhauling or the introduction of any kind of latency. Sheer throughput is increased, and the multi-cloud interconnect provider also improves resilience through its own redundant network design.

## Essential Considerations When Planning the Path to the Multi-Cloud

Multi-cloud interconnect promises to unlock the true value of cloud computing for any organization, regardless of size. It will radically change the way we manage information, opening the door to new innovation, new applications and new functionality — some we have not even envisioned yet. Beyond processing power, transmission power and storage power, there is also the power of ready, secure, highly-efficient accessibility, which enables just about anything.

Your own path to the cloud must be planned with this future in mind. Anticipate that projects of greater magnitude may require the assistance of external cloud integrators, whose experience with the various idiosyncrasies of each cloud platform will prove invaluable. The easiest way to evaluate potential servicers is to discuss your needs with them, and see if they advocate for a specific platform or recommend a multi-cloud solution when appropriate. Add to that an evaluation of their certifications and other credentials from reputable organizations.

With or without outside assistance, there are several key issues your organization must consider to ensure the most cost-efficient, secure and resilient transport paths for your data:

### Migration

Many early clients were concerned about migrating to the cloud from their familiar on-premises network. Their primary fear: the migration process would cause disruption of corporate operations. This was most easily resolved by showing them that the creation of a hybrid on-premise/cloud network enables slow, gradual migration of less critical workloads to more and more critical workloads, with easy fail-back ability.

## Operation

Cloud integrators must assure that operations between various CSPs orchestrate easily and seamlessly. The objective: render simpler operation and remove complexity.

## CI/CD

More and more clients seek to leverage cloud investments by pursuing constant improvement through constant development and deployment (CI/CD) using microservices in containers, a technology designed specifically to take best advantage of cloud computing and managing the processes in a DevOps environment. Network interconnects to CSPs must be ready to facilitate this new agility.

## Large Data Transfers

With multi-cloud interconnect networks, there should be no additional data egress, transfer fees or other expense. Since the data only transitions between the client, the provider and the major clouds, all data transfers are handled within that environment.

## Geographic Proximity

As with internet connections, the closer the client to the multi-cloud interconnect provider's nearest point-of-presence (PoP), the less the direct connection will cost.

## Data Sovereignty

GDPR and forthcoming domestic data privacy regulation may require that data remain physically stored within the borders of a given country. This becomes important when selecting the large CSPs that will be involved.

## Security

Security is always the top-of-mind concern, so place special focus on what security provisions are offered when evaluating any interconnect or cloud service provider.

## Insulation from Silent Government Interference

Whatever security provisions a given provider may offer, it is important to remember that the ultimate responsibility for data protection always rests with the client, which is why it always wants to encrypt data at rest in storage or in transit. This becomes important in the case that a government agency subpoenas the client's data from the provider. They will immediately comply and provide the data without notice, so the client may remain unaware of the action. If the data is encrypted, the government agency must contact the client to demand the encryption key, giving them the opportunity to prepare a legal response.

## What's Next: The Importance of Interoperability

With new technology innovated into existence all the time, it becomes incumbent upon innovators to adhere to standards of interoperability. Whether it's Z-Wave wireless devices in the home or industry, data transfer between storage devices, the Internet of Things or multi-cloud connectivity, the easier we make it for various services to interoperate, the better — and the more productive integration becomes.

# Related Reports


## 6 Steps to Earning a Large Upsell on Cloud Services

The rise of cloud services did not sound the death knell of IT managed services, but instead the cloud has emerged as one of the fastest-growing opportunities for partners, VARs and MSPs. It turns out that the value-added services that partners provide aren't subsumed by the cloud, but rather enhanced by it.


## 6 Cloud Trends Partners Must Watch

Cloud computing is not so much a trend as an everyday reality. Yet the pace of change in the cloud ecosystem means this is no staid, bread-and-butter opportunity for partners. In fact, the speed with which cloud vendors and services move is part of the reason why the partner opportunity is just beginning to hit its stride. In this report, we dig into six key trends that cloud-minded partners need to have on their radars.


## Cloud Storage: 7 Services Creating Opportunities for Channel

If data is "the new oil," then cloud storage is the new tank farm and partners are the data refinery, helping their customers turn data stored in the cloud into valuable, curated, secured business information.