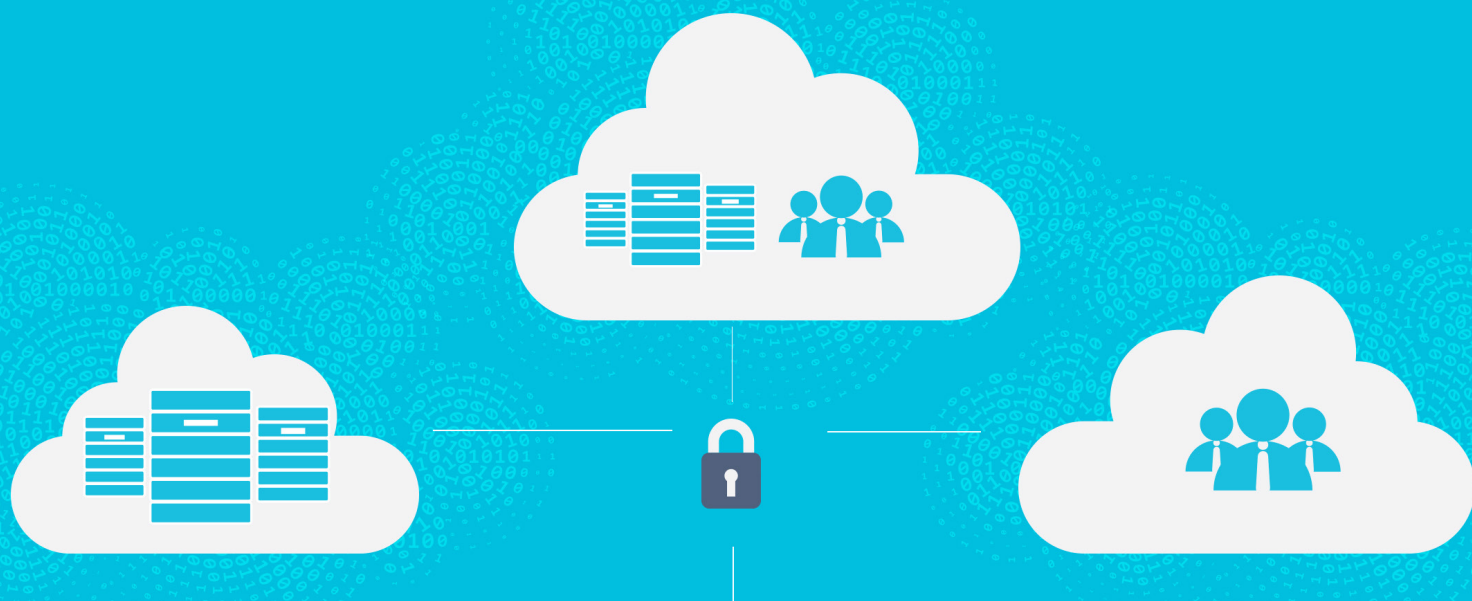


Breaking Barriers with the Hybrid Cloud



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01 The Existing Cloud Landscape

Cloud computing has witnessed enormous growth over the last decade. Revenue within the global cloud market is projected to reach USD **\$390 billion** by 2020, up from USD \$180 billion in 2015, at a compound annual growth rate (CAGR) of 17%.

The cloud is no longer just a cost saver; it has become an essential facilitator of innovation. Organizations are realizing this, as shown by the fact that companies are expected to divert USD **\$111 billion in IT spending** away from traditional infrastructure to cloud resources. In fact, Gartner estimates this figure will reach USD \$216 billion by 2020.

Cloud computing offers enterprises numerous benefits, including cost savings, scalability, and flexibility. These benefits enable companies to reinvent themselves by adopting new business models, and to innovate and scale without any restrictions. Businesses can now react swiftly to changing market dynamics and remain competitive in the face of technological disruption. This would otherwise not be possible, as it would require massive investment to pivot and recalibrate resources.

Public and private cloud are the two primary cloud deployment models available to customers. The public cloud offers customers unlimited scalability and elasticity on-demand at low cost, with high availability and reliability. However, there is one caveat, which relates to customers' dependence on cloud service providers for overseeing the security of their data.

Private cloud, on the other hand, offers organizations higher control and levels of security through the provisioning of dedicated servers. Some organizations require both, high security and data control assured by the private cloud, along with increased flexibility and cost savings offered by the public cloud. Hybrid cloud is the ideal solution, as it combines the advantages of both the public and private cloud.

This whitepaper assesses the market need for hybrid cloud solutions, and analyzes the advantages and shortcomings of both public and private cloud solutions. We also look at the benefits that a hybrid cloud can bring, and discuss important considerations every company must make prior to deployment. Finally, we consider Alibaba Cloud's hybrid cloud solutions, along with their unique advantages.

02 Market Need for Hybrid Cloud

Public cloud and private cloud are the two most prominent cloud deployment models. While markets for both models are already huge and expanding, certain scenarios prevent customers from leveraging them effectively, as discussed below.

2.1 Public Cloud

2.1.1 Introduction and Benefits

The public cloud market is expected to continue growing at a ferocious pace, with Gartner estimating the worldwide public cloud services market to amount to USD **\$383.3 billion** by 2020. The public cloud gives customers real-time and on-demand scalability as well as flexibility. Customers hand over the responsibilities of infrastructure management to the cloud vendor, allowing them to reduce costs and save time to focus on their core business.

The speed of resource provisioning ensures customers do not compromise on the quality of their services when demand is higher than usual. At the same time, enterprises can scale down resources when demand is low. Given that the pay-as-you-go payment model is based on actual consumption of compute resources, companies can enjoy huge cost savings, and forego the upfront and ongoing cost of managing in-house IT infrastructure.

2.1.2 Challenges

While the public cloud can deliver high availability given it has no geographical limitations, there is an element of risk involved. As company data resides in the hands of the public cloud service provider, customers do not have complete control over their data.

There is potential for the cloud service provider to suffer from an external attack or for data to be switched to a global data center in another region. This is a big obstacle for some organizations, as they may encounter challenges from a regulatory and compliance standpoint, depending on their industry. Healthcare companies with critical patient data and banking institutions with sensitive financial information are especially concerned with losing control over their data.

Reliability of services is yet another concern. Due to resource sharing, customers are unsure how downtime for a particular tenant may affect them. Shifting from one public cloud provider to another is also a very difficult process. Furthermore, customers are unable to plan for unexpected downtime caused by issues with their cloud provider.

Another challenge is integrating legacy IT infrastructure (including hardware, software, and applications) with public cloud environments, and which is essential for running in-house applications. Without a standard solution for this, businesses find it challenging to manage, and IT professionals often lack adequate training and experience. This knowledge gap can in turn cause organizations to defer public cloud deployment.

2.2 Private Cloud

2.2.1 Introduction and Benefits

As a public cloud breach and subsequent data loss can cause irreversible damage to a business' reputation, certain companies simply cannot afford to take any risks with the security of their data.

A private cloud solution is therefore a recommended option for organizations that have concerns with data security and legacy-environment integration. Private cloud offers the option of hosting their applications and software on hardware owned and managed in-house, while keeping complete control over their data.

2.2.1 Challenges

Numerous challenges exist in private cloud deployment. As highlighted by a practitioner sharing on Gartner's blog, [95% of respondents](#) experience problems in managing their private cloud. Setting up a private cloud involves significant up-front capital investment. Being solely responsible for managing their private cloud, organizations bear all related costs, including the cost of maintaining infrastructure and owning resources during lulls in usage.

Provisioning extra resources when the load on the server is high takes considerable time and money. Organizations relying on a private cloud solution therefore take significantly longer to scale resources as compared to those deployed on a public cloud, which offers resource provisioning in real-time.

Another challenge is finding talent to run in-house infrastructure. There is a scarcity of talent in the market, and IT teams typically don't have the capability to run private cloud infrastructure. Hiring competent professionals well versed in cloud technology adds to overall operational costs.

As data storage is managed in-house, organizations also waste storage space for non-crucial data that is unlikely to be reused. Disaster recovery is equally at risk, as a natural disaster or fire in the data center can permanently damage backed-up data stored in-house.

2.3 Hybrid Cloud

The challenges and limitations of both the public and private cloud ultimately led to demand for an alternative model that would integrate the advantages of both traditional models to deliver the agility, elasticity, and cost-effectiveness of the public cloud, without compromising ironclad data security offered by the private cloud.

The hybrid cloud offers customers a tailored approach. It provides the flexibility to migrate and test certain data and applications on the public cloud while keeping the remaining infrastructure in a private environment.

Organizations should first determine which applications are ideally suited to public cloud, and those that require the secure environment of a private cloud. This could for example entail deploying a dynamic application with unpredictable demand on a public cloud, and deploying another application requiring high security on a private cloud. Further, an

organization can choose to host data or applications requiring high regulatory oversight on-premise.

Organizations can choose where their data is stored and deploy powerful resources to ensure maximum efficiency and minimum network latency. This optimizes their IT environment while streamlining their day-to-day operations. In short, a hybrid cloud can empower organizations to host their data as per their requirements and convenience.

Earlier, organizations facing compliance constraints might have deemed against migrating to the cloud. But with the hybrid deployment model, organizations can evaluate which sections of their business they can afford to move to the cloud, and keep the rest in-house.

A hybrid solution is also helpful for startups and small organizations experiencing rapid growth but who lack the funds to make large-scale IT infrastructure investments. Leveraging a hybrid model, these organizations can take a phased approach to cloud adoption, moving certain layers of their infrastructure to the cloud at staggered intervals.

The next consideration is data storage. Organizations generate millions of terabytes of data every day. Estimates suggest that **2.5 quintillion bytes of data** is generated daily (that's 25 followed by 18 zeros). Processing even a small portion of this data requires intense computing and storage capacity. As there is no limit to provisioning resources on a hybrid cloud, organizations can integrate data from multiple sources, and seamlessly assimilate it for analysis.

Along with improved scalability, flexibility, and centralized management, companies can continue with their legacy IT environments, as legacy applications can be integrated to run on a hybrid cloud.

Lastly, hybrid cloud adoption is expected to rise, with IDC predicting that more than **80% of Enterprise IT Organizations** will have committed to a hybrid solution by 2017.

03 Hybrid Cloud Advantages

A hybrid cloud addresses the many shortcomings and concerns associated with public and private clouds. Here we discuss the major benefits of a hybrid model.



Flexible Architecture Design

A hybrid cloud allows customers to run their workloads where it is most efficient. Organizations need to be aware of the specific infrastructure demands of their business applications and software. They can customize their architecture to ensure fulfillment of high-performance requirements through dedicated servers.

On the other hand, for short-term or unknown demands, customers can opt for the public cloud. A hybrid cloud enables the user to own the foundational infrastructure while leasing more resources to deal with spikes in traffic, ensuring they only pay for actual consumption. Flexibility in architecture design also makes it easier to integrate legacy infrastructure, as organizations can customize their deployment to best suit their existing setup.

This way organizations can meet financial targets with the help of pay-as-you-go billing. IDC estimates that organizations can save up to [24% on their IT costs](#) by deploying a hybrid cloud.



Enhanced Security and Compliance

As discussed earlier, a common concern for organizations considering the cloud is security and multi-tenancy (infrastructure serving multiple customers). A hybrid model allays these concerns by offering customers the freedom to choose a dedicated network, servers, and storage as well as restricting access to unauthorized personnel. Further, customers can synchronize dedicated cloud servers to communicate on a private network.

Doing away with multi-tenancy and opting for dedicated hardware for their critical applications also helps businesses stay in-line with regulatory and compliance guidelines for their region.



Encouraging Innovation

Hybrid cloud has given developers the flexibility to test new applications, products and services. The fast pace at which resource provisioning and de-provisioning occurs takes away the time and cost restrictions associated with scaling in-house IT resources.

This makes it simple to perform pilot projects, Proof of Concepts (PoC), and software trials. If the testing yields a successful outcome, the organization can deploy cloud and dedicated resources to continue production. If the testing is deemed unsuccessful, cloud resources can be de-provisioned and developers can move on to testing the next idea.

The fact that testing can occur without any significant upfront capital expenditure removes cost barriers to innovation.



Business Continuity and Disaster Recovery

Business continuity is a crucial requirement for organizations, and depending on the industry could be stipulated by law. Business continuity refers to resumption of business operations in the midst of an IT infrastructure failure or a disaster. It is not just about backing up and replicating data on the cloud. An ideal business continuity solution ensures data availability seconds after a disaster. Hybrid cloud solutions are a key part of any business continuity solution as they enable replication of mission critical data to cloud infrastructure present in different locations to the primary infrastructure. This provides data insurance when disaster strikes, minimizing downtime and revenue loss from disruption of business operations.



Agility Through Scalability

Traditional methods of scaling IT infrastructure are complicated, expensive, and inefficient. As they involve the procurement of new hardware, companies must determine their exact resource needs and bear the expense of owning and maintaining new infrastructure. A hybrid cloud brings important relief in this regard, as companies can be selective in what they migrate to the cloud and reduce overall capital investment. Implementation is more convenient with the use of automation rules on the cloud for resource scaling. This facilitates demand-driven usage and optimizes the underlying infrastructure for efficient performance.



Improved Time to Market

In today's digital age, disruption is normal. Businesses are required to change business models overnight to keep apace with the latest trends and avoid market obsolescence. Time to market is crucial for the prosperity of online companies. As such, the reduced deployment time offered by a hybrid cloud solution enables businesses to respond faster to changing requirements without losing their competitive edge. Companies can test, prototype and launch new offerings under very tight deadlines. Such adaptability is not practical on traditional IT infrastructure.

04 Alibaba Cloud Hybrid Cloud Solutions

Alibaba Cloud Hybrid Cloud Solutions assists users to manage challenges associated with hybrid cloud deployment. With expertise in hybrid deployments and a team of solution architects that can design solutions to meet specific requirements, users can be assured a smooth experience when deploying a hybrid cloud.

4.1 Alibaba Cloud Products

Alibaba Cloud Hybrid Cloud Solutions leverage a range of Alibaba Cloud products.



Elastic Compute Service (ECS)

ECS supports large-scale workloads on virtual machines hosted on Alibaba Cloud with resizable compute, storage, and networking capacity on the cloud.



Virtual Private Cloud (VPC)

VPC is a software defined network that enables users to provision a logically isolated private network with the flexibility to define IP ranges, subnets, and configurations of route tables and security groups. It acts as the building block, together with a VPN or Express Connect connection, to form a hybrid cloud environment.



Express Connect

Express Connect makes it easy to establish a leased line connection between your on-premise environment and Alibaba Cloud VPC. This in turn provides a highly reliable and low latency private network connection with high throughput.



Storage Gateway

Storage Gateway is a third party product that helps back-up your on-premise environments to Alibaba Cloud OSS in a secure, low-latency and cost-effective manner within a hybrid environment.



Server Load Balancer

Server Load Balancer provides a high performance and scalable load balancing service to automatically distribute incoming application traffic across multiple ECS instances. It enables fault tolerance within your applications, and

provides the required amount of load balancing capacity needed to route application traffic across healthy instances.



Auto Scaling

Auto Scaling improves application availability and allows you to scale your ECS capacity up or down automatically according to the conditions you define. This allows you to avoid over-provisioning resources when dealing with traffic spikes.

4.2 Alibaba Cloud Hybrid Cloud Solutions

4.2.1 Backend System Integration

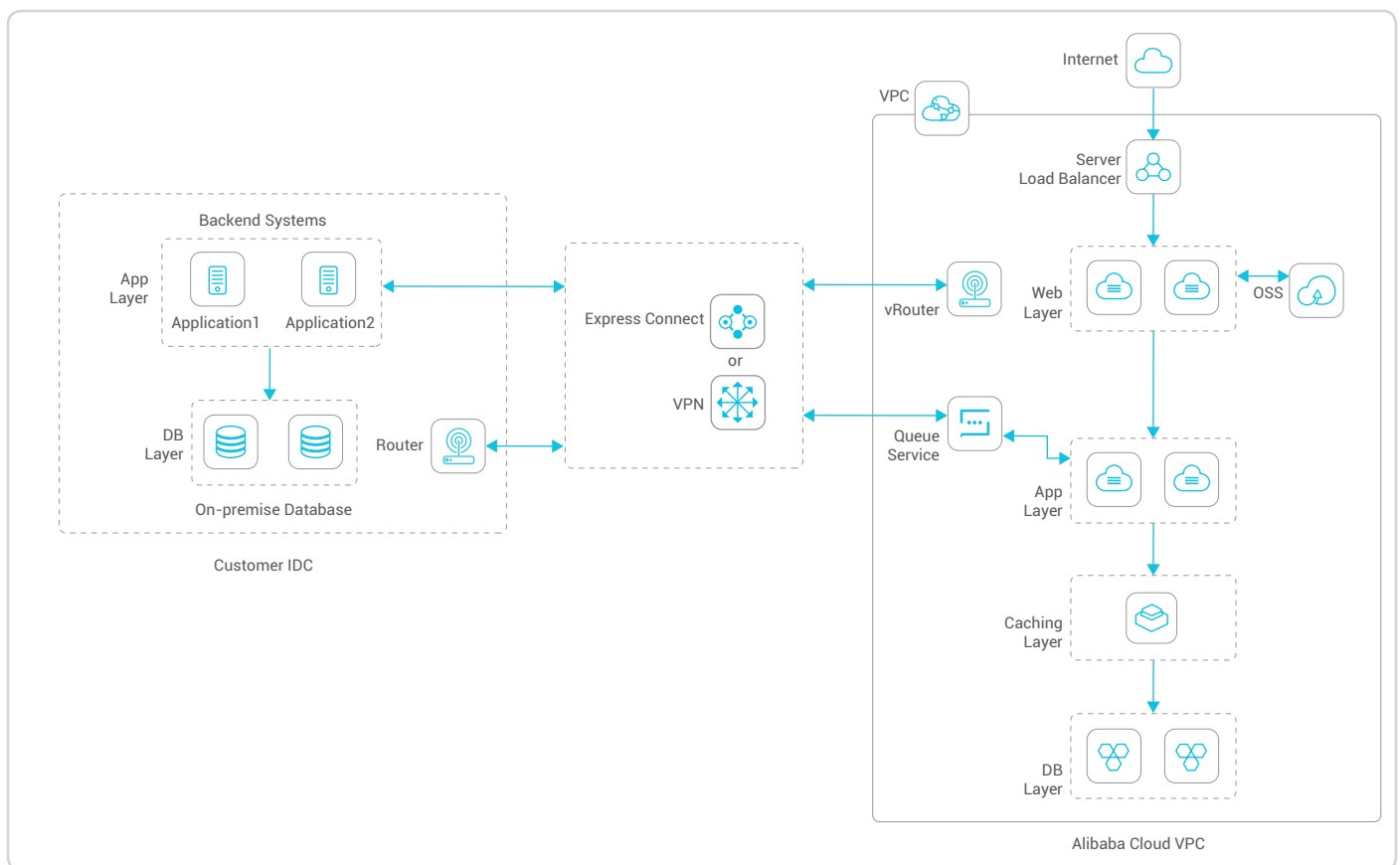


Diagram 1: Backend System Integration

This solution makes use of Alibaba Cloud ECS, VPC, and Express Connect. Upon setting up a hybrid cloud environment, the systems running on Alibaba Cloud VPC will communicate seamlessly with the backend systems running on-premise via a private network. Customers can choose synchronous or asynchronous integration through a queue service between the on-premise and Alibaba Cloud VPC environment.

Through this integration, customers can put all the cloud-ready systems within the Alibaba Cloud VPC to leverage reliable and scalable infrastructure services such as compute, storage, and networking as well as managed services such as relational database, NoSQL, and caching services. The systems running on the cloud can securely access the backend systems running on-premise to meet synchronous or asynchronous data exchange needs.

4.2.2 Cloud Backup and Recovery

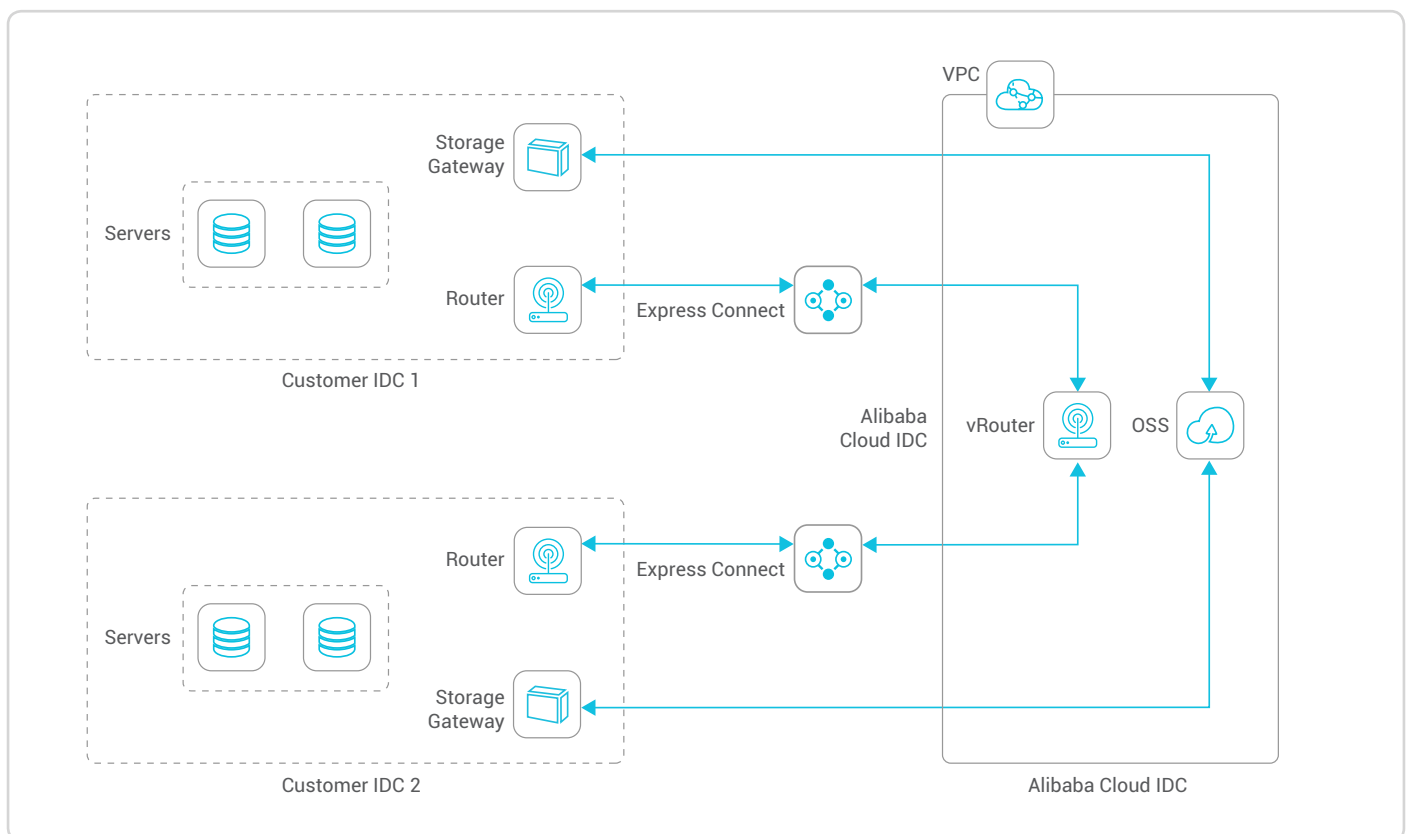


Diagram 2: Cloud Backup and Recovery

In most traditional environments, data is backed-up and sent off-site at regular intervals. With such an arrangement, it takes a long time to restore systems in the event of a disruption or disaster. Alibaba Cloud OSS is an ideal destination for backing up data that might be needed to perform a quick restore. Transferring data to and from Alibaba Cloud OSS typically occurs through the network, and is, therefore, accessible from any location. There are many commercial and open-source backup solutions integrated with Alibaba Cloud OSS. For longer-term data storage where retrieval times of several hours are required, Alibaba Cloud provides archive storage, at a much lower cost than OSS.

The backup and recovery scenario on the public cloud is achievable via a storage gateway installed on one of the customer's on-premise virtual machines and is responsible for configuring the connection to Alibaba Cloud OSS buckets. The storage gateway supports industry standard protocols such as NFS and CIFS to provide a seamless, low-latency, and secure connection between your on-premise environment and Alibaba Cloud OSS.

Storage gateway also supports local caching mode, which allows you to store primary data in OSS, at the same time keeping frequently accessed data local for low-latency access. Customers have the flexibility to allocate the local caching size without any limitations, based on their actual needs and on-premise storage capacity. Further, storage gateway usually supports both asynchronous data transmission and HA architecture.

As seen in the diagram above, Cloud Backup and Recovery solutions make use of Alibaba Cloud ECS, VPC, OSS, Storage Gateway and Express Connect.

4.2.3 Cloud Disaster Recovery

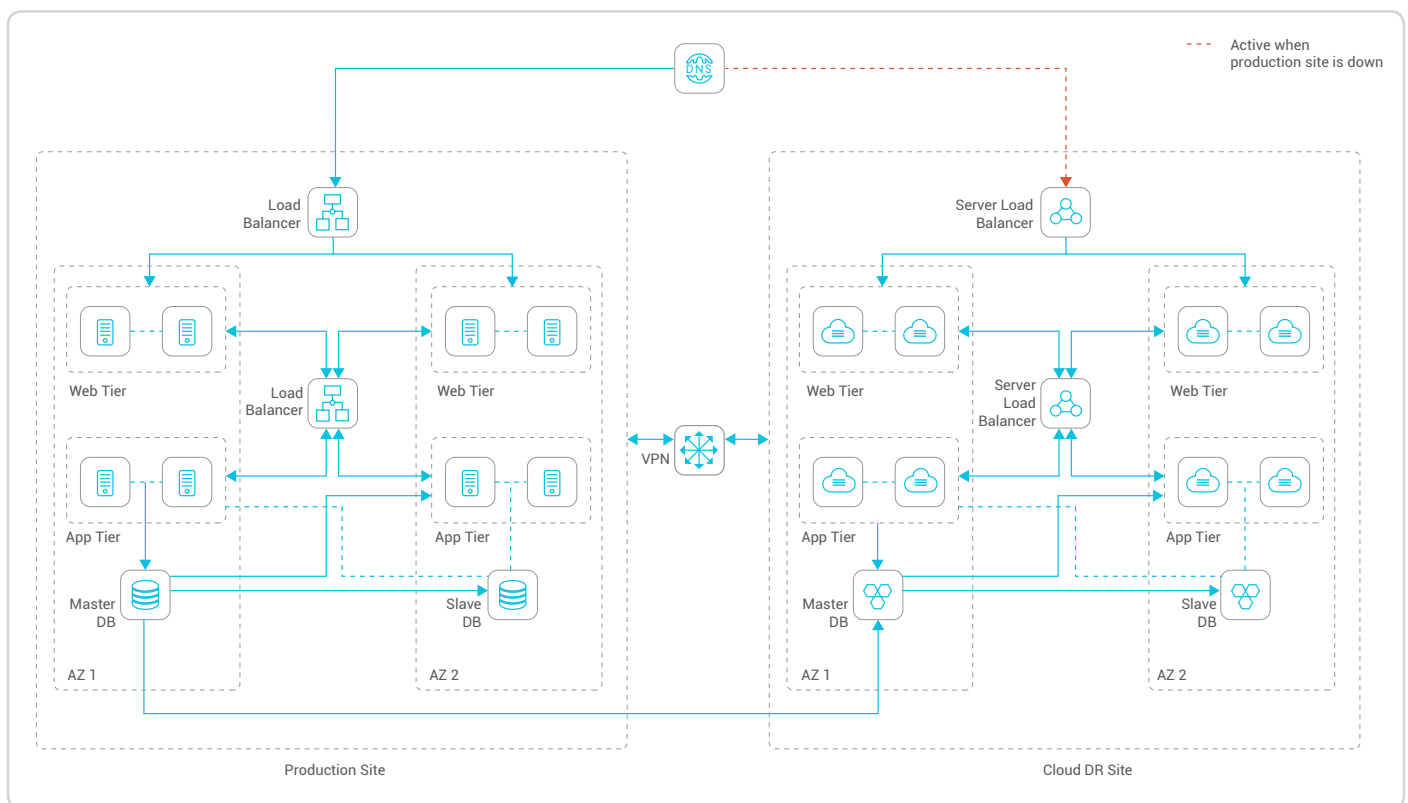


Diagram 3: Cloud Disaster Recovery

The above figure shows a common disaster recovery (DR) scenario called 'warm standby', in which a scaled-down version of a fully functional environment is always running in the cloud. A warm standby minimizes the recovery time through a mirror environment running continuously in the cloud. Application of the setup mainly occurs to mission-critical systems to meet the most stringent RTO (Recovery Time Objective) and RPO (Recovery Point Objective) targets.

These servers can run on a minimum sized fleet of Alibaba Cloud ECS instances. Despite the fact that this DR environment lacks scaling to take a full production load, it is completely functional.

In the case of failure of the production system, it scales up the standby environment for production load, and the DNS records change to route all traffic to Alibaba Cloud. This is done by adding more instances to the load balancer manually or via Auto Scaling, and by resizing the small capacity servers to run on larger ECS instance types. Horizontal

scaling is preferred to vertical scaling.

Cloud Disaster Recovery solutions leverage Alibaba Cloud ECS, Server Load Balancer, and VPC.

4.2.4 Cloud Bursting

Alibaba Cloud offers comprehensive cloud bursting solutions to ensure workloads can seamlessly move over to public cloud from private cloud/on-premise infrastructure. This way, organizations are well prepared to respond with agility to unexpected and sudden spikes in demand.

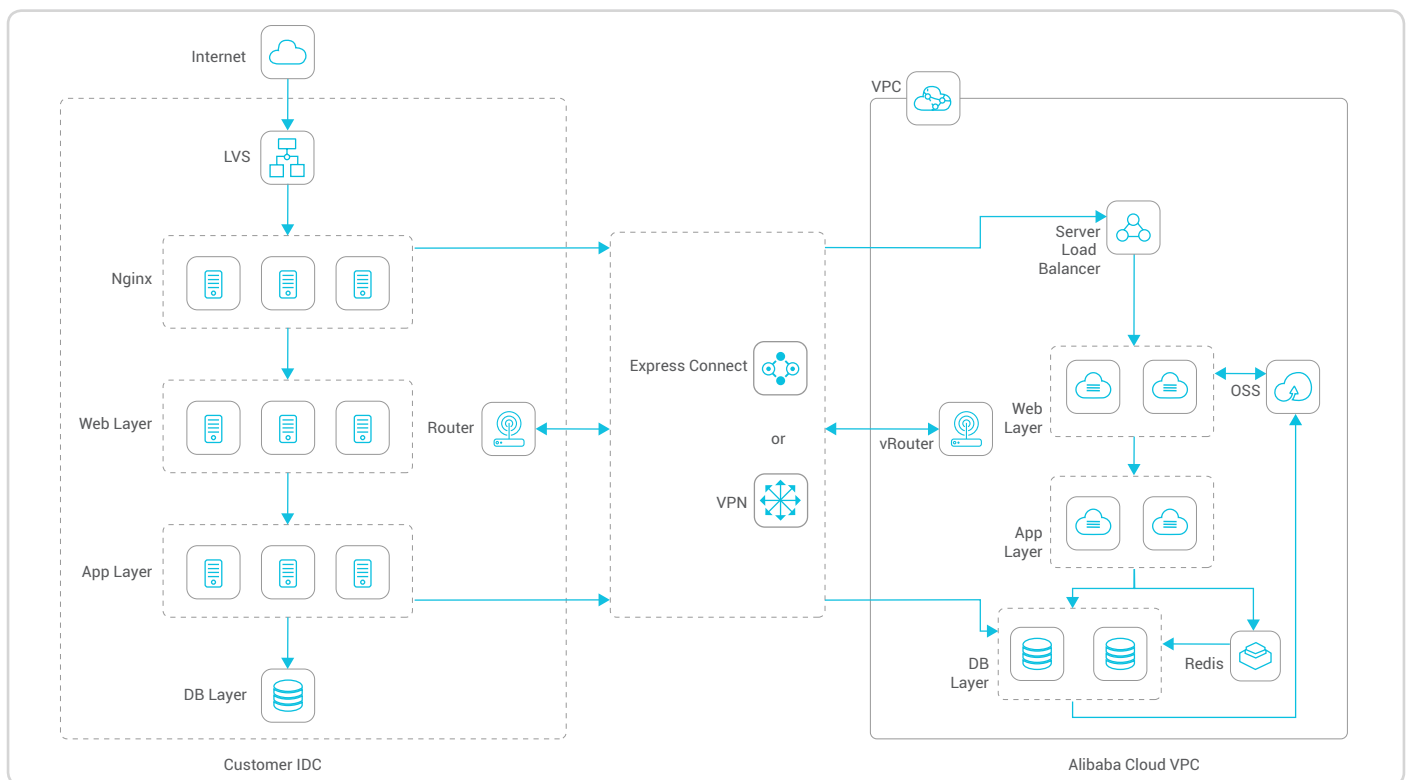


Diagram 4: Cloud Bursting

The complexity for cloud bursting lies in selecting and setting up tiered load balancers between on-premise and cloud environments. When the load on the on-premise service is low, using a Nginx or HAProxy as a single node load balancer is sufficient to handle load balancing needs. When the load increases to a level that a single Nginx node cannot handle, a load balancer that supports clustering such as LVS or a F5 reverse-proxy node (to direct the traffic to Alibaba Cloud Server Load Balancer) can be used to solve this problem.

Once the tiered load balancer is fully set up, an organization can treat Alibaba Cloud as an extension of its on-premise environment with almost unlimited computing and storage capacity to borrow when needed, without any long-term commitments.

The Cloud Bursting solution makes use of Alibaba Cloud ECS, VPC, Server Load Balancer, Express Connect and Auto Scaling.

05 Alibaba Cloud Advantages

Alibaba Cloud Hybrid Cloud Solutions provide customers state-of-the-art connectivity solutions with enhanced security (for data and network) to ensure smooth integration between an organization's on-premise/private cloud and public cloud, without any regulatory and compliance concerns. Customers benefit from minimum network latency and high data transfer rates for migrating data from private to public cloud. Here we look at features that make Alibaba Cloud stand out from other service providers offering hybrid cloud solutions.

5.1 Equinix Cloud Exchange

Equinix is one of Alibaba Cloud's global interconnect partners, and Equinix Cloud Exchange acts as one of the leased line connectivity options to form a hybrid cloud environment with Alibaba Cloud VPC. Once a customer decides to form a hybrid cloud with Alibaba Cloud using the leased line, they need to evaluate whether they want to form an IPLC or MPLS connection directly with Alibaba Cloud or via an interconnected partner such as Equinix Cloud Exchange.

The decision is largely a factor of cost and convenience in connectivity. For example, suppose the customer is already using Equinix in a certain region for its co-location service and would also like to form a hybrid cloud with Alibaba Cloud in that region. If Alibaba Cloud is connected with Equinix in that region and has registered for the Equinix Cloud Exchange service, the customer will only need to do a cross-connect at Equinix to get a hybrid cloud setup physically. Hence, customers can choose the way to move forward, safe in the knowledge that both approaches are equally feasible.

The Equinix Cloud Exchange (ECX) arms Alibaba Cloud with a multitude of private network connectivity options, ensuring customers a more feature rich solution. The egress network bandwidth of the software VPN is limited to 200 Mbps but can be extended to 500 Mbps.

5.2 Superior Connectivity through Express Connect to Alibaba Cloud VPC

Alibaba Cloud Express Connect streamlines the process of establishing a dedicated connection between your on-premise environment, such as your IDC or colocation centers and Alibaba Cloud VPC, establishing private connectivity for those environments. Compared to an Internet-based VPN connection, a private connection is more reliable with higher bandwidth and lower cost.

Alibaba Cloud Express Connect allows customers to establish dedicated private network connections of up to 10 Gbps between Alibaba Cloud VPC and the customers' on-premise environments through Alibaba Cloud Express Connect locations. Express Connect leverages industry standard VLANs to access Alibaba Cloud resources, such as ECS and RDS, running within an Alibaba Cloud VPC using private IP addresses. Customers have the flexibility to choose from

a list of preferred local NSPs to integrate their on-premise environments with Alibaba Cloud Express Connect locations.

5.3 Advanced Security through VPN connectivity

Alibaba Cloud VPC provides customers the flexibility to fully manage both sides of VPC connectivity through two different methods:

- Creating a VPN connection between the external network and a software VPN instance running on Alibaba Cloud VPC. The software VPN connectivity solution is recommended mainly to meet the security and compliance needs of businesses not having a high demand for network reliability and low egress network traffic needs.
- Creating remote-access VPN connections between customers' desktop, laptop, and mobile clients and a software remote-access VPN instance running on Alibaba Cloud VPC. This connectivity solution is ideal for companies who do not want to compromise on security, while providing remote network access to employees or allowing admins to maintain on-premise environments remotely.

Customers can choose from a wide range of software VPN applications that run on Alibaba Cloud ECS, including popular open-source tools such as Openswan and OpenVPN, as well as commercial products from Cisco, Check Point, and Sophos. By choosing this option, customers take the responsibility to manage the software VPN appliance including the setup, configuration, patches, and upgrades.

06 Alibaba Cloud Advisory for Hybrid Cloud Deployment

There are many important things, both technological and business-related, that an organization should evaluate and consider in regards to hybrid cloud deployment. Alibaba Cloud, with its expertise and experience in assisting customers to deploy hybrid cloud environments, suggests the following recommendations for organizations contemplating a hybrid cloud solution:

6.1 Opting for Leased Line or VPC

The communication latency and stability among systems running on your on-premise environment are usually superior to communication between on-premise and cloud environments. If requirements for bandwidth, latency, and stability are high, a leased line connection is a better option. In fact, most public cloud providers charge for egress network traffic. Therefore, if bandwidth requirements are high, setting up a VPN tunnel over the Internet adds to the total cost.

Asking yourself and clarifying the following points can help you make the right decision:

- Whether a dedicated network connection over private fiber is required?
- Whether predictive network performance is critical?
- Is a connection bandwidth of higher than 50Mbps required?

As illustrated in the table below from Gartner, 1-Gbps links support 4TB of daily incremental backups within 12 hours. With a 3% daily change rate, 4TB of daily incremental equals a 133TB production environment. Thus, 10-Gbps links support backup of a petabyte production environment within 12 hours.

Network Speed	50 Mbps	100 Mbps	500 Mbps	1 Gbps	10 Gbps
Theoretical Effective Throughput (80% of Line Speed)	5 MBps	10 MBps	48 MBps	96 MBps	954 MBps
Backup Data Size	Implied Backup Window				
10 GB	35.0 min	17.4 min	3.5 min	1.7 min	0.2 min
100 GB	5.8 hrs	2.9 hrs	34.7 min	17.4 min	1.7 min
500 GB	1.2 days	14.5 hrs	2.9 hrs	1.4 hrs	8.7 min
1 TB	2.4 days	1.2 days	5.8 hrs	2.9 hrs	17.5 min
10 TB	24.3 days	12.1 days	2.4 days	1.2 days	2.9 hrs

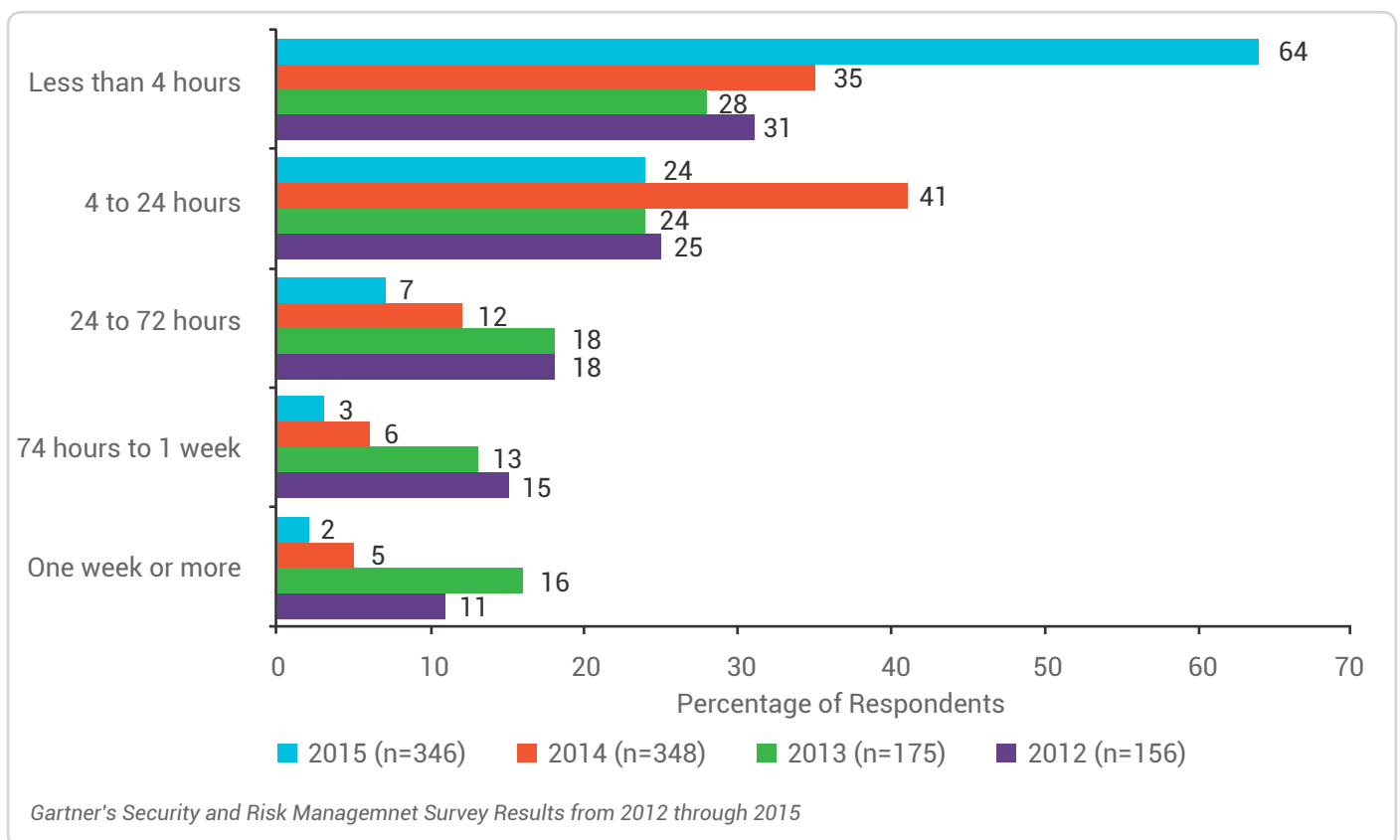
Mbps - Megabit per second
MBps - Megabytes per second

Source: Gartner(September 2015)

6.2 Have Clear RTO and RPO Targets

The Recovery Time Objective (RTO) is the maximum time a product or application can remain out of service, after which it needs to be restored, while the Recovery Point Objective (RPO) is the maximum data that an organization can afford to lose during downtime. Organizations should have clear figures in mind, depending on expected usage of applications on the cloud, and how critical they are to the business.

Below are the results of Gartner's survey regarding organizations' planned RTOs over the past few years. The emerging trend shows that organizations expect to recover disrupted data and overcome downtime much more quickly than in previous years.



Source: Gartner(January 2016)

6.3 Infrastructure Strategy

6.3.1 Monitoring

Traditionally, IT departments procured computing resources to meet peak workloads. However, if business demands are volatile with traffic spikes and lulls, this is neither cost-effective nor efficient. Resources would either be unused during periods of low demand, while under high traffic the organization would struggle with latency due to over-burdening of the underlying infrastructure. The hybrid cloud can help overcome this challenge.

Enterprises should put in place a workload monitoring system to monitor usage or load metrics for servers, network, storage systems, database, and hypervisors so a proper threshold can be setup to determine the minimum on-premise capacity. Cloud bursting can take care of resource expansion when demand is on the higher side.

6.3.2 Disaster Recovery Readiness

Organizations need to be ready to leverage a hybrid cloud in case a disaster strikes to minimize downtime and ensure business continuity. It is therefore important to consider the organization's scaling strategy and DNS strategy.

- **Scaling Strategy:** Warm standby can be used to provide a minimum setup running in the cloud and ensure the DR solution remains cost-effective. When disaster strikes, the organization will need to deploy applications on larger ECS instance types (vertical scaling) and increase the size of the ECS fleets in service with the Server Load Balancer (horizontal scaling).
- **DNS Strategy:** During a disaster, organizations need to switch their DNS records. This involves both careful planning and testing. Options include manual migration, or using DNS health checks to automate the traffic switch towards the Alibaba Cloud environment.

07 Conclusion

A hybrid cloud offers organizations the benefits of both a public and private cloud model to deliver agile, elastic, and secure cloud solutions at lower costs. Businesses are able to innovate with faster go-to-market strategies and respond with agility to changing market dynamics, increasing their competitiveness. Business continuity through disaster recovery is another benefit to the organization.

There are certain steps organizations should take before adopting a hybrid cloud. These include an assessment of existing software and applications to determine those ideally suited for public cloud deployment, and those that need to be kept on dedicated infrastructure. Businesses can start by moving a small part of their workload to the cloud, and optimize along their way to full-scale deployment.

Alibaba Cloud offers highly reliable and secure hybrid cloud deployment solutions, with a focus on allaying organizations' concerns regarding availability, security and connectivity. Leveraging products such as ECS, VPC, Storage Gateway and Express Connect, numerous solutions are available to oversee migration and setup including Cloud Bursting, Backend System Integration, Disaster Recovery, and Cloud Backup. These solutions in turn enable organizations to fully experience the unique benefits of the hybrid cloud.

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