

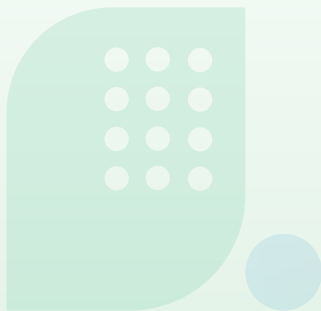


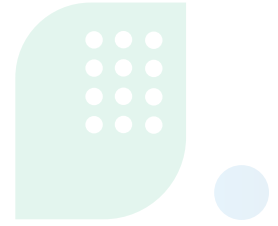
# CLOUD NETWORKING

• WHITE PAPER •



Next-generation connectivity.  
Instantly.



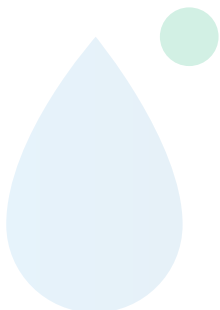


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# BACKGROUND

The network has emerged as a critical foundation for today's digital enterprises. However, the branched architecture of interconnected networks has hardly changed since the 1990s. Most businesses today still use private networks with Multi-Protocol Label Switching (MPLS), which offer enhanced reliability and security.

But now, this trend is starting to change. **Application traffic and big data have exploded in recent years due to the growth of the Internet of Things (IoT) and digital transformation.** Many companies are finding their current network models can no longer accommodate their growing needs. MPLS usage is now declining due to high deployment and maintenance costs, and its inability to support rising workloads.

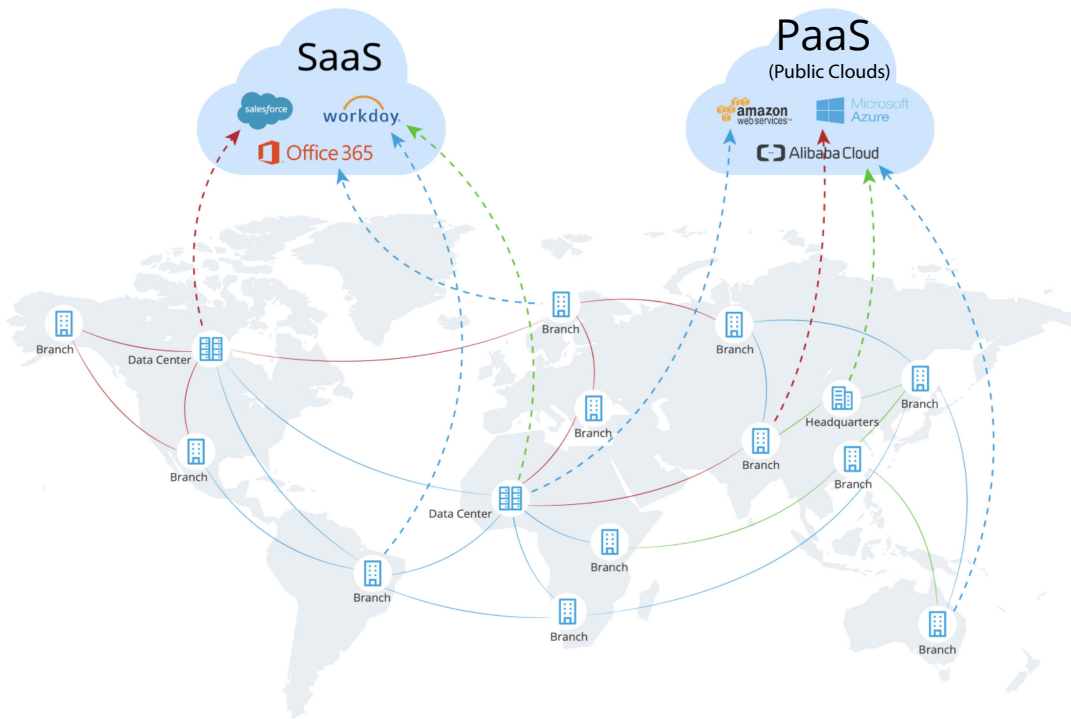


Figure 1. Architecture of a traditional MPLS network

To tackle this challenge, Zenlayer offers Cloud Networking, which is a global on-demand, full-mesh network as a service (NaaS) solution that provides instant connectivity to public clouds, private clouds, and Points of Presence (PoPs). Cloud Networking leverages Zenlayer's vast global network, which spans six continents and offers over 270 PoPs and 37+ Tbps bandwidth. Cloud Networking minimizes latency and lowers data transfer times for applications and digital platforms, guaranteeing strong digital experience.

## This white paper explores:

- Top networking challenges that businesses face in the cloud
- How Zenlayer Cloud Networking helps overcome these challenges
- Key product features for Zenlayer Cloud Networking
- Product application scenarios
- Examples of how customers are using Zenlayer Cloud Networking

## COMMON ENTERPRISE NETWORKING CHALLENGES

### ■ High costs

Many enterprises have distributed branches or data centers spread across multiple locations. To ensure network quality and performance, companies must add gateways, Wide-Area Network (WAN) accelerators, and other optimized network equipment. Adding links and making upgrades requires purchasing new equipment and link resources, which in turn leads to higher operational and maintenance costs.

### ■ Long response cycles

Responsiveness and agility go hand-in-hand. In other words, companies need to respond quickly to unexpected events, and when new business opportunities arise. Being able to respond quickly can be a major competitive advantage. However, many companies are unable to move with agility due to the time it takes to deploy traditional MPLS services. In fact, it can take three to six months on average to deploy new sites.

### ■ Rising network complexity

Given the ever-growing demand for agile connectivity between multiple branches and platforms in the enterprise, it's necessary to route and back up critical business applications with multiple network links. This causes network complexity to increase. As companies integrate more PoPs and users, they are being forced to seek solutions that are more efficient and allow for easier operations and maintenance.

### ■ Lack of flexibility

As enterprises become increasingly global, many are deploying business systems in the cloud. However, traditional MPLS is incompatible with cloud networking while enterprise data can only be transmitted through the internet, which makes it impossible to ensure network performance and security. There is an urgent demand for alternative solutions that are more flexible and cost-effective than MPLS.

### ■ Growing demand for L3 private lines

Solutions that are based on OpenFlow's transmitting and control technology can only provide "peer-to-peer" L2 connectivity. Currently, to meet clients' demand for L3 private lines, fully meshed L2 lines or non-standard equipment will have to be used.

### ■ Increasingly high bursts of traffic

Unpredictable high bursts of client traffic place higher demands on the performance of line repeaters, but the performance of current white-label OpenFlow switches can hardly meet the real traffic requirements.

## PRODUCT OVERVIEW

Zenlayer built its Software-Defined Networking (SDN) 2.0 global backbone using the OpenFlow network model. It uses Segment Routing (SR) as the underlying protocol, which is a source routing protocol in which the source node specifies the transmitting path and converts the path into an ordered segment list before being encapsulated into the message header.

The intermediate nodes of the path only need to be transmitted in line with the segment list in the message header. Based on SDN architecture, SR combines autonomous transmission and centralized device control to realize application-driven networks better.

Two sets of control planes, centralized SR and distributed MPLS, can be formed in the whole network. The centralized SR control plane has higher priority to guide the devices perform packet forwarding. Meanwhile, the distributed MPLS control plane is used as a backup with low priority in case of the failure of the SR control plane. The whole scheme not only features the global and flexible control capability, but also ensures reliable backup capability in case of failure.

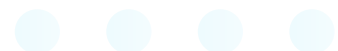
## PRODUCT FEATURES

### Global Connectivity

Zenlayer's 270+ edge nodes are located near PoPs in key markets, covering emerging economies such as China, India, Southeast Asia, South America and the Middle East. Zenlayer is also connected to leading cloud services such as AWS, Google Cloud, Alibaba Cloud, Tencent Cloud, Huawei Cloud, and IBM Cloud.

### Ultra-Low Latency

Zenlayer provides instant, on-demand networking to avoid the congestion of public internet strategically and reduce latency by 30-80% during rush hours. Besides, all routes feature full redundancy, failover protection, and high availability with 99.99% uptime.



### Full-mesh Network

Each node or PoP can be interconnected in Zenlayer's high-performance, full mesh L3 network. These connections make the network very flexible in routing data, thus reducing latency and costs while boosting data transmission speeds.

### Simple and Extensible Data Planes

Zenlayer simplifies the control plane. For instance, it is no longer necessary to deploy complex protocols like Label Distribution Protocol (LDP)/Resource Reservation Protocol for Traffic Engineering (RSVP-TE) in MPLS networks. Instead, it only requires devices to achieve label distribution and synchronization through the extension of SR by Interior Gateway Protocol (IGP).

Further, Zenlayer reduces the number of routing protocols, simplifies operation and maintenance management, and reduces operation costs. The label forwarding table is simple, extensible, and small, with the number of forwarding tables maintained on one device being  $N$  (i.e. the number of node labels, which is typically the number of nodes in the whole network) +  $A$  (i.e. the number of neighboring label data, which is typically the number of device interfaces), compared to  $N^2$  for traditional MPLS networks.

### Intelligent Scheduling of Traffic

As the control plane of Segment Routing, the SDN controller can dynamically select the optimal path for user packets according to different application requirements and scheduling policies, translate the path information into a segment list, and distribute to devices to flexibly control the packet transmission.

### Network Reliability

The SDN controller ensures the reliability of the transmitting path by calculating the primary and backup paths separately for different application requirements. In the SR network, the convergence and switching of primary and backup links are completed in just milliseconds, with no impact on the forwarding of service traffic.

# APPLICATION SCENARIOS

Zenlayer provides clients with solutions to meet demands in various scenarios, through SDN Cloud Networking technology and proprietary solutions.

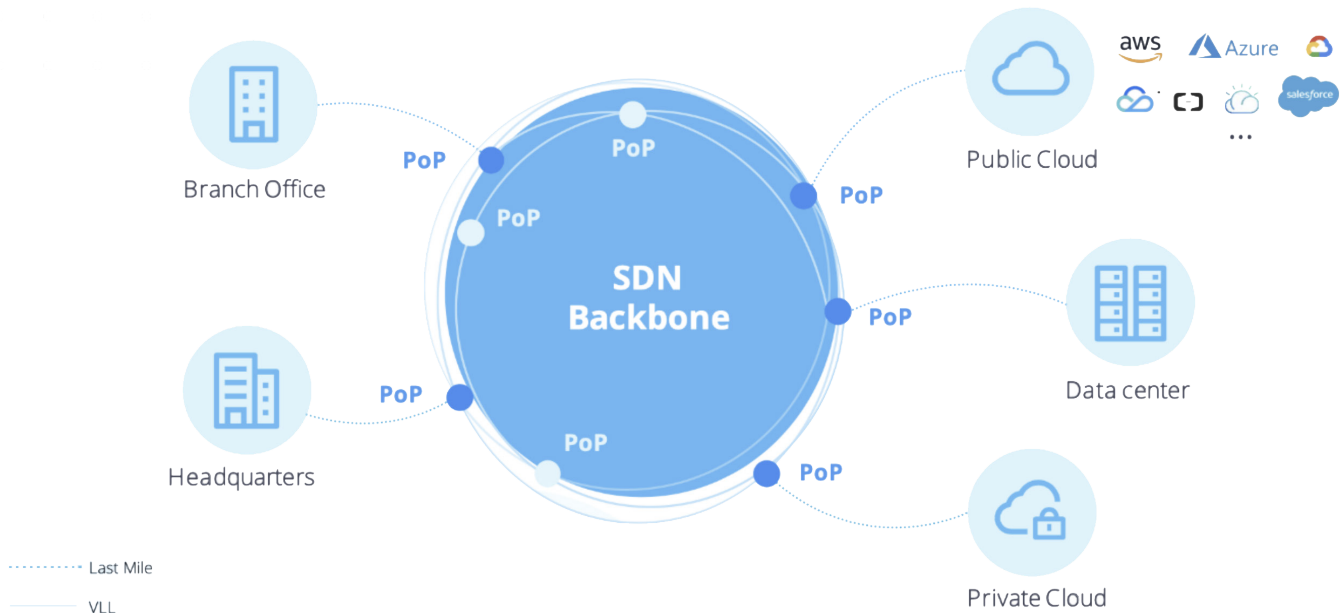


Figure 2. Business scenarios of cloud networking

## Typically, there are the following four scenarios:

### ■ SITE TO SITE

Zenlayer enables site-to-site connectivity between corporate headquarters and data centers, between corporate headquarters and branches, between data centers, etc., as needed.

### ■ MULTI-SITE TO MULTI-SITE

Zenlayer enables connectivity from multiple sites as needed, such as connections between corporate headquarters and data centers, between corporate headquarters and branches, and between data centers.

### ■ MULTI-SITE TO CLOUD

Zenlayer enables connectivity from multiple sites to the cloud as needed, such as connections between data center and public cloud, between data center and private cloud, between enterprises and public cloud, and between enterprises and private cloud.

### ■ CLOUD TO CLOUD

Zenlayer enables connectivity between multiple clouds as needed, such as connections between public clouds, between public clouds and private clouds, and between private clouds.

# Zenlayer Cloud Networking

## Zenlayer Global Coverage

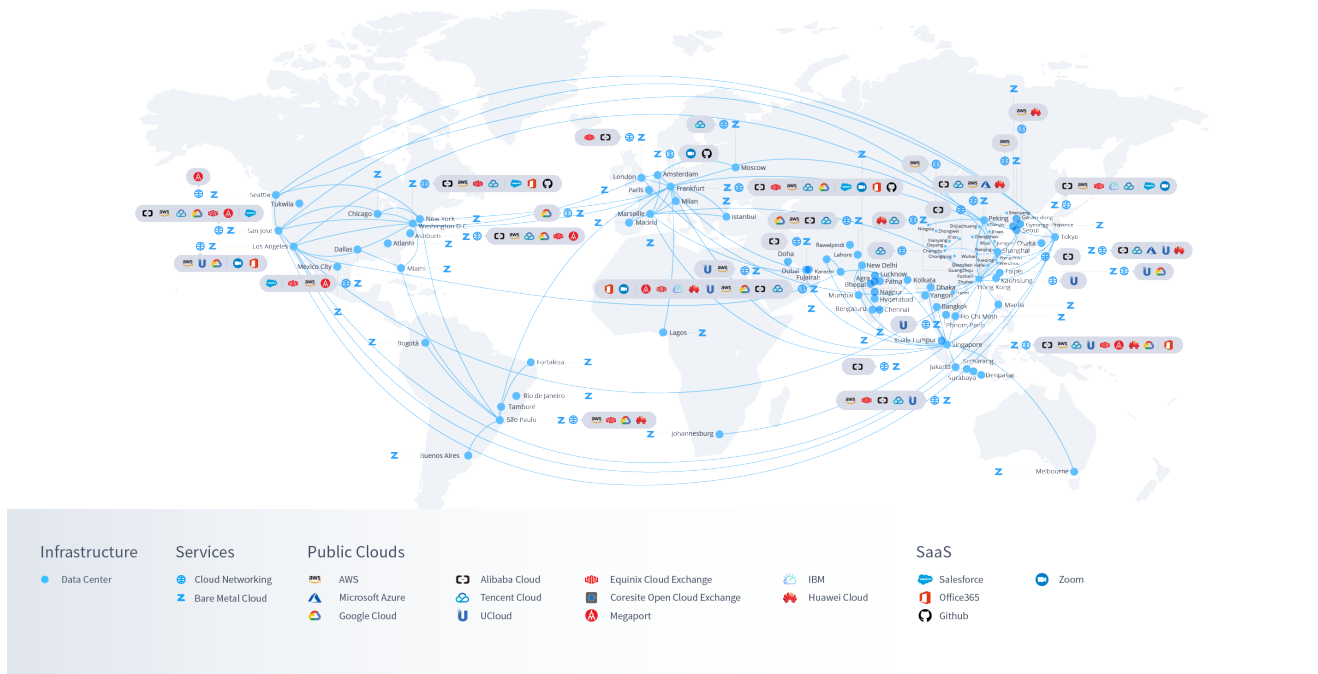


Figure 3. Distribution of cloud networking resources

With Zenlayer Cloud Networking, you can quickly create business connections and improve the business experience for global users. **Key advantages include:**

- **The provision of total solutions**, in addition to Bare Metal Cloud, IP Transit, Distributed Denial-of-Service (DDoS) Protection, and other supporting programs.
- **Independently developed core SDN products** that allow for flexible configuration and rapid delivery.
- **The ability to meet rapidly changing needs**, such as the demand for setting up and adapting new PoPs and cloud connections.
- **Reduced costs**, with the deployment costs being about 2.5 times lower than traditional approaches.
- **Simplified network management**, which is enabled by a core management system that monitors all network activities and supports remote troubleshooting.
- **Automated intelligent routing** that optimizes network traffic and improves bandwidth resource utilization through metrics such as latency, bandwidth and packet loss.
- **Abundant resources**: Hundreds of global data centers and cloud connections, which allow for redundancy in more than 80% of business lines and give clients more options.





### Case One

Zenlayer helps a popular gaming company significantly upgrade digital experience for global players

## Customer Overview

The client provides cloud acceleration services for various internet real-time interactive applications. The core products are some game acceleration- related products.

The customer accesses games through an accelerator but the expected acceleration effect is not achieved, and the connection will still be stuck and dropped. The customer needs an easy-to-use Operations and Maintenance (O&M) platform to view performance metrics.

## Solutions

### Dedicated Network Connection

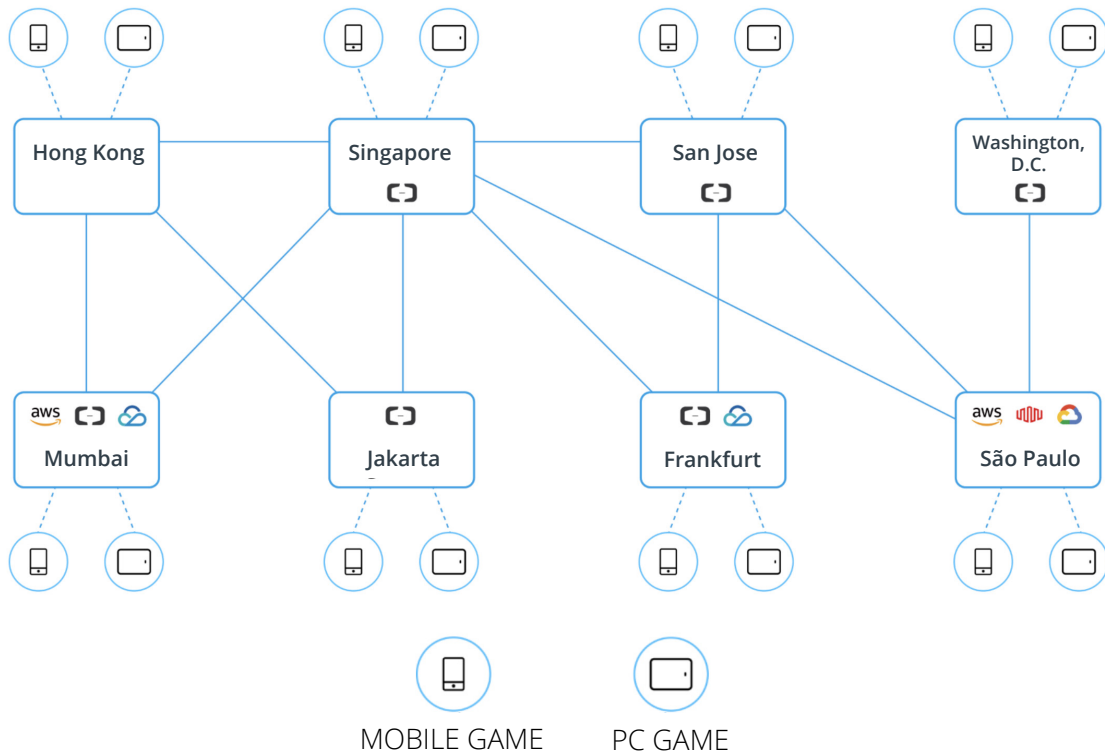
For the customer's access site, Zenlayer provides access to PoP nodes on its local backbone network, and full dedicated interconnection between the PoP nodes which guarantee strong network quality.

### Visual Portal Management

Zenlayer provides visualized O&M management data (including traffic, packet loss, latency, etc.). Zenlayer also supports quick and flexible service activation, as well as real-time and online adjustment of the service bandwidth, making it convenient for customers to make business adjustments.

### Highly Network Availability

Zenlayer cloud-connected PoPs are directly protected by multiple lines, ensuring continuity of network usage for customers.



## Solution Results



Client access latency decreased by 20-40%.



Jitter decreased by 30-50%

0%

Packet loss rate reduced to 0%



Gaming client satisfaction is significantly higher.



### Case Two

Zenlayer helps a video conferencing platform build a global private network to improve conferencing quality and user experience

## Customer Overview

The customer is a world-renowned audio-video conferencing and service provider and targets its business mainly at enterprises. The client's access to cross-border audio and video services (especially cross-border services for China) over the public network is highly susceptible to interference and jitter.

As a result, the customer needs a network with consistent quality that meets the following requirements:

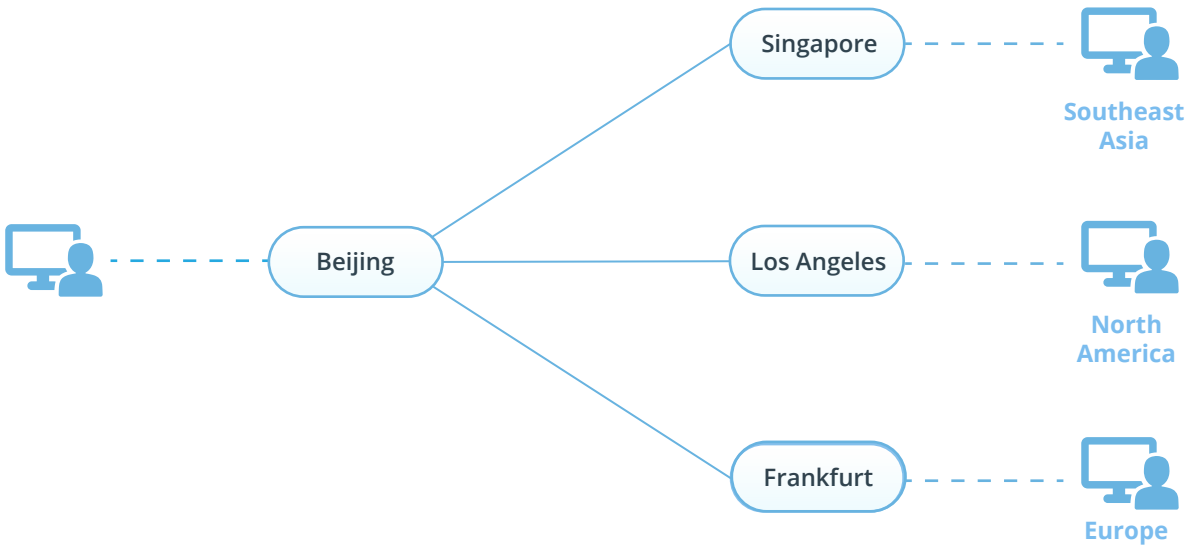
The optimal latency for video conferencing is less than 100 ms, with a maximum acceptable latency of 200 ms;

Data packet loss must be less than 1%.

## Solutions

**Dedicated network:** Zenlayer provides dedicated connections between Beijing and Singapore, between Beijing and Los Angeles, and between Beijing and Frankfurt to ensure ultra-low latency and superior network reliability.

**Visual management:** Zenlayer enables simple and flexible network management through connections from its clouds to portals, so that services can be quickly deployed and activated.



## Solution Results

 Latency decreased by 35%.

 Jitter decreased by 50%



## ZENLAYER CLOUD NETWORKING

### TURBOCHARGE CONNECTIVITY TO CLOUD SERVICES

Cloud Networking is a helpful service for any organization that needs to connect data centers, cloud services, and other solutions. You can use Cloud Networking to connect directly to public and private clouds, especially in emerging markets throughout places like the Asia-Pacific, Latin America, the Middle East, and Africa.

For further questions, please reach out to [sales@zenlayer.com](mailto:sales@zenlayer.com). You can also learn more about Cloud Networking by visiting our [product page](#).