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04 Introduction to CDN

Course Objectives

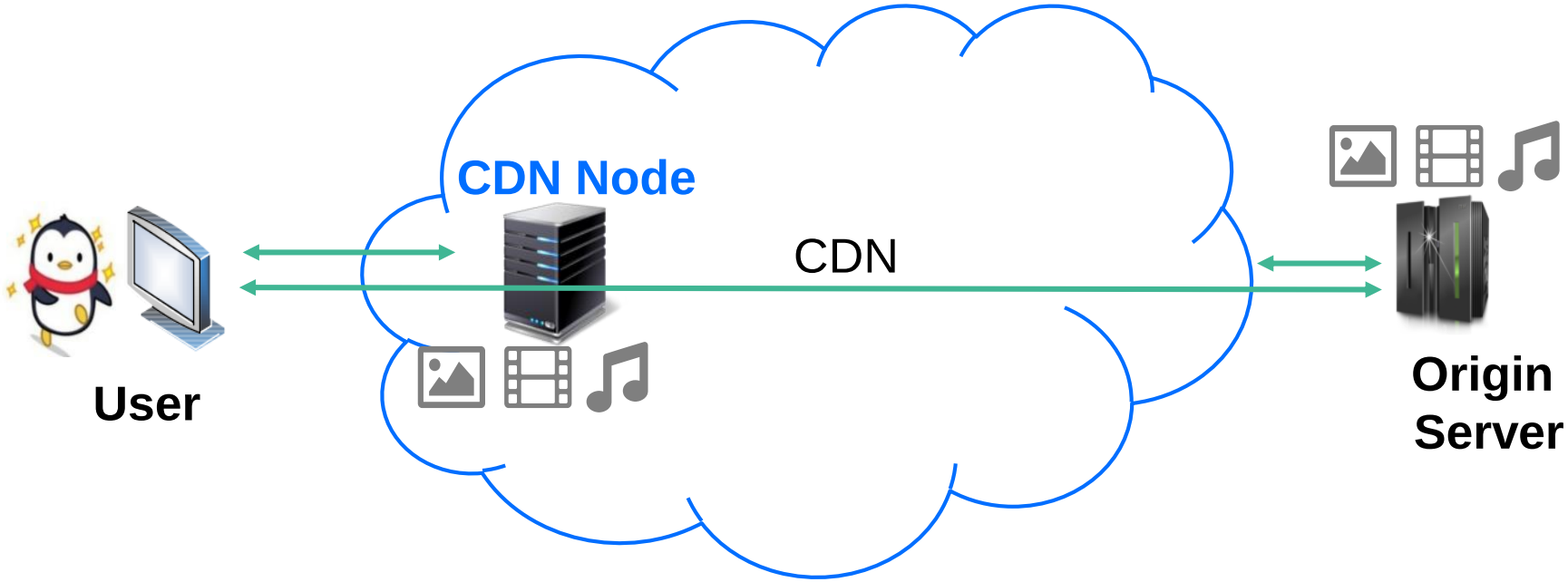
- At the end of this course, you will have a better understanding of:
  - The basics of CDN and how it works
  - The architecture of Tencent Cloud CDN
  - The security mechanisms of Tencent Cloud CDN
  - Tencent Cloud CDN products
  - Tencent Cloud CDN billing plans

Contents

Chapter 1 CDN Basics

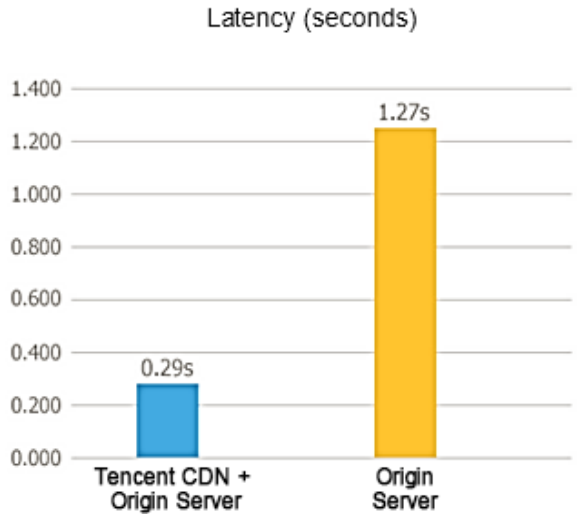
1.1 What Is a CDN?

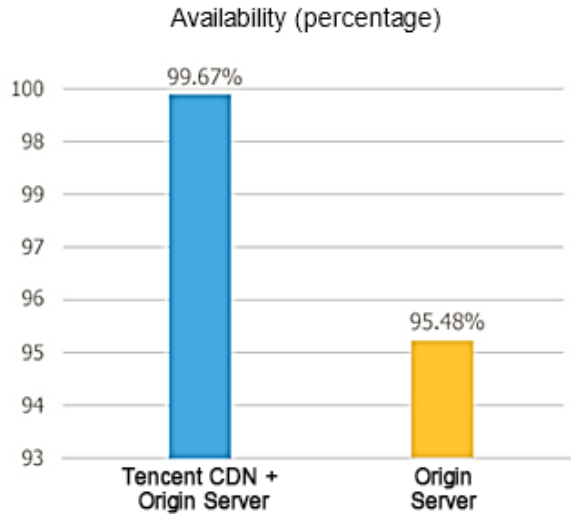
A content delivery network (CDN) is a cluster of distributed servers that accelerate the delivery of content to users in different locations. It consists of nodes in different geographic locations and delivers content to users based on their locations, the origin of the desired content, and the node that hosts the content.



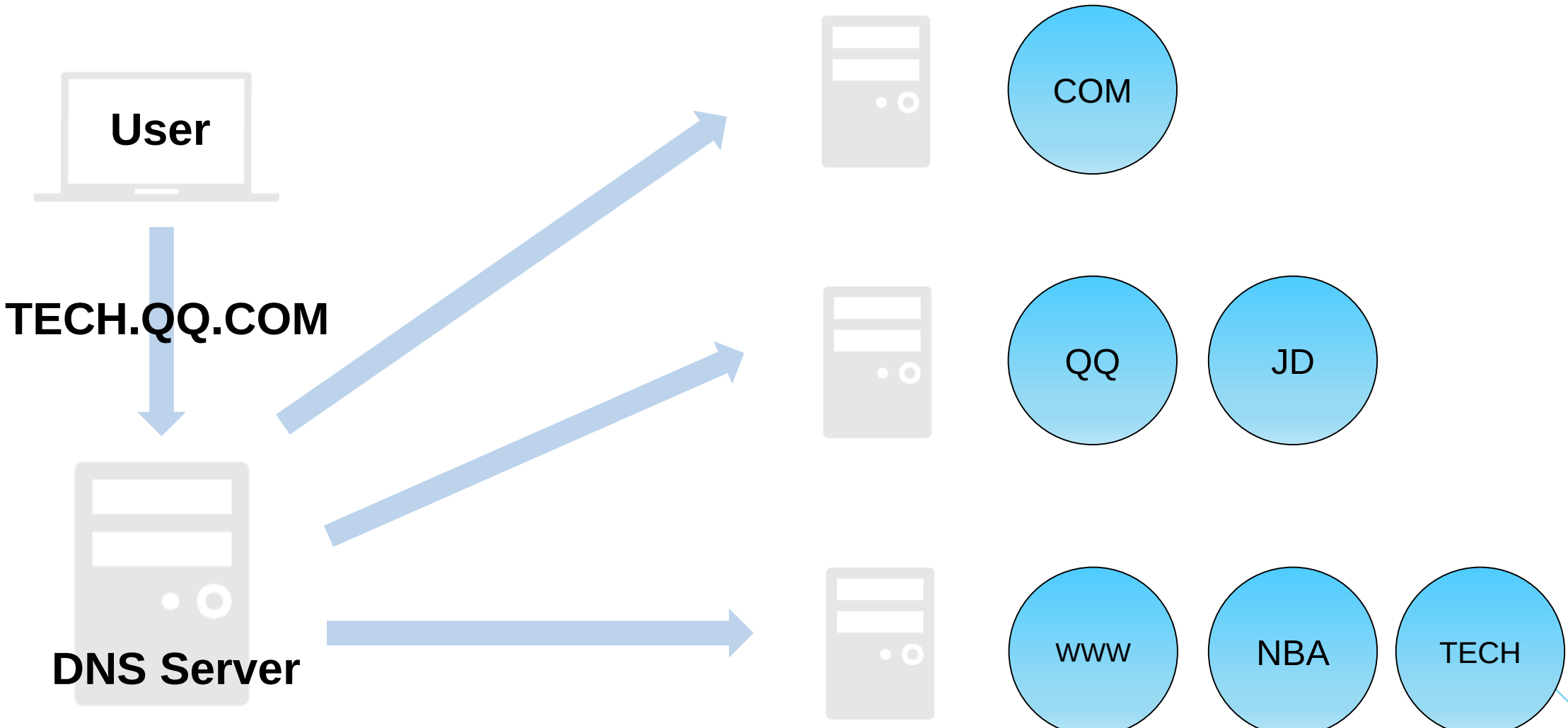
1.2 Why Use a CDN?

- A CDN is applicable to the following scenarios:
  - The user and the server are physically distant, which involves multiple forwarding events, resulting in high latency and unstable connection.
  - Packets are forwarded between different carriers if the user and the server are located in different carrier networks.
  - Network bandwidth and processing capacity are limited for a single server or a group of servers hosted in the same region. As the number of requests increases, the responsiveness and availability decrease.

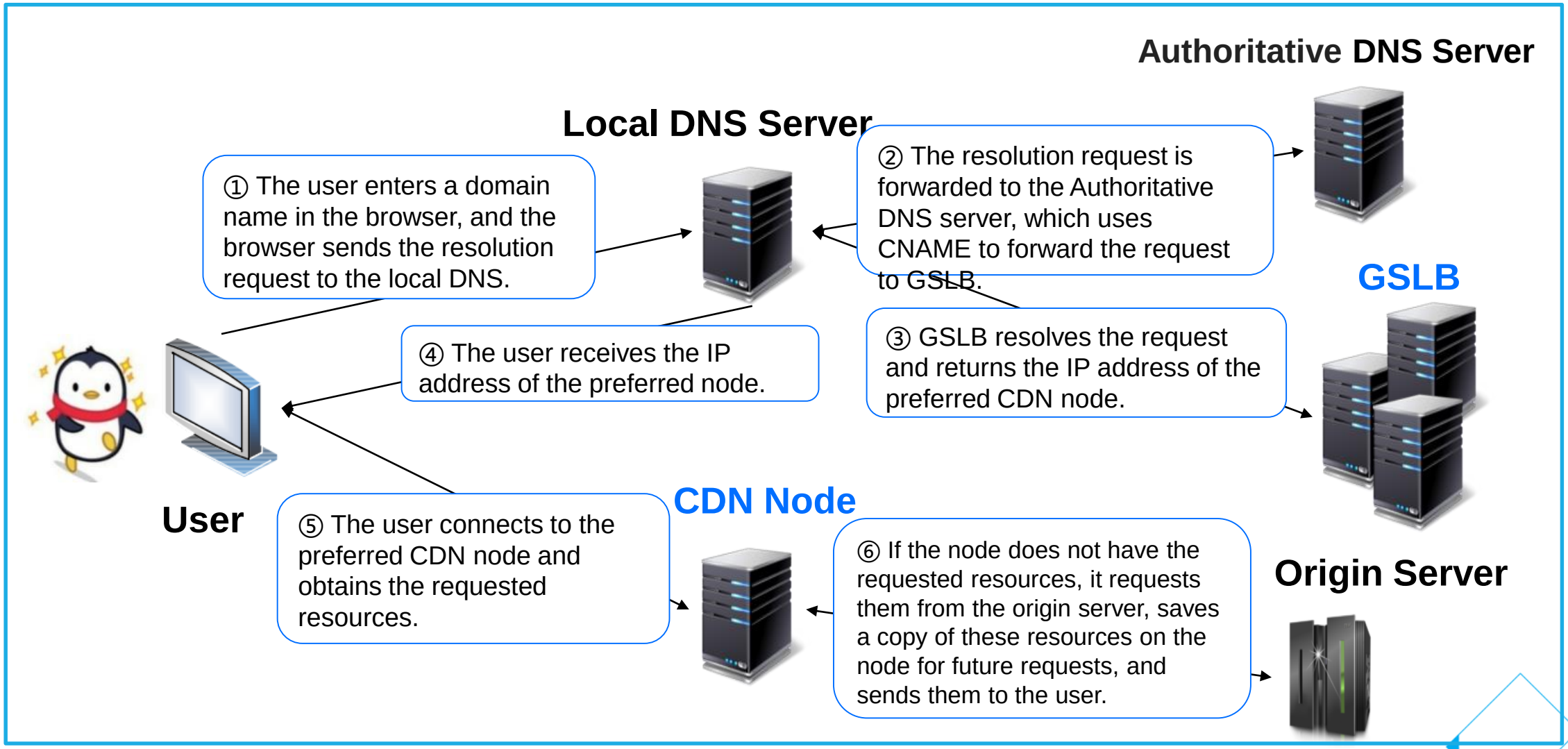




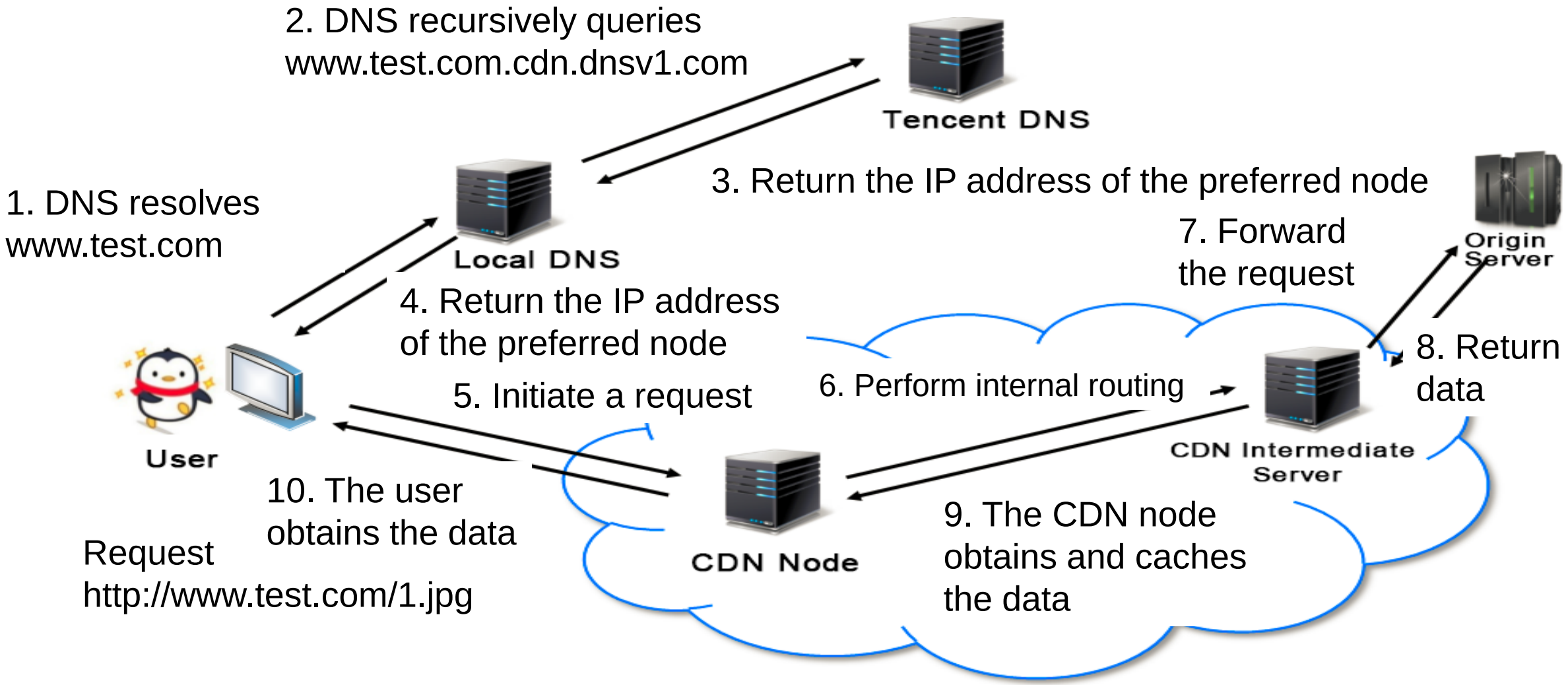
1.2.1 Why Use a CDN: How a Traditional Network Works



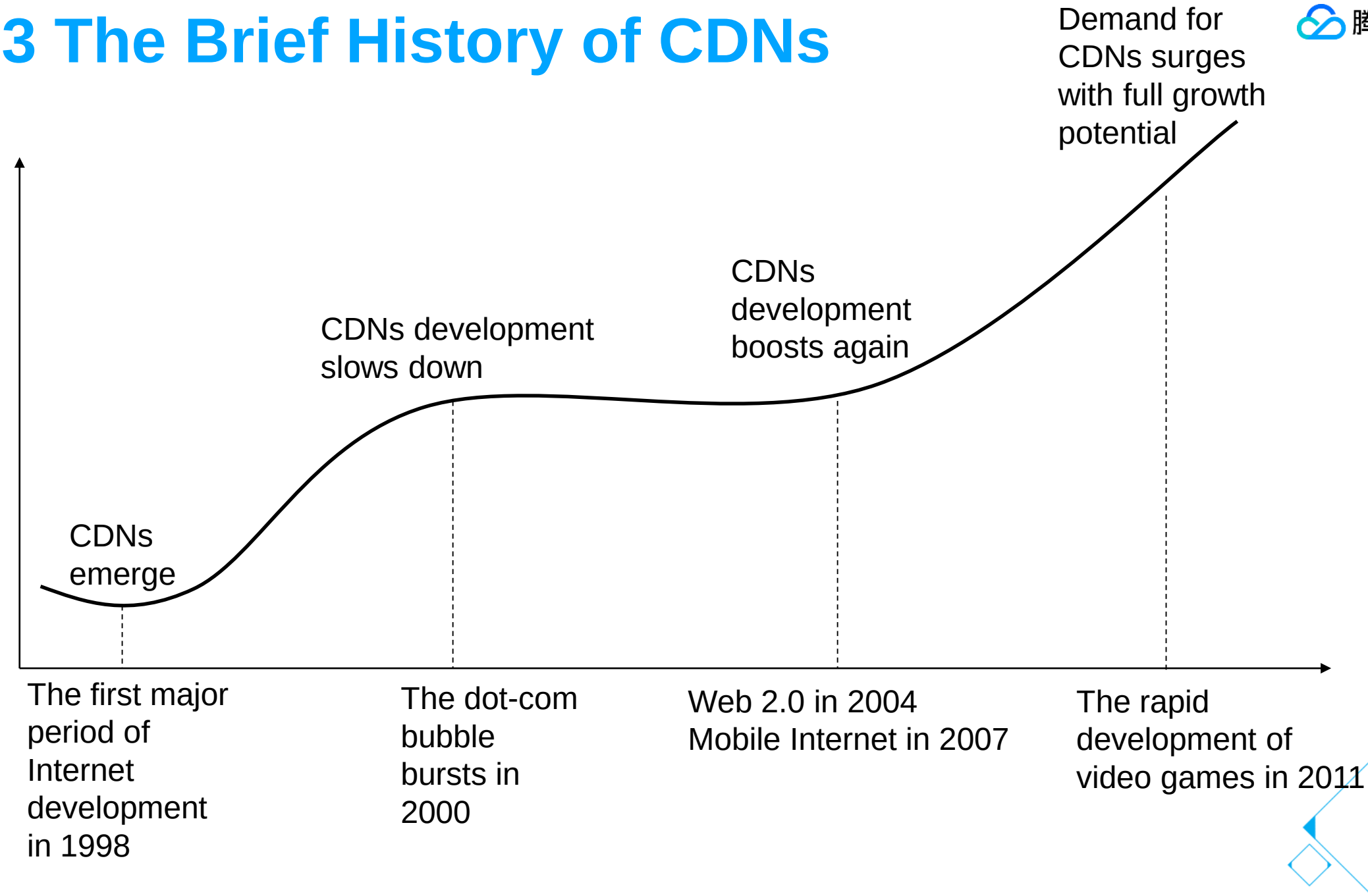
1.2.2 Why Use a CDN: How a CDN Works



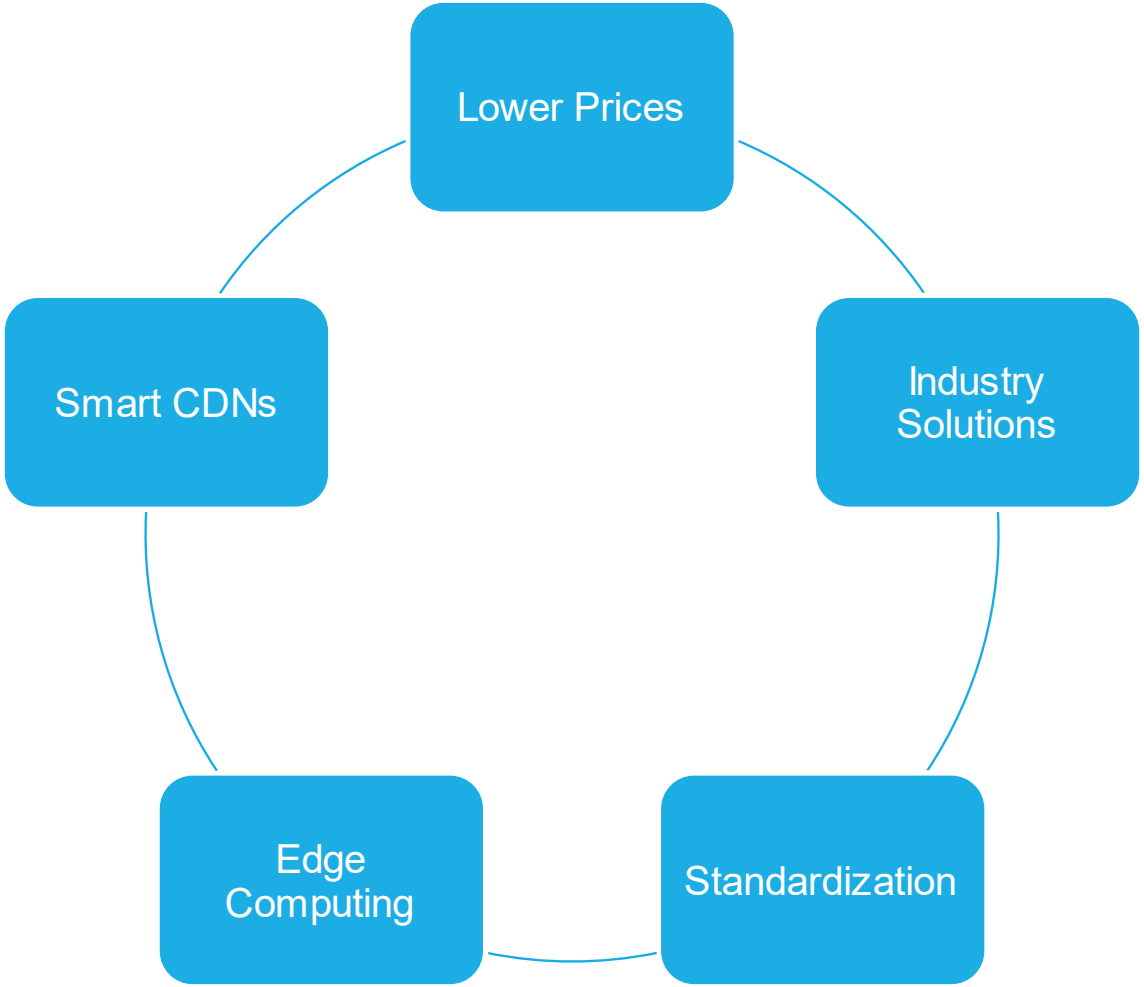
1.2.3 Why Use a CDN: Implementation of a CDN



1.3 The Brief History of CDNs



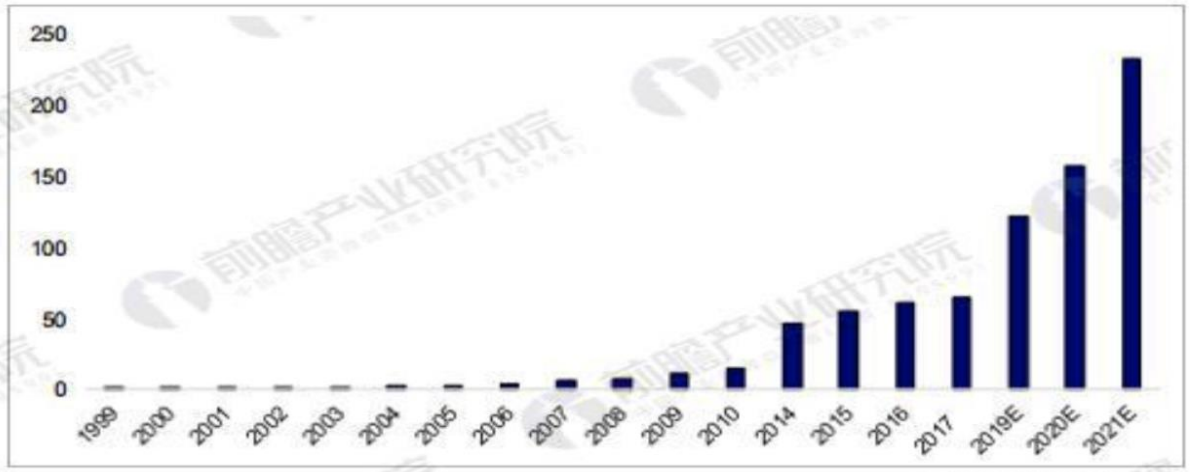
1.3 CDN Trends

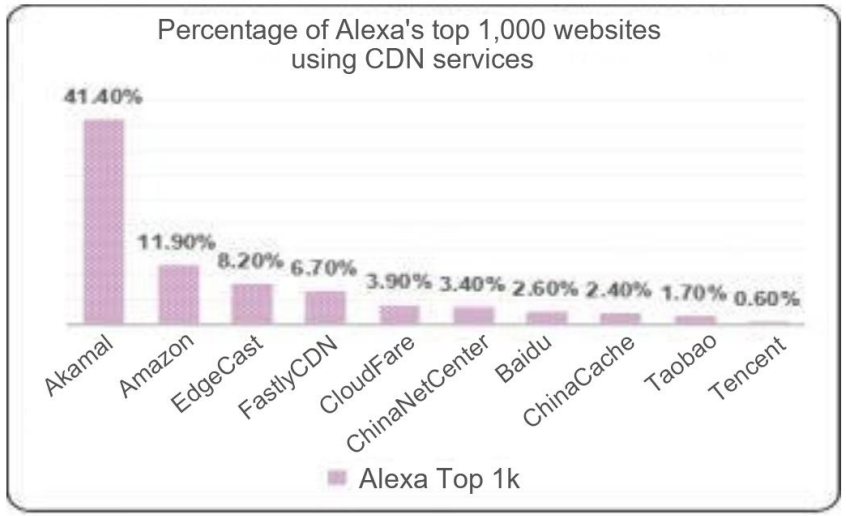


1.3 CDN Market Landscape

- At present, China's CDN coverage rate is merely 17.2%, while in a mature market like North America, it reaches 50%.
- Driven by videos, VR/AR, games, e-commerce, ABC, IoT, edge computing, and other online applications, the CDN market is expected to grow at an average annual rate of 35% over the next five years.

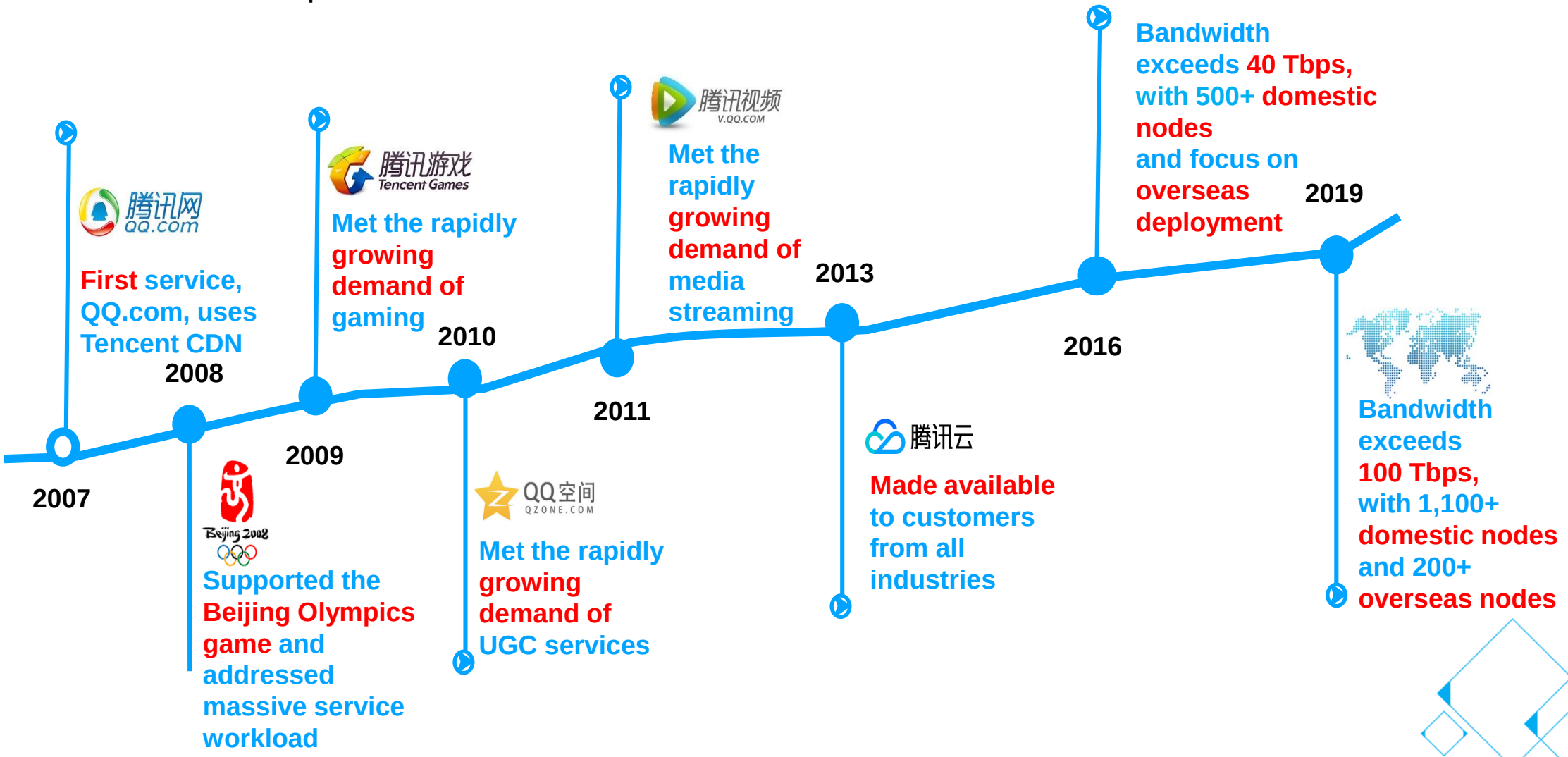
Global CDN market sizes and forecasts for 1999-2021 (in 100 million USD)





1.4 Tencent Cloud CDN Milestones

- Tencent has been working on CDN technology for 8 years, while Tencent Cloud has been launched for 3 years. Currently, Tencent Cloud has deployed 500+ domestic nodes, 40 Tbps bandwidth of resources, multiple overseas nodes, and a customer base of 100,000 users.



1.4 Tencent Cloud CDN’s Global Reach

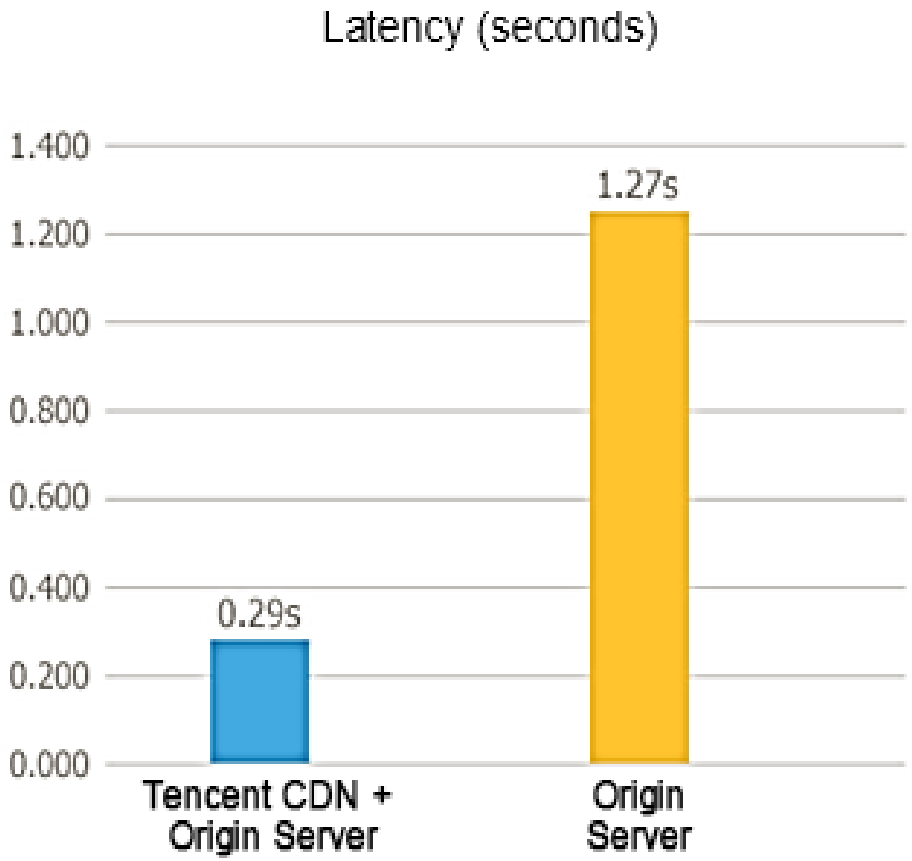
- We have deployed **1,100+** acceleration nodes nationwide, covering more than a dozen ISPs with 100 Tbps+ bandwidth.
- We have deployed **200+** nodes overseas, covering 50+ countries and regions worldwide.

1.4 Tencent Cloud CDN Performance

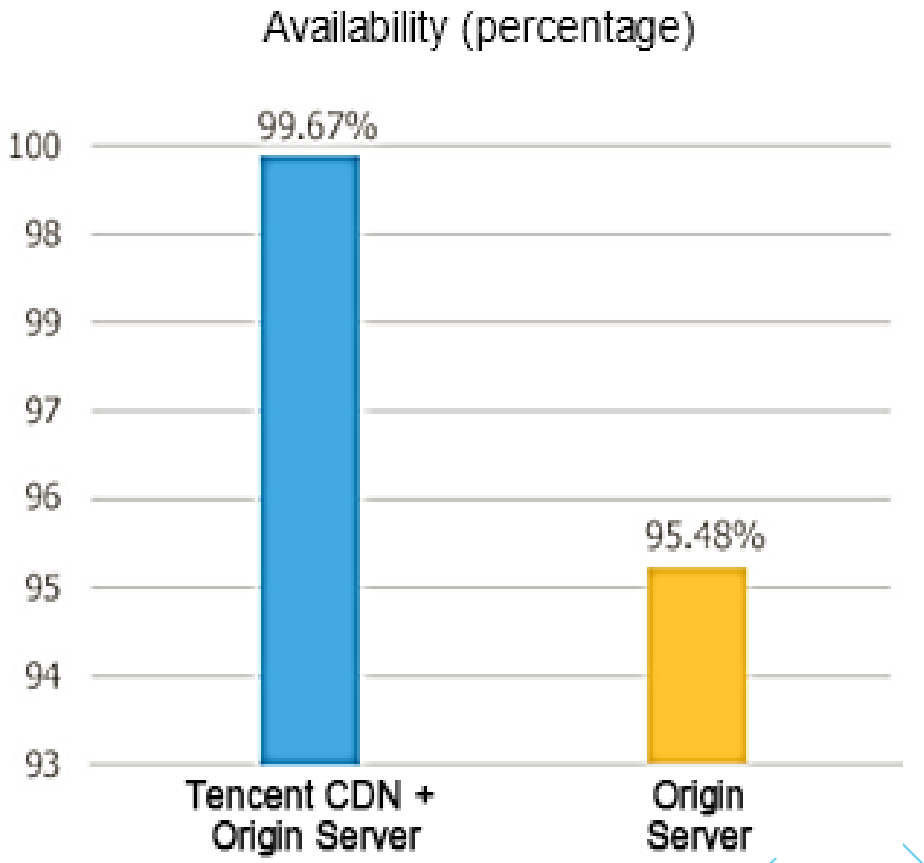
- Fast integration and easy management
  - Supports self-owned origin servers, Cloud Object Storage bucket origin servers, and a variety of other origin servers.
- Comprehensive configuration options and rich reports
  - Provides various configuration options, real-time alerts, troubleshooting tools, statistical analysis reports, and logs.
- Flexible billing and project management support
  - Provides multiple billing methods and project management support.

1.4 Tencent Cloud CDN Performance

- **Access latency is reduced fivefold**

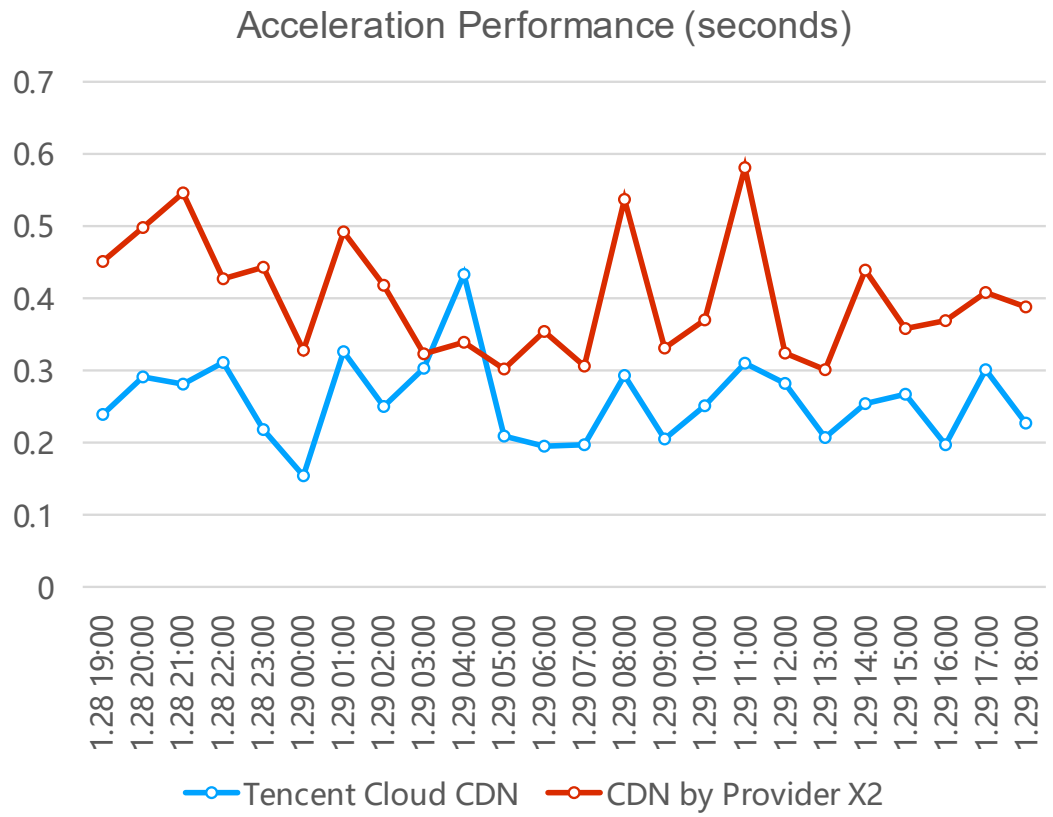


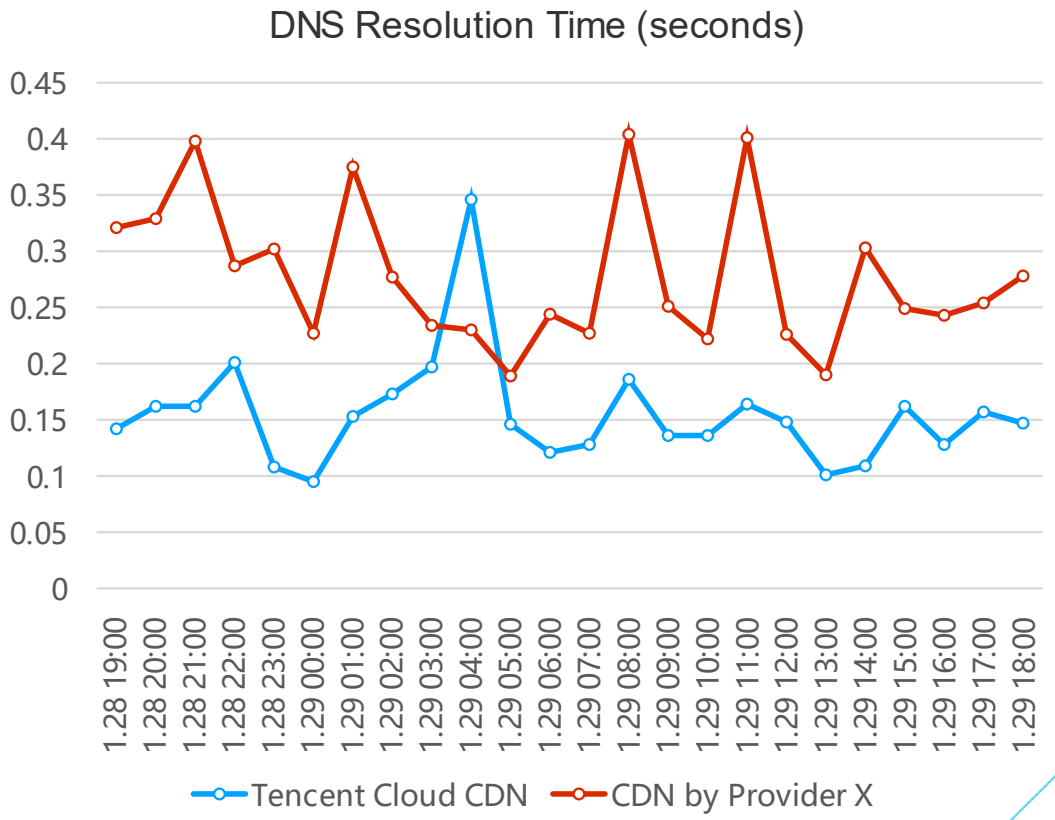
- **Availability increased to 99.5%**



1.4 Tencent Cloud CDN Performance

- The average latency of Tencent Cloud CDN is 0.26 seconds, which is twice as fast as CDNs from other cloud service providers.

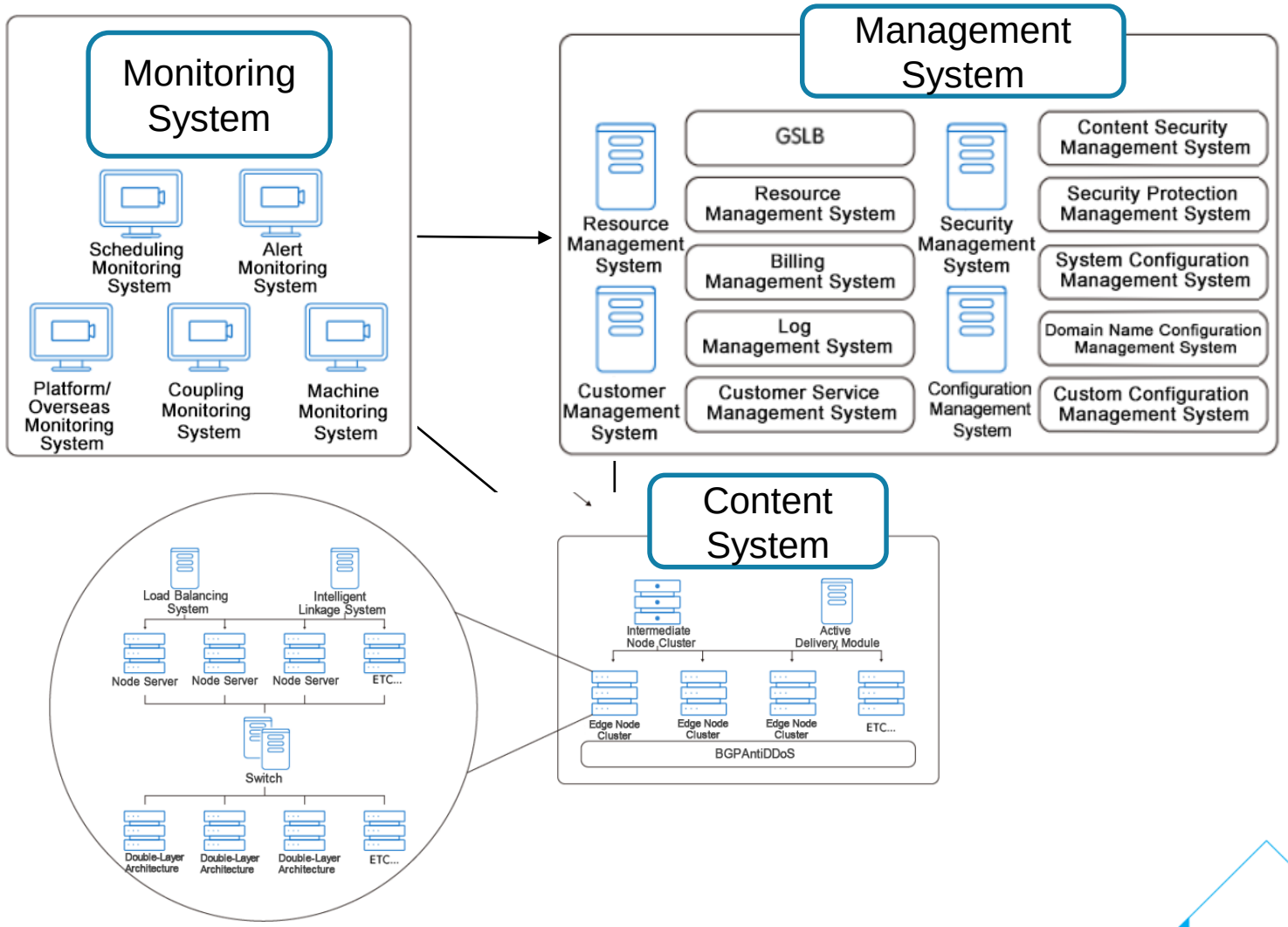




Chapter 2 Tencent Cloud CDN Architecture

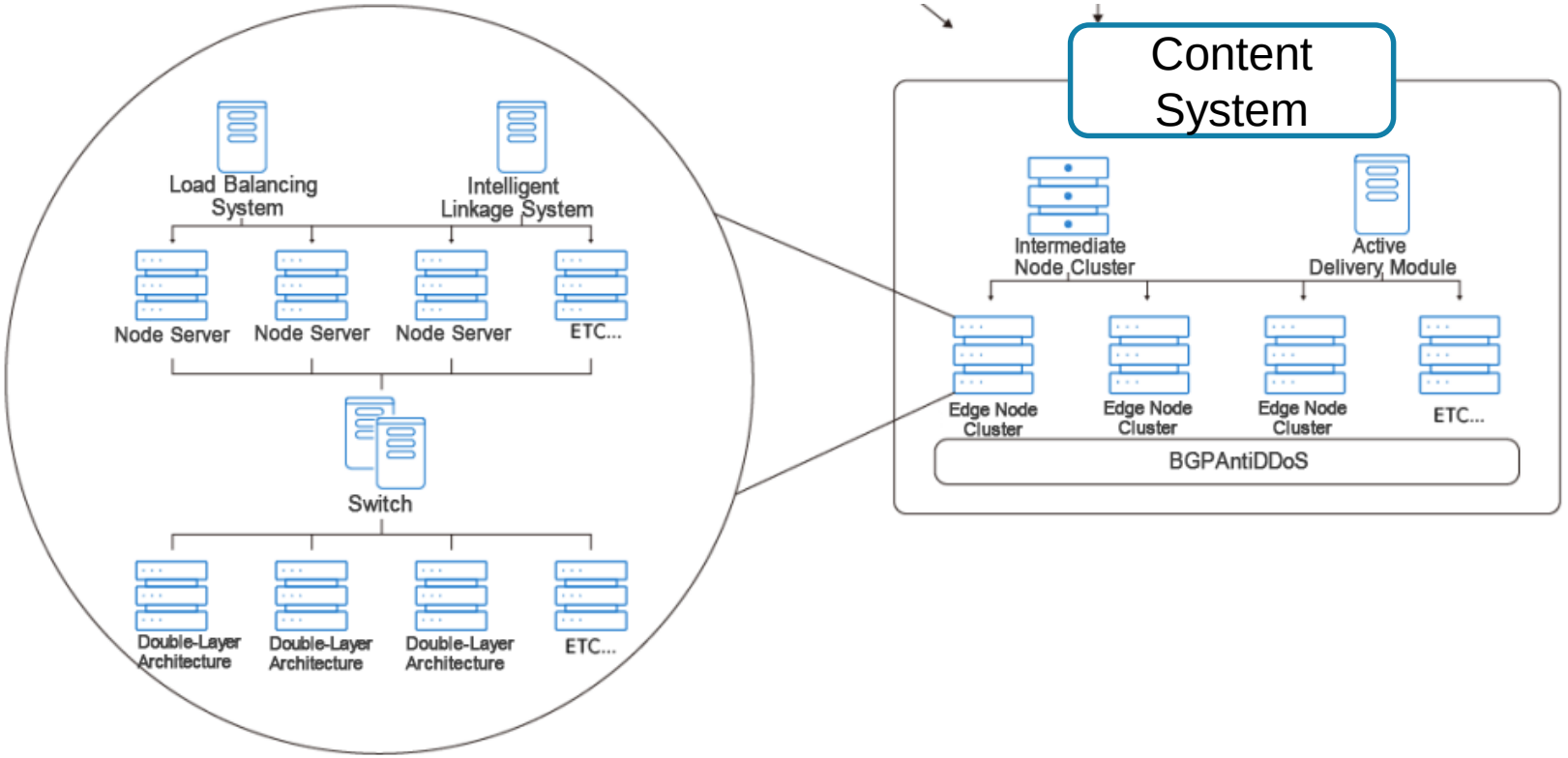
2.1 CDN Architecture

- Tencent Cloud has built a CDN platform that integrates management, content delivery, and monitoring.



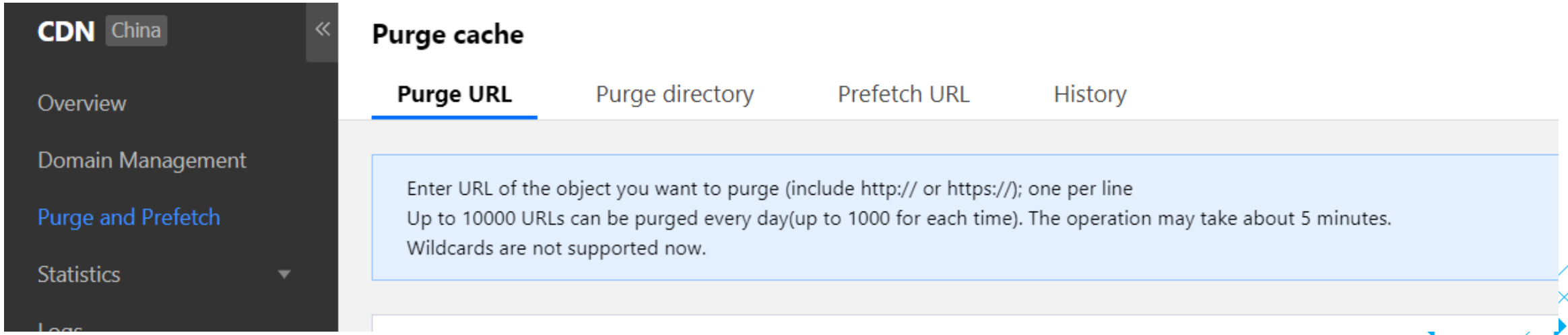
2.2 CDN Content System

- The content system uses the following technologies to ensure smooth operations:
  - DiskTank3 storage engine
  - Double-layer cache architecture
  - NWS node architecture
  - TGW cloud load balancer
  - Anti-DDoS



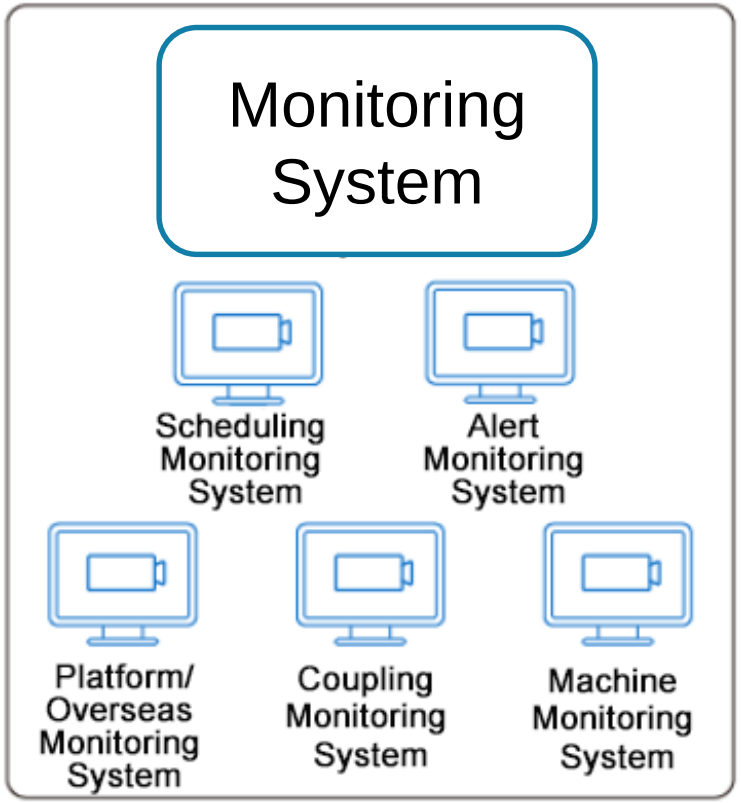
2.2 CDN Cache Purge

- **Cache expiration time:** 30 days by default. Common dynamic files never expire when the origin domain name is integrated.
- **Cache Purge:**
  - **URL purge:** Purges a specific file in the cache.
  - **Directory purge:** Purges all cached files under a specified directory.
- **URL prefetch:** Caches hot resources on edge nodes in advance by file.



2.3 CDN Monitoring System

- The monitoring system is designed to monitor and assess the status of the servers on CDN nodes with a variety of metrics. The result is a multi-dimensional, comprehensive, and multi-layered monitoring system that adjusts the traffic distribution of the entire network to ensure that users always receive optimal services.

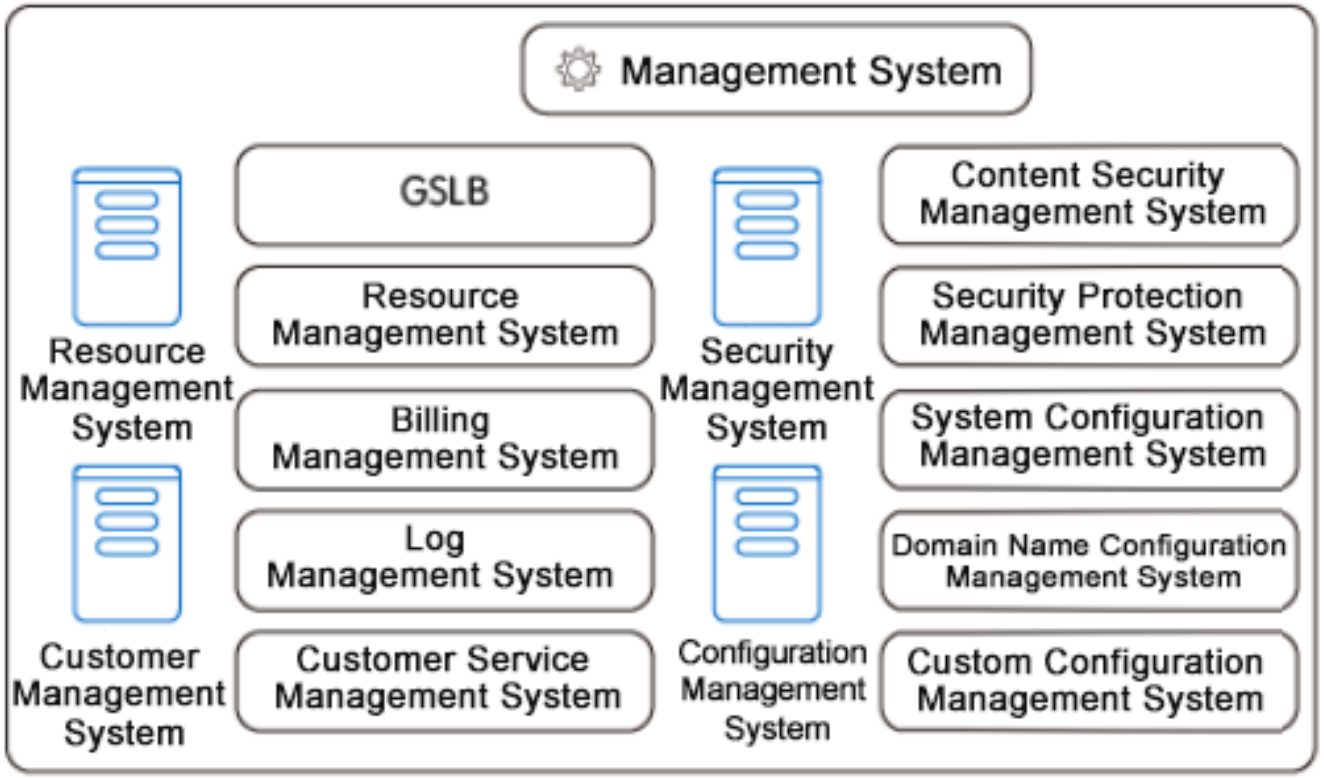


2.3 GSLB Intelligent Scheduling

- The Tencent-developed GSLB scheduling system can detect the quality of links throughout the entire network and adjust scheduling policies in real time.
  - **Optimal access:** User requests are dynamically scheduled and forwarded to the nearest preferred CDN node.
  - **Optimal origin-pull:** The optimal origin-pull link is selected by monitoring the status of the entire network in real time and using intelligent routing.
  - **Dynamic acceleration:** Provides optimal links for dynamic requests, effectively avoiding crappy and congested links.

2.4 CDN Management System

- The Tencent Cloud management system can be divided into four categories of subsystems: resource, security, configuration, and customer management systems. These management systems cover all aspects, from the status of a single server, to domain name or platform configuration, and to customer management.



Management System

2.5 CDN Integration Process

- In the CDN console, you can integrate CDNs and accelerate your services in four simple steps.

Self-owned/COS origin server

Configure Origin Server Info

Add a CNAME record to your DNS server

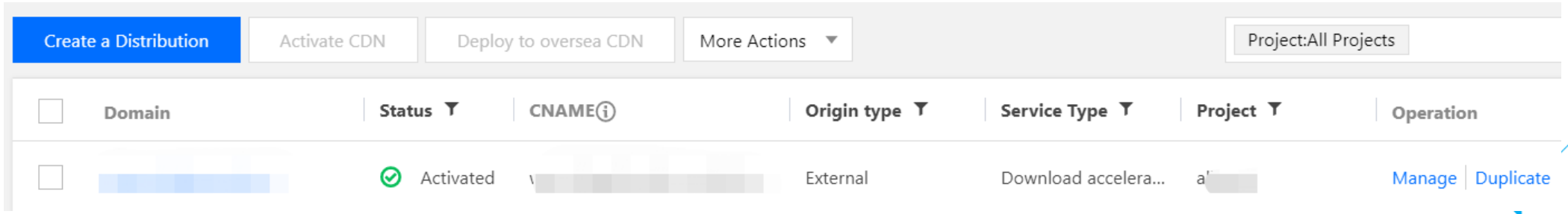
Edit CNAME

Add the Domain Name

The domain name has been filed and is accessible

Select an Acceleration Option

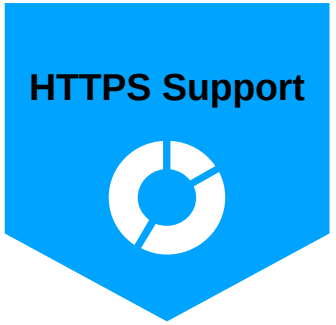
Static acceleration
Download acceleration
On-demand streaming acceleration



Chapter 3 Tencent Cloud CDN Security Mechanisms

3.1 CDN Security Mechanisms

HttpDNS



SSL Certificates

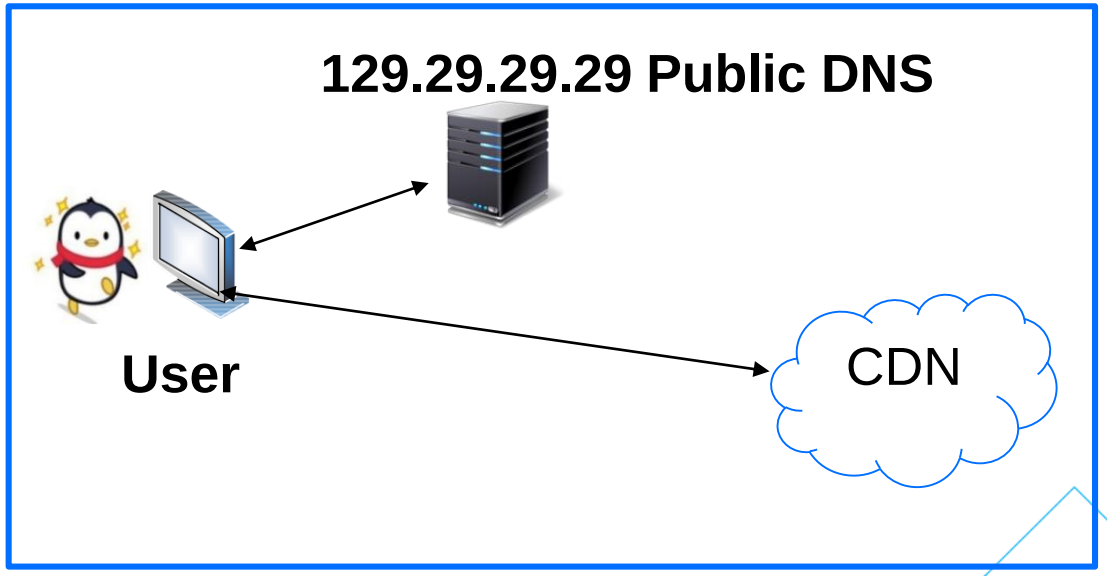
CDN Access Control

Security Protection SCDN

3.2 HttpDNS

- **Mobile Resolution (HttpDNS)**
  - Domain name resolution requests are sent to Tencent Cloud DNS servers over HTTP, instead of the traditional method that uses the ISP's local DNS servers and DNS protocol. This avoids the issues of domain name hijacking and cross-site access caused by the local DNS (the ISP).

Requests are always resolved by the public DNS, skipping the local DNS and avoiding domain name hijacking.



3.3 SSL Certificates

- **Challenges for HTTP:**
  - The HTTP protocol is used to transfer information between a web browser and a web server.
  - Data transmitted via the HTTP protocol is not encrypted, that is, in plaintext.

- **HTTPS = HTTP + SSL**
  - Data security is ensured by using encrypted transmission.
  - Identity authentication ensures the authenticity of the website.

3.3 Tencent Cloud SSL Certificates

- Tencent Cloud SSL Certificates (SSL Certificates) is a one-stop certificate service that provides HTTPS solutions for websites and mobile applications.

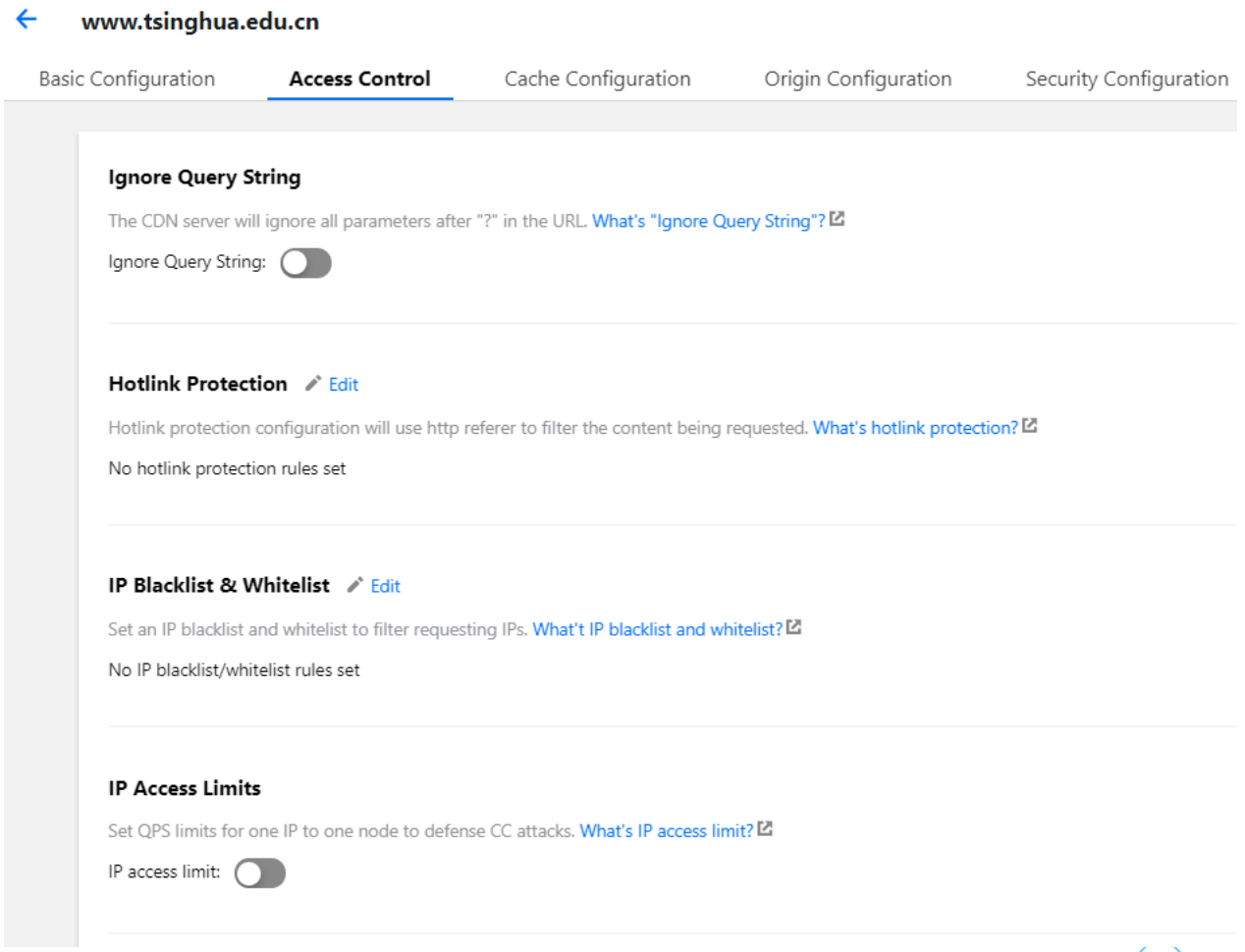
  - **Top CA authorities:** We work with top international CA authorities to guarantee security.
  - **100% compatibility:** Symantec root certificates ensure compatibility with all browsers and mobile devices.
  - **Improved search ranking:** HTTPS improves the search ranking and credibility of the website.
  - **Encrypted data transmission:** Transmitted data is encrypted to prevent tampering, traffic hijacking, targeted advertising, and other malicious activities.

3.3 SSL Certificate Types

Items	Domain Validated (DV)	Organization Validated (OV)	Extended Validation (EV)
Green address bar (using Chrome as an example)	 A padlock icon + https	 A padlock icon + https	 A padlock icon + https + company name
General purpose	Personal sites and applications: Simple HTTP encryption	E-commerce websites and applications: Small- and mid-sized business websites	Large financial platform: Large enterprise and government agency websites
Verified information	Domain name ownership verification	Domain name ownership verification and enterprise identification	Domain name ownership verification and strictest identity authentication for enterprises
Time of issuance	10 minutes - 24 hours	3-5 business days	5-7 business days
Validity period	1 year	1-2 years	1-2 years

3.4 CDN Access Control

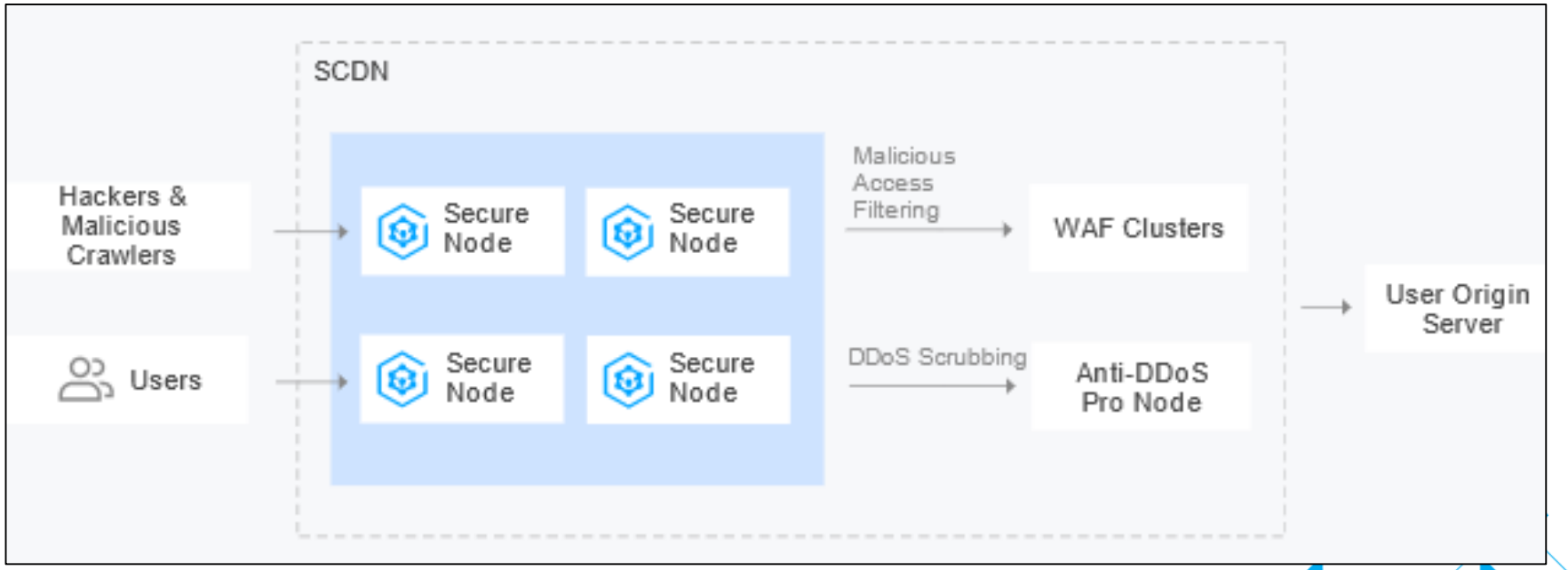
- Ignore Query String
- Hotlink Protection
- IP Blacklist & Whitelist
- IP Access Limits



4.7 CDN Attack Protection

- Tencent Cloud CDN users can enable SCDN with one click. It provides **protection against DDoS and CC attacks** as well as **WAF (Web Application Firewall)** to protect your services.

- DDoS scrubbing
- CC detection
- Precise access control
- WAF protection
- Attack scanning



Chapter 4 Tencent Cloud CDN Products

4.1 CDN Website Acceleration

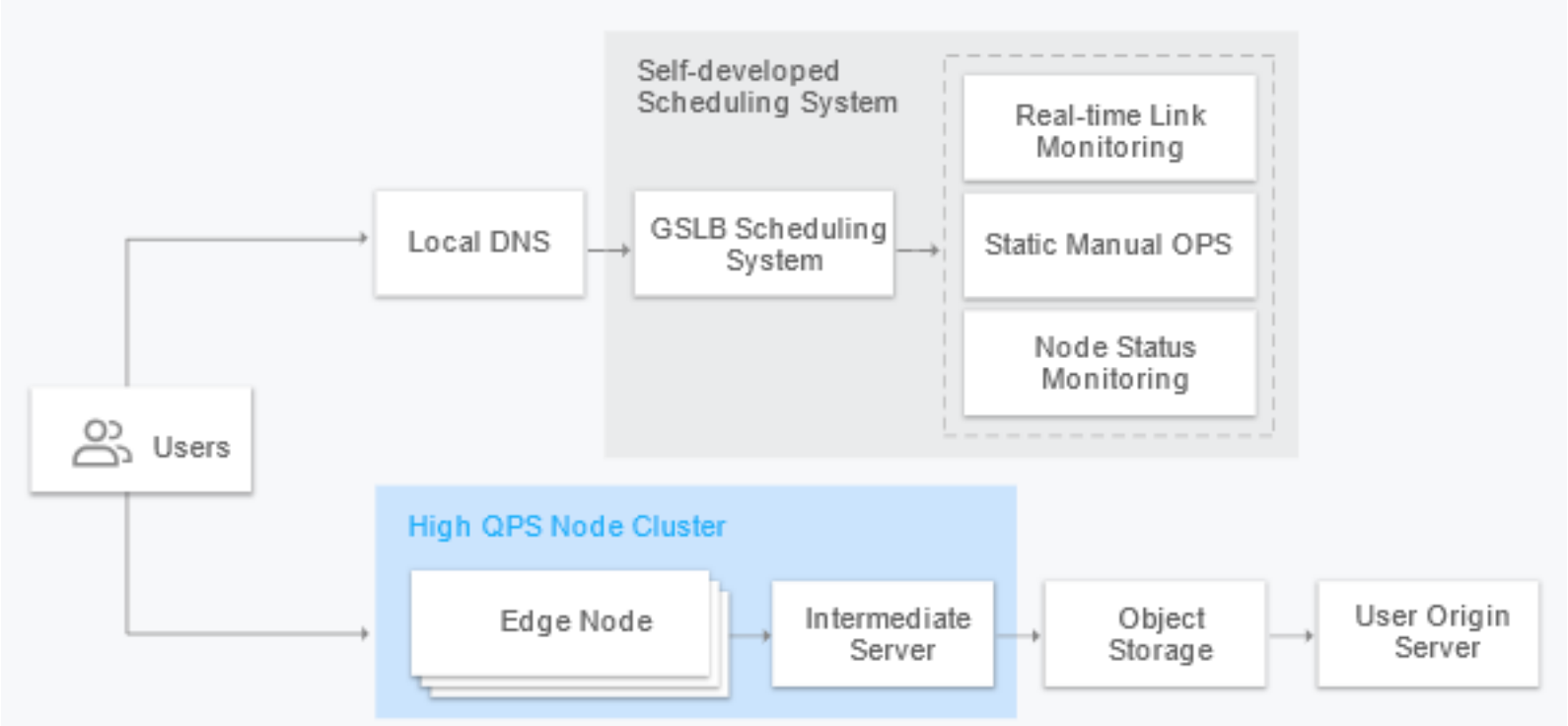
- **Use cases:** This product is suitable for portals, e-commerce, and UGC communities. It provides powerful acceleration performance for the delivery of static content, such as CSSs, images, and small files.

- **Success stories:**

大众点评

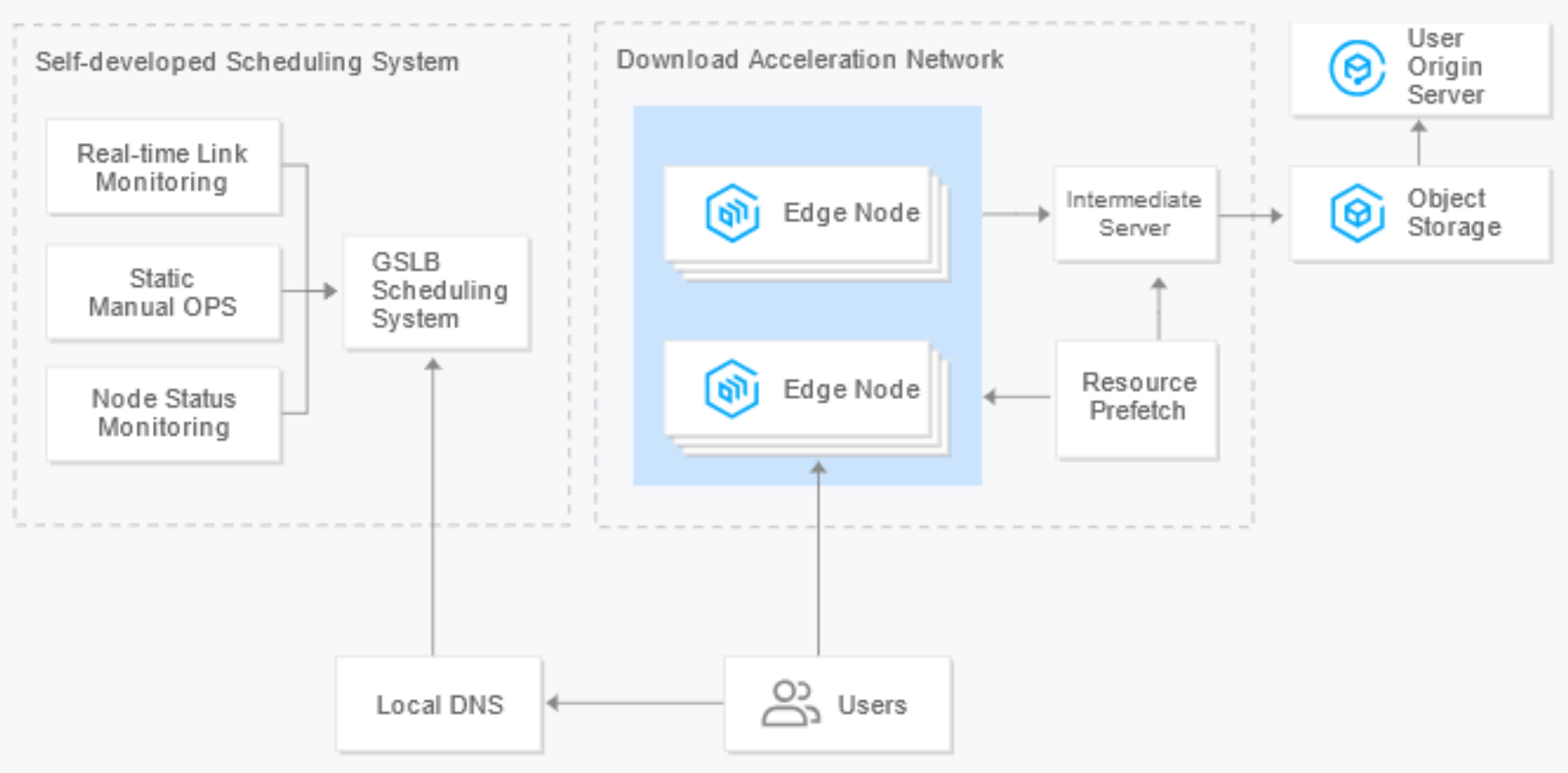
小红书

富途证券



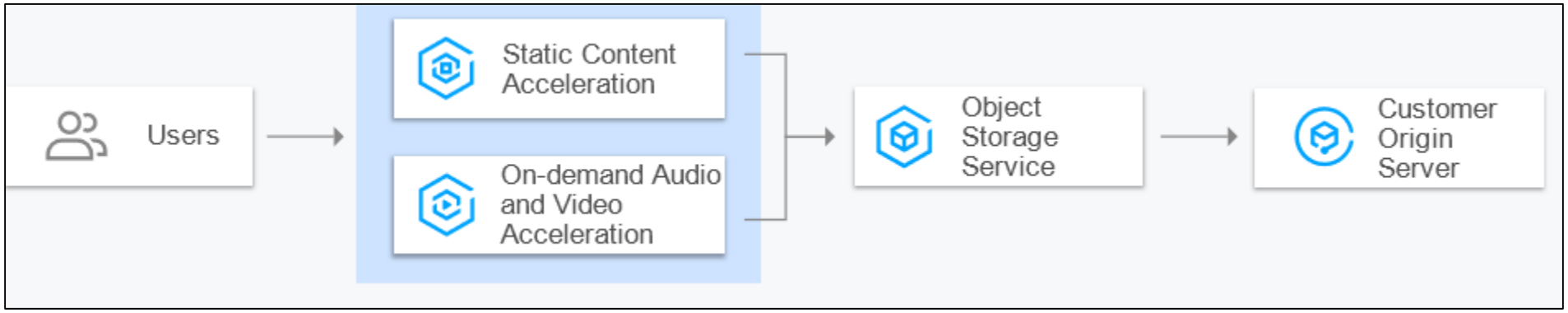
4.1 CDN Download Acceleration

- **Use cases:** This product is suitable for downloading large files, such as app packages, game updates, and mobile phone firmware upgrades.



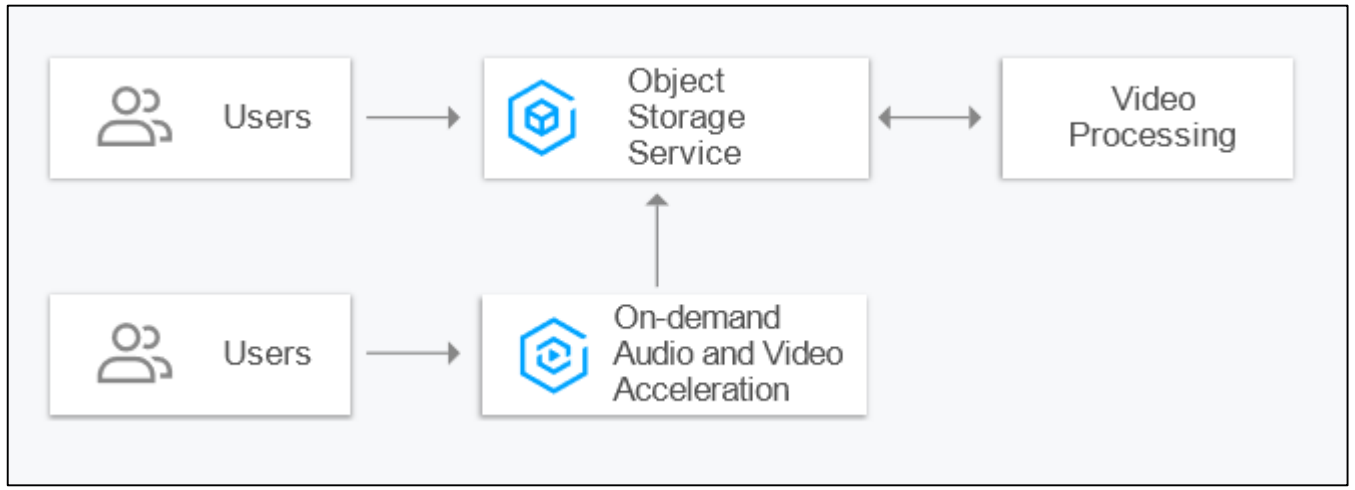
4.1 CDN Audio and Video Acceleration

- **Use cases:** This product is suitable for the delivery of streaming media content (such as .flv and .mp4 files) for video websites, TV boxes, and UGC video websites.
- Case 1: General use case for common video websites



4.1 CDN Audio and Video Acceleration (Continued)

- Case 2: Professional use



- Success stories:

bilibili
Popular Communities

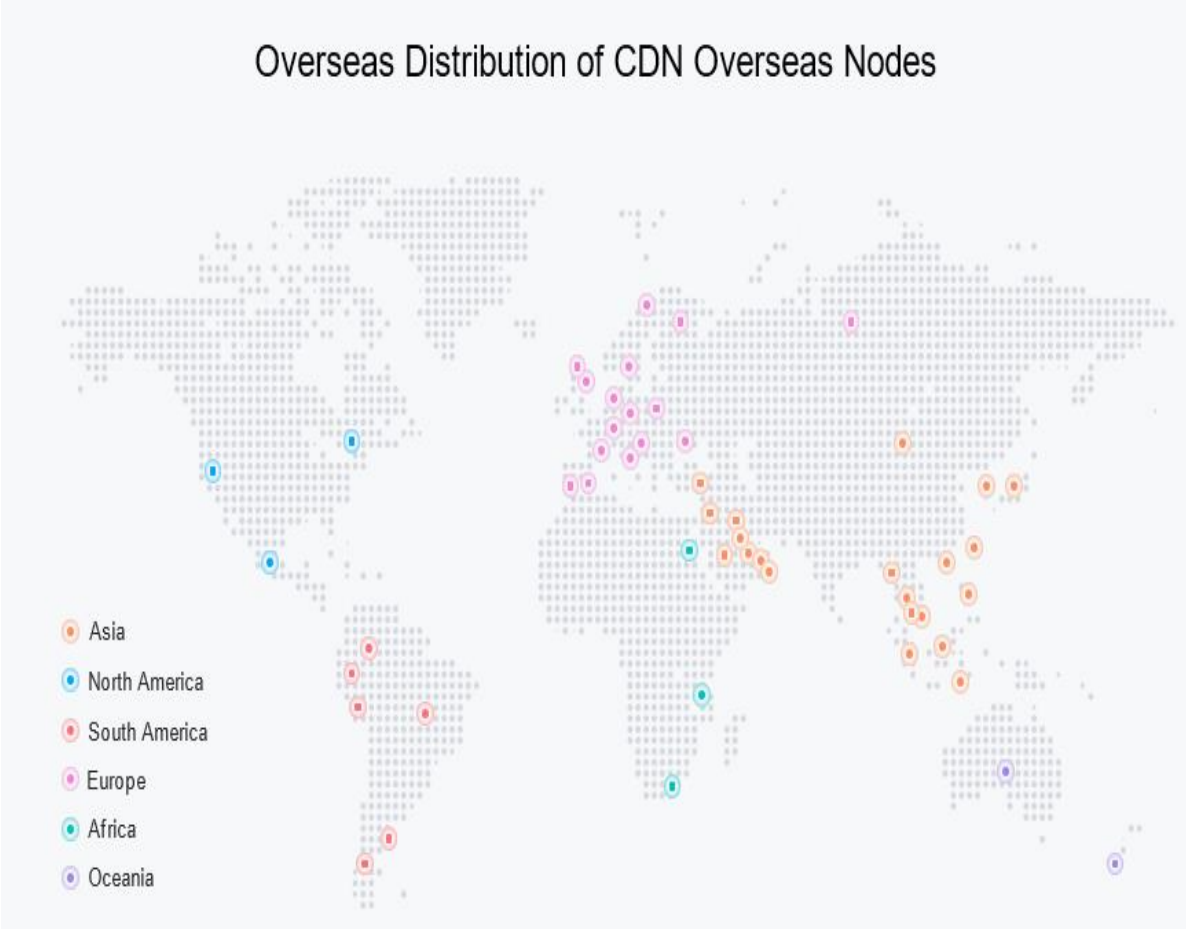
Kuaishou
UGSV and Social Media

CNTV
News and Media

4.2 Global Content Delivery (GCD)

- Global Content Delivery (GCD) handles cross-border access, effectively reduces latency, and helps businesses operate smoothly overseas.

- We have deployed 200+ overseas nodes covering more than 50 countries/regions with 20+ Tbps bandwidth.



4.3 Dynamic Site Accelerator (DSA)

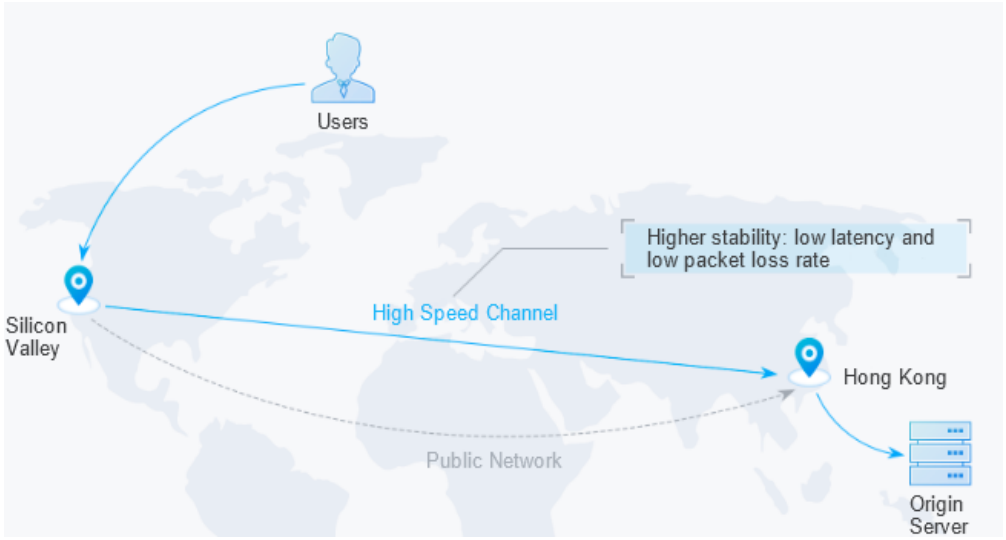
- Dynamic Site Accelerator (DSA) solves issues including slow response, packet loss, and unstable services due to factors such as cross-carrier requests, cross-border requests, and poor network connection.

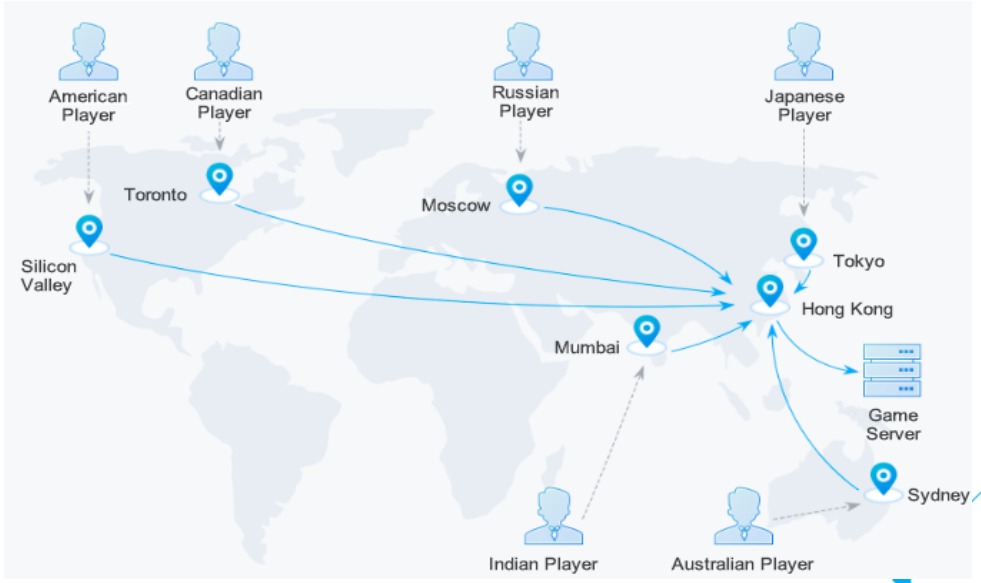
- Tencent's optimal linkage algorithm and protocol layer optimization enable dynamic content to be delivered to users securely and reliably through optimal transmission paths.

- DSA also supports multi-link redundant transmission to ensure reliability.

4.4 Global Application Acceleration Platform (GAAP)

- Global Application Acceleration Platform (GAAP) relies on high-speed channels among global nodes, forwarding clusters, and intelligent routing technologies to achieve nearby access and direct access to origin servers for users around the world. It helps solve the high latency problem for global users.
- **Integration method**: Domain name integration and IP address integration
- **Use cases**: Cross-region access acceleration One server for global users





4.5 CDN Edge: Edge Computing

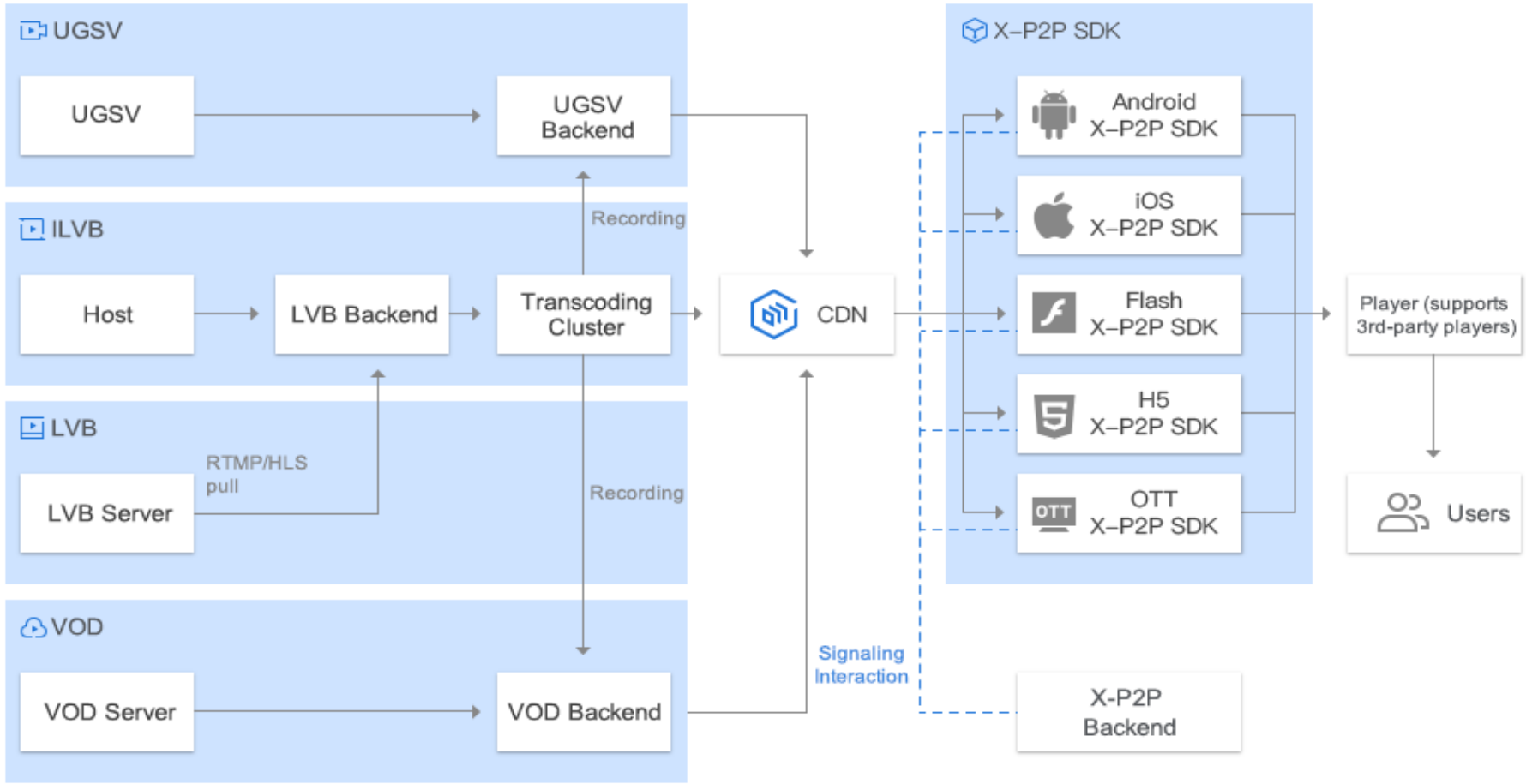
- **CDN Edge:** The capabilities of Tencent CDN go beyond caching and content delivery. Some processing functions can be migrated to CDN edge nodes by means of programming and configuration.
- **Strengths:** Reduced network latency, transmission loads, and backend computing pressure.
- **Use cases:** Suitable for customized applications, staged releases, dynamic source selection, and access control.

4.6 Smart CDN: X-P2P

- Use cases: ILVB, TV livestreaming, sports livestreaming, online video playback, UGSV, and a lot more
- Features:
  - Full platform support
  - Full protocol format support
  - Full use case coverage
  - Customized configurations for different use cases
  - Optimization against delay and lagging
- Success stories:

4.6 Smart CDN: X-P2P

- X-P2P Architecture: Enhanced playback experience



4.6 Smart CDN: X-P2P

- Advantages over traditional video delivery solutions

Tencent Cloud X-P2P	Traditional Video Delivery Solutions
Extremely low bandwidth costs	High bandwidth costs
Excellent user experience	Playback experience depends on network quality
Powerful load bearing	Service quality is limited by node resources
Consistent service quality	Single point of failure risks
Low barriers to integration	No client optimizations

Chapter 5 Tencent Cloud CDN Billing Plans

5.1 Tencent Cloud CDN Billing Plans

Tencent Cloud CDN provides two billing models **Pay-by-Bandwidth** and **Pay-by-Traffic**. Both methods use a post-payment policy and charged on a daily basis. You can select the method best suited to your business. See following slides for more information about these two billing models for China region. For outside of China, please reach to business representative.

*If you find that the billing model you selected is not applicable to your actual business during your use, you can change the billing model by following this instruction.

5.2 Price for Pay-by-Bandwidth

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Tiered Prices

CDN's "Pay by Bandwidth" method uses a tiered pricing model, with the tiered prices shown as below:

Billing Model	Bandwidth Tiers	Unit Price (USD/Mbps/Day)
Bandwidth Peak	0 - 500Mbps	0.094
	500Mbps - 5Gbps	0.092
	5Gbps - 50Gbps	0.086
	>= 50Gbps	0.084, or subject to the contract price

Calculation Method

Assume that the CDN peak bandwidth for the previous day is X, the tiered calculation is performed as follows:

- If X < 500 Mbps, the charge billed is X × 0.094;
- If 500Mbps <= X < 5000Mbps, the charge billed is X × 0.092;
- If 5000Mbps <= X < 50000Mbps, the charge billed is X × 0.086;
- If X >= 50000Mbps, the charge billed is X × 0.084. You may also contact us for off-line contracting. We have more discount options available for y

See more information about pay-by-bandwidth here.

5.2 Price for Pay-by-Traffic

Tiered Prices

CDN's "Pay by Traffic" method takes a monthly tiered progressive approach, with the tiered prices shown as below:

Billing Model	Traffic Tiers	Unit Price (USD/GB)
Monthly Tiered Traffic	0GB - 2TB	0.037
	2TB - 10TB	0.035
	10TB - 50TB	0.032
	50TB - 100TB	0.026
	>= 100TB	0.02, or subject to the contract price

Calculation Method

"Pay by Traffic" method takes a tiered progressive approach based on monthly traffic. See more information and examples about pay-by-traffic here.

Summary

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- **This course covered the following topics:**
- CDN Basics: How CDN works and an introduction to Tencent Cloud CDN
- Tencent Cloud CDN Architecture: Content, monitoring, management, cache purge, and integration
- Tencent Cloud CDN Security Mechanisms: HTTPS, access control, anti-domain-name hijacking, and attack protection
- Tencent Cloud CDN Products: Static content, download distribution, audio and video acceleration, overseas content acceleration, dynamic site acceleration, global application acceleration, edge computing, and X-P2P
- Tencent Cloud CDN billing plans

Thank you