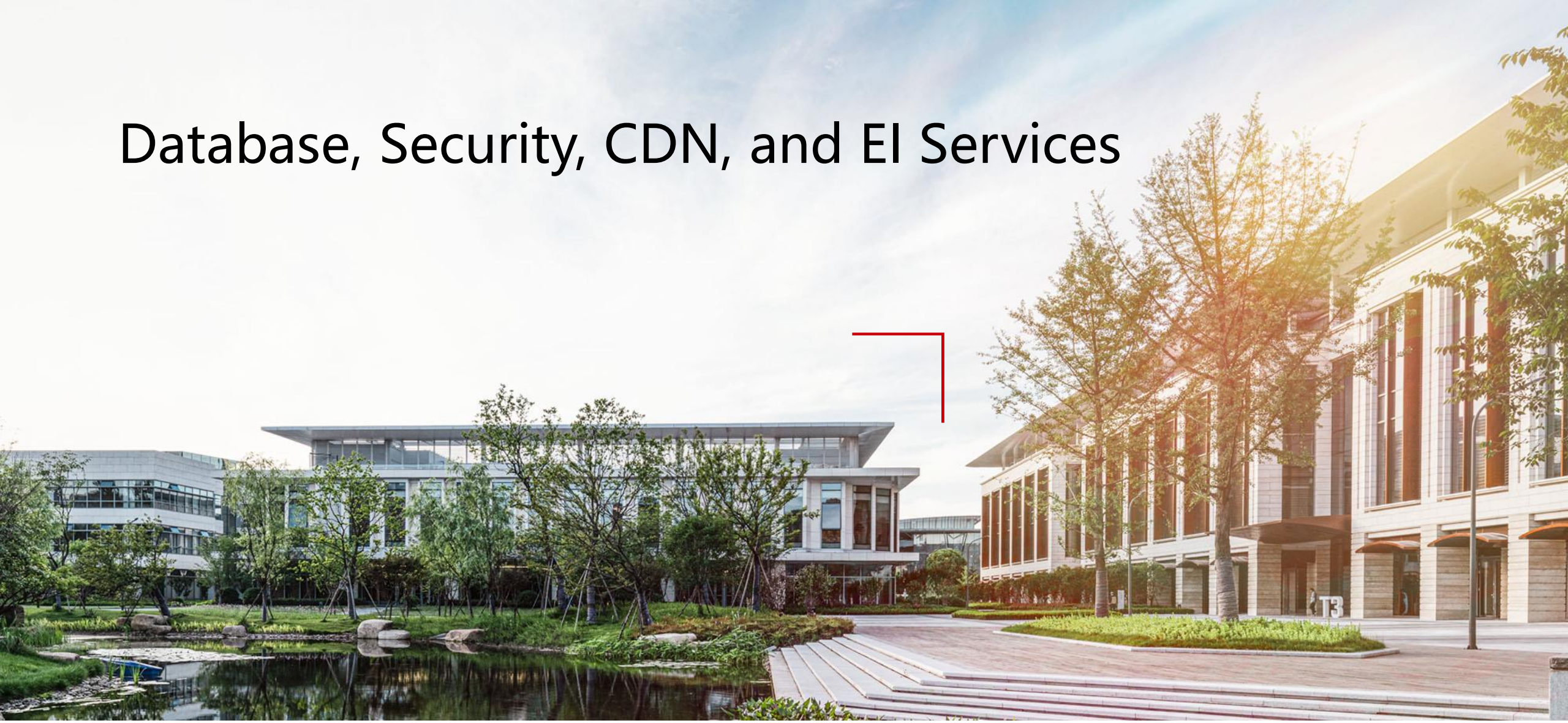
# Database, Security, CDN, and EI Services



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# Foreword

- In addition to compute, storage, and networking services, enterprises need database services, security services, Content Delivery Network (CDN), and EI services. These services can be billed on a pay-per-use basis and are easy to maintain, helping enterprises reduce investment and facilitate O&M.
- This chapter introduces database services, security services, CDN, and EI services.

# Objectives

- Upon completion of this course, you will:
  - Understand the basic concepts.
  - Understand the service positioning, principles, and functions.

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1. **Database Services**
   - Database Basics
   - Database Portfolio
   - RDS for MySQL
   - RDS for PostgreSQL
   - Document Database Service (DDS)
2. Security Services
3. Content Delivery Network (CDN)
4. EI Services

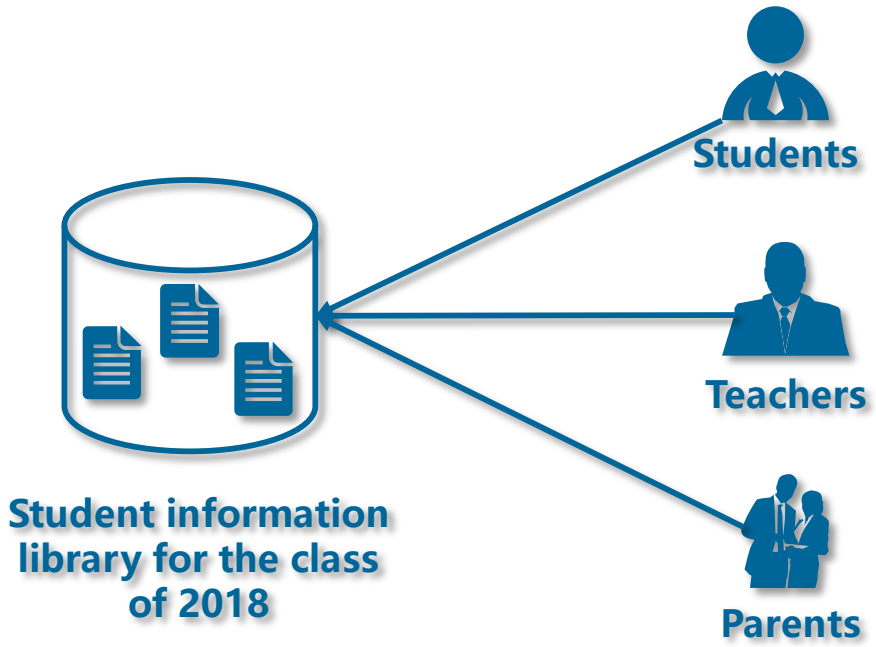
# Databases and Instances

**Database**

- A database is a collection of files that contain data organized using a given model.

**Instance**

- An instance contains a set of background processes and memory structures. It is the data management software that connects users and the operating system (OS).



# Database Types

A relational database organizes data using a relational model. Data is stored in rows and columns. A user retrieves data from a database through a query, which is a type of command that qualifies certain areas of the database. A relational model can be simply understood as a two-dimensional table model, and a relational database is a way of organizing data consisting of two-dimensional tables and their relationships.

Relational database

A non-relational database refers to a non-relational data storage system not compliant with ACID properties.

Non-relational database

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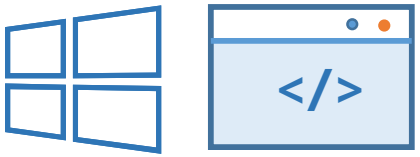
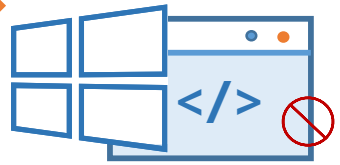
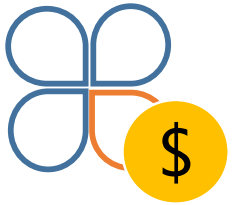
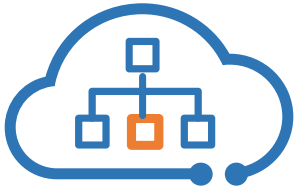
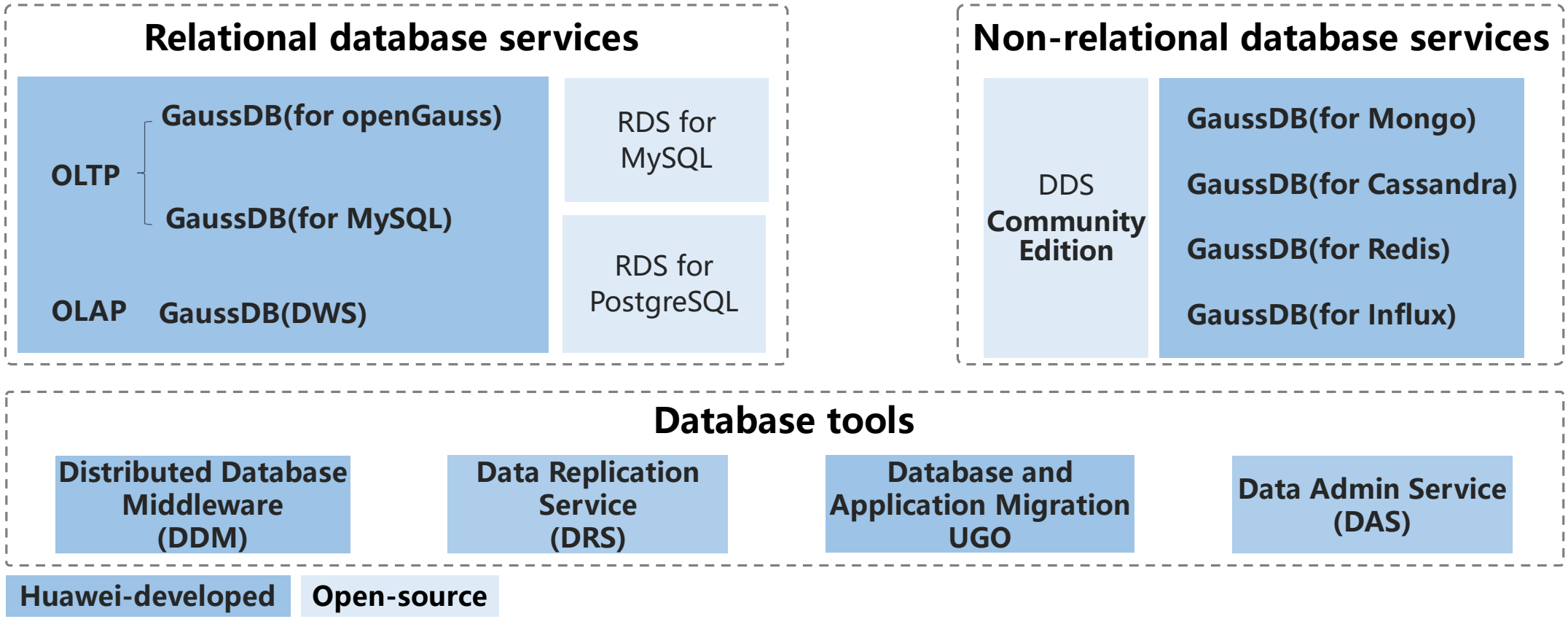
# Differences Between Cloud and Other Database Solutions

| | | | |
|---|---|---|---|
| On-premises databases |  Server procurement, hardware and operating systems deployment |  Equipment room hosting fees |  High DBA costs |
| Databases built on ECSs |  Purchase and installation of database software |  ECS rental fees |  High DBA costs |
| Cloud Databases |  No need to purchase or install any software or hardware |  Just pay for the databases |  Focus on architecture design and performance optimization |

# HUAWEI CLOUD Database Portfolio

- GaussDB is an open-source database designed for small and medium enterprises to achieve the ultimate in cost-effectiveness. GaussDB is a Huawei-developed database that meets the high reliability and performance requirements of governments and enterprises.



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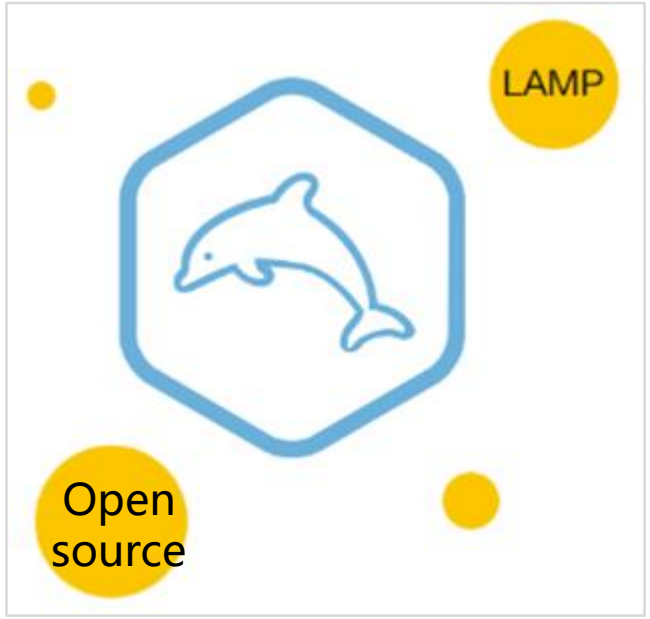
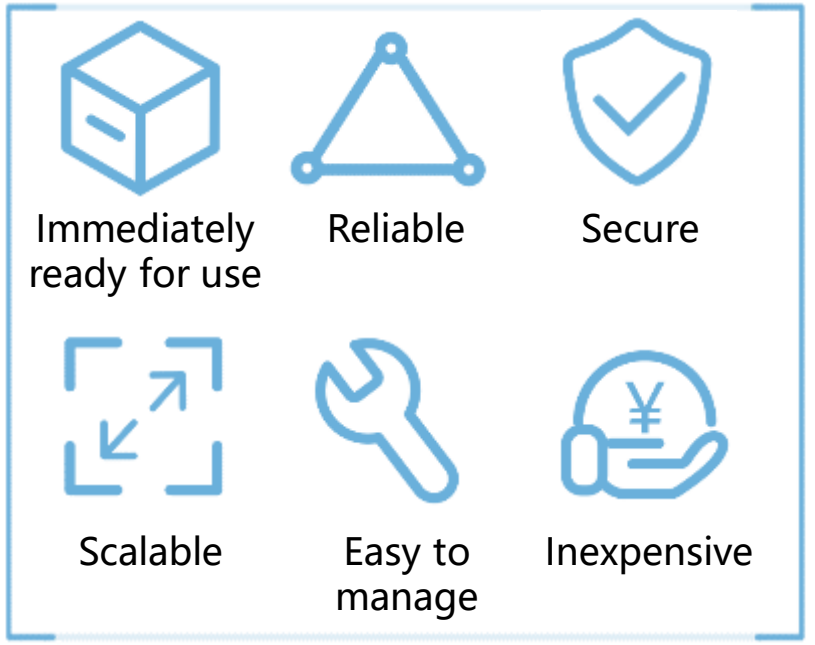
# What Is RDS for MySQL?

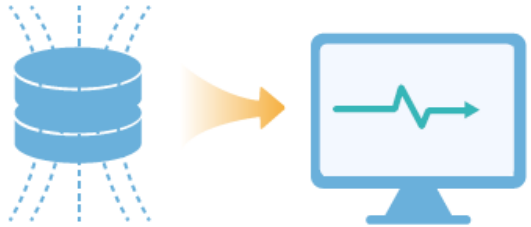
- MySQL is one of the world's most popular open-source relational databases. It works with the Linux, Apache, and PHP (LAMP) stack to provide efficient web solutions. RDS for MySQL is reliable, scalable, inexpensive, easy to manage, and immediately ready for use, freeing you to focus on developing your services.



# Advantages of RDS for MySQL

## Performance



- Huawei enhanced MySQL kernel (HWSQL) provides 3 times higher performance in high-concurrency scenarios.

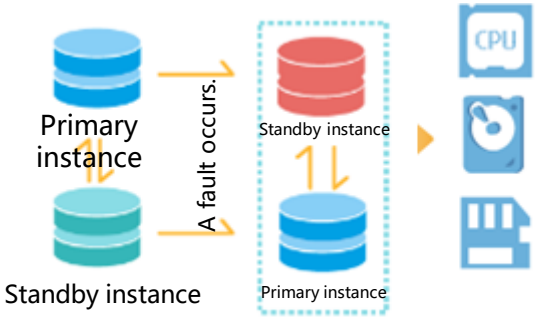
## Security


- RDS for MySQL is certified by China's Ministry of Public Security, uses security groups and VPCs to control access to databases, and supports post-incident audit.

## Efficiency

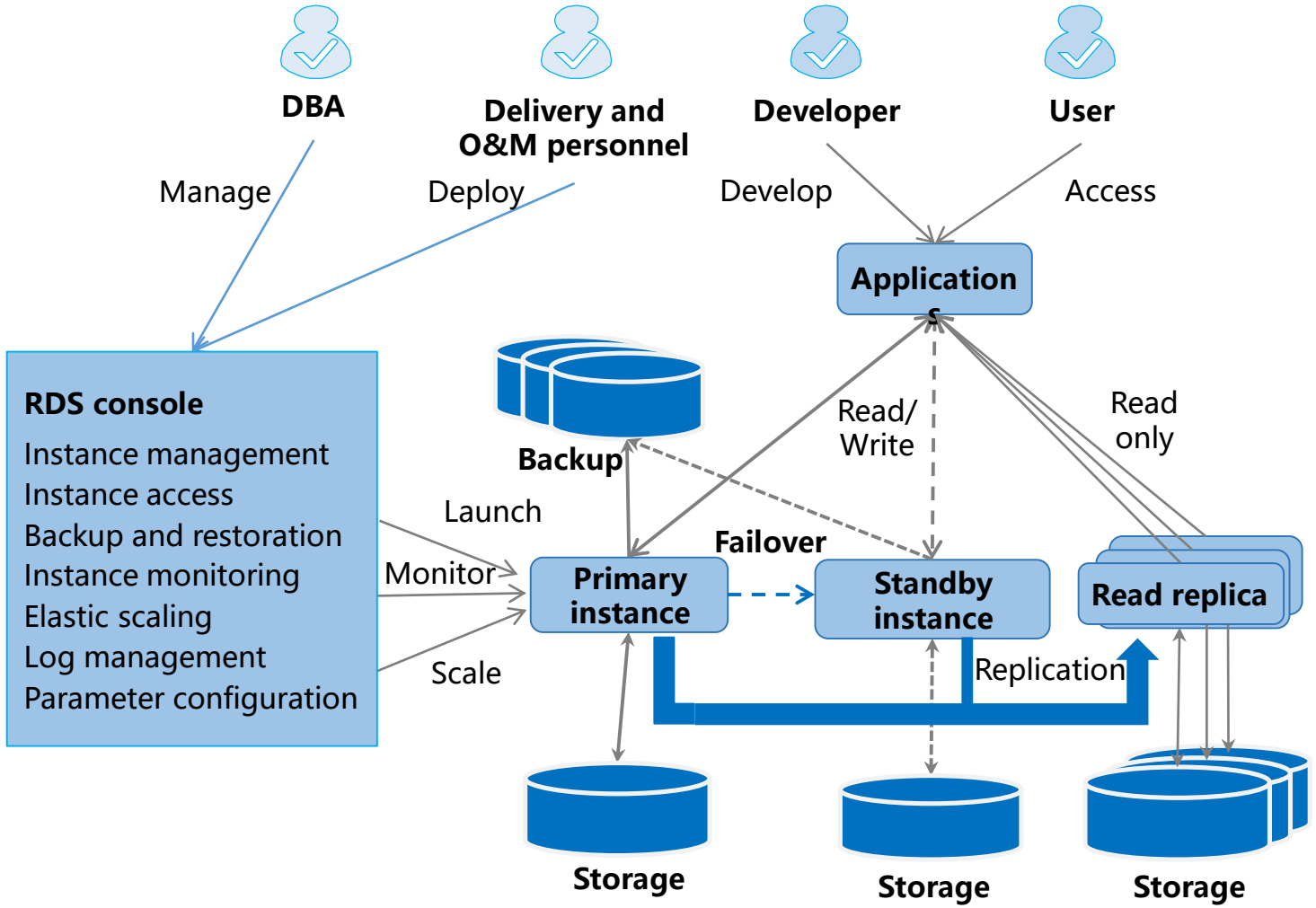

- A web-based management console provides an easy way to create, scale, monitor, and operate DB instances.

## Reliability




- Enhanced semi-synchronous replication prevents data loss. Automatic failover takes only a few seconds, ensuring a low recovery time objective (RTO).

# Architecture of RDS for MySQL



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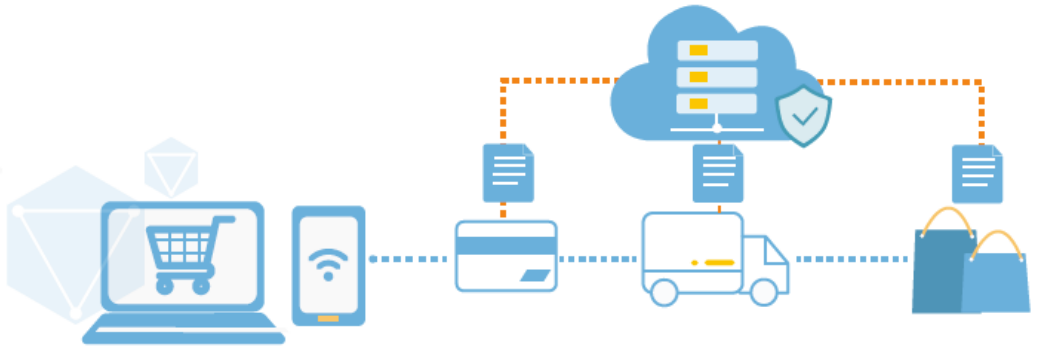
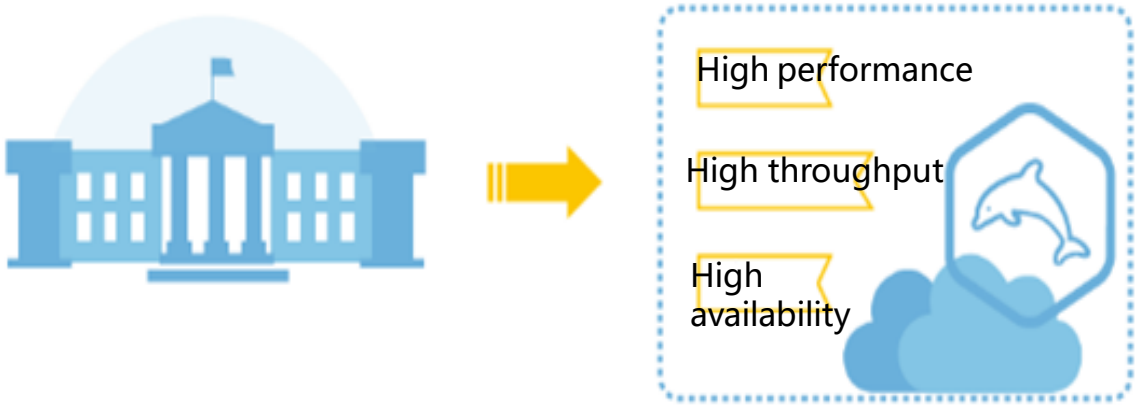
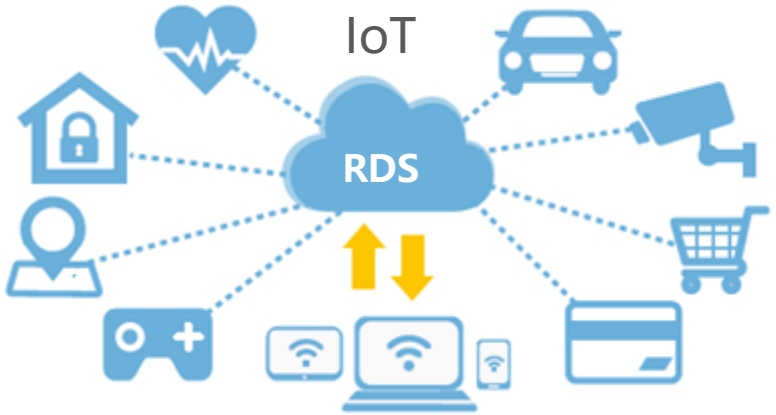
# Application Scenarios of RDS for MySQL

- Users of other cloud vendors
- Fast-growing start-ups
- Internet, e-commerce, and game enterprises
- IoT enterprises

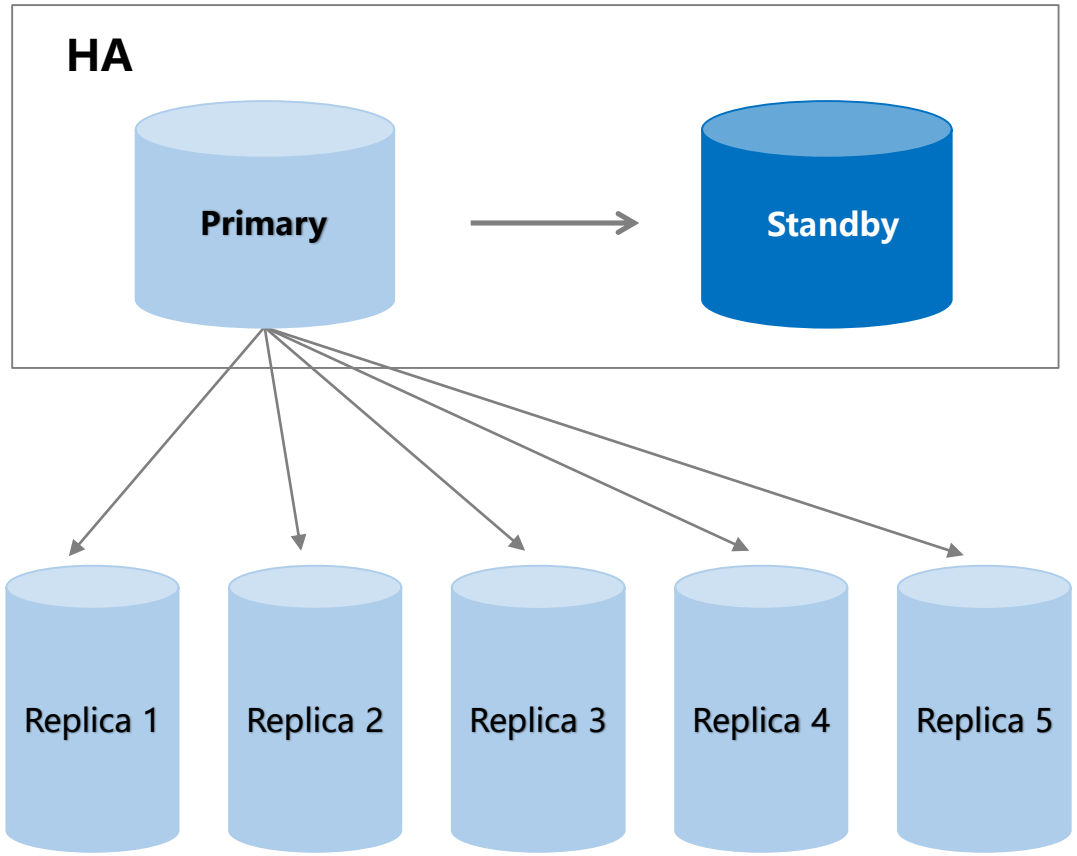




# RDS for MySQL Features - Cross-AZ HA

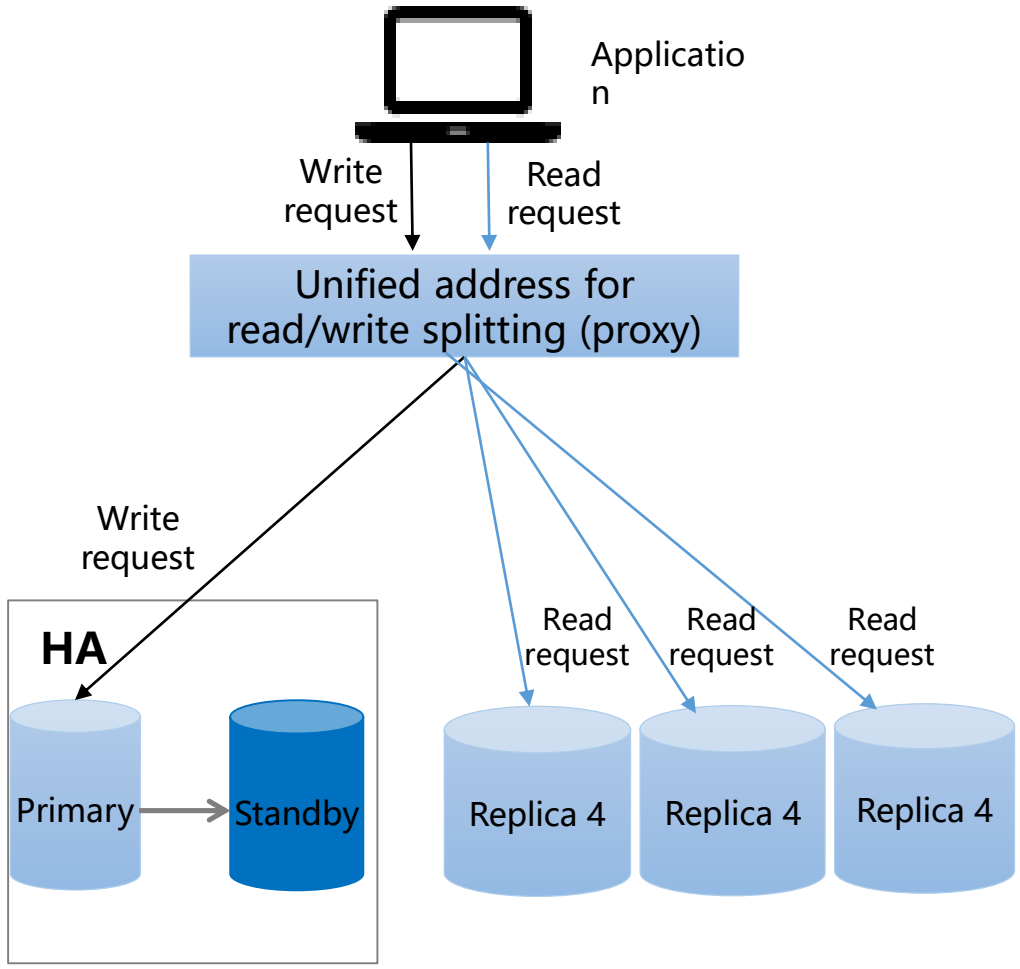
## Cross-AZ HA




## Functions

- Cross-AZ HA supports switchover in seconds.
- Up to 5 read replicas can be created for offloading read traffic.
- Standby DB instances are invisible to users. Users can access DB instances through virtual IP addresses.
- Read replicas cannot exist alone and must come with single or primary/standby DB instances.

# RDS for MySQL Features - Read/Write Splitting




## Functions

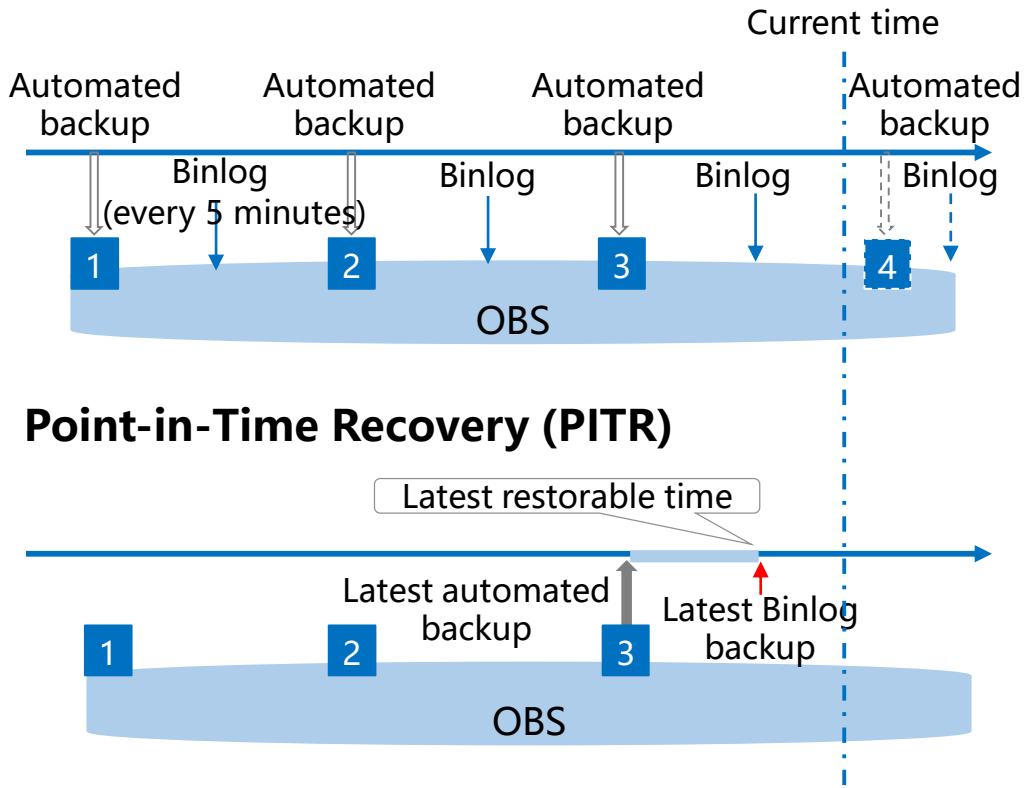
- A single read/write splitting address is provided, transparent to applications.
- Read-only permissions can be configured for each node.
- Instance health check is performed. If a DB instance breaks down or the latency exceeds what is supported, read requests are no longer allocated to the instance.

## Advantages

- A single read/write splitting address is provided, and read/write splitting does not require application reconstruction.
- The read weight assigned to a read replica is configurable.

# RDS for MySQL Feature - Point-In-Time Recovery (PITR)

## Full data backup + Binlog backup




## Point-in-Time Recovery (PITR)




## Functions

- Instance-level restoration in seconds is supported.
- Automated backups can be configured to be saved for up to 732 days (approximately 2 years).
- You can restore data to any point in time at least 5 minutes ago and restore the data to a new DB instance or to the original DB instance.

## Advantages

- The backup retention period is up to 732 days.
- RDS provides free backup space approximately equal to your purchased storage space.

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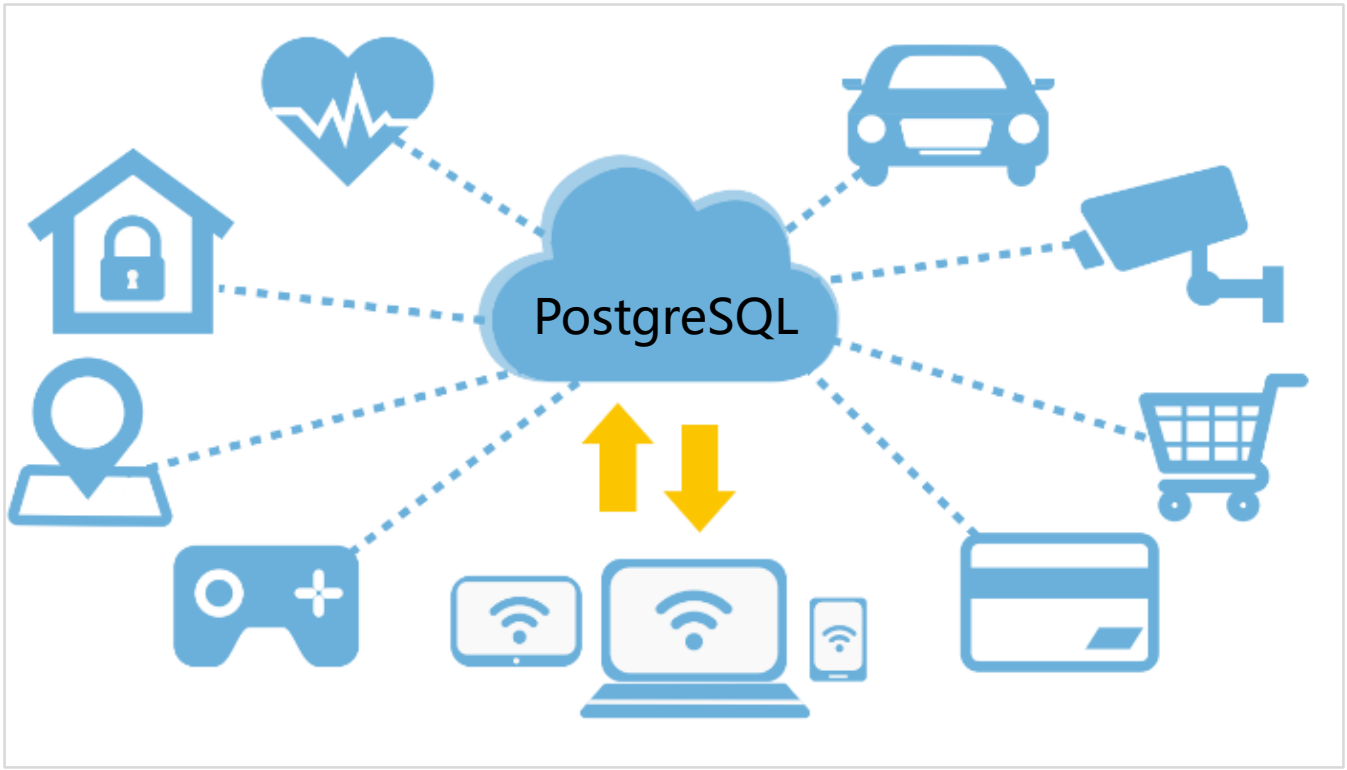
# What Is RDS for PostgreSQL?

- RDS for PostgreSQL is a typical open-source relational database that excels in data reliability and integrity. It supports Internet e-commerce, geographic location application systems, financial insurance systems, complex data object processing, and other applications.



# Advantages of RDS for PostgreSQL

**Ease-of-use**

- Services can be provisioned in minutes, and multiple specifications are available.

**Reliability**

- The primary and standby instances can fail over in the event of a fault.

**Efficient management**

- A range of metrics are monitored and can be viewed on the console.

**Scalability**

- Resources are used on demand and can be scaled flexibly.

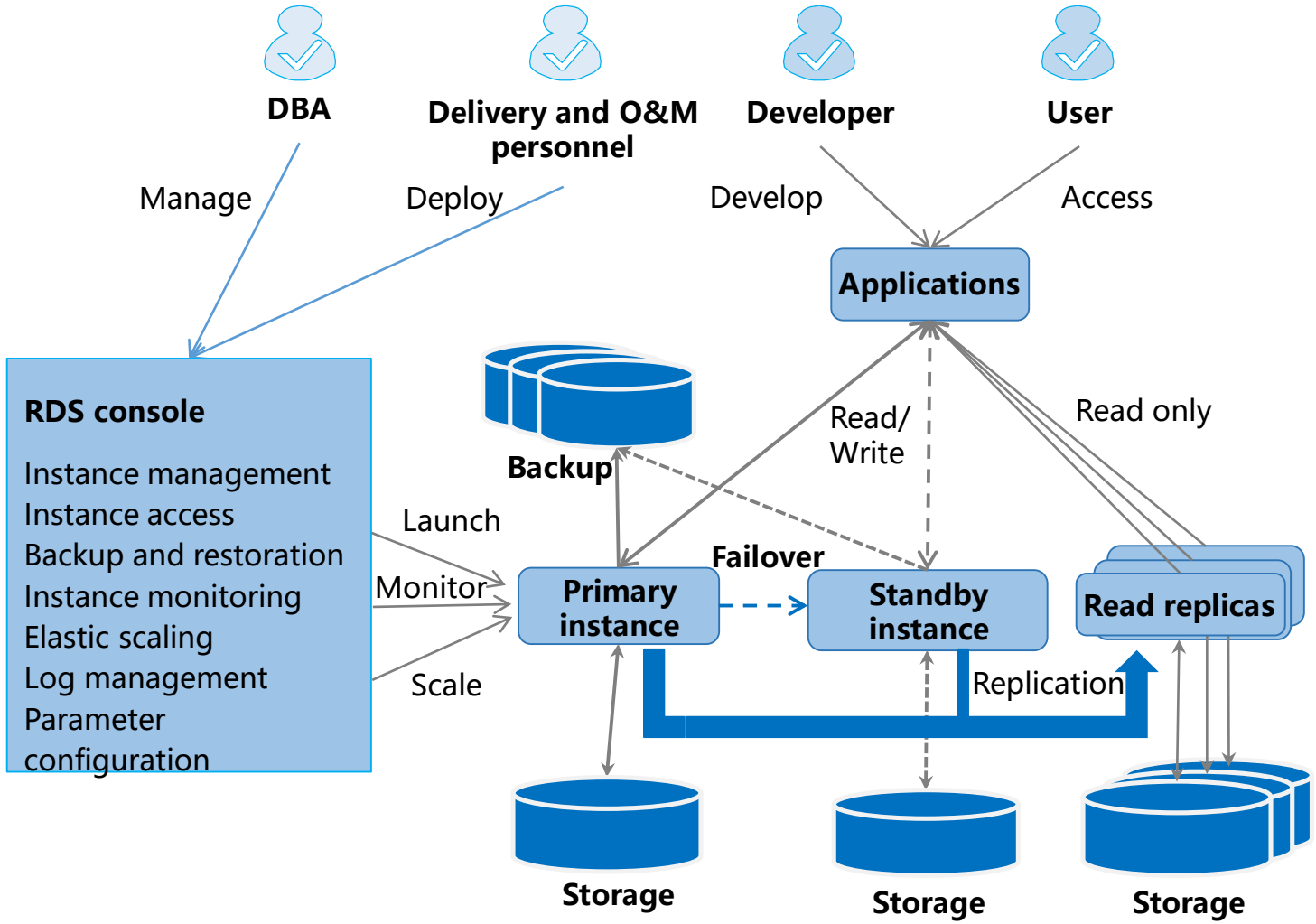
**High performance**

- Read replicas can be created for read/write splitting.

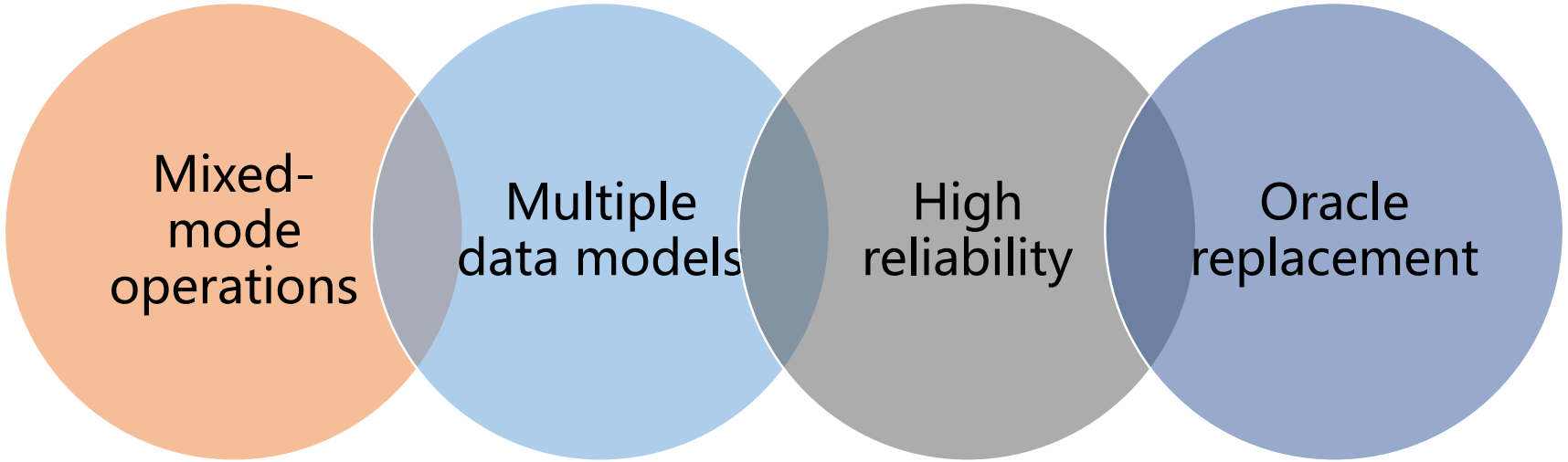
**Easy migration**

- Data Replication Service (DRS) provides online and offline migration and is compatible with third-party databases.

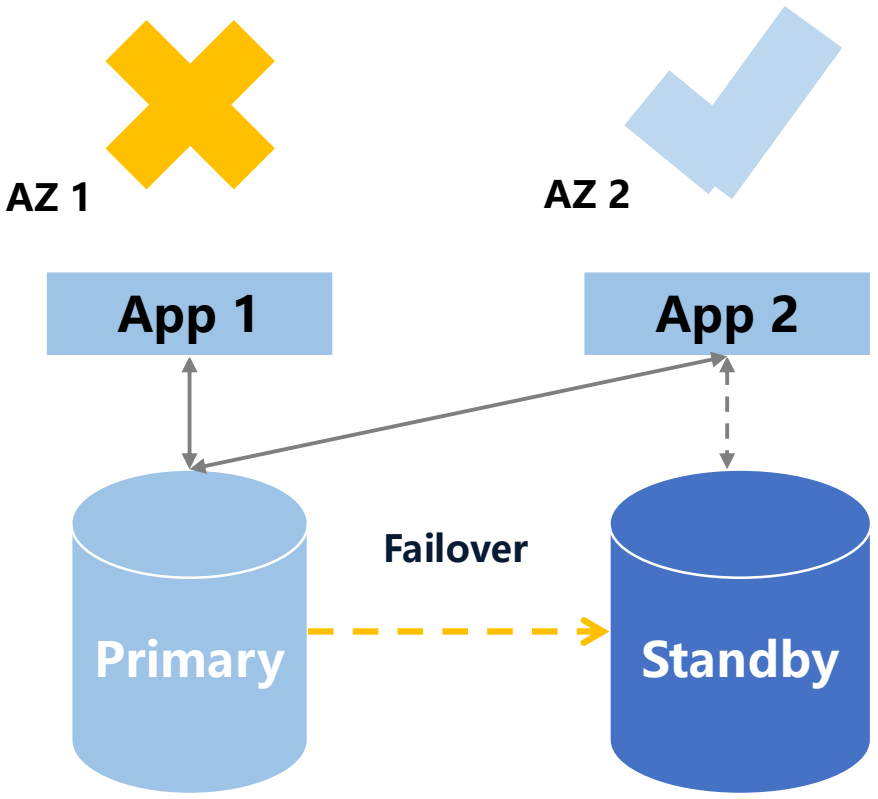
# Architecture of RDS for PostgreSQL



# Applications of RDS for PostgreSQL



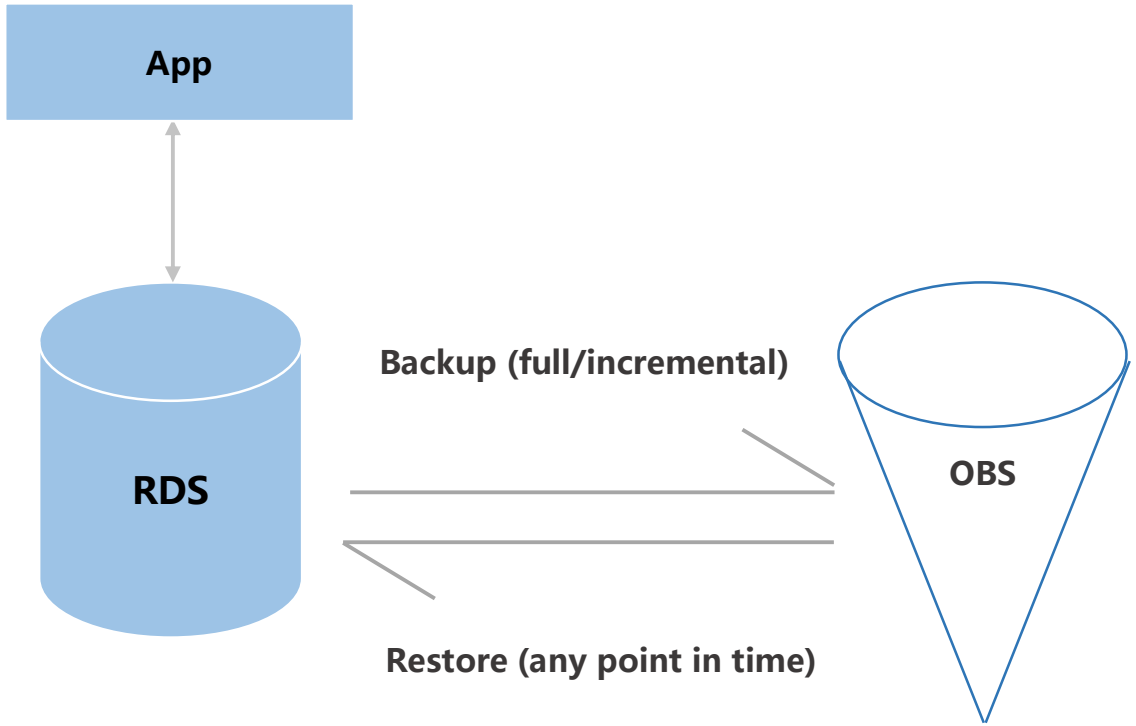
# RDS for PostgreSQL Features - High Availability




**Benefits of the HA cluster architecture:**

- You can choose a failover policy to prioritize reliability or availability.
- DB instances can be deployed in one AZ or across AZs and can automatically fail over within a cluster.
- You can manually switch a primary instance to standby to simulate a fault.
- A read replica can automatically associate itself with a new primary node.
- A switchover can be completed in seconds.
- The standby database does not handle traffic. It only ensures RTO.
- A Huawei-developed HA Monitor module is used.
- Virtual IP addresses can be switched completely invisibly to the applications.
- Multiple primary/standby switchovers can be performed.
- Automatic fault detection is provided.

# RDS for PostgreSQL Features - Point-In-Time Recovery (PITR)




- Backup cycle: 7 to 732 days
- Pay-per-use: Free EVS storage space equal to the requested storage and virtually limitlessly expandable
- Reliability: Up to 11 nines of data reliability
- Security encryption: KMS encryption and multiple protections

**Data archived in OBS can be restored to any point in time.**

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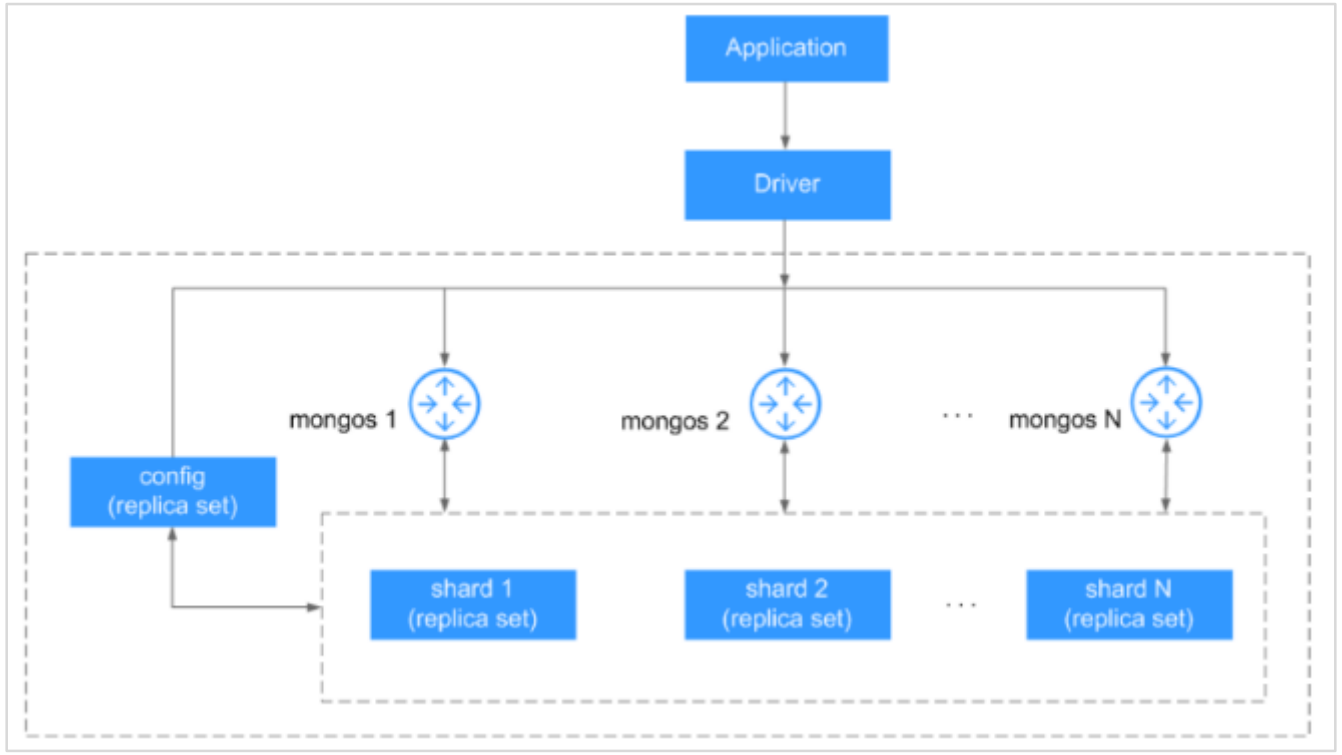
# What Is DDS?

- Document Database Service (DDS) is a high-performance, highly availability MongoDB-compatible database service that is scalable and secure. It provides one-click deployment, elastic capacity expansion, disaster recovery, backup, restoration, monitoring, and alarm reporting.



# DDS Advantages

**100% MongoDB compatibility**

- You can migrate on-premises MongoDB databases to the cloud without reconstructing your services.

**Reliable, available, and secure**

- You can create and save automated or manual backups of your DB instance to ensure data security.

**Efficient O&M**

- You can monitor DB instances from a convenient UI and expand storage in just a few clicks.

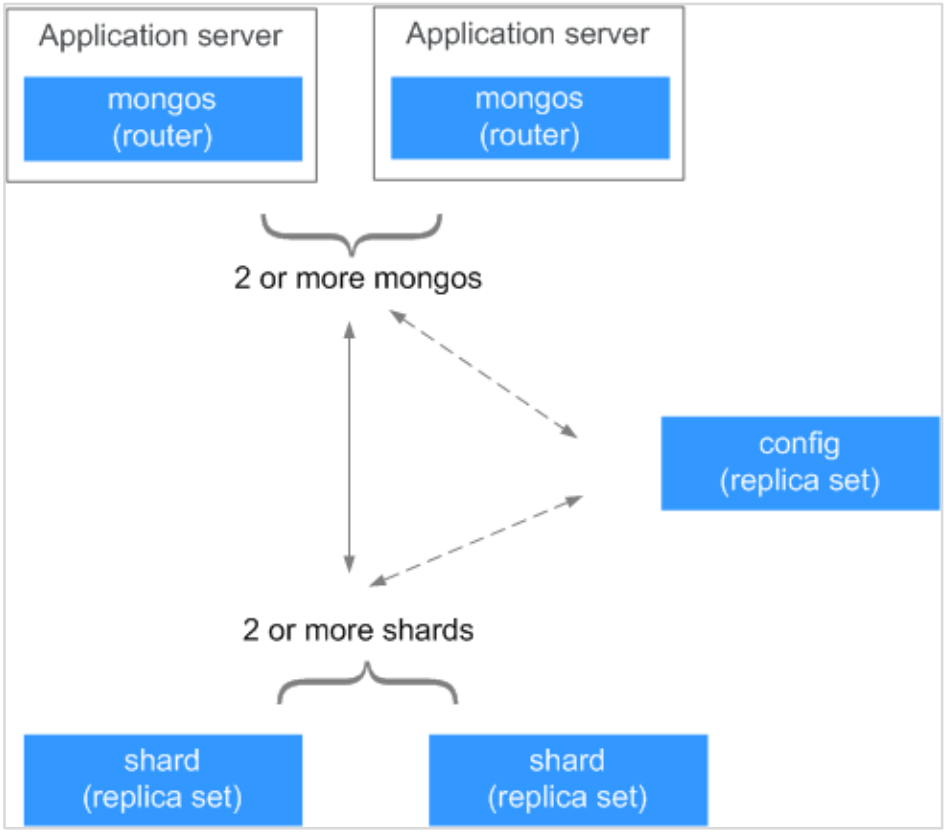
**3 types of architectures**

- You can use clusters, replica sets, and single nodes as required.

# Basic Concepts

- A DDS cluster consists of three types of nodes: mongos, config, and shard, each of which has different functions.

| | |
|---|---|
| mongos | • Each mongos node routes read and write requests, providing a unified interface for accessing DB instances. |
| config | • A config node is deployed as a replica set and stores instance configuration data. |
| shard | • Shard nodes store user data. |



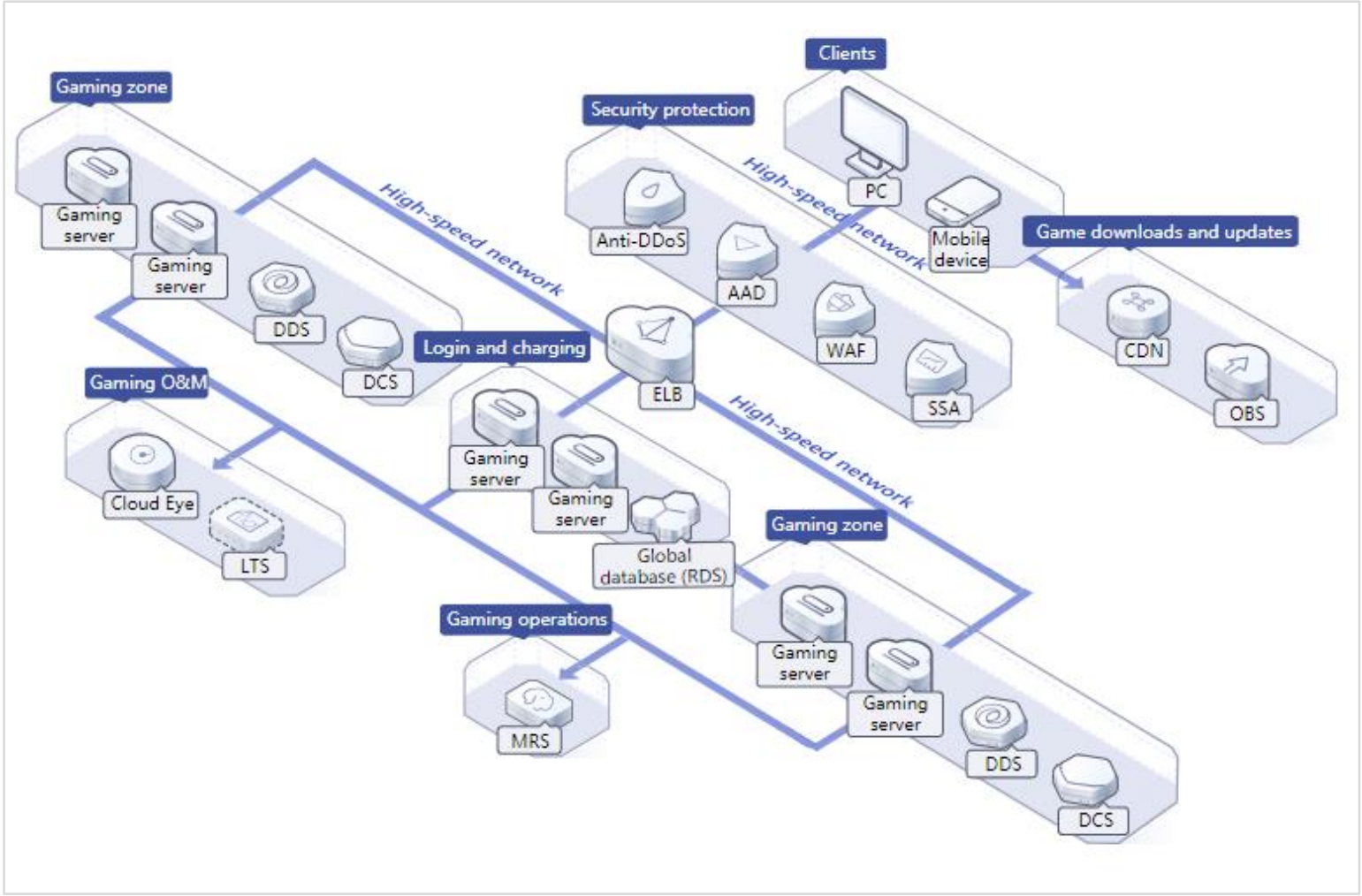
# Overview Architecture

- DDS supports the following deployment modes:

| | |
|---|---|
| Cluster | • Cluster instances are recommended for service systems that require both high availability and scalability. |
| Replica set | • Replica set instances are well suited to small- and medium-sized service systems that require high availability. |
| Single node | • A single-node architecture is useful for R&D, testing, and non-core data storage of enterprises. |

# Applications - Gaming

- DDS offers fast, reliable access to increasingly complex player profiles, including details such as character scores, items acquired and other details. For MMO games, the highly-available architecture of DDS clusters and replica sets can provide a smooth gaming experience even during peak hours.



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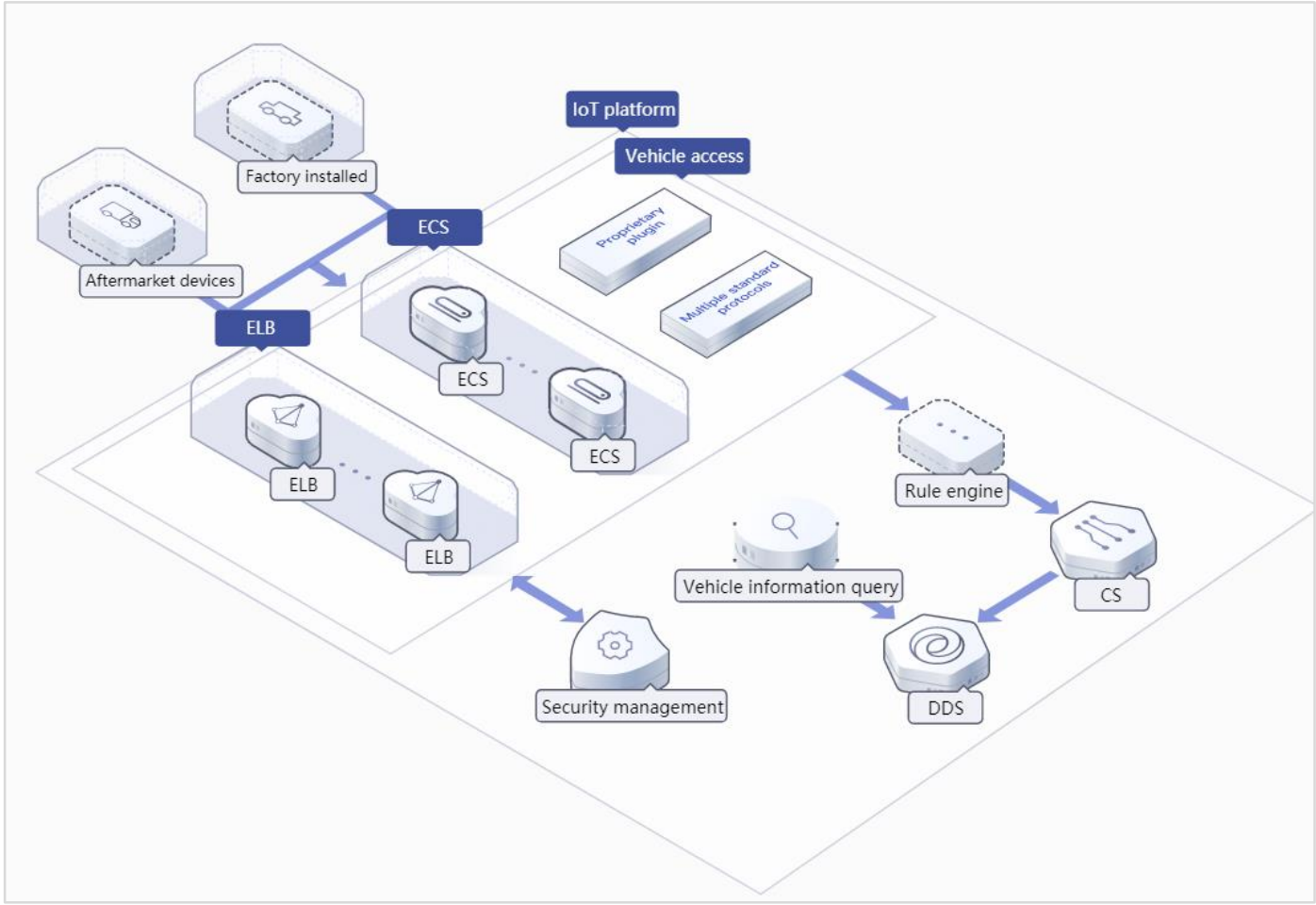
# Applications - IoT

- IoT applications feature high-concurrency writes, diverse data types, and sudden spikes in data volumes. With high performance and asynchronous data writes, DDS is able to process data as fast as in-memory databases when and where it is needed. In addition, the quantities and specifications of mongos and shard nodes in DDS cluster instances can be dynamically increased to meet growing demands, making DDS ideal for IoT applications.



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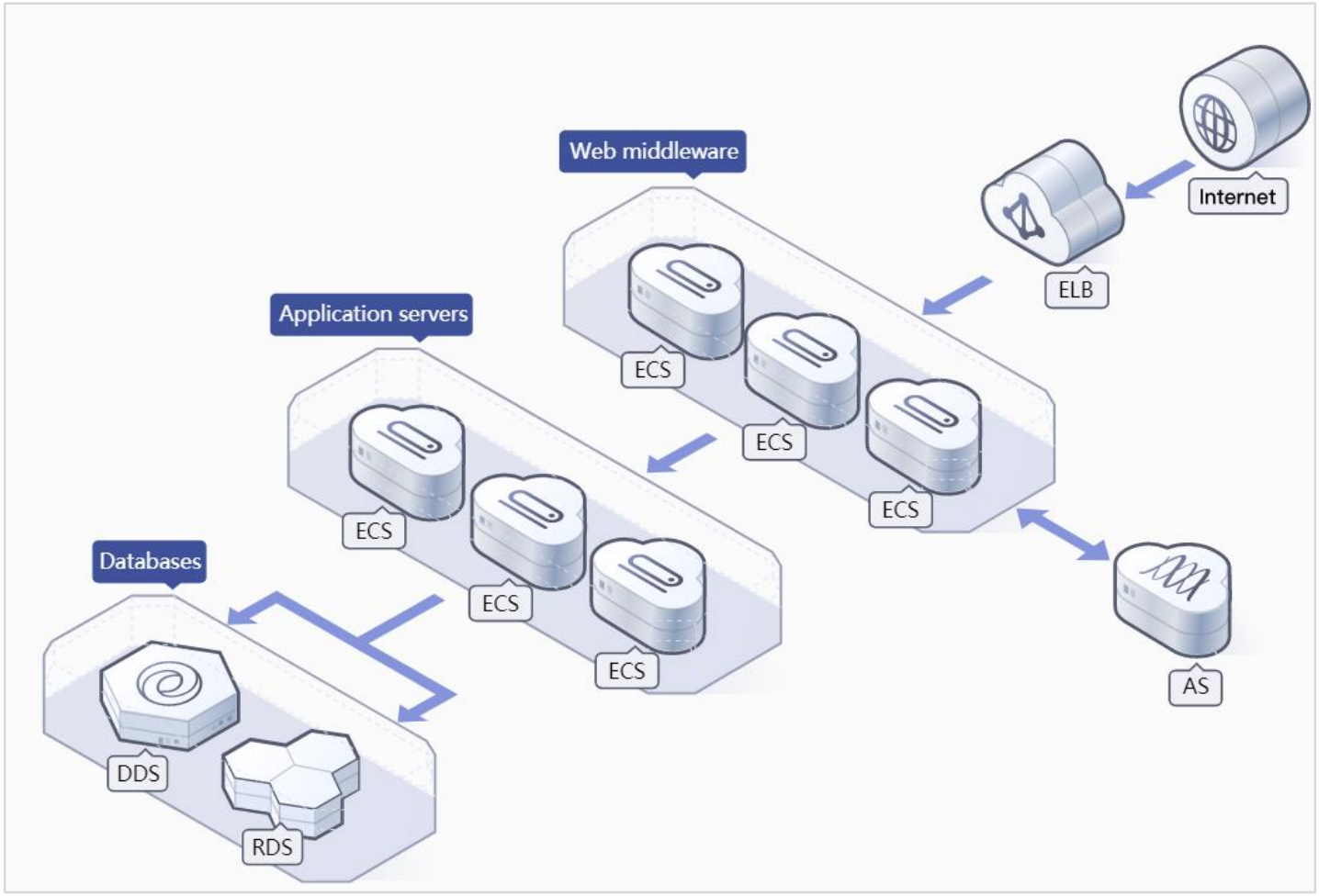
# Applications - Internet

- DDS replica sets use a three-node architecture to deliver reliability and enable disaster recovery. The three data nodes form an anti-affinity group and are deployed on different physical servers to automatically synchronize data. The primary and secondary nodes provide services. Each node has an independent private network address and works with the driver to distribute read load.



# Differences Between Cloud and Other Database Solutions

- Benefits: Cloud database O&M is more efficient, freeing up your database team to focus on database architecture design.

**[On-premises Databases]**

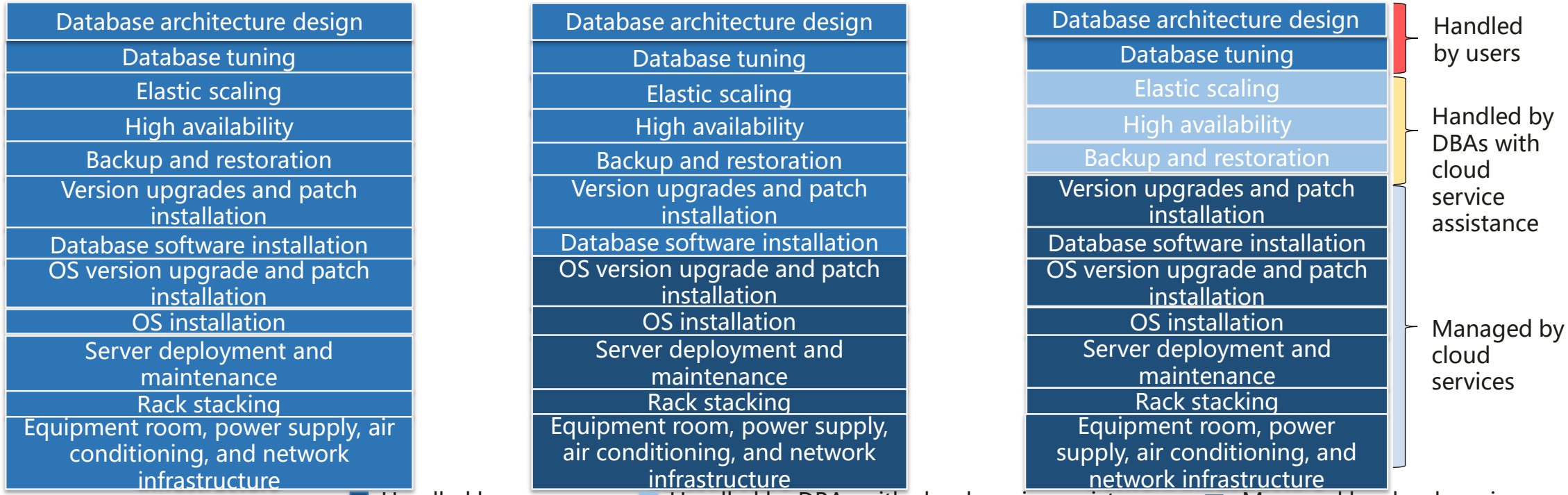
- Server procurement and hardware and operating systems deployment
- High hosting fees
- OS and database O&M

**[Databases on an ECS]**

- Database hardware procurement and installation
- Costs of renting cloud servers
- Database O&M

**[Cloud Databases]**

- No hardware or software investment
- Focused on database architecture design
- Focused on database application optimization



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     - WAF
     - DEW
     - IAM
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# Customer Requirements on Cloud Security

## CSA Top Threats

- Data Leakage
- Insufficient identity, credential, and access management
- Insecure ports and APIs
- System vulnerabilities
- Account hijacking
- Malicious insiders
- Advanced persistent threat (APT)
- Data loss
- Insufficient due diligence
- Abuse and nefarious use of cloud services
- Denial of service (DoS)
- Shared technology vulnerabilities

## Key Security Requirements for Enterprise Cloudification

**Continuous services**

- Defend against network attackers and hackers. Comply with laws and regulations.

**Controllable O&M**

- Configure security policies. Detect and eliminate risks. Audit and trace operations.

**Data confidentiality**

- Prevent data breach. Data is accessible only to authorized staff.

# HUAWEI CLOUD Security Services

- Build a series of top-quality security services for ensuring data security.

| Data Security | Compute security | Management security |
| --- | --- | --- |
| Data Encryption Workshop (DEW) | Host Security Service (HSS) | Managed Detection Response (MDR) |
| Database Security Service (DBSS) | Container Guard Service (CGS) | SSL Certificate Manager (SCM) |
| **App security** | **Cyber security** | Cloud Certificate Manager (CCM) |
| Web Application Firewall (WAF) | Anti-DDoS | Cloud Bastion Host (CBH) |
| Vulnerability Scan Service (VSS) | Advanced Anti-DDoS (AAD) | Situation Awareness (SA) |

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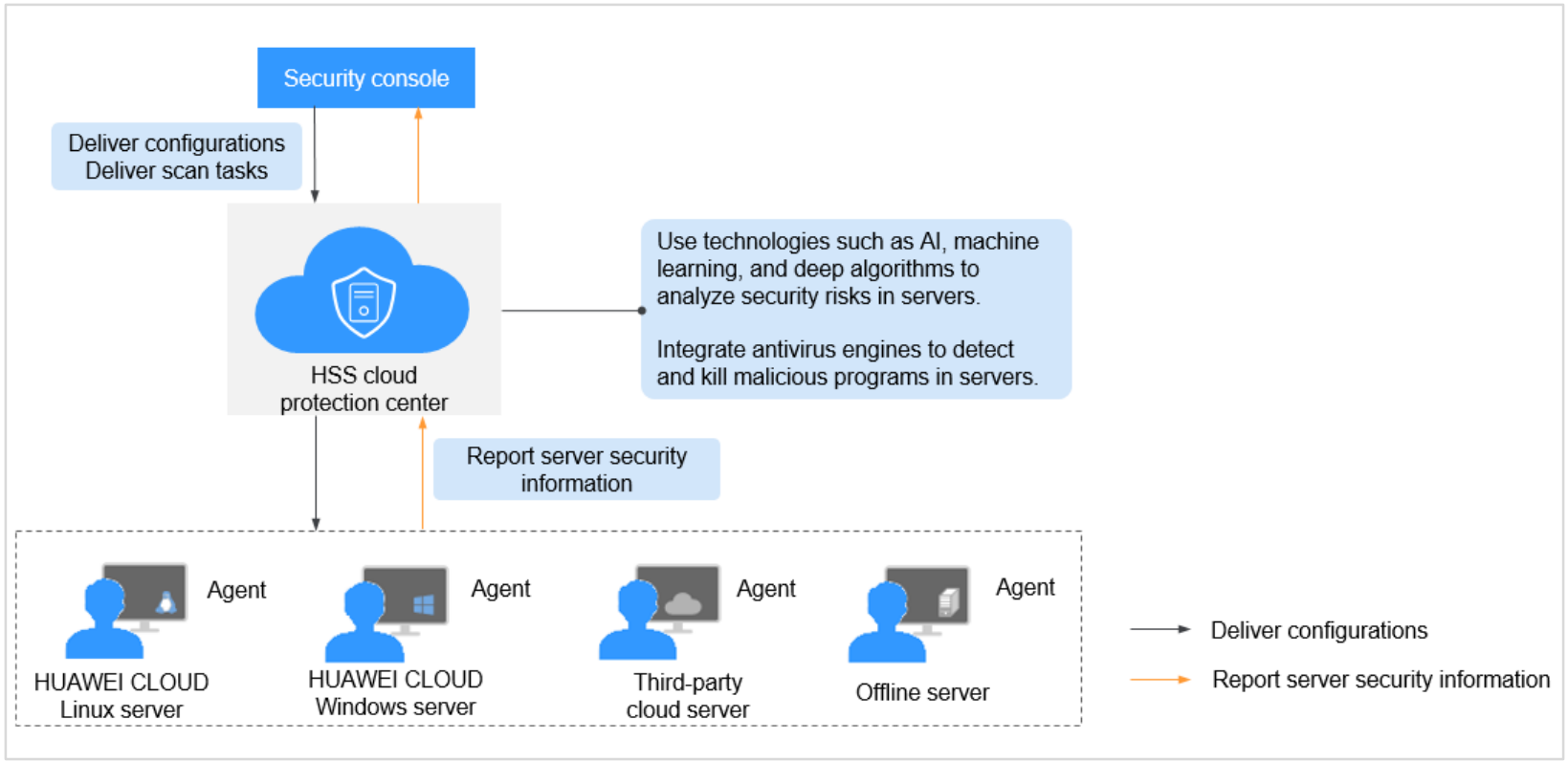
# What Is HSS?

- Host Security Service (HSS) helps you identify and manage the assets on your servers, eliminate risks, and defend against intrusions and web page tampering. There are also advanced protection and security operations functions available to help you easily detect and handle threats.



# HSS Features

**Centralized management**

- You can easily manage, scan, and protect your servers from a single console.

**Precision defense**

- HSS blocks attacks with pinpoint accuracy by using advanced detection technologies and diverse libraries.

**Lightweight agent**

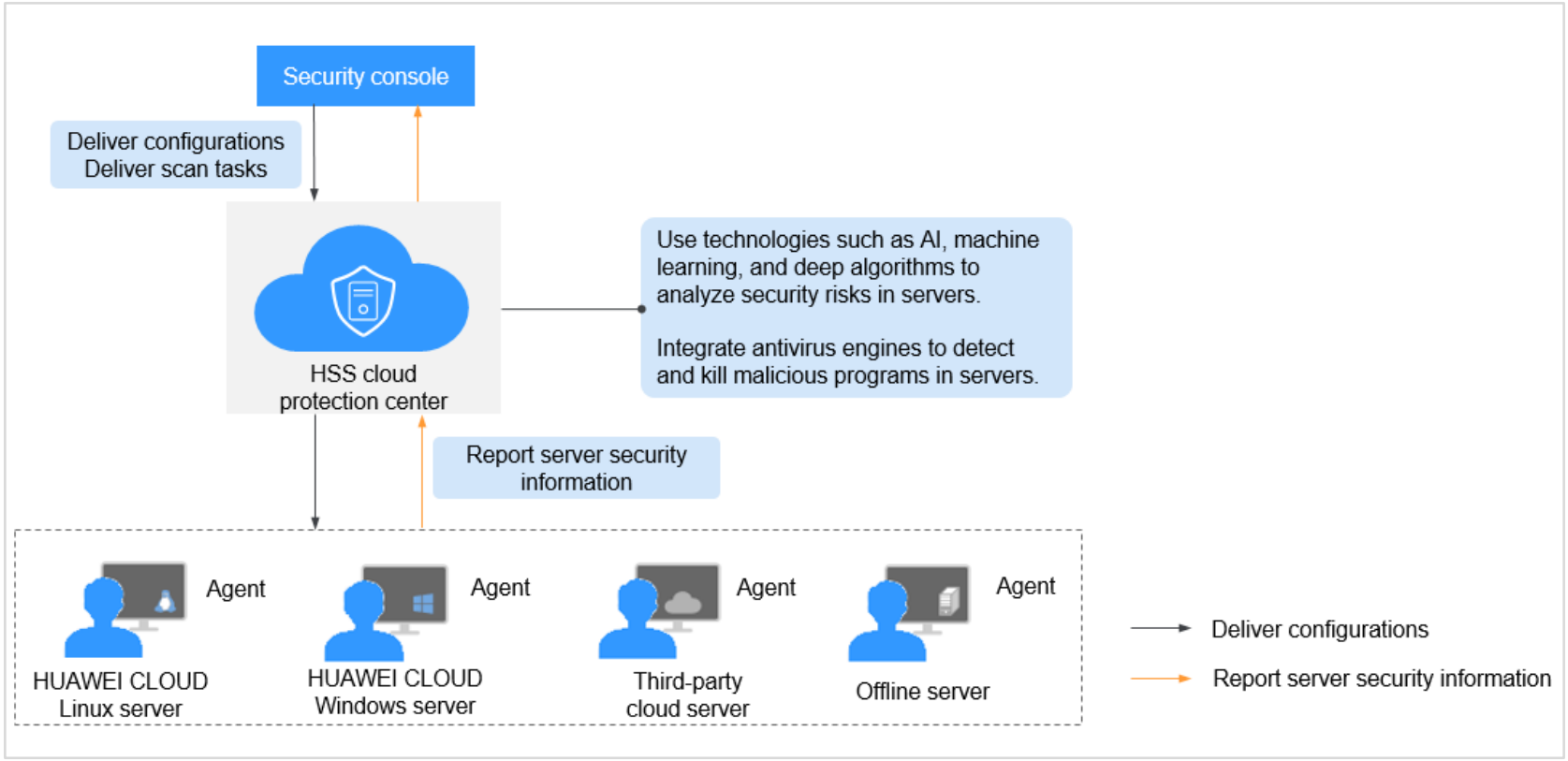
- The lightweight agent occupies only very limited resources, having no impact on system performance.

**Comprehensive protection**

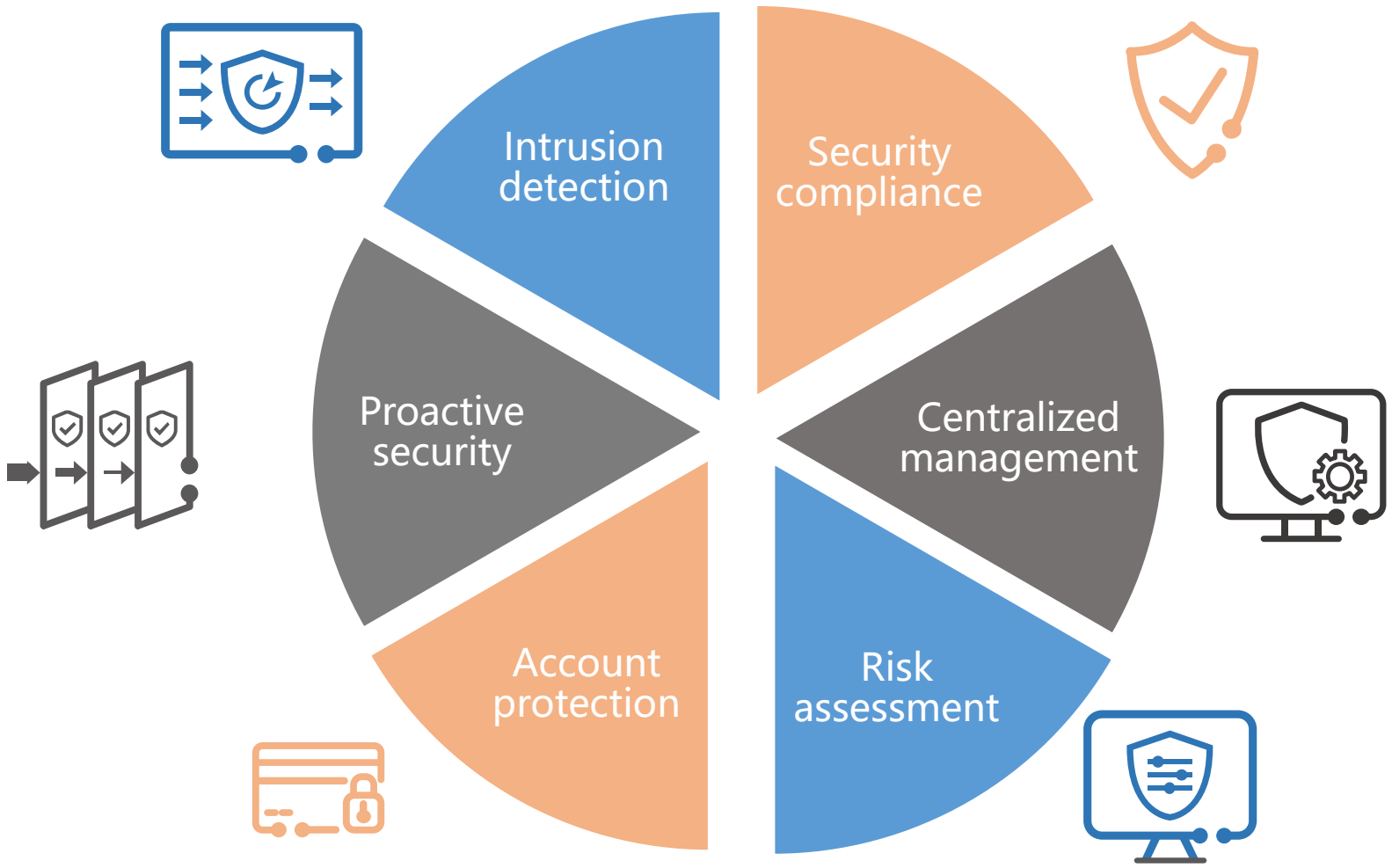
- Prevention before, protection during, and scanning and inspection after any attack.

# How HSS Works

- Install the HSS agent on your servers, and you will be able to monitor the server security status and identify risks in a region from the HSS console.



# HSS Applications



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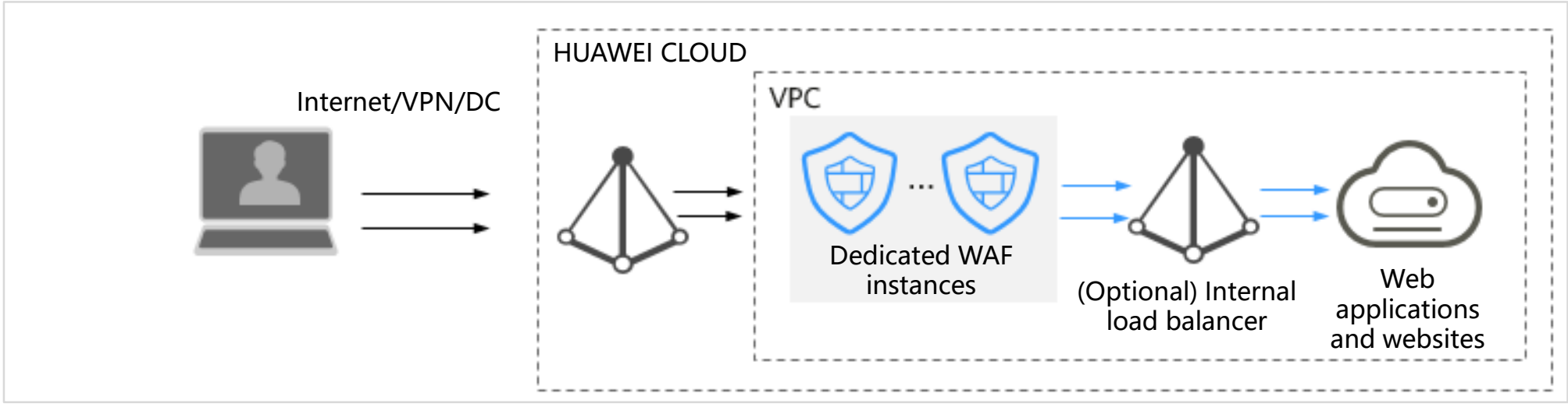
# What Is WAF?

- Web Application Firewall (WAF) keeps your website safe and stable. It comprehensively examines website service traffic to accurately identify malicious requests and block attacks, ensuring best-of-class system security and stability for your applications and data.



# WAF Features

## Comprehensive Protection

- WAF uses an extensive built-in attack signature library to detect and block dozens of common online attacks.

## Industry-leading Technologies

- WAF uses an industry-leading engine to accurately identify a wide range of threats, greatly improving the threat discovery rate.

## Top-notch Reliability

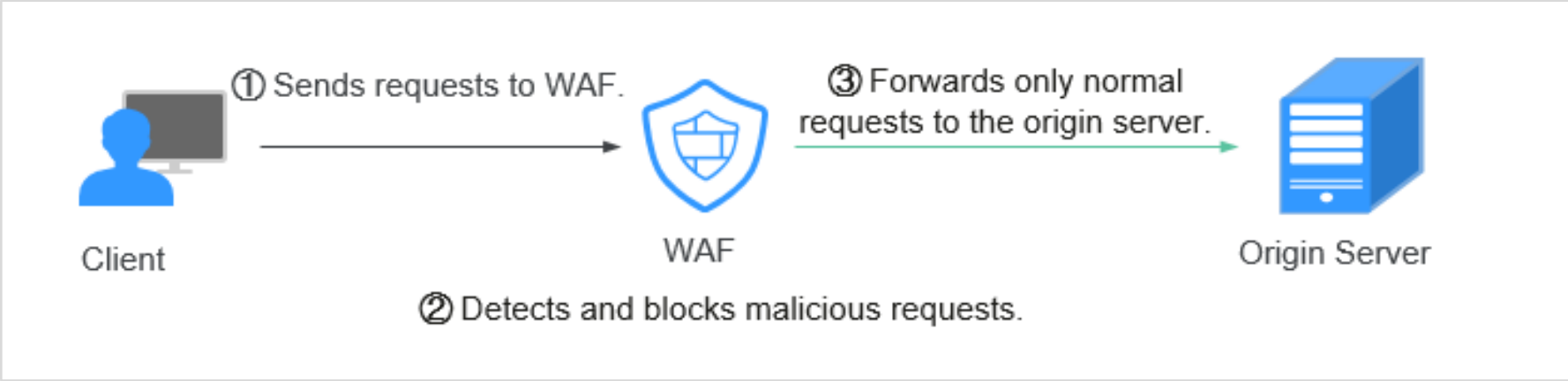
- WAF ensures zero service interruptions with distributed deployment, 24/7 monitoring, and remote disaster recovery.

## Flexible Configuration

- WAF provides multiple built-in configuration fields, enabling users to customize rules for focused protection.

# How WAF Works

- After a website is connected to WAF, all website access requests are forwarded to WAF first. Then, WAF inspects the traffic, filters out malicious traffic, and routes only normal traffic to the origin server, keeping the origin server secure, stable, and available.



# WAF Application Scenarios

Basic Protection

Data Leak Prevention

Web Tamper prevention

Protection for Promotion Activities on e-Commerce Platforms

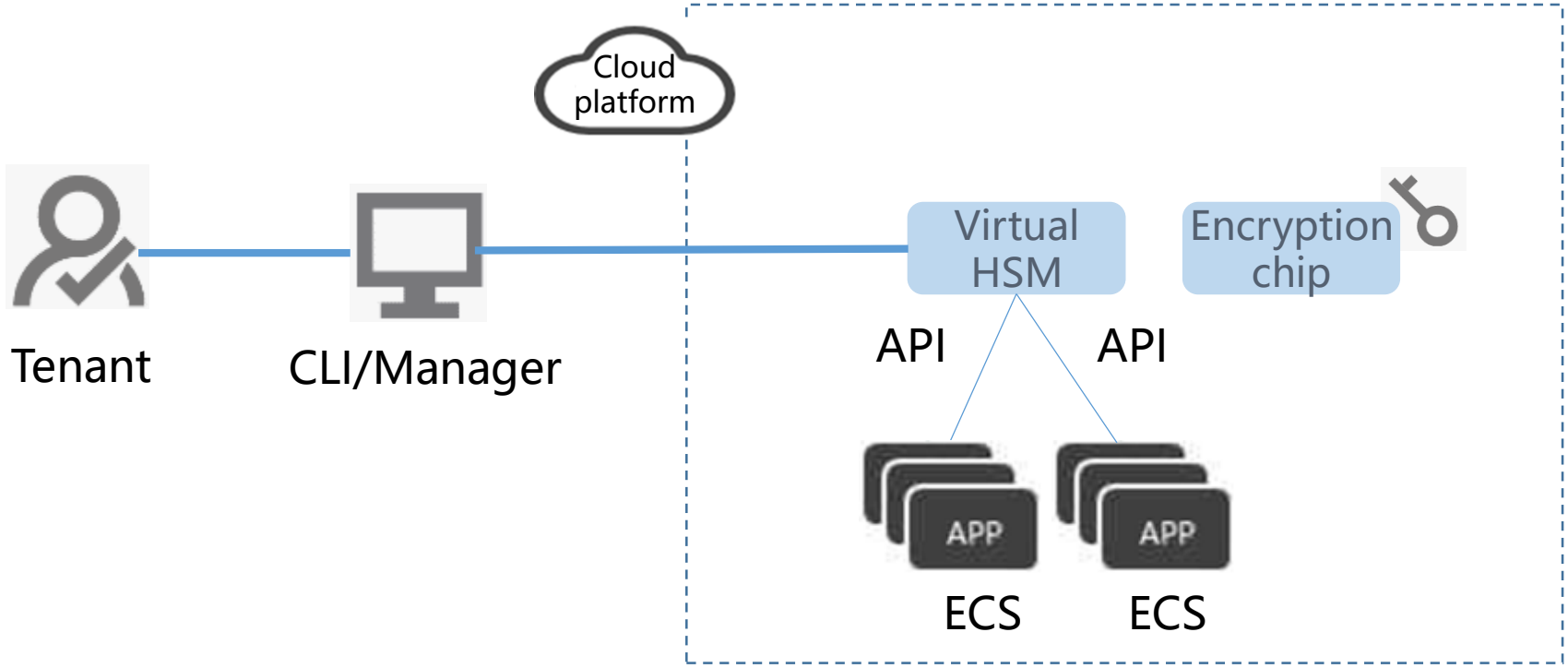
Defense Against Zero-day Vulnerabilities

# Contents


1. Database Services
2. **Security Services**
   - Customer Requirements on Cloud Security
   - HSS
   - WAF
   - DEW
   - IAM
3. Content Delivery Network (CDN)
4. EI Services

# What Is DEW?

- Data Encryption Workshop (DEW) is a cloud data encryption service. It provides Key Management Service (KMS), Key Pair Service (KPS), and Dedicated Hardware Security Module (Dedicated HSM).

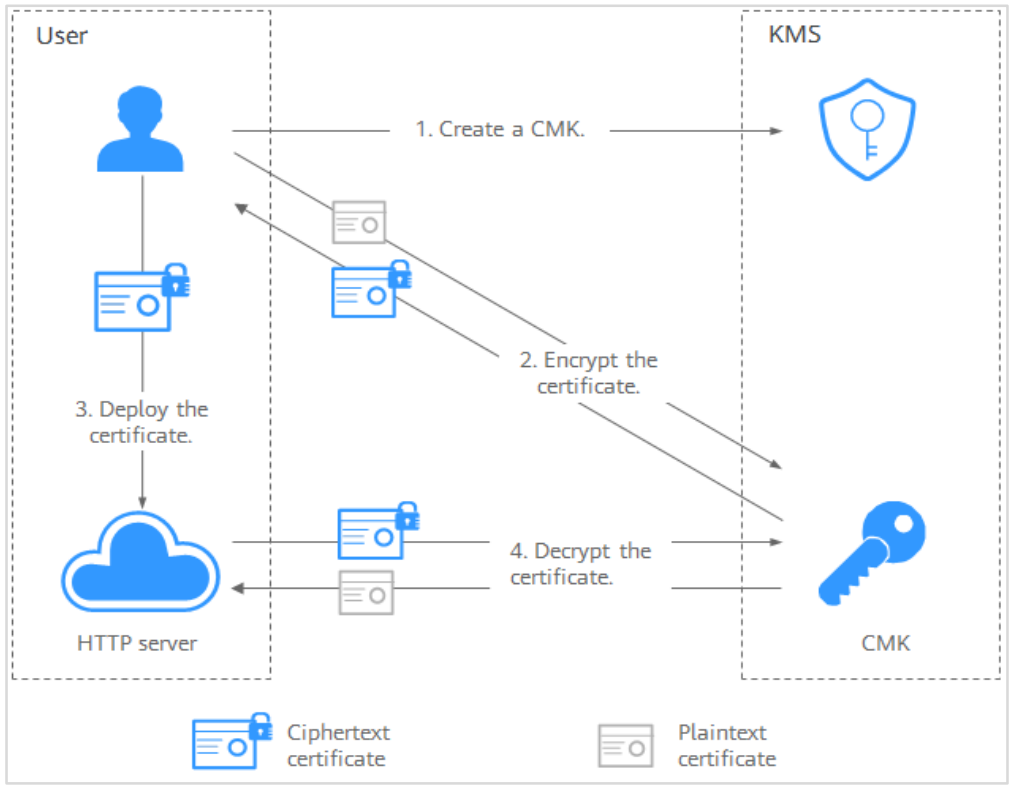


# DEW Services

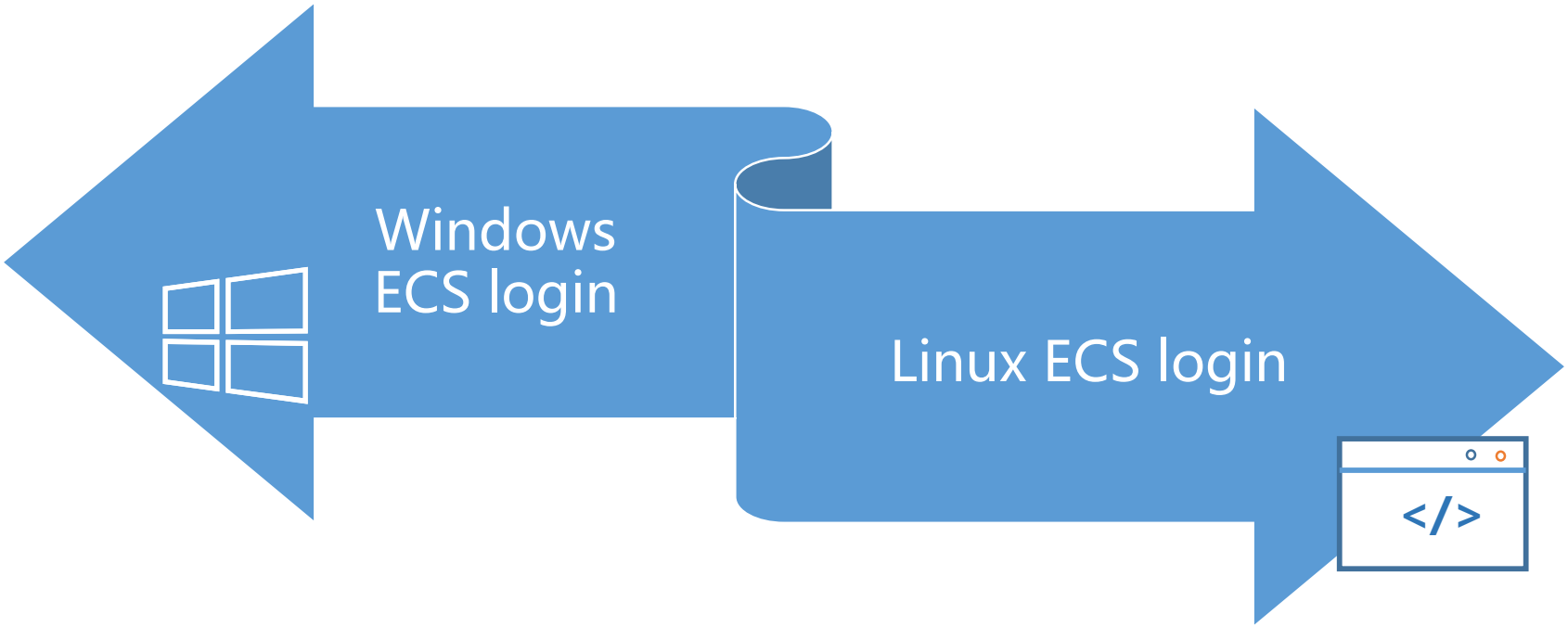
| | |
|---|---|
| KMS | • A secure, reliable, and easy-to-use key hosting service |
| KPS | • A secure, reliable, and easy-to-use SSH key pair hosting service |
| Dedicated HSM | • A cloud service used for encryption, decryption, signature, signature verification, key generation, and the secure storage of keys |

# KMS Application: Small Data Encryption and Decryption

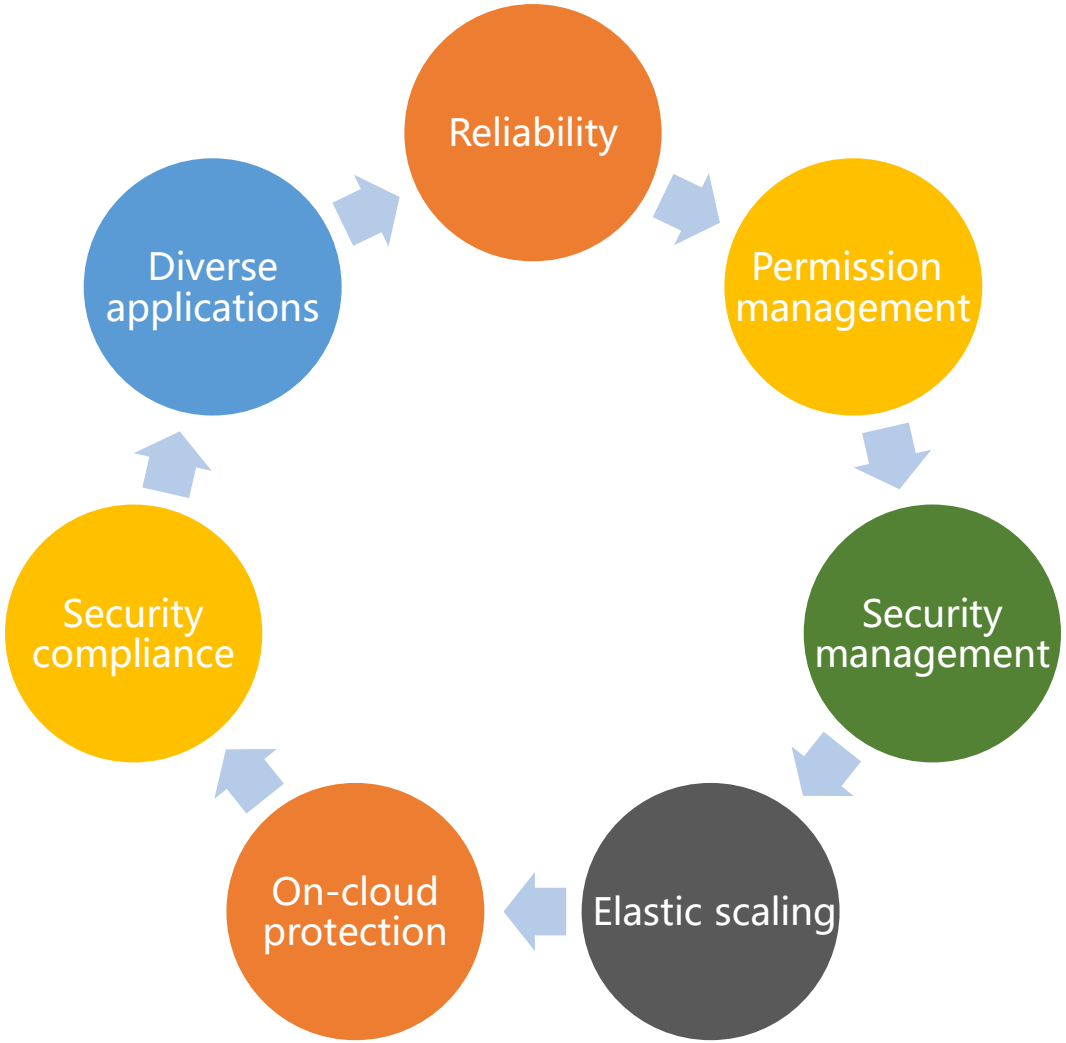
- Scenario: You can use online tools on the KMS console or call KMS APIs to directly encrypt or decrypt small amounts of data with a CMK, for instance, passwords, certificates, or phone numbers.



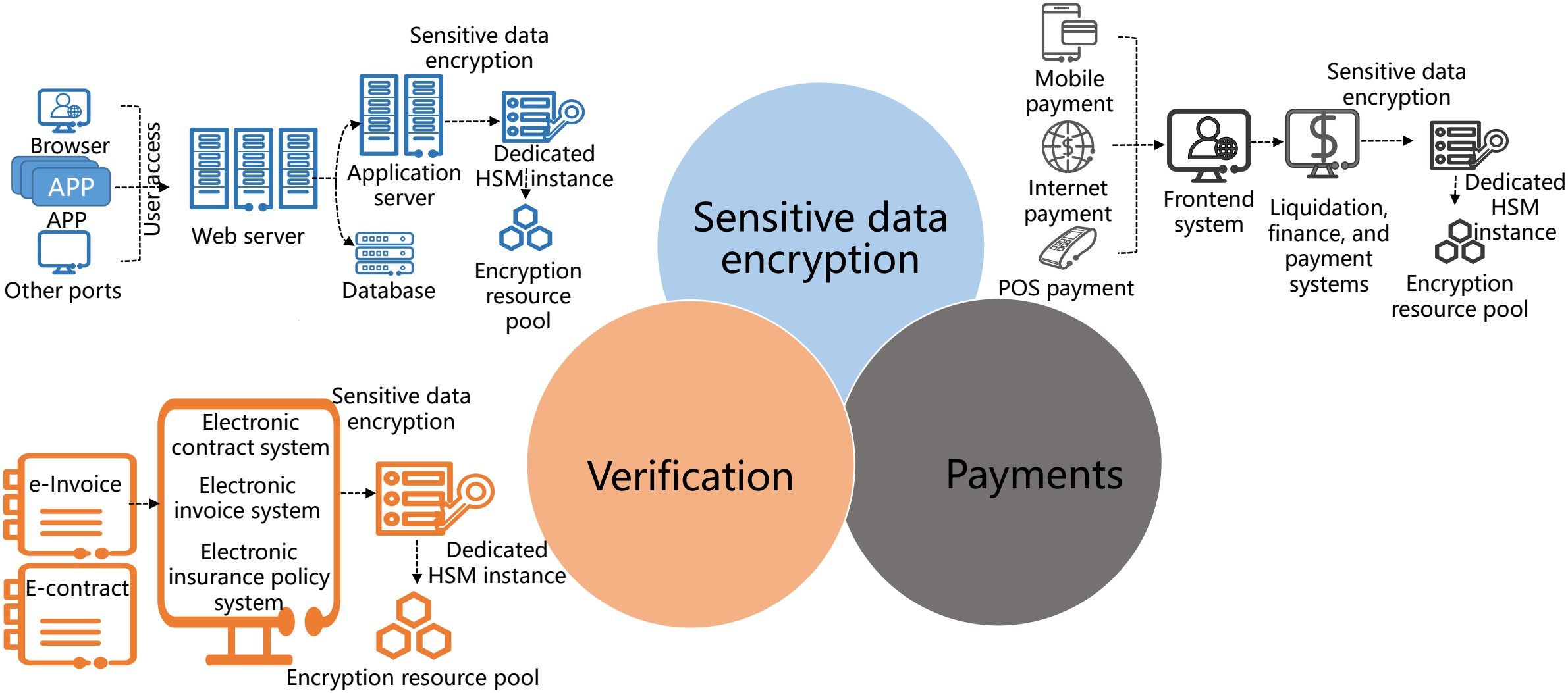
# KPS Applications



# Dedicated HSM Features



# Dedicated HSM Application Scenario






HUAWEI

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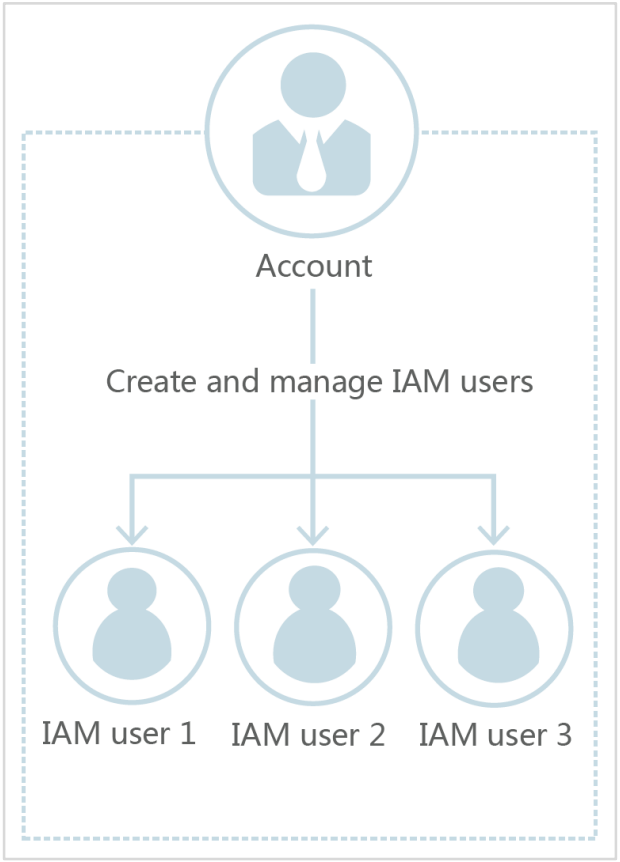
1. Database Services
2. **Security Services**
   - Customer Requirements on Cloud Security
   - HSS
   - WAF
   - DEW
   - IAM
3. Content Delivery Network (CDN)
4. EI Services

# What Is IAM?

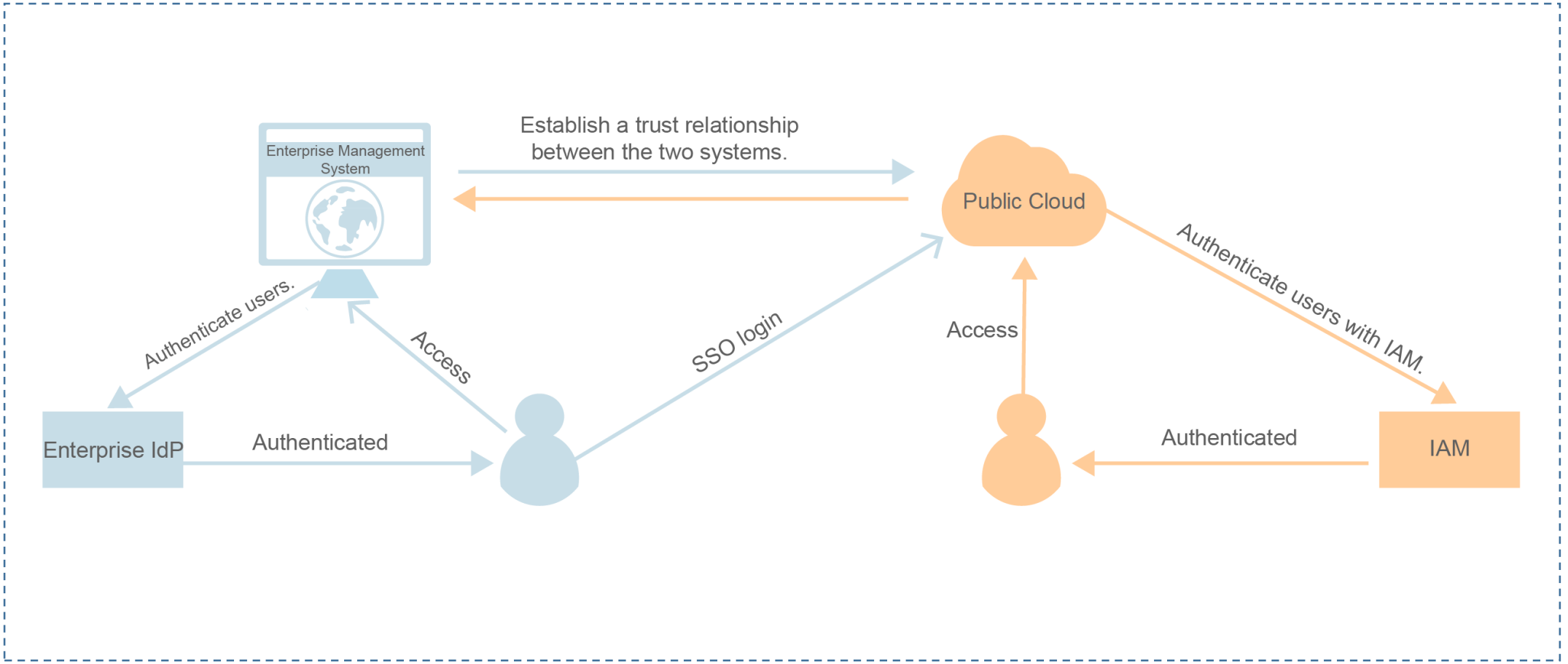
- Identity and Access Management (IAM) helps you manage your users and control their access to HUAWEI CLOUD services and resources.



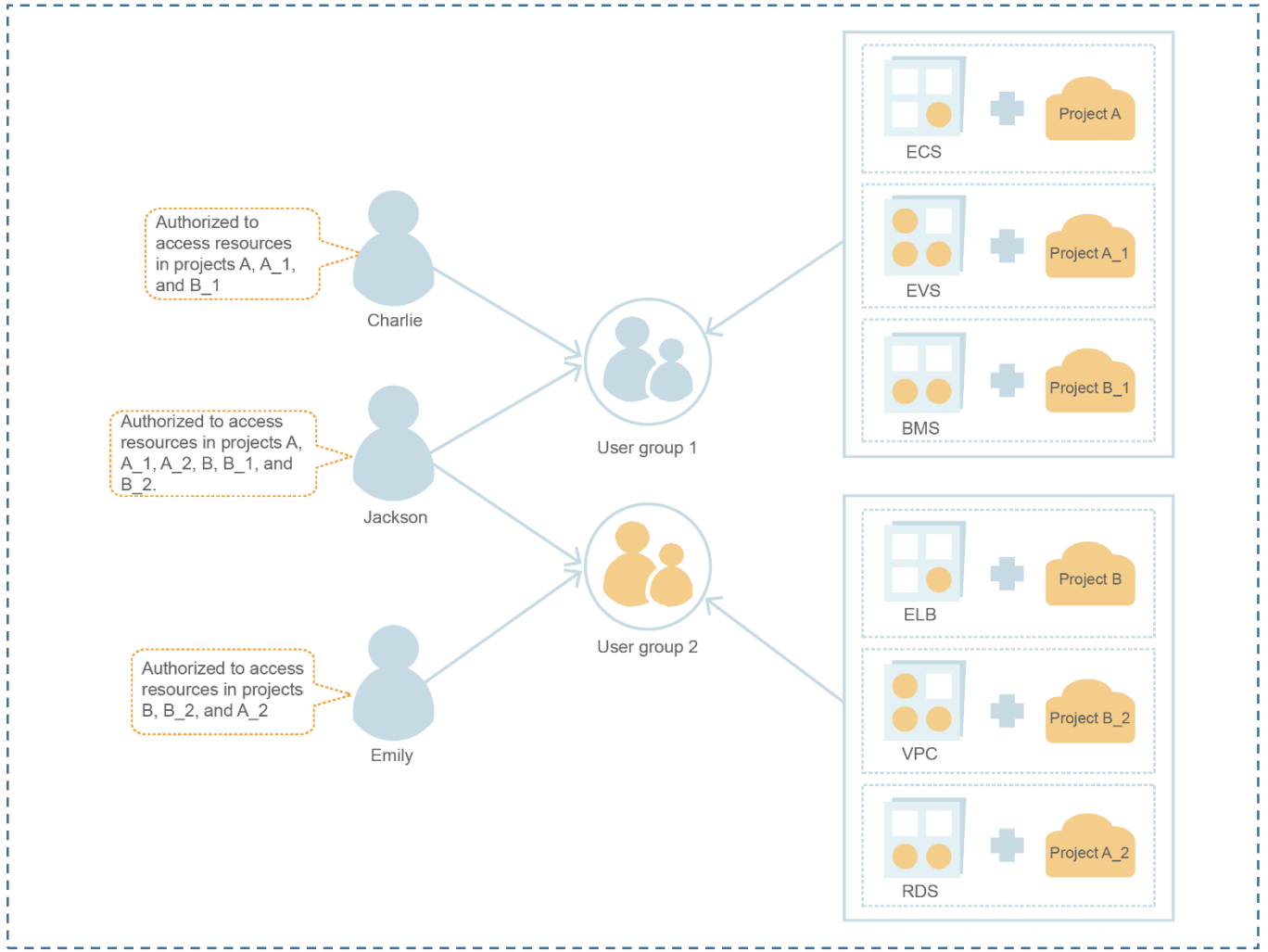
# Why Choose IAM?

- Federated access with existing enterprise accounts
- Finer access control of HUAWEI CLOUD resources
- Delegated access to resources across accounts

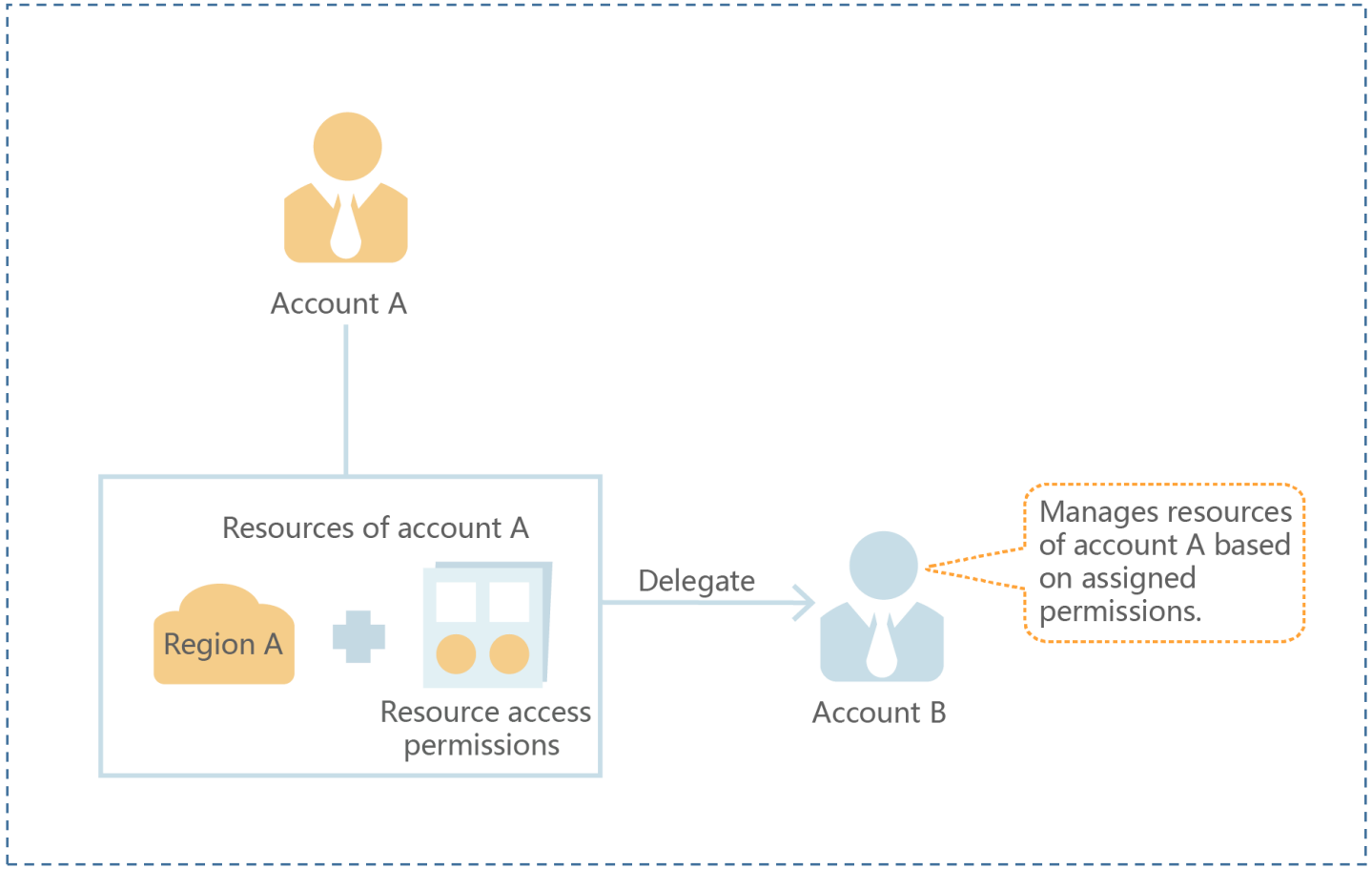
# Federated Access with Existing Enterprise Accounts



# Finer Access Control of HUAWEI CLOUD Resources



# Delegated Access to Resources Across Accounts



# Contents


1. Database Services
2. Security Services
3. **Content Delivery Network (CDN)**
4. EI Services

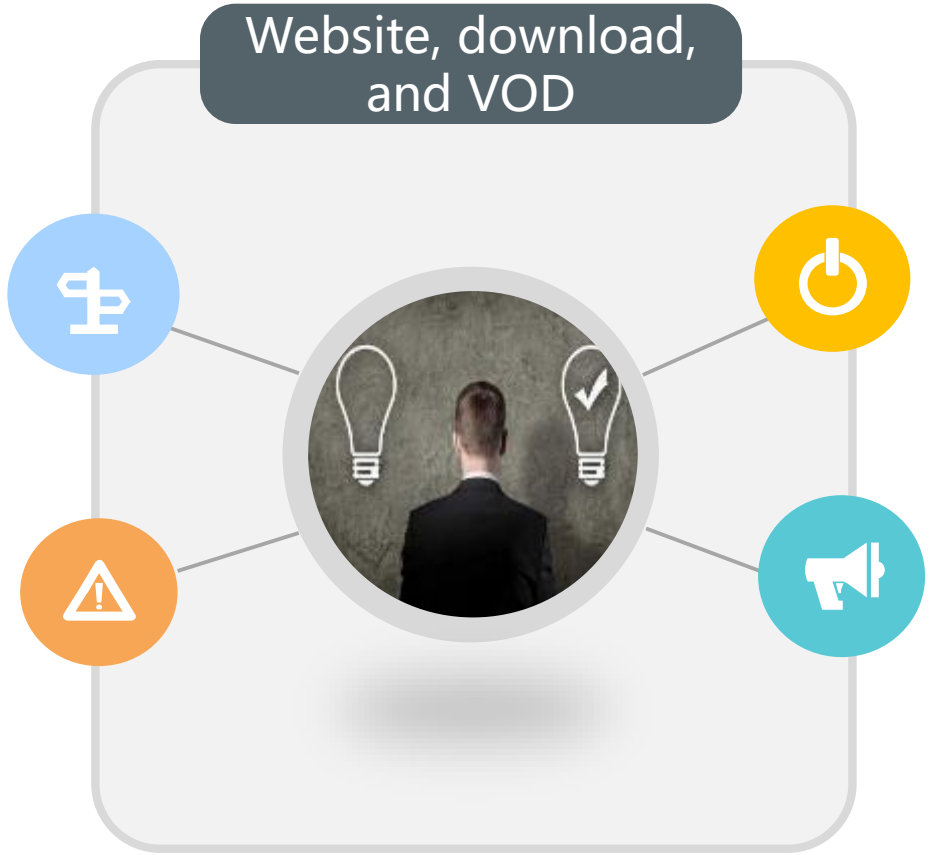
# Pain Points

**Poor user experience**

Slow access
Download or access failures
Video freezing

**High concurrency**

Traffic bursts and concurrent downloads when e-commerce promotions, popular games, or hit TV series go online




**Large bandwidth consumption and high costs**

Without CDN, everything must be fetched from origin servers, which wastes bandwidth and costs money.

**Heavy O&M workload**

Limited bandwidth
A huge number of concurrent requests
Inefficient O&M

# What Is CDN?

- Content Delivery Network (CDN) is an intelligent virtual network built on top of existing Internet infrastructure. Origin content is cached on CDN nodes around the world so users can quickly obtain desired content from nearby nodes.

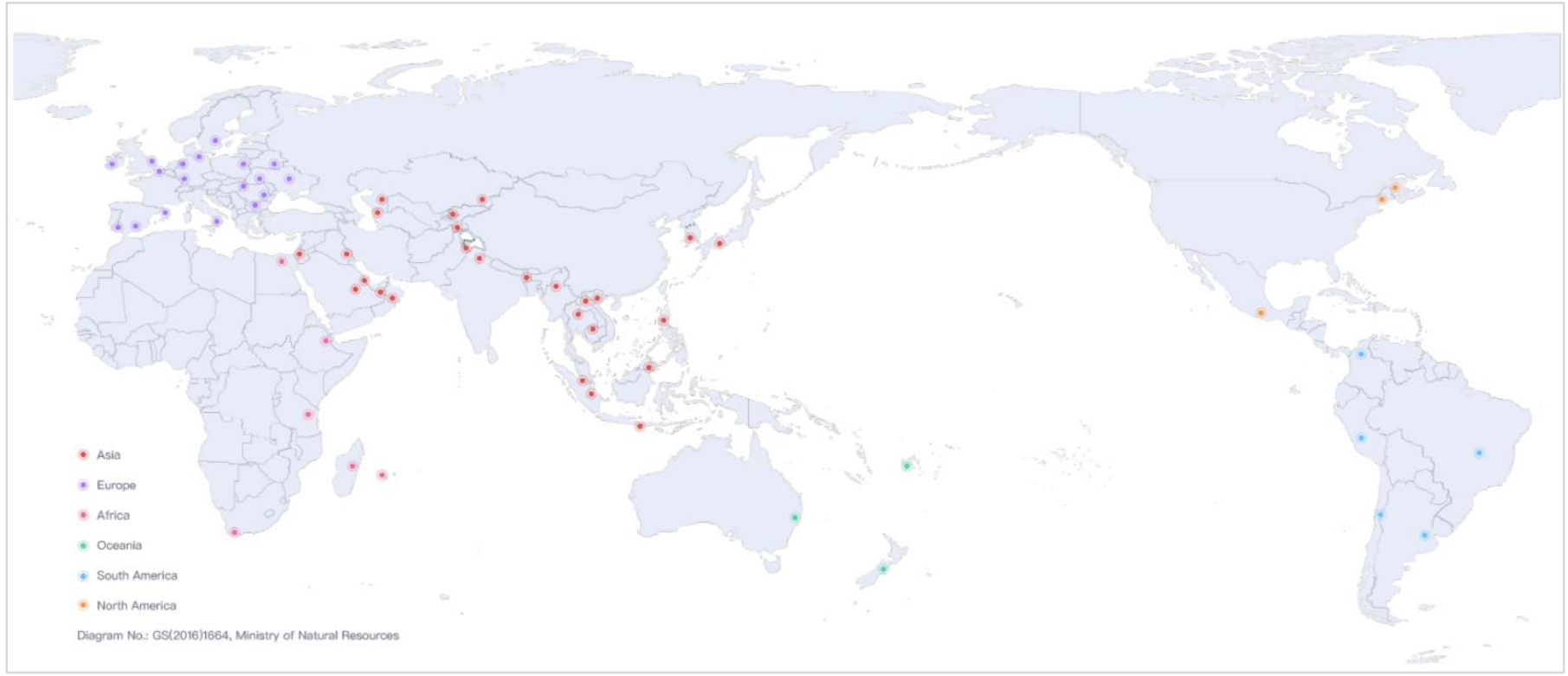
# Node Distribution in the Chinese Mainland

- HUAWEI CLOUD CDN operates 2,000+ nodes in the Chinese mainland. These nodes are connected to the networks of top carriers in China such as China Telecom, China Unicom, China Mobile, and China Education and Research Network (CERNET), as well as many small and medium-sized carriers. At least 100 Tbit/s of bandwidth is reserved for response to traffic bursts, and bandwidth expansion is not limited. CDN precisely schedules user requests to the most appropriate edge nodes, providing efficient and reliable acceleration.


Nodes in the Chinese mainland

# Node Distribution Outside the Chinese Mainland

- 500+ nodes across over 70 countries and regions, international private lines, and Tbit/s-level redundant bandwidth.



# Advantages of CDN

## Global Presence

HUAWEI CLOUD CDN has over 2,000 nodes in the Chinese mainland and over 500 nodes outside the Chinese mainland. The network bandwidth is higher than 100 Tbit/s.

## Intelligent Scheduling

- Accurate and evolving global IP geolocation database
- Dynamic adjustment of nodes to deliver cache to users based on real-time analysis

## Security

- Secure and reliable content delivery services
- Advanced network security capabilities throughout the network, such as data transmission over HTTPS and hotlink protection

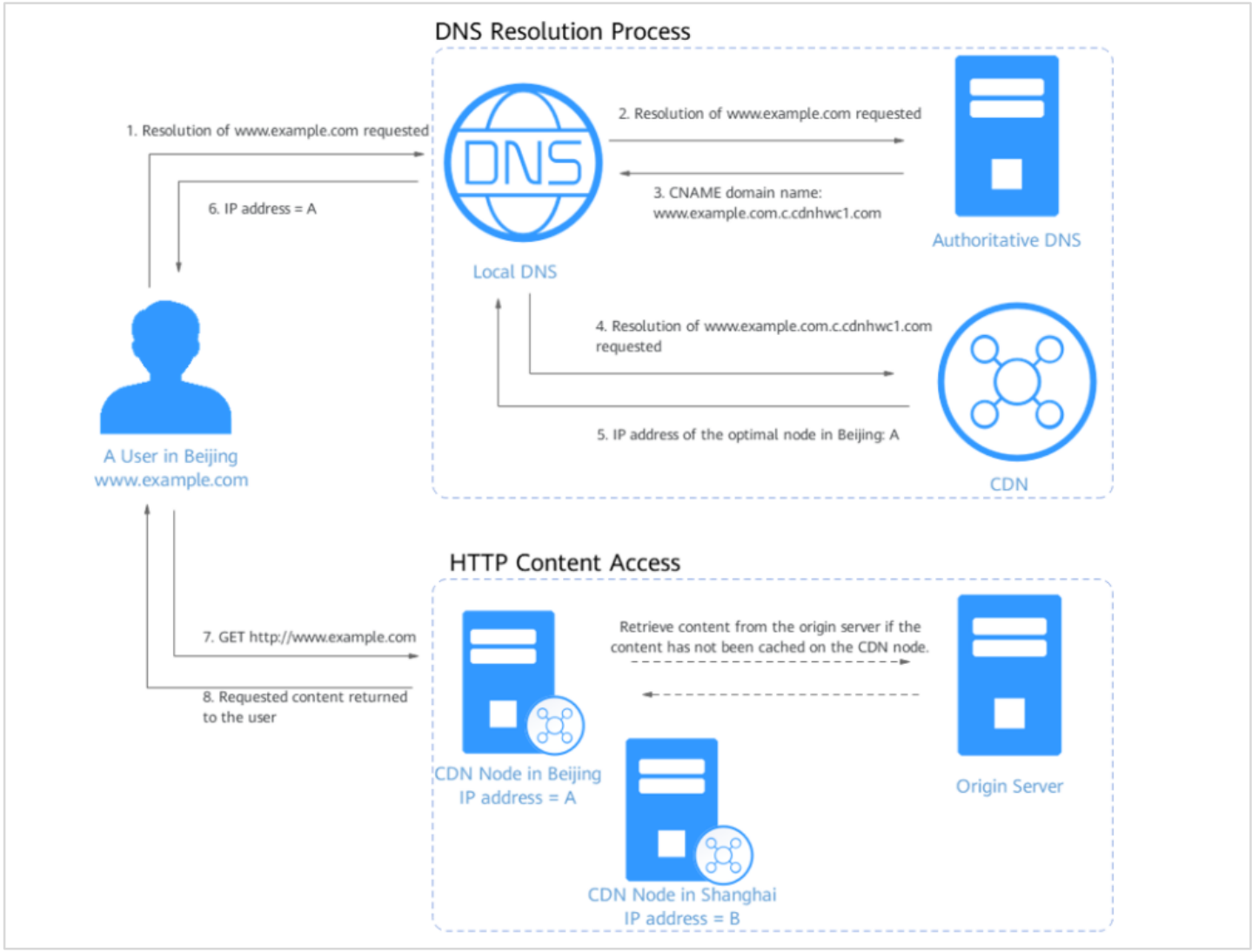
## Ease of Use

You can manage your domain names and logs, customize configurations (such as cache policies), and analyze domain data on the easy-to-use CDN console.

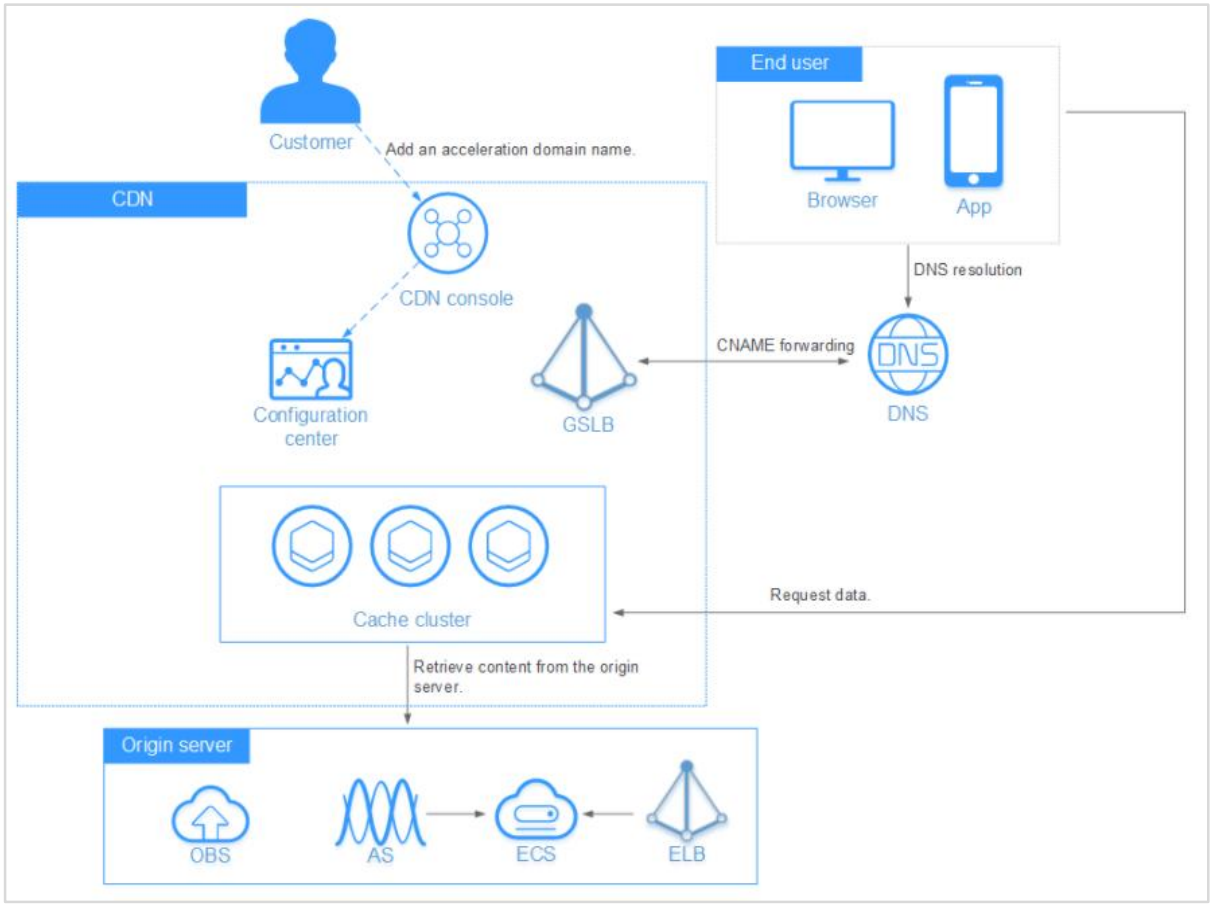
## Reliability

One-stop acceleration, including website, download, video, and whole site acceleration, meeting a wide range of requirements

# How Does CDN Work?

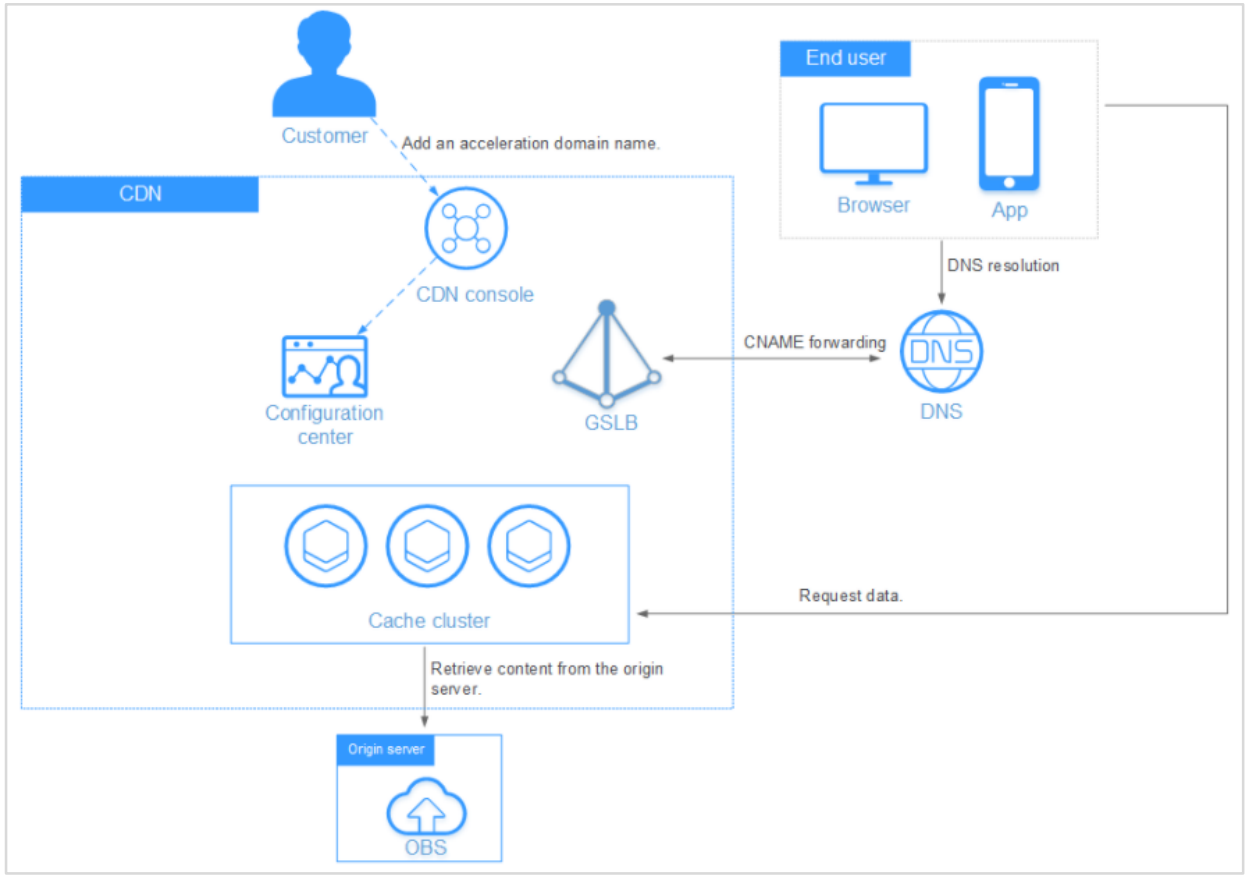


# Application Scenarios - Website Acceleration



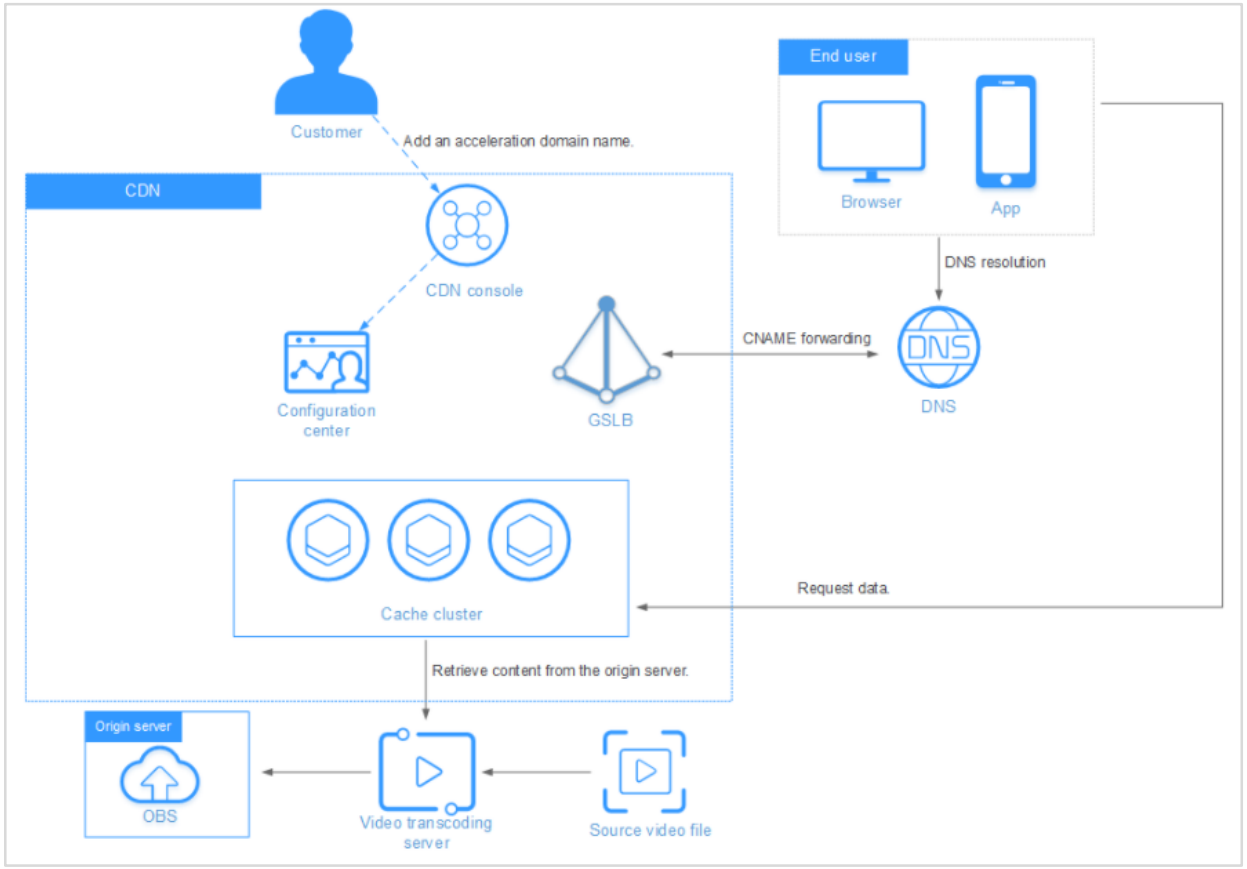

- Website Acceleration
- CDN is perfect for web portals, e-commerce platforms, news apps, and user generated content (UGC)-focused apps. It provides excellent acceleration for static content under an acceleration domain name. In addition, it supports custom cache policies. You can set the maximum cache age as needed.
- Advantages
  - Quick configuration: Domain names can be configured in just six simple steps.
  - Secure acceleration: HTTPS and referer validation ensure high security.
  - Flexible configuration: Content can be cached permanently or temporarily, or not cached.
- CDN can be used together with OBS, ECS, and DNS to build an E2E solution.

# Application Scenarios - Download Acceleration



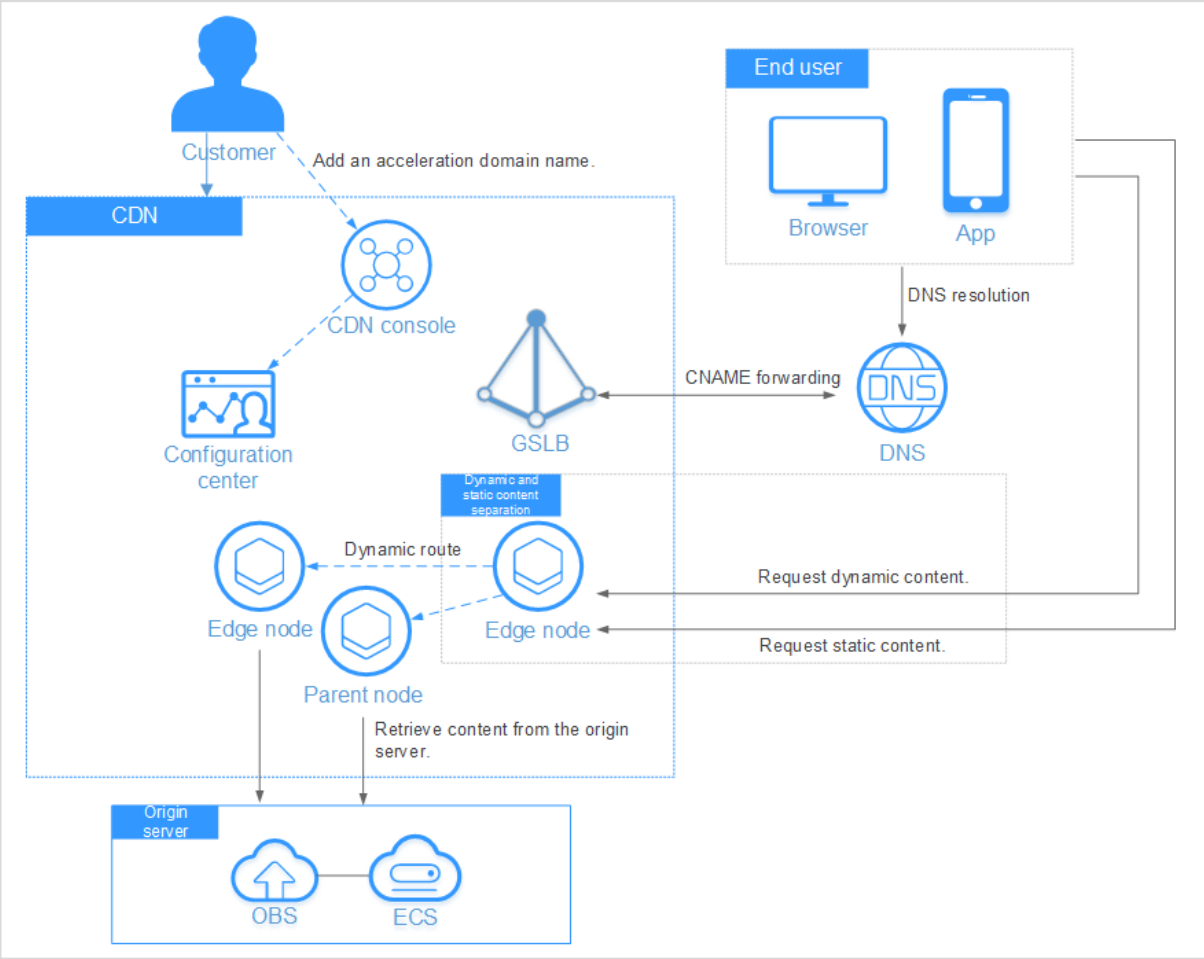

- Download Acceleration
- CDN is useful for download clients, game clients, app stores, websites that provide download services based on HTTP or HTTPS, and apps that require updates in real time, such as mobile games.
- Advantages
  - Real-time analysis: Log monitoring and statistical analysis are performed in real time.
  - Reliability: HTTPS acceleration and referer validation ensure high security.
  - Cost-effectiveness: CDN interworks with OBS to further enhance performance and reduce costs.
- CDN can be used together with OBS and DNS to build an E2E solution.

# Application Scenarios - VOD Acceleration




- VOD Acceleration
- CDN is a must if you intend to provide on-demand audiovisual services or live streaming services over the HTTP Live Streaming (HLS) protocol. Such services include online education, video sharing, and music or video on demand.
- Advantages
  - Real-time monitoring: Data such as traffic and bandwidth generated is displayed in CDN in real time.
  - Security: Referer validation protects copyrighted images from being used.
  - Flexible configuration: Content can be cached permanently or temporarily, or not cached.
- CDN can be used together with OBS and DNS to build an E2E solution.

# Application Scenarios - Whole Site Acceleration




- Whole Site Acceleration
- CDN is a good option for websites that consist of both dynamic and static content, and for websites that involve a large number of ASP, JSP, or PHP requests.
- Advantages
  - Separation of dynamic and static content: Dynamic and static content is accelerated separately.
  - Secure acceleration: HTTPS and referer validation ensure high security.
  - Sequential retrieval: If the number of content retrieval requests to an origin server increases sharply, you can set a threshold. Once the threshold is exceeded, the retrieval requests are queued for response based on the time the requests are sent.
- CDN can be used together with OBS, ECS, and DNS to build an E2E solution.

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HUAWEI

# Huawei EI Service Panorama - Artificial Intelligence

- HUAWEI CLOUD provides comprehensive AI and big data cloud services to facilitate the intelligent upgrades of governments and enterprises and build ubiquitous and pervasive AI.


ModelArts


Image Recognition


Optical Character Recognition (OCR)


Conversational Bot Service (CBS)


Natural Language Processing Customization (NLPC)


Content Moderation


Video Content Recognition (VCR)


Image Search (IS)


Speech Interaction Service (SIS)


Facial Recognition


Human Analysis Service (HAS)


Video Content Processing (VCP)

# HUAWEI CLOUD EI Service Panorama - Big Data

- HUAWEI CLOUD provides comprehensive AI and big data cloud services to facilitate the intelligent upgrades of governments and enterprises and build ubiquitous and pervasive AI.


Data Lake Insight (DLI)


MapReduce Service (MRS)


CloudTable Service (CloudTable)


Data Lake Visualization (DLV)


Data Warehouse Service (DWS)


Cloud Stream Service (CS)


Trusted Intelligent Computing Service (TICS)

Data Lake Governance Center (DGC)


Recommender System (RES)


Cloud Search Service (CSS)

Log Analysis Service (LOG)


Data Ingestion Service (DIS)

# One-Stop AI Development Platform ModelArts

- ModelArts is a one-stop AI development platform. For machine learning and deep learning, it supports data preprocessing, semi-automated data labeling, distributed training, automated model building, and on-demand deployment of device-edge-cloud models. ModelArts helps AI developers build and deploy models quickly and manage the lifecycle of AI workflows.

**ModelArts 3.0**

Intelligent sensing, cognition, and decision-making

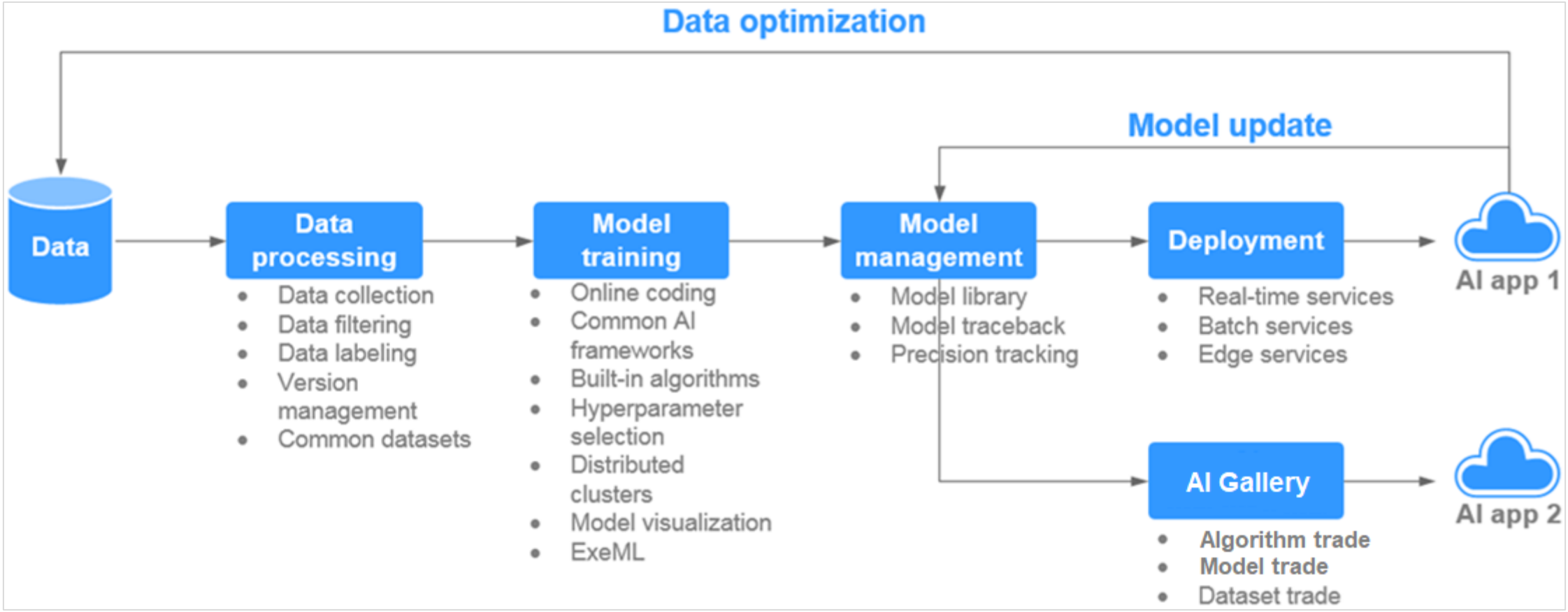
**ModelArts Pro**

World's first enterprise-grade AI application development suite

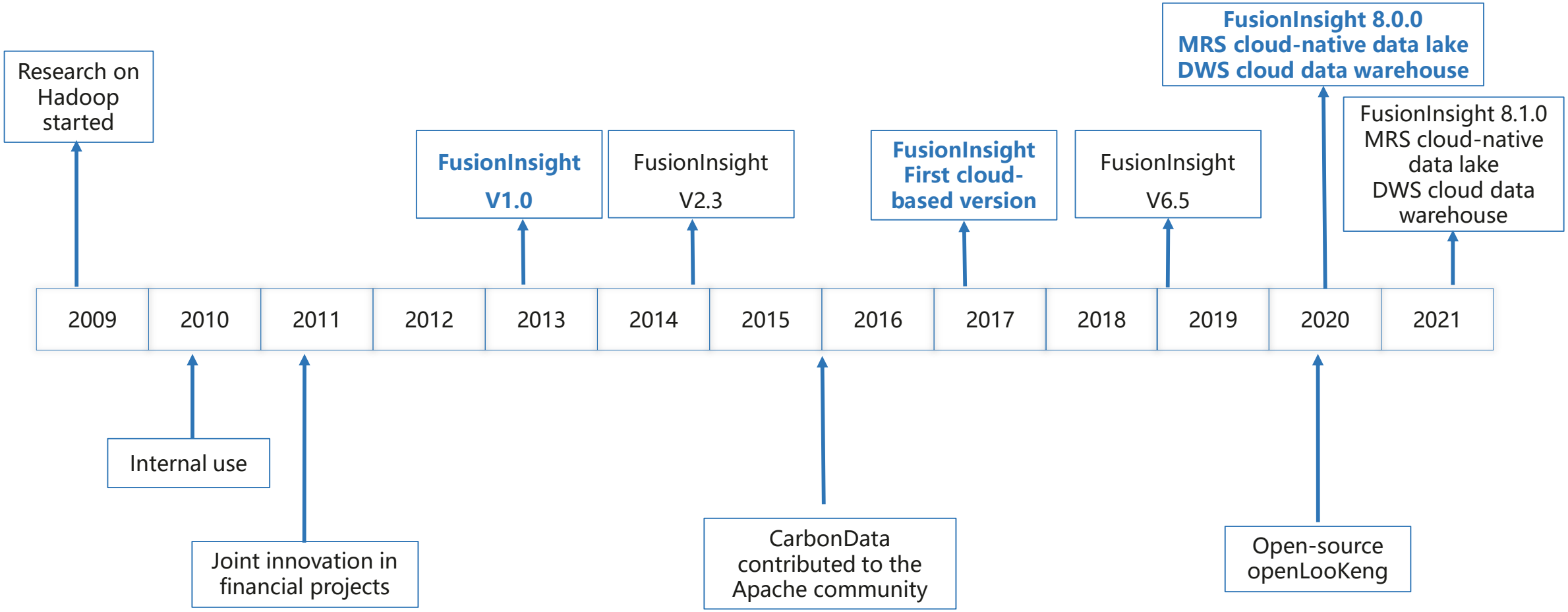
**Knowledge Compute**

New path integrating industry expertise with AI

# Functions of ModelArts



# FusionInsight Intelligent Data Lake - Milestones

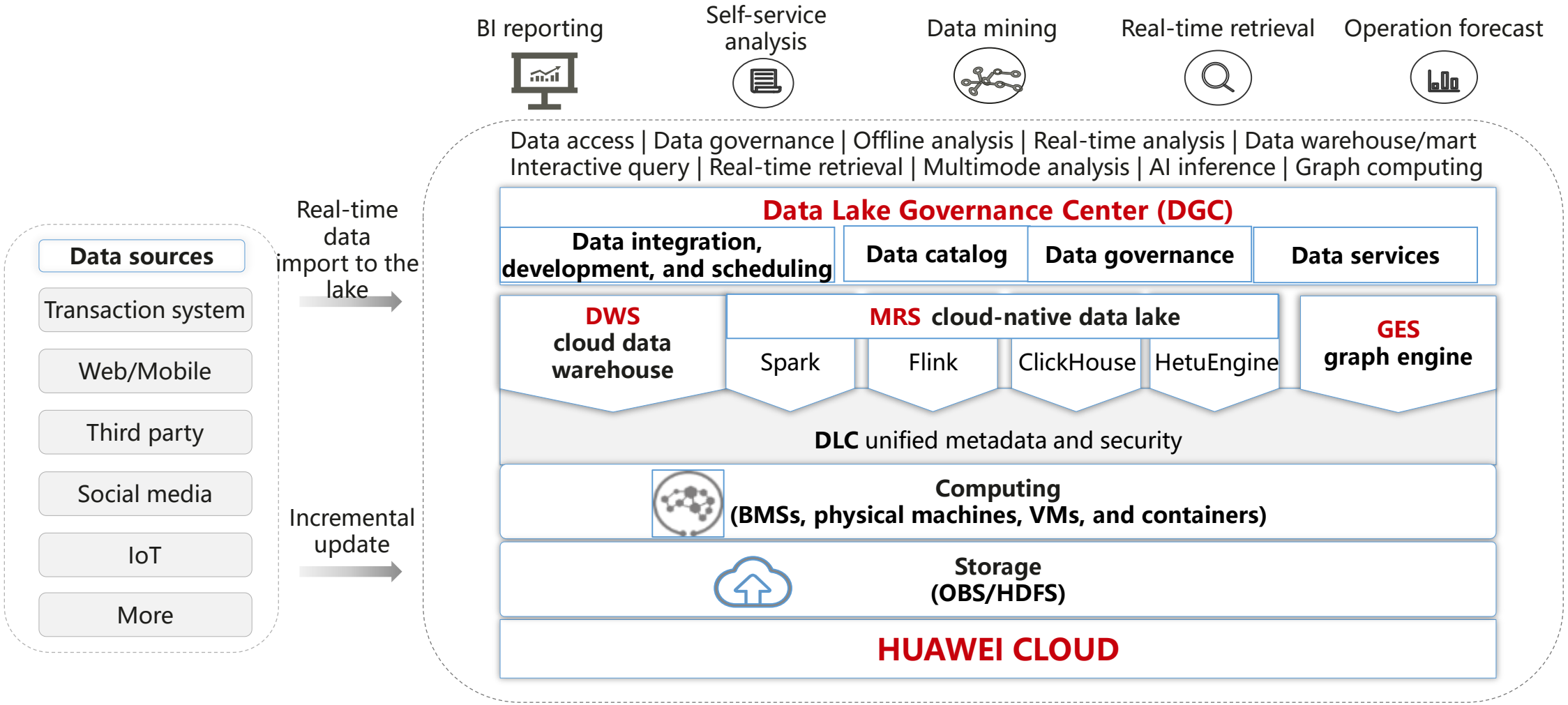



**10+ years of technological accumulation, worldwide R&D teams, and continuous version iteration enable service evolution for 3,000+ customers.**



HUAWEI

# FusionInsight Intelligent Data Lake



# MRS: Three Cloud - Native Data Lakes, One Architecture

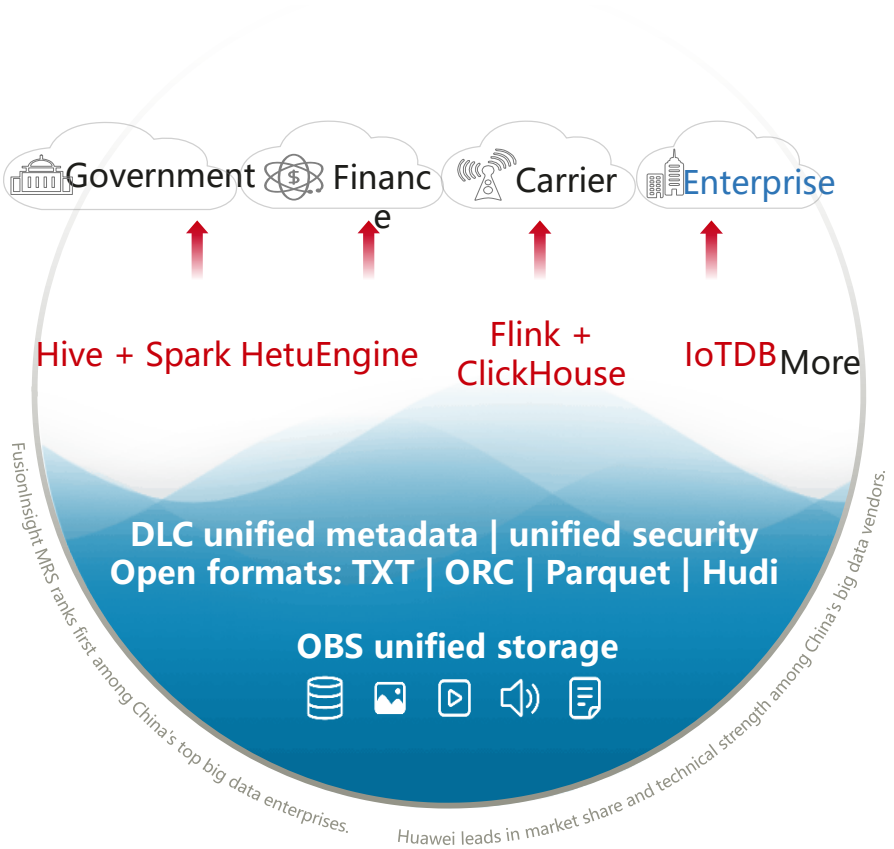
Traditional big data

**Hours**
Manual migration

**T+1**
Full update

**3 copies**
Storage-compute coupling

**Hours**
Upgrade interrupted




MRS cloud-native data lake

**Seconds**
Cross-lake/-warehouse/-cloud

**T+0**
Incremental update

**1.2 copies**
Storage-compute decoupling

**Zero Interruption**
Rolling upgrade

**Logical data lake**

- **Lakehouse** reduces data migration workload by **80%**.
- **Cross-source cross-domain collaboration** improves the efficiency by **50x**.
- **Unified interfaces simplify data usage.**

**Real-time data lake**

- **ACID is supported**, and data timeliness is improved from T+1 to **T+0**.
- **Self-service BI** enables real-time OLAP in **milliseconds**.
- **Batch-stream integration enables data utilization in seconds.**

**Offline data lake**

- **In-memory computing** improves analysis performance by **50%+**.
- **Multi-engine computing, such as interactive, BI, and AI analysis, is supported.**
- **Storage-compute decoupling** enables elastic resource expansion.



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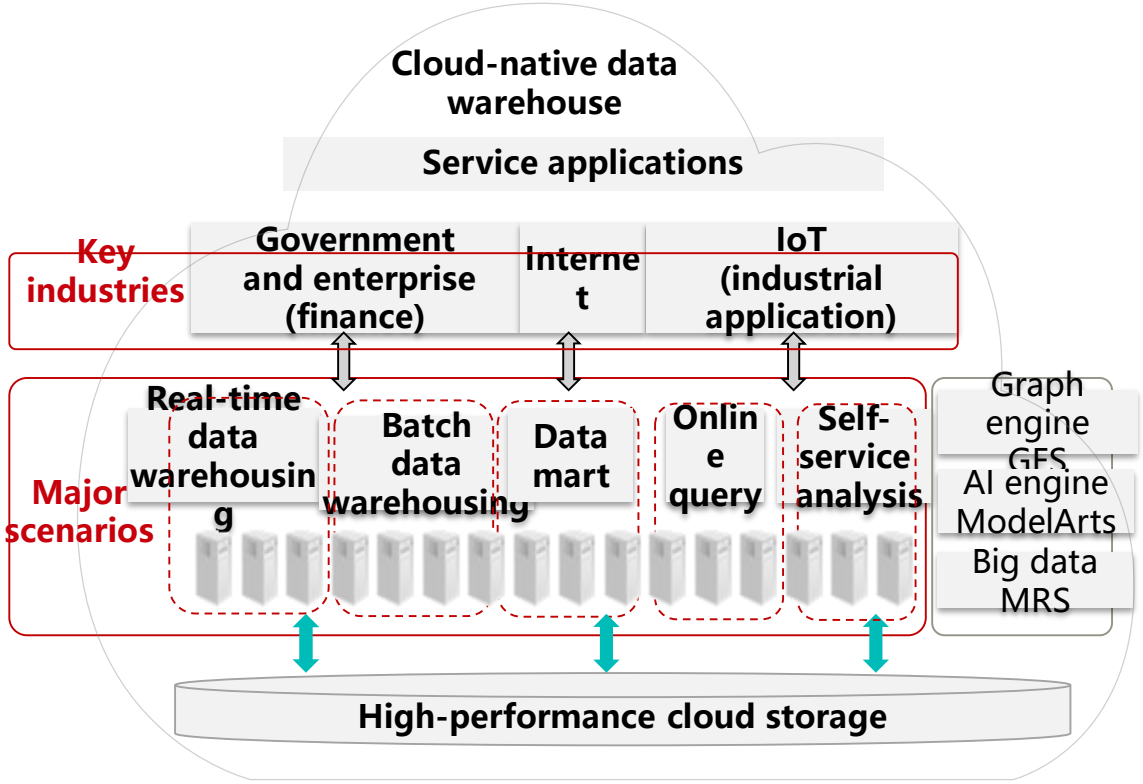
# GaussDB (DWS): Next-Generation Cloud Data Warehouse

- GaussDB(DWS) is a distributed database for data analysis and **hybrid transaction/analytical processing**. It supports both x86 and Kunpeng architectures and **row and column storage**, with the capabilities of **PB-level** data analysis, multi-mode analysis, and **real-time processing**. GaussDB(DWS) spans across the core systems of industries such as finance, government, and telecom.



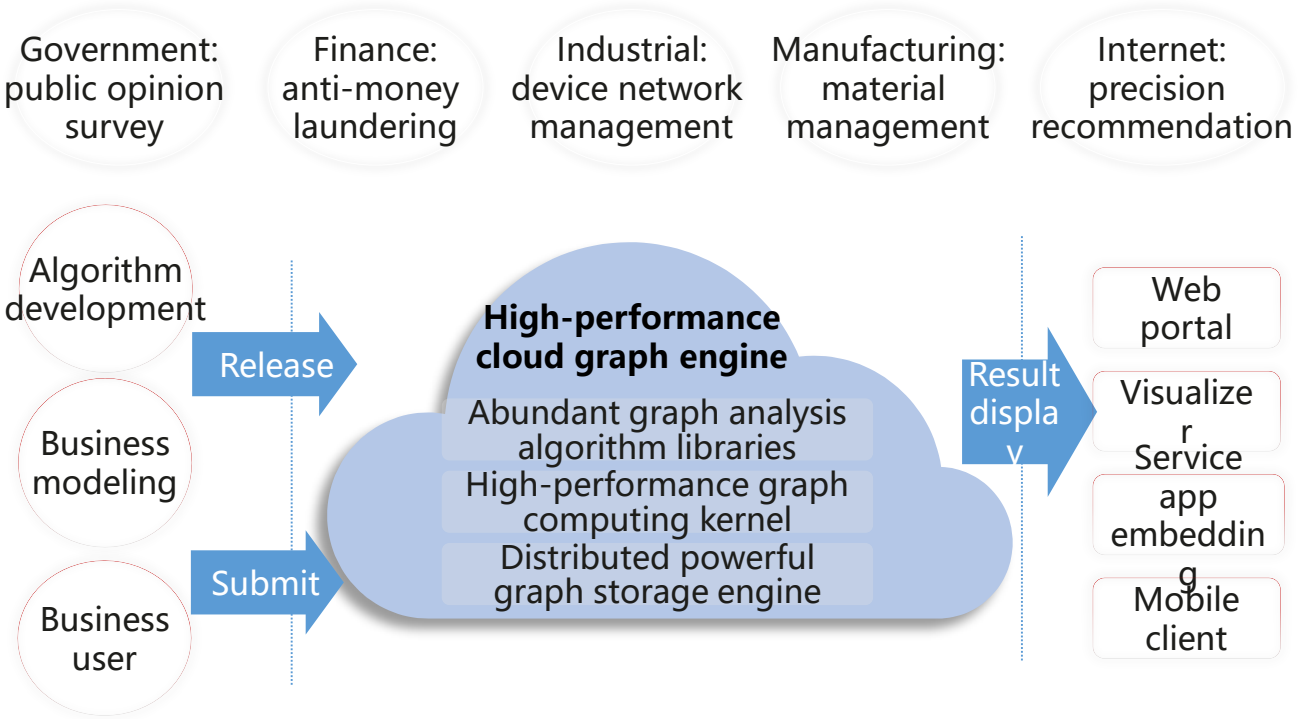

**Peer products: Teradata, Oracle, AWS Redshift, and Alibaba Cloud AnalyticDB**

| | |
|---|---|
| **Unified kernel and architecture** | • One set of kernel and one set of architecture ensure consistent user experience for public and hybrid clouds.<br>• **ECS**, **BMS**, and **physical machine (HUAWEI CLOUD Stack)** modes are supported. |
| **Largest financial data warehouses worldwide** | • Industry first: a single cluster with **2,048** nodes, certified by a third-party authority<br>• Industry first: a single cluster with **482 4-socket all-flash servers**, with a storage capacity of **20 PB**<br>• 280+ patents worldwide<br>• **Crowned the best product in the data warehouse category of the Big Data World in 2020** |
| **Key competencies** | **High performance**<br>Industry-leading TPC-DS performance<br><br>**High availability**<br>**Strong consistency**<br>In a cluster, RPO = 0, RTO < 30s<br>Online scale-out<br><br>**High scalability**<br>2,048 nodes<br>> 100 PB<br><br>**Enterprise-level features:**<br>Logical cluster, collaborative computing (+HD), convergent analysis (+AI), and real-time analysis (+IoT) |



HUAWEI

# GES: Integrated Graph Analysis and Querying




**1 One-stop graph database and engine**

- Integrated graph database and graph analysis engine
- Comprehensive graph analysis and query capabilities provided through user-friendly GUI
- China's first commercial native graph product with proprietary intellectual property rights

**2 Integrated analysis and query**

- A set of data is used for two purposes: query and analysis.
- Mainstream graph query languages, Cypher and Gremlin, are supported, and native REST APIs and open-source APIs are available.
- Over 30 high-performance algorithms are used for analysis and compute in multiple scenarios. More than 10 graph neural networks and graph embedding algorithms are provided.

**3 Large scale and high performance**

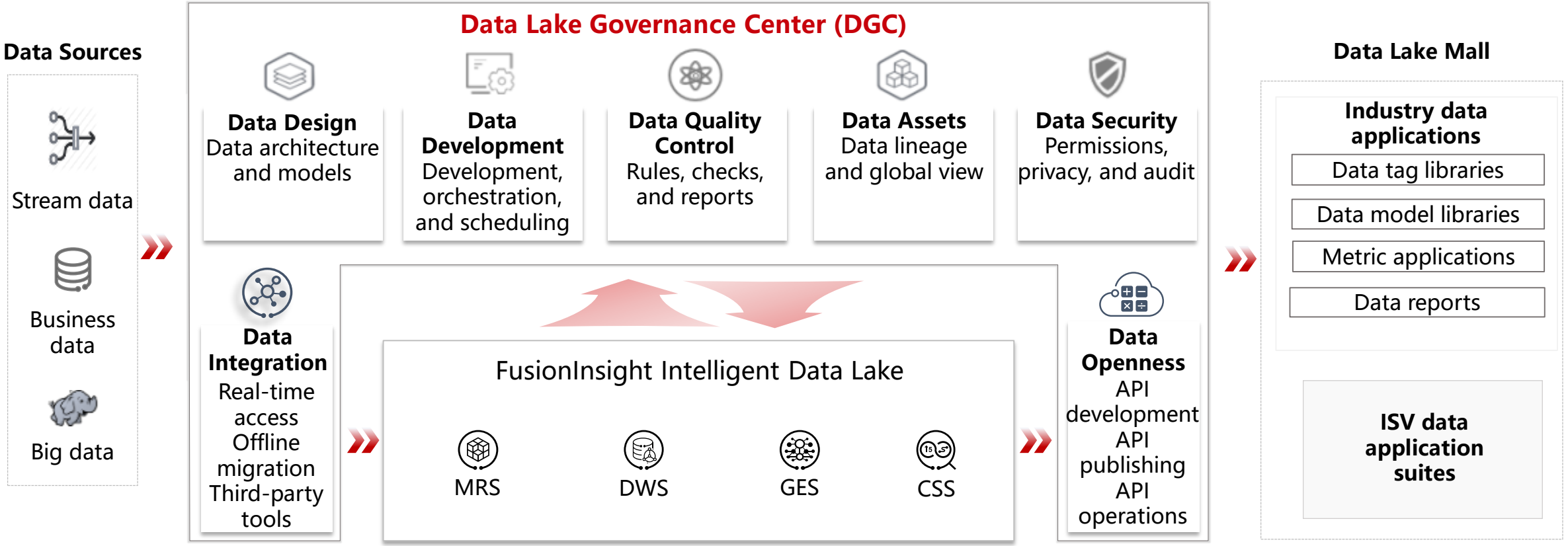
- Graphs with **over 10 billion vertices and 100 billion edges**
- The query and algorithm performance is better than that of competitors in the industry. The 6-hop query response is within seconds. Many algorithms are excellent in large graph compute.

**4 No-code visual analysis makes the GES easy to use**

- Editing and entity drill-down are made simple with the intuitive GUI.
- Wizard-based algorithm operations can be performed on the GUI, and the operation results and analytics are represented in an intuitive manner.

**5 Huawei-developed kernel that has won international awards for multiple times**

# DGC: One-Stop Data Development and Integration Management for 3x Higher Efficiency in Data Assetization






HUAWEI

# Quiz

1. CDN is a free cloud service.

   True

   False

2. Which of the following are the application scenarios for HUAWEI CLOUD CDN?

   A. Website acceleration

   B. File download acceleration

   C. VOD acceleration

   D. ECS running acceleration

# Summary

This course introduces database services, security services, CDN, and EI services of HUAWEI CLOUD, including:

- Relational and non-relational database types, and the application scenarios and key features of different databases.
- Basic concepts and importance of security services.
- Functions and working rules of the CDN and Enterprise Intelligence (EI) services.

After completing this course, you will have a comprehensive understanding of HUAWEI CLOUD and can better help enterprises accelerate cloud migration and business innovation.

# Recommendations

- Huawei Learning Website
  - https://e.huawei.com/en/talent/#/
- HUAWEI CLOUD Technical Support
  - https://support.huaweicloud.com/intl/en-us/help-novice.html
- HUAWEI CLOUD Academy
  - https://edu.huaweicloud.com/intl/en-us/

# Acronyms and Abbreviations

- AZ: availability zone
- APP: application
- API: application programming interface
- APT: advanced persistent threat
- CDN: content delivery network
- CPU: central processing unit
- CSA: cloud security alliance
- DDoS attack: distributed denial-of-service attack
- DDS: document database service
- DDM: distributed database middleware

# Acronyms and Abbreviations

- DAS: data admin service
- DWS: data warehouse service
- DEW: data encryption workshop
- EI: enterprise intelligence
- ELB: elastic load balance
- HA: highly available
- HSS: host security service
- IT: Internet technology
- IAM: identity and access management
- KMS: key management system

# Acronyms and Abbreviations

- LAMP: Linux+Apache+PHP+MySQL (a set of open-source software usually used to build dynamic websites)
- OLAP: online analytical processing
- OLTP: online transaction processing
- OBS: object storage service
- PITR: point-in-time recovery
- RTO: recovery time object
- UGC: user generated content
- VIP: virtual IP address
- WAF: web application firewall

# Thank you.

Bring digital to every person, home, and organization for a fully connected, intelligent world.