Distributed Cache Service

Service Overview

Issue 01

Date 2024-03-04

HUAWEI

HUAWEI CLOUD COMPUTING TECHNOLOGIES CO., LTD.

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Reliable Deployment
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Zero-Downtime Scaling
Easy Backups
Secure Performance
Protected Networks and Servers
Performance Beyond Expectations
Overall Management
Full Coverage
Agile Parameter Management
O&M at Your Service

2 What Is DCS?

Huawei Cloud Distributed Cache Service (DCS) is an online, distributed, fast in-memory cache service compatible with Redis. It is reliable, scalable, usable out of the box, and easy to manage, meeting your requirements for high read/write performance and fast data access.

- Usability out of the box

  DCS provides single-node, master/standby, read/write splitting, Proxy Cluster, and Redis Cluster instances with specifications ranging from 128 MB to 2048 GB. DCS instances can be created with just a few clicks on the console, without requiring you to prepare servers.

  DCS Redis 4.0, 5.0, and 6.0 instances are containerized and can be created within seconds.

- Security and reliability

  Instance data storage and access are securely protected through HUAWEI CLOUD security management services, including Identity and Access Management (IAM), Virtual Private Cloud (VPC), Cloud Eye, and Cloud Trace Service (CTS).

  Master/Standby and cluster instances can be deployed within an availability zone (AZ) or across AZs.

- Auto scaling

  DCS instances can be scaled up or down online, helping you control costs based on service requirements.

- Easy management

  A web-based console is provided for you to perform various operations, such as restarting instances, modifying configuration parameters, and backing up and restoring data. RESTful application programming interfaces (APIs) are also provided for automatic instance management.

- Online migration

  You can create a data migration task on the console to import backup files or migrate data online.

DCS for Redis

DCS for Redis supports Redis 4.0/5.0/6.0.

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NOTE

- DCS for Redis 3.0 is no longer provided. You can use DCS for Redis 4.0, 5.0, or 6.0 instead.
- DCS Redis 6.0 instances are supported only in some regions.

Redis is a storage system that supports multiple types of data structures, including key-value pairs. It can be used in such scenarios as data caching, event publishing/subscribing, and high-speed queuing, as described in **Application Scenarios**. Redis is written in ANSI C, supporting direct read/write of **strings**, **hashes**, **lists**, **sets**, **sorted sets**, and **streams**. Redis works with an in-memory dataset which can be persisted on disk.

DCS Redis instances can be customized based on your requirements.

- DCS for Redis 4.0/5.0/6.0 basic

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Table 2-1 DCS for Redis 4.0/5.0/6.0 basic

Instance type	DCS for Redis provides the following types of instances to suit different service scenarios: • Single-node: Suitable for caching temporary data in low reliability scenarios. Single-node instances support highly concurrent read/write operations, but do not support data persistence. Data will be deleted after instances are restarted. • Master/standby: Each master/standby instance runs on two nodes (one master and one standby). The standby node replicates data synchronously from the master node. If the master node fails, the standby node automatically becomes the master node. You can split read and write operations by writing to the master node and reading from the standby node. This improves the overall cache read/write performance. • Proxy Cluster: In addition to the native Redis cluster, a Proxy Cluster instance has proxies and load balancers. Load balancers implement load balancing. Different requests are distributed to different proxies to achieve high-concurrency. Each shard in the cluster has a master node and a standby node. If the master node is faulty, the standby node on the same shard is promoted to the master role to take over services. • Redis Cluster: Each Redis Cluster instance consists of multiple **shards** and each shard includes a master node and multiple replicas (or no replica at all). Shards are not visible to you. If the master node fails, a replica on the same shard takes over services. You can split read and write operations by writing to the master node and reading from the replicas. This improves the overall cache read/write performance. • Read/write splitting: A read/write splitting instance has proxies and load balancers in addition to the master/standby architecture. Load balancers implement load balancing, and different requests are distributed to different proxies. Proxies distinguish between read and write requests, and sends them to master nodes or standby nodes, respectively.
Instance specifications	DCS for Redis provides instances of different specifications, ranging from 128 MB to 1024 GB.
Open-source compatibility	DCS instances are compatible with open-source Redis 4.0/5.0/6.0.
Underlying architecture	Containerized deployment on physical machines. 100,000 QPS at a single node for a Redis 4.0/5.0 instance, 150,000 QPS for a single-node Redis 6.0 basic edition instance, and 170,000 QPS for a master/standby Redis 6.0 basic edition instance.

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High availability (HA) and disaster recovery (DR)	All instances except single-node ones can be deployed across AZs within a region with physically isolated power supplies and networks.

For more information about open-source Redis, visit **https://redis.io/**.

- DCS for Redis 6.0 professional edition

  DCS for Redis 6.0 professional edition features multithreading-based high performance.

  Multithreading-based high performance is achieved based on the open-source KeyDB, which is a Redis fork that delivers high performance. KeyDB focuses on multithreading, memory efficiency, and high throughput, and provides features found only in Redis Enterprise. KeyDB is fully compatible with the Redis protocol, modules, and scripts, and guarantees the atomicity of scripts and transactions. The development of KeyDB keeps pace with that of Redis, so KeyDB provides a superset of Redis functionality and can replace existing Redis deployments. Given the same hardware, KeyDB handles twice as many queries per second as Redis does with 60% lower latency.

  In versions earlier than Redis 6.0, a slow query often causes other queries to be delayed due to the single thread model. To address performance issues, the new edition has made a series of optimization based on a multi-thread model. Multi-thread concurrency has been improved for I/O and backend event processing; access to cached data is further accelerated through fair spinlock; expired keys can be removed twice as faster thanks to optimized algorithms; support for subkey expires also improves the read/write performance of big keys. As a result, the new edition is suitable in scenarios requiring high single-node performance, such as trending topics and livestreaming events on the Internet.

  Table 2-2 DCS for Redis 6.0 professional edition

Instance type	DCS for Redis 6.0 professional edition includes performance and storage sub-editions. Only master/standby instances are available. The professional (storage) edition uses memory and SSD disks. Each master/standby instance runs on two nodes (one master and one standby). The standby node replicates data synchronously from the master node. If the master node fails, the standby node automatically becomes the master node. You can split read and write operations by writing to the master node and reading from the standby node. This improves the overall cache read/write performance.
Instance specifications	8 GB, 16 GB, 32 GB, 64 GB

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Open-source compatibility	DCS for Redis 6.0 professional edition is based on KeyDB and is fully compatible with open-source Redis 6.0.
Underlying architecture	Deployed on VMs. 400,000 QPS at a single node.
HA and DR	All instances except single-node ones can be deployed across AZs within a region with physically isolated power supplies and networks.

For more information about KeyDB, visit **https://keydb.dev/**.

DCS for Memcached (Discontinued)

NOTE

DCS for Memcached is no longer provided. You can use DCS Redis instances instead.

Memcached is an in-memory key-value caching system that supports read/write of simple strings. It is often used to cache backend database data to alleviate load on these databases and accelerate web applications. For details about its application scenarios, see **Memcached (Discontinued) Application Scenarios**.

In addition to full compatibility with Memcached, DCS for Memcached provides the hot standby and data persistence.

Table 2-3 DCS Memcached instance configuration

Instance type	DCS for Memcached provides the following two types of instances to suit different service scenarios: Single-node: Suitable for caching temporary data in low reliability scenarios. Single-node instances support highly concurrent read/write operations, but do not support data persistence. Data will be deleted after instances are restarted. Master/Standby: Each master/standby instance runs on two nodes (one master and one standby). The standby node replicates data synchronously from the master node, but does not support read/write operations. If the master node fails, the standby node automatically becomes the master node.
Memory	Specification of single-node or master/standby DCS Memcached instances: 2 GB, 4 GB, 8 GB, 16 GB, 32 GB, and 64 GB.
HA and DR	Master/Standby DCS Memcached instances can be deployed across AZs in the same region with physically isolated power supplies and networks.

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For more information about open-source Memcached, visit **https://memcached.org/**.

DCS Video Introduction

Watch the following video to learn more about DCS.

Distributed Cache Service

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3 Application Scenarios

Redis Application Scenarios

Many large-scale e-commerce websites and video streaming and gaming applications require fast access to large amounts of data that has simple data structures and does not need frequent join queries. In such scenarios, you can use Redis to achieve fast yet inexpensive access to data. Redis enables you to retrieve data from in-memory data stores instead of relying entirely on slower disk-based databases. In addition, you no longer need to perform additional management tasks. These features make Redis an important supplement to traditional disk-based databases and a basic service essential for Internet applications receiving high-concurrency access.

Typical application scenarios of DCS for Redis are as follows:

1. **E-commerce flash sales**

   E-commerce product catalogue, deals, and flash sales data can be cached to Redis.

   For example, the high-concurrency data access in flash sales can be hardly handled by traditional relational databases. It requires the hardware to have higher configuration such as disk I/O. By contrast, Redis supports 100,000 QPS per node and allows you to implement locking using simple commands such as **SET**, **GET**, **DEL**, and **RPUSH** to handle flash sales.

   For details about locking, see **Implementing Distributed Locks with Redis** in *Best Practices*.

2. **Live video commenting**

   In live streaming, online user, gift ranking, and bullet comment data can be stored as sorted sets in Redis.

   For example, bullet comments can be returned using the **ZREVRANGEBYSCORE** command. The **ZPOPMAX** and **ZPOPMIN** commands in Redis 5.0 can further facilitate message processing.

3. **Game leaderboard**

   In online gaming, the highest ranking players are displayed and updated in real time. The leaderboard ranking can be stored as sorted sets, which are easy to use with up to 20 commands.

   For details, see **Ranking with Redis** in *Best Practices*.

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4. **Social networking comments**

   In web applications, queries of post comments often involve sorting by time in descending order. As comments pile up, sorting becomes less efficient.

   By using lists in Redis, a preset number of comments can be returned from the cache, rather than from disk, easing the load off the database and accelerating application responses.

Memcached (Discontinued) Application Scenarios

Memcached is suitable for storing simple key-value data.

1. Web pages

   Caching static data such as HTML pages, Cascading Style Sheets (CSS), and images to DCS Memcached instances improves access performance of web pages.

2. Frontend database

   In dynamic systems such as social networking and blogging sites, write operations are far fewer than read operations such as querying users, friends, and articles. To ease the database load and improve performance, the following data can be cached to Memcached:

   - Frequently accessed data that does not require real-time updates and can expire automatically

     Example: latest article lists and rankings. Although data is generated constantly, its impact on user experience is limited. Such data can be cached for a preset period of time and accessed from the database after this period. If web page editors want to view the latest ranking, a cache clearing or refreshing policy can be configured.

   - Frequently accessed data that requires real-time updates

     Example: friend lists, article lists, and reading records. Such data can be cached to Memcached first, and then updated whenever changes (adding, modifying, and deleting data) occur.

3. Flash sales

   It is difficult for traditional databases to write an order placement operation during flash sales into the database, modify the inventory data, and ensure transaction consistency while ensuring uninterrupted user experience.

   Memcached **incr** and **decr** commands can be used to store inventory information and complete order placement in memory. Once an order is submitted, an order number is generated. Then, the order can be paid.

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NOTE

Scenarios where Memcached is not suitable:

- The size of a single cache object is larger than 1 MB.

  Memcached cannot cache an object larger than 1 MB. In such cases, use Redis.

- The key contains more than 250 characters.

  To use Memcached in such a scenario, you can generate an MD5 hash for the key and cache the hash instead.

- High data reliability is required.

  Open-source Memcached does not provide data replication, backup, and migration, so data persistence is not supported.

  Master/Standby DCS Memcached instances support data persistence. For more information, contact technical support.

- Complex data structures and processing are required.

  Memcached supports only simple key-value pairs, and does not support complex data structures such as lists and sets, or complex operations such as sorting.

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4 Security

4.1 Shared Responsibilities

Huawei guarantees that its commitment to cyber security will never be outweighed by the consideration of commercial interests. To cope with emerging cloud security challenges and pervasive cloud security threats and attacks, Huawei Cloud builds a comprehensive cloud service security assurance system for different regions and industries based on Huawei's unique software and hardware advantages, laws, regulations, industry standards, and security ecosystem.

Figure 4-1 illustrates the responsibilities shared by Huawei Cloud and users.

- **Huawei Cloud**: Ensure the security of cloud services and provide secure clouds. Huawei Cloud's security responsibilities include ensuring the security of our IaaS, PaaS, and SaaS services, as well as the physical environments of the Huawei Cloud data centers where our IaaS, PaaS, and SaaS services operate. Huawei Cloud is responsible for not only the security functions and performance of our infrastructure, cloud services, and technologies, but also for the overall cloud O&M security and, in the broader sense, the security and compliance of our infrastructure and services.
- **Tenant**: Use the cloud securely. Tenants of Huawei Cloud are responsible for the secure and effective management of the tenant-customized configurations of cloud services including IaaS, PaaS, and SaaS. This includes but is not limited to virtual networks, the OS of virtual machine hosts and guests, virtual firewalls, API Gateway, advanced security services, all types of cloud services, tenant data, identity accounts, and key management.

Huawei Cloud Security White Paper elaborates on the ideas and measures for building Huawei Cloud security, including cloud security strategies, the shared responsibility model, compliance and privacy, security organizations and personnel, infrastructure security, tenant service and security, engineering security, O&M security, and ecosystem security.

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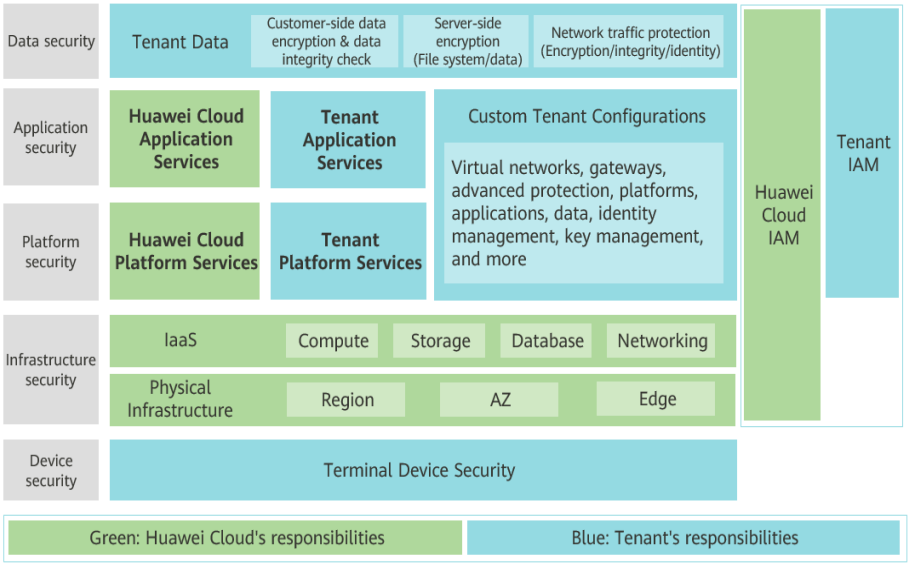
Figure 4-1 Huawei Cloud shared security responsibility model



4.2 Identity Authentication and Access Control

Identity Authentication

Access requesters must present the identity credential for identity validity verification when accessing DCS on the console or by calling APIs. DCS uses Identity and Access Management (IAM) to provide three identity authentication modes: **passwords**, **access keys**, and **temporary access keys**. In addition, DCS provides **login protection** and **login authentication policies** to harden identity authentication security.

Access Control

You can assign different permissions for DCS to employees in your organization for fine-grained permissions management. IAM provides identity authentication, permissions management, and access control, helping you secure access to your Huawei Cloud resources. For details, see **Permissions Management**.

4.3 Data Protection

DCS takes different measures to keep data secure and reliable.

Table 4-1 DCS data protection methods and features

Measure	Description	Reference
DR and multi-active	To meet reliability requirements of your data and services, you can deploy a DCS instance in a single AZ (single equipment room) or across AZs (intra-city DR).	**Disaster Recovery and Multi-Active Solution**

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Measure	Description	Reference
Data replication	Data can be incrementally synchronized between replicas for cache data consistency. When a network exception or node fault occurs, a failover is automatically performed using the replicas. After the fault is rectified, a full synchronization is performed to ensure data consistency.	**Data Replication**
Data persistence	Exceptions may occur during daily running of the service system. Some service systems require high reliability, including high availability of instances, cache data security, recoverability, and even permanent storage, so that backup data can be used to restore instances if an exception occurs, ensuring service running.	**Backing Up and Restoring Instances**

4.4 Audit and Logs

Cloud Trace Service (CTS)

CTS records operations on the cloud resources in your account. You can use the logs generated by CTS to perform security analysis, trace resource changes, audit compliance, and locate faults.

After you enable CTS and configure a tracker, CTS can record management and data traces of DCS for auditing.

For details about how to enable and configure CTS, see **Enabling CTS**.

For details about DCS management and data operations that can be traced, see **Operations Logged by CTS**.

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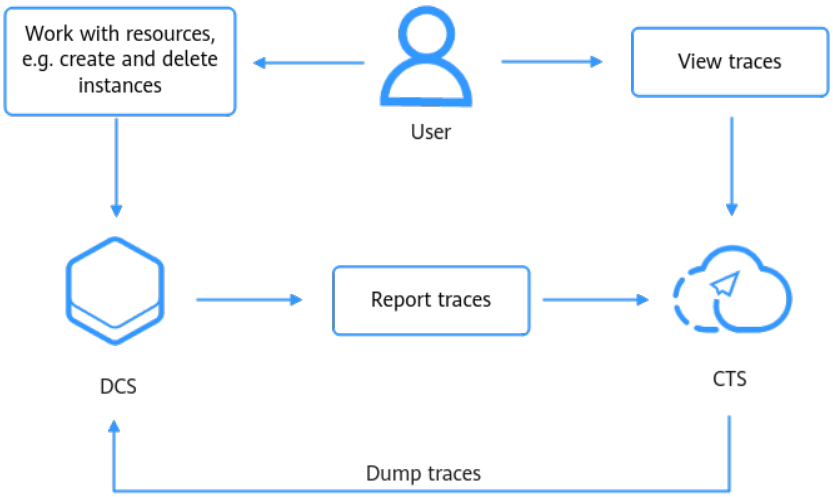
Figure 4-2 CTS



4.5 Resilience

DCS provides a three-level reliability architecture and uses cross-AZ DR, intra-AZ instance DR, and instance data replication to ensure service durability and reliability.

Table 4-2 DCS reliability architecture

Reliability Solution	Description
Cross-AZ DR	DCS provides master/standby, Redis Cluster, and Proxy Cluster instances that support cross-AZ DR. When an AZ is abnormal, the instances can still provide services.
Intra-AZ instance DR	A master/standby, Redis Cluster, or Proxy Cluster DCS instance has multiple nodes for instance-level DR within an AZ. If the master node is faulty, services are quickly switched to a standby node to ensure uninterrupted DCS services.
Data DR	Data DR is implemented through data replication.

4.6 Security Risks Monitoring

DCS uses Cloud Eye to help you monitor your DCS instances and receive alarms and notifications in real time. You can obtain key information about instances in real time, such as service requests, resource usage, bandwidth, number of concurrent operations, and flow control times.

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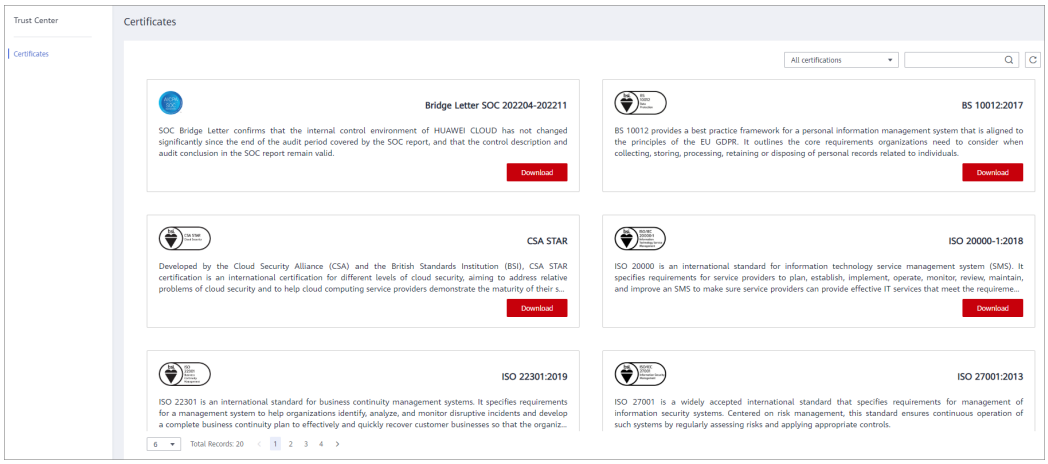
For details about DCS metrics and how to create alarm rules, see **DCS Metrics**.

4.7 Certificates

Compliance Certificates

Huawei Cloud services and platforms have obtained various security and compliance certifications from authoritative organizations, such as International Organization for Standardization (ISO). You can **download** them from the console.

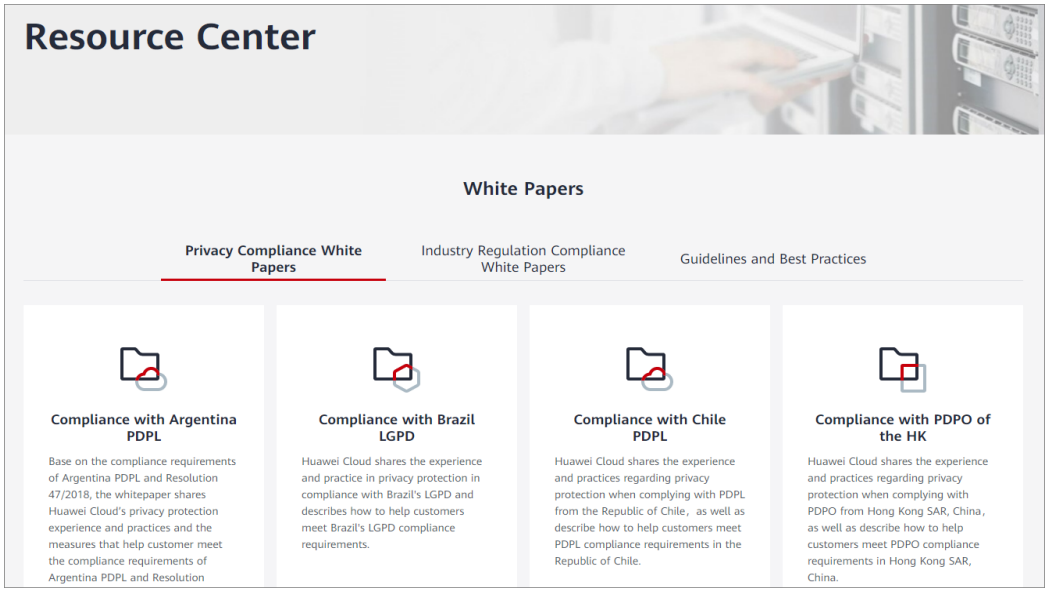
Figure 4-3 Downloading compliance certificates



Resource Center

Huawei Cloud also provides the following resources to help users meet compliance requirements. For details, see **Resource Center**.

Figure 4-4 Resource center



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5 DCS Instance Types

5.1 Single-Node Redis

Each single-node DCS Redis instance has only one node and does not support data persistence. They are suitable for cache services that do not require data reliability.

NOTE

- Currently, DCS for Redis 6.0 is available only in some regions, such as CN North-Beijing4 and CN South-Guangzhou.
- You cannot upgrade the Redis version for an instance. For example, a single-node DCS Redis 4.0 instance cannot be upgraded to a single-node DCS Redis 5.0 instance. If your service requires the features of higher Redis versions, create a DCS Redis instance of a higher version and then migrate data from the old instance to the new one.
- Single-node instances cannot ensure data persistence and do not support automatic or manual data backup. Exercise caution when using them.

Features

1. Low system overhead and high QPS

   Single-node instances do not support data synchronization or data persistence, reducing system overhead and supporting higher concurrency. QPS of single-node DCS Redis instances reaches up to 100,000.

2. Process monitoring and automatic fault recovery

   With an HA monitoring mechanism, if a single-node DCS instance becomes faulty, a new process is started within 30 seconds to resume service provisioning.

3. Out-of-the-box usability and no data persistence

   Single-node DCS instances can be used out of the box because they do not involve data loading. If your service requires high QPS, you can warm up the data beforehand to avoid strong concurrency impact on the backend database.

4. Low-cost and suitable for development and testing

   Single-node instances are 40% cheaper than master/standby DCS instances, suitable for setting up development or testing environments.

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In summary, single-node DCS instances support highly concurrent read/write operations, but do not support data persistence. Data will be deleted after instances are restarted. They are suitable for scenarios which do not require data persistence, such as database front-end caching, to accelerate access and ease the concurrency load off the backend. If the desired data does not exist in the cache, requests will go to the database. When restarting the service or the DCS instance, you can pre-generate cache data from the disk database to relieve pressure on the backend during startup.

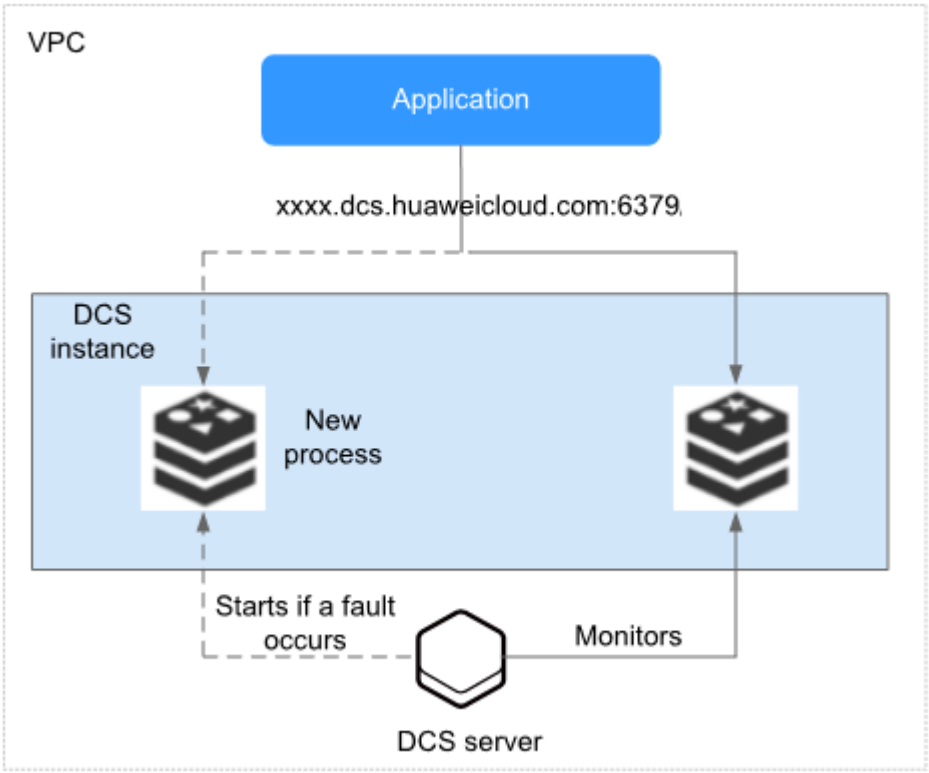
Architecture

Figure 5-1 shows the architecture of a single-node DCS Redis instance.

NOTE

Redis 3.0 and 6.0 professional do not support port customization and allow only port 6379. For Redis 4.0/5.0/6.0 basic, you can specify a port or use the default port 6379. In the following architecture, port 6379 is used. If you have customized a port, replace **6379** with the actual port.

Figure 5-1 Single-node DCS Redis instance architecture



Architecture description:

- **VPC**
  The VPC where all nodes of the instance run.

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NOTE

For intra-VPC access, the client and the instance must be in the same VPC with specific security group rule configurations.

A DCS Redis 3.0 instance can be accessed from a VPC or over public networks. The client can be deployed outside of the VPC and access the instance through the elastic IP address (EIP) bound to the instance. DCS Redis 4.0/5.0/6.0 instances do not support public access.

For more information, see **Public Access to a DCS Redis Instance** and **How Do I Configure a Security Group?**

- **Application**

  The client of the instance, which is the application running on an Elastic Cloud Server (ECS).

  DCS Redis and Memcached instances are respectively compatible with Redis and Memcached protocols, and can be accessed through open-source clients. For examples of accessing DCS instances with different programming languages, see the **instance access instructions**.

- **DCS instance**

  A single-node DCS instance, which has only one node and one Redis process.

  DCS monitors the availability of the instance in real time. If the Redis process becomes faulty, DCS starts a new process within seconds to resume service provisioning.

5.2 Master/Standby Redis

This section describes master/standby DCS Redis instances.

NOTE

- Currently, DCS for Redis 6.0 is available only in some regions, such as CN North-Beijing4 and CN South-Guangzhou.
- You cannot upgrade the Redis version for an instance. For example, a master/standby DCS Redis 4.0 instance cannot be upgraded to a master/standby DCS Redis 5.0 instance. If your service requires the features of higher Redis versions, create a DCS Redis instance of a higher version and then migrate data from the old instance to the new one.

Features

Master/Standby DCS instances have higher availability and reliability than single-node DCS instances.

Master/Standby DCS instances have the following features:

1. **Data persistence and high reliability**

   By default, data persistence is enabled by both the master and the standby nodes of a master/standby DCS Redis instance.

   The standby node of a Redis 3.0 instance is invisible to you. Only the master node provides data read/write operations.

   The standby node of a Redis 4.0/5.0/6.0 basic instance is visible to you. You can read data from the standby node by connecting to it using the instance read-only address.

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2. **Data synchronization**

   Data in the master and standby nodes is kept consistent through incremental synchronization.

   NOTE

   After recovering from a network exception or node fault, master/standby instances perform a full synchronization to ensure data consistency.

3. **Automatic master/standby switchover**

   If the master node becomes faulty, the instance is disconnected and unavailable for several seconds. The standby node takes over within 30 seconds without manual operations to resume stable services.

4. **Multiple DR policies**

   Each master/standby DCS instance can be deployed across AZs with physically isolated power supplies and networks. Applications can also be deployed across AZs to achieve HA for both data and applications.

5. **Read/write splitting**

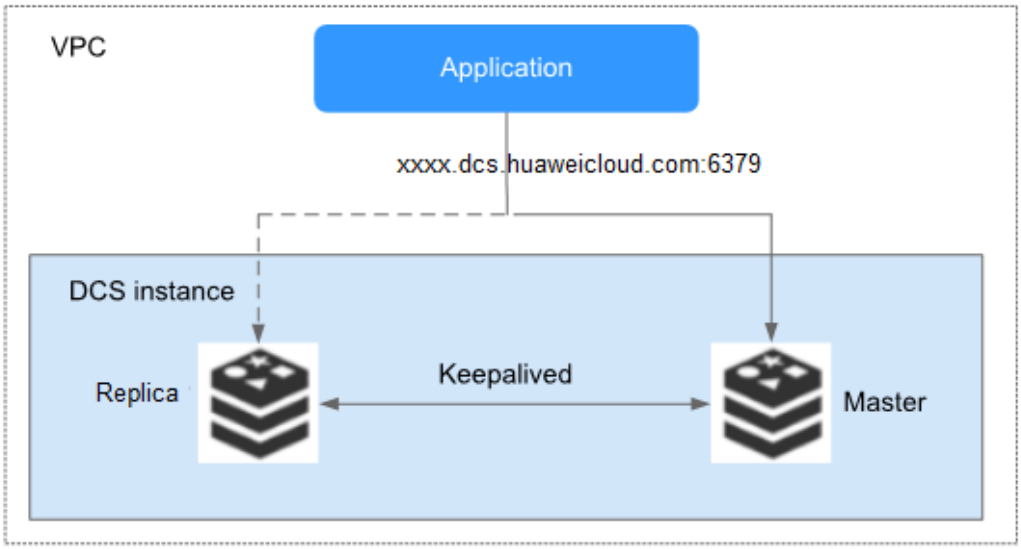
   Master/standby DCS Redis 4.0/5.0/6.0 basic instances support client read/write splitting. When connecting to such an instance, you can use the read/write address to connect to the master node or use the read-only address to connect to the standby node.

   If you use a master/standby instance and need client-side read/write splitting, configure the client. If read/write splitting is required, **read/write splitting instances** are recommended.

Architecture of Master/Standby DCS Redis 3.0 Instances

Figure 5-2 shows the architecture of a master/standby DCS Redis 3.0 instance.

Figure 5-2 Architecture of a master/standby DCS Redis 3.0 instance



Architecture description:

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- **VPC**

  The VPC where all nodes of the instance run.

  NOTE

  For intra-VPC access, the client and the instance must be in the same VPC with specific security group rule configurations.

  A DCS Redis 3.0 instance can be accessed from a VPC or over public networks. The client accessing the instance can be deployed outside of the VPC and access the instance through the EIP bound to the instance. Public access is not supported by DCS Redis 4.0/5.0/6.0 instances.

  For more information, see **Public Access to a DCS Redis Instance** and **How Do I Configure a Security Group?**

- **Application**

  The Redis client of the instance, which is the application running on the ECS.

  DCS Redis and Memcached instances are respectively compatible with Redis and Memcached protocols, and can be accessed through open-source clients. For examples of accessing DCS instances with different programming languages, see the **instance access instructions**.

- **DCS instance**

  A master/standby DCS instance which has a master node and a replica node. By default, data persistence is enabled and data is synchronized between the two nodes.

  DCS monitors the availability of the instance in real time. If the master node becomes faulty, the standby node becomes the master node and resumes service provisioning.

  The default Redis port is 6379.

Architecture of Master/Standby DCS Redis 4.0/5.0/6.0 Basic Instances

The following figure shows the architecture of a master/standby DCS Redis 4.0/5.0/6.0 basic instance.

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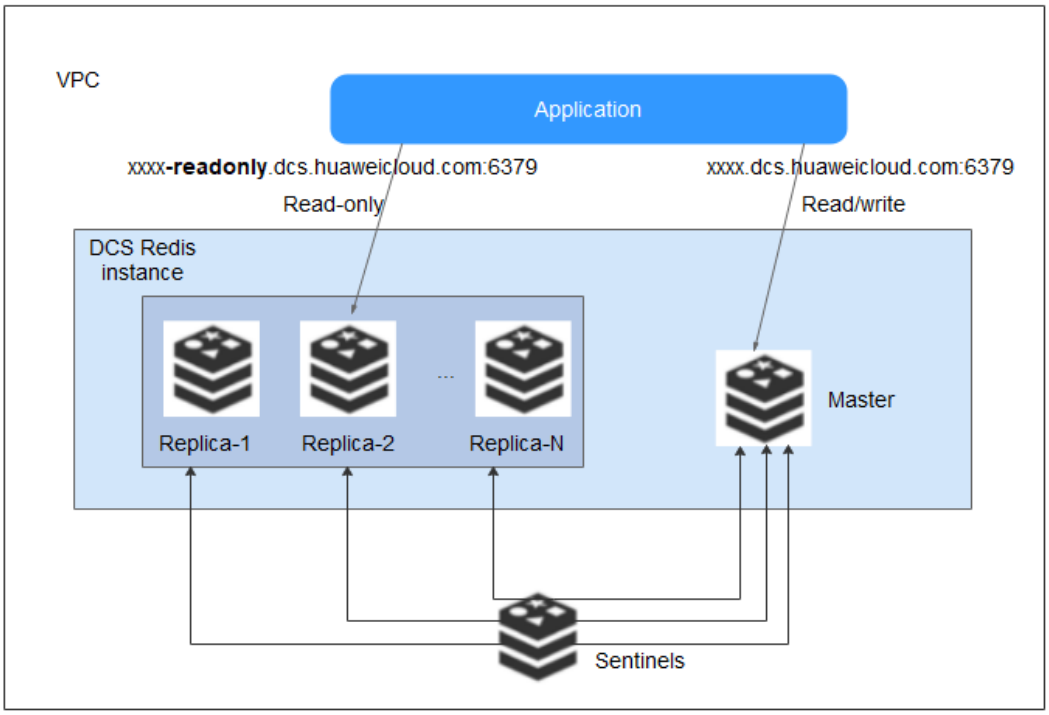
Figure 5-3 Architecture of a master/standby DCS Redis 4.0/5.0/6.0 basic instance



Architecture description:

1. Each master/standby DCS Redis 4.0/5.0/6.0 basic instance has a domain name address (for connecting to the master node) for read and write and an address (for connecting to the standby node) for read only.

   These addresses can be obtained on the instance details page on the DCS console.

2. You can configure Sentinel for a master/standby Redis 4.0/5.0/6.0 basic instance. Sentinels monitor the running status of the master and standby nodes. If the master node becomes faulty, a failover will be performed.

   Sentinels are invisible to you and is used only in the service. For details about Sentinel, see **What Is Sentinel?**

3. A read-only node has the same specifications as a read/write node. When a master/standby instance is created, a pair of master and standby nodes are included in the instance by default.

   NOTE

   - For DCS Redis 4.0/5.0/6.0 basic instances, you can customize the port. If no port is specified, the default port 6379 will be used. In the architecture diagram, port 6379 is used. If you have customized a port, replace **6379** with the actual port.
   - Read-only domain names of master/standby DCS Redis 4.0, 5.0, or 6.0 basic edition instances do not support load balancing. For high reliability and low latency, use cluster or read/write splitting instances.
   - Requests to the domain name address may fail if the standby of a master/standby pair (DCS Redis 4.0, 5.0, or 6.0 basic edition) is faulty. For higher reliability and lower latency, use read/write splitting instances.

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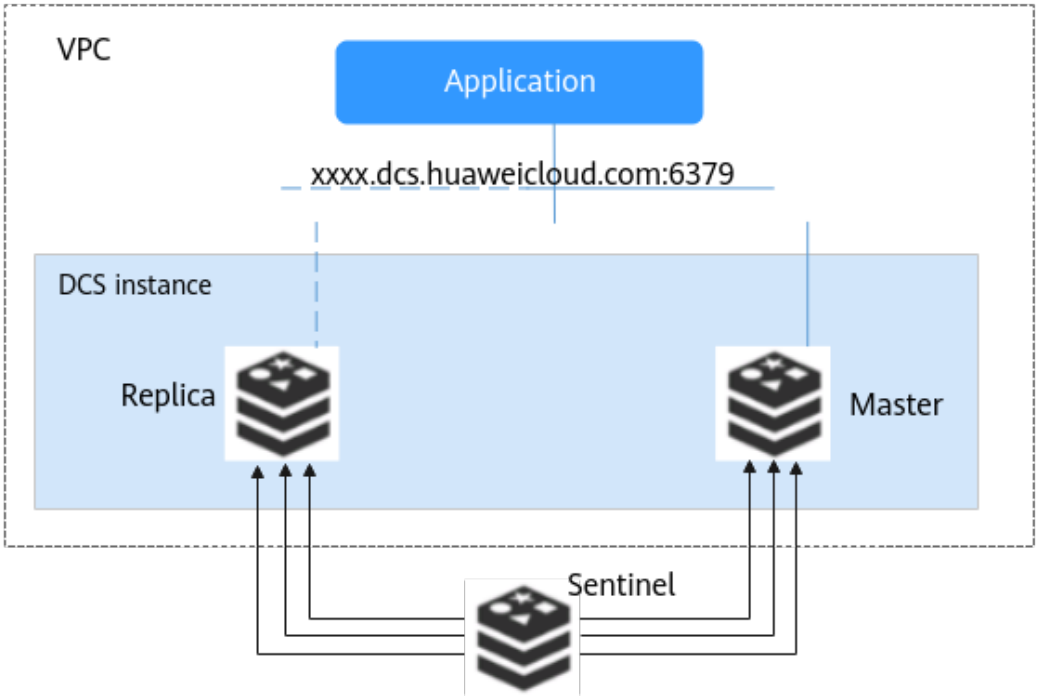
Architecture of Master/Standby DCS Redis 6.0 Professional Edition Instances

Figure 5-4 shows the architecture of a master/standby DCS Redis 6.0 professional edition instance.

Figure 5-4 Architecture of a master/standby DCS Redis 6.0 professional edition instance



Architecture description:

- **VPC**

  The VPC where all nodes of the instance run.

  NOTE

  For intra-VPC access, the client and the instance must be in the same VPC with specific security group rule configurations. For more information, see **How Do I Configure a Security Group?**

- **Application**

  The Redis client of the instance, which is the application running on the ECS.

  DCS Redis and Memcached instances are respectively compatible with Redis and Memcached protocols, and can be accessed through open-source clients. For examples of accessing DCS instances with different programming languages, see the **instance access instructions**.

- **DCS instance**

  A master/standby DCS instance which has a master node and a replica node.

  Master/standby DCS Redis 6.0 professional edition instances support Sentinels. Sentinels monitor the running status of the master and standby nodes. If the master node becomes faulty, a failover will be performed.

  Sentinels are invisible to you and is used only in the service. For details about Sentinel, see **What Is Sentinel?**

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The default Redis port is 6379.

5.3 Proxy Cluster Redis

DCS for Redis provides Proxy Cluster instances, which use Linux Virtual Server (LVS) and proxies to achieve high availability. Proxy Cluster instances have the following features:

- The client is decoupled from the cloud service.
- They support millions of concurrent requests, equivalent to Redis Cluster instances.
- A wide range of memory specifications adapt to different scenarios.

NOTE

- You cannot upgrade the Redis version for an instance. For example, a Proxy Cluster DCS Redis 4.0 instance cannot be upgraded to a Proxy Cluster DCS Redis 5.0 instance. If your service requires the features of higher Redis versions, create a DCS Redis instance of a higher version and then migrate data from the old instance to the new one.
- A Proxy Cluster instance can be connected in the same way that a single-node or master/standby instance is connected, without any special settings on the client. You can use the IP address or domain name of the instance, and do not need to know or use the proxy or shard addresses.

Proxy Cluster DCS Redis 3.0 Instances

Proxy Cluster DCS Redis 3.0 instances are based on x86, compatible with **open source codis** and come with specifications ranging from 64 GB to 1024 GB, meeting requirements for **millions of concurrent connections** and **massive data cache**. Distributed data storage and access is implemented by DCS, without requiring development or maintenance.

Each Proxy Cluster instance consists of load balancers, proxies, cluster managers, and **shards**.

Table 5-1 Total memory, proxies, and shards of Proxy Cluster DCS Redis 3.0 instances

Total Memory	Proxies	Shards
64 GB	3	8
128 GB	6	16
256 GB	8	32
512 GB	16	64
1024 GB	32	128

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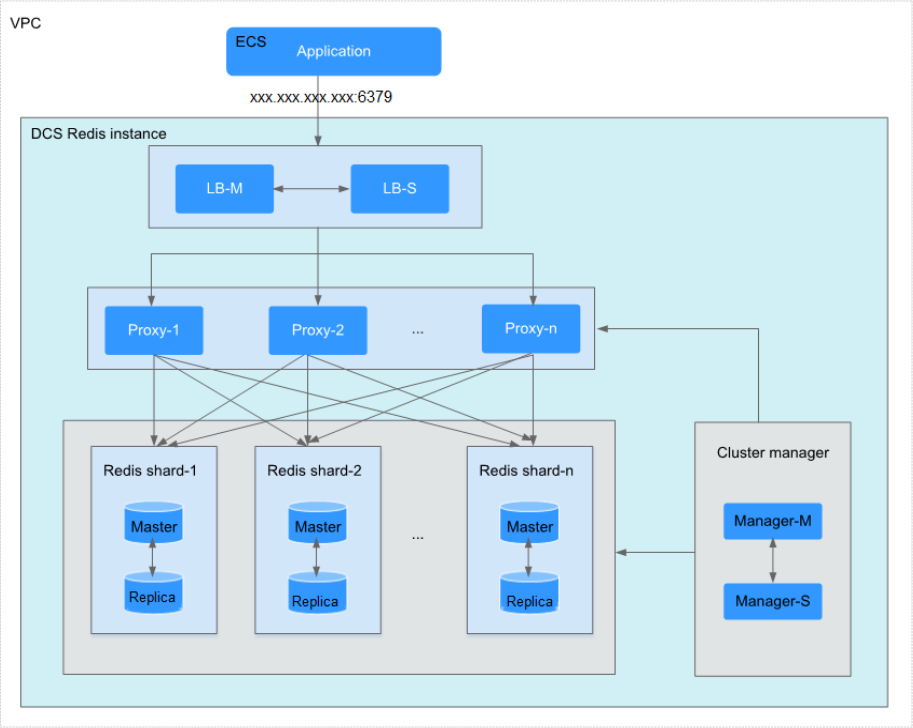
Figure 5-5 Architecture of a Proxy Cluster DCS Redis 3.0 instance



Architecture description:

- **VPC**

  The VPC where all nodes of the instance are run.

  NOTE

  If public access is not enabled for the instance, ensure that the client and the instance are in the same VPC and configure security group rules for the VPC.

  If public access is enabled for the instance, the client can be deployed outside of the VPC to access the instance through the EIP bound to the instance.

  For more information, see **Public Access to a DCS Redis 3.0 Instance** and **How Do I Configure a Security Group?**

- **Application**

  The client used to access the instance.

  DCS Redis instances can be accessed using open-source clients. For examples of accessing DCS instances with different programming languages, see **Accessing a DCS Redis Instance**.

- **LB-M/LB-S**

  The load balancers, which are deployed in master/standby HA mode. The connection addresses (**IP address:Port** and **Domain Name:Port**) of the cluster DCS Redis instance are the addresses of the load balancers.

- **Proxy**

  The proxy server used to achieve high availability and process high-concurrency client requests.

  You can connect to a Proxy Cluster instance at the IP addresses of its proxies.

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- **Redis shard**

  A shard of the cluster.

  Each shard consists of a pair of master/replica nodes. If the master node becomes faulty, the replica node automatically takes over cluster services.

  If both the master and replica nodes of a shard are faulty, the cluster can still provide services but the data on the faulty shard is inaccessible.

- **Cluster manager**

  The cluster configuration managers, which store configurations and partitioning policies of the cluster. You cannot modify the information about the configuration managers.

Proxy Cluster DCS Redis 4.0/5.0 Instances

NOTE

Proxy Cluster DCS Redis 4.0 and later instances are provided only in some regions.

Proxy Cluster DCS Redis 4.0/5.0 instances are built based on open-source Redis 4.0/5.0 and compatible with **open source codis**. They provide multiple large-capacity specifications ranging from 4 GB to 1024 GB.

Table 5-2 lists the number of shards corresponding to different specifications. You can customize the shard size when creating an instance. Currently, the number of replicas cannot be customized. By default, each shard has two replicas.

Memory per shard=Instance specification/Number of shards. For example, if a 48 GB instance has 6 shards, the size of each shard is 48 GB/6 = 8 GB.

Table 5-2 Total memory, proxies, and shards of Proxy Cluster DCS Redis 4.0/5.0 instances

Total Memory	Proxies	Shards	Memory per Shard (GB)
4 GB	3	3	1.33
8 GB	3	3	2.67
16 GB	3	3	5.33
24 GB	3	3	8
32 GB	3	3	10.67
48 GB	6	6	8
64 GB	8	8	8
96 GB	12	12	8
128 GB	16	16	8
192 GB	24	24	8
256 GB	32	32	8
384 GB	48	48	8

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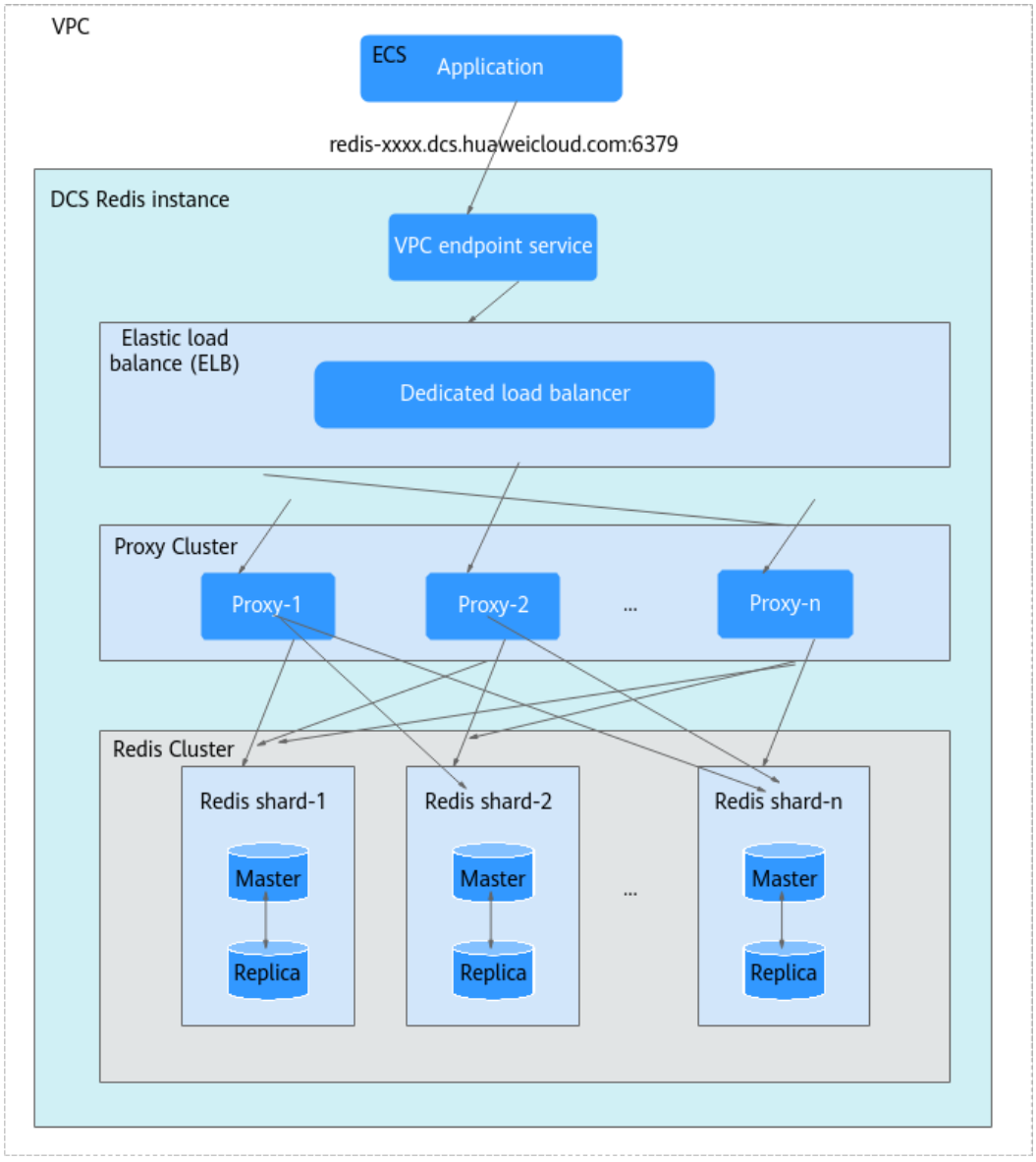
Total Memory	Proxies	Shards	Memory per Shard (GB)
512 GB	64	64	8
768 GB	96	96	8
1024 GB	128	128	8

Figure 5-6 Proxy Cluster DCS Redis 4.0/5.0 instances



Architecture description:

- **VPC**
  The VPC where all nodes of the instance are run.

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> NOTE
>
> The client and the cluster instance must be in the same VPC, and the instance whitelist must allow access from the client IP address.

- **Application**

  The client used to access the instance.

  DCS Redis instances can be accessed using open-source clients. For examples of accessing DCS instances with different programming languages, see **Accessing a DCS Redis Instance**.

- **VPC endpoint service**

  You can configure your DCS Redis instance as a VPC endpoint service and access the instance at the VPC endpoint service address.

  The IP address or domain name address of the Proxy Cluster DCS Redis instance is the address of the VPC endpoint service.

- **ELB**

  The load balancers are deployed in cluster HA mode and support multi-AZ deployment.

- **Proxy**

  The proxy server used to achieve high availability and process high-concurrency client requests.

  You cannot connect to a Proxy Cluster instance at the IP addresses of its proxies.

- **Redis Cluster**

  A shard of the cluster.

  Each shard consists of a pair of master/replica nodes. If the master node becomes faulty, the replica node automatically takes over cluster services.

  If both the master and replica nodes of a shard are faulty, the cluster can still provide services but the data on the faulty shard is inaccessible.

5.4 Redis Cluster

Redis Cluster DCS instances use the native distributed implementation of Redis. Redis Cluster instances have the following features:

- They are compatible with native Redis clusters.
- They inherit the smart client design from Redis.
- They deliver many times higher performance than master/standby instances.

Read/write splitting is supported by configuring the client for Redis Cluster instances. **Read more** about DCS's support for read/write splitting.

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NOTE

- You cannot upgrade the Redis version for an instance. For example, a Redis Cluster DCS Redis 4.0 instance cannot be upgraded to a Redis Cluster DCS Redis 5.0 instance. If your service requires the features of higher Redis versions, create a Redis Cluster instance of a higher version and then migrate data from the old instance to the new one.
- The method of connecting a client to a Redis Cluster instance is different from that of connecting a client to other types of instances. For details, see **Accessing a DCS Redis Instance**.
- Currently, Redis Cluster DCS for Redis 6.0 basic edition is available only in regions such as CN North-Beijing4 and CN South-Guangzhou.

Redis Cluster Instances

The Redis Cluster instance type provided by DCS is compatible with the **native Redis Cluster**, which uses smart clients and a distributed architecture to perform sharding.

Table 5-3 lists the shard specifications for different instance specifications.

You can customize the shard size when creating a Redis Cluster instance. If the shard size is not customized, the default size is used. **Size of a shard = Instance specification/Number of shards**. For example, if a 48 GB instance has 6 shards, the size of each shard is 48 GB/6 = 8 GB.

Table 5-3 Specifications of Redis Cluster DCS instances

Total Memory	Shards
4 GB/8 GB/16 GB/24 GB/32 GB	3
48 GB	6
64 GB	8
96 GB	12
128 GB	16
192 GB	24
256 GB	32
384 GB	48
512 GB	64
768 GB	96
1024 GB	128
2048 GB	128

- Distributed architecture

  Any node in a Redis Cluster can receive requests. Received requests are then redirected to the right node for processing. Each node consists of a subset of

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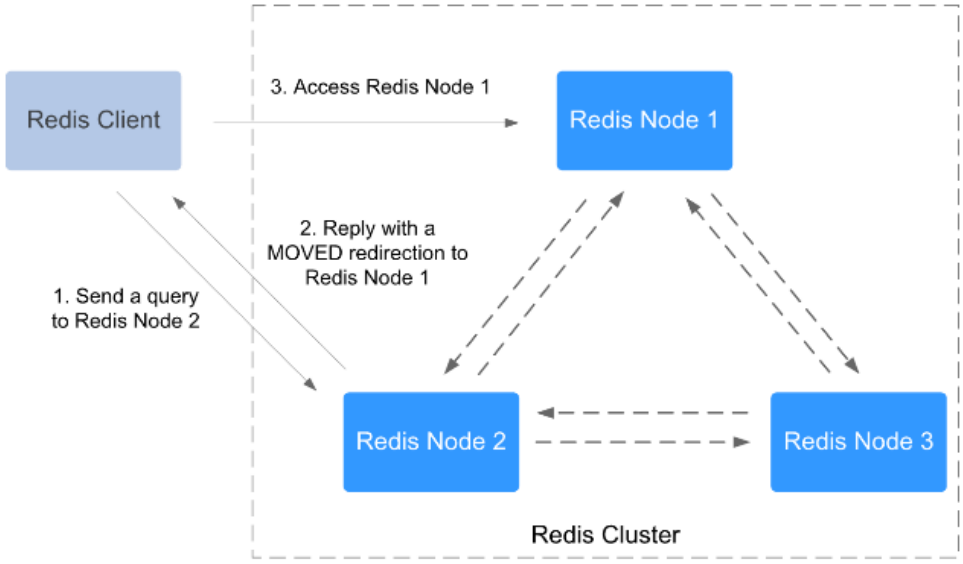
one master and one (by default) or multiple replicas. The master or replica roles are determined through an election algorithm.

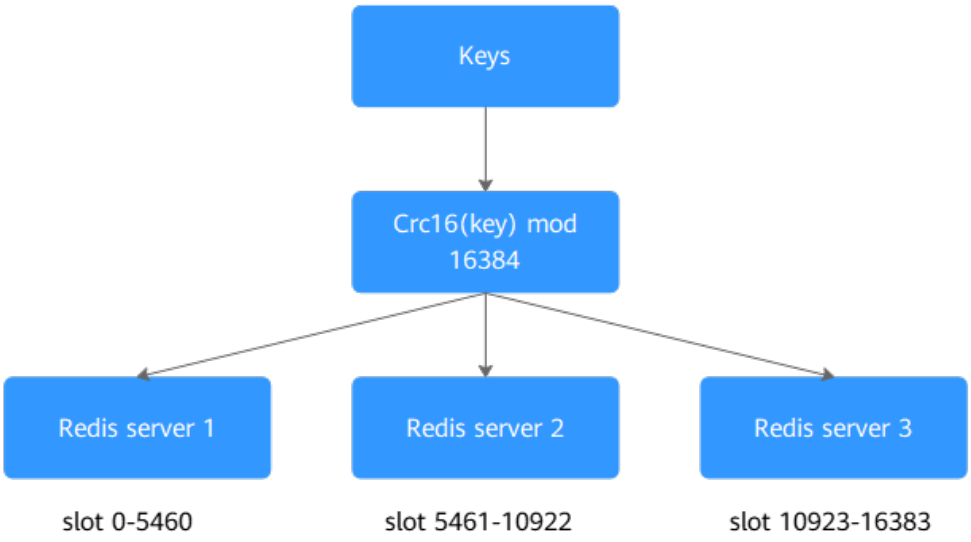
Figure 5-7 Distributed architecture of Redis Cluster



- Presharding

  There are 16,384 hash slots in each Redis Cluster. The mapping between hash slots and Redis nodes is stored in Redis Servers. To compute what is the hash slot of a given key, simply take the CRC16 of the key modulo 16384.

Figure 5-8 Redis Cluster presharding



5.5 Read/Write Splitting Redis

Read/write splitting is suitable for scenarios with high read concurrency and few write requests, aiming to improve the performance of high concurrency and reducing O&M costs.

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NOTE

Read/write splitting is supported only in some regions.

Only DCS Redis 4.0/5.0 support read/write splitting instances.

Read/Write splitting is implemented on the server side by default. Proxies distinguish between read and write requests, and forward write requests to the master node and read requests to the standby node. You do not need to perform any configuration on the client.

When using read/write splitting instances, note the following:

1. Read requests are sent to replicas. There is a delay when data is synchronized from the master to the replicas.

   If your services are sensitive to the delay, do not use read/write splitting instances. Instead, use master/standby or cluster instances.

2. Read/write splitting is suitable when there are more read requests than write requests. If there are a lot of write requests, the master and replicas may be disconnected, or the data synchronization between them may fail after the disconnection. As a result, the read performance deteriorates.

   If your services are write-heavy, use master/standby or cluster instances.

3. If a replica is faulty, it takes some time to synchronize all data from the master. During the synchronization, the replica does not provide services, and the read performance of the instance deteriorates.

   To reduce the impact of the interruption, use an instance with less than 32 GB memory. The smaller the memory, the shorter the time for full data synchronization between the master and replicas, and the smaller the impact of the interruption.

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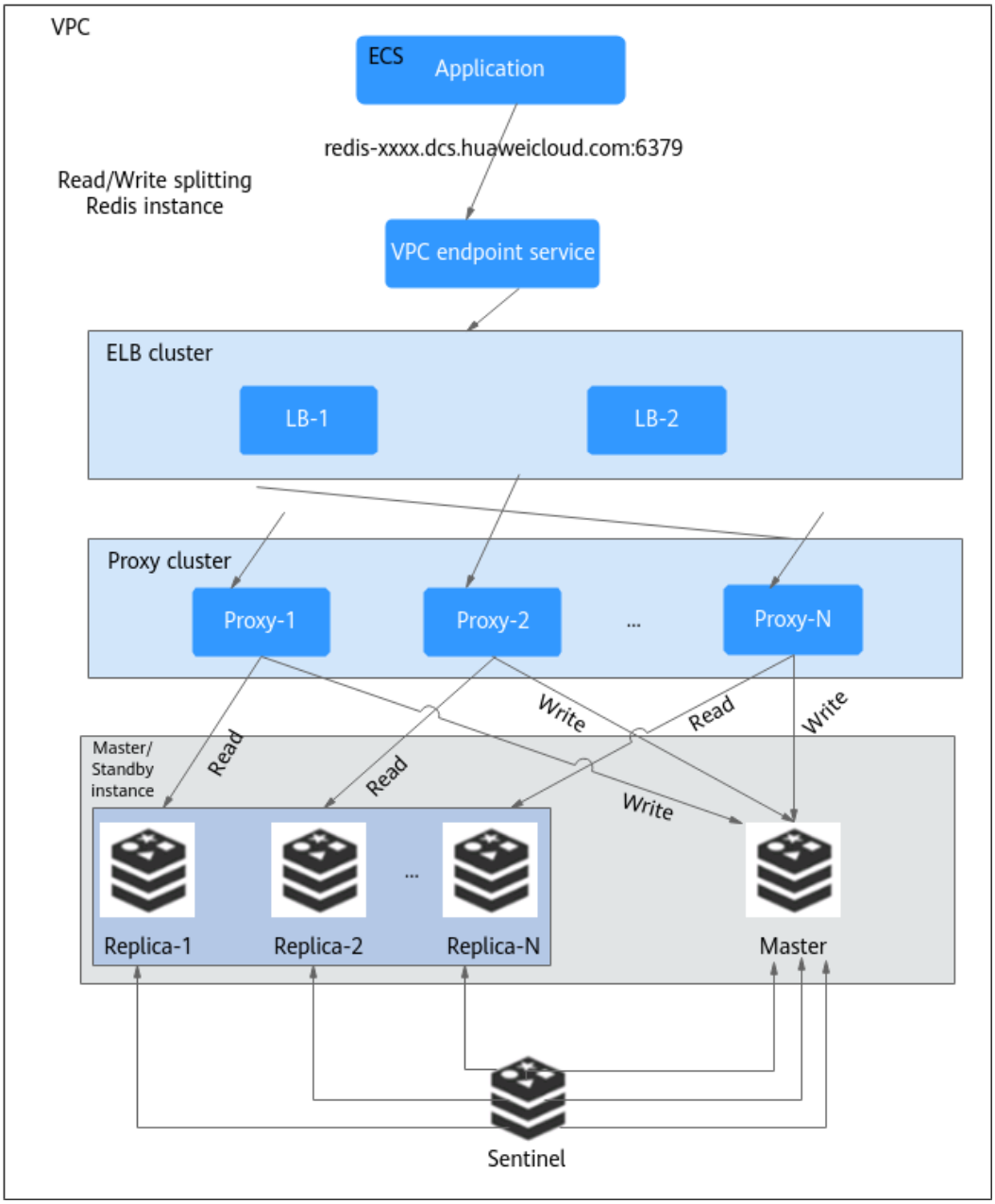
Architecture

Figure 5-9 Architecture of a read/write splitting instance



Architecture description:

- **VPC endpoint service**

  You can configure your DCS Redis instance as a VPC endpoint service and access the instance at the VPC endpoint service address.

  The IP address or domain name of the read/write splitting DCS Redis instance is the address of the VPC endpoint service.

- **ELB**

  The load balancers are deployed in cluster HA mode and support multi-AZ deployment.

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- **Proxy**

  A proxy cluster is used to distinguish between read requests and write requests, and forward write requests to the master node and read requests to the standby node. You do not need to configure the client.

- **Sentinel cluster**

  Sentinels monitor the status of the master and replicas. If the master node is faulty or abnormal, a failover is performed to ensure that services are not interrupted.

- **Master/standby instance**

  A read/write splitting instance is essentially a master/standby instance that consists of a master node and a standby node. By default, data persistence is enabled and data is synchronized between the two nodes.

  The master and standby nodes can be deployed in different AZs.

5.6 Comparing DCS Redis Instance Types

Table 5-4 describes the differences between different Redis instance types in terms of features and commands.

NOTE

DCS for Redis 3.0 is no longer provided. You can use DCS for Redis 4.0 or later.

Table 5-4 Differences between DCS instance types

Item	Single-Node, Read/Write Splitting, or Master/Standby	Proxy Cluster	Redis Cluster
Redis version compatibility	Redis 3.0/4.0/5.0/6.0. You can select a version when creating an instance. DCS for Redis 6.0 professional edition is compatible with open-source KeyDB (available only for master/standby instances).	Redis 3.0/4.0/5.0. You can select a version when creating an instance.	Redis 4.0/5.0/6.0. You can select a version when creating an instance.

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Item	Single-Node, Read/Write Splitting, or Master/ Standby	Proxy Cluster	Redis Cluster
Support	• Keyspace notifications • Pipelining	• Pipelining, **MSET** command, and **MGET** command • **SCAN** command, **KEYS** command, and Redis Slow Log • Pub/Sub	• Keyspace notifications • **BRPOP**, **BLPOP**, and **BRPOPLPUSH** commands • Pub/Sub
Restrictions	Single-node instances do not support data persistence, backup, or restoration.	• LUA script is restricted: All keys must be in the same hash slot to avoid errors. **Hash tags** are recommended. • Some commands that contain multiple keys require that the keys must be in the same hash slot to avoid errors. **Hash tags** are recommended. For details about these multi-key commands, see **Multi-Key Commands of Proxy Cluster Instances**. • Keyspace notifications are not supported.	• LUA script is restricted: All keys must be in the same hash slot. **Hash tags** are recommended. • The client SDK must support Redis Cluster and be able to process MOVED errors. • When you are using pipelining, **MSET** command, or **MGET** command, all keys must be in the same hash slot to avoid errors. **Hash tags** are recommended. • When using keyspace notifications, establish connections with every Redis server and process events on each connection. • When using a traversing or global command such as **SCAN** and **KEYS**, run the command on each Redis server.
Client	Any Redis client	Any Redis client (no need to support the Redis Cluster protocol)	Any client that supports the Redis Cluster protocol

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Item	Single-Node, Read/Write Splitting, or Master/ Standby	Proxy Cluster	Redis Cluster
Disabled commands	**Command Compatibility** lists disabled commands. **Command Restrictions** lists the command restricted for read/write splitting instances.	**Command Compatibility** lists disabled commands. **Command Restrictions** lists the command restricted for Proxy Cluster instances.	**Command Compatibility** lists disabled commands. **Command Restrictions** lists the command restricted for Redis Cluster instances.

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Item	Single-Node, Read/Write Splitting, or Master/ Standby	Proxy Cluster	Redis Cluster
Replicas	A single-node instance has only one replica. By default, a master/standby or read/write splitting instance has two replicas, with one of them being the master. When creating a master/ standby or read/write splitting DCS Redis 4.0 or 5.0 instance, you can customize the number of replicas, with one of them being the master. Currently, the number of replicas cannot be customized for master/ standby DCS Redis 3.0 and 6.0 instances.	Each shard in the cluster has and can only have two replicas, with one of them being the master.	By default, each shard in the cluster has two replicas. The number of replicas can be customized, with one of them being the master. When creating an instance, you can set the replica quantity to one, indicating that the instance only has the master node. In this case, high data reliability cannot be ensured.

Related FAQs

- **Does DCS for Redis Support Multi-DB?**
- **What Are the CPU Specifications of DCS Instances?**
- **Does DCS for Redis Support Read/Write Splitting?**

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5.7 Single-Node Memcached (Discontinued)

NOTE

DCS for Memcached is no longer provided. You can use DCS Redis instances instead.

This section describes the features and architecture of single-node DCS Memcached instances.

Features

1. Low system overhead and high QPS

   Single-node instances do not support data synchronization or data persistence, reducing system overhead and supporting higher concurrency. QPS of single-node DCS Memcached instances reaches up to 100,000.

2. Process monitoring and automatic fault recovery

   With an HA monitoring mechanism, if a single-node DCS instance becomes faulty, a new process is started within 30 seconds to resume service provisioning.

3. Out-of-the-box usability and no data persistence

   Single-node DCS instances can be used out of the box because they do not involve data loading. If your service requires high QPS, you can warm up the data beforehand to avoid strong concurrency impact on the backend database.

4. Low-cost and suitable for development and testing

   Single-node instances are 40% cheaper than master/standby DCS instances, suitable for setting up development or testing environments.

In summary, single-node DCS instances support highly concurrent read/write operations, but do not support data persistence. Data will be deleted after instances are restarted. They are suitable for scenarios which do not require data persistence, such as database front-end caching, to accelerate access and ease the concurrency load off the backend. If the desired data does not exist in the cache, requests will go to the database. When restarting the service or the DCS instance, you can pre-generate cache data from the disk database to relieve pressure on the backend during startup.

Architecture

Figure 5-10 shows the architecture of single-node DCS Memcached instances.

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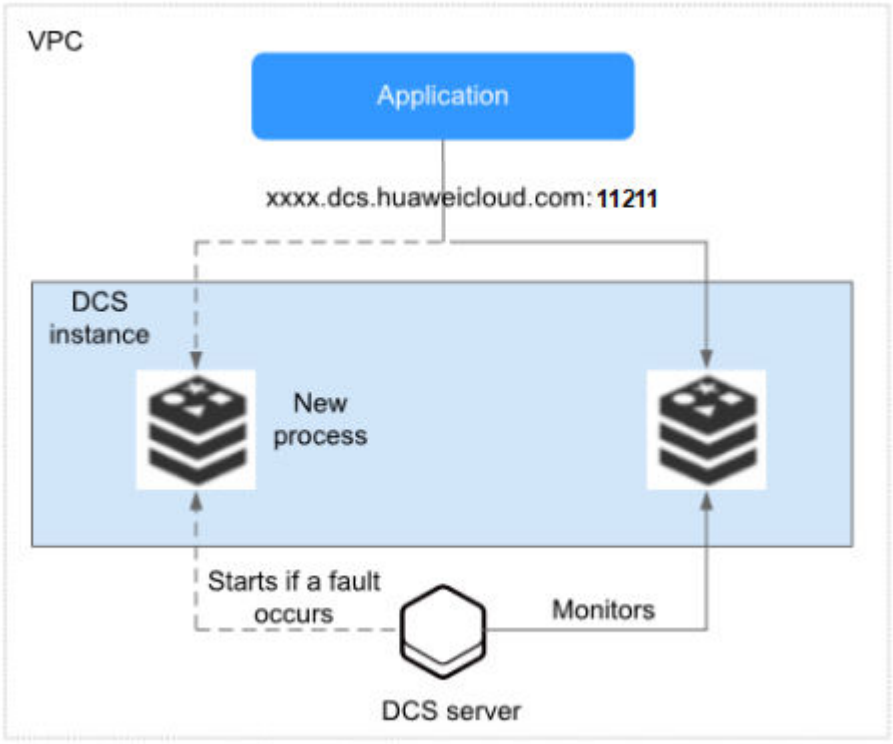
Figure 5-10 Single-node DCS instance architecture



Architecture description:

- **VPC**

  The VPC where all nodes of the instance are run.

  NOTE

  Single-node DCS Memcached instances do not support public access. The client and the instance must be in the same VPC with security group rule configurations.

  For more information, see **How Do I Configure a Security Group?**

- **Application**

  The client of the instance, which is the application running on an Elastic Cloud Server (ECS).

  DCS Memcached instances are compatible with the Memcached protocol, and can be accessed through open-source clients. For examples of accessing DCS instances with different programming languages, see **Accessing a DCS Memcached Instance**.

- **DCS instance**

  A single-node DCS instance, which has only one node and one Memcached process.

  DCS monitors the availability of the instance in real time. If the Memcached process becomes faulty, DCS starts a new process to resume service provisioning.

  Use port 11211 to access a DCS Memcached instance.

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5.8 Master/Standby Memcached (Discontinued)

NOTE

DCS for Memcached is no longer provided. You can use DCS Redis instances instead.

This section describes master/standby DCS Memcached instances.

Features

Master/Standby instances have higher availability and reliability than single-node instances.

Master/Standby DCS Memcached instances have the following features:

1. **Data persistence and high reliability**

   By default, data persistence is enabled by both the master and the standby node of a master/standby DCS Memcached instance. In addition, data persistence is supported to ensure high data reliability.

   The standby node of a DCS Memcached instance is invisible to you. Only the master node provides data read/write operations.

2. **Data synchronization**

   Data in the master and standby nodes is kept consistent through incremental synchronization.

   NOTE

   After recovering from a network exception or node fault, master/standby instances perform a full synchronization to ensure data consistency.

3. **Automatic master/standby switchover**

   If the master node becomes faulty, the standby node takes over within 30 seconds, without requiring any service interruptions or manual operations.

4. **Multiple DR policies**

   Each master/standby instance can be deployed across AZs with physically isolated power supplies and networks. Applications can also be deployed across AZs to achieve HA for both data and applications.

Architecture of Master/Standby DCS Memcached Instances

Figure 5-11 shows the architecture of master/standby DCS Memcached instances.

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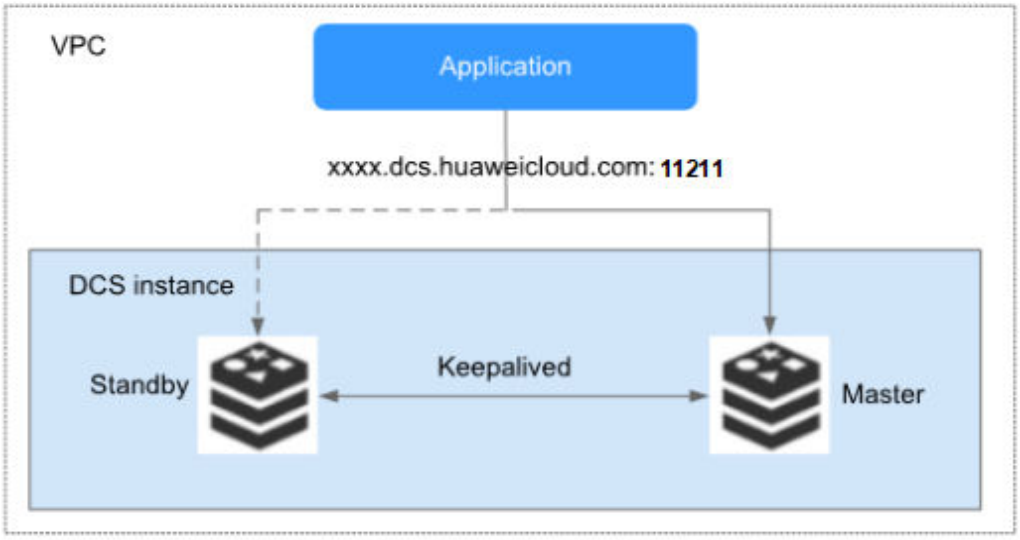
Figure 5-11 Master/Standby DCS Memcached instance architecture



Architecture description:

- **VPC**

  The VPC where all nodes of the instance are run.

  NOTE

  Master/Standby DCS Memcached instances do not support public access. The client and the instance must be in the same VPC with security group rule configurations.

  For more information, see **How Do I Configure a Security Group?**

- **Application**

  The Memcached client of the instance, which is the application running on the ECS.

  DCS Memcached instances are compatible with the Memcached protocol, and can be accessed through open-source clients. For examples of accessing DCS instances with different programming languages, see **Accessing a DCS Memcached Instance**.

- **DCS instance**

  Indicates a master/standby DCS instance which has a master node and a standby node. By default, data persistence is enabled and data is synchronized between the two nodes.

  DCS monitors the availability of the instance in real time. If the master node becomes faulty, the standby node becomes the master node and resumes service provisioning.

  Use port 11211 to access a DCS Memcached instance.

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6 DCS Instance Specifications

6.1 Redis 4.0 and 5.0 Instance Specifications

This section describes DCS Redis 4.0 and 5.0 instance specifications, including the total memory, available memory, maximum number of connections allowed, maximum/assured bandwidth, and reference performance.

The following metrics are related to the instance specifications:

- Used memory: You can check the memory usage of an instance by viewing the **Memory Usage** and **Used Memory** metrics.
- Maximum connections: The maximum number of connections allowed is the maximum number of clients that can be connected to an instance. To check the number of connections to an instance, view the **Connected Clients** metric. After an instance is created, you can change the maximum number of connections of the instance by modifying the **maxclients** parameter on the **Instance Configuration** > **Parameters** page on the console. This parameter cannot be modified for Proxy Cluster instances.
- QPS represents queries per second, which is the number of commands processed per second. For details about QPS testing, see the **Performance White Paper**.
- Bandwidth: You can view the **Flow Control Times** metric to check whether the bandwidth has exceeded the limit. You can also check the **Bandwidth Usage** metric. This metric is for reference only, because it may be higher than 100%. For details, see **Why Does Bandwidth Usage Exceed 100%?**

NOTE

- DCS Redis 4.0 and 5.0 instances are available in single-node, master/standby, Proxy Cluster, Redis Cluster, and read/write splitting types.
- DCS Redis 4.0 and 5.0 instances support x86 and Arm architectures. x86 is recommended. Arm is unavailable in some regions.
- The specifications available on the console vary by region.

Single-Node Instances

Single-node DCS Redis 4.0 or 5.0 instances support x86 and Arm CPU architectures. The following table lists the specifications.

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Table 6-1 Specifications of single-node DCS Redis 4.0 or 5.0 instances

Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
0.125	0.125	10,000/10,000	40/40	80,000	x86: redis.single.xu1.tiny.128 Arm: redis.single.au1.tiny.128
0.25	0.25	10,000/10,000	80/80	80,000	x86: redis.single.xu1.tiny.256 Arm: redis.single.au1.tiny.256
0.5	0.5	10,000/10,000	80/80	80,000	x86: redis.single.xu1.tiny.512 Arm: redis.single.au1.tiny.512
1	1	10,000/50,000	80/80	80,000	x86: redis.single.xu1.large.1 Arm: redis.single.au1.large.1
2	2	10,000/50,000	128/128	80,000	x86: redis.single.xu1.large.2 Arm: redis.single.au1.large.2
4	4	10,000/50,000	192/192	80,000	x86: redis.single.xu1.large.4 Arm: redis.single.au1.large.4

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Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/ Limit) (Count)	Assured/ Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
8	8	10,000/50,000	192/192	100,000	x86: redis.single.xu1.large.8 Arm: redis.single.au1.large.8
16	16	10,000/50,000	256/256	100,000	x86: redis.single.xu1.large.16 Arm: redis.single.au1.large.16
24	24	10,000/50,000	256/256	100,000	x86: redis.single.xu1.large.24 Arm: redis.single.au1.large.24
32	32	10,000/50,000	256/256	100,000	x86: redis.single.xu1.large.32 Arm: redis.single.au1.large.32
48	48	10,000/50,000	256/256	100,000	x86: redis.single.xu1.large.48 Arm: redis.single.au1.large.48
64	64	10,000/50,000	384/384	100,000	x86: redis.single.xu1.large.64 Arm: redis.single.au1.large.64

Master/Standby Instances

Master/standby instances support x86 and Arm CPU architectures. An instance can have 2 to 5 replicas. For example, the specifications of an Arm-based instance can

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be **Arm | master/standby | 2 replicas** or **Arm | master/standby | 5 replicas**. By default, a master/standby instance has one master node and two replicas (including the master replica).

Given the same memory size, the differences between x86-based master/standby instances, Arm-based master/standby instances, and master/standby instances with multiple replicas are as follows:

- The available memory, maximum number of connections, assured/maximum bandwidth, and QPS are the same.
- Specification code: **Table 6-2** only lists the specification names of x86- and Arm-based instances. The specification names reflect the number of replicas, for example, redis.ha.au1.large.**r2**.8 (master/standby | Arm | 2 replicas | 8 GB) and redis.ha.au1.large.**r3**.8 (master/standby | Arm | 3 replicas | 8 GB).
- IP addresses: Number of occupied IP addresses = Number of master nodes x Number of replicas. For example:

  2 replicas: Number of occupied IP addresses = 1 x 2 = 2

  3 replicas: Number of occupied IP addresses = 1 x 3 = 3

Table 6-2 Specifications of master/standby DCS Redis 4.0 or 5.0 instances

Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
0.125	0.125	10,000/10,000	40/40	80,000	x86: redis.ha.xu1.tiny.r2.128 Arm: redis.ha.au1.tiny.r2.128
0.25	0.25	10,000/10,000	80/80	80,000	x86: redis.ha.xu1.tiny.r2.256 Arm: redis.ha.au1.tiny.r2.256
0.5	0.5	10,000/10,000	80/80	80,000	x86: redis.ha.xu1.tiny.r2.512 Arm: redis.ha.au1.tiny.r2.512

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Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
1	1	10,000/50,000	80/80	80,000	x86: redis.ha.xu1.large.r2.1 Arm: redis.ha.au1.large.r2.1
2	2	10,000/50,000	128/128	80,000	x86: redis.ha.xu1.large.r2.2 Arm: redis.ha.au1.large.r2.2
4	4	10,000/50,000	192/192	80,000	x86: redis.ha.xu1.large.r2.4 Arm: redis.ha.au1.large.r2.4
8	8	10,000/50,000	192/192	100,000	x86: redis.ha.xu1.large.r2.8 Arm: redis.ha.au1.large.r2.8
16	16	10,000/50,000	256/256	100,000	x86: redis.ha.xu1.large.r2.16 Arm: redis.ha.au1.large.r2.16
24	24	10,000/50,000	256/256	100,000	x86: redis.ha.xu1.large.r2.24 Arm: redis.ha.au1.large.r2.24

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Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
32	32	10,000/50,000	256/256	100,000	x86: redis.ha.xu1.large.r2.32 Arm: redis.ha.au1.large.r2.32
48	48	10,000/50,000	256/256	100,000	x86: redis.ha.xu1.large.r2.48 Arm: redis.ha.au1.large.r2.48
64	64	10,000/50,000	384/384	100,000	x86: redis.ha.xu1.large.r2.64 Arm: redis.ha.au1.large.r2.64

Proxy Cluster Instances

Proxy Cluster instances support x86 and Arm CPU architectures. **Table 6-3** lists the specifications.

Proxy Cluster instances do not support customization of the number of replicas. Each shard has two replicas by default. For details about the default number of shards, see **Table 5-2**. When buying an instance, you can customize the size of a single shard.

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NOTE

- The following table lists only the Proxy Cluster instance specifications with default shards. If you customize shards, see the maximum number of connections, assured/maximum bandwidth, and product specification code (flavor) in the **Instance Specification** table on the **Buy DCS Instance** page of the DCS console.
- The maximum connections of a cluster is for the entire instance, and not for a single shard. Maximum connections of a single shard = Maximum connections of an instance/Number of shards.
- The maximum bandwidth and assured bandwidth of a cluster is for the entire instance, and not for a single shard. The relationship between the instance bandwidth and the bandwidth of a single shard is as follows:
  - Instance bandwidth = Bandwidth of a single shard x Number of shards
  - For a cluster instance, if the memory of a single shard is 1 GB, the bandwidth of a single shard is 384 Mbit/s. If the memory of a single shard is greater than 1 GB, the bandwidth of a single shard is 768 Mbit/s.
  - The upper limit of the bandwidth of a Proxy Cluster instance is 10,000 Mbit/s. That is, even if the bandwidth of a single shard multiplied by the number of shards is greater than 10,000 Mbit/s, the bandwidth of the instance is still 10,000 Mbit/s.

Table 6-3 Specifications of Proxy Cluster DCS Redis 4.0 and 5.0 instances

Specification (GB)	Available Memory (GB)	Shards (Master Nodes)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
4	4	3	20,000/20,000	2304/2304	240,000	x86: redis.proxy.xu1.large.4 Arm: redis.proxy.au1.large.4
8	8	3	30,000/30,000	2304/2304	240,000	x86: redis.proxy.xu1.large.8 Arm: redis.proxy.au1.large.8
16	16	3	30,000/30,000	2304/2304	240,000	x86: redis.proxy.xu1.large.16 Arm: redis.proxy.au1.large.16

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Specification (GB)	Available Memory (GB)	Shards (Master Nodes)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
24	24	3	30,000/30,000	2304/2304	240,000	x86: redis.proxy.xu1.large.24 Arm: redis.proxy.au1.large.24
32	32	3	30,000/30,000	2304/2304	240,000	x86: redis.proxy.xu1.large.32 Arm: redis.proxy.au1.large.32
48	48	6	60,000/60,000	4608/4608	480,000	x86: redis.proxy.xu1.large.48 Arm: redis.proxy.au1.large.48
64	64	8	80,000/80,000	6144/6144	640,000	x86: redis.proxy.xu1.large.64 Arm: redis.proxy.au1.large.64
96	96	12	120,000/120,000	9216/9216	960,000	x86: redis.proxy.xu1.large.96 Arm: redis.proxy.au1.large.96
128	128	16	160,000/160,000	10,000/10,000	1,280,000	x86: redis.proxy.xu1.large.128 Arm: redis.proxy.au1.large.128

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Specification (GB)	Available Memory (GB)	Shards (Master Nodes)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
192	192	24	200,000/240,000	10,000/10,000	1,920,000	x86: redis.proxy.xu1.large.192 Arm: redis.proxy.au1.large.192
256	256	32	200,000/320,000	10,000/10,000	> 2,000,000	x86: redis.proxy.xu1.large.256 Arm: redis.proxy.au1.large.256
384	384	48	200,000/480,000	10,000/10,000	> 2,000,000	x86: redis.proxy.xu1.large.384 Arm: redis.proxy.au1.large.384
512	512	64	200,000/500,000	10,000/10,000	> 2,000,000	x86: redis.proxy.xu1.large.512 Arm: redis.proxy.au1.large.512
768	768	96	200,000/500,000	10,000/10,000	> 2,000,000	x86: redis.proxy.xu1.large.768 Arm: redis.proxy.au1.large.768
1024	1024	128	200,000/500,000	10,000/10,000	> 2,000,000	x86: redis.proxy.xu1.large.1024 Arm: redis.proxy.au1.large.1024

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Specification (GB)	Available Memory (GB)	Shards (Master Nodes)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
2048	2048	128	200,000/500,000	10,000/10,000	> 2,000,000	x86: redis.proxy.xu1.large.2048 Arm: redis.proxy.au1.large.2048
4096	4096	128	200,000/500,000	10,000/10,000	> 2,000,000	x86: redis.proxy.xu1.large.2048 Arm: redis.proxy.au1.large.2048

Redis Cluster Instances

Redis Cluster instances support x86 and Arm CPU architectures. Each instance can have 1 to 5 replicas. For example, the instance specifications can be **Redis Cluster | 1 replica** or **Redis Cluster | 5 replicas**. By default, a Redis Cluster instance has two replicas. A Redis Cluster instance with only 1 replica indicates that the replica quantity has been decreased.

Given the same memory size, the differences between x86-based Redis Cluster instances, Arm-based Redis Cluster instances, and Redis Cluster instances with multiple replicas are as follows:

- The available memory, shard quantity (master node quantity), maximum number of connections, assured/maximum bandwidth, and QPS are the same.
- Specification name: **Table 6-4** only lists the specification names of x86- and Arm-based instances with 2 replicas. The specification names reflect the number of replicas, for example, redis.cluster.au1.large.**r2**.24 (Redis Cluster | Arm | 2 replicas | 24 GB) and redis.cluster.au1.large.**r3**.24 (Redis Cluster | Arm | 3 replicas | 24 GB).
- IP addresses: Number of occupied IP addresses = Number of shards x Number of replicas. For example:

  24 GB | Redis Cluster | 3 replicas: Number of occupied IP addresses = 3 x 3 = 9
- Available memory per node = Instance available memory/Master node quantity

  For example, a 24 GB x86-based instance has 24 GB available memory and 3 master nodes. The available memory per node is 24/3 = 8 GB.
- Maximum connections limit per node = Maximum connections limit/Master node quantity For example:

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For example, a 24 GB x86-based instance has 3 master nodes and the maximum connections limit is 150,000. The maximum connections limit per node = 150,000/3 = 50,000.

NOTE

- The following table lists only the Redis Cluster instance specifications with default shards. If you customize shards, see the maximum number of connections, assured/maximum bandwidth, and product specification code (flavor) in the **Instance Specification** table the **Buy DCS Instance** page of the DCS console.
- The maximum connections of a cluster is for the entire instance, and not for a single shard. Maximum connections of a single shard = Maximum connections of an instance/Number of shards.
- The maximum bandwidth and assured bandwidth of a cluster is for the entire instance, and not for a single shard. The relationship between the instance bandwidth and the bandwidth of a single shard is as follows:
  - Instance bandwidth = Bandwidth of a single shard x Number of shards
  - For a cluster instance, if the memory of a single shard is 1 GB, the bandwidth of a single shard is 384 Mbit/s. If the memory of a single shard is greater than 1 GB, the bandwidth of a single shard is 768 Mbit/s.

Table 6-4 Specifications of Redis Cluster DCS Redis 4.0 and 5.0 instances

Total Memory (GB)	Available Memory (GB)	Shards (Master Nodes)	Max. Connections (Default/ Limit) (Count)	Assured/ Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
4	4	3	30,000 / 150,000	2304/2304	240,000	x86: redis.cluster.xu1.large.r2.4 Arm: redis.cluster.au1.large.r2.4
8	8	3	30,000 / 150,000	2304/2304	240,000	x86: redis.cluster.xu1.large.r2.8 Arm: redis.cluster.au1.large.r2.8
16	16	3	30,000 / 150,000	2304/2304	240,000	x86: redis.cluster.xu1.large.r2.16 Arm: redis.cluster.au1.large.r2.16

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Total Memory (GB)	Available Memory (GB)	Shards (Master Nodes)	Max. Connections (Default/ Limit) (Count)	Assured/ Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
24	24	3	30,000 / 150,000	2304/2304	300,000	x86: redis.cluster.xu1.large.r2.24 Arm: redis.cluster.au1.large.r2.24
32	32	3	30,000 / 150,000	2304/2304	300,000	x86: redis.cluster.xu1.large.r2.32 Arm: redis.cluster.au1.large.r2.32
48	48	6	60,000 / 300,000	4608/4608	> 300,000	x86: redis.cluster.xu1.large.r2.48 Arm: redis.cluster.au1.large.r2.48
64	64	8	80,000 / 400,000	6144/6144	500,000	x86: redis.cluster.xu1.large.r2.64 Arm: redis.cluster.au1.large.r2.64
96	96	12	120,000 / 600,000	9216/9216	> 500,000	x86: redis.cluster.xu1.large.r2.96 Arm: redis.cluster.au1.large.r2.96
128	128	16	160,000 / 800,000	12,288/12,288	1,000,000	x86: redis.cluster.xu1.large.r2.128 Arm: redis.cluster.au1.large.r2.128

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Total Memory (GB)	Available Memory (GB)	Shards (Master Nodes)	Max. Connections (Default/ Limit) (Count)	Assured/ Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
192	192	24	240,000 / 1,200,000	18,432/18,432	> 1,000,000	x86: redis.cluster.xu1.large.r2.192 Arm: redis.cluster.au1.large.r2.192
256	256	32	320,000 / 1,600,000	24,576/24,576	> 2,000,000	x86: redis.cluster.xu1.large.r2.256 Arm: redis.cluster.au1.large.r2.256
384	384	48	480,000 / 2,400,000	36,864/36,864	> 2,000,000	x86: redis.cluster.xu1.large.r2.384 Arm: redis.cluster.au1.large.r2.384
512	512	64	640,000 / 3,200,000	49,152/49,152	> 2,000,000	x86: redis.cluster.xu1.large.r2.512 Arm: redis.cluster.au1.large.r2.512
768	768	96	960,000 / 4,800,000	73,728/73,728	> 2,000,000	x86: redis.cluster.xu1.large.r2.768 Arm: redis.cluster.au1.large.r2.768
1024	1024	128	1,280,000 / 6,400,000	98,304/98,304	> 2,000,000	x86: redis.cluster.xu1.large.r2.1024 Arm: redis.cluster.au1.large.r2.1024

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Read/Write Splitting Instances

- Currently, read/write splitting instances only support the x86 CPU architecture. **Table 6-5** lists the specifications.
- The maximum connections of a read/write splitting DCS Redis instance cannot be modified.
- Bandwidth limit per Redis Server (MB/s) = Total bandwidth limit (MB/s)/ Number of replicas (including masters)
- Reference performance per node (QPS) = Reference performance (QPS)/ Number of replicas (including masters)
- When using read/write splitting instances, note the following:

  a. Read requests are sent to replicas. There is a delay when data is synchronized from the master to the replicas.

     If your services are sensitive to the delay, do not use read/write splitting instances. Instead, you can use master/standby or cluster instances.

  b. Read/write splitting is suitable when there are more read requests than write requests. If there are a lot of write requests, the master and replicas may be disconnected, or the data synchronization between them may fail after the disconnection. As a result, the read performance deteriorates.

     If your services are write-heavy, use master/standby or cluster instances.

  c. If a replica is faulty, it takes some time to synchronize all data from the master. During the synchronization, the replica does not provide services, and the read performance of the instance deteriorates.

     To reduce the impact of the interruption, use an instance with less than 32 GB memory. The smaller the memory, the shorter the time for full data synchronization between the master and replicas, and the smaller the impact of the interruption.

Table 6-5 Specifications of read/write splitting DCS Redis 4.0 or 5.0 instances

Specification	Available Memory (GB)	Replicas (Including Masters)	Max. Connections (Default/ Limit)	Bandwidth Limit (MB/s)	Bandwidth Limit per Redis Server (MB/s)	Reference Performance (QPS)	Reference Performance per Node (QPS)	Specification Code (spec_code in the API)
8	8	2	20,000	192	96	160,000	80,000	redis.ha.xu1.large.p2.8
8	8	3	30,000	288	96	240,000	80,000	redis.ha.xu1.large.p3.8

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Specification	Available Memory (GB)	Replicas (Including Masters)	Max. Connections (Default/ Limit)	Bandwidth Limit (MB/s)	Bandwidth Limit per Redis Server (MB/s)	Reference Performance (QPS)	Reference Performance per Node (QPS)	Specification Code (spec_code in the API)
8	8	4	40,000	384	96	320,000	80,000	redis.ha.xu1.large.p4.8
8	8	5	50,000	480	96	400,000	80,000	redis.ha.xu1.large.p5.8
8	8	6	60,000	576	96	480,000	80,000	redis.ha.xu1.large.p6.8
16	16	2	20,000	192	96	160,000	80,000	redis.ha.xu1.large.p2.16
16	16	3	30,000	288	96	240,000	80,000	redis.ha.xu1.large.p3.16
16	16	4	40,000	384	96	320,000	80,000	redis.ha.xu1.large.p4.16
16	16	5	50,000	480	96	400,000	80,000	redis.ha.xu1.large.p5.16
16	16	6	60,000	576	96	480,000	80,000	redis.ha.xu1.large.p6.16
32	32	2	20,000	192	96	160,000	80,000	redis.ha.xu1.large.p2.32

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Specification	Available Memory (GB)	Replicas (Including Masters)	Max. Connections (Default/ Limit)	Bandwidth Limit (MB/s)	Bandwidth Limit per Redis Server (MB/s)	Reference Performance (QPS)	Reference Performance per Node (QPS)	Specification Code (spec_code in the API)
32	32	3	30,000	288	96	240,000	80,000	redis.ha.xu1.large.p3.32
32	32	4	40,000	384	96	320,000	80,000	redis.ha.xu1.large.p4.32
32	32	5	50,000	480	96	400,000	80,000	redis.ha.xu1.large.p5.32
32	32	6	60,000	576	96	480,000	80,000	redis.ha.xu1.large.p6.32
64	64	2	20,000	192	96	160,000	80,000	redis.ha.xu1.large.p2.64
64	64	3	30,000	288	96	240,000	80,000	redis.ha.xu1.large.p3.64
64	64	4	40,000	384	96	320,000	80,000	redis.ha.xu1.large.p4.64
64	64	5	50,000	480	96	400,000	80,000	redis.ha.xu1.large.p5.64
64	64	6	60,000	576	96	480,000	80,000	redis.ha.xu1.large.p6.64

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6.2 Redis 6.0 Instance Specifications

This section describes DCS Redis 6.0 instance specifications, including the total memory, available memory, maximum number of connections allowed, maximum/assured bandwidth, and reference performance.

The following metrics are related to the instance specifications:

- Used memory: You can check the memory usage of an instance by viewing the **Memory Usage** and **Used Memory** metrics.
- Maximum connections: The maximum number of connections allowed is the maximum number of clients that can be connected to an instance. To check the number of connections to an instance, view the **Connected Clients** metric.
- QPS represents queries per second, which is the number of commands processed per second. For details about QPS testing, see the **Performance White Paper**.

DCS for Redis 6.0 comes in basic, professional (performance), and professional (storage) editions. They are currently available only in some regions, including CN North-Beijing4 and CN South-Guangzhou. For details about the architecture of DCS Redis 6.0 instances, see **DCS Instance Types**.

DCS Redis 6.0 basic instances are available in single-node, master/standby, and Redis Cluster types.DCS Redis 6.0 professional instances are available only in the master/standby type. All of them are based on the x86 CPU.

NOTE

The specifications available on the console vary by region.

Basic Edition, Master/Standby

Table 6-6 Specifications of master/standby DCS Redis 6.0 basic edition instances

Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
0.125	0.125	10,000/10,000	40/40	80,000	redis.ha.xu1.tiny.r2.128
0.25	0.25	10,000/10,000	80/80	80,000	redis.ha.xu1.tiny.r2.256
0.5	0.5	10,000/10,000	80/80	80,000	redis.ha.xu1.tiny.r2.512
1	1	10,000/50,000	80/80	80,000	redis.ha.xu1.large.r2.1

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Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
2	2	10,000/50,000	128/128	80,000	redis.ha.xu1.large.r2.2
4	4	10,000/50,000	192/192	80,000	redis.ha.xu1.large.r2.4
8	8	10,000/50,000	192/192	100,000	redis.ha.xu1.large.r2.8
16	16	10,000/50,000	256/256	100,000	redis.ha.xu1.large.r2.16
24	24	10,000/50,000	256/256	100,000	redis.ha.xu1.large.r2.24
32	32	10,000/50,000	256/256	100,000	redis.ha.xu1.large.r2.32
48	48	10,000/50,000	256/256	100,000	redis.ha.xu1.large.r2.48
64	64	10,000/50,000	384/384	100,000	redis.ha.xu1.large.r2.64

Basic Edition, Single-Node

Table 6-7 Specifications of single-node DCS Redis 6.0 basic edition instances

Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
0.125	0.125	10,000/10,000	40/40	80,000	redis.single.xu1.tiny.128
0.25	0.25	10,000/10,000	80/80	80,000	redis.single.xu1.tiny.256
0.5	0.5	10,000/10,000	80/80	80,000	redis.single.xu1.tiny.512
1	1	10,000/50,000	80/80	80,000	redis.single.xu1.large.1

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Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
2	2	10,000/50,000	128/128	80,000	redis.single.xu1.large.2
4	4	10,000/50,000	192/192	80,000	redis.single.xu1.large.4
8	8	10,000/50,000	192/192	100,000	redis.single.xu1.large.8
16	16	10,000/50,000	256/256	100,000	redis.single.xu1.large.16
24	24	10,000/50,000	256/256	100,000	redis.single.xu1.large.24
32	32	10,000/50,000	256/256	100,000	redis.single.xu1.large.32
48	48	10,000/50,000	256/256	100,000	redis.single.xu1.large.48
64	64	10,000/50,000	384/384	100,000	redis.single.xu1.large.64

Basic Edition, Redis Cluster

- Specification code: **Table 6-8** only lists the specification codes of instances with 2 replicas (default). The specification names reflect the number of replicas, for example, redis.cluster.xu1.large.r**2**.4 (2 replicas | 4 GB) and redis.cluster.xu1.large.r**1**.4 (1 replica | 4 GB).
- IP addresses: Number of occupied IP addresses = Number of shards x Number of replicas. For example:

  24 GB | Redis Cluster | 2 replicas: Number of occupied IP addresses = 3 x 2 = 6
- Available memory per node = Instance available memory/Master node quantity. For example:

  For example, a 24 GB instance has 24 GB available memory and 3 master nodes. The available memory per node is 24/3 = 8 GB.
- Maximum connections limit per node = Maximum connections limit/Master node quantity. For example:

  For example, a 24 GB instance has 3 master nodes and the maximum connections limit is 150,000. The maximum connections limit per node = 150,000/3 = 50,000.

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NOTE

- The following table lists only the Redis Cluster instance specifications with default shards. If you customize shards, see the maximum number of connections, assured/maximum bandwidth, and product specification code (flavor) in the **Instance Specification** table the **Buy DCS Instance** page of the DCS console.
- The maximum connections of a cluster is for the entire instance, and not for a single shard. Maximum connections of a single shard = Maximum connections of an instance/Number of shards.
- The maximum bandwidth and assured bandwidth of a cluster is for the entire instance, and not for a single shard. The relationship between the instance bandwidth and the bandwidth of a single shard is as follows:
  - Instance bandwidth = Bandwidth of a single shard x Number of shards
  - For a cluster instance, if the memory of a single shard is 1 GB, the bandwidth of a single shard is 384 Mbit/s. If the memory of a single shard is greater than 1 GB, the bandwidth of a single shard is 768 Mbit/s.

Table 6-8 Specifications of Redis Cluster DCS Redis 6.0 basic edition instances

Total Memory (GB)	Available Memory (GB)	Shards (Master Nodes)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
4	4	3	30,000/150,000	2304/2304	240,000	redis.cluster.xu1.large.r2.4
8	8	3	30,000/150,000	2304/2304	240,000	redis.cluster.xu1.large.r2.8
16	16	3	30,000/150,000	2304/2304	240,000	redis.cluster.xu1.large.r2.16
24	24	3	30,000/150,000	2304/2304	300,000	redis.cluster.xu1.large.r2.24
32	32	3	30,000/150,000	2304/2304	300,000	redis.cluster.xu1.large.r2.32
48	48	6	60,000/300,000	4608/4608	> 300,000	redis.cluster.xu1.large.r2.48
64	64	8	80,000/400,000	6144/6144	500,000	redis.cluster.xu1.large.r2.64
96	96	12	120,000/600,000	9216/9216	> 500,000	redis.cluster.xu1.large.r2.96
128	128	16	160,000/800,000	12,288/12,288	1,000,000	redis.cluster.xu1.large.r2.128

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Total Memory (GB)	Available Memory (GB)	Shards (Master Nodes)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
192	192	24	240,000/1,200,000	18,432/18,432	> 1,000,000	redis.cluster.xu1.large.r2.192
256	256	32	320,000/1,600,000	24,576/24,576	> 2,000,000	redis.cluster.xu1.large.r2.256
384	384	48	480,000/2,400,000	36,864/36,864	> 2,000,000	redis.cluster.xu1.large.r2.384
512	512	64	640,000/3,200,000	49,152/49,152	> 2,000,000	redis.cluster.xu1.large.r2.512
768	768	96	960,000/4,800,000	73,728/73,728	> 2,000,000	redis.cluster.xu1.large.r2.768
1024	1024	128	1,280,000/6,400,000	98,304/98,304	> 2,000,000	redis.cluster.xu1.large.r2.1024
2048	2048	128	2,560,000/12,800,000	98,304/98,304	> 2,000,000	redis.cluster.xu1.large.r2.2048

Professional (Performance) Edition

Currently, DCS for Redis 6.0 professional (performance) edition supports master/standby instances based on x86 CPUs.

Table 6-9 Specifications of DCS Redis 6.0 professional (performance) edition instances

Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
8	8	10,000/50,000	1536/1536	400,000	redis.ha.xu1.large.enthp.8
16	16	10,000/50,000	1536/1536	400,000	redis.ha.xu1.large.enthp.16
32	32	10,000/50,000	1536/1536	400,000	redis.ha.xu1.large.enthp.32

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Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
64	64	10,000/50,000	1536/1536	400,000	redis.ha.xu1.large.enthp.64

Professional (Storage) Edition

Currently, DCS for Redis 6.0 professional (storage) edition supports master/standby instances based on x86 CPUs.

Professional (storage) instances use memory and SSDs. They use memory to cache hot data and SSDs to store all data. "Available Memory" in the following table is the disk capacity.

Table 6-10 Specifications of DCS Redis 6.0 professional (storage) edition instances

Total Memory (GB)	Maximum Storage (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
8	64	10,000/50,000	768/768	70,000	redis.ha.xu1.large.entst.8
16	128	10,000/50,000	768/768	70,000	redis.ha.xu1.large.entst.16
32	256	10,000/50,000	768/768	70,000	redis.ha.xu1.large.entst.32

6.3 Redis 3.0 Instance Specifications (Discontinued)

This section describes DCS Redis 3.0 instance specifications, including the total memory, available memory, maximum number of connections allowed, maximum/assured bandwidth, and reference performance.

The following metrics are related to the instance specifications:

- Used memory: You can check the memory usage of an instance by viewing the **Memory Usage** and **Used Memory** metrics.
- Maximum connections: The maximum number of connections allowed is the maximum number of clients that can be connected to an instance. To check the number of connections to an instance, view the **Connected Clients** metric.

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- QPS represents queries per second, which is the number of commands processed per second.

NOTE

- DCS Redis 3.0 instances are available in single-node, master/standby, and Proxy Cluster types.
- DCS for Redis 3.0 is no longer provided. You can use DCS for Redis 4.0, 5.0, or 6.0 instead.

Single-Node Instances

For each single-node DCS Redis instance, the available memory is less than the total memory because some memory is reserved for system overheads, as shown in **Table 6-11**.

Table 6-11 Specifications of single-node DCS Redis 3.0 instances

Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
2	1.5	5000/50,000	42/512	50,000	dcs.single_node
4	3.2	5000/50,000	64/1536	100,000	dcs.single_node
8	6.8	5000/50,000	64/1536	100,000	dcs.single_node
16	13.6	5000/50,000	85/3072	100,000	dcs.single_node
32	27.2	5000/50,000	85/3072	100,000	dcs.single_node
64	58.2	5000/60,000	128/5120	100,000	dcs.single_node

Master/Standby Instances

For each master/standby DCS Redis instance, the available memory is less than that of a single-node DCS Redis instance because some memory is reserved for data persistence, as shown in **Table 6-12**. The available memory of a master/standby instance can be adjusted to support background tasks such as data persistence and master/standby synchronization.

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Table 6-12 Specifications of master/standby DCS Redis 3.0 instances

Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
2	1.5	5000/50,000	42/512	50,000	dcs.master_standby
4	3.2	5000/50,000	64/1536	100,000	dcs.master_standby
8	6.4	5000/50,000	64/1536	100,000	dcs.master_standby
16	12.8	5000/50,000	85/3072	100,000	dcs.master_standby
32	25.6	5000/50,000	85/3072	100,000	dcs.master_standby
64	51.2	5000/60,000	128/5120	100,000	dcs.master_standby

Proxy Cluster Instances

In addition to larger memory, cluster instances feature more connections allowed, higher bandwidth allowed, and more QPS than single-node and master/standby instances.

Table 6-13 Specifications of Proxy Cluster DCS Redis 3.0 instances

Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/Limit) (Count)	Assured/Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
64	64	90,000/90,000	600/5120	500,000	dcs.cluster
128	128	180,000/180,000	600/5120	500,000	dcs.cluster
256	256	240,000/240,000	600/5120	500,000	dcs.cluster
512	512	480,000/480,000	600/5120	500,000	dcs.cluster

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Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/ Limit) (Count)	Assured/ Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
1024	1024	960,000/960,000	600/5120	500,000	dcs.cluster

NOTE

- Pay-per-use Proxy Cluster DCS Redis instances are available in 64 GB, 128 GB, and 256 GB.
- Yearly/Monthly Proxy Cluster DCS Redis instances are available in 64 GB, 128 GB, 256 GB, 512 GB, and 1024 GB.

  Currently, only the CN-Hong Kong region supports yearly/monthly billing. If you need to use this billing mode in other regions, submit a service ticket on the console to request the technical personnel to enable the function for you in the background.

6.4 Memcached Instance Specifications (Discontinued)

NOTE

DCS for Memcached is no longer provided. You can use DCS Redis instances instead.

This section describes DCS Memcached instance specifications, including the total memory, available memory, maximum number of connections allowed, maximum/assured bandwidth, and reference performance.

The maximum number of connections allowed is the maximum number of clients connected to an instance. To check the number of connections to an instance, view the **Connected Clients** metric.

QPS represents queries per second, which is the number of commands processed per second.

NOTE

DCS Memcached instances are available in single-node and master/standby types.

Single-Node Instances

For each single-node DCS Memcached instance, the available memory is less than the total memory because some memory is reserved for system overheads, as shown in **Table 6-14**.

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Table 6-14 Specifications of single-node DCS Memcached instances

Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/ Limit) (Count)	Assured/ Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
2	1.5	5000/50,000	42/128	50,000	dcs.memcached.single_node
4	3.2	5000/50,000	64/192	100,000	dcs.memcached.single_node
8	6.8	5000/50,000	64/192	100,000	dcs.memcached.single_node
16	13.6	5000/50,000	85/256	100,000	dcs.memcached.single_node
32	27.2	5000/50,000	85/256	100,000	dcs.memcached.single_node
64	58.2	5000/50,000	128/384	100,000	dcs.memcached.single_node

Master/Standby Instances

For each master/standby DCS Memcached instance, the available memory is less than the total memory because some memory is reserved for data persistence, as shown in **Table 6-15**. The available memory of a master/standby instance can be adjusted to support background tasks such as data persistence and master/standby synchronization.

Table 6-15 Specifications of master/standby DCS Memcached instances

Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/ Limit) (Count)	Assured/ Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
2	1.5	5000/50,000	42/128	50,000	dcs.memcached.master_standby
4	3.2	5000/50,000	64/192	100,000	dcs.memcached.master_standby
8	6.8	5000/50,000	64/192	100,000	dcs.memcached.master_standby

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Total Memory (GB)	Available Memory (GB)	Max. Connections (Default/ Limit) (Count)	Assured/ Maximum Bandwidth (Mbit/s)	Reference Performance (QPS)	Specification Code (spec_code in the API)
16	13.6	5000/50,000	85/256	100,000	dcs.memcached.master_standby
32	27.2	5000/50,000	85/256	100,000	dcs.memcached.master_standby
64	58.2	5000/50,000	128/384	100,000	dcs.memcached.master_standby

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7 Command Compatibility

7.1 Commands Supported and Disabled by DCS for Redis 4.0

DCS for Redis 4.0 is developed based on Redis 4.0.14 and is compatible with open-source protocols and commands. This section describes DCS for Redis 4.0's compatibility with Redis commands, including supported and disabled commands.

DCS Redis instances support most Redis commands. Any client compatible with the Redis protocol can access DCS.

- For security purposes, some Redis commands are disabled in DCS, as listed in **Commands Disabled by DCS for Redis 4.0**.
- Some Redis commands are supported by cluster DCS instances for multi-key operations in the same slot. For details, see **Command Restrictions**.
- Some Redis commands (such as **KEYS**, **FLUSHDB**, and **FLUSHALL**) have usage restrictions, which are described in **Other Command Usage Restrictions**.
- Some high-risk commands can be renamed. For details, see **Commands That Can Be Renamed**.

Commands Supported by DCS for Redis 4.0

- **Table 7-1** and **Table 7-2** list commands supported by single-node, master/standby, and Redis Cluster DCS Redis 4.0 instances.
- **Table 7-3** and **Table 7-4** list the Redis commands supported by Proxy Cluster DCS Redis 4.0 instances.
- **Table 7-5** and **Table 7-6** list the Redis commands supported by read/write splitting DCS Redis 4.0 instances.

For details about the command syntax, visit the **Redis official website**. For example, to view details about the **SCAN** command, enter **SCAN** in the search box on **this page**.

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NOTE

- Commands available since later Redis versions are not supported by earlier-version instances. Run a command on redis-cli to check whether it is supported by DCS for Redis. If the message "(error) ERR unknown command" is returned, the command is not supported.
- For DCS Redis 4.0 instances in the Redis Cluster mode, ensure that all commands in a pipeline are executed on the same shard.

Table 7-1 Commands supported by single-node, master/standby, and Redis Cluster DCS Redis 4.0 instances (1)

Generic (Key)	String	Hash	List	Set	Sorted Set	Server
DEL	APPEND	HDEL	BLPOP	SADD	ZADD	FLUSHALL
DUMP	BITCOUNT	HEXISTS	BRPOP	SCARD	ZCARD	FLUSHDB
EXISTS	BITOP	HGET	BRPOPLRUSH	SDIFF	ZCOUNT	DBSIZE
EXPIRE	BITPOS	HGETALL	LINDEX	SDIFFSTORE	ZINCRBY	TIME
MOVE	DECR	HINCRBY	LINSERT	SINTER	ZRANGE	INFO
PERSIST	DECRBY	HINCRBYFLOAT	LLEN	SINTERSTORE	ZRANGEBYSCORE	CLIENT KILL
PTTL	GET	HKEYS	LPOP	SISMEMBER	ZRANK	CLIENT LIST
RANDOMKEY	GETRANGE	HMGET	LPUSHX	SMEMBERS	ZREMRANGEBYRANK	CLIENT GETNAME
RENAME	GETSET	HMSET	LRANGE	SMOVE	ZREMRANGEBYCORE	CLIENT SETNAME
RENAMENX	INCR	HSET	LREM	SPOP	ZREVRANGE	CONFIG GET
RESTORE	INCRBY	HSETNX	LSET	SRANDMEMBER	ZREVRANGEBYSCORE	MONITOR
SORT	INCRBYFLOAT	HVALS	LTRIM	SREM	ZREVRANK	SLOWLOG
TTL	MGET	HSCAN	RPOP	SUNION	ZSCORE	ROLE
TYPE	MSET	HSTRLEN	RPOPLPU	SUNIONSTORE	ZUNIONSTORE	SWAPDB

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
SCAN	MSETNX	HLEN	RPOPLPUSH	SSCAN	ZINTERSTORE	MEMORY
OBJECT	PSETEX	-	RPUSH	-	ZSCAN	CONFIG
PEXPIRE	SET	-	RPUSHX	-	ZRANGEBYLEX	-
PEXPIREAT	SETBIT	-	LPUSH	-	ZLEXCOUNT	-
KEYS	SETEX	-	-	-	ZREMRANGEBYSCORE	-
-	SETNX	-	-	-	ZREM	-
-	SETRANGE	-	-	-	-	-
-	STRLEN	-	-	-	-	-
-	BITFIELD	-	-	-	-	-

Table 7-2 Commands supported by single-node, master/standby, and Redis Cluster DCS Redis 4.0 instances (2)

HyperLogLog	Pub/Sub	Transactions	Connection	Scripting	Geo
PFADD	PSUBSCRIBE	DISCARD	AUTH	EVAL	GEOADD
PFCOUNT	PUBLISH	EXEC	ECHO	EVALSHA	GEOHASH
PFMERGE	PUBSUB	MULTI	PING	SCRIPT EXISTS	GEOPOS
-	PUNSUBSCRIBE	UNWATCH	QUIT	SCRIPT FLUSH	GEODIST
-	SUBSCRIBE	WATCH	SELECT (not supported by Redis Cluster instances)	SCRIPT KILL	GEORADIUS
-	UNSUBSCRIBE	-	-	SCRIPT LOAD	GEORADIUSBYMEMBER

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Table 7-3 Commands supported by Proxy Cluster DCS Redis 4.0 instances (1)

Generic (Key)	String	Hash	List	Set	Sorted Set	Server
DEL	APPEND	HDEL	BLPOP	SADD	ZADD	FLUSHALL (FLUSHALL SYNC not supported.)
DUMP	BITCOUNT	HEXISTS	BRPOP	SCARD	ZCARD	FLUSHDB
EXISTS	BITOP	HGET	BRPOPLRUSH	SDIFF	ZCOUNT	DBSIZE
EXPIRE	BITPOS	HGETALL	LINDEX	SDIFFSTORE	ZINCRBY	TIME
MOVE	DECR	HINCRBY	LINSERT	SINTER	ZRANGE	INFO
PERSIST	DECRBY	HINCRBYFLOAT	LLEN	SINTERSTORE	ZRANGEBYSCORE	ROLE
PTTL	GET	HKEYS	LPOP	SISMEMBER	ZRANK	MEMORY
RENAME	GETRANGE	HMGET	LPUSHX	SMEMBERS	ZREMRANGEBYRANK	COMMAND
RENAMENX	GETSET	HMSET	LRANGE	SMOVE	ZREMRANGEBYCORE	COMMAND COUNT
RESTORE	INCR	HSET	LREM	SPOP	ZREVRANGE	COMMAND GETKEYS
SORT	INCRBY	HSETNX	LSET	SRANDMEMBER	ZREVRANGEBYSCORE	COMMAND INFO
TTL	INCRBYFLOAT	HVALS	LTRIM	SREM	ZREVRANK	CONFIG GET
TYPE	MGET	HSCAN	RPOP	SUNION	ZSCORE	CONFIG RESETSTAT

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
SCAN	MSET	HSTRLEN	RPOPLPUSH	SUNIONSTORE	ZUNIONSTORE	CONFIG REWRITE
OBJECT	MSETNX	HLEN	RPUSH	SSCAN	ZINTERSTORE	CONFIG SET
PEXPIRE	PSETEX	HKEYS	RPUSHX	-	ZSCAN	-
PEXPIREAT	SET	-	LPUSH	-	ZRANGEBYLEX	-
EXPIREAT	SETBIT	-	-	-	ZLEXCOUNT	-
KEYS	SETEX	-	-	-	ZREMRANGEBYSCORE	-
TOUCH	SETNX	-	-	-	ZREM	-
UNLINK	SETRANGE	-	-	-	ZREMRANGEBYLEX	-
RANDOMKEY	STRLEN	-	-	-	ZREVRANGEBYLEX	-
-	BITFIELD	-	-	-	-	-
-	GETBIT	-	-	-	-	-

Table 7-4 Commands supported by Proxy Cluster DCS Redis 4.0 instances (2)

HyperLogLog	Pub/Sub	Transactions	Connection	Scripting	Geo	Cluster
PFADD	PSUBSCRIBE	DISCARD	AUTH	EVAL	GEOADD	CLUSTER INFO
PFCOUNT	PUBLISH	EXEC	ECHO	EVALSHA	GEOHASH	CLUSTER NODES
PFMERGE	PUBSUB	MULTI	PING	SCRIPT EXISTS	GEOPOS	CLUSTER SLOTS
-	PUNSUBSCRIBE	UNWATCH	QUIT	SCRIPT FLUSH	GEODIST	CLUSTER ADDSLOTS
-	SUBSCRIBE	WATCH	SELECT	SCRIPT KILL	GEORADIUS	ASKING

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HyperLogLog	Pub/Sub	Transactions	Connection	Scripting	Geo	Cluster
-	UNSUBSCRIBE	-	CLIENT KILL	SCRIPT LOAD	GEORADIUSBYMEMBER	READONLY
-	-	-	CLIENT LIST	SCRIPT DEBUG YES|SYNC|NO	GEOSEARCH	READWRITE
-	-	-	CLIENT GETNAME	-	GEOSEARCHSTORE	-
-	-	-	CLIENT SETNAME	-	-	-

NOTE

Cluster commands in the preceding table are supported only by Proxy Cluster instances created on or after September 1, 2022.

Table 7-5 Commands supported by read/write splitting DCS Redis 4.0 instances (1)

Generic (Key)	String	Hash	List	Set	Sorted Set	Server
DEL	APPEND	HDEL	BLPOP	SADD	ZADD	FLUSHALL (FLUSHALL SYNC not supported.)
DUMP	BITCOUNT	HEXISTS	BRPOP	SCARD	ZCARD	FLUSHDB
EXISTS	BITOP	HGET	BRPOPLRUSH	SDIFF	ZCOUNT	DBSIZE
EXPIRE	BITPOS	HGETALL	LINDEX	SDIFFSTORE	ZINCRBY	TIME
MOVE	DECR	HINCRBY	LINSERT	SINTER	ZRANGE	INFO
PERSIST	DECRBY	HINCRBYFLOAT	LLEN	SINTERSTORE	ZRANGEBYSCORE	MONITOR

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
PTTL	GET	HKEYS	LPOP	SISMEMBER	ZRANK	SLOWLOG
RANDOMKEY	GETRANGE	HMGET	LPUSHX	SMEMBERS	ZREMRANGEBYRANK	ROLE
RENAME	GETSET	HMSET	LRANGE	SMOVE	ZREMRANGEBYCORE	SWAPDB
RENAMENX	INCR	HSET	LREM	SPOP	ZREVRANGE	MEMORY
RESTORE	INCRBY	HSETNX	LSET	SRANDMEMBER	ZREVRANGEBYSCORE	COMMAND
SORT	INCRBYFLOAT	HVALS	LTRIM	SREM	ZREVRANK	COMMAND COUNT
TTL	MGET	HSCAN	RPOP	SUNION	ZSCORE	COMMAND GETKEYS
TYPE	MSET	HSTRLEN	RPOPLPUSH	SUNIONSTORE	ZUNIONSTORE	COMMAND INFO
SCAN	MSETNX	HLEN	RPUSH	SSCAN	ZINTERSTORE	CONFIG GET
OBJECT	PSETEX	-	RPUSHX	-	ZSCAN	CONFIG RESETSTAT
PEXPIRE	SET	-	LPUSH	-	ZRANGEBYLEX	CONFIG REWRITE
PEXPIREAT	SETBIT	-	-	-	ZLEXCOUNT	CONFIG SET
EXPIREAT	SETEX	-	-	-	ZREMRANGEBYSCORE	-
KEYS	SETNX	-	-	-	ZREM	-
TOUCH	SETRANGE	-	-	-	ZREMRANGEBYLEX	-

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
UNLINK	STRLEN	-	-	-	ZREVRANGEBYLEX	-
-	BITFIELD	-	-	-	-	-
-	GETBIT	-	-	-	-	-

Table 7-6 Commands supported by read/write splitting DCS Redis 4.0 instances (2)

HyperLogLog	Pub/Sub	Transactions	Connection	Scripting	Geo
PFADD	PSUBSCRIBE	DISCARD	AUTH	EVAL	GEOADD
PFCOUNT	PUBLISH	EXEC	ECHO	EVALSHA	GEOHASH
PFMERGE	PUBSUB	MULTI	PING	SCRIPT EXISTS	GEOPOS
-	PUNSUBSCRIBE	UNWATCH	QUIT	SCRIPT FLUSH	GEODIST
-	SUBSCRIBE	WATCH	SELECT	SCRIPT KILL	GEORADIUS
-	UNSUBSCRIBE	-	CLIENT KILL	SCRIPT LOAD	GEORADIUSBYMEMBER
-	-	-	CLIENT LIST	SCRIPT DEBUG YES|SYNC|NO	GEOSEARCH
-	-	-	CLIENT GETNAME	-	GEOSEARCHSTORE
-	-	-	CLIENT SETNAME	-	-

Commands Disabled by DCS for Redis 4.0

The following lists commands disabled by DCS for Redis 4.0.

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Table 7-7 Redis commands disabled in single-node and master/standby Redis 4.0 instances

Generic (Key)	Server
MIGRATE	SLAVEOF
-	SHUTDOWN
-	LASTSAVE
-	DEBUG commands
-	COMMAND
-	SAVE
-	BGSAVE
-	BGREWRITEAOF
-	SYNC
-	PSYNC

Table 7-8 Redis commands disabled in Proxy Cluster DCS Redis 4.0 instances

Generic (Key)	Server	Sorted Set
MIGRATE	BGREWRITEAOF	BZPOPMAX
MOVE	BGSAVE	BZPOPMIN
WAIT	CLIENT commands	ZPOPMAX
-	DEBUG OBJECT	ZPOPMIN
-	DEBUG SEGFAULT	-
-	LASTSAVE	-
-	PSYNC	-
-	SAVE	-
-	SHUTDOWN	-
-	SLAVEOF	-
-	LATENCY commands	-
-	MODULE commands	-
-	LOLWUT	-
-	SWAPDB	-
-	REPLICAOF	-

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Generic (Key)	Server	Sorted Set
-	SYNC	-

Table 7-9 Redis commands disabled in Redis Cluster DCS Redis 4.0 instances

Generic (Key)	Server	Cluster
MIGRATE	SLAVEOF	CLUSTER MEET
-	SHUTDOWN	CLUSTER FLUSHSLOTS
-	LASTSAVE	CLUSTER ADDSLOTS
-	DEBUG commands	CLUSTER DELSLOTS
-	COMMAND	CLUSTER SETSLOT
-	SAVE	CLUSTER BUMPEPOCH
-	BGSAVE	CLUSTER SAVECONFIG
-	BGREWRITEAOF	CLUSTER FORGET
-	SYNC	CLUSTER REPLICATE
-	PSYNC	CLUSTER COUNT-FAILURE-REPORTS
-	-	CLUSTER FAILOVER
-	-	CLUSTER SET-CONFIG-EPOCH
-	-	CLUSTER RESET

Table 7-10 Redis commands disabled in read/write splitting DCS Redis 4.0 instances

Generic	Server	Sorted Set
MIGRATE	BGREWRITEAOF	BZPOPMAX
WAIT	BGSAVE	BZPOPMIN
-	DEBUG OBJECT	ZPOPMAX
-	DEBUG SEGFAULT	ZPOPMIN
-	LASTSAVE	-
-	LOLWUT	-
-	MODULE LIST/LOAD/ UNLOAD	-

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Generic	Server	Sorted Set
-	PSYNC	-
-	REPLICAOF	-
-	SAVE	-
-	SHUTDOWN [NOSAVE| SAVE]	-
-	SLAVEOF	-
-	SWAPDB	-
-	SYNC	-

Commands That Can Be Renamed

Table 7-11 Commands that can be renamed

Command	command, keys, flushdb, flushall, hgetall, scan, hscan, sscan, and zscan For Proxy Cluster instances, the **dbsize** and **dbstats** commands can also be renamed.
Method	See **Renaming Commands**.

7.2 Commands Supported and Disabled by DCS for Redis 5.0

DCS for Redis 5.0 is developed based on Redis 5.0.9 and is compatible with open-source protocols and commands. This section describes DCS for Redis 5.0's compatibility with Redis commands, including supported and disabled commands.

DCS Redis instances support most Redis commands. Any client compatible with the Redis protocol can access DCS.

- For security purposes, some Redis commands are disabled in DCS, as listed in **Commands Disabled by DCS for Redis 5.0**.
- Some Redis commands are supported by cluster DCS instances for multi-key operations in the same slot. For details, see **Command Restrictions**.
- Some Redis commands (such as **KEYS**, **FLUSHDB**, and **FLUSHALL**) have usage restrictions, which are described in **Other Command Usage Restrictions**.
- Some high-risk commands can be renamed. For details, see **Commands That Can Be Renamed**.

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Commands Supported by DCS for Redis 5.0

- **Table 7-12** and **Table 7-13** list commands supported by single-node, master/standby, and Redis Cluster DCS Redis 5.0 instances.
- **Table 7-14** and **Table 7-15** list commands supported by Proxy Cluster DCS for Redis 5.0 instances.
- **Table 7-16** and **Table 7-17** list the Redis commands supported by read/write splitting DCS Redis 5.0 instances.

For details about the command syntax, visit the **Redis official website**. For example, to view details about the **SCAN** command, enter **SCAN** in the search box on **this page**.

NOTE

- Commands available since later Redis versions are not supported by earlier-version instances. Run a command on redis-cli to check whether it is supported by DCS for Redis. If the message "(error) ERR unknown command" is returned, the command is not supported.
- For DCS Redis 5.0 instances in the Redis Cluster mode, ensure that all commands in a pipeline are executed on the same shard.

Table 7-12 Commands supported by single-node, master/standby, and Redis Cluster DCS Redis 5.0 instances (1)

Generic (Key)	String	Hash	List	Set	Sorted Set	Server
DEL	APPEND	HDEL	BLPOP	SADD	ZADD	FLUSHALL
DUMP	BITCOUNT	HEXISTS	BRPOP	SCARD	ZCARD	FLUSHDB
EXISTS	BITOP	HGET	BRPOPLRUSH	SDIFF	ZCOUNT	DBSIZE
EXPIRE	BITPOS	HGETALL	LINDEX	SDIFFSTORE	ZINCRBY	TIME
MOVE	DECR	HINCRBY	LINSERT	SINTER	ZRANGE	INFO
PERSIST	DECRBY	HINCRBYFLOAT	LLEN	SINTERSTORE	ZRANGEBYSCORE	KEYS
PTTL	GET	HKEYS	LPOP	SISMEMBER	ZRANK	CLIENT KILL
RANDOMKEY	GETRANGE	HMGET	LPUSHX	SMEMBERS	ZREMRANGEBYRANK	CLIENT LIST
RENAME	GETSET	HMSET	LRANGE	SMOVE	ZREMRANGEBYCORE	CLIENT GETNAME
RENAMENX	INCR	HSET	LREM	SPOP	ZREVRANGE	CLIENT SETNAME

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
RESTORE	INCRBY	HSETNX	LSET	SRANDMEMBER	ZREVRANGEBYSCORE	CONFIG GET
SORT	INCRBYFLOAT	HVALS	LTRIM	SREM	ZREVRANK	MONITOR
TTL	MGET	HSCAN	RPOP	SUNION	ZSCORE	SLOWLOG
TYPE	MSET	HSTRLEN	RPOPLPU	SUNIONSTORE	ZUNIONSTORE	ROLE
SCAN	MSETNX	HLEN	RPOPLPUSH	SSCAN	ZINTERSTORE	SWAPDB
OBJECT	PSETEX	-	RPUSH	-	ZSCAN	MEMORY
PEXPIREAT	SET	-	RPUSHX	-	ZRANGEBYLEX	CONFIG
PEXPIRE	SETBIT	-	LPUSH	-	ZLEXCOUNT	-
KEYS	SETEX	-	-	-	ZPOPMIN	-
-	SETNX	-	-	-	ZPOPMAX	-
-	SETRANGE	-	-	-	ZREMRANGEBYSCORE	-
-	STRLEN	-	-	-	ZREM	-
-	BITFIELD	-	-	-	-	-

Table 7-13 Commands supported by single-node, master/standby, and Redis Cluster DCS Redis 5.0 instances (2)

HyperLogLog	Pub/Sub	Transactions	Connection	Scripting	Geo	Stream
PFADD	PSUBSCRIBE	DISCARD	AUTH	EVAL	GEOADD	XACK
PFCOUNT	PUBLISH	EXEC	ECHO	EVALSHA	GEOHASH	XADD
PFMERGE	PUBSUB	MULTI	PING	SCRIPT EXISTS	GEOPOS	XCLAIM
-	PUNSUBSCRIBE	UNWATCH	QUIT	SCRIPT FLUSH	GEODIST	XDEL

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HyperLogLog	Pub/Sub	Transactions	Connection	Scripting	Geo	Stream
-	SUBSCRIBE	WATCH	SELECT (not supported by Redis Cluster instances)	SCRIPT KILL	GEORADIUS	XGROUP
-	UNSUBSCRIBE	-	-	SCRIPT LOAD	GEORADIUSBYMEMBER	XINFO
-	-	-	-	-	-	XLEN
-	-	-	-	-	-	XPENDING
-	-	-	-	-	-	XRANGE
-	-	-	-	-	-	XREAD
-	-	-	-	-	-	XREADGROUP
-	-	-	-	-	-	XREVRANGE
-	-	-	-	-	-	XTRIM

Table 7-14 Commands supported by Proxy Cluster DCS Redis 5.0 instances (1)

Generic (Key)	String	Hash	List	Set	Sorted Set	Server
DEL	APPEND	HDEL	BLPOP	SADD	ZADD	FLUSHALL (FLUSHALL SYNC not supported.)
DUMP	BITCOUNT	HEXISTS	BRPOP	SCARD	ZCARD	FLUSHDB
EXISTS	BITOP	HGET	BRPOPLRUSH	SDIFF	ZCOUNT	DBSIZE
EXPIRE	BITPOS	HGETALL	LINDEX	SDIFFSTORE	ZINCRBY	TIME
MOVE	DECR	HINCRBY	LINSERT	SINTER	ZRANGE	INFO

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
PERSIST	DECRBY	HINCRBYFLOAT	LLEN	SINTERSTORE	ZRANGEBYSCORE	ROLE
PTTL	GET	HKEYS	LPOP	SISMEMBER	ZRANK	MEMORY
RENAME	GETRANGE	HMGET	LPUSHX	SMEMBERS	ZREMRANGEBYRANK	COMMAND
RENAMENX	GETSET	HMSET	LRANGE	SMOVE	ZREMRANGEBYCORE	COMMAND COUNT
RESTORE	INCR	HSET	LREM	SPOP	ZREVRANGE	COMMAND GETKEYS
SORT	INCRBY	HSETNX	LSET	SRANDMEMBER	ZREVRANGEBYSCORE	COMMAND INFO
TTL	INCRBYFLOAT	HVALS	LTRIM	SREM	ZREVRANK	CONFIG GET
TYPE	MGET	HSCAN	RPOP	SUNION	ZSCORE	CONFIG RESETSTAT
SCAN	MSET	HSTRLEN	RPOPLPUSH	SUNIONSTORE	ZUNIONSTORE	CONFIG REWRITE
OBJECT	MSETNX	HLEN	RPUSH	SSCAN	ZINTERSTORE	CONFIG SET
PEXPIRE	PSETEX	HKEYS	RPUSHX	-	ZSCAN	-
PEXPIREAT	SET	-	LPUSH	-	ZRANGEBYLEX	-
EXPIREAT	SETBIT	-	-	-	ZLEXCOUNT	-
KEYS	SETEX	-	-	-	ZREMRANGEBYSCORE	-
UNLINK	SETNX	-	-	-	ZREM	-
TOUCH	SETRANGE	-	-	-	ZREMRANGEBYLEX	-

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
RANDOMKEY	STRLEN	-	-	-	ZPOPMAX	-
-	BITFIELD	-	-	-	ZPOPMIN	-
-	GETBIT	-	-	-	BZPOPMAX	-
-	-	-	-	-	BZPOPMIN	-
-	-	-	-	-	ZREVRANGEBYLEX	-

Table 7-15 Commands supported by Proxy Cluster DCS Redis 5.0 instances (2)

HyperLogLog	Pub/Sub	Transactions	Connection	Scripting	Geo	Cluster
PFADD	PSUBSCRIBE	DISCARD	AUTH	EVAL	GEOADD	CLUSTER INFO
PFCOUNT	PUBLISH	EXEC	ECHO	EVALSHA	GEOHASH	CLUSTER NODES
PFMERGE	PUBSUB	MULTI	PING	SCRIPT EXISTS	GEOPOS	CLUSTER SLOTS
-	PUNSUBSCRIBE	UNWATCH	QUIT	SCRIPT FLUSH	GEODIST	CLUSTER ADDSLOTS
-	SUBSCRIBE	WATCH	SELECT	SCRIPT KILL	GEORADIUS	ASKING
-	UNSUBSCRIBE	-	CLIENT KILL	SCRIPT LOAD	GEORADIUSBYMEMBER	READONLY
-	-	-	CLIENT LIST	SCRIPT DEBUG YES|SYNC|NO	GEOSEARCH	READWRITE
-	-	-	CLIENT GETNAME	-	GEOSEARCHSTORE	-

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HyperLogLog	Pub/Sub	Transactions	Connection	Scripting	Geo	Cluster
-	-	-	CLIENT SETNAME	-	-	-

NOTE

Cluster commands in the preceding table are supported only by Proxy Cluster instances created on or after September 1, 2022.

Table 7-16 Commands supported by read/write splitting DCS Redis 5.0 instances (1)

Generic (Key)	String	Hash	List	Set	Sorted Set	Server
DEL	APPEND	HDEL	BLPOP	SADD	ZADD	FLUSHALL (FLUSHALL SYNC not supported.)
DUMP	BITCOUNT	HEXISTS	BRPOP	SCARD	ZCARD	FLUSHDB
EXISTS	BITOP	HGET	BRPOPLRUSH	SDIFF	ZCOUNT	DBSIZE
EXPIRE	BITPOS	HGETALL	LINDEX	SDIFFSTORE	ZINCRBY	TIME
MOVE	DECR	HINCRBY	LINSERT	SINTER	ZRANGE	INFO
PERSIST	DECRBY	HINCRBYFLOAT	LLEN	SINTERSTORE	ZRANGEBYSCORE	MONITOR
PTTL	GET	HKEYS	LPOP	SISMEMBER	ZRANK	SLOWLOG
RANDOMKEY	GETRANGE	HMGET	LPUSHX	SMEMBERS	ZREMRANGEBYRANK	ROLE
RENAME	GETSET	HMSET	LRANGE	SMOVE	ZREMRANGEBYCORE	SWAPDB
RENAMENX	INCR	HSET	LREM	SPOP	ZREVRANGE	MEMORY

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
RESTORE	INCRBY	HSETNX	LSET	SRANDMEMBER	ZREVRANGEBYSCORE	COMMAND
SORT	INCRBYFLOAT	HVALS	LTRIM	SREM	ZREVRANK	COMMAND COUNT
TTL	MGET	HSCAN	RPOP	SUNION	ZSCORE	COMMAND GETKEYS
TYPE	MSET	HSTRLEN	RPOPLPUSH	SUNIONSTORE	ZUNIONSTORE	COMMAND INFO
SCAN	MSETNX	HLEN	RPUSH	SSCAN	ZINTERSTORE	CONFIG GET
OBJECT	PSETEX	-	RPUSHX	-	ZSCAN	CONFIG RESETSTAT
PEXPIRE	SET	-	LPUSH	-	ZRANGEBYLEX	CONFIG REWRITE
PEXPIREAT	SETBIT	-	-	-	ZLEXCOUNT	CONFIG SET
EXPIREAT	SETEX	-	-	-	ZREMRANGEBYSCORE	-
KEYS	SETNX	-	-	-	ZREM	-
UNLINK	SETRANGE	-	-	-	ZREMRANGEBYLEX	-
TOUCH	STRLEN	-	-	-	BZPOPMAX	-
-	BITFIELD	-	-	-	BZPOPMIN	-
-	GETBIT	-	-	-	ZPOPMAX	-
-	-	-	-	-	ZPOPMIN	-
-	-	-	-	-	ZREVRANGEBYLEX	-

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Table 7-17 Commands supported by read/write splitting DCS Redis 5.0 instances (2)

HyperLogLog	Pub/Sub	Transactions	Connection	Scripting	Geo	Stream
PFADD	PSUBSCRIBE	DISCARD	AUTH	EVAL	GEOADD	XACK
PFCOUNT	PUBLISH	EXEC	ECHO	EVALSHA	GEOHASH	XADD
PFMERGE	PUBSUB	MULTI	PING	SCRIPT EXISTS	GEOPOS	XCLAIM
-	PUNSUBSCRIBE	UNWATCH	QUIT	SCRIPT FLUSH	GEODIST	XDEL
-	SUBSCRIBE	WATCH	SELECT	SCRIPT KILL	GEORADIUS	XGROUP
-	UNSUBSCRIBE	-	CLIENT KILL	SCRIPT LOAD	GEORADIUSBYMEMBER	XINFO
-	-	-	CLIENT LIST	SCRIPT DEBUG YES|SYNC|NO	GEOSEARCH	XLEN
-	-	-	CLIENT GETNAME	-	GEOSEARCHSTORE	XPENDING
-	-	-	CLIENT SETNAME	-	-	XRANGE
-	-	-	-	-	-	XREAD
-	-	-	-	-	-	XREADGROUP
-	-	-	-	-	-	XREVRANGE
-	-	-	-	-	-	XTRIM

Commands Disabled by DCS for Redis 5.0

The following lists commands disabled by DCS for Redis 5.0.

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Table 7-18 Redis commands disabled in single-node and master/standby Redis 5.0 instances

Generic (Key)	Server
MIGRATE	SLAVEOF
-	SHUTDOWN
-	LASTSAVE
-	DEBUG commands
-	COMMAND
-	SAVE
-	BGSAVE
-	BGREWRITEAOF
-	SYNC
-	PSYNC

Table 7-19 Redis commands disabled in Proxy Cluster DCS Redis 5.0 instances

Generic (Key)	Server	Sorted Set
MIGRATE	BGREWRITEAOF	-
MOVE	BGSAVE	-
WAIT	CLIENT commands	-
-	DEBUG OBJECT	-
-	DEBUG SEGFAULT	-
-	LASTSAVE	-
-	PSYNC	-
-	SAVE	-
-	SHUTDOWN	-
-	SLAVEOF	-
-	LATENCY commands	-
-	MODULE commands	-
-	LOLWUT	-
-	SWAPDB	-
-	REPLICAOF	-

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Generic (Key)	Server	Sorted Set
-	SYNC	-

Table 7-20 Redis commands disabled in Redis Cluster DCS Redis 5.0 instances

Generic (Key)	Server	Cluster
MIGRATE	SLAVEOF	CLUSTER MEET
-	SHUTDOWN	CLUSTER FLUSHSLOTS
-	LASTSAVE	CLUSTER ADDSLOTS
-	DEBUG commands	CLUSTER DELSLOTS
-	COMMAND	CLUSTER SETSLOT
-	SAVE	CLUSTER BUMPEPOCH
-	BGSAVE	CLUSTER SAVECONFIG
-	BGREWRITEAOF	CLUSTER FORGET
-	SYNC	CLUSTER REPLICATE
-	PSYNC	CLUSTER COUNT-FAILURE-REPORTS
-	-	CLUSTER FAILOVER
-	-	CLUSTER SET-CONFIG-EPOCH
-	-	CLUSTER RESET

Table 7-21 Redis commands disabled in read/write splitting DCS Redis 5.0 instances

Generic	Server
MIGRATE	BGREWRITEAOF
WAIT	BGSAVE
-	DEBUG OBJECT
-	DEBUG SEGFAULT
-	LASTSAVE
-	LOLWUT
-	MODULE LIST/LOAD/UNLOAD
-	PSYNC

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Generic	Server
-	REPLICAOF
-	SAVE
-	SHUTDOWN [NOSAVE|SAVE]
-	SLAVEOF
-	SWAPDB
-	SYNC

Commands That Can Be Renamed

Table 7-22 Commands that can be renamed

Command	command, keys, flushdb, flushall, hgetall, scan, hscan, sscan, and zscan For Proxy Cluster instances, the **dbsize** and **dbstats** commands can also be renamed.
Method	See **Renaming Commands**.

7.3 Commands Supported and Disabled by DCS for Redis 6.0

DCS for Redis 6.0 is compatible with open-source protocols and commands. The basic edition is based on Redis 6.2.7 and the professional edition is based on KeyDB 6.0.16.

This section describes DCS for Redis 6.0's compatibility with KeyDB commands, including supported and disabled commands.

For more information about the command syntax, visit the **KeyDB official website**.

DCS Redis instances support most Redis commands. Any client compatible with the Redis protocol can access DCS.

- For security purposes, some Redis commands are disabled in DCS, as listed in **Commands Disabled by DCS for Redis 6.0**.
- Some Redis commands are supported by cluster DCS instances for multi-key operations in the same slot. For details, see **Command Restrictions**.
- Some Redis commands (such as **KEYS**, **FLUSHDB**, and **FLUSHALL**) have usage restrictions, which are described in **Other Command Usage Restrictions**.
- Some high-risk commands can be renamed. For details, see **Commands That Can Be Renamed**.

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Commands Supported by DCS for Redis 6.0 Basic Edition

Table 7-23 Commands supported by single-node, master/standby, and Redis Cluster DCS Redis 6.0 instances (1)

Generic (Key)	String	Hash	List	Set	Sorted Set	Server
DEL	APPEND	HDEL	BLPOP	SADD	ZADD	FLUSHALL
DUMP	BITCOUNT	HEXISTS	BRPOP	SCARD	ZCARD	FLUSHDB
EXISTS	BITOP	HGET	BRPOPLRUSH	SDIFF	ZCOUNT	DBSIZE
EXPIRE	BITPOS	HGETALL	LINDEX	SDIFFSTORE	ZINCRBY	TIME
MOVE	DECR	HINCRBY	LINSERT	SINTER	ZRANGE	INFO
PERSIST	DECRBY	HINCRBYFLOAT	LLEN	SINTERSTORE	ZRANGEBYSCORE	CONFIG GET
PTTL	GET	HKEYS	LPOP	SISMEMBER	ZRANK	MONITOR
RANDOMKEY	GETRANGE	HMGET	LPUSHX	SMEMBERS	ZREMRANGEBYRANK	SLOWLOG
RENAME	GETSET	HMSET	LRANGE	SMOVE	ZREMRANGEBYCORE	ROLE
RENAMENX	INCR	HSET	LREM	SPOP	ZREVRANGE	SWAPDB
RESTORE	INCRBY	HSETNX	LSET	SRANDMEMBER	ZREVRANGEBYSCORE	MEMORY
SORT	INCRBYFLOAT	HVALS	LTRIM	SREM	ZREVRANK	CONFIG
TTL	MGET	HSCAN	RPOP	SUNION	ZSCORE	ACL
TYPE	MSET	HSTRLEN	RPOPLPU	SUNIONSTORE	ZUNIONSTORE	-
SCAN	MSETNX	HLEN	RPOPLPUSH	SSCAN	ZINTERSTORE	-
OBJECT	PSETEX	-	RPUSH	SMISMEMBER	ZSCAN	-

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
PEXPIREAT	SET	-	RPUSHX	-	ZRANGEBYLEX	-
PEXPIRE	SETBIT	-	LPUSH	-	ZLEXCOUNT	-
KEYS	SETEX	-	BLMOVE	-	ZPOPMIN	-
COPY	SETNX	-	LMOVE	-	ZPOPMAX	-
-	SETRANGE	-	LPOS	-	ZREMRANGEBYSCORE	-
-	STRLEN	-	-	-	ZREM	-
-	BITFIELD	-	-	-	ZDIFF	-
-	BITFIELD_RO	-	-	-	ZDIFFSTORE	-
-	GETDEL	-	-	-	ZINTER	-
-	GETEX	-	-	-	ZMSCORE	-
-	-	-	-	-	ZRANDMEMBER	-
-	-	-	-	-	ZRANGESTORE	-
-	-	-	-	-	ZUNION	-

Table 7-24 Commands supported by single-node, master/standby, and Redis Cluster DCS Redis 6.0 instances (2)

HyperLoglog	Pub/Sub	Transactions	Connection	Scripting	Geo	Stream
PFADD	PSUBSCRIBE	DISCARD	AUTH	EVAL	GEOADD	XACK
PFCOUNT	PUBLISH	EXEC	ECHO	EVALSHA	GEOHASH	XADD
PFMERGE	PUBSUB	MULTI	PING	SCRIPT EXISTS	GEOPOS	XCLAIM
-	PUNSUBSCRIBE	UNWATCH	QUIT	SCRIPT FLUSH	GEODIST	XDEL

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HyperLoglog	Pub/Sub	Transactions	Connection	Scripting	Geo	Stream
-	SUBSCRIBE	WATCH	SELECT (not supported by Redis Cluster instances)	SCRIPT KILL	GEORADIUS	XGROUP
-	UNSUBSCRIBE	-	CLIENT CACHING	SCRIPT LOAD	GEORADIUSBYMEMBER	XINFO
-	-	-	CLIENT GETREDIR	-	-	XLEN
-	-	-	CLIENT INFO	-	-	XPENDING
-	-	-	CLIENT TRACKING	-	-	XRANGE
-	-	-	CLIENT TRACKINGINFO	-	-	XREAD
-	-	-	CLIENT UNPAUSE	-	-	XREADGROUP
-	-	-	CLIENT KILL	-	-	XREVRANGE
-	-	-	CLIENT LIST	-	-	XTRIM
-	-	-	CLIENT GETNAME	-	-	XAUTOCLAIM
-	-	-	CLIENT SETNAME	-	-	XGROUP CREATECONSUMER
-	-	-	HELLO	-	-	-
-	-	-	RESET	-	-	-

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Commands Supported by DCS for Redis 6.0 Professional Edition

The following lists commands supported by DCS for Redis 6.0 professional edition.

Table 7-25 Commands supported by DCS for Redis 6.0 professional edition (1)

Generic (Key)	String	Hash	List	Set	Sorted Set	Server
COPY	APPEND	HDEL	BLMOVE	SADD	BZPOPMAX	FLUSHALL
DEL	BITCOUNT	HEXISTS	LINDEX	SCARD	BZPOPMIN	FLUSHDB
DUMP	BITOP	HGET	LINSERT	SDIFF	ZADD	DBSIZE
EXISTS	BITPOS	HGETALL	LLEN	SDIFFSTORE	ZCARD	TIME
EXPIRE	BITFIELD	HINCRBY	LPOP	SINTER	ZCOUNT	INFO
MOVE	DECR	HINCRBYFLOAT	LPUSHX	SINTERSTORE	ZDIFF	CLIENT KILL
PERSIST	DECRBY	HKEYS	LRANGE	SISMEMBER	ZDIFFSTORE	CLIENT LIST
PTTL	GET	HMGET	LREM	SMEMBERS	ZINCRBY	CLIENT GETNAME
RANDOMKEY	GETRANGE	HMSET	LSET	SMOVE	ZINTER	CLIENT SETNAME
RENAME	GETSET	HSET	LTRIM	SPOP	ZINTERSTORE	CONFIG GET
RENAMENX	GETDEL	HSETNX	RPOP	SRANDMEMBER	ZLEXCOUNT	MONITOR
SORT	GETEX	HVALS	LMOVE	SREM	ZMSCORE	SLOWLOG
TTL	INCR	HSCAN	RPOPLPUSH	SUNION	ZPOPMAX	ROLE
TYPE	INCRBY	HSTRLEN	RPUSH	SUNIONSTORE	ZPOPMIN	SWAPDB
SCAN	INCRBYFLOAT	HLEN	RPUSHX	SSCAN	ZRANDMEMBER	MEMORY
PEXPIREAT	MGET	HRANDFIELD	LPUSH	SMISMEMBER	ZRANGE	LASTSAVE

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
PEXPIRE	MSET	-	BLPOP	-	ZRANGEBYLEX	REPLCONF
OBJECT ENCODING	MSETNX	-	BRPOP	-	ZRANGEBYSCORE	LASTSAVE
OBJECT FREQ	PSETEX	-	BRPOPLPUSH	-	ZRANGESTORE	COMMAND
OBJECT IDLETIME	SET	-	LPOS	-	ZRANK	COMMAND COUNT
OBJECT REFCOUNT	SETBIT	-	-	-	ZREM	COMMAND GETKEYS
RESTORE	SETEX	-	-	-	ZREMRANGEBYLEX	COMMAND INFO
TOUCH	SETNX	-	-	-	ZREMRANGEBYRANK	CONFIG
UNLINK	SETRANGE	-	-	-	ZREMRANGEBYSCORE	-
EXPIREAT	STRLEN	-	-	-	ZREVRANGE	-
KEYS	SUBSTR	-	-	-	ZREVRANGEBYLEX	-
WAIT	-	-	-	-	ZREVRANGEBYSCORE	-
-	-	-	-	-	ZREVRANK	-
-	-	-	-	-	ZSCAN	-
-	-	-	-	-	ZSCORE	-
-	-	-	-	-	ZUNION	-
-	-	-	-	-	ZUNIONSTORE	-

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Table 7-26 Commands supported by DCS for Redis 6.0 professional edition (2)

HyperLoglog	Pub/Sub	Connection	Scripting	Geo	Stream	Bitmaps
PFADD	PSUBSCRIBE	AUTH	EVAL	GEOADD	XACK	BITCOUNT
PFCOUNT	PUBLISH	CLIENT CACHING	EVALSHA	GEODIST	XADD	BITFIELD
PFMERGE	PUBSUB	CLIENT GETNAME	SCRIPT DEBUG	GEOHASH	XAUTOCLAIM	BITFIELD_RO
PFSELFTEST	PUNSUBSCRIBE	CLIENT GETREDIR	SCRIPT EXISTS	GEOPOS	XCLAIM	BITOP
-	SUBSCRIBE	CLIENT ID	SCRIPT FLUSH	GEORADIUS	XDEL	BITPOS
-	UNSUBSCRIBE	CLIENT INFO	SCRIPT KILL	GEORADIUSBYMEMBER	XGROUP	GETBIT
-	-	CLIENT KILL	SCRIPT LOAD	GEORADIUSBYMEMBER_RO	XINFO	SETBIT
-	-	CLIENT LIST	-	GEORADIUS_RO	XLEN	-
-	-	CLIENT PAUSE	-	GEOSEARCH	XPENDING	-
-	-	CLIENT REPLY	-	GEOSEARCHSTORE	XRANGE	-
-	-	CLIENT SETNAME	-	-	XREAD	-
-	-	CLIENT TRACKING	-	-	XREADGROUP	-
-	-	CLIENT TRACKINGINFO	-	-	XREVRANGE	-
-	-	CLIENT UNBLOCK	-	-	XSETID	-

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HyperLoglog	Pub/Sub	Connection	Scripting	Geo	Stream	Bitmaps
-	-	CLIENT UNPAUSE	-	-	XTRIM	-
-	-	ECHO	-	-	-	-
-	-	HELLO	-	-	-	-
-	-	PING	-	-	-	-
-	-	QUIT	-	-	-	-
-	-	RESET	-	-	-	-
-	-	SELECT	-	-	-	-

Commands Disabled by DCS for Redis 6.0

Table 7-27 Redis commands disabled in DCS Redis 6.0 basic edition instances

Generic (Key)	Server	Cluster
MIGRATE	SLAVEOF	CLUSTER MEET
-	SHUTDOWN	CLUSTER FLUSHSLOTS
-	LASTSAVE	CLUSTER ADDSLOTS
-	DEBUG commands	CLUSTER DELSLOTS
-	COMMAND	CLUSTER SETSLOT
-	SAVE	CLUSTER BUMPEPOCH
-	BGSAVE	CLUSTER SAVECONFIG
-	BGREWRITEAOF	CLUSTER FORGET
-	SYNC	CLUSTER REPLICATE
-	PSYNC	CLUSTER COUNT-FAILURE-REPORTS
-	-	CLUSTER FAILOVER
-	-	CLUSTER SET-CONFIG-EPOCH
-	-	CLUSTER RESET

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Table 7-28 Redis commands disabled in DCS Redis 6.0 professional edition instances

Generic (Key)	Server	HyperLoglog
MIGRATE	SLAVEOF	PFDEBUG
-	SHUTDOWN	-
-	SAVE	-
-	BGSAVE	-
-	BGREWRITEAOF	-
-	SYNC	-
-	PSYNC	-
-	REPLICAOF	-

Commands That Can Be Renamed

Table 7-29 Commands that can be renamed

Command	command, keys, flushdb, flushall, hgetall, scan, hscan, sscan, and zscan For Proxy Cluster instances, the **dbsize** and **dbstats** commands can also be renamed.
Method	See **Renaming Commands**.

7.4 Commands Supported and Disabled in Web CLI

Web CLI is a command line tool provided on the DCS console. This section describes Web CLI's compatibility with Redis commands, including supported and disabled commands. Currently, only DCS for Redis 6.0/5.0/4.0 support Web CLI.

NOTE

- Keys and values cannot contain spaces.
- If the value is empty, **nil** is returned after the **GET** command is executed.

Commands Supported in Web CLI

The following lists the commands supported when the using Web CLI. For details about the command syntax, visit the **Redis official website**. For example, to view details about the **SCAN** command, enter **SCAN** in the search box on **this page**.

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Table 7-30 Commands supported by Web CLI (1)

Generic (Key)	String	List	Set	Sorted Set	Server
DEL	APPEND	RPUSH	SADD	ZADD	FLUSHALL
OBJECT	BITCOUNT	RPUSHX	SCARD	ZCARD	FLUSHDB
EXISTS	BITOP	BRPOPLRUSH	SDIFF	ZCOUNT	DBSIZE
EXPIRE	BITPOS	LINDEX	SDIFFSTORE	ZINCRBY	TIME
MOVE	DECR	LINSERT	SINTER	ZRANGE	INFO
PERSIST	DECRBY	LLEN	SINTERSTORE	ZRANGEBYSCORE	CLIENT KILL
PTTL	GET	LPOP	SISMEMBER	ZRANK	CLIENT LIST
RANDOMKEY	GETRANGE	LPUSHX	SMEMBERS	ZREMRANGEBYRANK	CLIENT GETNAME
RENAME	GETSET	LRANGE	SMOVE	ZREMRANGEBYCORE	CLIENT SETNAME
RENAMENX	INCR	LREM	SPOP	ZREVRANGE	CONFIG GET
SCAN	INCRBY	LSET	SRANDMEMBER	ZREVRANGEBYSCORE	SLOWLOG
SORT	INCRBYFLOAT	LTRIM	SREM	ZREVRANK	ROLE
TTL	MGET	RPOP	SUNION	ZSCORE	SWAPDB
TYPE	MSET	RPOPLPU	SUNIONSTORE	ZUNIONSTORE	MEMORY
-	MSETNX	RPOPLPUSH	SSCAN	ZINTERSTORE	-
-	PSETEX	-	-	ZSCAN	-
-	SET	-	-	ZRANGEBYLEX	-
-	SETBIT	-	-	ZLEXCOUNT	-
-	SETEX	-	-	-	-
-	SETNX	-	-	-	-
-	SETRANGE	-	-	-	-

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Generic (Key)	String	List	Set	Sorted Set	Server
-	STRLEN	-	-	-	-
-	BITFIELD	-	-	-	-

Table 7-31 Commands supported by Web CLI (2)

Hash	HyperLoglog	Connection	Scripting	Geo	Pub/Sub
HDEL	PFADD	AUTH	EVAL	GEOADD	UNSUBSCRIBE
HEXISTS	PFCOUNT	ECHO	EVALSHA	GEOHASH	PUBLISH
HGET	PFMERGE	PING	SCRIPT EXISTS	GEOPOS	PUBSUB
HGETALL	-	QUIT	SCRIPT FLUSH	GEODIST	PUNSUBSCRIBE
HINCRBY	-	-	SCRIPT KILL	GEORADIUS	-
HINCRBYFLOAT	-	-	SCRIPT LOAD	GEORADIUSBYMEMBER	-
HKEYS	-	-	-	-	-
HMGET	-	-	-	-	-
HMSET	-	-	-	-	-
HSET	-	-	-	-	-
HSETNX	-	-	-	-	-
HVALS	-	-	-	-	-
HSCAN	-	-	-	-	-
HSTRLEN	-	-	-	-	-

Commands Disabled in Web CLI

The following lists the commands disabled when the using Web CLI.

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Table 7-32 Commands disabled in Web CLI (1)

Generic (Key)	Server	Transactions	Cluster
MIGRATE	SLAVEOF	UNWATCH	CLUSTER MEET
WAIT	SHUTDOWN	REPLICAOF	CLUSTER FLUSHSLOTS
DUMP	DEBUG commands	DISCARD	CLUSTER ADDSLOTS
RESTORE	CONFIG SET	EXEC	CLUSTER DELSLOTS
-	CONFIG REWRITE	MULTI	CLUSTER SETSLOT
-	CONFIG RESETSTAT	WATCH	CLUSTER BUMPEPOCH
-	SAVE	-	CLUSTER SAVECONFIG
-	BGSAVE	-	CLUSTER FORGET
-	BGREWRITEAOF	-	CLUSTER REPLICATE
-	COMMAND	-	CLUSTER COUNT-FAILURE-REPORTS
-	KEYS	-	CLUSTER FAILOVER
-	MONITOR	-	CLUSTER SET-CONFIG-EPOCH
-	SYNC	-	CLUSTER RESET
-	PSYNC	-	-
-	ACL	-	-
-	MODULE	-	-

Table 7-33 Commands disabled in Web CLI (2)

List	Connection	Sorted Set	Pub/Sub
BLPOP	SELECT	BZPOPMAX	PSUBSCRIBE
BRPOP	-	BZPOPMIN	SUBSCRIBE
BLMOVE	-	BZMPOP	-
BRPOPLPUSH	-	-	-
BLMPOP	-	-	-

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7.5 Command Restrictions

Some Redis commands are supported by Redis Cluster instances for multi-key operations in the same slot. Restricted commands are listed in **Table 7-34**.

Some commands support multiple keys but do not support cross-slot access. For details, see **Table 7-36**. Restricted commands are listed in **Table 7-35**.

Table 7-37 lists commands restricted for read/write splitting instances.

NOTE

While running commands that take a long time to run, such as **FLUSHALL**, DCS instances may not respond to other commands and may change to the faulty state. After the command finishes executing, the instance will return to normal.

Redis commands restricted in Redis Cluster DCS instances

Table 7-34 Redis commands restricted in Redis Cluster DCS instances

Category	Description
Set	
SINTER	Returns the members of the set resulting from the intersection of all the given sets.
SINTERSTORE	Equal to **SINTER**, but instead of returning the result set, it is stored in *destination*.
SUNION	Returns the members of the set resulting from the union of all the given sets.
SUNIONSTORE	Equal to **SUNION**, but instead of returning the result set, it is stored in *destination*.
SDIFF	Returns the members of the set resulting from the difference between the first set and all the successive sets.
SDIFFSTORE	Equal to **SDIFF**, but instead of returning the result set, it is stored in *destination*.
SMOVE	Moves **member** from the set at **source** to the set at *destination*.
Sorted Set	
ZUNIONSTORE	Computes the union of *numkeys* sorted sets given by the specified keys.
ZINTERSTORE	Computes the intersection of *numkeys* sorted sets given by the specified keys.
HyperLogLog	

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Category	Description
PFCOUNT	Returns the approximated cardinality computed by the HyperLogLog data structure stored at the specified variable.
PFMERGE	Merges multiple HyperLogLog values into a unique value.
Key	
RENAME	Renames *key* to *newkey*.
RENAMENX	Renames *key* to *newkey* if *newkey* does not yet exist.
BITOP	Performs a bitwise operation between multiple keys (containing string values) and stores the result in the destination key.
RPOPLPUSH	Returns and removes the last element (tail) of the list stored at source, and pushes the element at the first element (head) of the list stored at *destination*.
String	
MSETNX	Sets the given keys to their respective values.

Redis commands restricted in Proxy Cluster DCS instances

Table 7-35 Redis commands restricted in Proxy Cluster DCS instances

Category	Command	Restriction
Sets	SMOVE	For a Proxy Cluster instance, the source and destination keys must be in the same slot.
Sorted sets	BZPOPMAX	For a Proxy Cluster instance, all keys transferred must be in the same slot. Not supported for Proxy Cluster DCS Redis 4.0 instances.
	BZPOPMIN	
Geo	GEORADIUS	• For a Proxy Cluster instance, all keys transferred must be in the same slot. • For a Proxy Cluster instance with multiple databases, the **STORE** option is not supported.
	GEORADIUSBYMEMBER	
	GEOSEARCHSTORE	

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Category	Command	Restriction
Connection	CLIENT KILL	• Only the following two formats are supported: – CLIENT KILL ip:port – CLIENT KILL ADDR ip:port • The **id** field has a random value, and it does not meet the idc1<idc2→Tc1<Tc2 requirement.
	CLIENT LIST	• Only the following two formats are supported: – CLIENT LIST – CLIENT LIST [TYPE normal|master|replica|pubsub] • The **id** field has a random value, and it does not meet the idc1<idc2→Tc1<Tc2 requirement.
	SELECT index	Multi-DB of Proxy Cluster instances can be implemented by changing the keys. This solution is not recommended. For details about multi-DB restrictions on Proxy Cluster instances, see **What Are the Constraints on Implementing Multiple Databases on a Proxy Cluster Instance?**
HyperLogLog	PFCOUNT	For a Proxy Cluster instance, all keys transferred must be in the same slot.
	PFMERGE	
Keys	RENAME	For a Proxy Cluster instance, all keys transferred must be in the same slot.
	RENAMENX	
	SCAN	Proxy Cluster instances do not support the **SCAN** command in pipelines.
Lists	BLPOP	For a Proxy Cluster instance, all keys transferred must be in the same slot.
	BRPOP	
	BRPOPLPUSH	
Pub/Sub	PSUBSCRIBE	Proxy Cluster instances do not support keyspace event subscription, so there would be no keyspace event subscription failure.

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Category	Command	Restriction
Scripting	EVAL	• For a Proxy Cluster instance, all keys transferred must be in the same slot. • When the multi-DB function is enabled for a Proxy Cluster instance, the **KEYS** parameter will be modified. Pay attention to the **KEYS** parameter used in the Lua script.
	EVALSHA	

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<table>
<tr><th>Category</th><th>Command</th><th>Restriction</th></tr>
<tr><td rowspan="8">Server</td><td>MEMORY DOCTOR</td><td rowspan="8">For a Proxy Cluster instance, add the ip:port of the node at the end of the command.
Do as follows to obtain the IP address and port number of a node (MEMORY USAGE is used as an example):
1. Run the cluster keyslot key command to query the slot number of a key.
2. Run the icluster nodes command to query the IP address and port number corresponding to the slot where the key is.
If the required information is not returned after you run the icluster nodes command, your Proxy Cluster instance may be of an earlier version. In this case, run the cluster nodes command.
3. Run the MEMORY USAGE key ip:port command.
If multi-DB is enabled for the Proxy Cluster instance, run the MEMORY USAGE xxx:As {key} ip:port command, where xxx indicates the DB where the key value is. For example, DB0, DB1, and DB255 correspond to 000, 001, and 255, respectively.
The following is an example for a single-DB Proxy Cluster instance:
set key1 value1
OK
get key1
value1
cluster keyslot key1
9189
icluster nodes
xxx 192.168.00.00:1111@xxx xxx
connected 10923-16383
xxx 192.168.00.01:2222@xxx xxx
connected 0-5460
xxx 192.168.00.02:3333@xxx xxx
connected 5461-10922
MEMORY USAGE key1 192.168.00.02:3333
54</td></tr>
<tr><td>MEMORY HELP</td></tr>
<tr><td>MEMORY MALLOC-STATS</td></tr>
<tr><td>MEMORY PURGE</td></tr>
<tr><td>MEMORY STATS</td></tr>
<tr><td>MEMORY USAGE</td></tr>
<tr><td>MONITOR</td></tr>
</table>

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Category	Command	Restriction
Strings	BITOP	For a Proxy Cluster instance, all keys transferred must be in the same slot.
	MSETNX	
Transactions	WATCH	For a Proxy Cluster instance, all keys transferred must be in the same slot.
	MULTI	The order of cross-slot commands in a transaction is not guaranteed. The following commands cannot be used in transactions: **WATCH**, **MONITOR**, **RANDOMKEY**, **KEYS**, **SCAN**, **SUBSCRIBE**, **UNSUBSCRIBE**, **PSUBSCRIBE**, **PUNSUBSCRIBE**, **SCRIPT**, **EVAL**, **EVALSHA**, **DBSIZE**, **AUTH**, **FLUSHDB**, **FLUSHALL**, **CLIENT**, **MEMORY**
	EXEC	
Streams	XACK	Currently, Proxy Cluster instances do not support Streams.
	XADD	
	XCLAIM	
	XDEL	
	XGROUP	
	XINFO	
	XLEN	
	XPENDING	
	XRANGE	
	XTRIM	
	XREVRANGE	
	XREAD	
	XREADGROUP GROUP	
	XAUTOCLAIM	

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Multi-Key Commands of Proxy Cluster Instances

Table 7-36 Multi-key commands of Proxy Cluster instances

Category	Command
Multi-key commands that support cross-slot access	DEL, MGET, MSET, EXISTS, SUNION, SINTER, SDIFF, SUNIONSTORE, SINTERSTORE, SDIFFSTORE, ZUNIONSTORE, ZINTERSTORE
Multi-key commands that do not support cross-slot access	SMOVE, SORT, BITOP, MSETNX, RENAME, RENAMENX, BLPOP, BRPOP, RPOPLPUSH, BRPOPLPUSH, PFMERGE, PFCOUNT, BLMOVE, COPY, GEOSEARCHSTORE, LMOVE, ZRANGESTORE

Redis Commands Restricted for Read/Write Splitting Instances

Table 7-37 Redis commands restricted for read/write splitting instances

Category	Command	Restriction
Connection	CLIENT KILL	• Only the following two formats are supported: – CLIENT KILL ip:port – CLIENT KILL ADDR ip:port • The **id** field has a random value, and it does not meet the idc1<idc2→Tc1<Tc2 requirement.
	CLIENT LIST	• Only the following two formats are supported: – CLIENT LIST – CLIENT LIST [TYPE normal|master|replica|pubsub] • The **id** field has a random value, and it does not meet the idc1<idc2→Tc1<Tc2 requirement.

7.6 Other Command Usage Restrictions

This section describes restrictions on some Redis commands.

KEYS Command

In case of a large amount of cached data, running the **KEYS** command may block the execution of other commands for a long time or occupy exceptionally large memory. Therefore, when running the **KEYS** command, describe the exact pattern

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and do not use fuzzy **keys ***. Do not use the **KEYS** command in the production environment. Otherwise, the service running will be affected.

Commands in the Server Group

- While running commands that take a long time to run, such as **FLUSHALL**, DCS instances may not respond to other commands and may change to the faulty state. After the command finishes executing, the instance will return to normal.
- When the **FLUSHDB** or **FLUSHALL** command is run, execution of other service commands may be blocked for a long time in case of a large amount of cached data.

EVAL and EVALSHA Commands

- When the **EVAL** or **EVALSHA** command is run, at least one key must be contained in the command parameter. Otherwise, the error message "ERR eval/evalsha numkeys must be bigger than zero in redis cluster mode" is displayed.
- When the **EVAL** or **EVALSHA** command is run, a cluster DCS Redis instance uses the first key to compute slots. Ensure that the keys to be operated in your code are in the same slot. For details, visit the **Redis official website**.
- For the **EVAL** command:
  - Learn the Lua script features of Redis before running the **EVAL** command. For details, visit the **Redis official website**.
  - The execution timeout time of a Lua script is 5 seconds. Time-consuming statements such as long-time sleep and large loop statements should be avoided.
  - When calling a Lua script, do not use random functions to specify keys. Otherwise, the execution results are inconsistent on the master and standby nodes.

Debugging Lua Scripts

When you debug Lua scripts for Proxy Cluster and read/write splitting instances, only the asynchronous non-blocking mode **--ldb** is supported. The synchronous blocking mode **--ldb-sync-mode** is not supported. By default, the maximum concurrency on each proxy is **2**. This restriction does not apply to other instance types.

Other Restrictions

- The time limit for executing a Redis command is 15 seconds. To prevent other services from failing, a master/replica switchover will be triggered after the command execution times out.
- Cluster DCS Redis instances created before July 10, 2018 must be upgraded to support the following commands:

  SINTER, SDIFF, SUNION, PFCOUNT, PFMERGE, SINTERSTORE, SUNIONSTORE, SDIFFSTORE, SMOVE, ZUNIONSTORE, ZINTERSTORE, EVAL, EVALSHA, BITOP, RENAME, RENAMENX, RPOPLPUSH, MSETNX, SCRIPT LOAD, SCRIPT KILL, SCRIPT EXISTS, and SCRIPT FLUSH

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7.7 Commands Supported and Disabled by DCS for Redis 3.0 (Discontinued)

DCS for Redis 3.0 is developed based on Redis 3.0.7 and is compatible with open-source protocols and commands. This section describes DCS for Redis 3.0's compatibility with Redis commands, including supported commands, disabled commands, unsupported scripts and commands of later Redis versions, and restrictions on command usage.

NOTE

DCS for Redis 3.0 is no longer provided. You can use DCS for Redis 4.0, 5.0, or 6.0 instead.

DCS Redis instances support most Redis commands. Any client compatible with the Redis protocol can access DCS.

- For security purposes, some Redis commands are disabled in DCS, as listed in **Commands Disabled by DCS for Redis 3.0**.
- Some Redis commands are supported by cluster DCS instances for multi-key operations in the same slot. For details, see **Command Restrictions**.
- Some Redis commands (such as **KEYS**, **FLUSHDB**, and **FLUSHALL**) have usage restrictions, which are described in **Other Command Usage Restrictions**.

Commands Supported by DCS for Redis 3.0

The following lists commands supported by DCS for Redis 3.0. For details about the command syntax, visit the **Redis official website**. For example, to view details about the **SCAN** command, enter **SCAN** in the search box on **this page**.

NOTE

- Commands available since later Redis versions are not supported by earlier-version instances. Run a command on redis-cli to check whether it is supported by DCS for Redis. If the message "(error) ERR unknown command" is returned, the command is not supported.
- The following commands listed in the tables are not supported by Proxy Cluster instances:
  - **List** group: **BLPOP**, **BRPOP**, and **BRPOPLRUSH**
  - **CLIENT** commands in the **Server** group: **CLIENT KILL**, **CLIENT GETNAME**, **CLIENT LIST**, **CLIENT SETNAME**, **CLIENT PAUSE**, and **CLIENT REPLY**.
  - **Server** group: **MONITOR**
  - **Transactions** group: **UNWATCH** and **WATCH**
  - **Key** group: **RANDOMKEY** (for old instances)

Table 7-38 Commands supported by DCS Redis 3.0 instances (1)

Generic (Key)	String	Hash	List	Set	Sorted Set	Server
DEL	APPEND	HDEL	BLPOP	SADD	ZADD	FLUSHALL

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
DUMP	BITCOUNT	HEXISTS	BRPOP	SCARD	ZCARD	FLUSHDB
EXISTS	BITOP	HGET	BRPOPLRUSH	SDIFF	ZCOUNT	DBSIZE
EXPIRE	BITPOS	HGETALL	LINDEX	SDIFFSTORE	ZINCRBY	TIME
MOVE	DECR	HINCRBY	LINSERT	SINTER	ZRANGE	INFO
PERSIST	DECRBY	HINCRBYFLOAT	LLEN	SINTERSTORE	ZRANGEBYSCORE	CLIENT KILL
PTTL	GET	HKEYS	LPOP	SISMEMBER	ZRANK	CLIENT LIST
RANDOMKEY	GETRANGE	HMGET	LPUSHX	SMEMBERS	ZREMRANGEBYRANK	CLIENT GETNAME
RENAME	GETSET	HMSET	LRANGE	SMOVE	ZREMRANGEBYCORE	CLIENT SETNAME
RENAMENX	INCR	HSET	LREM	SPOP	ZREVRANGE	CONFIG GET
RESTORE	INCRBY	HSETNX	LSET	SRANDMEMBER	ZREVRANGEBYSCORE	MONITOR
SORT	INCRBYFLOAT	HVALS	LTRIM	SREM	ZREVRANK	SLOWLOG
TTL	MGET	HSCAN	RPOP	SUNION	ZSCORE	ROLE
TYPE	MSET	-	RPOPLPU	SUNIONSTORE	ZUNIONSTORE	-
SCAN	MSETNX	-	RPOPLPUSH	SSCAN	ZINTERSTORE	-
OBJECT	PSETEX	-	RPUSH	-	ZSCAN	-
KEYS	SET	-	RPUSHX	-	ZRANGEBYLEX	-
-	SETBIT	-	-	-	-	-
-	SETEX	-	-	-	-	-
-	SETNX	-	-	-	-	-
-	SETRANGE	-	-	-	-	-

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Generic (Key)	String	Hash	List	Set	Sorted Set	Server
-	STRLEN	-	-	-	-	-

Table 7-39 Commands supported by DCS Redis 3.0 instances (2)

HyperLogLog	Pub/Sub	Transactions	Connection	Scripting	Geo
PFADD	PSUBSCRIBE	DISCARD	AUTH	EVAL	GEOADD
PFCOUNT	PUBLISH	EXEC	ECHO	EVALSHA	GEOHASH
PFMERGE	PUBSUB	MULTI	PING	SCRIPT EXISTS	GEOPOS
-	PUNSUBSCRIBE	UNWATCH	QUIT	SCRIPT FLUSH	GEODIST
-	SUBSCRIBE	WATCH	SELECT	SCRIPT KILL	GEORADIUS
-	UNSUBSCRIBE	-	-	SCRIPT LOAD	GEORADIUSBYMEMBER

Commands Disabled by DCS for Redis 3.0

The following lists commands disabled by DCS for Redis 3.0.

Table 7-40 Redis commands disabled in single-node and master/standby DCS Redis 3.0 instances

Generic (Key)	Server
MIGRATE	SLAVEOF
-	SHUTDOWN
-	LASTSAVE
-	DEBUG commands
-	COMMAND
-	SAVE
-	BGSAVE
-	BGREWRITEAOF

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Table 7-41 Redis commands disabled in Proxy Cluster DCS Redis 3.0 instances

Generic (Key)	Server	List	Transactions	Connection	Cluster	codis
MIGRATE	SLAVEOF	BLPOP	DISCARD	SELECT	CLUSTER	TIME
MOVE	SHUTDOWN	BRPOP	EXEC	-	-	SLOTSINFO
-	LASTSAVE	BRPOPLPUSH	MULTI	-	-	SLOTSDEL
-	DEBUG commands	-	UNWATCH	-	-	SLOTSMGRTSLOT
-	COMMAND	-	WATCH	-	-	SLOTSMGRTONE
-	SAVE	-	-	-	-	SLOTSCHECK
-	BGSAVE	-	-	-	-	SLOTSMGRTTAGSLOT
-	BGREWRITEAOF	-	-	-	-	SLOTSMGRTTAGONE
-	SYNC	-	-	-	-	-
-	PSYNC	-	-	-	-	-
-	MONITOR	-	-	-	-	-
-	CLIENT commands	-	-	-	-	-
-	OBJECT	-	-	-	-	-
-	ROLE	-	-	-	-	-

7.8 Commands Supported and Disabled by DCS for Memcached (Discontinued)

NOTE

DCS for Memcached is no longer provided. You can use DCS Redis instances instead.

Memcached supports the TCP-based text protocol and binary protocol. Any clients compatible with a Memcached protocol can access DCS instances.

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Memcached Text Protocol

The Memcached text protocol uses ASCII text to transfer commands, helping you compile clients and debug problems. DCS Memcached instances can even be directly connected using Telnet.

Compared with the Memcached binary protocol, the Memcached text protocol is compatible with more open-source clients, but the text protocol does not support authentication.

NOTE

Clients can use the Memcached text protocol to access DCS Memcached instances only if password-free access is enabled. Password-free access means that access to DCS Memcached instances will not be username- and password-protected, and any Memcached clients that satisfy security group rules in the same VPC can access the instances. Enabling password-free access poses security risks. Exercise caution when enabling password-free access.

Table 7-42 lists the commands supported by the Memcached text protocol and describes whether these commands are supported by DCS Memcached instances.

Table 7-42 Commands supported by the Memcached text protocol

Command	Description	Supported by DCS
add	Adds data.	Yes
set	Sets data, including adding or modifying data.	Yes
replace	Replaces data.	Yes
append	Adds data after the value of the specified key.	Yes
prepend	Adds data before the value of a specified key.	Yes
cas	Checks and set data.	Yes
get	Queries data.	Yes
gets	Queries data details.	Yes
delete	Deletes data.	Yes
incr	Adds the specified amount to the requested counter.	Yes
decr	Removes the specified amount to the requested counter.	Yes
touch	Updates the expiration time of existing data.	Yes
quit	Closes the connection.	Yes

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Command	Description	Supported by DCS
flush_all	Invalidates all existing data. **NOTE** The value of the delay option (if any) must be **0**.	Yes
version	Queries Memcached version information.	Yes
stats	Manages operation statistics. **NOTE** Currently, only basic statistics can be queried. Commands on optional parameters cannot be queried.	Yes
cache_memlimit	Adjusts the cache memory limit.	No
slabs	Queries usage of internal storage structures.	No
lru	Manages policies of deleting expired data.	No
lru_crawler	Manages threads of deleting expired data.	No
verbosity	Sets the verbosity level of the logging output.	No
watch	Inspects what's going on internally.	No

Memcached Binary Protocol

The Memcached binary protocol encodes commands and operations into specific structures before sending them. Commands are represented by predefined character strings.

The Memcached binary protocol provides more features but fewer clients than the Memcached text protocol. The Memcached binary protocol is more secure than the Memcached text protocol as it additionally supports simple authentication and security layer (SASL) authentication.

Table 7-43 lists the commands supported by the Memcached binary protocol and describes whether these commands are supported by DCS Memcached instances.

Table 7-43 Commands supported by the Memcached binary protocol

Command Code	Command	Description	Supported by DCS
0x00	GET	Queries data.	Yes

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Command Code	Command	Description	Supported by DCS
0x01	SET	Sets data, including adding or modifying data.	Yes
0x02	ADD	Adds data.	Yes
0x03	REPLACE	Replaces data.	Yes
0x04	DELETE	Deletes data.	Yes
0x05	INCREMENT	Adds the specified amount to the requested counter.	Yes
0x06	DECREMENT	Removes the specified amount to the requested counter.	Yes
0x07	QUIT	Closes the connection.	Yes
0x08	FLUSH	Invalidates all existing data. **NOTE** The value of the delay option (if any) must be **0**.	Yes
0x09	GETQ	Queries data. The client will not receive any response in case of failure.	Yes
0x0a	NOOP	No-operation instruction, equivalent to ping.	Yes
0x0b	VERSION	Queries Memcached version information.	Yes
0x0c	GETK	Queries data and adds a key into the response packet.	Yes
0x0d	GETKQ	Queries data and returns a key. The client will not receive any response in case of failure.	Yes
0x0e	APPEND	Adds data after the value of the specified key.	Yes
0x0f	PREPEND	Adds data before the value of a specified key.	Yes
0x10	STAT	Queries statistics of DCS Memcached instances. **NOTE** Currently, only basic statistics can be queried. Commands on optional parameters cannot be queried.	Yes

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Command Code	Command	Description	Supported by DCS
0x11	SETQ	Sets data, including adding or modifying data. The **SETQ** command only returns a response on failures. The client will not receive any response in the case of success.	Yes
0x12	ADDQ	Adds data. Unlike the **ADD** command, the **ADDQ** command only returns a response on failures. The client will not receive any response in the case of success.	Yes
0x13	REPLACEQ	Replaces data. Unlike the **REPLACE** command, the **REPLACEQ** command only returns a response on failures. The client will not receive any response in the case of success.	Yes
0x14	DELETEQ	Deletes data. Unlike the **DELETE** command, the **DELETEQ** command only returns a response on failures. The client will not receive any response in the case of success.	Yes
0x15	INCREMENTQ	Adds the specified amount to the requested counter. Unlike the **INCREMENT** command, the **INCREMENTQ** command only returns a response on failures. The client will not receive any response in the case of success.	Yes

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Command Code	Command	Description	Supported by DCS
0x16	DECREMENTQ	Removes the specified amount to the requested counter. Unlike the **DECREMENT** command, the **DECREMENTQ** command only returns a response on failures. The client will not receive any response in the case of success.	Yes
0x17	QUITQ	Closes the connection.	Yes
0x18	FLUSHQ	Clears data and returns no information. **NOTE** The value of the delay option (if any) must be **0**.	Yes
0x19	APPENDQ	Adds data after the value of the specified key. Unlike the **APPEND** command, the **APPENDQ** command only returns a response on failures. The client will not receive any response in the case of success.	Yes
0x1a	PREPENDQ	Adds data before the value of a specified key. Unlike the **PREPEND** command, the **PREPENDQ** command only returns a response on failures. The client will not receive any response in the case of success.	Yes
0x1c	TOUCH	Updates the expiration time of existing data.	Yes
0x1d	GAT	Queries data and updates the expiration time of existing data.	Yes
0x1e	GATQ	Queries data and returns a key. The client will not receive any response in case of failure.	Yes

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Command Code	Command	Description	Supported by DCS
0x23	GATK	Queries data, adds a key into the response packet, and updates the expiration time of existing data.	Yes
0x24	GATKQ	Queries data, returns a key, and updates the expiration time of existing data. The client will not receive any response in case of failure.	Yes
0x20	SASL_LIST_MECHS	Asks the server what SASL authentication mechanisms it supports.	Yes
0x21	SASL_AUTH	Starts SASL authentication.	Yes
0x22	SASL_STEP	Further authentication steps are required.	Yes

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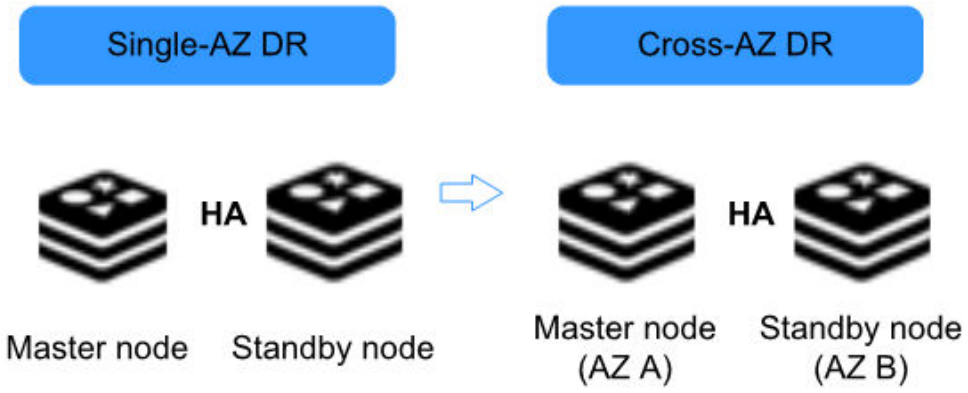
8 Disaster Recovery and Multi-Active Solution

Whether you use DCS as the frontend cache or backend data store, DCS is always ready to ensure data reliability and service availability. The following figure shows the evolution of DCS DR architectures.

Figure 8-1 DCS DR architecture evolution



To meet the reliability requirements of your data and services, you can choose to deploy your DCS instance within a single AZ or across AZs.

Single-AZ HA Within a Region

Single-AZ deployment means deploying an instance within a physical equipment room. DCS provides process/service HA, data persistence, and hot standby DR policies for different types of DCS instances.

Single-node DCS instance: When DCS detects a process fault, a new process is started to ensure service HA.

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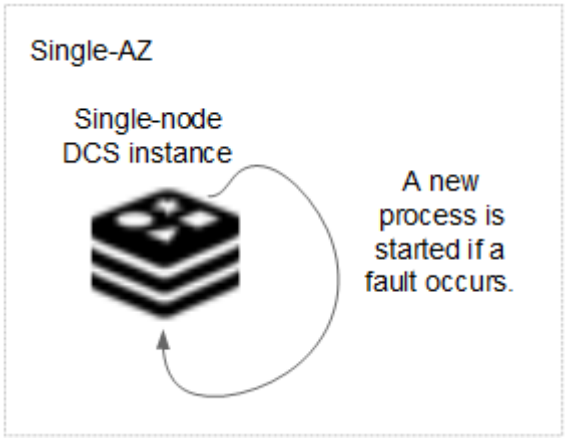
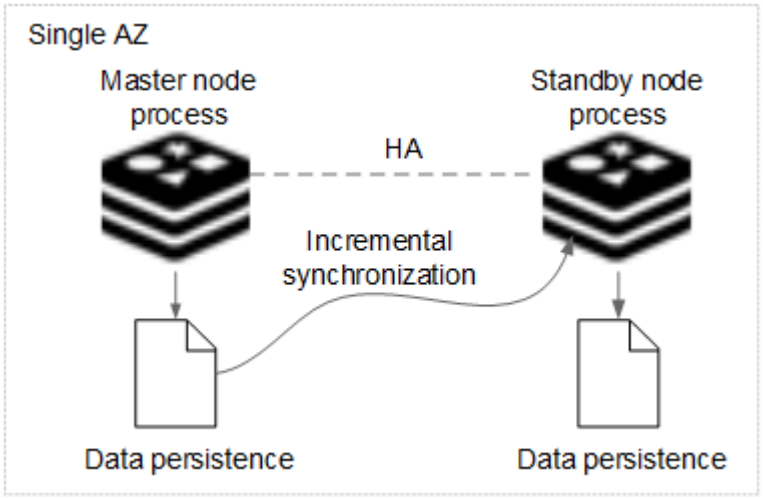
Figure 8-2 HA for a single-node DCS instance deployed within an AZ



Master/Standby DCS instance: Data is persisted to disk on the master node and incrementally synchronized and persisted to the standby node, achieving hot standby and data persistence.

Figure 8-3 HA for a master/standby DCS instance deployed within an AZ



Cluster DCS instance: Similar to a master/standby instance, data in each shard (instance process) of a cluster instance is synchronized between master and standby nodes and persisted in both nodes.

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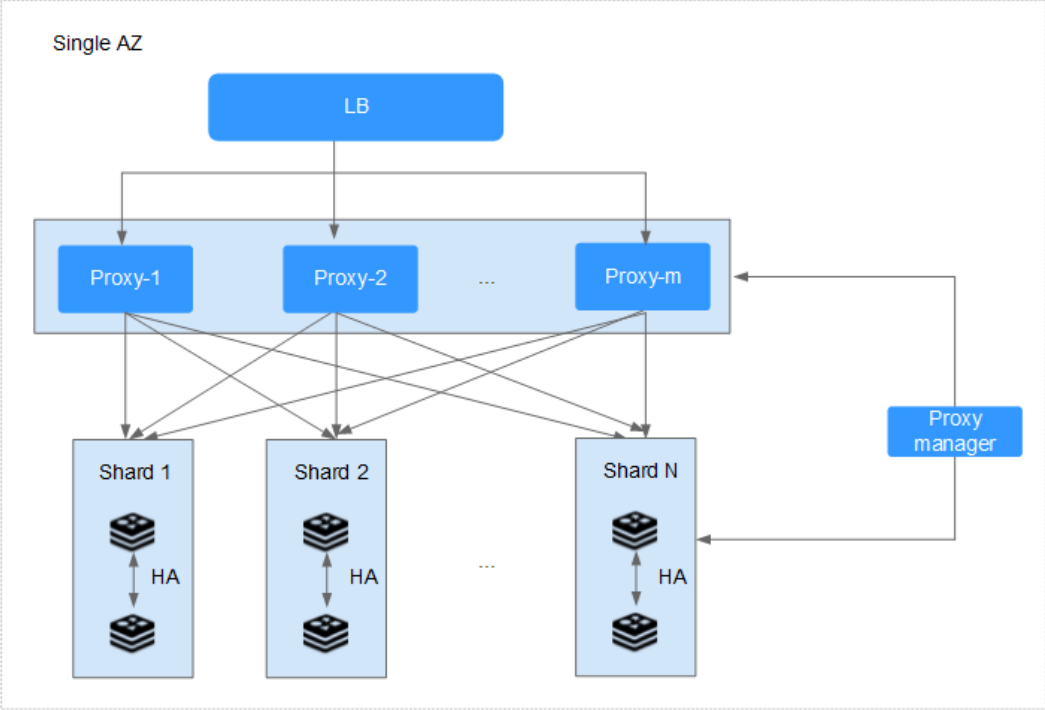
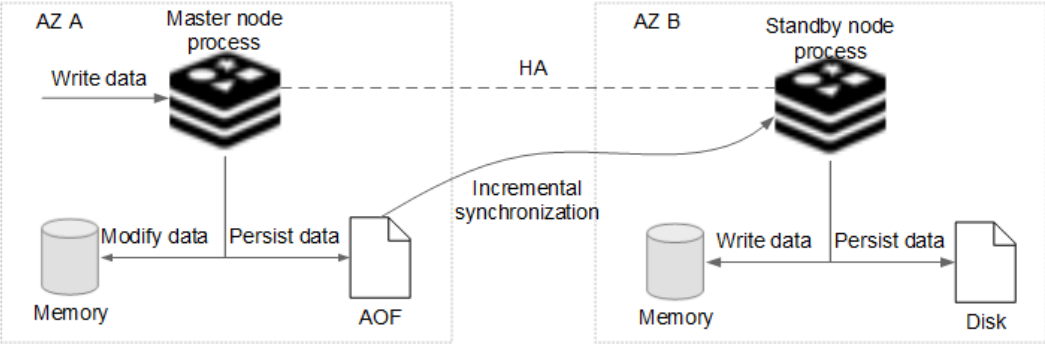
Figure 8-4 HA for a cluster DCS instance deployed within an AZ



Cross-AZ DR Within a Region

The master and standby nodes of a master/standby or cluster DCS instance can be deployed across AZs (in different equipment rooms). Power supplies and networks of different AZs are physically isolated. When a fault occurs in the AZ where the master node is deployed, the standby node connects to the client and takes over data read and write operations.

Figure 8-5 Cross-AZ deployment of a master/standby DCS instance



NOTE

This mechanism applies in a similar way to a cluster DCS instance, in which each shard (process) is deployed across AZs.

When creating a master/standby DCS instance, select a standby AZ that is different from the master AZ as shown below.

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Figure 8-6 Selecting different AZs

NOTE

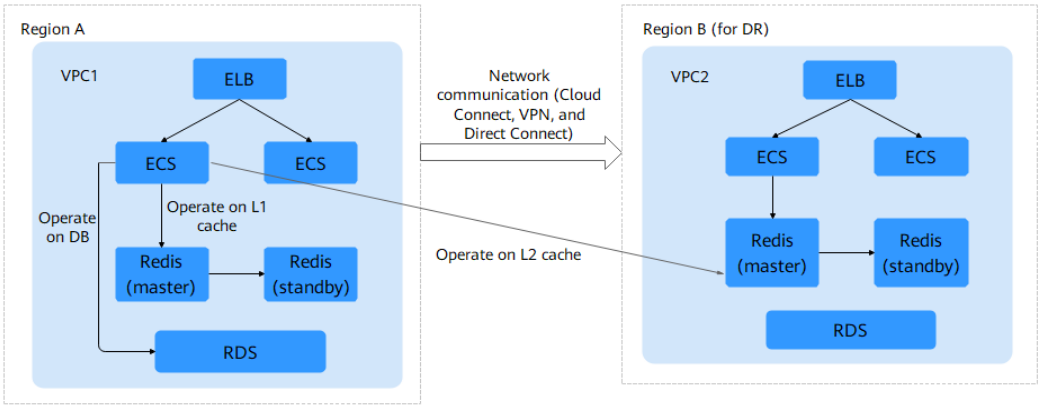
You can also deploy your application across AZs to ensure both data reliability and service availability in the event of power supply or network disruptions.

Cross-Region Multi-Active

Currently, HUAWEI CLOUD DCS does not support cross-region multi-active because Redis does not have a mature active-active solution. **Active-active is different from disaster recovery or master/standby HA.**

Redis active-active across clouds or regions cannot be achieved because the customized REdis Serialization Protocols (RESP) are not unified. If active-active is required, it can be implemented through **dual-write on the application end**.

Figure 8-7 Dual-write on the application side to achieve multi-active



Note:

1. The dual-write solution **cannot ensure cache consistency** (due to network problems). **Applications** need to **tolerate cache inconsistency** (by setting the time to live to achieve eventual consistency). If applications require strong cache consistency, this solution is not suitable. Currently, there is no solution in the industry to ensure strong cross-region cache consistency.

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2. You are advised to perform operations on the cross-region L2 cache in asynchronous mode.

9 Cache Engine Differences

9.1 Comparing Redis Versions

When creating a DCS Redis instance, you can select the cache engine version and the instance type.

NOTE

- DCS for Redis 3.0 is no longer provided. You can use DCS for Redis 4.0, 5.0, or 6.0 instead.
- The underlying architectures vary by Redis version. Once a Redis version is chosen, it cannot be changed. For example, you cannot upgrade a DCS Redis 3.0 instance to Redis 4.0 or 5.0. If you require a higher Redis version, create a new instance that meets your requirements and then migrate data from the old instance to the new one.

- **Version**

  DCS supports Redis 6.0, 5.0, 4.0, and 3.0. **Table 9-1** describes the differences between these versions. For more information, see **New Features of DCS for Redis 4.0**, **New Features of DCS for Redis 5.0**, and **New Features of DCS for Redis 6.0**.

  Table 9-1 Differences between Redis versions

Feature	Redis 3.0 (Discontinued)	Redis 4.0 & Redis 5.0	Redis 6.0
Open-source compatibility	Redis 3.0.7	Redis 4.0.14 and 5.0.9, respectively	Basic edition: Redis 6.2.7 Professional edition: KeyDB 6.0.16

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Feature	Redis 3.0 (Discontinued)	Redis 4.0 & Redis 5.0	Redis 6.0
Instance deployment mode	Based on VMs	Containerized based on physical servers	Basic edition: Containerized based on physical servers Professional edition: Based on VMs
Time required for creating an instance	3–15 minutes Cluster instance: 10–30 minutes	8 seconds	Basic edition: 8s Professional edition: 5 to 15 minutes
QPS	100,000 QPS per node	100,000 QPS per node	Basic edition: 100,000 QPS per node Professional edition: 400,000 QPS per node
Public network access	Supported	Not supported	Not supported
Domain name connection	Supported in VPC	Supported in VPC	Supported in VPC
Visualized data management	Not supported	Provides Web CLI for Redis access and data management.	Provides Web CLI for Redis access and data management.
Instance type	Single-node, master/standby, and Proxy Cluster	Single-node, master/standby, Proxy Cluster, and Redis Cluster	Basic edition: single-node, master/standby, and Redis Cluster Professional edition: master/standby

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Feature	Redis 3.0 (Discontinued)	Redis 4.0 & Redis 5.0	Redis 6.0
Capacity expansion/ reduction	Online capacity expansion and reduction	Online capacity expansion and reduction	Online capacity expansion and reduction
Backup and restoration	Supported for master/standby and Proxy Cluster instances	Supported for master/ standby, Proxy Cluster, Redis Cluster, and read/write splitting instances	Supported for master/ standby and Redis Cluster instances

- **Instance type**

  DCS provides single-node, master/standby, Proxy Cluster, Redis Cluster, and read/write splitting instance types. For details about their architectures and application scenarios, see **DCS Instance Types**.

9.2 Comparing Professional and Basic Editions

DCS professional edition is based on KeyDB. KeyDB is a Redis fork that delivers high performance and focuses on multithreading, memory efficiency, and high throughput. It splits Redis's main thread into multiple worker threads. Every worker thread listens on the port, accepts requests, reads data, and parses protocols, making KeyDB a multi-threaded Redis.

Table 9-2 Comparing professional and basic editions

Item	Basic Edition	Professional Editions
Open-source compatibility	Open-source Redis 4.0/5.0/6.0, single-threaded	KeyDB, compatible with open-source Redis 6.0, multi-threaded
Performance	100,000 QPS per shard, up to 1 ms latency	Professional (performance): 400,000 QPS per shard Professional (storage): 70,000 QPS per shard Up to 1 ms latency

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Item	Basic Edition	Professional Editions
Instance specifications	Instance types: single-node, master/standby, cluster, and read/write splitting • Single-node and master/standby: 128 MB to 64 GB • Read/write splitting: 8–32 GB • Cluster: up to 2048 GB	Currently, only the master/standby instance type is available. There are two editions: • Professional (performance): 8–64 GB • Professional (storage): 8–32 GB memory, and up to 256 GB with SSD storage For details about the differences between professional (performance) and professional (storage) editions, see **Table 9-3**.
Data security	• Fine-grained authorization and IP address whitelists • Data persistence and backup (except for the single-node type) • Cross-AZ DR • Automatic failover • Capacity expansion and instance type change with a few clicks	• Fine-grained authorization and security groups • Persistence and backup • Cross-AZ DR • Automatic failover • Capacity expansion with a few clicks

Table 9-3 Differences between professional (performance) and professional (storage) editions

Item	Professional (Performance) Edition	Professional (Storage) Edition
QPS	400,000 QPS per shard, higher than the storage edition	70,000 QPS per shard
Storage	SSD storage is not supported. Data is stored entirely in memory. Data is persisted using AOF files.	Memory + SSD Memory caches hot data and SSDs store all data.
Backup file format	AOF and RDB	RDB

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10 Comparing DCS and Open-Source Cache Services

DCS supports single-node, master/standby, and cluster instances, ensuring high read/write performance and fast data access. It also supports various instance management operations to facilitate your O&M. With DCS, you only need to focus on the service logic, without concerning about the deployment, monitoring, scaling, security, and fault recovery issues.

DCS is compatible with open-source Redis and Memcached, and can be customized based on your requirements. This renders DCS unique features in addition to the advantages of open-source cache databases.

DCS for Redis vs. Open-Source Redis

Table 10-1 Differences between DCS for Redis and open-source Redis

Feature	Open-Source Redis	DCS for Redis
Service deployment	Requires 0.5 to 2 days to prepare servers.	• A DCS Redis 3.0 or 6.0 professional instance is deployed on VMs and can be created in 5 to 15 minutes. • DCS Redis 4.0/5.0/6.0 basic instances are containerized and can be created in 8 seconds.
Version	-	Deeply engaged in the open-source community and supports the latest Redis version. Currently, Redis 3.0/4.0/5.0/6.0 are supported.
Security	Network and server safety is the user's responsibility.	• Network security is ensured using HUAWEI CLOUD VPCs and security groups. • Data reliability is ensured by data replication and scheduled backup.
Performance	-	100,000 QPS per node. DCS for Redis 6.0 can reach 400,000 QPS per node.

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Feature	Open-Source Redis	DCS for Redis
Monitoring	Provides only basic statistics.	Provides more than 30 monitoring metrics and customizable alarm threshold and policies. ● Various metrics – External metrics include the number of commands, concurrent operations, connections, clients, and denied connections. – Resource usage metrics include CPU usage, physical memory usage, network input throughput, and network output throughput. – Internal metrics include instance capacity usage, as well as the number of keys, expired keys, PubSub channels, PubSub patterns, keyspace hits, and keyspace misses. ● Custom alarm thresholds and policies for different metrics to help identify service faults.
Backup and restoration	Supported	● Supports scheduled and manual backup. Backup files can be downloaded. ● Backup data can be restored on the console.
Parameter management	No visualized parameter management	● Visualized parameter management is supported on the console. ● Configuration parameters can be modified online. ● Data can be accessed and modified on the console.
Scale-up	Interrupts services and involves a complex procedure, from modifying the server RAM to modifying Redis memory and restarting the OS and services.	● Supports online scale-up and scale-down without interrupting services. ● Specifications can be scaled up or down within the available range based on service requirements.
O&M	Manual O&M	24/7 end-to-end O&M services

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DCS for Memcached vs. Open-Source Memcached

Table 10-2 Differences between DCS for Memcached and open-source Memcached

Feature	Open-Source Memcached	DCS for Memcached
Service deployment	Requires 0.5 to 2 days to prepare servers.	Creates an instance in 5 to 15 minutes.
Security	Network and server safety is the user's responsibility.	• Network security is ensured using HUAWEI CLOUD VPCs and security groups. • Data reliability is ensured by data replication and scheduled backup.
Performance	-	100,000 QPS per node
Monitoring	Provides only basic statistics.	Provides more than 30 monitoring metrics and customizable alarm threshold and policies. • Various metrics – External metrics include the number of commands, concurrent operations, connections, clients, and denied connections. – Resource usage metrics include CPU usage, physical memory usage, network input throughput, and network output throughput. – Internal metrics include instance capacity usage, as well as the number of keys, expired keys, PubSub channels, PubSub patterns, keyspace hits, and keyspace misses. • Custom alarm thresholds and policies for different metrics to help identify service faults.
Backup and restoration	Not supported	• Supports scheduled and manual backup. • Backup data can be restored on the console.
Visualized maintenance	No visualized parameter management	• Visualized parameter management is supported on the console. • Configuration parameters can be modified online.

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Feature	Open-Source Memcached	DCS for Memcached
Scale-up	Interrupts services and involves a complex procedure, from modifying the server RAM to modifying Redis memory and restarting the OS and services.	• Supports online scale-up without interrupting services. • Specifications can be scaled up or down within the available range based on service requirements.
O&M	Manual O&M	24/7 end-to-end O&M services
Data persistence	Not supported	Supported for master/standby instances

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11 Notes and Constraints

Account and Quota

You can only create a certain number of instances with certain total memory by default. Quotas are different by user and by region. Refer to the quota displayed on the console. For more information about quotas, see **Quotas**. To increase quotas, submit a **service ticket**.

Network

VPCs are used to manage the network security of cloud services.

- The client must be deployed on an ECS that belongs to the same VPC as the DCS instance.
- For a DCS Redis 3.0/6.0 professional/Memcached instance, select the same security group for the DCS instance and the ECS where your client is deployed. If the DCS instance and ECS belong to different security groups, add inbound and outbound rules for the security groups. For more information on how to add the rules, see **the "How Do I Configure a Security Group" FAQ**.
- For a DCS Redis 4.0/5.0/6.0 basic edition instance, add the IP address of the ECS where your client is deployed to the whitelist of the instance. For details, see **Managing IP Address Whitelist**.

Scaling

You can scale up an instance only within the remaining quota scope. If your quota is insufficient, submit a **service ticket** to increase the quota.

Remarks

- You can use RESTful APIs to access DCS. Before debugging the APIs, obtain region and endpoint information from **Regions and Endpoints**.
- If you are interested in DCS pricing, see **Price Calculator** or **Pricing Details**.

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12 Billing

DCS supports the pay-per-use mode and yearly/monthly billing mode. For details, see **Product Pricing Details**.

NOTE

The billing modes available on the console vary by region. Some regions do not support the yearly/monthly billing mode.

Billing Items

DCS usage is billed by DCS instance specification.

Billing Item	Description
DCS instance	Billing based on DCS instance specifications.

Note: HUAWEI CLOUD DCS charges based on the selected DCS instance specifications instead of the actual cache capacity.

Billing Modes

DCS provides two billing modes: pay-per-use and yearly/monthly. Pay-per-use is recommended if you are unsure of your future service needs and want to avoid paying for unused resources. However, if you are sure of your needs, yearly/monthly will be less expensive.

- Yearly/Monthly: Provides a larger discount than pay-per-use mode and is recommended for long-term users.
- Pay-per-use (hourly): You can start and stop DCS instances as needed and will be billed based on the duration of your use of DCS instances. Billing starts when a DCS instance is created and ends when the DCS instance is deleted. The minimum time unit is one second.
- You can switch between the yearly/monthly and pay-per-use modes.

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Configuration Changes

You can change the specifications of a DCS Redis or Memcached instance, that is, scale up or down an instance and change the instance type. After you successfully change the specifications, the instance is billed based on new specifications. For details, see **Modifying DCS Instance Specifications**.

Renewal

You can renew a resource package upon its expiration, or you can set auto-renewal rules for a resource package. For more information about renewing resource packages, see **Renewal Management**.

FAQ

For more information about DCS billing, see the **Purchasing and Billing FAQs**.

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13 Permissions Management

If you need to assign different permissions to employees in your enterprise to access your DCS resources, IAM is a good choice for fine-grained permissions management. IAM provides identity authentication, permissions management, and access control, helping you secure access to your HUAWEI CLOUD resources.

With IAM, you can use your Huawei Cloud account to create IAM users for your employees, and assign permissions to the users to control their access to specific resource types. For example, some software developers in your enterprise need to use DCS resources but should not be allowed to delete DCS instances or perform any other high-risk operations. In this scenario, you can create IAM users for the software developers and grant them only the permissions required for using DCS resources.

If your Huawei Cloud account does not require individual IAM users for permissions management, skip this section.

IAM can be used free of charge. You pay only for the resources in your account. For more information about IAM, see the **IAM Service Overview**.

DCS Permissions

By default, new IAM users do not have permissions assigned. You need to add a user to one or more groups, and attach permissions policies or roles to these groups. Users inherit permissions from the groups to which they are added and can perform specified operations on cloud services based on the permissions.

DCS is a project-level service deployed and accessed in specific physical regions. To assign DCS permissions to a user group, specify the scope as region-specific projects and select projects for the permissions to take effect. If **All projects** is selected, the permissions will take effect for the user group in all region-specific projects. When accessing DCS, the users need to switch to a region where they have been authorized to use this service.

You can grant users permissions by using roles and policies.

- Roles: A type of coarse-grained authorization mechanism that defines permissions related to user responsibilities. This mechanism provides only a limited number of service-level roles for authorization. When using roles to grant permissions, you need to also assign other roles on which the permissions depend to take effect. However, roles are not an ideal choice for fine-grained authorization and secure access control.

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- Policies: A type of fine-grained authorization mechanism that defines permissions required to perform operations on specific cloud resources under certain conditions. This mechanism allows for more flexible policy-based authorization, meeting requirements for secure access control. For example, you can grant DCS users only the permissions for operating DCS instances. Most policies define permissions based on APIs. For the API actions supported by DCS, see **Permissions Policies and Supported Actions**.

Table 1 lists all the system-defined roles and policies supported by DCS.

Table 13-1 System-defined roles and policies supported by DCS

Role/Policy Name	Description	Type	Dependency
DCS FullAccess	All permissions for DCS. Users granted these permissions can operate and use all DCS instances.	System-defined policy	Actions required for buying professional instances: iam:permissions:listRolesForAgencyOnProject iam:agencies:listAgenciesiam:roles:listRoles iam:permissions:grantRoleToAgencyOnProject iam:agencies:createAgency iam:agencies:deleteAgency
DCS UserAccess	Common user permissions for DCS, excluding permissions for creating, modifying, deleting DCS instances and modifying instance specifications.	System-defined policy	None
DCS ReadOnlyAccess	Read-only permissions for DCS. Users granted these permissions can only view DCS instance data.	System-defined policy	None
DCS Administrator	Administrator permissions for DCS. Users granted these permissions can operate and use all DCS instances.	System-defined role	The **Server Administrator** and **Tenant Guest** roles need to be assigned in the same project.

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Role/Policy Name	Description	Type	Dependency
DCS AgencyAccess	Permissions to assign to DCS agencies. These permissions are used by a tenant to delegate DCS to perform the following operations on tenant resources when necessary. They are irrelevant to the operations performed by authorized users. • Querying a subnet • Querying the subnet list • Querying a port • Querying the port list • Updating a port • Creating a port	System-defined policy	None

NOTE

The **DCS UserAccess** policy is different from the **DCS FullAccess** policy. If you configure both of them, you cannot create, modify, delete, or scale DCS instances because deny statements will take precedence over allowed statements.

Table 2 lists the common operations supported by each system policy of DCS. Please choose proper system policies according to this table.

Table 13-2 Common operations supported by each system policy

Operation	DCS FullAccess	DCS UserAccess	DCS ReadOnlyAccess	DCS Administrator
Modifying instance configuration parameters	√	√	×	√
Deleting background tasks	√	√	×	√
Accessing instances using Web CLI	√	√	×	√

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Operation	DCS FullAccess	DCS UserAccess	DCS ReadOnlyAccess	DCS Administrator
Modifying instance running status	√	√	×	√
Expanding instance capacity	√	×	×	√
Changing instance passwords	√	√	×	√
Modifying DCS instances	√	×	×	√
Performing a master/standby switchover	√	√	×	√
Backing up instance data	√	√	×	√
Analyzing big keys or hot keys	√	√	×	√
Creating DCS instances	√	×	×	√
Deleting instance backup files	√	√	×	√
Restoring instance data	√	√	×	√
Resetting instance passwords	√	√	×	√
Migrating instance data	√	√	×	√

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Operation	DCS FullAccess	DCS UserAccess	DCS ReadOnlyAccess	DCS Administrator
Downloading instance backup data	√	√	×	√
Deleting DCS instances	√	×	×	√
Querying instance configuration parameters	√	√	√	√
Querying instance restoration logs	√	√	√	√
Querying instance backup logs	√	√	√	√
Querying DCS instances	√	√	√	√
Querying instance background tasks	√	√	√	√
Querying all instances	√	√	√	√
Operating slow queries	√	√	√	√

Helpful Links

- IAM Service Overview
- Creating a User and Granting DCS Permissions
- Permissions Policies and Supported Actions

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14 Basic Concepts

DCS Instance

An instance is the minimum resource unit provided by DCS.

You can select the Redis or Memcached cache engine. Instance types can be single-node, master/standby, or cluster. For each instance type, multiple specifications are available.

For details, see **DCS Instance Specifications** and **DCS Instance Types**.

Public Network Access

An EIP can be bound to a DCS Redis 3.0 instance. You can access the instance through clients by using the EIP. Public access is not supported by DCS Redis 4.0/5.0/6.0 instances.

Stunnel is used to encrypt communication content in public network access. The network delay is slightly higher than that in the VPC, so public network access is suitable for local commissioning in the development phase.

For details, see the **public access instructions**.

Password-Free Access

DCS instances can be accessed in a VPC without passwords. Latency is lower because no password authentication is involved.

You can enable password-free access for instances that do not have sensitive data. To ensure data security, you are not allowed to enable password-free access for instances enabled with public network access.

For details, see **Enabling Password-free Access to a DCS Redis Instance**.

Maintenance Time Window

The maintenance time window is the period when the DCS service team upgrade and maintain the instance.

DCS instance maintenance takes place only once a quarter and does not interrupt services. Even so, you are advised to select a time period when the service demand is low.

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When creating an instance, you must specify a maintenance time window, which can be modified after the instance is created.

For details, see: **Modifying an Instance's Maintenance Time Window**.

Cross-AZ Deployment

Master/Standby, cluster, and read/write splitting instances are deployed across different AZs with physically isolated power supplies and networks Applications can also be deployed across AZs to achieve HA for both data and applications.

When creating an instance, you can select a primary AZ and a standby AZ.

Shard

A **shard** is a management unit of a cluster DCS Redis instance. Each shard corresponds to a redis-server process. A cluster consists of multiple shards. Each shard has multiple slots. Data is distributed to the slots. The use of shards increases cache capacity and concurrent connections.

Each cluster instance consists of multiple shards. By default, each shard is a master/standby instance with two replicas. The number of shards is equal to the number of master nodes in a cluster instance.

Replica

A replica is a **node** of a DCS instance. A single-replica instance has no standby node. A two-replica instance has one master node and one standby node. By default, each master/standby instance has two replicas. If the number of replicas is set to three for a master/standby instance, the instance has one master node and two standby nodes. A single-node instance has only one node.

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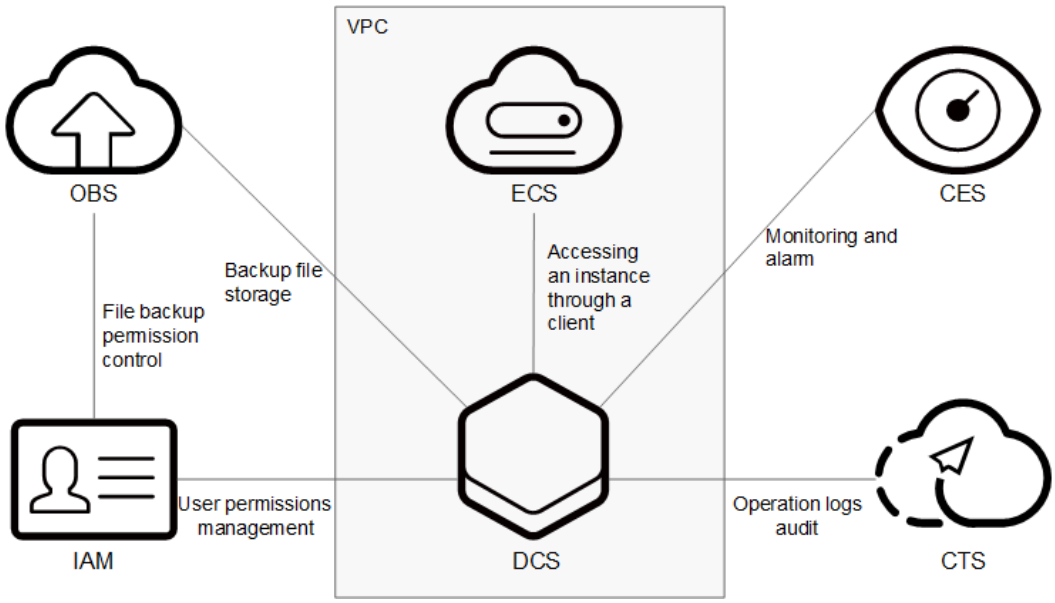
15 Related Services

DCS is used together with other HUAWEI CLOUD services, including VPC, ECS, IAM, Cloud Eye, CTS, and Object Storage Service (OBS).

Figure 15-1 Relationships between DCS and other services



VPC

A VPC is an isolated virtual network environment on HUAWEI CLOUD. You can configure IP address ranges, subnets, and security groups, assign EIPs, and allocate bandwidth in a VPC.

DCS runs in VPCs. The VPC service manages EIPs and bandwidth, and provides security groups. You can configure access rules for security groups to secure the access to DCS.

ECS

An ECS is a cloud server that provides scalable, on-demand computing resources for secure, flexible, and efficient applications.

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You can access and manage your DCS instances using an ECS.

IAM

IAM provides identity authentication, permissions management, and access control.

With IAM, you can control access to DCS.

Cloud Eye

Cloud Eye is a secure, scalable, and integrated monitoring service. With Cloud Eye, you can monitor your DCS service and configure alarm rules and notifications.

Cloud Trace Service (CTS)

CTS provides you with a history of operations performed on cloud service resources. With CTS, you can query, audit, and backtrack operations. The traces include the operation requests sent using the management console or open APIs and the results of these requests.

OBS

OBS provides secure, cost-effective storage service using objects as storage units. With OBS, you can store and manage the lifecycle of massive amounts of data.

You can store DCS instance backup files in OBS.

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