

## Bare Metal Server

# Service Overview

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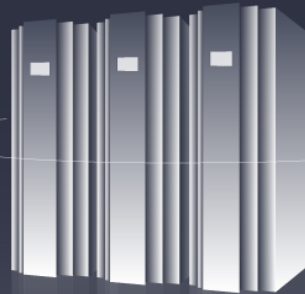
# 1 BMS Infographics

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# Bare Metal Server

Dedicated Cloud Servers for Enterprises



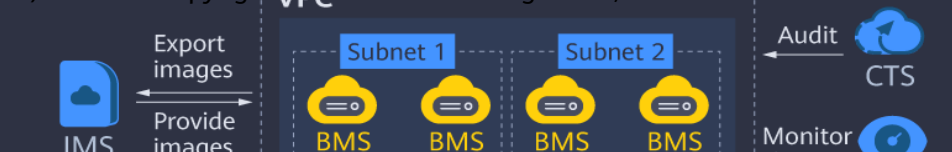
## Challenges in Cloud Adoption

- 1 VMs alone unable to fulfill requirements in complex scenarios
- 2 High performance requirements and stringent oversights in security ratings
- 3 Smooth migration from private to public cloud
- 4 Inflexible and costly traditional hosting services

**HUAWEI CLOUD Bare Metal Server helps you easily address these challenges.**

## What Is BMS?

**Bare Metal Server (BMS)** provides tenants with dedicated servers featuring excellent computing performance equivalent to physical servers as well as high security and reliability. You can obtain BMSs as easily and quickly as Elastic Cloud Servers (ECSs) and also use the service together with Image Management Service (IMS), Elastic Volume Service (EVS), and Virtual Private Cloud (VPC). The BMS service offers both the stability of traditional hosted servers and the high scalability of cloud-based services.



# 2 What Is BMS?

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## Overview

Bare Metal Server (BMS) features both the scalability of Elastic Cloud Server (ECS) and high performance of physical servers. It provides dedicated servers on the cloud, delivering the performance and security required by core databases, critical applications, high-performance computing (HPC), and big data.

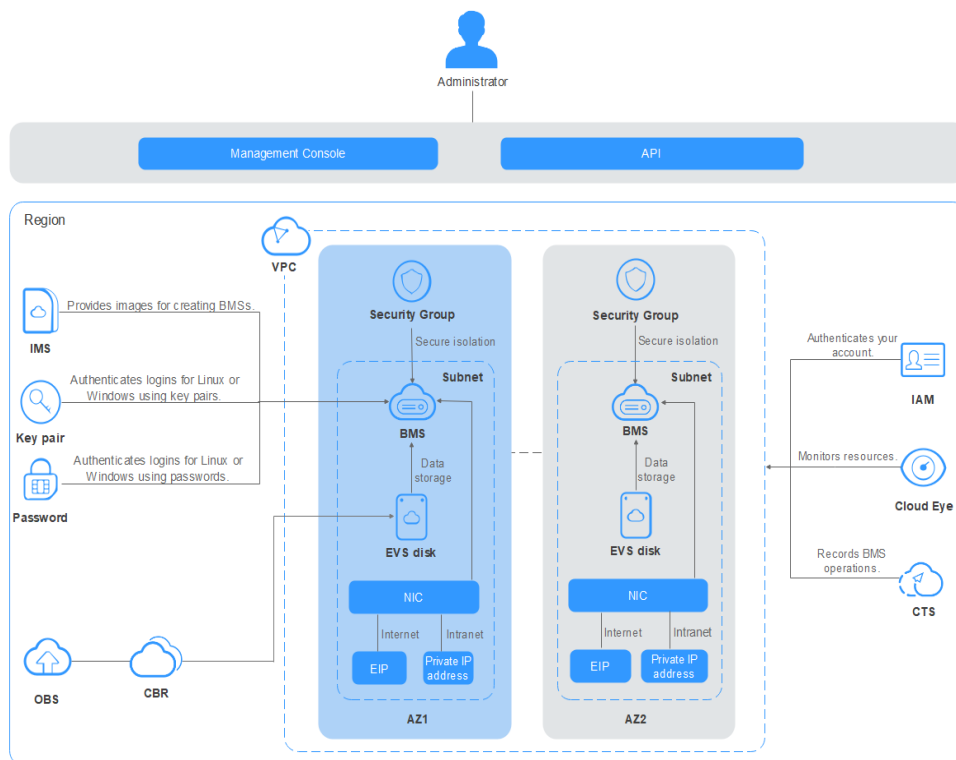
The BMS self-service feature allows you to apply for and use a BMS on demand. To apply for a BMS, you need to specify the server type, image, required network, and other configurations. You can obtain the BMS you require within 30 minutes.

## System Architecture

BMS works with other cloud services to provide computing, storage, network, and image functions.

- BMSs are deployed in multiple availability zones (AZs) connected with each other through an internal network. If an AZ becomes faulty, other AZs in the same region will not be affected.
- Virtual Private Cloud (VPC) allows you to create a dedicated network for BMSs and configure subnets and security groups. BMSs in a VPC can communicate with the external network through EIPs (bandwidth support required).
- Image Management Service (IMS) allows you to install OSs on BMSs or create BMSs using private images for rapid service deployment.
- Elastic Volume Service (EVS) provides storage and Volume Backup Service (VBS) provides data backup and restoration.
- Cloud Eye is a key measure to monitor BMS performance, reliability, and availability. Using Cloud Eye, you can monitor BMS in real time.
- Cloud Backup and Recovery (CBR) backs up data for EVS disks and BMSs, and uses snapshot backups to restore the EVS disks and BMSs.

Figure 2-1 System architecture



## BMSs, Physical Servers, and ECSs

Table 2-1 compares BMSs, physical servers, and ECSs. Y indicates supported and N indicates unsupported.

### NOTE

BMSs have all the features and advantages of physical servers. Your applications can access the physical CPU and memory without any virtualization overhead.

Table 2-1 Comparison between BMSs, physical servers, and ECSs

Category	Function	BMS	Physical Server	ECS
Provisioning	Automatic provisioning	Y	N	Y
Compute	No feature loss	Y	Y	N
	No performance loss	Y	Y	N
	Exclusive resources	Y	Y	N
Storage	Local storage	Y	Y	N



Category	Function	BMS	Physical Server	ECS
	Booting from an EVS disk (system disk)	Y	N	Y
	Using an image (free from OS installation)	Y	N	Y
Network	VPC	Y	N	Y
	Communication between physical servers and VMs through a VPC	Y	N	Y
Management and control	Consistent remote login experience as VMs	Y	N	Y
	Monitoring and auditing of key operations	Y	N	Y

## Related Concepts

- [Instance Family](#)
- [BMS Types](#)
- [Image](#)
- [BMS Networks](#)
- [EIP](#)

## Access Methods

The public cloud provides a web-based service management system (management console). You can access BMS through the management console or HTTPS APIs. The two access methods differ as follows:

- API  
If you want to integrate BMS into a third-party system for secondary development, use APIs to access the BMS service.
- Management console  
For all other purposes, use the management console. Log in to the management console and choose **Compute > Bare Metal Server** on the homepage.

If you do not have an account, sign up to create one as instructed in [Making Preparations](#).

# 3 BMS Advantages

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## High Security and Reliability

BMS allows you to use dedicated computing resources, add servers to VPCs and security groups for network isolation, and integrate related components for server security. The BMSs running on the QingTian architecture can use EVS disks as system and data disks, which can be backed up for restoration. BMS can interconnect with dedicated storage to ensure the data security and reliability required by enterprise services.

## High Performance

BMS has no virtualization overhead, allowing dedicated computing resources for service running. Running on QingTian, a hardware-software synergy architecture developed by Huawei, BMS can use high-bandwidth, low-latency storage and networks on the cloud, meeting the deployment density and performance requirements of critical services such as enterprise databases, big data, containers, HPC, and AI.

## Quick Provisioning and Unified O&M

Hardware-based acceleration provided by the QingTian architecture enables EVS disks to be used as system disks. The required BMSs can be provisioned within minutes after you submit an order. You can manage your BMSs throughout their lifecycle from the management console or using open APIs with SDKs.

## Quick Integration of Cloud Services and Solutions

Based on the unified VPC model, cloud services and solutions (such as database, big data, container, HPC, and AI solutions) can be quickly integrated to run on BMSs. This accelerates cloud transformation.

# 4 Application Scenarios

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## Database

Mission-critical database services of governments and financial institutions must be deployed on physical servers with dedicated resources, isolated networks, and guaranteed performance. The BMS service properly meets these database service requirements by providing high-performance servers dedicated for individual users.

## Big Data

For Internet services involving big data storage and analysis, the BMS service provides both local storage and compute-storage decoupling backed by OBS.

## Container

Containers enable elastic load balancing for Internet services. BMSs provide more agile container deployment with higher density and lower resource overhead than VMs. Cloud native technologies reduce the cost of cloud transformation.

## HPC/AI

In high-performance computing (HPC) such as supercomputing, DNA sequencing, and AI, a large amount of data needs to be processed. The BMS service meets the requirements of HPC services for high computing performance, high stability, and high real-time performance of servers.

# 5 Instance

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## 5.1 Instance Family

### Overview

An instance is a purchased BMS. Different instance types provide varied computing capabilities, storage space, and network performance. You can select a type that meets your service requirements. After you purchase a BMS, you can perform operations such as starting, stopping, and in-band monitoring.

### BMS Types

A BMS has x86 or Kunpeng CPUs. Huawei-developed high-performance physical servers with exclusive optimization algorithms provide a reliable hardware environment for all the BMSs.

- [x86 V4 BMS with Intel Broadwell CPU](#) (no more provisioning)
- [x86 V5 BMS with Intel Skylake CPU](#) (no more provisioning)
- [x86 V6 BMS with Intel Cascade Lake CPU](#)

### Remarks

- If a BMS uses local disks, its system disk is configured as RAID 1 and cannot be changed. The data disks are configured as RAID 0. To change the RAID configuration of data disks, contact the operation administrator.

## 5.2 x86 V4 BMS with Intel Broadwell CPU

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 **CAUTION**

x86 V4 BMSs will no longer be provisioned.

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- General-purpose

This BMS type provides general compute, storage, and network specifications and is ideal for systems that have general requirements for performance but require dedicated resources and isolated networks, such as databases, core ERP systems, and financial systems.

**Table 5-1** General-purpose BMS specifications

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.s3.large	2 x 10 Core Intel Xeon E5-2618L V4 (2.20 GHz)	DDR4 RAM (128 GB)	2 x 600GB SAS System Disk RAID1	2 x 2-port 10GE + SDI
physical.s3.xlarge	2 x 14 Core Intel Xeon E5-2658 V4 (2.30 GHz)	DDR4 RAM (256 GB)	2 x 600GB SAS System Disk RAID1	2 x 2-port 10GE + SDI
physical.s3.2xlarge	2 x 10 Core Intel Xeon E5-2618L V4 (2.20 GHz)	DDR4 RAM (192 GB)	2 x 600GB SAS System Disk RAID1	2 x 2-port 10GE + SDI

- Disk-intensive

This BMS type uses local disks as both the system disk and data disks, and is ideal for scenarios that have large data volumes and require high computing performance, stability, and real-time performance, such as big data and distributed cache.

**Table 5-2** Disk-intensive BMS specifications

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.d1.large	2 x 10 Core Intel Xeon E5-2618L V4 (2.20 GHz)	DDR4 RAM (128 GB)	2 x 600GB SAS System Disk RAID 1 + 8 x 4TB SATA	2 x 2-port 10GE

- Memory-optimized

This BMS type provides ultra-large memory of more than 1 TB and is ideal for scenarios such as in-memory databases, SAP HANA, and HPC fat nodes.

**Table 5-3** Memory-optimized BMS specifications

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.m2.small	4 x 24 Core Xeon E7-8890 V4 (2.20 GHz)	DIMM RAM (1024 GB)	2 x 600GB SAS System Disk RAID1 + 7 x 1.8TB SAS HDD RAID5 + 2 x 1.6TB NVMe SSD	2 x 2-port 10GE + 16G FC + SDI
physical.m2.medium	4 x 24 Core Xeon E7-8890 V4 (2.20 GHz)	DIMM RAM (2048 GB)	2 x 600GB SAS System Disk RAID1	2 x 2-port 10GE + SDI
physical.m2.large	4 x 24 Core Xeon E7-8890 V4 (2.20 GHz)	DIMM RAM (3072 GB)	2 x 600GB SAS System Disk RAID1 + 14 x 1.8TB SAS HDD + 4 x 400GB SAS SSD + 2 x 1600GB NVMe SSD	2 x 2-port 10GE + SDI
physical.m2.xlarge	4 x 24 Core Xeon E7-8890 V4 (2.20 GHz)	DIMM RAM (4096 GB)	2 x 600GB SAS System Disk RAID1 + 14 x 1.8TB SAS HDD + 4 x 400GB SAS SSD + 2 x 1600GB NVMe SSD	2 x 2-port 10GE + SDI

- I/O-optimized  
This BMS type uses SSD disks as both the system disk and data disks. It is ideal for high-performance big data, databases, and other scenarios that require high storage I/O performance.

**Table 5-4** I/O-optimized BMS specifications

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.io1.large	2 x 10 Core E5 2618L V4 (2.20 GHz)	DDR4 RAM (256 GB)	2 x 800GB SAS SSD System Disk RAID1 + 4 x 3.2TB NVMe SSD	2 x 2-port 10GE

- GPU-accelerated

This BMS type includes computing-accelerated BMSs (P series) and graphics-accelerated BMSs (G series). It provides outstanding floating-point computing performance and is ideal for scenarios that require real-time, highly concurrent massive computing, such as deep learning, scientific computing, CAE, 3D animation rendering, and CAD.

**Table 5-5** GPU-accelerated BMS specifications

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.p1.large	2 x 14 Core Intel Xeon E5-2690 V4 (2.60 GHz)	DDR4 RAM (512 GB)	2 x 600GB SAS HDD System Disk RAID1+ 6 x 800GB NVMe SSD Disk	NIC: 1 x 100G IB + 2 x 10GE + SDI GPU: 8 x Tesla P100 GPU memory: 16 GB
physical.p2.large	2 x 14 Core Intel Xeon E5-2690 V4 (2.60 GHz)	DDR4 RAM (512 GB)	2 x 600GB SAS HDD + 6 x 800GB NVMe SSD	NIC: 1 x 100G IB + 2 x 10GE + SDI GPU: 8 x Tesla V100 GPU memory: 16 GB
physical.g1.small	2 x 14 Core Intel Xeon E5-2690 V4 (2.60 GHz)	DDR4 RAM (256 GB)	2 x 600GB SAS + 960GB SSD	NIC: 3 x 2-port 10GE GPU: 1 x M60



## 5.3 x86 V5 BMS with Intel Skylake CPU

 CAUTION

x86 V5 BMSs will no longer be provisioned.

- General-purpose

This BMS type provides general compute, storage, and network specifications and supports attachment of EVS disks. It is ideal for systems that have general requirements for performance but require dedicated resources and isolated networks, such as databases, core ERP systems, and financial systems.

**Table 5-6** General-purpose BMS specifications

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.s4.medium	2 x 10 Core Intel Xeon Silver 4114 V5 (2.20 GHz)	DDR4 RAM (128 GB)	None	2 x 2-port 10GE + SDI
physical.s4.large	2 x 10 Core Intel Xeon Silver 4114 V5 (2.20 GHz)	DDR4 RAM (192 GB)	None	2 x 2-port 10GE + SDI
physical.s4.xlarge	2 x 14 Core Intel Xeon Gold 5120 V5 (2.20 GHz)	DDR4 RAM (192 GB)	None	2 x 2-port 10GE + SDI
physical.s4.2xlarge	2 x 14 Core Intel Xeon Gold 5120 V5 (2.20 GHz)	DDR4 RAM (384 GB)	None	2 x 2-port 10GE + SDI
physical.s4.3xlarge	2 x 22 Core Intel Xeon Gold 6161 V5 (2.20 GHz)	DDR4 RAM (384 GB)	None	2 x 2-port 10GE + SDI

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.o3.small	2 x 4 Core Intel Skylake Xeon Gold 5122 V5 (3.60 GHz)	DDR4 RAM (192 GB)	None	2 x 2-port 10GE + SDI

- Disk-intensive

This BMS type uses local disks as both the system disk and data disks, and is ideal for scenarios that have large data volumes and require high computing performance, stability, and real-time performance, such as big data and distributed cache.

**Table 5-7** Disk-intensive BMS specifications

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.d2.tiny	2 x 10 Core Intel Xeon Silver 4114 V5 (2.20 GHz)	DDR4 RAM (128 GB)	2 x 600GB SAS System Disk RAID1 + 12 x 1.8TB SAS	2 x 2-port 10GE
physical.d2.large	2 x 12 Core Intel Xeon Gold 5118 V5 (2.30 GHz)	DDR4 RAM (192 GB)	2 x 600GB SAS System Disk RAID1 + 12 x 10TB SATA	2 x 2-port 10GE
physical.d2.xmedium	2 x 18 Intel Xeon Gold 6151 V5 (3.00 GHz)	DDR4 RAM (384 GB)	2 x 600GB SAS RAID1 + 24 x 1.8TB SAS	2 x 2-port 10GE

- I/O-optimized

This BMS type uses SSD disks as both the system disk and data disks. It is ideal for high-performance big data, databases, and other scenarios that require high storage I/O performance.

**Table 5-8** I/O-optimized BMS specifications

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.io2.xlarge	2 x 22 Core Intel Xeon Gold 6161 V5 (2.20 GHz)	DDR4 RAM (384 GB)	2 x 800GB SSD RAID1 + 10 x 800GB SSD	2 x 2-port 10GE

- High-performance computing

This BMS type uses InfiniBand NICs and provides a large number of CPU cores, large memory size, and high throughput. It is ideal for high-performance computing.

**Table 5-9** High-performance computing BMS specifications

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.h2.large	2 x 18 Core Intel Xeon Gold 6151 V5 (3.00 GHz)	DDR4 RAM (192 GB)	1 x 1.6TB NVMe SSD	1 x 100G IB + 2 x 10GE + SDI
physical.hc2.xlarge	2 x 18 Core Intel Xeon Gold 6151 V5 (3.00 GHz)	DDR4 RAM (384 GB)	None	2 x 2-port 10GE + SDI

- GPU-accelerated

This BMS type provides powerful floating-point computing and is ideal for real-time, highly concurrent massive computing scenarios, such as deep learning, scientific computing, CAE, 3D animation rendering, and CAD.

**Table 5-10** GPU-accelerated BMS specifications

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.p3.large	2 x 18 Core Intel Skylake 6151 V5 (3.00 GHz)	DDR4 RAM (512 GB)	2 x 1.2TB RAID 1 + 6 x 800GB NVMe SSD	NIC: 1 x 100G IB + 2 x 10GE + SDI GPU: 8 x Tesla V100 GPU memory: 32 GB

## 5.4 x86 V6 BMS with Intel Cascade Lake CPU

- General-purpose

This BMS type provides general compute, storage, and network specifications and supports attachment of EVS disks. It is ideal for systems that have general requirements for performance but require dedicated resources and isolated networks, such as databases, ERP systems, containers, and big data computing.

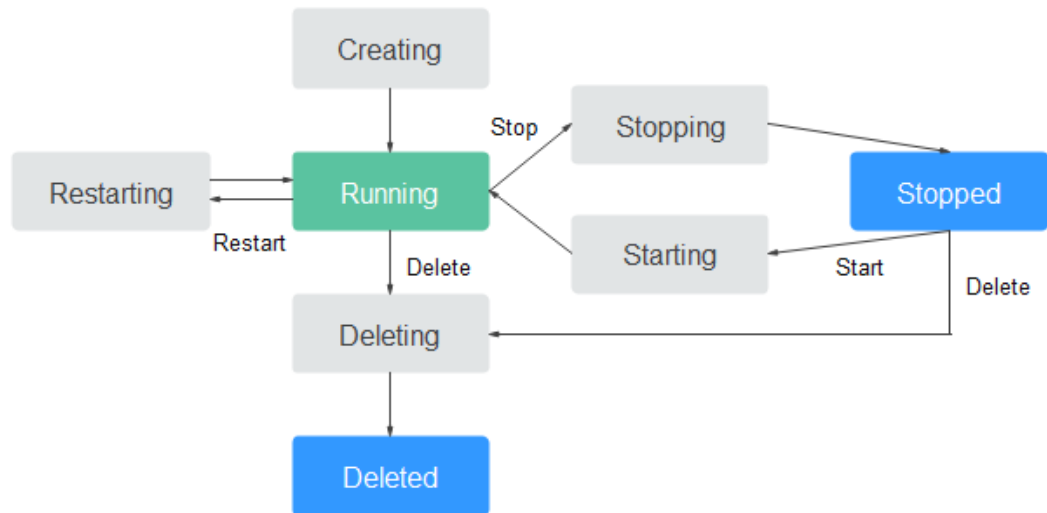
**Table 5-11** General-purpose BMS specifications

Flavor Name/ID	CPU	Memory	Local Disk	Extended Configuration
physical.c6s.3xlarge	2 x 26 Core Intel Cascade Lake 6278 V6 (2.60 GHz)	DDR4 RAM (384 GB)	None	SDI 3.0 (40 GE)
physical.c6sd.3xlarge	2 x 26 Core Intel Cascade Lake 6278 V6 (2.60 GHz)	DDR4 RAM (384 GB)	4 x 3.2TB NVMe SSD	SDI 3.0 (40 GE)
physical.c6sd.6xlarge	2 x 26 Core Intel Cascade Lake 6278 V6 (2.60 GHz)	DDR4 RAM (768 GB)	4 x 3.2TB NVMe SSD	SDI 3.0 (40 GE)

## 5.5 Lifecycle

The lifecycle of a BMS contains all states from its creation to deletion.

**Figure 5-1** BMS states



**Table 5-12** BMS states

State	Attribute	Description	API Status
Creating	Intermediate state	A BMS is in this state after you request for the BMS and before it enters the running state. If a BMS remains in this state for a long time, exceptions will occur. Contact the operation administrator to handle the exceptions.	BUILD/ BUILDING
Starting	Intermediate state	It is an intermediate state between <b>Stopped</b> and <b>Running</b> . If a BMS remains in this state for a long time, exceptions will occur. Contact the operation administrator to handle the exceptions.	SHUTOFF
Running	Stable state	A BMS is in this state when it is running properly. A BMS in this state can be used normally.	ACTIVE

State	Attribute	Description	API Status
Stopping	Intermediate state	It is an intermediate state between <b>Running</b> and <b>Stopped</b> . If a BMS remains in this state for a long time, exceptions will occur. Contact the operation administrator to handle the exceptions.	ACTIVE
Stopped	Stable state	A BMS is in this state after it is stopped successfully. A BMS in this state cannot be used.	SHUTOFF
Restarting	Intermediate state	A BMS is in this state when it is being restarted. If a BMS remains in this state for a long time, exceptions will occur. Contact the operation administrator to handle the exceptions.	REBOOT
Forcibly restarting	Intermediate state	A BMS is in this state when it is being forcibly restarted.	HARD_REBOOT
Deleting	Intermediate state	A BMS is in this state when it is being deleted. If a BMS remains in this state for a long time, exceptions will occur. Contact the operation administrator to handle the exceptions.	ACTIVE/ SHUTOFF/ REBOOT/ HARD_REBOOT/ ERROR
Deleted	Intermediate state	A BMS is in this state after it is deleted successfully. A BMS in this state cannot be used and will be removed from the system in a short time.	DELETED
Faulty	Stable state	A BMS is in this state when an exception occurs on it. A BMS in this state cannot be used. Contact the operation administrator to rectify the fault.	ERROR
Rebuilding	Intermediate state	A BMS is in this state when it is being rebuilt.	SHUTOFF
Reinstalling OS	Intermediate state	A BMS is in this state when its OS is being reinstalled.	SHUTOFF

State	Attribute	Description	API Status
Reinstalling OS failed	Stable state	An exception occurred when the BMS OS was being reinstalled and the reinstallation failed.  A BMS in this state cannot be used. Contact the operation administrator to rectify the fault.	SHUTOFF

# 6 Image

## 6.1 Overview

### What Is an Image?

An image is a template of the BMS running environment. It contains an OS and runtime environment, and some pre-installed applications. An image file is equivalent to a copy file that contains all data in the system disk.

### Image Types

Images can be classified into public images, private images, and shared images.

**Table 6-1** Image types

Image Type	Description
Public image	A public image is provided by the cloud platform and is available to all users. It contains an OS and preinstalled public applications.
Private image	A private image is created by a user and is available only to the user who created it. It contains an OS, pre-installed public applications, and the user's private applications. Using a private image to create BMSs frees you from repeatedly configuring BMSs.
Shared image	A shared image is a private image other users share with you.

### Public Images

Public images are provided by Huawei Cloud. These images are available to all users, compatible with BMSs and most mainstream OSs, and are pre-installed with necessary plug-ins. Public images available to you vary depending on the BMS flavor you selected. For details, see [OSs Supported by Different Types of BMSs](#).



### Characteristics

- OS types: Linux and Windows OSs that are updated and maintained periodically
- Pre-installed software: plug-ins that BMS storage, networks, and basic functions depend on

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**⚠ CAUTION**

These plug-ins are necessary for BMSs to run properly. Do not delete or modify any of them. Otherwise, basic BMS functions will be affected.

---

**Table 6-2** Pre-installed software

Software	Description
Cloud-Init	Cloud-Init is an open-source cloud initialization program, which initializes specific configurations, such as the host name, key, and user data, of a newly created BMS.
bms-network-config	This plug-in is used to automatically configure BMS networks during BMS provisioning and restore the BMS network when the network is interrupted due to faults. The plug-in is stored in the <code>/opt/huawei</code> directory. Do not delete or modify it.
SDI iNIC frontend driver plug-in	This plug-in is installed in the image so that EVS disks can be attached to BMSs. In this way, BMSs can be booted from EVS disks, facilitating quick BMS provisioning.

- Compatibility: compatible with server hardware
- Security: highly stable and licensed
- Restrictions: no restrictions on usage

## Private Images

A private image contains an OS, preinstalled public applications, and a user's private applications. You can use a private image to create BMSs without having to repeatedly configure them.

### Characteristics

- Compatibility: Private images can be used to deploy servers that are of the same model as the source BMS and may fail to deploy servers of other models.
- Functions: You can create and delete private images, as well as create BMSs and reinstall the BMS OS using private images. You can also perform the following operations:
  - [Share images](#) with other tenants.

- [Export images](#) to your OBS bucket.
- Restrictions: You can create a maximum of 50 private images.
- Pricing: You will be charged for storing private images. For more information, see [Pricing Details](#).

## Shared Images

A shared image is a private image other users share with you.

## Application Scenarios

- Deploying software environments in a batch  
Prepare a BMS with an OS, the partition arrangement you prefer, and software installed to create a private image. You can use the image to create batch clones of your custom BMS.
- Backing up a BMS  
Create an image from a BMS to back up the BMS. If the software of the BMS becomes faulty, you can use the image to restore the BMS.

## 6.2 OSs Supported by Different Types of BMSs

The following tables list the 64-bit OSs supported by different BMS types.

- [Table 6-3](#) lists the OSs supported by x86 V4 BMSs with Intel Broadwell CPU.
- [Table 6-4](#) lists the OSs supported by x86 V5 BMSs with Intel Skylake CPU.
- [Table 6-5](#) lists the OSs supported by x86 V6 BMSs with Intel Cascade Lake CPU.

### NOTE

- It is recommended that you use the official OS release versions. Do not tailor or customize the release versions, or problems may occur.
- OS vendors do not always update OS release versions regularly. Some versions are no longer maintained, and these deprecated versions no longer receive security patches. Ensure that you read the update notifications from OS vendors and update your OS so that it runs properly.
- For CentOS 7.4 or earlier, BMS extension NICs cannot be pinged due to known kernel issues. So, you are advised to use CentOS 7.5 or later. For details, see [How Do I Handle the Failure to Ping a CentOS 7 Extension NIC?](#)

**Table 6-3** OSs supported by BMSs with x86 V4 CPU

BMS Type	Windows	CentOS	Red Hat	SUSE	Ubuntu	Oracle Linux	EulerOS
Disk-intensive physical.d 1.large	Windows Server 2012 R2/2016 Standard	CentOS 6.7/6.8/6.9/7.2/7.3/7.4/7.5/7.6	Red Hat 6.7/6.8/6.9/7.2/7.3/7.4/7.5	SUSE Linux Enterprise 11.SP4/12.SP1/12.SP2/12.SP3	Ubuntu 14.04.5 LTS Ubuntu 16.04 LTS	Oracle Linux 6.9/7.4	EulerOS 2.2/2.3
General-purpose physical.s 3.large physical.s 3.xlarge physical.s 3.2xlarge	Windows Server 2012 R2/2016 Standard	CentOS 6.7/6.8/6.9/7.2/7.3/7.4/7.5/7.6	Red Hat 6.7/6.8/6.9/6.10/7.2/7.3/7.4/7.5	SUSE Linux Enterprise 11.SP4/12.SP1/12.SP2/12.SP3	Ubuntu 14.04.5 LTS Ubuntu 16.04 LTS	Oracle Linux 6.9/7.4	EulerOS 2.2/2.3
Memory-optimized physical.m 2.small physical.m 2.medium physical.m 2.large physical.m 2.xlarge	-	CentOS 7.2	-	-	-	-	-
I/O-optimized physical.io 1.large	Windows Server 2012 R2/2016 Standard	CentOS 6.7/6.8/6.9/7.2/7.3/7.4/7.5/7.6	Red Hat 6.7/6.8/6.9/7.2/7.3/7.4/7.5	SUSE Linux Enterprise 11.SP4/12.SP1/12.SP2/12.SP3	Ubuntu 14.04.5 LTS Ubuntu 16.04 LTS	Oracle Linux 6.9/7.4	EulerOS 2.2/2.3

BMS Type	Windows	CentOS	Red Hat	SUSE	Ubuntu	Oracle Linux	EulerOS
GPU-accelerated physical.p1.large physical.p2.large physical.g1.small	-	CentOS 7.4/7.5/7.6	-	-	Ubuntu 16.04 LTS	-	EulerOS 2.3

**Table 6-4** OSs supported by BMSs with x86 V5 CPU

BMS Type	Windows	CentOS	Red Hat	SUSE	Ubuntu	Oracle Linux	EulerOS
Disk-intensive physical.d2.large physical.d2.tiny physical.d2.xmedium	Windows Server 2012 R2/2016 Standard	CentOS 6.7/6.8/6.9/7.2/7.3/7.4/7.5/7.6	Red Hat 6.7/6.8/6.9/7.2/7.3/7.4/7.5	SUSE Linux Enterprise 11.SP4/12.SP1/12.SP2/12.SP3	Ubuntu 14.04.5 LTS Ubuntu 16.04 LTS	Oracle Linux 6.9/7.4	EulerOS 2.3
General-purpose physical.s4.medium physical.s4.large physical.s4.xlarge physical.s4.2xlarge physical.s4.3xlarge	Windows Server 2012 R2/2016 Standard	CentOS 6.9/7.3/7.4/7.5/7.6	Red Hat 6.9/7.3/7.4/7.5	SUSE Linux Enterprise 11.SP4/12.SP2/12.SP3	Ubuntu 14.04.5 LTS Ubuntu 16.04 LTS	Oracle Linux 6.9/7.4	EulerOS 2.3

BMS Type	Windows	CentOS	Red Hat	SUSE	Ubuntu	Oracle Linux	EulerOS
I/O-optimized physical.io 2.xlarge	Windows Server 2012 R2/2016 Standard	CentOS 6.9/7.3/7.4/7.5/7.6	Red Hat 6.9/7.3/7.4/7.5	SUSE Linux Enterprise 11.SP4/12.SP2/12.SP3	Ubuntu 16.04 LTS	Oracle Linux 6.9/7.4	EulerOS 2.3
High-performance computing physical.h 2.large	-	CentOS 6.9/7.3/7.4/7.5/7.6	-	SUSE Linux Enterprise 11.SP4	Ubuntu 16.04 LTS	-	EulerOS 2.3
High-performance computing physical.h c2.xlarge	Windows Server 2012 R2/2016 Standard	CentOS 6.9/7.3/7.4/7.5/7.6	Red Hat 6.9/7.3/7.4/7.5	SUSE Linux Enterprise 11.SP4/12.SP2/12.SP3	Ubuntu 14.04.5 LTS Ubuntu 16.04 LTS	Oracle Linux 6.9/7.4	EulerOS 2.3
GPU-accelerated physical.p 3.large	-	-	-	-	-	-	EulerOS 2.3

**Table 6-5** OSs supported by BMSs with x86 V6 CPU

BMS Type	CentOS	Red Hat	SUSE	Ubuntu	Oracle Linux	EulerOS
General-purpose physical.c6s.3xlarge physical.c6sd.3xlarge physical.c6sd.6xlarge	CentOS 7.6/7.8/7.9/8.2	Red Hat 7.6	SUSE Linux Enterprise 15.SP2	Ubuntu 18.04.3 LTS	Oracle Linux 7.6	EulerOS 2.5

# 7 EVS Disk

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## What Is Elastic Volume Service (EVS)?

EVS offers scalable block storage for BMSs. EVS disks feature high reliability, high performance, and rich specifications, and are ideal for distributed file systems, development and test environments, data warehouse applications, and high-performance computing (HPC) scenarios.

Unlike traditional servers that can only use local disks, BMSs can use EVS disks that are not constrained by capacity. Shared EVS disks allow concurrent reads and writes by multiple BMSs, enabling you to deploy core applications in clusters.

## EVS Disk Types

BMSs support the following types of EVS disks:

- **Common I/O (previous generation):** This EVS disk type delivers a maximum of 2200 IOPS. It is ideal for application scenarios that require large capacity, medium read/write speed, and fewer transactions, such as enterprise applications and small-scale testing.
- **High I/O:** This EVS disk type delivers a maximum of 5,000 IOPS and a minimum of 1 ms read/write latency. It is designed to meet the needs of mainstream high-performance, high-reliability application scenarios, such as enterprise applications, large-scale development and testing, and web server logs.
- **Ultra-high I/O:** This EVS disk type delivers a maximum of 33,000 IOPS and a minimum of 1 ms read/write latency. It is excellent for ultra-high I/O, ultra-high bandwidth, and read/write-intensive application scenarios, such as distributed file systems in HPC or NoSQL/RDS in I/O-intensive scenarios.
- **General purpose SSD:** This EVS disk type delivers a maximum of 20,000 IOPS and a minimum of 1 ms read/write latency. It is designed to meet the needs of mainstream high-performance, low-latency, interactive application scenarios, such as enterprise office applications, large-scale development and testing, transcoding, web server logs, and containers.
- **Extreme SSD:** This EVS disk type delivers up to 128,000 IOPS and sub-millisecond read latencies. With RDMA integrated with low-latency congestion control algorithms, this disk type is suitable for application scenarios that require ultra-high bandwidth and ultra-low latency.

## EVS Disk Performance

The key indicators of EVS disk performance include read/write latency, IOPS, and throughput.

- IOPS: number of read/write operations performed by an EVS disk per second
- Throughput: amount of data successfully transmitted by an EVS disk per second, that is, the amount of data read from and written into an EVS disk
- Read/write latency: minimum interval between two consecutive read/write operations of an EVS disk

For more details, see [Disk Types and Performance](#).

## EVS Disk Device Types

BMS supports only Small Computer System Interface (SCSI) EVS disks.

On the management console, you can create EVS disks with **Device Type** set to **SCSI**. The EVS disks support transparent SCSI command transmission, allowing BMS OSs to directly access underlying storage media. The EVS disks support basic read/write SCSI commands and advanced SCSI commands.

### NOTE

BMS public image OSs are preinstalled with the driver required to use SCSI disks, so you do not need to install the driver. To know how to install the driver, see [Installing the SDI Card Driver](#) in *Bare Metal Server Private Image Creation Guide*.

# 8 Network

BMS network types include:

- VPC

**Table 8-1** BMS network types

Network	Network Feature	x86 V4 BMS	x86 V5 BMS	x86 V6 BMS	Kunpeng BMS
VPC	Supported	Yes	Yes	Yes	Yes
	Bandwidth	10 GE	10 GE	40 GE	40 GE
	Number of NICs	2	2	32	32

## VPC

A VPC is a logically isolated, configurable, and manageable virtual network. It helps improve the security of cloud resources and simplifies network deployment. You can create security groups and VPNs, configure IP address ranges, and specify bandwidth sizes in your VPC. With a VPC, you can easily manage and configure internal networks and change network configurations. You can also customize access rules to control BMS access within a security group and across different security groups to enhance BMS security.

For more information, see [Virtual Private Cloud Service Overview](#).



# 9 Security

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## 9.1 License Type

### Use License from the System

You can use OS licenses provided by the cloud platform. You need to pay for the licenses which are billed on a pay-as-you-go basis. The licenses are managed by the cloud platform.

### Bring Your Own License (BYOL)

#### What Is BYOL?

Bring Your Own License (BYOL) allows you to use your own OS licenses. You do not need to pay for the licenses but need to manage them by yourself.

#### How Can I Use BYOL?

If you choose BYOL, you need to manage licenses by yourself. The cloud platform provides functions you need for maintaining license compliance during the lifecycle of your license.

#### Application Scenarios

You can choose BYOL when you create a BMS.

The system will not allow you to change the license type after you create the BMS or when you reinstall its OS.

## 9.2 Identity Authentication and Access Control

Identity and Access Management (IAM) provides functions such as user identity authentication, permission assignment, and access control. You can use IAM to securely control user access to your BMSs. IAM permissions define which actions on your cloud resources are allowed or denied. After creating an IAM user, add it to a user group and grant the permissions required by BMS to the user group. Then, all users in this group will be automatically granted with these permissions.

## Account Security

If you are an enterprise administrator, you can use IAM to create a user and grant permissions to the user. Enterprise employees can use the user account to access the system, and you do not need to share your account password or key pair with them. This helps you manage resources efficiently. You can also configure account security policies to protect these user accounts and reduce security risks for your enterprise information.

## Fine-Grained Authorization

You can grant refined permissions to employee accounts to ensure that cloud services are properly used.

## Security Group

A security group is a virtual firewall that detects status and filters data packets. It is an important network isolation method used for access control of ECSs, BMSs, load balancers, and databases.

You can configure security group rules to allow instances in a security group to access the public or private network.

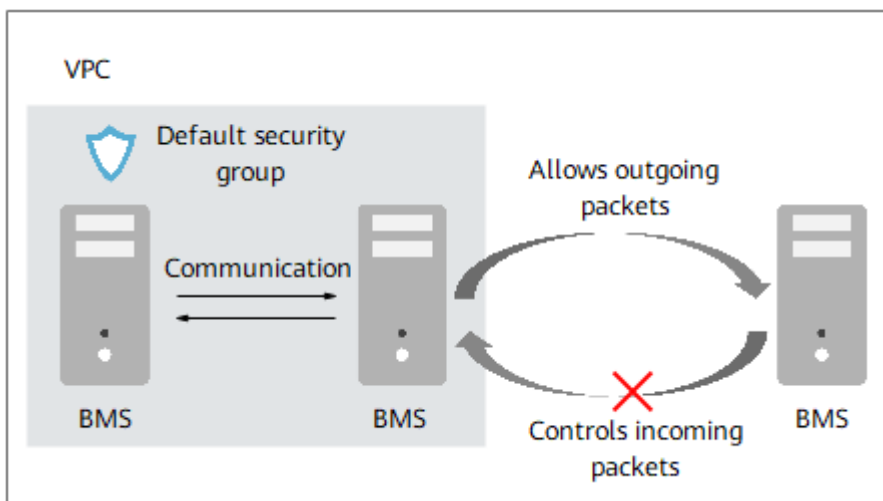
- A security group is a logical group. You can add BMSs that have the same security protection requirements within a region to the same security group.
- By default, BMSs in the same security group can communicate with each other through an internal network, whereas BMSs in different security groups cannot.
- You can modify a security group rule at any time, and the modification takes effect immediately.

## Default Security Group

When you create a BMS in a region, the system will create a default security group if there is no security group in the region.

The default security group rule allows all outgoing data packets and blocks incoming data packets. BMSs in this security group can access each other already. You do not need to add additional rules.

**Figure 9-1** Default security group



**Table 9-1** describes the rules of the default security group.

**Table 9-1** Rules in the default security group

Direction	Protocol	Port/Range	Source/Destination	Description
Outbound	All	All	Destination: 0.0.0.0/0	Allows all outbound traffic.
Inbound	All	All	Source: the current security group (for example, sg-xxxxx)	Allows communications among s within the security group and denies all inbound traffic (incoming data packets).
Inbound	TCP	22	Source: 0.0.0.0/0	Allows all IP addresses to access Linux s over SSH.

For more information, see [Security Group Overview](#).

## Key Pair Authentication

- What is a key pair?

A key pair, or SSH key pair, is an authentication method used when you remotely log in to Linux instances. A key pair is generated using an encryption algorithm. It contains a public key, and a private key reserved for you. The public key is used to encrypt data (for example, a password), and the private key is used to decrypt the data.


Huawei Cloud stores the public key, and you need to store the private key. Do not share your private key with anyone. Keep your private key secure.

- Advantages

A key pair is more secure and easier to use than username/password in authentication.

**Table 9-2** Comparison between the key pair and username/password

Item	Key pair	Username and Password
Security	<ul style="list-style-type: none"><li>• More secure than username/password and free from brute-force attacks</li><li>• Cannot be derived from the public key</li></ul>	Less secure
Easy to use	Simultaneous login to a large number of Linux instances, simplifying management	Login to only one Linux instance at one time, giving no chance of batch maintenance

- Constraints
    - Only Linux instances support the key pair method.
    - Only RSA key pairs are supported. RSA keys are typically 1024, 2048, or 4096 bits long.
    - A Linux instance can have only one key pair. If a key pair has been bound to your BMS and you bind a new key pair to the BMS, the new key pair will replace the original one.
  - Generation
    - Create a key pair on the management console.
-  **NOTE**
- When a key pair is generated, download and properly keep it.
- Use PuTTYgen to create a key pair and import the key pair into Huawei Cloud.

## Helpful Links

[Using an SSH Key Pair](#)

## 9.3 Data Protection

BMS takes different measures to ensure data security and reliability.

- BMSs offer physical server-level performance and isolation. They provide dedicated computing resources without any loss due to virtualization. Such BMSs can ensure the security of data stored on them.
- If a BMS uses local disks, RAID can be used to improve fault tolerance and ensure data security.
- You can boot BMSs without local disks from Elastic Volume Service (EVS) disks and provision the BMSs within minutes. Cloud Server Backup Service

(CSBS) provides the backup service for BMSs. It works based on the consistent snapshot technology for EVS disks. With CSBS, you can use backup data to restore BMS, ensuring data security and correctness.

# 10 Billing

## 10.1 Billing

### Billing Items

The billing items include BMS, EVS disk (optional), and EIP (optional). For details, see [Table 10-1](#).

**Table 10-1** BMS billing

Billing Item	Description
BMS	Pricing for the BMS is based on the specifications you choose, including CPU, memory, local disks, and extended configurations. For details, see <a href="#">BMS Pricing Details</a> .
(Optional) EVS disk	EVS disks that you create when you create a BMS are billed in the same manner as the BMS, but those you later attached to a BMS are billed independently (pay-per-use or yearly/monthly). For details, see <a href="#">EVS Pricing Details</a> .
(Optional) EIP	You can bind an EIP to a BMS and pay for the EIP by bandwidth or traffic. For details, see <a href="#">EIP Pricing Details</a> .

### Billing Modes

BMSs are billed on a yearly/monthly basis and cannot be billed on a pay-per-use basis. You can buy 10 months and get two free. If you intend to use BMSs for a long term, you can save more by specifying a longer duration.

### Billing Involved in Specifications Changes

If you require additional storage space, you can either expand the capacity of EVS disks that are attached to a BMS or attach more EVS disks to the BMS. The

additional storage space will be billed on a pay-per-use or yearly/monthly basis depending on the billing modes you specified for the EVS disks.

## FAQ

- [Where Can I Query the BMS Price?](#)
- [What Are Pre-payment and Post-payment? How Do I Choose Between Them?](#)
- [What Is the Impact on Billing if I Unsubscribe from a BMS?](#)
- [How Do I Set Automatic Renewal for BMSs Billed on a Yearly/Monthly Basis?](#)
- [When Will a BMS Be Released After It Expires?](#)

# 11 Region and AZ

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## Concept

A region and availability zone (AZ) identify the location of a data center. You can create resources in a specific region and AZ.

- Regions are divided based on geographical location and network latency. Public services, such as Elastic Cloud Server (ECS), Elastic Volume Service (EVS), Object Storage Service (OBS), Virtual Private Cloud (VPC), Elastic IP (EIP), and Image Management Service (IMS), are shared within the same region. Regions are classified into universal regions and dedicated regions. A universal region provides universal cloud services for common tenants. A dedicated region provides specific services for specific tenants.
- An AZ contains one or more physical data centers. Each AZ has independent cooling, fire extinguishing, moisture-proof, and electricity facilities. Within an AZ, computing, network, storage, and other resources are logically divided into multiple clusters. to support high-availability systems.

## Selecting a Region

If your target users are in Europe, select the **EU-Dublin** region.

## Selecting an AZ

When deploying resources, consider your applications' requirements on disaster recovery (DR) and network latency.

- For high DR capability, deploy resources in different AZs within the same region.
- For lower network latency, deploy resources in the same AZ.



# 12 Related Services

## Relationships Between BMS and Other Services

**Table 12-1** Relationships between BMS and other services

Service	Relationship	Main Interactions/ Best Practices
Image Management Service (IMS)	You can quickly create BMSs using images. You can also create private images using BMSs and share them with other users.	<ul style="list-style-type: none"> <li>• <a href="#">Creating a BMS Using a Private Image</a></li> <li>• <a href="#">Creating a Private Image from a BMS</a></li> <li>• <a href="#">Creating a Private Image from an External Image File</a></li> </ul>
Virtual Private Cloud (VPC)	You can configure a logically isolated network for your BMSs and configure security groups, VPN, IP address segments, and bandwidth. With a VPC, you can easily manage and configure internal networks and change network configurations. You can also customize access rules to control BMS access within a security group and across different security groups to enhance BMS security.	<ul style="list-style-type: none"> <li>• <a href="#">Adding Security Group Rules</a></li> <li>• <a href="#">Binding an EIP</a></li> </ul>
Dedicated Cloud (DeC)	Resources in a DeC are physically isolated from those in public resource pools. If your services have high security compliance requirements, you can create BMSs in a DeC.	<ul style="list-style-type: none"> <li>• <a href="#">Creating a Dedicated BMS</a></li> </ul>

Service	Relationship	Main Interactions/ Best Practices
Elastic Volume Service (EVS)	You can attach EVS disks to a BMS and expand their capacity at any time.	<ul style="list-style-type: none"> <li>● <a href="#">Attaching Data Disks</a></li> <li>● <a href="#">Initializing Data Disks</a></li> <li>● <a href="#">Detaching Data Disks</a></li> <li>● <a href="#">Expanding Disk Capacity</a></li> </ul>
Dedicated Distributed Storage Service (DSS)	DSS provides you with dedicated, physical storage resources. DSS features data redundancy and cache acceleration and provides highly reliable, durable, low-latency, and stable storage resources. It provides enterprise-class performance in a wide range of scenarios, such as HPC, OLAP, and a mix of loads.	<ul style="list-style-type: none"> <li>● <a href="#">Disk Types</a></li> </ul>
Cloud Eye	After you obtain a BMS and install and configure Agent on the BMS, you can view the monitoring data of the BMS in Cloud Eye.	<ul style="list-style-type: none"> <li>● <a href="#">Server Monitoring Overview</a></li> <li>● <a href="#">Supported Monitoring Metrics (with Agent Installed)</a></li> </ul>
Tag Management Service (TMS)	You can tag BMSs to classify and search them more easily.	<ul style="list-style-type: none"> <li>● <a href="#">Adding Tags</a></li> <li>● <a href="#">Searching for Resources by Tag</a></li> <li>● <a href="#">Deleting Tags</a></li> </ul>

# 13 Features and Constraints

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## Features

### BMS

- Automatic BMS provisioning and remote login to BMSs through the management console
- Managing the lifecycle of a BMS, including querying, starting, stopping, restarting, and deleting a BMS
- Reinstalling the OS
- Rebuilding a BMS if the BMS hardware or SDI iNIC is damaged
- Using Cloud Server Backup Service (CSBS) to back up BMS configurations and EVS disk data into Object Storage Service (OBS) buckets for data security
- Injecting scripts to simplify BMS configuration and initialization
- Installation of Cloudera's Distribution Including Apache Hadoop (CDH) on BMSs, which enables communication with other services you have purchased
- Using APIs to manage BMSs
- Server monitoring, with which you can obtain the CPU, memory, and disk I/O metrics of your BMSs
- Tagging BMSs to make them easier to identify and search

### Disk

- Attaching EVS disks to or detaching EVS disks from Linux or Windows BMSs
- Shared EVS disks
- Dynamic capacity expansion of EVS disks

### Image

- Using a public, private, or shared image to create BMSs
- Creating a private image from a BMS
- Creating a private image from an external image file
- Sharing images and exporting images to an OBS bucket

### Network

- VPC
- Creating a security group and defining rules to protect BMS security
- Binding an EIP to a BMS to enable the BMS to access the Internet
- Attaching multiple NICs to a BMS

## Constraints

- External hardware devices (such as USB devices, bank USB keys, external hard disks, and dongles) cannot be loaded.
- Out-of-band management is not supported. Your BMSs are managed and maintained by Huawei Cloud.
- Live migration is not supported. If a BMS is faulty, your services running on it may be affected. It is good practice to deploy your services in a cluster or in primary/standby mode to ensure high availability.
- You cannot create a server without an OS, that is, a BMS must have an OS.
- After a BMS is created, you cannot change its VPC.
- Virtualization software cannot be installed on a BMS.
- When you create a BMS, you can only select a flavor with specified CPU, memory, and local disks but cannot configure them separately. After a BMS is created, you can expand the capacity of attached EVS disks but cannot modify the BMS CPU, memory, or local disks.
- You can only attach EVS disks whose device type is **SCSI** to a BMS.
- You cannot attach EVS disks to BMSs of certain flavors or BMSs created from certain images because these BMSs do not have SDI iNICs or lack compatibility.
- Do not delete or modify built-in plug-ins of an image, such as Cloud-Init and bms-network-config. Otherwise, basic BMS functions may be unavailable.
- If you choose to assign an IP address automatically when you create a BMS, do not change the private IP address of the BMS after the BMS is provisioned. Otherwise, the IP address may conflict with that of another BMS.
- BMSs do not support bridge NICs because they will cause network interruptions.
- Do not upgrade the OS kernel. Otherwise, the hardware driver may become incompatible with the BMS and adversely affect the BMS reliability.
- You can stop a BMS only on the management console and cannot run **shutdown** to stop it.
- Quotas are enforced for service resources on the platform to prevent unforeseen spikes in resource usage. The BMS service has no independent quota. It shares the number of instances, CPU cores, and memory with the ECS service. You can view BMS quota in the **Elastic Cloud Server** row. For details see [How Do I View My Quotas?](#)

# 14 Change History

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Released On	Description
2022-09-30	This issue is the first official release.