Storage Services - Elastic Volume Service

Foreword

- This course introduces HUAWEI CLOUD Elastic Volume Service (EVS).

Objectives

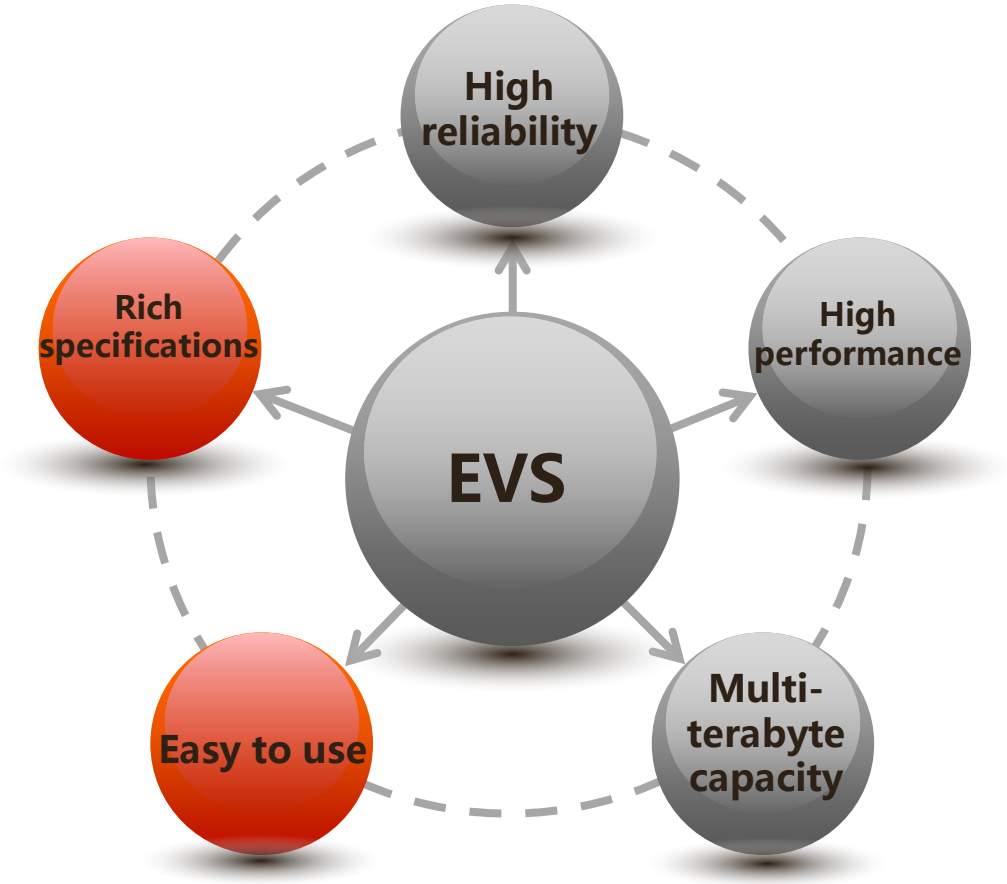
- Upon completion of this course, you will be able to:
  - Describes HUAWEI CLOUD EVS.
  - Understand the concepts, functions, and application scenarios of EVS.
  - Understand how to create and manage EVS disks.
  - Understand how to troubleshoot EVS frequently asked questions (FAQs).

Contents

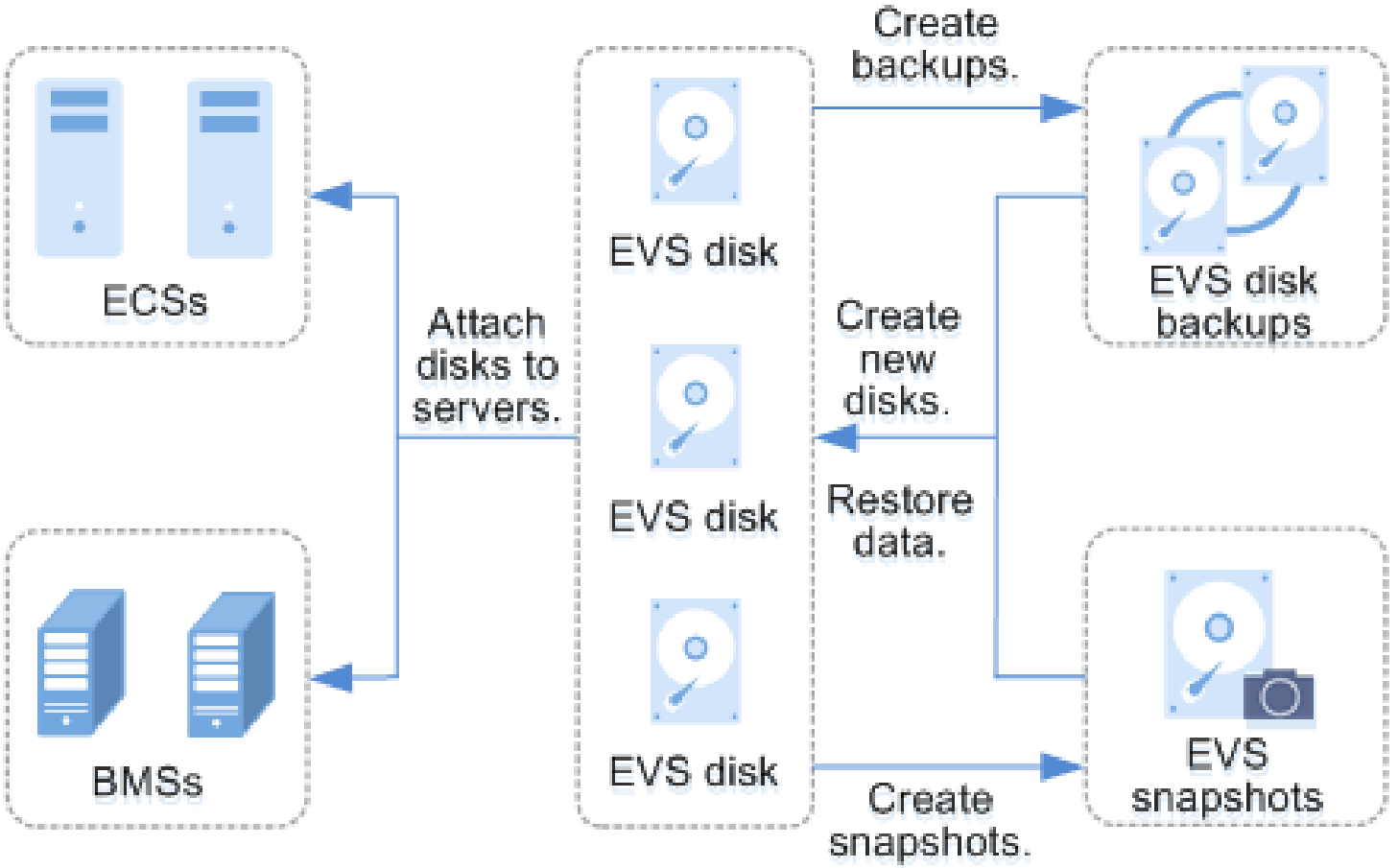
Concepts

- EVS offers scalable block storage for cloud servers. With high reliability, high performance, and rich specifications, EVS disks can be used for distributed file systems, development and test environments, data warehouse applications, and high-performance computing (HPC) scenarios to meet diverse service requirements.
- You can create EVS disks and attach them to servers. The method for using EVS disks is the same as that for using traditional disks on physical servers.

Product Advantages



Product Architecture



Functions

EVS provides storage resources for servers.

- Create disks.
- Attach disks to servers.
- Detach disks.
- Expand disk capacities.
- Create backups for disks.
- Create snapshots.
- Delete disks.
- Query disks.

Application Scenarios

Disk Type	IOPS per GB/EVS disk	Max. IOPS/EVS disk	Typical Application Scenario
Common I/O	2	2,200	Suitable for scenarios that feature few transactions and require large capacity and normal read/write speed. For example, office applications or small-scale test environments.
High I/O	6	5,000	Suitable for mainstream scenarios that require high performance and high reliability. For example, large-scale development and test environments, web server logs, and enterprise applications. Typical enterprise applications include SAP, Microsoft Exchange, and Microsoft SharePoint.
Ultra-high I/O	20	33,000	Suitable for read/write-intensive applications that require ultra-high I/O and throughput, such as distributed file systems used in the HPC scenarios or NoSQL and relational databases used in I/O-intensive scenarios. Typical databases include MongoDB, Oracle, SQL Server, MySQL, and PostgreSQL.

Billing

- EVS disks are billed based on factors, including capacity, type, and usage duration. You can pay for EVS disks in yearly/monthly or pay-per-use billing mode.
- EVS disk types are classified as common I/O, high I/O, and ultra-high I/O based on I/O performance and differ in performance and price.

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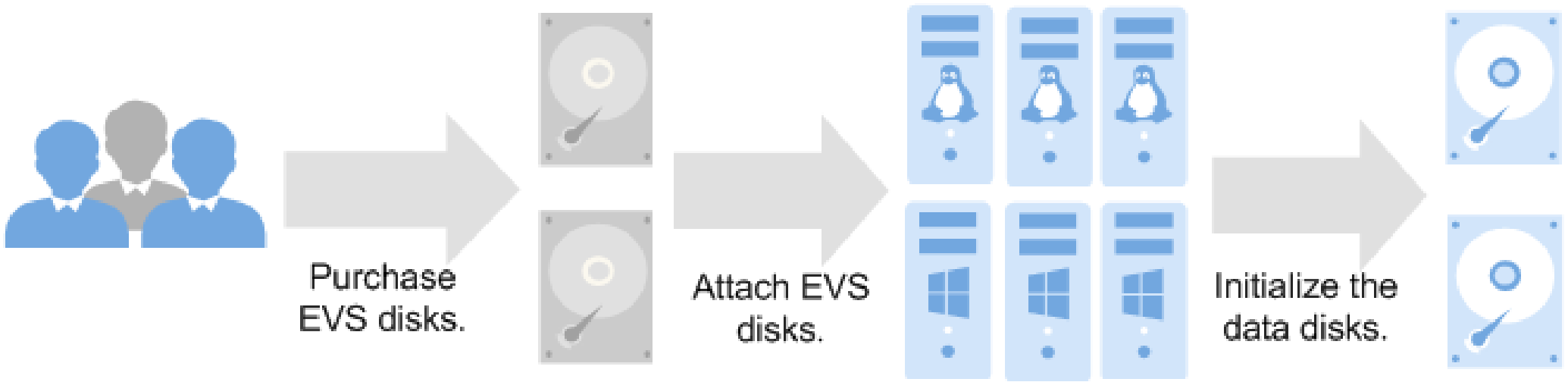
Operation Procedure



Key Purchasing Parameters

Parameter	Mandatory	Description
Billing Mode	Mandatory	Pay-per-use or yearly/monthly
AZ	Mandatory	Availability zone (AZ) where the disk belongs
Disk Type	Mandatory	Disk types are classified as common I/O, high I/O, and ultra-high I/O by I/O performance.
Capacity (GB)	Mandatory	Data disk: 10 GB to 32768 GB
Create from backup	Optional	The disk will be created from a backup.
Create from snapshot	Optional	The disk will be created from a snapshot.
Share	Optional	A shared disk can be attached to multiple servers for use.
SCSI	Optional	SCSI EVS disks allow the server OS to directly access the underlying storage media and send SCSI commands to the disks.
Encryption	Optional	Disk encryption is used for data disk encryption only.
Auto Backup	Optional	Data on the disks can be backed up according to the backup policy.
Tag	Optional	Tags can be created during disk creation to identify cloud resources for purposes of easy categorization and quick search.
Disk Name	Optional	volume-0001
Quantity	Mandatory	-

Disk Type

Disk Type	IOPS per GB/EVS disk	Max. IOPS/EVS disk	Max. Throughput
Common I/O	2	2,200	90 MB/s
High I/O	6	5,000	150 MB/s
Ultra-high I/O	50	33,000	350 MB/s

Device Type

- VBD is the default disk device type. VBD EVS disks support only basic SCSI read/write commands.
- SCSI EVS disks support transparent SCSI command transmission and allow the server OS to directly access the underlying storage media. Besides basic read/write SCSI commands, SCSI EVS disks also support advanced SCSI commands.
  - SCSI EVS disks: BMSs support only SCSI EVS disks, which can be used as either system disks or data disks.
  - Shared SCSI EVS disks: Shared SCSI EVS disks must be used together with a distributed file system or cluster software. Because most cluster applications, such as Windows MSCS, Veritas VCS, and Veritas CFS, require the usage of SCSI reservations, you are advised to use shared EVS disks with SCSI.

Disk Status

Status	Description	Status	Description
In-use	The EVS disk is attached to a server and is in use.	Downloading	Data is being downloaded from an image to the EVS disk. This status occurs when you create a server.
Available	The EVS disk is successfully created and has not been attached to any server.	Error	An error occurs when you try to create an EVS disk.
Creating	The EVS disk is being created.	Deletion Failed	An error occurs when you try to delete an EVS disk.
Attaching	The EVS disk is being attached.	Expansion failed	An error occurs when you try to expand the capacity of an EVS disk.
Detaching	The EVS disk is being detached.	Restoration failed	An error occurs when you try to restore an EVS disk from a backup.
Deleting	The EVS disk is being deleted.	Rolling back	Data on the EVS disk is being restored from a snapshot.
Restoring	A VBS backup is being used to restore the EVS disk.	Rollback failed	An error occurs when an EVS disk is being rolled back from a snapshot.
Expanding	The capacity of the EVS disk is being expanded.	Awaiting transfer	An EVS disk is awaiting for a transfer.
Uploading	Data on the EVS disk is being uploaded to an image. This status occurs when you create an image from a server.	-	-

Disk Status Changes

- Create a disk: Creating → Available (if the creation succeeded) or Error (if the creation failed)
- Attach a disk: Available → Attaching → In-use (if the attachment succeeded)
- Detach a disk: In-use → Detaching → Available (if the detachment succeeded)
- Expand the capacity of an Available disk: Available → Expanding → Available (if the expansion succeeded) or Expansion failed (if the expansion failed)
- Expand the capacity of an In-use disk: In-use → Expanding → In-use (if the expansion succeeded) or Expansion failed (if the expansion failed)
- Delete a disk: Available, Expansion failed, Error, Restoration failed, or Rollback failed → Deleting → No longer displayed (if the deletion succeeded) or Deletion failed (if the deletion failed)
- Restore data from a backup: Available → Restoring → Available (if the restoration succeeded) or Restoration failed (if the restoration failed)
- Roll back data from a snapshot: Available or Rollback failed → Rolling back → Available (if the rollback succeeded) or Rollback failed (if the rollback failed)
- Transfer a disk: Available → Awaiting transfer → Available (if the transfer succeeded)

Contents

Common Functions

- Attachment
- Detachment
- Deletion
- Capacity Expansion
- Backup
- Snapshot

Attachment

- EVS disks cannot be used independently. You must attach EVS disks to servers, and the disks can be used as data disks.
  - A system disk is automatically added during server creation, and you do not need to manually attach the system disk.
  - Data disks can be created during or after server creation. If you create data disks during server creation, the disks will be automatically attached to the server. If you create data disks after server creation, you need to manually attach the disks to the server.
- Number of servers that a data disk can be attached to:
  - A non-shared data disk: 1
  - A shared data disk: 16
- Disk attachment process:

  Available → Attaching → In-use (if the attachment succeeded)

Detachment

- **If an EVS disk is attached to a server, the disk status is In-use. In this case, if the operations you need to perform require the disk to be in the Available state, detach the disk from the server. Such operations include data rollback from a snapshot.**
  - Before detaching a system disk, ensure that the server using this system disk is in the **Stopped** state. That said, the server must be stopped when detaching its system disk.
  - A data disk can be detached when the server is in either **Stopped** or **Running** state.
- Disk detachment process:
  - In-use → Detaching → Available (if the detachment succeeded)

Deletion

- If an EVS disk is no longer used, you can delete it to release virtual resources. After a disk was deleted, it will no longer be charged.
  - Before deleting an EVS disk, ensure that the disk status is **Available**, **Error**, **Expansion failed**, **Restoration failed**, or **Rollback failed**.
  - Before you delete a shared disk, ensure that the disk has been detached from all its servers.
  - When you delete an EVS disk, all the disk data including the snapshots created for this disk will be deleted. Exercise caution when performing this operation.
- Disk detachment process:

  Available, Expansion failed, Error, Restoration failed, or Rollback failed → Deleting → No longer displayed (if the deletion succeeded) or Deletion failed (if the deletion failed)

Capacity Expansion

- When the storage space of an EVS disk is insufficient, you can handle the insufficiency in either of the following ways:
  - Create a new disk and attach it to a server.
  - Expand the capacity of an existing disk. The capacities of both system disks and data disks can be expanded.
- You can expand the disk capacities when the disks are in the **In-use** or **Available** state.
  - Expanding an **In-use** disk means that the to-be-expanded disk has been attached to a server.
  - Expanding an **Available** disk means that the to-be-expanded disk has not been attached to any server.
- Capacity expansion process (Available disks):

  Available → Expanding → Available (if the expansion succeeded) or Expansion failed (if the expansion failed)
- Capacity expansion process (In-use disks):

  In-use→ Expanding → In-use (if the expansion succeeded) or Expansion failed (if the expansion failed)

Backup

- EVS disk backups are created using the Volume Back Service (VBS) service.
  - Backups can be created for EVS disks only when the disks are in the **Available** or **In-use** state.
  - With backup policies configured, data on EVS disks can be periodically backed up to improve data security.
  - When data on an EVS disk is lost, you can restore the disk data from the backup.
- Process of data restoration from a backup:

  Available → Restoring → Available (if the restoration succeeded) or Restoration failed (if the restoration failed)

Snapshot

- You can create EVS snapshots to save the disk data at specific time points.
- If a snapshot is no longer used, you can delete it to release virtual resources.
- You can create EVS disks from snapshots.
- If the data on an EVS disk is incorrect or damaged, you can roll back the data from a snapshot to the source disk to restore data.
  - You can only roll back the snapshot to its source EVS disk. A rollback to another EVS disk is not possible.
  - A snapshot can be rolled back only when the snapshot status is **Available** and the sourc e EVS disk status is **Available** (not attached to any server) or **Rollback failed**.
- Process of data rollback from a snapshot:

  Available or Rollback failed → Rolling back → Available (if the rollback succeeded) or Rollb ack failed (if the rollback failed)

Contents

FAQs

- **Can I attach an EVS disk to multiple servers?**
  - No. An EVS disk can be attached to only one server.
  - A shared EVS disk can be attached to a maximum of 16 servers.
- **Will data in the EVS disk be lost after the disk is detached?**

  If the CMK used to encrypt the disk is available, you can detach the encrypted disk, and data will not be lost.
- **Why I cannot view the attached EVS disk on the server?**

  After attaching the disk to the server on the management console, the disk cannot be used. You need to initialize the disk first and then view and use the disk on the server.

Contents

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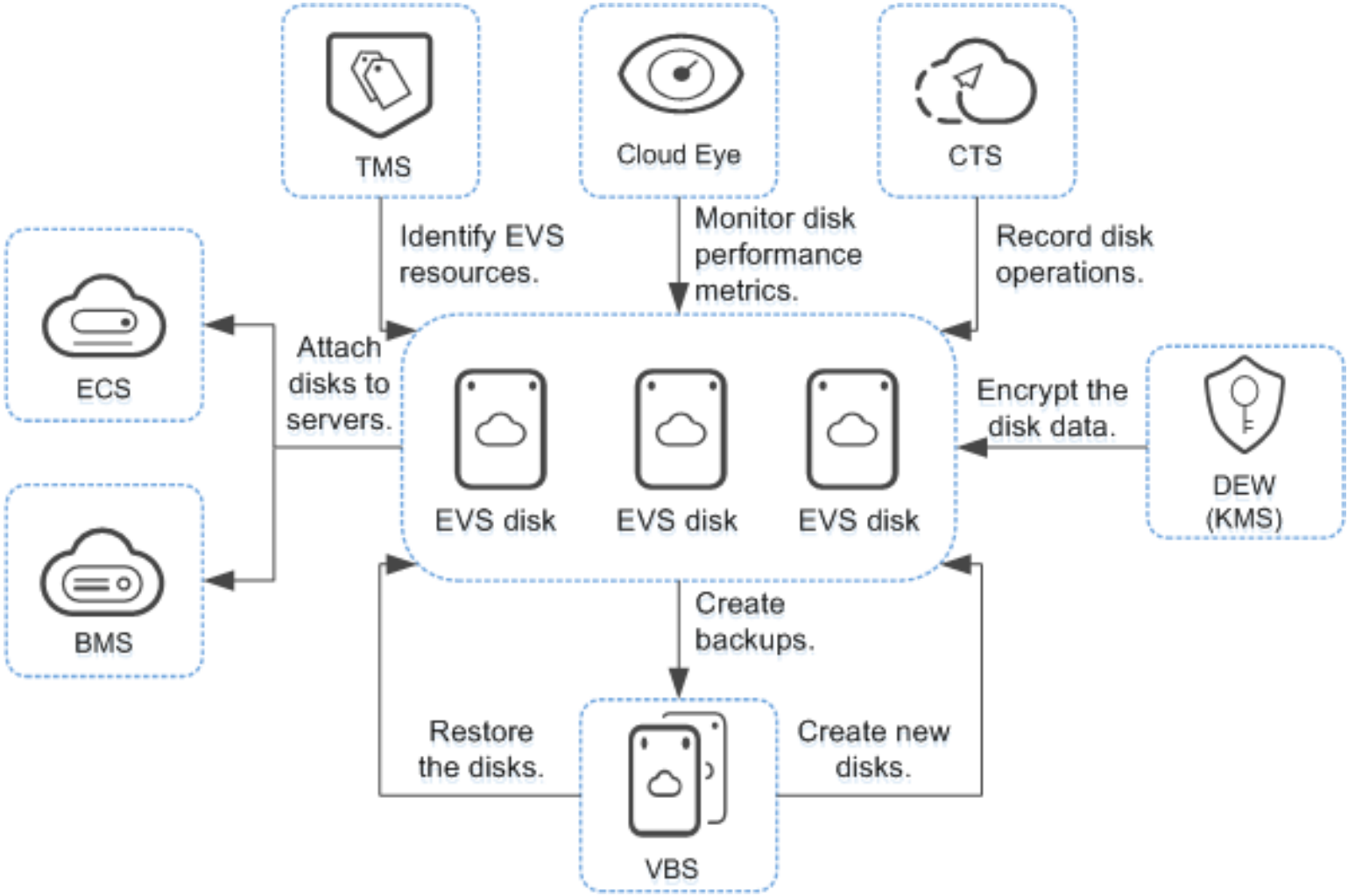
Related Services

- Elastic Cloud Server (ECS)
- Bare Metal Server (BMS)
- Volume Backup Service (VBS)
- Data Encryption Workshop (DEW)
- Cloud Eye
- Cloud Trace Service (CTS)
- Tag Management Service (TMS)

Related Services (Diagram)



Quiz

1. Which of the followings are EVS disk types? (multiple-answer question)

   A. Ultra-high I/O

   B. High I/O

   C. Common I/O

   D. Optimized I/O

2. How many servers can a shared EVS disk be attached to at most? (single-choice questions)

   A. 5

   B. 7

   C. 8

   D. 16

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   A. 5

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   C. 8

   D. 16

Quiz

1. Briefly describes the methods that can be used to restore data on EVS disks.
   - Restore disk data from backups.
   - Restore disk data from snapshots.

Summary

- Describes HUAWEI CLOUD EVS.
- Introduces the concepts, functions, and application scenarios of EVS.
- Introduces how to create and manage EVS disks.

More Information

- For more information, visit at:
- https://support-intl.huaweicloud.com/evs/index.html

Recommendations

- Huawei learning website
  - http://support.huawei.com/learning/en/newindex.html
- Huawei support cases
  - http://support.huawei.com/enterprise/servicecenter?lang=en

Acronyms

Acronym	Full Name	Description
IOPS	Input/Output Operations Per Second	Number of operations performed per second
VBD	Virtual Block Device	Virtual block storage device
SCSI	Small Computer System Interface	Small computer system interface


Thank You
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