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Hybrid Backup Product Introduction

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Document conventions

Style	Description	Example
 Danger	A danger notice indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	 Danger: Resetting will result in the loss of user configuration data.
 Warning	A warning notice indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	 Warning: Restarting will cause business interruption. About 10 minutes are required to restart an instance.
 Notice	A caution notice indicates warning information, supplementary instructions, and other content that the user must understand.	 Notice: If the weight is set to 0, the server no longer receives new requests.
 Note	A note indicates supplemental instructions, best practices, tips, and other content.	 Note: You can use Ctrl + A to select all files.
>	Closing angle brackets are used to indicate a multi-level menu cascade.	Click Settings> Network> Set network type .
Bold	Bold formatting is used for buttons, menus, page names, and other UI elements.	Click OK .
Courier font	Courier font is used for commands	Run the <code>cd /d C:/window</code> command to enter the Windows system folder.
<i>Italic</i>	Italic formatting is used for parameters and variables.	<code>bae log list --instanceid</code> <i>Instance_ID</i>
[] or [a b]	This format is used for an optional value, where only one item can be selected.	<code>ipconfig [-all -t]</code>
{ } or {a b}	This format is used for a required value, where only one item can be selected.	<code>switch {active stand}</code>

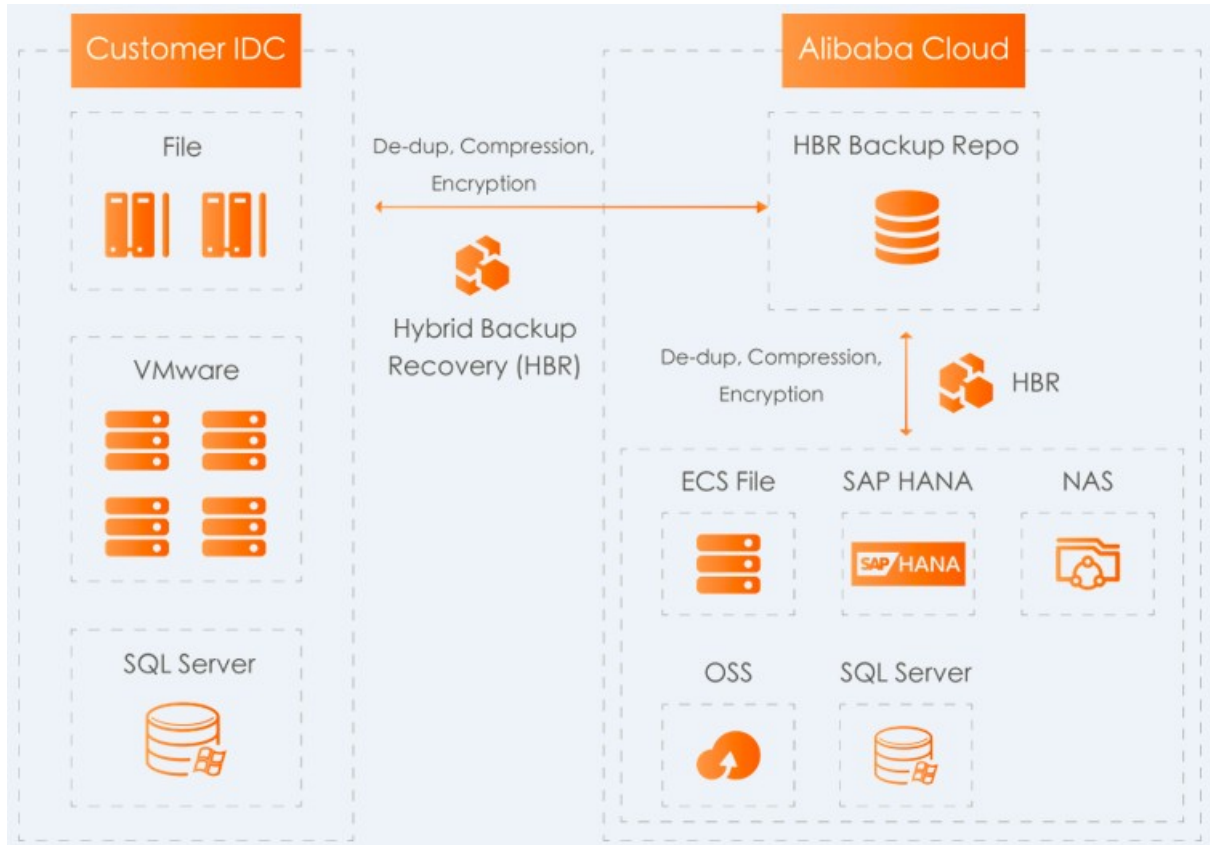
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1. What is Hybrid Backup Recovery?

Hybrid Backup Recovery (HBR) is a fully managed online backup service that allows you to back up data to the cloud in an efficient, secure, and cost-effective way. You can use HBR to back up data from local Internet data centers (IDCs), branches, or cloud resources to a cloud vault.

Architecture



After an HBR client is deployed in a local IDC, you can use an Express Connect circuit, a virtual private network (VPN) gateway, or the Internet to back up data from specified local files, Network Attached Storage (NAS) files, VMware virtual machines, and SQL Server databases to a backup vault on Alibaba Cloud. Based on the high-level encryption and efficient deduplication and compression technologies, HBR guarantees the efficiency and security of data transmission.

In addition, HBR provides easy-to-use native data protection for data that comes from various sources on Alibaba Cloud, including files on Elastic Compute Service (ECS) instances, SQL Server and SAP HANA deployed on ECS instances, Apsara File Storage NAS, and Object Storage Service (OSS).

Benefits

The following table lists the advantages of HBR over an on-premises backup system that is built in a local IDC or on the cloud.

Item	On-premises backup system	HBR
------	---------------------------	-----

Item	On-premises backup system	HBR
Permission management	<p>Not supported.</p> <p>No strict permission management is available, and therefore misoperation may easily occur. For example, you may incorrectly delete data.</p>	<p>Supported.</p> <p>HBR uses Resource Access Management (RAM) to grant different permissions to different roles and allow each role to access only authorized resources.</p>
Deduplication and compression	<p>Not supported.</p> <p>Duplicate backup data increases storage costs and lowers the backup speed.</p>	<p>Supported.</p> <p>Using deduplication and compression technologies that are developed by Alibaba Cloud, HBR can effectively reduce the amount of transmitted data and occupied storage. This raises the backup speed and reduces costs.</p>
Backup alerting	<p>Not supported.</p> <p>You need to manually track backup processes to detect backup failures. Otherwise, you may find backup failures only when you attempt to restore data from backups.</p>	<p>Supported.</p> <p>HBR provides the backup alerting feature to send alert notifications to specified contacts when a backup fails or a client is disconnected from a server.</p>
Lifecycle management	<p>You need to manually manage the lifecycle of backup data.</p>	<p>HBR automatically manages the lifecycle of backup data.</p>
Remote backup	<p>Not supported.</p>	<p>HBR allows you to create a remote mirror vault for a backup vault. You can use a mirror vault to back up or restore data across regions.</p>
Data restoration	<p>You need to manually restore data from multiple data replicas.</p>	<p>HBR provides backup versions for you to choose when you attempt to restore data. You can also set restore rules.</p>
Management costs	<p>High.</p> <p>You need to compile scripts to back up data and dispatch dedicated engineers to manage backups. The complex and difficult operations and maintenance reduce resource utilization and increase management costs.</p>	<p>Low.</p> <p>HBR manages your backup data in cloud vaults. You do not need to worry about backup management, such as hardware procurement, configuration, cluster scaling, and security.</p>

Item	On-premises backup system	HBR
Data encryption	You need to build a data encryption system.	HBR automatically encrypts your data. It uses the Advanced Encryption Standard (AES) 256-bit algorithm to encrypt and transmit data from a backup source and store the backup data in the cloud. During data transmission, it also uses HTTPS to encrypt data.

Supported backup sources

Backup source		Operating system	Backup client
Local IDC	File directory	Windows, Windows Server, and Linux	File backup client
	Images of VMware vSphere virtual machines	Windows, Windows Server, and Linux	Virtual machine backup client
	SAP HANA	Linux	File backup client
	SQL Server	Windows Server	File backup client
	MySQL	Windows Server and Linux	File backup client
	MongoDB	Windows Server and Linux	File backup client
Alibaba Cloud ECS	File directory on an ECS instance	Windows Server and Linux	ECS backup client
	SAP HANA deployed on an ECS instance	Windows Server and Linux	ECS backup client
	SQL Server deployed on an ECS instance	Windows Server	ECS backup client
Cloud Storage Gateway	File gateway deployed on Alibaba Cloud	N/A	Cloud Storage Gateway backup client
Apsara File Storage NAS	Data stored in Apsara File Storage NAS	N/A	N/A
Alibaba Cloud OSS	Data stored in OSS	N/A	N/A

Terms

Term	Description
Backup source	The host on which the data to be backed up is stored, such as a server, a virtual machine, or an ECS instance.
Client	<p>The client that you install on a backup source to back up and restore data. You must install an appropriate client for different backup sources.</p> <p>Each client supports resumable upload and timed retry to guarantee backup stability. In this way, data can be backed up even when short-term network jitter occurs.</p>
Region	The physical location of an Alibaba Cloud IDC. After a resource is created, you cannot change the region of the resource. For more information, see Regions and zones .
Backup vault	<p>The HBR cloud backup warehouse used to store backup data in the cloud. Backup data from multiple clients can be stored in the same vault. This helps you manage the backup data and reduce management time and costs.</p> <p>The number of clients and the storage capacity supported by each backup vault are not limited. You can install a client and extend the storage capacity as needed. Each backup vault features data reliability of 99.9999999999%.</p> <p>You must specify an appropriate region for each backup vault to improve backup performance and facilitate disaster recovery. After a backup vault is created, you cannot change the region of the backup vault. A backup vault is also the basic unit that you can use to remove duplicates or compress data.</p>
Intermediate host	The host that has a graphical user interface (GUI). If you attempt to back up data from a file directory in a Linux operating system without a GUI, you can download and install an HBR client on an intermediate host, and deploy the intermediate host on the backup source. Then, you can log on to the client on the intermediate host and back up data from the backup source.

2.Scenarios

Hybrid Backup Recovery (HBR) supports the backing up of data from physical machines, VMWare or Hyper-V virtual machines, cloud virtual machines, and workflow-based data sources. You can use HBR in the following scenario:

Back up data from local data centers

When failures occur in a local data center and cannot be immediately fixed, you can restore data from an Alibaba Cloud backup vault by using a specific application.

Back up data from Alibaba Cloud

Back up data that is stored on Alibaba Cloud virtual machines and use the internal network bandwidth to back up data to HBR backup vaults.

Manage the backup of data from multiple branches

You can use HBR to back up data across multiple local and cloud branches. You can also back up cloud data to other regions to implement geo-disaster recovery. This ensures the availability of data and services. By centralizing the backup of data from multiple regions, you can reduce management costs.

Back up workflow-based data sources

You can use HBR to back up workflow-based data sources to ensure data security. HBR supports data sources, such as SAP HANA, SQL Server, Oracle, MySQL, MongoDB, and Hyper-V.

3. Service linked roles for HBR

This topic describes four service linked roles for Hybrid Backup Recovery (HBR): `AliyunServiceRoleForHbrEcsBackup`, `AliyunServiceRoleForHbrOssBackup`, `AliyunServiceRoleForHbrNasBackup`, and `AliyunServiceRoleForHbrCsgBackup`. This topic also describes how to delete these RAM roles.

Background information

HBR needs to access other Alibaba Cloud services to implement a feature. In this case, HBR must create and assume service linked roles to obtain required permissions. For more information, see [Service linked roles](#).

When HBR requires access to Elastic Compute Service (ECS), Virtual Private Cloud (VPC), Object Storage Service (OSS), Apsara File Storage NAS, or Cloud Storage Gateway (CSG), the corresponding service linked role is automatically created.

- When the ECS backup features of HBR require access to ECS and VPC, the `AliyunServiceRoleForHbrEcsBackup` role is automatically created.
- When the OSS backup feature of HBR requires access to OSS, the `AliyunServiceRoleForHbrOssBackup` role is automatically created.
- When the NAS backup feature of HBR requires access to NAS, the `AliyunServiceRoleForHbrNasBackup` role is automatically created.
- When the CSG backup feature of HBR requires access to CSG, the `AliyunServiceRoleForHbrCsgBackup` role is automatically created.

Permissions of service linked roles

This section lists the permission policy that is attached to each service linked role.

- The policy that is attached to the `AliyunServiceRoleForHbrEcsBackup` role includes the permissions on ECS. After HBR assumes the role, HBR obtains the permissions on ECS.

```
{
  "Action": [
    "ecs:RunCommand",
    "ecs:CreateCommand",
    "ecs:InvokeCommand",
    "ecs>DeleteCommand",
    "ecs:DescribeCommands",
    "ecs:StopInvocation",
    "ecs:DescribeInvocationResults",
    "ecs:DescribeCloudAssistantStatus",
    "ecs:DescribeInstances",
    "ecs:DescribeInstanceRamRole",
    "ecs:DescribeInvocations"
  ],
  "Resource": "*"
}
```

```
"Effect": "Allow"
},
{
  "Action": [
    "ecs:AttachInstanceRamRole",
    "ecs:DetachInstanceRamRole"
  ],
  "Resource": [
    "acs:ecs:*:*:instance/*",
    "acs:ram:*:*:role/aliyunecsaccessinghbrrole"
  ],
  "Effect": "Allow"
},
{
  "Action": [
    "ram:GetRole",
    "ram:GetPolicy",
    "ram:ListPoliciesForRole"
  ],
  "Resource": "*",
  "Effect": "Allow"
},
{
  "Action": [
    "ram:PassRole"
  ],
  "Resource": "*",
  "Effect": "Allow",
  "Condition": {
    "StringEquals": {
      "acs:Service": [
        "ecs.aliyuncs.com"
      ]
    }
  }
},
{
  "Action": [
    "ecs:DescribeSecurityGroups",
    "ecs:DescribeImages",
    "ecs:CreateImage",
```

```

"ecs:DeleteImage",
"ecs:DescribeSnapshots",
"ecs:CreateSnapshot",
"ecs>DeleteSnapshot",
"ecs:DescribeSnapshotLinks",
"ecs:DescribeAvailableResource",
"ecs:ModifyInstanceAttribute",
"ecs:CreateInstance",
"ecs>DeleteInstance",
"ecs:AllocatePublicIpAddress",
"ecs:CreateDisk",
"ecs:DescribeDisks",
"ecs:AttachDisk",
"ecs:DetachDisk",
"ecs>DeleteDisk",
"ecs:ResetDisk",
"ecs:StartInstance",
"ecs:StopInstance",
"ecs:ReplaceSystemDisk",
"ecs:ModifyResourceMeta"
],
"Resource": "*",
"Effect": "Allow"
}

```

- The policy that is attached to the `AliyunServiceRoleForHbrEcsBackup` role includes the permissions on VPC. After HBR assumes the role, HBR obtains the permissions on VPC.

```

{
  "Action": [
    "vpc:DescribeVpcs",
    "vpc:DescribeVSwitches"
  ],
  "Resource": "*",
  "Effect": "Allow"
}

```

- The policy that is attached to the `AliyunServiceRoleForHbrOssBackup` role includes the permissions on OSS. After HBR assumes the role, HBR obtains the permissions on OSS.

```
{
  "Action": [
    "oss:ListObjects",
    "oss:HeadBucket",
    "oss:GetBucket",
    "oss:GetBucketAcl",
    "oss:GetBucketLocation",
    "oss:GetBucketInfo",
    "oss:PutObject",
    "oss:CopyObject",
    "oss:GetObject",
    "oss:AppendObject",
    "oss:GetObjectMeta",
    "oss:PutObjectACL",
    "oss:GetObjectACL",
    "oss:PutObjectTagging",
    "oss:GetObjectTagging",
    "oss:InitiateMultipartUpload",
    "oss:UploadPart",
    "oss:UploadPartCopy",
    "oss:CompleteMultipartUpload",
    "oss:AbortMultipartUpload",
    "oss:ListMultipartUploads",
    "oss:ListParts"
  ],
  "Resource": "*",
  "Effect": "Allow"
}
```

- The policy that is attached to the `AliyunServiceRoleForHbrNasBackup` role includes the permissions on NAS. After HBR assumes the role, HBR obtains the permissions on NAS.

```
{
  "Action": [
    "nas:DescribeFileSystems",
    "nas:CreateMountTargetSpecial",
    "nas>DeleteMountTargetSpecial",
    "nas:CreateMountTarget",
    "nas>DeleteMountTarget",
    "nas:DescribeMountTargets",
    "nas:DescribeAccessGroups"
  ],
  "Resource": "*",
  "Effect": "Allow"
}
```

- The policy that is attached to the `AliyunServiceRoleForHbrCsgBackup` role includes the permissions on CSG. After HBR assumes the role, HBR obtains the permissions on CSG.

```
{
  "Action": [
    "hcs-sgw:DescribeGateways"
  ],
  "Resource": "*",
  "Effect": "Allow"
}
```

Delete a service linked role

You may need to delete a service linked role. For example, if you no longer need to use the ECS backup features, you can delete the `AliyunServiceRoleForHbrEcsBackup` role to ensure security.

Notice

Make sure that no backup vaults exist under the Alibaba Cloud account before you delete the `AliyunServiceRoleForHbrEcsBackup` role. Otherwise, the service linked role cannot be deleted.

To delete the `AliyunServiceRoleForHbrEcsBackup` role, perform the following steps:

1. Log on to the [RAM console](#).
2. In the left-side navigation pane, click **RAM Roles**.
3. On the **RAM Roles** page, enter `AliyunServiceRoleForHbrEcsBackup` in the search box to find the role.
4. In the **Actions** column, click **Delete**.
5. In the **Delete RAM Role** dialog box, click **OK**.

If you want to delete the `AliyunServiceRoleForHbrOssBackup`, `AliyunServiceRoleForHbrNasBackup`, or `AliyunServiceRoleForHbrCsgBackup` role, enter the role name instead of `AliyunServiceRoleForHbrEcsBackup` in the search box.

4.Limits

This topic describes the limits of Hybrid Backup Recovery (HBR).

Back up files

- Windows clients support Volume Shadow Copy Service (VSS). You can only create a single VSS snapshot at a time.
- An incomplete backup occurs if one or more files are changed by other applications during the backup job. The status of the backup job is displayed as partially completed when the backup job is complete. You must ensure the integrity of data in each backup job.
- During a backup job, if one or more files are locked by processes or cannot be read by the backup job, this results in an incomplete backup of data. The status of the backup job is displayed as partially completed when the backup job is complete.

Back up virtual machines

- You must install a VCenter Web Client (5.5, 6.0, or 6.5) on each virtual machine for which a backup is to be created.
- A VCenter client and ESXi hypervisor must allow access from a backup gateway by using a fully qualified domain name (FQDN) or an IP address.
- Snapshots cannot exist if you want to back up a virtual machine. Otherwise, you will be prompted a message when selecting a virtual machine: You cannot back up the virtual machine because you have already created a snapshot of the virtual machine. If a snapshot exists, you can delete it.
- You cannot back up virtual machines that have SCSI devices because vSphere virtual machines do not support shared SCSI devices.
- The name of a virtual machine to be backed up cannot contain the following characters.
` ^ ~ = ; ! / ([] { } @ \$ \ & # % +
- When you attempt to use Changed Block Tracking (CBT) to perform an incremental backup for a virtual machine, the backup cannot be performed in the following scenarios:
 - The hardware version of the virtual machine is earlier than version 7.
 - CBT is disabled on the virtual machine.
 - The disk of the virtual machine uses raw device mapping (RDM) in physical compatibility mode.
 - The disk mode of the virtual machine is independent_persistent or independent_nonpersistent.

Back up data from an SAP HANA database that is located on an ECS instance

You can only install one SAP HANA instance on an ECS instance. Otherwise, you will be prompted an error message: Failed to install SAP HANA.

Back up data from a SQL Server database that is located on an ECS instance

Supported versions of SQL Server that you can use Hybrid Backup Recovery to back up are as follows.

Version	Full backup	Differential backup	Log backup	Data restore
SQL Server 2008 R2	Yes	Yes	Yes	Yes
SQL Server 2012	Yes	Yes	Yes	Yes
SQL Server 2014	Yes	Yes	Yes	Yes
SQL Server 2016	Yes	Yes	Yes	Yes
SQL Server 2017	Yes	Yes	Yes	Yes

5.Supported resources

Hybrid Backup Recovery (HBR) supports backup for mainstream infrastructure and operating systems.

Infrastructure

Facility	Supported backup sources
PC or server	File backups: supported
Virtual machine	<ul style="list-style-type: none"> File backup: supported Image backup: vSphere 5.5, 6.0, and 6.5 Workflow-based data sources, such as SAP HANA, SQL Server, MySQL, and MongoDB
ECS instance	<ul style="list-style-type: none"> File backup: supported SAP HANA: 1.0 and 2.0 SQL Server: SQL Server 2008 R2, SQL Server 2012, SQL Server 2014, SQL Server 2016, and SQL Server 2017

Operating systems

System	Supported version
Windows	7, 8, and 10
Windows Server	2008 R2, 2012, 2012 R2, 2016 and 2019
RHEL	7.0, 7.2, and 7.4
CentOS	6.5, 6.9, 7.2, 7.3, and 7.4
Ubuntu	14.04 and 16.04
SUSE Linux Enterprise Server	11, 12, and 15