Cloud Backup and Recovery

Best Practices

Issue 01

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1 Using a Custom Script to Implement Application-Consistent Backup

1.1 Using a Custom Script to Implement Consistent Backup for MySQL

This practice uses single-server MySQL 5.5 running on SUSE 11 SP3 to demonstrate how to use a custom script to freeze and unfreeze the MySQL database in order to implement application-consistent backup.

Scenario

An enterprise purchases Elastic Cloud Servers (ECSs) and installs MySQL 5.5 on ECSs for storing business data. As data increases, crash-consistent backup cannot meet the recovery time objective (RTO) and recovery point time (RPO) requirements and therefore application-consistent backup is needed.

Required Data

Table 1-1 Required data

Item	Description	Example Value
MySQL username	Username for connecting to the MySQL database	root
MySQL password	Password for connecting to the MySQL database	Example@123

Procedure

Step 1 Encrypt the MySQL password.

1. Log in to the MySQL server and run the **cd /home/rdadmin/Agent/bin/** command to go to the Agent directory.

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2. Run the **/home/rdadmin/Agent/bin/agentcli encpwd** command. The following information is displayed:

```
Enter password:
```

Enter the MySQL password and press **Enter**. After the encrypted password is displayed, copy it to the clipboard.

NOTE

The plaintext password configured in the freezing and unfreezing scripts cannot exceed 16 characters. Or, the password will be truncated after the configuration, and application consistency backup will fail.

Step 2 Run the **cd /home/rdadmin/Agent/bin/thirdparty/ebk_user** command to go to the directory saving the custom scripts and run the **vi mysql_freeze.sh** command to open the example MySQL freezing script.

The following figure shows an example. Set **MYSQL_USER** and **MYSQL_PASSWORD** based on your actual conditions, where **MYSQL_PASSWORD** should be the encrypted password obtained in **step 1**.

```
#*********************************************************************************
#Importnata note
#Please change this parameters according to your Mysql system configuration!!!
MYSQL_USER="root"
MYSQL_PASSWORD="00000001000000010000000000000005000000010000000017334dcf36ace871b1
0001000000000000080400000001000000012967 8894e3225391233bac37497d372800000000000000
#*********************************************************************************
```

You can also run the **sed** commands to modify the configuration:

sed -i 's/^MYSQL_PASSWORD=.*/MYSQL_PASSWORD="*XXX*"/' mysql_freeze.sh mysql_unfreeze.sh, where ***XXX*** indicates the password obtained in step 1.

If you run this command, both the freezing and unfreezing scripts will be modified and therefore **Step 3** is not needed.

Step 3 Run the **vi mysql_unfreeze.sh** command to open the example MySQL unfreezing script and change the username and password in the script to be consistent with your actual settings.

The **mysql_unfreeze.sh** and **mysql_freeze.sh** scripts can only be used to freeze and unfreeze databases. If other operations are required, you can add them in the scripts via compilation. For details, see **Using a Custom Script to Implement Consistent Backup for Other Linux Applications**.

CAUTION

MySQL is frozen by running the **FLUSH TABLES WITH READ LOCK** command. This command will not trigger disk flushing on **bin log**. If **bin log** is enabled and the value of **sync_binlog** is not **1**, some SQL operations saved in the backup image may not be recorded in **bin log**. To realize complete protection on **bin log**, set **sync_binlog** to **1**.

----End

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1.2 Using a Custom Script to Implement Consistent Backup for SAP HANA

The following example uses single-server HANA 2.0 running on SUSE 11 SP4 for SAP to demonstrate how to use a custom script to freeze and unfreeze the HANA database in order to implement database backup.

Scenario

An enterprise has purchased ECSs and installed HANA 2.0 on ECSs for saving business data. As data increases, crash-consistent backup cannot meet the RTO and RPO requirements and therefore application-consistent backup is needed.

Required Data

Table 1-2 Required data

Item	Description	Example Value
HANA username	Username for connecting to the HANA SYSTEMDB database	system
HANA password	Password for connecting to the HANA SYSTEMDB database	Example@123
HANA instance ID	Instance ID for connecting to the HANA database	00
HANA SID	SID for connecting to the HANA database	WXJ

Procedure

Step 1 Encrypt the HANA password.

1. Log in to the HANA server and run the **cd /home/rdadmin/Agent/bin/** command to go to the Agent directory.
2. Run the **/home/rdadmin/Agent/bin/agentcli encpwd** command. The following information is displayed:
   ```
   Enter password:
   ```
   Enter the HANA password and press **Enter**. After the encrypted password is displayed, copy it to the clipboard.

   NOTE

   The plaintext password configured in the freezing and unfreezing scripts cannot exceed 16 characters. Or, the password will be truncated after the configuration, and application consistency backup will fail.

   Run the **cd /home/rdadmin/Agent/bin/thirdparty/ebk_user** command to go to the custom script directory and run the **vi hana_freeze.sh** command to open the example freezing script.

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Step 2 The following figure shows an example. You need to set **HANA_USER**, **HANA_PASSWORD**, and **INSTANCE_NUMBER DB_SID** based on your actual conditions, where **HANA_PASSWORD** should be the encrypted password obtained in step 1.

```
#********************************************************************************
#Importnata note
#Please change this parameters according to your HANA system configuration!!!

HANA_USER="system"
HANA_PASSWORD="00000001000000010000000000000005000000010000000161b3258428fbdf
00100000000000003040000000100000001c9562ef9b7f838e984dc3d1080975be00000000000
INSTANCE_NUMBER="00"
DB_SID="WXJ"

#********************************************************************************
```

You can also run the **sed** commands to modify the configuration:

sed -i 's/^HANA_USER=.*/HANA_USER="*XXX*"/' hana_freeze.sh hana_unfreeze.sh, where ***XXX*** indicates the database username.

sed -i 's/^HANA_PASSWORD=.*/HANA_PASSWORD="*XXX*"/' hana_freeze.sh hana_unfreeze.sh, where ***XXX*** indicates the password obtained in step 1

sed -i 's/^INSTANCE_NUMBER=.*/INSTANCE_NUMBER="*XXX*"/' hana_freeze.sh hana_unfreeze.sh, where ***XXX*** indicates the database instance number

sed -i 's/^DB_SID=.*/DB_SID="*XXX*"/' hana_freeze.sh hana_unfreeze.sh, where ***XXX*** indicates the database SID

If you run this command, both the freezing and unfreezing scripts will be modified and therefore **step 3** is not needed.

Step 3 Run the **vi hana_unfreeze.sh** command to open the example HANA unfreezing script and change the username, password, instance ID, and SID in the script to be consistent with your actual settings.

The **hana_freeze.sh** and **hana_unfreeze.sh** scripts can only be used to freeze and unfreeze databases. If other operations are required, you can add them in the scripts via compilation. For details, see **Using a Custom Script to Implement Consistent Backup for Other Linux Applications**.

WARNING

When freezing the SAP HANA database, you need to freeze the XFS file systems of the data volumes as SAP suggested. Otherwise, data inconsistency may occur. The example script mentioned in this section will query the mount point of the **Data** volume used by the HANA database and then use the **xfs_freeze** command to freeze the database.

If the HANA system does not have an independent partition for saving the data volumes as SAP suggested but stores them in the same partition as the system volume, modify the **hana_freeze.sh** script by commenting out lines related to **xfs_freeze** to avoid the freezing of the entire system. However, such operations still could not eliminate data inconsistency.

----End

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1.3 Using a Custom Script to Implement Consistent Backup for Other Linux Applications

Scenario

If other Linux applications need application-consistent backup, you can compile custom scripts to freeze and unfreeze them. To ensure the custom scripts invokable by the Agent, save them in the **/home/rdadmin/Agent/bin/thirdparty/ebk_user** directory.

The following example uses an application named **appexample** for demonstration.

appexample is a new database. It provides the **appexample -freeze** and **appexample -unfreeze** commands for freezing and unfreezing.

To implement application-consistent backup, you need to compile two scripts named **appexample_freeze.sh** and **appexample_unfreeze.sh**. During a backup, the Agent first invokes the **appexample_freeze.sh** script to freeze I/Os, then activates consistent snapshots on disks to ensure that the backup data is consistent, and finally invokes **appexample_unfreeze.sh** to unfreeze I/Os.

Figure 1-1 shows the backup process.

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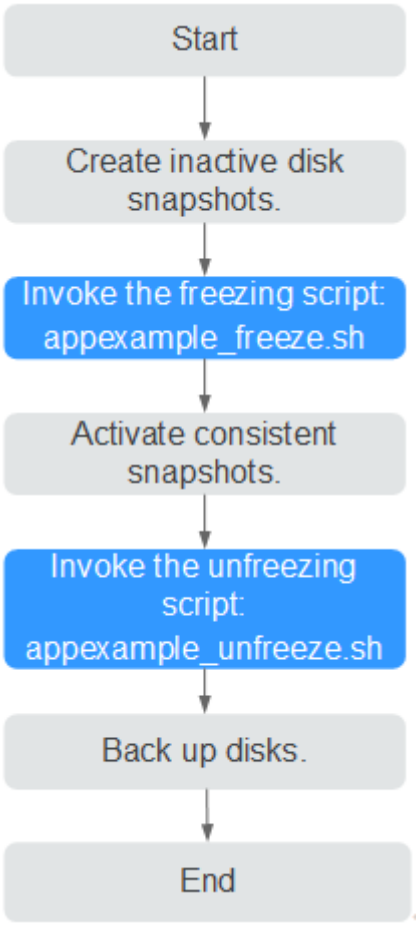
Figure 1-1 Application-consistent backup flowchart



Compiling a Freezing Script

Example freezing script named **appexample_freeze.sh**:

```
#!/bin/sh
AGENT_ROOT_PATH=$1  #The root directory required when the Agent invokes the script. Functions, such as log functions, will use this variable. Do not rename this directory.
PID=$2 #The PID required when the Agent invokes the script. It is used for command output. Do not rename it.
. "${AGENT_ROOT_PATH}/bin/agent_func.sh"#Reference script framework, which provides functions, such as logging, encryption, and decryption
#Result processing function, which writes operation results into given files for invokers to obtain return values.
 # Input parameter. $1: 0 indicates a success; 1 indicates a failure.
# No return value
#RESULT_FILE is defined in agent_func.sh.
function ExitWithResult()
{
    Log "[INFO]:Freeze result is $1."
    echo $1 > ${RESULT_FILE}
    chmod 666 ${RESULT_FILE}
    exit $1
}
function Main()
{
    Log "********************************************************************"
    Log "[INFO]:Begin to freeze appexample."
    #Check whether appexample exists. If not, 0 is returned and the script exits.
    #In the process of freezing I/Os, the Agent program invokes each freezing script in sequence. If any script
```

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```
fails to be invoked, the whole process fails. To avoid interference from other programs, 0 should be returned when appexample cannot be found.
   which appexample
   if [ $? -ne 0 ]
   then
         Log "[INFO]:appexample is not installed."
         ExitWithResult 0
   fi
   #Invoke the actual freezing command.
   appexample -freeze
   if [ $? -ne 0 ]
   then
         Log "[INFO]:appexample freeze failed."
         #Freezing failed. Record the result and exit.
         ExitWithResult 1
   fi
   Log "[INFO]:Freeze appexample success."
   #Freezing successful. Record the result and exit.
   ExitWithResult 0
}
Main
```

Compiling an Unfreezing Script

Example unfreezing script named **appexample_unfreeze.sh**:

```
#!/bin/sh
AGENT_ROOT_PATH=$1  #The root directory required when the Agent invokes the script. Functions, such as log functions, will use this variable. Do not rename this directory.
PID=$2 #The PID required when the Agent invokes the script. It is used for command output. Do not rename it.
. "${AGENT_ROOT_PATH}/bin/agent_func.sh"#Reference script framework, which provides functions, such as logging, encryption, and decryption
#Result processing function, which writes operation results into given files for invokers to obtain return values.
 # Input parameter. $1: 0 indicates a success; 1 indicates a failure.
# No return value
#RESULT_FILE is defined in agent_func.sh.
function ExitWithResult()
{
   Log "[INFO]:Freeze result is $1."
   echo $1 > ${RESULT_FILE}
   chmod 666 ${RESULT_FILE}
   exit $1
}
function Main()
{
   Log "********************************************************************"
   Log "[INFO]:Begin to freeze appexample."
   #Check whether appexample exists. If not, 0 is returned and the script exits.
   #In the process of unfreezing I/Os, the Agent program invokes each unfreezing script in sequence. If any script fails to be invoked, the whole process fails. To avoid interference from other programs, 0 should be returned when appexample cannot be found.
   which appexample
   if [ $? -ne 0 ]
   then
         Log "[INFO]:appexample is not installed."
         ExitWithResult 0
   fi
   #Invoke the actual unfreezing command.
   appexample -unfreeze
   if [ $? -ne 0 ]
   then
       Log "[INFO]:appexample freeze failed."
      #Unfreezing failed. Record the result and exit.
       ExitWithResult 1
   fi
   Log "[INFO]:Freeze appexample. success"
   #Unfreezing successful. Record the result and exit.
```

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```
    ExitWithResult 0
}
Main
```

1.4 Verifying the Application-Consistent Backup Result

After application-consistent backup is implemented using customized scripts, perform the following operations to check whether the backup is successful:

Verifying the Application-Consistent Backup Result (Linux)

The following uses the MySQL database as an example.

Step 1 Log in to MySQL database and create a database.

Step 2 After the database is created, create a stored procedure. For details, see **Figure 1-2**.

Figure 1-2 Creating a stored procedure

```
DELIMITER //
CREATE DEFINER=`root`@`localhost` PROCEDURE `test_insert_xuwei3`()
BEGIN
declare i int;
declare v float;
set i = 0;
while i < 10000000
do
select RAND()*100 into v;
insert into xuwei1_test values(i, 'xxxxxx', now());
set i = i+1;
end while;
END
//
DELIMITER ;
```

Step 3 Log in to the CBR console and create an application-consistent backup for the desired ECS.

Step 4 After the backup is complete, open the **/home/rdadmin/Agent/log/thirdparty.log** file and view the freezing and unfreezing logs to determine the freezing and unfreezing times.

Step 5 Use the newly created application-consistent backup to restore the ECS. After the restoration is successful, log in to the ECS and database and check the time when the last data record is inserted.

Step 6 Compare the VSS freezing success time recorded in **step 5** with the time recorded in **step 4**. Before the freezing is successful, data insertion is stopped. Therefore, the time in **step 5** should be earlier than that in **step 4**. If the time in **step 5** is earlier than that in **step 4**, the application-consistent backup is successful.

----End

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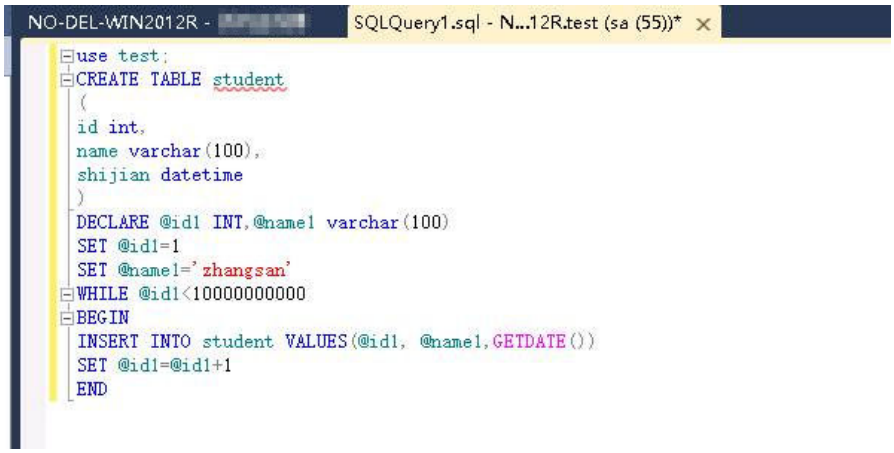
Verifying the Application-Consistent Backup Result (Windows)

The following uses the SQL Server database as an example.

Step 1 Log in to SQL Server database and create a database.

Step 2 After the database is created, create a stored procedure. For details, see **Figure 1-3**.

Figure 1-3 Creating a stored procedure



Step 3 Log in to the CBR console and create an application-consistent backup for the desired ECS.

Step 4 After the backup is complete, open the **Cloud Server Backup Agent-WIN64\log\rdagent.txt** file and view the freezing and unfreezing logs to determine the freezing and unfreezing times. As shown in the figure, the freeze success time is **17:28:51**.

Figure 1-4 Viewing logs

```
[2018-11-14 17:28:46][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,1369]Start snap shot set.
[2018-11-14 17:28:46][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,1372]Add to snapshot set.
[2018-11-14 17:28:46][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,1375]Prepare for backup.
[2018-11-14 17:28:46][0x0000531600001535][2052][SYSTEM][INFO][Requester.cpp,1261]Begin prepare for backup.
[2018-11-14 17:28:46][0x0000531600001535][2052][SYSTEM][INFO][Requester.cpp,1272]Prepare for backup succ.
[2018-11-14 17:28:46][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,1378]Do snapshot set.
[2018-11-14 17:28:46][0x0000531600001535][2052][SYSTEM][INFO][Requester.cpp,1278]Begin create the shadow (Do SnapShot Set).
[2018-11-14 17:28:51][0x0000531600001535][2052][SYSTEM][INFO][Requester.cpp,1317]Create the shadow (Do SnapShot Set) succ.
[2018-11-14 17:28:51][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,227]Freeze volume succ.
[2018-11-14 17:28:51][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,180]Freeze file sys, succ.
[2018-11-14 17:28:51][0x0000531600001536][2052][SYSTEM][INFO][App.cpp,383]Vss freeze success.
[2018-11-14 17:28:51][0x0000531600001536][2052][SYSTEM][INFO][AppPlugin.cpp,157]Freeze app succ.
[2018-11-14 17:28:51][0x0000531600001536][4872][SYSTEM][INFO][MessageProcess.cpp,1034]Json key "loop_time" does not exist.
[2018-11-14 17:28:51][0x0000531600001536][4872][SYSTEM][INFO][FTExceptionHandle.cpp,849]Update monitor obj freeze begin time
[2018-11-14 17:28:52][0x0000531600001536][544][SYSTEM][INFO][Communication.cpp,400]End accept fcgx
[2018-11-14 17:28:52][0x0000531600001536][544][SYSTEM][INFO][Authentication.cpp,104]strClientCertDN: CN=BCManager eBackup C1
[2018-11-14 17:28:52][0x0000531600001536][544][SYSTEM][INFO][Authentication.cpp,130]Client IP address 100.125.1.142 Auth suc
[2018-11-14 17:28:52][0x0000531600001536][544][SYSTEM][INFO][Communication.cpp,390]Begin accept fcgx
[2018-11-14 17:28:53][0x0000531600001536][2052][SYSTEM][INFO][AppPlugin.cpp,168]Begin unfreeze app.
[2018-11-14 17:28:53][0x0000531600001536][2052][SYSTEM][INFO][App.cpp,392]Begin vss unfreeze.
[2018-11-14 17:28:53][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,275]Begin unfreeze all.
[2018-11-14 17:28:53][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,1703]Begin wait for async ex.
[2018-11-14 17:28:53][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,1733]End wait for async ex, return 0x0004230a (V
[2018-11-14 17:28:53][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,1579]VSS async finished.
[2018-11-14 17:28:53][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,303]End unfreeze all.
[2018-11-14 17:28:53][0x0000531600001536][2052][SYSTEM][INFO][App.cpp,415]VSS unfreeze success.
[2018-11-14 17:28:53][0x0000531600001536][2052][SYSTEM][INFO][App.cpp,424]Begin vss endbakup.
[2018-11-14 17:28:53][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,311]Begin end bakcup.
[2018-11-14 17:29:05][0x0000531600001536][2052][SYSTEM][INFO][Requester.cpp,333]End end backup.
[2018-11-14 17:29:05][0x0000531600001536][2052][SYSTEM][INFO][App.cpp,445]Vss endbakup success.
[2018-11-14 17:29:05][0x0000531600001536][2052][SYSTEM][INFO][App.cpp,342]Unfreeze all apps success.
[2018-11-14 17:29:05][0x0000531600001536][2052][SYSTEM][INFO][AppPlugin.cpp,185]Unfreeze app succ.
[2018-11-14 17:29:05][0x0000531600001536][4872][SYSTEM][INFO][MessageProcess.cpp,1034]Json key "loop_time" does not exist.
```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Step 5 Use the newly created application-consistent backup to restore the ECS. After the restoration is successful, log in to the ECS and database and check the time when the last data record is inserted (**17:28:49** in the following figure).

Step 6 Compare the VSS freezing success time recorded in **step 5** with the time recorded in **step 4**. Before the freezing is successful, data insertion is stopped. Therefore, the time in **step 5** should be earlier than that in **step 4**. If the time in **step 5** is earlier than that in **step 4**, the application-consistent backup is successful.

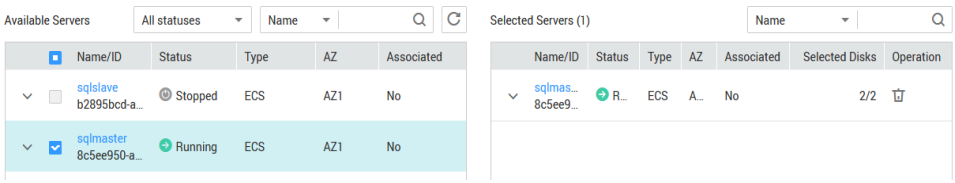
----End

1.5 Protecting SQL Server

Protecting SQL Server in Failover Cluster Mode

Currently, cloud server backup provides application-consistent backup only on single VMs. The support for clustered databases will be implemented later.

In Failover Cluster mode, the SQL Server service is enabled only on the active node. Because of this, you only need to associate the active node with the policy when creating a cloud server backup. After an active/standby switchover, you need to modify the policy at once to keep the node being backed up is always the active one. To restore data of the active node, stop all standby nodes first.



Protecting SQL Server in Always on Availability Groups Mode

Currently, cloud server backup provides application-consistent backup only on single VMs. The support for clustered databases will be implemented later.

In Always on Availability Groups mode, the SQL Server service is enabled both on the active and standby nodes, data is replicated from the active node to standby nodes, and the active node contains the complete data. When creating a cloud server backup, you only need to associate the active node with the policy. After an active/standby switchover, you need to modify the policy at once to keep the node being backed up is always the active one.

Restoring data of the active node triggers synchronization, because of the SQL Server mechanism. The synchronization will overwrite data on the standby nodes, resulting in loss of data generated during the restoration. To prevent such unexpected data loss, we recommend you to perform entire-ECS restoration only when none of the active and standby nodes is available.

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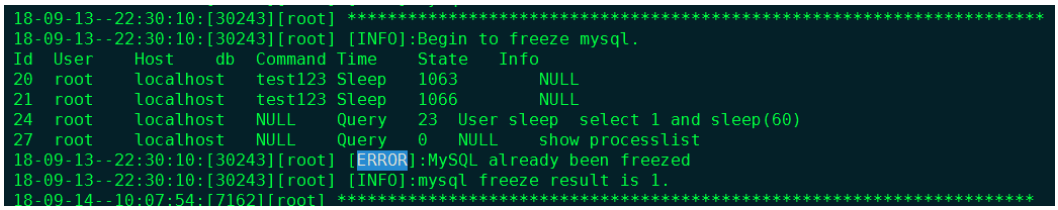
1.6 Troubleshooting a Custom Script Error

Application-consistent backup may fail due to custom script defects. In such conditions, open the **/home/rdadmin/Agent/log/thirdparty.log** file and view logs to locate the fault.

Figure 1-5 provides a log example recording a MySQL database freezing failure

Figure 1-5 Log example



18-09-13--22:30:10 in the first column records the logging time.

[30243] in the second column is the script PID.

[root] in the third column is the user who executes the script.

[INFO] or **[ERROR]** in the fourth column indicates the log level.

When a script invocation failure occurs, you can view the **ERROR** logs generated around the failure occurrence time to locate the fault. In **Figure 1-5**, the freezing fails because the MySQL database is in the frozen state and cannot be frozen again.

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2 Performing Periodic Recovery Drills Using the Backup Data

Background

According to the data security law, **data recovery tests must be performed periodically** for the backup and DR data. By performing a recovery, the backup software restores the backup data to the data source. As the service system is running in most of the time, it is not a good practice to perform recovery tests in the production environment. To verify the availability of the backup data, the integrity and reliability of the backup solution, and the system capability to deal with emergencies, you can create new backup resources to verify your backup solution and data recoverability.

Drill Principles

- You are advised to periodically perform recovery drills. For details about how to determine the drill frequency, see **Backup and DR Policies**.
- You do not need to perform recovery using each backup. Make sure that at least one backup of each type of resource has been used for recovery in a certain period.
- To prevent the service system from being affected by drills, create new resources to perform recovery drills.
- After a restoration task is delivered, the recovery is considered successful if the task is successful, the resource can be restored using the backup, and the restored data is correct.
- After a restoration task is delivered, the recovery is considered failed if the task fails or the task is successful but data is lost or cannot be read. In this case, contact the Huawei Cloud engineer to locate and rectify the fault.
- The operator should record the drill cycle, process, and results in detail.

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Resource Planning and Costs

Table 2-1 Resource planning and costs

Resource	Description	Quantity	Monthly Price
Server backup vault	The vault capacity must be greater than or equal to the total capacity of the cloud server disks to be backed up.	1	For detailed billing modes and billing standards, see **Billing**.
SFS Turbo backup vault	The vault capacity must be greater than or equal to the total capacity of the SFS Turbo file systems to be backed up.	1	
Elastic Cloud Server (ECS)	The ECS must have the same configuration as that of the server you want to perform drills.	1	
SFS Turbo file system	The SFS Turbo file system must have the same configuration as that of the file system you want to perform drills.	1	
Relational Database Service (RDS) DB instance	The RDS DB instance must have the same configuration as that of the DB instance you want to perform drills.	1	

Backup Drill

The backup drill process of the three backup types is as follows:

Performing a Recovery Drill Using a Cloud Server Backup

Step 1 Find a cloud server that runs a business core system and perform recovery drills on a monthly basis.

Step 2 Log in to the CBR console.

1. **Log in to the management console**.
2. Click in the upper left corner and select a region.
3. Click and choose **Storage** > **Cloud Backup and Recovery**.

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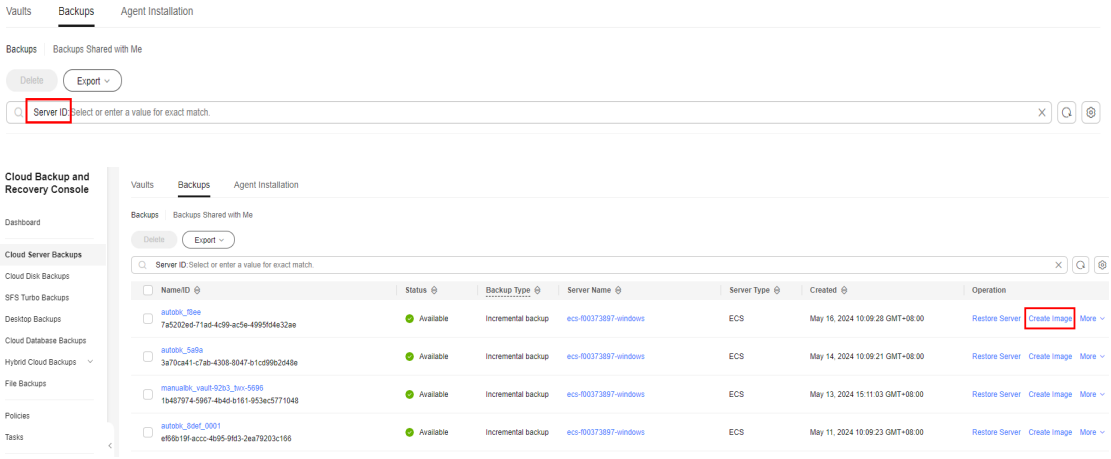
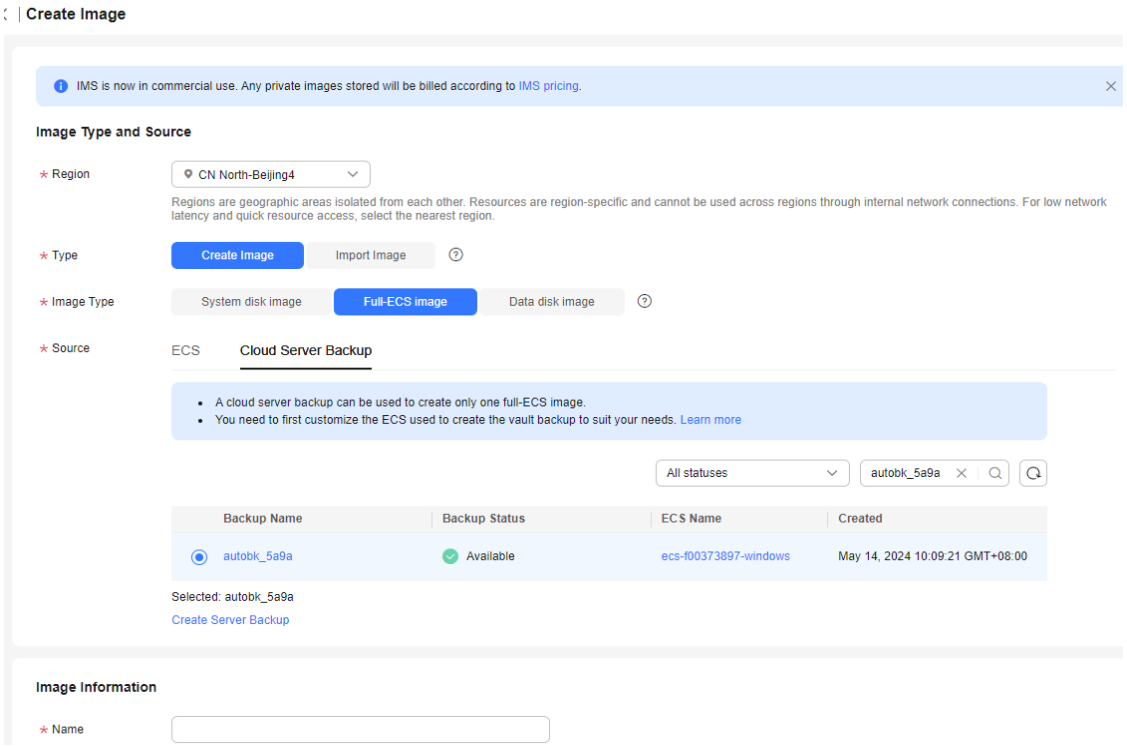
Step 3 Choose **Cloud Server Backups**. In the right pane, click the **Backups** tab.

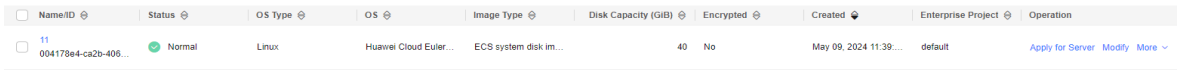
Step 4 Obtain the backup list of this cloud server. Specifically, choose **Server ID**, enter the ID of the cloud server you want to perform the drill, and click **Search**.



Step 5 Select a backup and click **Create Image** to go to the IMS private image creation page. Specify an image name and click **OK**.



Step 6 After the image is created, use the image to create a server.



Step 7 View the data on the newly created server and check that the data is as expected.

----End

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Performing a Recovery Drill Using an SFS Turbo Backup

Step 1 Find an SFS Turbo file system that is used by a business core system and perform recovery drills on a monthly basis.

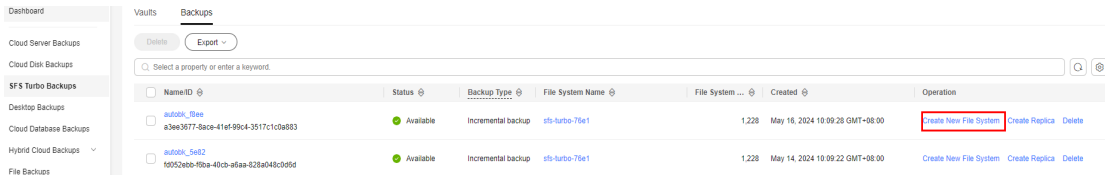
Step 2 Log in to the CBR console.

1. **Log in to the management console**.
2. Click in the upper left corner and select a region.
3. Click and choose **Storage** > **Cloud Backup and Recovery**.

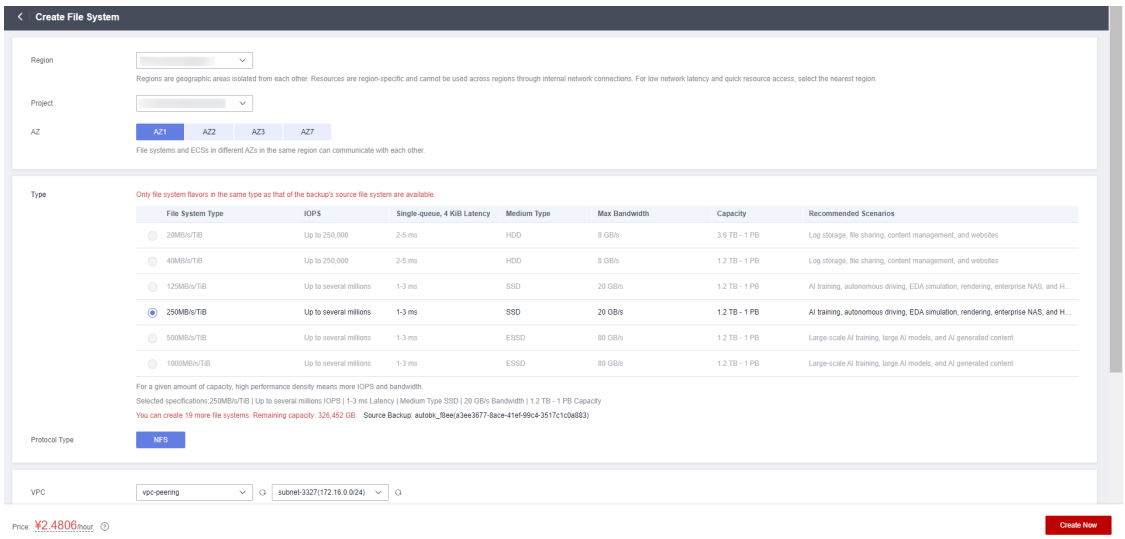
Step 3 Choose **SFS Turbo Backups**. In the right pane, click the **Backups** tab.

Step 4 Obtain the backup list of this SFS Turbo file system. Specifically, choose **File system ID**, enter the ID of the file system you want to perform the drill, and click **Search**.

Step 5 Select a backup and click **Create New File System** to go to the file system creation page.



Step 6 Configure file system parameters and click **Create Now**.



Step 7 View the data on the newly created file system and check that the data is as expected.

----End

Performing a Recovery Drill Using a Cloud Database Backup

Step 1 Log in to the CBR console.

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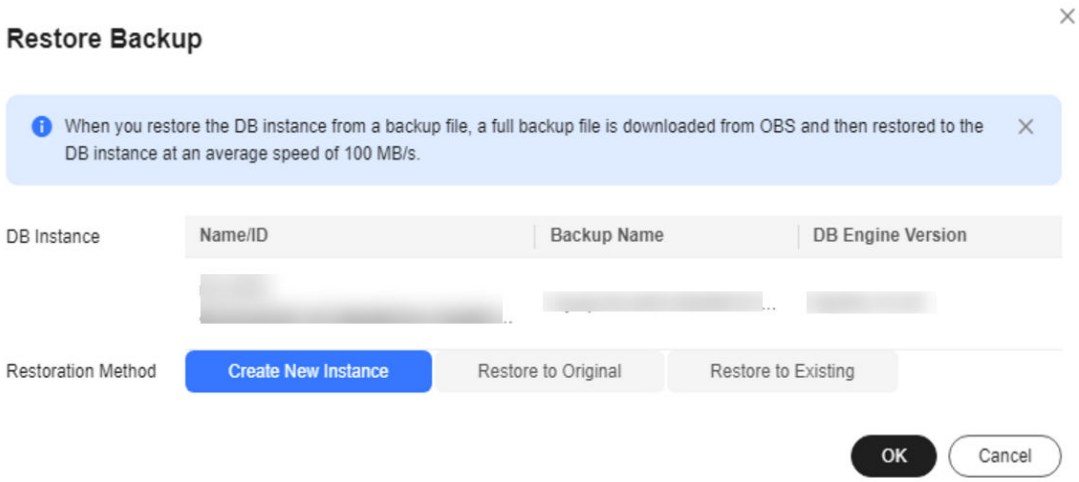
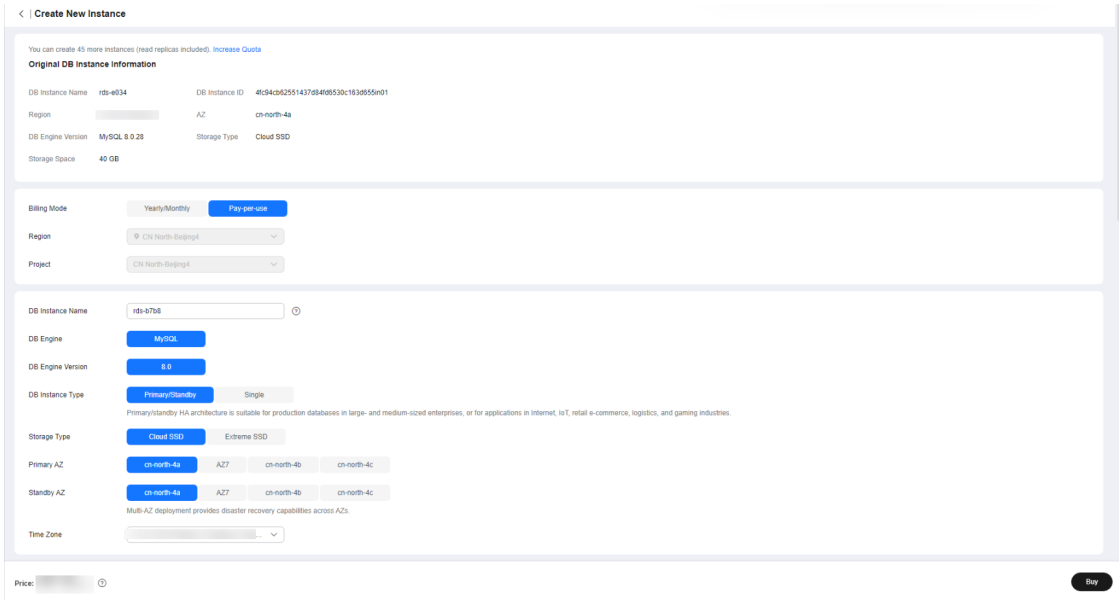
1. **Log in to the management console**.
2. Click in the upper left corner and select a region.
3. Click and choose **Databases** > **Relational Database Service**.

Step 2 Choose **Backups**. In the right pane, locate the backup you want to use for recovery, and click **Restore** in the **Operation** column.

Step 3 Choose to restore to a new DB instance and click **OK**.



Step 4 The DB engine and version of the new instance is the same as that of the original instance. The new DB instance has the same as the original DB instance by default and must be at least as large as the original DB instance. For details about other parameters, see **Buy a DB Instance**.



Step 5 Click **Buy**. When the instance status changes from **Creating** to **Available**, the restoration is successful.

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Step 6 Log in to the DB instance and check that the database data is as expected.

----End

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3 Creating Backup Policies Based on Service Tiering

Background

Resource backup policies define the backup frequency and retention rules. In practice, you need to configure different data backup policies based on the importance of data and the tiers of service systems deployed on the cloud.

Resource Planning and Costs

Table 3-1 Resource planning and costs

Resource	Description	Quantity	Monthly Price
Backup vault	After a backup policy is created, you need to apply the policy to a vault to perform periodic backups.	1	For detailed billing modes and billing standards, see **Billing**.

Service Tiering

Based on the importance of service systems and the impact scope and degree of the service system interruption on the company's services, service systems can be classified into the following types:

- **Core system**
  a. Core systems that run a company's core business processes, such as purchase systems. If such systems are stopped, the company's operations will be severely affected or significant financial losses will be incurred.
  b. Important infrastructure and office systems that support the company's critical applications. If such systems are interrupted, a large number of employees' work will be affected.

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- **Important system**
  a. Important systems that run a company's crucial business processes. If such systems are stopped, the company's operations will be greatly affected or major financial losses will be incurred.
  b. Infrastructure and office systems that support the company's important applications. If such systems are interrupted, employees' work will be severely affected.
- **General system**
  a. General systems that run a company's business processes, such as training systems. If such systems are stopped, the company's operations will be affected or financial losses will be incurred.
  b. Infrastructure and office systems that support the company's general systems. If such systems are interrupted, employees' work will be affected.

Normally, data levels can be evaluated based on the impact of service systems. Core data corresponds to core systems, important data corresponds to important systems, and general data corresponds to general systems. If the data level and service system level do not match, determine the service system level based on the data level. For example, if a service system is evaluated as an important system, but its data is considered as the core data, then the service system should be considered as a core system.

Backup and DR Policies

You are advised to configure different data backup policies based on service system levels. The following table shows the commonly used backup policies for cloud resources. You can adjust the policies based on service requirements. For details, see **Creating a Backup Policy**.

System Level	Backup Object	RPO	Retained Duration	Full Backup	Incremental Backup	Remote Backup	Drill Frequency
Core system	Cloud server	4 hours	> 1 year	Weekly	6 times/day	Yes	Monthly
	Cloud database	4 hours	> 1 year	Weekly	6 times/day	Yes	Monthly
	SFS Turbo file system	4 hours	> 1 year	Weekly	6 times/day	Yes	Monthly
Important system	Cloud server	12 hours	1 year	Every two weeks	2 times/day	Yes	Quarterly

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	Cloud database	12 hours	1 year	Every two weeks	2 times/day	Yes	Quarterly
	SFS Turbo file system	12 hours	1 year	Every two weeks	2 times/day	Yes	Quarterly
General system	Cloud server	24 hours	6 months	Monthly	1 time/day	No	Half a year
	Cloud database	24 hours	6 months	Monthly	1 time/day	No	Half a year
	SFS Turbo file system	24 hours	6 months	Monthly	1 time/day	No	Half a year

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