

Cloud Trace Service

User Guide

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1 Service Overview

1.1 What Is Cloud Trace Service

Cloud Trace Service (CTS) records operations on cloud service resources, enabling you to query, audit, and backtrack operations.

CTS records:

- Operations performed on the management console.
- Operations performed by calling supported APIs.
- Operations triggered by connected cloud services.

On the CTS console, you can check operation records of the last seven days. To store operation records for a longer period, transfer them to Object Storage Service (OBS) buckets.

1.2 Basic Concepts

Trackers

When you enable CTS for the first time, a management tracker named **system** is created automatically. You can also manually create multiple data trackers on the **Tracker List** page.

The management tracker identifies and associates with all cloud services your tenant account is using, and records all operations of your tenant account. Data trackers record details of the tenant's operations on data in OBS buckets.

A management tracker and 100 data trackers can be created for a tenant account.

Traces

Traces are operation logs of cloud service resources and are captured and stored by CTS. You can view traces to get to know details of operations performed on specific resources.

There are two types of traces:

- Management traces
Traces reported by cloud services.
- Data traces
Traces of read and write operations reported by OBS.

Trace List

The trace list displays traces generated in the last seven days. These traces record operations (in the last hour by default) on cloud service resources, including creation, modification, and deletion, but do not record query operations. There are two types of traces:

- Management traces: record details about creating, , and deleting cloud service resources in your tenant account.
- Data traces: record operations on data in OBS buckets, such as data upload and download.

Trace Files

A trace file is a collection of traces. CTS generates trace files based on services and transfer cycle and send these files to your specified OBS bucket in real time. In most cases, all traces of a service generated in a transfer cycle are compressed into one trace file. However, if there are a large number of traces, CTS will adjust the number of traces contained in each trace file.

Traces files are in JSON format. [Figure 1-1](#) shows an example of a trace file.

Figure 1-1 Trace file example

```
[[
  "time": 1491482532828,
  "user": {
    "id": "S9F40829165447fb9470b56f41dff599",
    "name": " ",
    "domain": {
      "name": " ",
      "id": "0f27bc42d1eb46a69482a72cbfc33ed2"
    }
  },
  "request": {
    "bucket_name": "obs-570f",
    "file_prefix_name": "-RsU",
    "status": "disabled"
  },
  "response": {
    "bucket_name": "obs-570f",
    "file_prefix_name": "-RsU",
    "status": "disabled",
    "tracker_name": "system"
  },
  "service_type": "CTS",
  "resource_type": "tracker",
  "resource_name": "system",
  "source_ip": " ",
  "trace_name": "updateTracker",
  "trace_type": "ConsoleAction",
  "api_version": "1.0",
  "record_time": 1491482532857,
  "trace_id": "7519ef09-lac6-11e7-8cc0-3d812829baf6",
  "trace_status": "normal"
},
  {
    "time": 1491482535203,
    "user": {
      "id": "S9F40829165447fb9470b56f41dff599",
      "name": " ",
      "domain": {
        "name": " ",
        "id": "0f27bc42d1eb46a69482a72cbfc33ed2"
      }
    },
    "request": {
      "bucket_name": "obs-570f",
      "file_prefix_name": "-RsU",
      "status": "enabled"
    },
    "response": {
      "bucket_name": "obs-570f",
      "file_prefix_name": "-RsU",
      "status": "enabled",
      "tracker_name": "system"
    },
    "service_type": "CTS",
    "resource_type": "tracker",
    "resource_name": "system",
    "source_ip": " ",
    "trace_name": "updateTracker",
    "trace_type": "ConsoleAction",
    "api_version": "1.0",
    "record_time": 1491482535224,
    "trace_id": "76831bfb-lac6-11e7-98ff-a1036f244dcd",
    "trace_status": "normal"
  }
]]
```

1.3 How CTS Functions

CTS connects to other cloud services on the cloud platform, records operations on cloud resources and the results, and stores these records in the form of trace files to OBS buckets in real time.

You can use CTS to create trackers to record trace files. If trace transfer has been configured, trace files will be stored in the OBS bucket that you have specified.

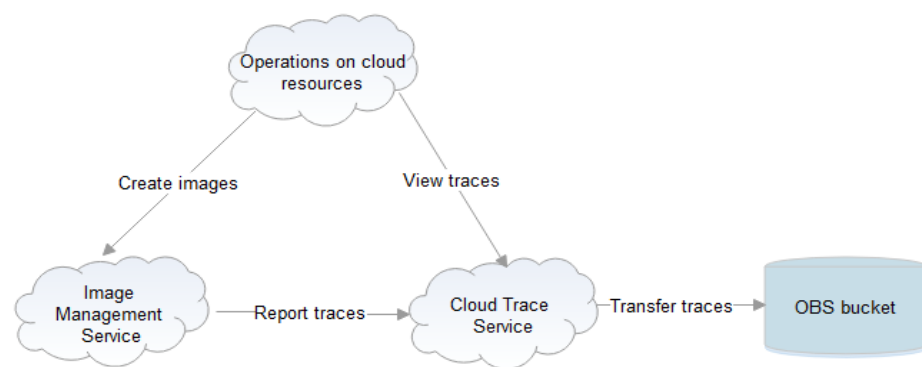
You can perform the following operations on a trace file:

- Trace file creation and storage
 - When you add, delete, or modify resources on services interconnected with CTS, such as Elastic Cloud Server (ECS), Elastic Volume Service (EVS), and Image Management Service (IMS), the target services will record the operations and their results automatically and deliver them in the form of trace files to CTS for archiving.
 - Operation records of the last seven days are displayed on the CTS console. If trace transfer has been enabled, operation records are periodically delivered to the OBS bucket that you have specified for long-term storage.
- Trace file query

- You can query operation records of the last 90 days on the **Trace List** page by filter or time.
- To query operation records earlier than seven days, you can download the trace files stored in OBS buckets if trace transfer has been configured.
- You can enable, disable, configure, or delete a tracker on the **Tracker List** page.

For example, if you create an image using IMS, the service will report the creation operation to CTS. Then, CTS will deliver the trace to an OBS bucket for storage if trace transfer has been configured. You can view trace files in the trace list. **Figure 1-2** shows the working principle of CTS.

Figure 1-2 How CTS functions



1.4 Application Scenarios

CTS provides operation records on cloud service resources. A record contains the user who performed the operation, IP address, operation content, and returned response message. With these records, you can better conduct auditing, plan and use resources, and identify operations of high risks or that violate regulations.

CTS can be used in the following three scenarios:

- **Security auditing**
You can query operation records matching specified conditions and check whether operations have been performed by authorized users for security analysis.
- **Fault locating**
If a specific resource or action encounters a fault, you can query operation records on the resource in a specific time period and view the requests and responses to facilitate fault locating.
- **Resource tracking**
You can view operation records of a cloud resource throughout its lifecycle.

1.5 Billing

You can use the basic functions of CTS for free, including enabling a tracker, tracking traces, as well as storing and querying traces of the last seven days. In addition, CTS works with other G42 cloud services to provide you with value-added functions such as trace file transfer and encryption. These functions may generate fees in other cloud services, but the fees are usually low. Use the value-added functions as needed.

Value-added functions:

- Trace transfer: OBS is required. Trace files configured for the management tracker are permanently stored, and trace files configured for the data tracker are stored based on the transfer time.
- Trace file encryption: After enabling trace transfer, you can use Data Encryption Workshop (DEW) to encrypt trace files stored in OBS buckets.
- Trace analysis: This function is provided by CTS and is free to use. However, it depends on log storage of Log Tank Service (LTS), which may generate fees.
- Key event notification: CTS provides the key event notification function to send notifications to your mobile phones and email addresses when specific operations are performed. You need to subscribe to topics on the Simple Message Notification (SMN) console for this function to take effect.

1.6 Permissions Management

You can use Identity and Access Management (IAM) to manage CTS permissions and control access to your resources. IAM provides identity authentication, permissions management, and access control.

With IAM, you can use your account to create IAM users for your employees, and assign permissions to the users to control their access to resource types. For example, you can create IAM users for software developers and assign specific permissions to allow them to use CTS resources but prevent them from deleting resources or performing any high-risk operations.

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

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

CTS Permissions

By default, new IAM users do not have any permissions assigned. To assign permissions to these new users, add them to one or more groups, and attach permissions policies or roles to these groups.

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

You can grant users permissions by using roles and policies.

- Roles: A type of coarse-grained authorization mechanism that provides only a limited number of service-level roles. When using roles to grant permissions, you also need to assign dependency roles. Roles are not an ideal choice for fine-grained authorization and secure access control.
- Policies: A type of fine-grained authorization mechanism that defines permissions required to perform operations on specific cloud resources under certain conditions. This mechanism allows for more flexible policy-based authorization for more secure access control. For example, you can grant ECS users only the permissions for managing a certain type of ECSs. Most policies define permissions based on APIs.

For the API actions supported by CTS, see [Table 1-1](#).

Table 1-1 System-defined roles and policies supported by CTS

Role/ Policy Name	Description	Type	Dependency
CTS FullAccess	Full permissions for CTS.	System-defined policy	None
CTS ReadOnlyAccess	Read-only permissions for CTS.	System-defined policy	None
CTS Administrator	Administrator permissions for CTS. Users granted these permissions can perform all operations on CTS. Users with this permission can perform read-only operations on all services except IAM.	System-defined role	This role must be used together with the Tenant Guest and OBS Administrator roles in the same project.

[Table 1-2](#) lists the common operations supported by each system-defined policy or role of CTS. Select the policies or roles as required.

Table 1-2 Common operations supported by system-defined policies or roles

Operation	CTS FullAccess	CTS ReadOnlyAccess	CTS Administrator
Querying traces	√	√	√
Querying quotas	√	√	√

Operation	CTS FullAccess	CTS ReadOnlyAccess	CTS Administrator
Creating a tracker	√	×	√
Modifying a tracker	√	×	√
Disabling a tracker	√	×	√
Enabling a tracker	√	×	√
Querying a tracker	√	√	√
Deleting a tracker	√	×	√
Creating a key event notification	√	×	√
Modifying a key event notification	√	×	√
Disabling a key event notification	√	×	√
Enabling a key event notification	√	×	√
Querying a key event notification	√	√	√
Deleting a key event notification	√	×	√

Custom Permissions Policies

You can create custom permissions policies to supplement the system-defined policies.

- For details, see "Creating a Custom Policy" in the *IAM User Guide*.

2 Getting Started

2.1 Overview

Scenarios

You need to enable CTS before using it. A management tracker named **system** is automatically created when CTS is enabled. All traces recorded by CTS are associated with the tracker.

Trace files must be stored in an Object Storage Service (OBS) bucket or Log Tank Service (LTS) log streams. Ensure that you have enabled OBS and LTS and have full permissions for the OBS bucket and LTS log stream you are going to use. By default, only the owner of OBS buckets can access the buckets and all objects contained in the buckets, but the owner can grant access permissions to other services and users by configuring access policies.

Associated Services


- OBS: used to store trace files.

NOTE

You must select a standard OBS bucket because CTS needs to frequently access the OBS bucket that stores traces.

- Data Encryption Workshop (DEW): Provides keys that can be used to encrypt trace files.
- LTS: stores logs.
- SMN: Sends email or SMS message notifications to users when key operations are performed.

Procedure

1. Log in to the management console.
2. Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.

3. Choose **Tracker List** in the navigation pane on the left.
4. Click **Enable CTS**.
5. In the displayed dialog box, click **Enable**. A tracker is automatically created.

You can view the tracker information on the **Tracker List** page.

The tracker records operations on cloud resources performed by the tenant who creates the tracker. For details about the cloud services supported by CTS, see [Supported Services and Operations](#).




2.2 Querying Real-Time Traces

Scenarios

After you enable CTS and the management tracker is created, CTS starts recording operations on cloud resources. After a data tracker is created, the system starts recording operations on data in OBS buckets. CTS stores operation records generated in the last seven days.

This section describes how to query and export operation records of the last seven days on the CTS console.

Procedure

1. Log in to the management console.
2. Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
3. Choose **Trace List** in the navigation pane on the left.
4. Set filters to search for your desired traces. The following filters are available:
 - **Trace Source, Resource Type, and Search By**
Select a filter from the drop-down list.
If you select **Resource ID** for **Search By**, specify a resource ID.
If you select **Trace name** for **Search By**, specify a trace name.
If you select **Resource name** for **Search By**, specify a resource name.
 - **Operator**: Select a user.
 - **Trace Status**: Select **All trace statuses, Normal, Warning, or Incident**.
 - Time range: You can query traces generated during any time range in the last seven days.
 - Click **Export** to export all traces in the query result as a CSV file. The file can contain up to 5000 records.
5. Click **Query**.
6. On the **Trace List** page, you can also export and refresh the trace list.
 - Click **Export** to export all traces in the query result as a CSV file. The file can contain up to 5000 records.
 - Click  to view the latest information about traces.
7. Click  on the left of a trace to expand its details.

8. Click **View Trace** in the **Operation** column. The trace details are displayed.

View Trace ×

```
{
  "trace_id": "df201462-8373-11e9-a4db-c3ac3c023b88",
  "code": "302",
  "trace_name": "logout",
  "resource_type": "user",
  "trace_rating": "normal",
  "source_ip": "-",
  "service_type": "IAM",
  "trace_type": "SystemAction",
  "event_type": "system",
  "resource_id": "f3f18b9215014f0d9ded3045af020811",
  "tracker_name": "system",
  "time": "May 31, 2019 15:15:29 GMT+08:00",
  "resource_name": "██████████",
  "record_time": "May 31, 2019 15:15:29 GMT+08:00",
  "user": {
    "name": "██████████",
    "id": "f3f18b9215014f0d9ded3045af020811",
    "domain": {
      "name": "██████████",
      "id": "2306579dc99f4c8690b14b68e734fcd9"
    }
  }
}
```

For details about key fields in the trace structure, see [Trace Structure](#) and [Example Traces](#).

2.3 Querying Archived Traces

Scenarios

CTS periodically sends trace files to OBS buckets. A trace file is a collection of traces. CTS generates trace files based on services and transfer cycle, and adjusts the number of traces contained in each trace file as needed. CTS can also save audit logs to LTS log streams.


This section describes how to view historical operation records in trace files downloaded from OBS buckets and in LTS log streams.

Prerequisites

You have configured a tracker in CTS and enabled **Transfer to OBS** or **Transfer to LTS**. For details, see [Configuring a Tracker](#).

Querying Traces Transferred to OBS

If you enable **Transfer to OBS** when configuring the tracker, traces will be periodically transferred to a specified OBS bucket as trace files for long-term storage.

1. Log in to the management console.
2. Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.

3. Choose **Tracker List** in the navigation pane on the left.
4. Click a bucket in the **OBS Bucket** column.
5. In the OBS bucket, locate the file storage path to view the desired trace, and click **Download** on the right to download the file to the default download path of the browser. If you need to save it to a custom path, click **More > Download As** on the right.

- The trace file storage path is as follows:

OBS bucket name > CloudTraces > Region > Year > Month > Day > Tracker name > Service directory

An example is ***User-defined name > CloudTraces > region > 2016 > 5 > 19 > system > ECS.***

- The trace file naming format is as follows:

Trace file prefix_CloudTrace_Region/Region-project_Time when the trace file was uploaded to OBS: Year-Month-DayTHour-Minute-SecondZ_Random characters.json.gz

An example is ***File Prefix_CloudTrace_region-project_2016-05-30T16-20-56Z_21d36ced8c8af71e.json.gz.***

 **NOTE**

The OBS bucket name and trace file prefix are user-defined, and other parameters are automatically generated.

Downloading the file will incur request fees and traffic fees.

For details about key fields in the CTS trace structure, see [Trace Structure](#) and [Example Traces](#).

6. Decompress the downloaded package to obtain a JSON file with the same name as the package, as shown in [Figure 2-1](#). Open the JSON file using a text file editor to view traces.

Figure 2-1 JSON file

```


{
  "time": 149149253200,
  "user": {
    "id": "59f40929165447eb9470b6641d4ef699",
    "name": "XXXXXXXXXXXX",
    "domain": {
      "name": "XXXXXXXXXXXX",
      "id": "02c70c42d1ab46e69492a72cb0fc39e02"
    }
  },
  "request": {
    "bucket_name": "obs-5702",
    "file_prefix_name": "-5AD",
    "status": "disabled"
  },
  "response": {
    "bucket_name": "obs-5702",
    "file_prefix_name": "-5AD",
    "status": "disabled",
    "tracker_name": "system"
  },
  "service_type": "CTS",
  "resource_type": "tracker",
  "resource_name": "system",
  "source_ip": "XXXXXXXXXXXX",
  "trace_name": "updateTracker",
  "trace_type": "ConsoleAction",
  "api_version": "1.0",
  "record_time": 149149253201,
  "record_id": "768318fb-lac6-11e7-80c0-3d812829a6f6",
  "trace_status": "Normal"
}

```

Querying Traces Transferred to LTS

If you enable **Transfer to LTS** when configuring a tracker, traces will be transferred to the **CTS/{Tracker Name}** log stream for long-term storage. *{Tracker Name}* indicates the name of the current tracker. For example, the log stream path of the management tracker is **CTS/system-trace**.

Step 1 Log in to the management console.


Step 2 Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.

Step 3 Choose **Tracker List** in the navigation pane on the left.

Step 4 Click an LTS log stream in the **Storage** column.

Step 5 On the **Log Stream** tab page in the **CTS** log group page, select the *{Tracker name}* log stream to view trace logs.

For details about key fields in the CTS trace structure, see [Trace Structure](#) and [Example Traces](#).

Step 6 Click  to download the log file to your local PC.

NOTE

Each time you can download up to 5,000 log events. If the number of selected log events exceeds 5000, you cannot download them directly from LTS. Transfer them to OBS and then download them from OBS.

----End

2.4 Configuring Key Event Notifications

You can create key event notifications on CTS so that SMN sends you SMS, email, or HTTP/HTTPS notifications of key events. This function is triggered by CTS, and notifications are sent by SMN. SMN sends key event notifications to subscribers. Before setting notifications, you need to know how to create topics and add subscriptions on the SMN console.

Scenarios


You can use this function for:

- Real-time detection of high-risk operations (such as VM restart and security configuration changes), cost-sensitive operations (such as creating and deleting expensive resources), and service-sensitive operations (such as network configuration changes).
- Detection of operations such as login of users with admin-level permissions or operations performed by users who do not have the required permissions.
- Connection with your own audit system: You can synchronize all audit logs to your audit system in real time to analyze the API calling success rate, unauthorized operations, security, and costs.

Prerequisites

- SMN sends key event notifications to subscribers. Before setting notifications, you need to know how to create topics and add subscriptions on the SMN console.
- You can create up to 100 key event notifications on CTS:
 - Specify key operations, users, and topics to customize notifications.
 - Complete key event notifications can be sent to notification topics.
- If CTS and Cloud Eye use the same message topic, they can receive messages from the same terminal but with different content.
- You can configure one key event notification for operations initiated by a maximum of 50 users in 10 user groups. For each key event notification, you can add users from different user groups, but cannot select multiple user groups at once.

Creating a Key Event Notification

1. Log in to the management console.
2. Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
3. In the navigation pane on the left, choose **Key Event Notifications**. The **Key Event Notifications** page is displayed.
4. Click **Create Key Event Notification**. On the displayed page, specify required parameters.
5. Enter a key event notification name.
Notification Name: Identifies key event notifications. This parameter is mandatory. The name can contain up to 64 characters. Only letters, digits, and underscores (_) are allowed.
6. Configure key operations.
Select the operations that will trigger notifications. When a selected operation is performed, an SMN notification is sent immediately.
 - **Operation Type:** Select **All** or **Custom**.
 - **All:** This option is suitable if you have connected CTS to your own audit system. When **All** is chosen, you cannot deselect operations because all operations on all cloud services that have connected with CTS will trigger notifications. You are advised to use an SMN topic for which HTTPS is selected.
 - **Custom:** This option is suitable for enterprises that require detection of high-risk, cost-sensitive, service-sensitive, and unauthorized operations. You can connect CTS to your own audit system for log analysis.
Customize the operations that will trigger notifications. Up to 1000 operations of 100 services can be added for each notification. For details, see [Supported Services and Operations](#).
 - **Advanced Filter:** You can set an advanced filter to specify the operations that will trigger notifications. Operations can be filtered by fields **api_version**, **code**, **trace_rating**, **trace_type**, **resource_id**, and

resource_name. Up to six filter conditions can be set. When you configure multiple conditions, specify whether an operation is considered a match when all conditions are met (AND) or any of the conditions are met (OR).

7. Configure users.
SMN messages will be sent to subscribers when the specified users perform key operations.
 - If you select **All users**, SMN will notify subscribers of key operations initiated by all users.
 - If you select **Specified users**, SMN will notify subscribers of key operations initiated by your specified users.
8. Configure an SMN topic.
 - When **Yes** is selected for **Send Notification**:
 - **SMN Topic:** You can select an existing topic or click **SMN** to create one on the SMN console.
 - If you do not want to send notifications, no further action is required.
9. Click **OK**.

Managing Key Event Notifications

After you create a key event notification, you can view its name, status, template, and SMN topic in the notification list and delete it as required.



- Step 1** Log in to the management console.
- Step 2** Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
- Step 3** Choose **Key Event Notifications** in the navigation pane on the left. On the displayed page, perform the following operations as required. For details, see [Table 2-1](#).

Table 2-1 Related operations

Operation	Description
Viewing a key event notification	Click View in the Operation column to view the operation list and user list details of the notification.
Enable/Disable a key event notification	Click Enable or Disable in the Operation column. NOTE CTS can trigger key event notifications only after SMN is configured.

Operation	Description
Modifying a key event notification	Click More > Modify in the Operation column to modify the configuration of the key event notification.
Deleting a key event notification	Click More > Delete in the Operation column.
Refreshing the key event notification list	Click  in the upper right corner.

----End

3 Querying Traces


3.1 Querying Real-Time Traces



Scenarios

After you enable CTS and the management tracker is created, CTS starts recording operations on cloud resources. After a data tracker is created, the system starts recording operations on data in OBS buckets. CTS stores operation records generated in the last seven days.

This section describes how to query and export operation records of the last seven days on the CTS console.

Procedure

1. Log in to the management console.
2. Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
3. Choose **Trace List** in the navigation pane on the left.
4. Set filters to search for your desired traces. The following filters are available:
 - **Trace Source, Resource Type, and Search By**
Select a filter from the drop-down list.
If you select **Resource ID** for **Search By**, specify a resource ID.
If you select **Trace name** for **Search By**, specify a trace name.
If you select **Resource name** for **Search By**, specify a resource name.
 - **Operator**: Select a user.
 - **Trace Status**: Select **All trace statuses, Normal, Warning, or Incident**.
 - **Time range**: You can query traces generated during any time range in the last seven days.
 - Click **Export** to export all traces in the query result as a CSV file. The file can contain up to 5000 records.

5. Click **Query**.
6. On the **Trace List** page, you can also export and refresh the trace list.
 - Click **Export** to export all traces in the query result as a CSV file. The file can contain up to 5000 records.
 - Click  to view the latest information about traces.
7. Click  on the left of a trace to expand its details.
8. Click **View Trace** in the **Operation** column. The trace details are displayed.

View Trace ✕

```
{
  "trace_id": "df201462-8373-11e9-a4db-c3ac3c023b88",
  "code": "302",
  "trace_name": "logout",
  "resource_type": "user",
  "trace_rating": "normal",
  "source_ip": "-",
  "service_type": "IAM",
  "trace_type": "SystemAction",
  "event_type": "system",
  "resource_id": "f3f18b9215014f0d9ded3045af020811",
  "tracker_name": "system",
  "time": "May 31, 2019 15:15:29 GMT+08:00",
  "resource_name": "f3f18b9215014f0d9ded3045af020811",
  "record_time": "May 31, 2019 15:15:29 GMT+08:00",
  "user": {
    "name": "f3f18b9215014f0d9ded3045af020811",
    "id": "f3f18b9215014f0d9ded3045af020811",
    "domain": {
      "name": "f3f18b9215014f0d9ded3045af020811",
      "id": "2306579dc99f4c8690b14b68e734fcd9"
    }
  }
}
```

For details about key fields in the trace structure, see [Trace Structure](#) and [Example Traces](#).

3.2 Querying Archived Traces

Scenarios

CTS periodically sends trace files to OBS buckets. A trace file is a collection of traces. CTS generates trace files based on services and transfer cycle, and adjusts the number of traces contained in each trace file as needed. CTS can also save audit logs to LTS log streams.


This section describes how to view historical operation records in trace files downloaded from OBS buckets and in LTS log streams.

Prerequisites

You have configured a tracker in CTS and enabled **Transfer to OBS** or **Transfer to LTS**. For details, see [Configuring a Tracker](#).

Querying Traces Transferred to OBS

If you enable **Transfer to OBS** when configuring the tracker, traces will be periodically transferred to a specified OBS bucket as trace files for long-term storage.

1. Log in to the management console.
2. Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
3. Choose **Tracker List** in the navigation pane on the left.
4. Click a bucket in the **OBS Bucket** column.
5. In the OBS bucket, locate the file storage path to view the desired trace, and click **Download** on the right to download the file to the default download path of the browser. If you need to save it to a custom path, click **More > Download As** on the right.
 - The trace file storage path is as follows:
OBS bucket name > CloudTraces > Region > Year > Month > Day > Tracker name > Service directory
An example is ***User-defined name > CloudTraces > region > 2016 > 5 > 19 > system > ECS***.
 - The trace file naming format is as follows:
Trace file prefix_CloudTrace_Region/Region-project_Time when the trace file was uploaded to OBS: Year-Month-DayTHour-Minute-SecondZ_Random characters.json.gz
An example is ***File Prefix_CloudTrace_region-project_2016-05-30T16-20-56Z_21d36ced8c8af71e.json.gz***.

NOTE

The OBS bucket name and trace file prefix are user-defined, and other parameters are automatically generated.

Downloading the file will incur request fees and traffic fees.

For details about key fields in the CTS trace structure, see [Trace Structure](#) and [Example Traces](#).

6. Decompress the downloaded package to obtain a JSON file with the same name as the package, as shown in [Figure 3-1](#). Open the JSON file using a text file editor to view traces.

Figure 3-1 JSON file


```

{
  "time": 1491402552020,
  "user": {
    "id": "59f40029166447eb9470b66641df2f99",
    "name": "*****",
    "domain": {
      "name": "*****",
      "id": "0017bc42d1ab64e69482a72cbdfc33e02"
    }
  },
  "request": {
    "bucket_name": "uba-ST02",
    "file_prefix_name": "-RAD",
    "status": "disabled"
  },
  "response": {
    "bucket_name": "uba-ST02",
    "file_prefix_name": "-RAD",
    "status": "disabled",
    "tracker_name": "system"
  },
  "service_type": "CTS",
  "resource_type": "tracker",
  "resource_name": "system",
  "resource_id": "*****",
  "trace_name": "updateTracker",
  "trace_type": "Configuration",
  "api_version": "1.0",
  "resource_time": 1491402552020,
  "trace_id": "1819ed99-1ac6-11e7-90c0-3d812929a6df",
  "trace_status": "Normal"
},
{
  "time": 1491402552020,
  "user": {
    "id": "59f40029166447eb9470b66641df2f99",
    "name": "*****",
    "domain": {
      "name": "*****",
      "id": "0017bc42d1ab64e69482a72cbdfc33e02"
    }
  },
  "request": {
    "bucket_name": "uba-ST02",
    "file_prefix_name": "-RAD",
    "status": "enabled"
  },
  "response": {
    "bucket_name": "uba-ST02",
    "file_prefix_name": "-RAD",
    "status": "enabled",
    "tracker_name": "system"
  },
  "service_type": "CTS",
  "resource_type": "tracker",
  "resource_name": "system",
  "resource_id": "*****",
  "trace_name": "updateTracker",
  "trace_type": "Configuration",
  "api_version": "1.0",
  "resource_time": 1491402552020,
  "trace_id": "769310d0-1ac6-11e7-90c0-e103c224660c",
  "trace_status": "Normal"
}
}


```

Querying Traces Transferred to LTS

If you enable **Transfer to LTS** when configuring a tracker, traces will be transferred to the **CTS/{Tracker Name}** log stream for long-term storage. *{Tracker Name}* indicates the name of the current tracker. For example, the log stream path of the management tracker is **CTS/system-trace**.

- Step 1** Log in to the management console.
- Step 2** Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
- Step 3** Choose **Tracker List** in the navigation pane on the left.
- Step 4** Click an LTS log stream in the **Storage** column.
- Step 5** On the **Log Stream** tab page in the **CTS** log group page, select the *{Tracker name}* log stream to view trace logs.

For details about key fields in the CTS trace structure, see [Trace Structure](#) and [Example Traces](#).

- Step 6** Click  to download the log file to your local PC.

NOTE

Each time you can download up to 5,000 log events. If the number of selected log events exceeds 5000, you cannot download them directly from LTS. Transfer them to OBS and then download them from OBS.

----End

4 Management Trackers

CTS provides two types of trackers: a management tracker and multiple data trackers. The management tracker records management traces, which are operations on all cloud resources, such as creation, login, and deletion. Data trackers record data traces, which are operations performed by tenants on data in Object Storage Service (OBS) buckets, such as upload and download.

This section describes how to use the management tracker.

4.1 Creating a Tracker

If you log in to CTS for the first time, click **Enable CTS** on the **Tracker List** page. A management tracker named **system** will be automatically created. The management tracker identifies and associates with all cloud services your tenant account is using, and records all operations of your tenant account.

NOTE

- CTS records operations performed in the last seven days. To store traces for a longer time, configure a tracker. The tracker will store traces to your specified LTS log streams or OBS buckets.
- CTS can only have one management tracker. The stored historical traces are retained even after the management tracker is deleted. When you enable CTS again, the management tracker is restored.

4.2 Configuring a Tracker

Scenario

You can configure the created management tracker to transfer traces recorded in CTS to OBS or LTS for long-term storage.

You can select whether to send recorded traces to an OBS bucket. You can also transfer the traces of multiple accounts to the same OBS bucket for centralized management.

 **NOTE**

There are three storage classes of OBS buckets, Standard, Infrequent Access, and Archive. You must use Standard OBS buckets for trace transfer because CTS needs to frequently access the OBS buckets.

After the tracker configuration is complete, CTS will immediately start recording operations under the new settings.

This section describes how to configure the management tracker.

Prerequisites

You have enabled CTS.

Procedure



- Step 1** Log in to the management console.
- Step 2** Click  in the upper left corner to select the desired region and project.
- Step 3** Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
- Step 4** Choose **Tracker List** in the left navigation pane.
- Step 5** Click **Configure** in the **Operation** column in the row of the management tracker.
- Step 6** On the **Configure Transfer** page, modify the transfer configurations of the tracker. For details, see [Table 4-1](#).

Table 4-1 Transfer parameters

Parameter	Description
Transfer to OBS	When Transfer to OBS is enabled, select an existing OBS bucket or create one on this page and set File Prefix . When Transfer to OBS is disabled, no operation is required.
OBS Bucket	New: If this function is enabled, an OBS bucket will be created automatically with the name you enter. Existing: Select an existing OBS bucket.
Select Bucket	If you select New for OBS Bucket , enter an OBS bucket name. The OBS bucket name cannot be empty. It can contain 3 to 63 characters, including only lowercase letters, digits, hyphens (-), and periods (.). It cannot contain two consecutive periods (for example, my..bucket). A period (.) and a hyphen (-) cannot be adjacent to each other (for example, my-.bucket and my.-bucket). Do not use an IP address as a bucket name. If you select Existing for OBS Bucket , select an existing OBS bucket.

Parameter	Description
Retention Period	The duration for storing traces in the OBS bucket. This configuration will apply to the selected bucket and all files in it. Different compliance standards require different trace retention periods. You are advised to set the retention period to at least 180 days. <ul style="list-style-type: none"> For the management tracker, the retention period configured on the OBS console is used by default and cannot be changed.
File Prefix	A prefix is used to mark a transferred trace file. Your specified prefix will be automatically added to the beginning of the name of a transferred file, helping you quickly filter files. Enter 0 to 64 characters. Only letters, digits, hyphens (-), underscores (_), and periods (.) are allowed.
Encrypt Trace File	When OBS Bucket Account is set to Logged-in user , you can configure an encryption key for the traces. When Encrypt Trace File is enabled, CTS obtains the key IDs of the current login user from DEW. You can select a key from the drop-down list.
Transfer to LTS	When Transfer to LTS is enabled, traces are transferred to the log stream.
Log Group	When Transfer to LTS is enabled, the default log group name CTS is set. When Transfer to LTS is disabled, no operation is required.

Step 7 Click **Next > Configure** to complete the configuration of the tracker.

You can then view the tracker details on the **Tracker List** page.

 **NOTE**

Traces recorded by CTS are delivered periodically to the OBS bucket for storage. If you configure an OBS bucket for a tracker, traces generated during the current cycle (usually several minutes) will be delivered to the configured OBS bucket. For example, if the current cycle is from 12:00:00 to 12:05:00 and you configure an OBS bucket for a tracker at 12:02:00, traces received from 12:00:00 to 12:02:00 will also be delivered to the configured OBS bucket for storage at 12:05:00.

----End

4.3 Disabling or Enabling a Tracker

Scenario



You can enable or disable a tracker on the CTS console. Disabling a tracker does not affect existing operation records.

This section describes how to enable or disable a tracker.

Prerequisites

You have enabled CTS.

Procedure

- Step 1** Log in to the management console.
- Step 2** Click  in the upper left corner to select the desired region and project.
- Step 3** Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
- Step 4** Choose **Tracker List** in the left navigation pane.
- Step 5** Click **Disable** in the **Operation** column in the row of the management tracker.
- Step 6** Click **OK**.

----End

After the tracker is disabled, the **Disable** button changes to **Enable**. To enable the management tracker again, click **Enable** and then click **OK**. The tracker will start recording operations again.

5 Data Trackers

CTS provides two types of trackers: a management tracker and multiple data trackers. The management tracker records management traces, which are operations on all cloud resources, such as creation, login, and deletion. Data trackers record data traces, which are operations performed by tenants on data in OBS buckets, such as upload and download.

This section describes how to use a data tracker.

5.1 Creating a Tracker

Scenario

You can create data trackers to record operations on data. Data trackers record data traces, which are operations performed by tenants on data in OBS buckets, such as upload and download.

When you enable CTS, a management tracker is created automatically. Only one management tracker can be created. The trackers you created are all data trackers.

NOTE

- CTS records operations performed in the last seven days. To store traces for a longer time, configure a tracker. The tracker will store traces to your specified LTS log streams or OBS buckets.

Prerequisites

You have enabled CTS.

Procedure

1. Log in to the management console.
2. In the service list, choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
3. Choose **Tracker List** in the left navigation pane. In the upper right corner of the displayed page, click **Create Tracker**.

4. Set basic information. Enter a tracker name. Click **Next**.

 **NOTE**

- Tracker name contains only letters, digits, hyphens (-), and underscores (_), and must start with a letter or digit.
 - Tracker name cannot be empty and contains a maximum of 32 characters.
 - The name of the data tracker cannot be system or system-trace.
5. Select a trace. Set parameters and click **Next**.

Table 5-1 Parameters for selecting a trace

Parameter	Description
Data Trace Source	Container for storing data traces. Currently, OBS buckets are used.
OBS Bucket	Select an OBS bucket from the drop-down list.
Operation	<ul style="list-style-type: none"> • Select the operations to record. • Options: Read and Write. Select at least one of them.

6. Configure a transfer. Set parameters and click **Next**.

Table 5-2 Parameters for configuring a transfer

Parameter	Description
Transfer to OBS	<p>If you select Yes, select an existing OBS bucket and set File Prefix.</p> <p>When Transfer to OBS is disabled, no operation is required.</p>
OBS Bucket	<p>New: If this function is enabled, an OBS bucket will be created automatically with the name you enter.</p> <p>Select Existing: Select an existing OBS bucket.</p>
Select Bucket	<p>When you select New, enter an OBS bucket name. The OBS bucket name cannot be empty. It can contain 3 to 63 characters, including only lowercase letters, digits, hyphens (-), and periods (.). It cannot contain two consecutive periods (for example, my..bucket). A period (.) and a hyphen (-) cannot be adjacent to each other (for example, my-.bucket and my.-bucket). Do not use an IP address as a bucket name.</p> <p>When you select Existing, select an existing OBS bucket.</p>

Parameter	Description
Retention Period	The duration for storing traces in the OBS bucket. This configuration will apply to the selected bucket and all files in it. Different compliance standards require different trace retention periods. You are advised to set the retention period to at least 180 days. <ul style="list-style-type: none">For a data tracker, you can set the duration to 30 days, 60 days, 90 days, 180 days, 3 years, or the same as that of OBS.
File Prefix	A prefix is used to mark a transferred trace file. Your specified prefix will be automatically added to the beginning of the name of a transferred file, helping you quickly filter files. Enter 0 to 64 characters. Only letters, digits, hyphens (-), underscores (_), and periods (.) are allowed.
Transfer to LTS	When Transfer to LTS is enabled, traces are transferred to the log stream.
Log group name	When Transfer to LTS is enabled, the default log group name CTS is set. When Transfer to LTS is disabled, no operation is required.

- Preview the tracker information and click **Create**.
- Click **OK**.

5.2 Configuring a Tracker

Scenario

You can configure key event notifications of trackers on the CTS console no matter whether the trackers are enabled or not. For enabled trackers, you can also configure **Transfer to OBS** or **Transfer to LTS** for trace transfer.

- You can select an existing OBS bucket for trace transfer. CTS will automatically attach a required policy to the OBS bucket.
- If you modify the trace file prefix of a tracker, the OBS bucket policy will not be affected.

NOTE

There are three storage classes of OBS buckets, Standard, Infrequent Access, and Archive. You must use Standard OBS buckets for trace transfer because CTS needs to frequently access the OBS buckets.

The configuration will take effect immediately after it is complete.

This section describes how to configure a data tracker.

Prerequisites

You have enabled CTS and created a data tracker.

Procedure



1. Log in to the management console.
2. Click  in the upper left corner to select the desired region and project.
3. Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
4. Choose **Tracker List** in the navigation pane on the left.
5. Click **Configure** in the **Operation** column in the row of the target data tracker.
6. In the **Select Trace** step, the name of the current OBS bucket is displayed by default for **OBS Bucket** under **Data Trace Source** and cannot be changed. In the **Configure Transfer** step, you can modify the transfer settings of the tracker. For details about the parameters, see [Table 5-3](#).

Table 5-3 Parameters for configuring a transfer

Parameter	Description
Transfer to OBS	If you select Yes , select an existing OBS bucket and set File Prefix . When Transfer to OBS is disabled, no operation is required.
OBS Bucket	New: If this function is enabled, an OBS bucket will be created automatically with the name you enter. Select Existing: Select an existing OBS bucket.
Select Bucket	When you select New , enter an OBS bucket name. The OBS bucket name cannot be empty. It can contain 3 to 63 characters, including only lowercase letters, digits, hyphens (-), and periods (.). It cannot contain two consecutive periods (for example, my..bucket). A period (.) and a hyphen (-) cannot be adjacent to each other (for example, my-.bucket and my.-bucket). Do not use an IP address as a bucket name. When you select Existing , select an existing OBS bucket.
Retention Period	The duration for storing traces in the OBS bucket. This configuration will apply to the selected bucket and all files in it. Different compliance standards require different trace retention periods. You are advised to set the retention period to at least 180 days. <ul style="list-style-type: none"> • For a data tracker, you can set the duration to 30 days, 60 days, 90 days, 180 days, 3 years, or the same as that of OBS.

Parameter	Description
File Prefix	A prefix is used to mark a transferred trace file. Your specified prefix will be automatically added to the beginning of the name of a transferred file, helping you quickly filter files. Enter 0 to 64 characters. Only letters, digits, hyphens (-), underscores (_), and periods (.) are allowed.
Transfer to LTS	When Transfer to LTS is enabled, traces are transferred to the log stream.
Log group name	When Transfer to LTS is enabled, the default log group name CTS is set. When Transfer to LTS is disabled, no operation is required.

7. Click **Next** > **Configure** to complete the configuration of the data tracker. You can then view the tracker details on the **Tracker List** page.

 **NOTE**

Traces recorded by CTS are delivered periodically to the OBS bucket for storage. If you configure an OBS bucket for a tracker, traces generated during the current cycle (usually several minutes) will be delivered to the configured OBS bucket. For example, if the current cycle is from 12:00:00 to 12:05:00 and you configure an OBS bucket for a tracker at 12:02:00, traces received from 12:00:00 to 12:02:00 will also be delivered to the configured OBS bucket for storage at 12:05:00.

5.3 Disabling or Enabling a Tracker



Scenario

You can disable a tracker on the CTS console. After a tracker is disabled, it will stop recording operations, but you can still view operation records that have been collected.

Prerequisites

You have created a data tracker on the CTS console.

Procedure

1. Log in to the management console.
2. Click  in the upper left corner to select the desired region and project.
3. Click  in the upper left corner and choose **Management & Deployment** > **Cloud Trace Service**. The CTS console is displayed.
4. Choose **Tracker List** in the navigation pane on the left.
5. Click **Disable** in the **Operation** column in the row of the target data tracker.
6. Click **Yes**.

After the tracker is disabled, the **Disable** button changes to **Enable**. To enable the tracker, click **Enable** and then click **OK**. The tracker will start recording operations again.

5.4 Deleting a Tracker

Scenario

Deleting a data tracker on the CTS console is available, and does not affect the existing operation records. This section describes how to delete a data tracker on the management console.



NOTE

When you enable CTS, a management tracker is created automatically. Only one management tracker can be created and it cannot be deleted.

Prerequisites

A data tracker has been created.

Procedure

1. Log in to the management console.
2. Click  in the upper left corner to select the desired region and project.
3. Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
4. Choose **Tracker List** in the navigation pane on the left.
5. Click **Delete** in the **Operation** column of the target configuration item.

NOTE

The system tracker cannot be deleted.

6. Click **Yes**.

6 Application Examples

6.1 Security Auditing

Scenario



You can query operation records matching specified conditions and check whether operations have been performed by authorized users for security analysis.

Prerequisites

You have enabled CTS and trackers are running properly.

Procedure (for Old Console)

The following takes the records of EVS disk creation and deletion in the last two weeks as an example.

1. Log in to the management console as a CTS administrator.
2. Click  in the upper left corner to select the desired region and project.
3. Click  in the upper left corner and choose **Management & Deployment** > **Cloud Trace Service**. The CTS console is displayed.
4. Choose **Trace List** in the left navigation pane.
5. Set the time range to **Last 1 week**, set filters in sequence, and click **Query**.

NOTE

Select **Management** for **Trace Type**, **evs** for **Trace Source**, **evs** for **Resource Type**, **Trace name** for **Search By**, select **createVolume** or **deleteVolume**, and click **Query**. By default, all EVS disk creation or deletion operations performed in the last hour are queried. You can also set the time range to query all EVS creation or deletion operations performed in the last seven days at most.

6. To obtain the operation records of the last week, query them in the OBS bucket. Choose **Tracker List** in the navigation pane on the left.

 NOTE

To store operation records for more than seven days, you must configure the management tracker to transfer them to an OBS bucket. Otherwise, you cannot query the operation records generated seven days ago.

7. Download traces older than seven days or all traces by following the instructions in [Querying Archived Traces](#).
8. In the trace files, search traces using keywords **createVolume** or **deleteVolume**.
9. Check the traces obtained from steps 5 and 8 to see whether there are any unauthorized operations or operations that do not conform to security rules.

6.2 Fault Locating

Scenario



If a resource or an action encounters an exception, you can query operation records of the resource or action in a specified time period and view the requests and responses to facilitate fault locating.

Prerequisites

You have enabled CTS and trackers are running properly.

Procedure (for Old Console)

The following shows how to locate an ECS fault which occurred in a morning.

1. Log in to the management console as a CTS administrator.
2. Click  in the upper left corner to select the desired region and project.
3. Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
4. Choose **Trace List** in the left navigation pane.
5. Set filters in sequence and click **Query**.



 NOTE

Select **Management** for **Trace Type**, **ECS** for **Trace Source**, **ecs** for **Resource Type**, **Resource ID** for **Search By**, and enter the ID of the faulty virtual machine (VM). In the upper right corner, select a time range from 06:00:00 to 12:00:00 on the day when the fault occurred. Then, click **Query** to view the result.

6. Check the returned traces, especially the request type and response of each trace. Pay attention to traces whose status is **warning** or **incident**, and traces whose response indicates a failure.

The following shows how to locate a fault after an ECS server failed to be created.

1. Log in to the management console as a CTS administrator.

2. Click  in the upper left corner to select the desired region and project.
3. Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
4. Choose **Trace List** in the left navigation pane.
5. Select **Management** for **Trace Type**, **ECS** for **Trace Source**, **ecs** for **Resource Type**, and **Warning** for **Trace Status**. In the returned traces, locate the trace named **createServer**.
6. Check the trace details and locate the fault based on the error code or error message.

6.3 Resource Tracking

Scenario



You can view operation records of a cloud resource throughout its lifecycle.

Prerequisites

You have enabled CTS and trackers are running properly.

Procedure (for Old Console)

The following takes the records of all operations on an ECS server as an example.

1. Log in to the management console as a CTS administrator.
2. Click  in the upper left corner to select the desired region and project.
3. Click  in the upper left corner and choose **Management & Deployment > Cloud Trace Service**. The CTS console is displayed.
4. Choose **Trace List** in the left navigation pane.
5. Set filters in sequence and click **Query**.

NOTE

Select **Management** for **Trace Type**, **ECS** for **Trace Source**, **ecs** for **Resource Type**, **Resource ID** for **Search By**, enter the ID of the faulty VM, and click **Query**. By default, the matching traces generated in the last hour are returned. You can also set the time range to view the matching traces in the last seven days at most.

6. Choose **Tracker List** in the navigation pane on the left.
7. Download traces older than seven days or all traces by following the instructions in [Querying Archived Traces](#).
8. Check all the traces obtained in [5](#) and [7](#).

7 Trace References

7.1 Trace Structure

A trace consists of multiple key fields shown in [Table 7-1](#).

 **NOTE**

- This section describes the key trace fields displayed on the CTS console.
- When some fields are displayed on the CTS console, their formats are optimized for easy understanding.

Table 7-1 Key trace fields

Field	Mandatory	Type	Description
time	Yes	Date	Time when a trace occurred When the field is displayed on the console, its value is the local standard time (in GMT time), for example, Dec 8, 2016 11:24:04 GMT+08:00 . However, this field is transmitted and stored as a timestamp in APIs. In this case, the value is the number of milliseconds since 00:00:00 on January 1, 1970 (GMT).
user	Yes	Structure	Cloud account used to perform an operation The value is also displayed in the Operator column on the Trace List page. This field is transmitted and stored as a string in APIs.

Field	Mandatory	Type	Description
request	No	Structure	Requested operation This field is transmitted and stored as a string in APIs.
response	No	Structure	Response to a request This field is transmitted and stored as a string in APIs.
service_type	Yes	String	Operation source
resource_type	Yes	String	Resource type
resource_name	No	String	Resource name
resource_id	No	String	Unique resource ID
source_ip	Yes	String	IP address of the user that performed an operation The value of this field is empty if the operation was triggered by system.
trace_name	Yes	String	Operation name
trace_rating	Yes	String	Trace status. The value can be normal , warning , or incident . <ul style="list-style-type: none"> ● normal: The operation succeeded. ● warning: The operation failed. ● incident: The operation caused a serious consequence, for example, a node failure or service interruption.
trace_type	Yes	String	Operation type There are types of operations: <ul style="list-style-type: none"> ● ConsoleAction: operations performed on the management console ● SystemAction: operations triggered by system ● ApiCall: operations triggered by calling API Gateway
api_version	No	String	Version of the cloud service API which was called to perform an operation

Field	Mandatory	Type	Description
message	No	Structure	Remarks
record_time	Yes	Number	Time when the operation was recorded, in the form of a timestamp
trace_id	Yes	String	Unique operation ID

7.2 Example Traces

This section provides two example traces and describes their key fields to help you better understand traces. You can read other traces in a similar way as shown below.

For details on the fields in a trace file, see [Trace Structure](#).

ECS Server Creation

```
{
  "time": "2016/12/08 11:07:28 GMT+08:00",
  "user": {
    "name": "aaa/op_service",
    "id": "f2fe9fac63414a35a7d03108d5f1ea73",
    "domain": {
      "name": "aaa",
      "id": "1f9b9ba51f6b4061bd5c1736b28469f8"
    }
  },
  "request": {
    "server": {
      "name": "as-config-15f1_XWO68TFC",
      "imageRef": "b2b2c7dc-bbb0-4d6b-81dd-f0904023d54f",
      "flavorRef": "m1.tiny",
      "personality": [],
      "vpcid": "e4c374b9-3675-482c-9b81-4acd59745c2b",
      "nics": [
        {
          "subnet_id": "fff89132-88d4-4e5b-9e27-d9001167d24f",
          "nictype": null,
          "ip_address": null,
          "binding:profile": null,
          "extra_dhcp_opts": null
        }
      ],
      "adminPass": "*****",
      "count": 1,
      "metadata": {
        "op_svc_userid": "26e96eda18034ae9a44130bacb967b96"
      },
      "availability_zone": "az1.dc1",
      "root_volume": {
        "volumetype": "SATA",
        "extendparam": {
          "resourceSpecCode": "SATA"
        }
      },
      "size": 40
    },
    "data_volumes": [],
    "security_groups": [
      {

```

```
        "id": "dd597fd7-d119-4994-a22c-891fcfc54be1"
      }
    ],
    "key_name": "KeyPair-3e51"
  }
},
"response": {
  "status": "SUCCESS",
  "entities": {
    "server_id": "42d39b4a-19b7-4ee2-b01b-a9f1353b4c54"
  },
  "job_id": "4010b39d58b855980158b8574b270018",
  "job_type": "createSingleServer",
  "begin_time": "2016-12-01T03:04:38.437Z",
  "end_time": "2016-12-01T03:07:26.871Z",
  "error_code": null,
  "fail_reason": null
},
"service_type": "ECS",
"resource_type": "ecs",
"resource_name": "as-config-15f1_XWO68TFC",
"resource_id": "42d39b4a-19b7-4ee2-b01b-a9f1353b4c54",
"source_ip": "",
"trace_name": "createSingleServer",
"trace_rating": "normal",
"trace_type": "SystemAction",
"api_version": "1.0",
"record_time": "2016/12/08 11:07:28 GMT+08:00",
"trace_id": "4abc3a67-b773-11e6-8412-8f0ed3cc97c6"
}
```

You can pay special attention to the following fields:

- **time** indicates the time when the trace occurred. In this example, the time is 11:07:28 on December 8.
- **user** indicates the user who performed the operation. In this example, the user is **aaa** (**name** field) under the enterprise account **aaa** (**domain** field).
- **request** indicates the request to create an ECS server. It contains basic information about the ECS server, such as its name (**as-config-15f1_XWO68TFC**) and VPC ID (**e4c374b9-3675-482c-9b81-4acd59745c2b**).
- **response** indicates the response to the ECS creation request. It contains **status** (**SUCCESS** in this example), **error_code** (**null** in this example), and **fail_reason** (**null** in this example).

EVS Disk Creation

```
{
  "time": "2016/12/08 11:24:04 GMT+08:00",
  "user": {
    "name": "aaa",
    "id": "26e96eda18034ae9a44130bacb967b96",
    "domain": {
      "name": "aaa",
      "id": "1f9b9ba51f6b4061bd5c1736b28469f8"
    }
  },
  "request": "",
  "response": "",
  "service_type": "EVS",
  "resource_type": "evs",
  "resource_name": "volume-39bc",
  "resource_id": "229142c0-2c2e-4f01-a1b4-2dfdf1c678c7",
  "source_ip": "10.146.230.124",
  "trace_name": "deleteVolume",
}
```



```
"trace_rating": "normal",  
"trace_type": "ConsoleAction",  
"api_version": "1.0",  
"record_time": "2016/12/08 11:24:04 GMT+08:00",  
"trace_id": "c529254f-bcf5-11e6-a89a-7fc778a6c92c"  
}
```

You can pay special attention to the following fields:

- **time** indicates the time when the trace occurred. In this example, the time is 11:24:04 on December 8.
- **user** indicates the user who performed the operation. In this example, the user is **aaa** (**name** field) under the enterprise account **aaa** (**domain** field).
- **request**: optional. It is null in this example.
- **response**: optional. It is null in this example.
- **trace_rating** indicates the trace status. It can replace the **response** field to indicate the operation result. In this example, the value is **normal**, indicating that the operation was successful according to [Trace Structure](#).

8 Auditing

Cloud Trace Service (CTS) provides records of operations performed on cloud service resources.

With CTS, you can record operations associated with CTS itself for later query, audit, and backtracking.

Table 8-1 CTS operations that can be recorded by itself

Operation	Resource Type	Trace Name
Creating a tracker	tracker	createTracker
Modifying a tracker	tracker	updateTracker
Disabling a tracker	tracker	updateTracker
Enabling a tracker	tracker	updateTracker
Deleting a tracker	tracker	deleteTracker
Creating a key event notification	notification	createNotification
Deleting a key event notification	notification	deleteNotification
Modifying a key event notification	notification	updateNotification
Changing the status of a key event notification	notification	updateNotificationStatus
Disabling a key event notification	notification	updateNotification
Enabling a key event notification	notification	updateNotification
Exporting traces	trace	getTrace

9 Supported Services and Operations

Table 9-1 Supported services and operations

Category	Cloud Service	Operations
Compute	Elastic Cloud Server (ECS)	ECS operations that can be recorded by CTS
	Image Management Service (IMS)	IMS operations that can be recorded by CTS
	Auto Scaling (AS)	AS operations that can be recorded by CTS
	FunctionGraph	FunctionGraph operations that can be recorded by CTS
Storage	Elastic Volume Service (EVS)	EVS operations that can be recorded by CTS
	Scalable File Service (SFS)	SFS operations that can be recorded by CTS
Network	Elastic Load Balance (ELB)	ELB operations that can be recorded by CTS
	Enterprise Router (ER)	ER operations that can be recorded by CTS
Container	Cloud Container Engine (CCE)	CCE operations that can be recorded by CTS
	SoftWare Repository for Container (SWR)	SWR operations that can be recorded by CTS
Migration	Server Migration Service (SMS)	SMS operations that can be recorded by CTS
Management & Governance	Cloud Eye Service (CES)	CES operations that can be recorded by CTS

Category	Cloud Service	Operations
	Cloud Trace Service (CTS)	CTS operations that can be recorded by itself
	Identity and Access Management (IAM)	IAM operations that can be recorded by CTS
	Tag Management Service (TMS)	TMS operations that can be recorded by CTS
	Resource Management Service (RMS)	RMS operations that can be recorded by CTS
	Simple Message Notification (SMN)	SMN operations that can be recorded by CTS
Application Middleware	Distributed Message Service for Kafka (DMS for Kafka)	DMS for Kafka operations that can be recorded by CTS
	Distributed Message Service for RabbitMQ (DMS for RabbitMQ)	DMS for RabbitMQ operations that can be recorded by CTS
	Distributed Message Service for RocketMQ (DMS for RocketMQ)	DMS for RocketMQ operations that can be recorded by CTS
	Distributed Cache Service (DCS)	DCS operations that can be recorded by CTS
	API Gateway (APIG)	APIG operations that can be recorded by CTS
Database	Relational Database Service (RDS)	RDS for MySQL operations that can be recorded by CTS
		RDS for PostgreSQL operations that can be recorded by CTS
		RDS for SQL Server operations that can be recorded by CTS
	Document Database Service (DDS)	DDS operations that can be recorded by CTS
	Distributed Database Middleware (DDM)	DDM operations that can be recorded by CTS
Security & Compliance	Data Encryption Workshop (DEW)	DEW operations that can be recorded by CTS
	Web Application Firewall (WAF)	WAF operations that can be recorded by CTS

Category	Cloud Service	Operations
	Database Security Service (DBSS)	DBSS operations that can be recorded by CTS
	Data Security Center (DSC)	DSC operations that can be recorded by CTS
Enterprise Application	ROMA Connect	ROMA Connect operations that can be recorded by CTS
	Domain Name Service (DNS)	DNS operations that can be recorded by CTS
AI	ModelArts	ModelArts operations that can be recorded by CTS
Big Data	MapReduce Service (MRS)	MRS operations that can be recorded by CTS
	GaussDB(DWS)	GaussDB(DWS) operations that can be recorded by CTS
	Cloud Search Service (CSS)	CSS operations that can be recorded by CTS
Content Delivery & Edge Computing	Intelligent EdgeFabric (IEF)	IEF operations that can be recorded by CTS

10 FAQs

10.1 Must I Use an IAM User (Sub Account) to Configure Transfer on CTS and Perform Operations on an OBS Bucket?

No. You only need to ensure that you have the permissions for OBS buckets.

10.2 How Will CTS Be Affected If My Account Is in Arrears?

If your account is in arrears, CTS can still receive operation records from supported services, but the records can only be retained for 7 days. In most cases, records can be merged into trace files and transferred to OBS buckets for long term storage. Trace file storage in OBS buckets generates fees and this function cannot work when your account is in arrears.

In addition, the only action you can perform on trackers is to delete them.

10.3 What Are the Recommended Users of CTS?

It is highly recommended that cloud users should enable CTS.

- CTS is core to information security audit. It is an essential part of security risk control for information systems in enterprises and public sectors, and is also necessary for compliance with many industry standards and audit specifications.
- CTS helps accelerate troubleshooting and reduces workforce costs when exceptions occur on cloud resources. With CTS, you can track all operations involved when a fault happens, which helps narrow the possibilities.

10.4 What Will Happen If I Have Enabled Trace Transfer But Have Not Configured an Appropriate Policy for an OBS Bucket?

CTS delivers trace files based on the OBS bucket policy. If the policy is configured incorrectly, trace files cannot be delivered.

If an OBS bucket has been deleted or encounters an exception, an error message will be displayed on the management console.

10.5 Does CTS Support Integrity Verification of Trace Files?

Yes. The following fields must be included in trace files: **time**, **service_type**, **resource_type**, **trace_name**, **trace_rating**, and **trace_type**. Other fields can be added by the services from which traces are collected.

10.6 Why Are There Some Null Fields on the View Trace Page?

Fields **source_ip**, **code**, **request**, **response**, and **message** can be null. These fields are not mandatory for CTS.

- **source_ip**: If the value of **trace_type** is **SystemAction**, the operation was triggered by the system. In this case, **source_ip** is null.
- **request**, **response**, and **code**: These three fields indicate the request content, request result, and HTTP return code of an operation. In some cases, these fields are null or have no service meaning. Therefore, they are left blank based on actual situations.
- **message**: This is a reserved field. Information of other cloud services will be added to this field when necessary. It is normal that the field is null.

10.7 Why Is an Operation Recorded Twice in the Trace List?

For an asynchronously invoked trace, such as **deleteDesktop** trace of Workspace, two records with the same trace name, resource type, and resource name will be generated. The two records may seem to be the same. However, they are generated at different times and document different details.

- The first record documents the request initiated by a user.
- The second record documents the response to the request and the operation result, and is usually several minutes later than the first record.

The two records together give a full view of the operation.

10.8 What Services Are Supported by Key Event Notifications?

CTS sends notifications of all key operations on services including ECS, EVS, VPC, DEW, native OpenStack, and IAM. These operations include creation, deletion, login, and native OpenStack API calls.

10.9 How Can I Store Trace Files for a Long Time?

CTS only retains traces for seven days. To store traces for a long time, configure your tracker to transfer traces to OBS buckets. For details, see [Configuring a Tracker](#).

10.10 Why Are `user` and `source_ip` Null for Some Traces with `trace_type` as `SystemAction`?

The `trace_type` field indicates the request source. This field can be `ConsoleAction`, `ApiCall`, and `SystemAction`.

`SystemAction` indicates operations that are not triggered by users, such as alarms, elastic scaling, regular backup, or secondary invocations by systems to complete a user's request. In this case, `user` and `source_ip` are both null.

10.11 How Can I Find Out Who Created a Specific ECS?

Solution

To identify the user who created a specific ECS, you can view traces recorded by CTS.

Prerequisites

- You have enabled CTS.
- You have obtained the resource ID of the ECS.

Procedure

Log in to the CTS console, choose **Trace List**, and select **ECS** for **Trace Source**. In the displayed traces, look for the **createServer** trace with the obtained resource ID, and expand the trace details.

The `user` field shows details of the IAM user who created the ECS. The format is `{"name": "Account name", "id": "Account ID", "domain":{"name": "IAM user name", "id": "IAM user ID"}}`. If the ECS was created by an account, the IAM user name and the account name are the same.

10.12 How Can I Find Out the Login IP Address of an IAM User?

Background

If you want to check if there are security risks in your account by examining the login IP addresses and login time of IAM users, you can view traces recorded by CTS.

Prerequisites

You have enabled CTS.

Procedure

- Step 1** Log in to the CTS console, select **IAM** for **Trace Source**, select a time range, and click **Query**.
- Step 2** Click **View Trace** in the **Operation** column of a trace to view its details. **source_ip** indicates the login IP address, and **record_time** indicates the login time.

----End

10.13 Why Are Two deleteMetadata Traces Generated When I Buy an ECS?

During ECS creation, metadata is used to store temporary information. When the creation is finished, the information is automatically deleted. Thus, two traces named **deleteMetadata** are generated.

10.14 What Can I Do If I Cannot Query Traces?

Background

Traces cannot be queried on the CTS console.

Procedure

- Step 1** Check whether you have configured a proper query time range.
- Step 2** Check whether you have configured filters correctly.

Step 3 If you still cannot query traces after the preceding steps, submit a service ticket for technical support.

----End

10.15 Can I Disable CTS?

You can use the basic functions of CTS for free, including enabling a tracker, tracking traces, as well as storing and querying traces of the last seven days. Only value-added services, such as trace transfer, are charged. If you only use the basic services, you do not need to disable CTS since no fees are generated.

If you do need to disable CTS, you can do it in the following two ways:

- Delete or disable existing trackers. (The **system** tracker created by CTS can only be disabled and cannot be deleted.) No traces will be generated.
- Delete the CTS agency from the IAM agency list. CTS will become unavailable.

11 Change History

Released On	Description
2023-10-30	This issue is the third official release, which incorporates the following changes: <ul style="list-style-type: none">• Optimized the document structure.• Update the Services and Operations Recorded by CTS.
2023-3-30	This issue is the second official release, which incorporates the following changes: <ul style="list-style-type: none">• Modified section "Supported Services and Operations".• Added "Permissions Management", "Constraints", "Verifying Trace File Integrity", "Quota Adjustment", and "FAQs".
2020-11-30	This issue is the first official release.