Data Lake Insight

SDK Reference

Issue 01

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HUAWEI

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Contents

1 Overview

Introduction to DLI SDKs

Data Lake Insight (DLI) software development kits (SDKs) encapsulates RESTful APIs provided by DLI to simplify development. You can directly call API functions provided by DLI SDKs to submit DLI SQL and Spark jobs.

DLI SDKs consist of both the SDK V3 and other SDKs developed by DLI.

- (Recommended)DLI SDK V3: automatically generates API based on YAML files that define the API, ensuring that the API parameters are consistent with the API of the service.

  For details, see **SDK V3**.
- DLI SDK (self-developed): SDKs developed by the DLI team. This manual introduces the usage of DLI's self-developed SDKs.
  - For details about how to use the Java SDK, see **Java SDK**.
  - For details about how to use the Python SDK, see **Python SDK**.

NOTE

The DLI SDK calls APIs using HTTPS. The certificate for using the server is provided.

2 (Recommended) DLI's SDK V3

Writing Instructions

This document provides a list of DLI's V3 SDKs and the links to download the latest SDKs.

SDKs

The SDK list lists the SDKs supported by DLI. You can view SDK updates, obtain installation packages, and view user guides in GitHub.

SDK V3

The SDK list lists the SDKs supported by DLI. You can view SDK updates, obtain installation packages, and view user guides in GitHub.

Generating SDK Code Online

[Example]

Use API Explorer to dynamically generate SDK code.

You can view the SDK code of a range of programming languages in the **Sample Code** tab of an API.

3 DLI SDK

3.1 DLI SDK Function Matrix

This development guide describes how to install and configure an environment and call functions provided by DLI SDK for secondary development.

Table 1 lists the function matrix of DLI's Java and Python SDKs.

Table 3-1 SDK function matrix

Language	Function	Content
Java	**OBS Authorization**	This section provides instructions on how to authorize DLI's Java SDKs to access and operate on OBS buckets.
	Queue-Related SDKs	This section provides instructions on how to use DLI's Java SDKs to create queues, retrieve the default queue, query all queues, and delete queues.
	Resource-Related SDKs	This section provides instructions on how to use DLI's Java SDKs to upload resource packages, query all resource packages, query specific resource packages, and delete resource packages.
	SDKs Related to SQL Jobs	This section provides instructions on how to use DLI's Java SDKs for database-related operations, table-related operations, and job-related operations.
	SDKs Related to Flink Jobs	This section provides instructions on how to use DLI's Java SDKs to create new Flink jobs, retrieve job details, and list jobs.

Language	Function	Content
	SDKs Related to Spark Jobs	This section provides instructions on how to use DLI's Java SDKs to submit Spark jobs, query all Spark jobs, and delete Spark jobs.
	SDKs Related to Flink Job Templates	This section provides instructions on how to use DLI's Java SDKs to create new Flink job templates, update existing Flink job templates, and delete Flink job templates.
Python	Queue-Related SDKs	This section provides instructions on how to use DLI's Python SDKs to retrieve a list of all queues.
	Resource-Related SDKs	This section provides instructions on how to use DLI's Python SDKs to upload resource packages, query all resource packages, query specific resource packages, and delete resource packages.
	SDKs Related to SQL Jobs	This section provides instructions on how to use DLI's Python SDKs for database-related operations, table-related operations, and job-related operations.
	SDKs Related to Spark Jobs	This section provides instructions on how to use DLI's Python SDKs to submit Spark jobs, cancel Spark jobs, and delete Spark jobs.

3.2 Mapping Between DLI SDKs and APIs

OBS Authorization SDKs

Table 3-2 Mapping between OBS authorization APIs and SDKs

Class	Method	Java Method	Python Method	API
Authorize	OBS authorization	authorizeBucket	-	POST /v1.0/{project_id}/dli/obs-authorize

Queue-related SDKs

Table 3-3 Mapping between queue-related APIs and SDKs

Class	Method	Java Method	Python Method	API
Queue	Creating a Queue	createQueue	-	POST /v1.0/{project_id}/queues
	Deleting a Queue	deleteQueue	-	DELETE /v1.0/{project_id}/queues/{queue_name}
	Obtaining the Default Queue	getDefaultQueue	-	-
	Querying All Queues	listAllQueues	list_queues	GET/v1.0/{project_id}/queues

Resource-related SDKs

Table 3-4 Mapping between resource-related APIs and SDKs

Class	Method	Java Method	Python Method	API
package Resources	Uploading a Resource Package	uploadResources	upload_resource	POST /v2.0/{project_id}/resources
	Deleting a Resource Package	deleteResource	delete_resource	DELETE /v2.0/{project_id}/resources/{resource_name}
	Querying All Resource Packages	listAllResources	list_resources	GET /v2.0/{project_id}/resources
	Querying a Specified Resource Package	getResource	get_package_resource	GET /v2.0/{project_id}/resources/{resource_name}

SDKs Related to SQL Jobs

Table 3-5 Mapping between SQL job APIs and SDKs

Class	Method	Java Method	Python Method	API
Database	Creating a Database	**createDatabase**	**create_database**	POST /v1.0/{project_id}/databases
	Deleting a Database	**deleteDatabase**	**delete_database**	DELETE /v1.0/{project_id}/databases/{database_name}
	Querying All Databases	**listAllDatabases**	**list_databases**	GET /v1.0/{project_id}/databases
	Modifying a Database User	-	-	PUT /v1.0/{project_id}/databases/{database_name}/owner
Table	Creating a DLI Table	**createDLITable**	**create_dli_table**	POST /v1.0/{project_id}/databases/{database_name}/tables
	Creating an OBS Table	**createObsTable**	**create_obs_table**	POST /v1.0/{project_id}/databases/{database_name}/tables
	Deleting a Table	**deleteTable**	**delete_table**	DELETE /v1.0/{project_id}/databases/{database_name}/tables/{table_name}
	Querying All Tables	**listAllTables**	**list_tables**	GET /v1.0/{project_id}/databases/{database_name}/tables?keyword=tb&with-detail=true
	Describing Table Information	**getTableDetail**	**get_table_schema**	GET /v1.0/{project_id}/databases/{database_name}/tables/{table_name}
	Previewing a Table	-	-	GET /v1.0/{project_id}/databases/{database_name}/tables/{table_name}/preview
	Modifying a Table User	-	-	PUT /v1.0/{project_id}/databases/{database_name}/tables/{table_name}/owner

Class	Method	Java Method	Python Method	API
Job	Importing Data	**submit**	**import_table**	POST /v1.0/{project_id}/jobs/import-table
	Exporting Data	**submit**	**export_table**	POST /v1.0/{project_id}/jobs/export-table
	Submitting a Job	**submit**	**execute_sql**	POST /v1.0/{project_id}/jobs/submit-job
	Canceling a Job	**cancelJob**	-	DELETE /v1.0/{project_id}/jobs/{job_id}
	Querying All Jobs	**listAllJobs**	-	GET /v1.0/{project_id}/jobs?page-size=*{size}*&current-page=*{page_number}*&start=*{start_time}*&end=*{end_time}*&job-type={QUERY}&queue_name={test}&order={duration_desc}
	Querying Job Results	**queryJobResultInfo**	-	GET/v1.0/{project_id}/jobs/{job_id}?page-size=*{size}*&current-page=*{page_number}*
	Querying Job Status	-	-	GET/v1.0/{project_id}/jobs/{job_id}/status
	Querying Job Details	-	-	GET/v1.0/{project_id}/jobs/{job_id}/detail
	Querying Jobs of the SQL Type	**listSQLJobs**	-	-
	Checking the SQL Syntax	-	-	POST /v1.0/{project_id}/jobs/check-sql
	Exporting Search Results	-	-	POST /v1.0/{project_id}/jobs/{job_id}/export-result

SDKs Related to Flink Jobs

Table 3-6 Mapping between Java and Python SDKs and APIs

Class	Method	Java Method	Python Method	API
Job	Creating a Flink SQL Job	**submitFlinkSqUob**	-	POST /v1.0/{project_id}/streaming/sql-jobs
	Creating a Custom Flink Job	**createFlinkJarJob**	-	POST /v1.0/{project_id}/streaming/flink-jobs
	Updating a Flink SQL Job	**updateFlinkSqUob**	-	PUT /v1.0/{project_id}/streaming/sql-jobs/{job_id}
	Updating a Custom Flink Job	**updateFlinkJarJob**	-	PUT /v1.0/{project_id}/streaming/flink-jobs/{job_id}
	Querying the List of Jobs	**getFlinkJobs**	-	GET /v1.0/{project_id}/streaming/jobs
	Querying Flink Job Details	**getFlinkJobDetail**	-	GET /v1.0/{project_id}/streaming/jobs/{job_id}
	Querying the Flink Job Execution Plan Diagram	**getFlinkJobExecuteGraph**	-	GET /v1.0/{project_id}/streaming/jobs/{job_id}/execute-graph
	Querying Flink Job Monitoring Information	**getFlinkJobsMetrics**	-	POST /v1.0/{project_id}/streaming/jobs/metrics
	Querying the APIG Address of a Flink Job	**getFlinkApigSinks**	-	GET /v1.0/{project_id}/streaming/jobs/{job_id}/apig-sinks
	Running a Flink Job	**runFlinkJob**	-	POST /v1.0/{project_id}/streaming/jobs/run
	Stopping a Flink Job	**stopFlinkJob**	-	POST /v1.0/{project_id}/streaming/jobs/stop

Class	Method	Java Method	Python Method	API
	Deleting Flink Jobs in Batches	deleteFlinkJobInBatch	-	POST /v1.0/{project_id}/streaming/jobs/delete

SDKs Related to Spark Jobs

Table 3-7 Mapping between Spark job APIs and SDKs

Class	Method	Java Method	Python Method	API
BatchJob	Submitting Batch Jobs	asyncSubmit	submit_spark_batch_job	POST /v2.0/{project_id}/batches
	Deleting Batch Jobs	deleteBatchJob	del_spark_batch_job	DELETE /v2.0/{project_id}/batches/{batch_id}
	Querying All Batch Jobs	listAllBatchJobs	-	GET /v2.0/{project_id}/batches
	Querying Batch Job Details	-	-	GET /v2.0/{project_id}/batches/{batch_id}
	Querying a Batch Job Status	getStateBatchJob	-	GET /v2.0/{project_id}/batches/{batch_id}/state
	Querying Batch Job Logs	getBatchJobLog	-	GET /v2.0/{project_id}/batches/{batch_id}/log

SDKs Related to Flink Job Templates

Table 3-8 Mapping between Java and Python SDKs and APIs

Class	Java Method	Python Method	API
Template	createFlinkJobTemplate	-	POST /v1.0/{project_id}/streaming/job-templates
	updateFlinkJobTemplate	-	PUT /v1.0/{project_id}/streaming/job-templates/{template_id}

Class	Java Method	Python Method	API
	deleteFlinkJobTemplate	-	DELETE /v1.0/{project_id}/streaming/job-templates/{template_id}
	getFlinkJobTemplates	-	GET /v1.0/{project_id}/streaming/job-templates

4 Java SDK

4.1 Overview

Scenario

With DLI's Java SDKs, you can quickly and easily use DLI without worrying about the details of the requests. This section describes how to obtain and use Java SDKs.

Notes

- To use DLI's Java SDKs to access a specific service's API, you need to ensure that the current service has been enabled and authorized on the DLI management console.
- The Java SDKs can be used in Java JDK 1.8 or later. For details about how to configure the Java development environment, see **Configuring the Java SDK Environment**.
- For details about how to obtain and install Java SDKs, see **Obtaining and Installing the SDK**.
- To use SDKs to access DLI, you need to initialize the DLI client. During DLI client initialization, you can use the AK/SK or token for authentication. For details, see **Initializing the DLI Client**.

Java SDKs

Table 4-1 Java SDKs

SDK	Description
OBS Authorization	This section provides instructions on how to authorize DLI's Java SDKs to access and operate on OBS buckets.

SDK	Description
Queue-Related SDKs	This section provides instructions on how to use DLI's Java SDKs to create queues, retrieve the default queue, query all queues, and delete queues.
Resource-Related SDKs	This section provides instructions on how to use DLI's Java SDKs to upload resource packages, query all resource packages, query specific resource packages, and delete resource packages.
SDKs Related to SQL Jobs	This section provides instructions on how to use DLI's Java SDKs for database-related operations, table-related operations, and job-related operations.
SDKs Related to Flink Jobs	This section provides instructions on how to use DLI's Java SDKs to create new Flink jobs, retrieve job details, and list jobs.
SDKs Related to Spark Jobs	This section provides instructions on how to use DLI's Java SDK to submit Spark jobs, query all Spark jobs, and delete Spark jobs.
SDKs Related to Flink Job Templates	This section provides instructions on how to use DLI's Java SDKs to create new Flink job templates, update existing Flink job templates, and delete Flink job templates.

4.2 Configuring the Java SDK Environment

4.2.1 Preparing a Java Development Environment

Scenario

Before installing and using Java SDKs, make sure you have completed the basic configuration of your development environment.

Java SDKs require JDK 1.8 or later. To ensure compatibility with future versions, it is recommended to use version 1.8.

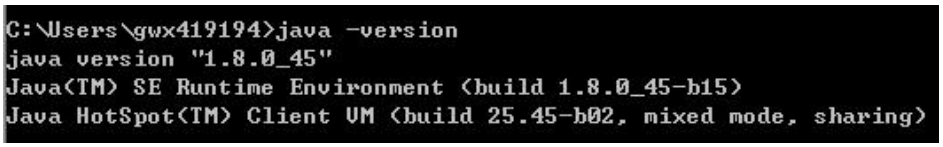
Once the Java runtime environment is configured, you can open the Windows command line and execute the command **Java -version** to check the version information.

Procedure

1. Install the JDK. Download the JDK 1.8 installation package from **Oracle official website** and install it.
2. Set environment variables. Specifically, choose **Start** > **Control Panel**. Click **System** > **Advanced system settings**. In the displayed **System Properties** dialog box, click **Advanced** and then click **Environment Variables** to switch to the **Environment Variables** dialog box.

3. Create the system variable **JAVA_HOME** with **Value** set to the JDK installation path, for example, **D:\Java\jdk1.8.0_45**.
4. Edit the **Path** variable and add **%JAVA_HOME%\bin** to **Variable value**.
5. Create the **CLASSPATH** variable with **Variable value** set to **.;%JAVA_HOME%\lib;%JAVA_HOME%\lib\tools.jar**.
6. Check whether the configurations succeed. Specifically, at the Start menu, enter **cmd** and press **Enter** to bring up the command prompt window. Enter ***java -version*** and press **Enter**. If the version information is displayed, as shown in **Figure 4-1**, Python is successfully installed and configured.

Figure 4-1 Checking the configuration



4.2.2 Obtaining and Installing the SDK

Installing Java SDKs

You can install Java SDKs in either of the following ways:

- Import Maven dependencies, which applies to Java projects managed by Maven. For details, see **Method 1: Installing DLI SDK Dependencies Using Maven**.
- Import JAR files into the integrated development environment, which is suitable for projects that use Eclipse as their IDE. For details, see **Method 2: Installing the SDK by Importing JAR Files to Eclipse**.

Obtaining DLI SDKs

1. Log in to the DLI management console.
2. On the **Overview** page, click **SDK Download** under **Common Links**.
3. On the **DLI SDK DOWNLOAD** page, select a driver and download it.

   Obtain the **dli-sdk-java-*x.x.x*.zip** package and decompress it. The following table shows the directory structure of the package.

Table 4-2 Directory structure

Parameter	Description
jars	SDK and its dependent JAR packages.
maven-install	Script and JAR package that are installed in the local Maven repository.
dli-sdk-java.version	Java SDK version description.

Method 1: Installing DLI SDK Dependencies Using Maven

You are advised to install dependencies using Maven to use Huawei Cloud Java SDKs.

- **Installing service-level SDK dependencies**
  a. **Download** and **install** Apache Maven on your operating system.
  b. After installing and configuring Maven, run the **mvn -v** command. Maven is installed successfully if the following information is displayed.

```
D:\>mvn -v
D:\
Apache Maven 3.3.9 (bb52d8502b132ec0a5a3f4c09453c07478323dc5; 2015-11-11T00:41:47+08:00)
Maven home: D:\maven\apache-maven-3.3.9\bin\..
Java version: 1.8.0_262, vendor: Huawei Technologies Co., Ltd
Java home: D:\develop\jdk_1.8\jre
Default locale: zh_CN, platform encoding: GBK
OS name: "windows 10", version: "10.0", arch: "amd64", family: "dos"
```

  c. Add dependencies to an existing Maven project or use an integrated development environment (IDE) to create a Maven project.

     For example, to create a Maven project using IntelliJ IDEA, perform the following steps (skip them if you already have a Maven project):

     i. Start IntelliJ IDEA.
     ii. Choose **File** > **New** > **project...**
     iii. In the displayed **New Project** dialog box, click **Maven** and then **Next**.
     iv. Specify **GroupId** and **ArtifactId**, and click **Next**.
     v. Specify **Project name** and **Project location**, and click **Finish**.

  d. Add dependency items to the **pom.xml** file of the Maven project.

     Taking the example of importing the latest version of the SDK, obtain the latest version of the SDK package and replace the version in the code.

```
<dependency>
  <groupId>com.huawei.dli</groupId>
  <artifactId>huaweicloud-dli-sdk-java</artifactId>
  <version>x.x.x</version>
</dependency>
```

- **Installing SDK dependencies of other services**

  DLI depends on SDKs (for example, OBS SDK), which can be downloaded by configuring the Maven image source repository of Huawei Cloud.

  – **(Recommended) Using the Huawei image source as the main repository:**

    For how to configure the Huawei Maven image source, visit Huawei open source image site, select Huawei SDK, and click **HuaweiCloud SDK**.

    If you build a project with Maven, modify the **settings.xml** file by adding the following content:

    i. Add the following content to the **profiles** node:

```
<profile>
  <id>MyProfile</id>
  <repositories>
    <repository>
      <id>HuaweiCloudSDK</id>
      <url>https://repo.huaweicloud.com/repository/maven/huaweicloudsdk/</url>
      <releases>
        <enabled>true</enabled>
```



```
            </releases>
            <snapshots>
               <enabled>false</enabled>
            </snapshots>
         </repository>
      </repositories>
      <pluginRepositories>
         <pluginRepository>
            <id>HuaweiCloudSDK</id>
            <url>https://repo.huaweicloud.com/repository/maven/huaweicloudsdk/</url>
            <releases>
               <enabled>true</enabled>
            </releases>
            <snapshots>
               <enabled>false</enabled>
            </snapshots>
         </pluginRepository>
      </pluginRepositories>
   </profile>
```

ii. Add the following information to the **mirrors** node:

```
<mirror>
   <id>huaweicloud</id>
   <mirrorOf>*,!HuaweiCloudSDK</mirrorOf>
   <url>https://repo.huaweicloud.com/repository/maven/</url>
</mirror>
```

iii. Add the **activeProfiles** tag to activate the configurations.

```
<activeProfiles>
 <activeProfile>MyProfile</activeProfile>
</activeProfiles>
```

– **Use a non-Huawei image source as the main repository (for example, a user-defined image source) to use HuaweiCloud SDKs:**

If you build a project with Maven, modify the **settings.xml** file as follows:

```
<settings xmlns="http://maven.apache.org/SETTINGS/1.0.0"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://maven.apache.org/SETTINGS/1.0.0 http://
maven.apache.org/xsd/settings-1.0.0.xsd">
   <servers>
    <server>
     <id>demo-releases</id>
     <username>deployment</username>
     <password><![CDATA[xxx]]></password>
   </server>
 </servers>
 <mirrors>
   <mirror>
     <id>demo-releases</id>
     <mirrorOf>*,!HuaweiCloudSDK</mirrorOf>
     <url>http://maven.demo.com:8082/demo/content/groups/public</url>
   </mirror>
 </mirrors>
 <profiles>
   <profile>
     <id>demo</id>
     <activation>
       <activeByDefault>true</activeByDefault>
       <jdk>1.8</jdk>
     </activation>
     <properties>
       <maven.compiler.source>1.8</maven.compiler.source>
       <maven.compiler.target>1.8</maven.compiler.target>
       <maven.compiler.compilerVersion>1.8</maven.compiler.compilerVersion>
     </properties>
     <repositories>
       <repository>
        <id>demo-releases</id>
        <url>http://demo-releases</url>
```



```
      <releases>
        <enabled>true</enabled>
      </releases>
      <snapshots>
        <enabled>true</enabled>
      </snapshots>
    </repository>
  </repositories>
  <pluginRepositories>
    <pluginRepository>
      <id>demo-releases</id>
      <url>http://demo-releases</url>
      <releases>
        <enabled>true</enabled>
      </releases>
      <snapshots>
        <enabled>true</enabled>
      </snapshots>
    </pluginRepository>
  </pluginRepositories>
 </profile>
 <profile>
  <id>huaweicloudrepo</id>
  <repositories>
    <repository>
      <id>HuaweiCloudSDK</id>
      <url>https://repo.huaweicloud.com/repository/maven/huaweicloudsdk/</url>
      <releases>
        <enabled>true</enabled>
      </releases>
      <snapshots>
        <enabled>false</enabled>
      </snapshots>
    </repository>
  </repositories>
  <pluginRepositories>
    <pluginRepository>
      <id>HuaweiCloudSDK</id>
      <url>https://repo.huaweicloud.com/repository/maven/huaweicloudsdk/</url>
      <releases>
        <enabled>true</enabled>
      </releases>
      <snapshots>
        <enabled>false</enabled>
      </snapshots>
    </pluginRepository>
  </pluginRepositories>
 </profile>
</profiles>
<activeProfiles>
 <activeProfile>demo</activeProfile>
 <activeProfile>huaweicloudrepo</activeProfile>
</activeProfiles>
</settings>
```

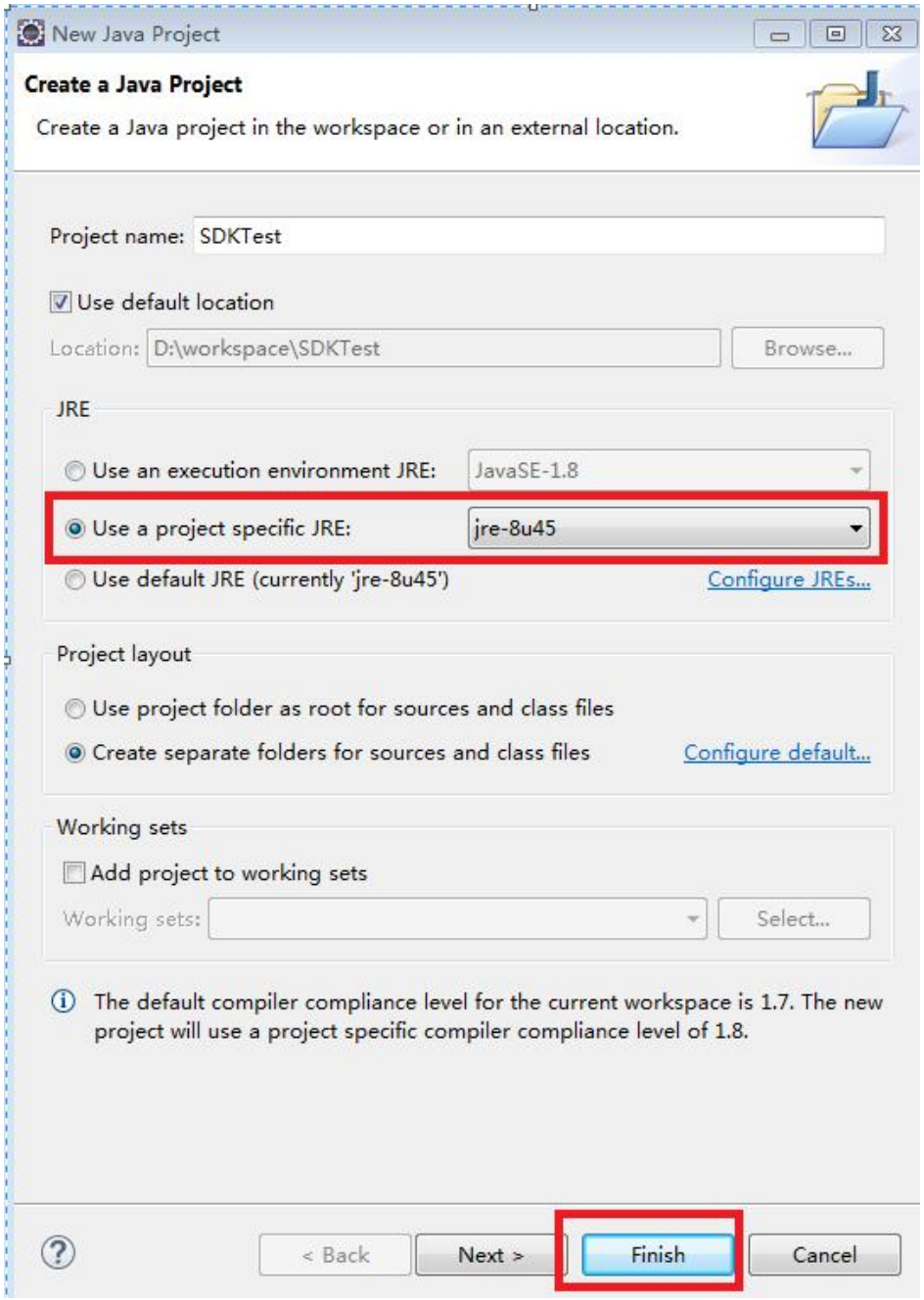
Method 2: Installing the SDK by Importing JAR Files to Eclipse

To import JAR files into an Eclipse integrated development environment project, follow these steps.

Step 1 Download Eclipse IDE for Java Developers of the latest version from the **Eclipse's official website** and install it. Configure the JDK in Eclipse.

1. Create a project and select the correct JRE version. For details, see **Figure 4-2**.

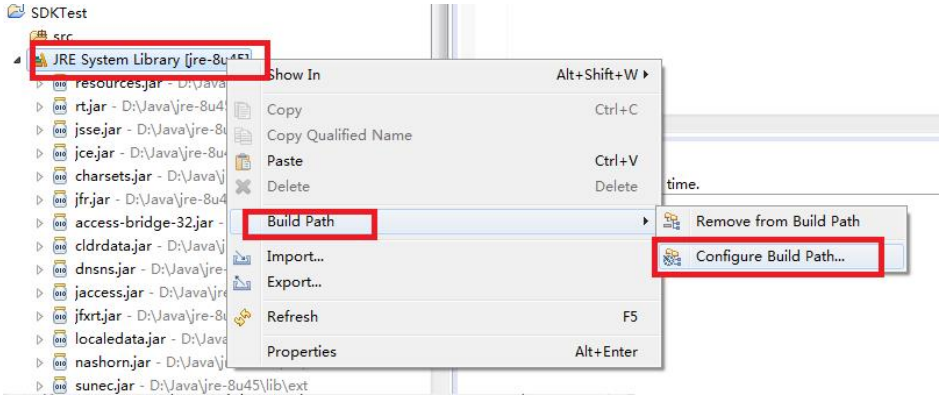
Figure 4-2 Creating a project



Step 2 Configure and import the SDK JAR file.

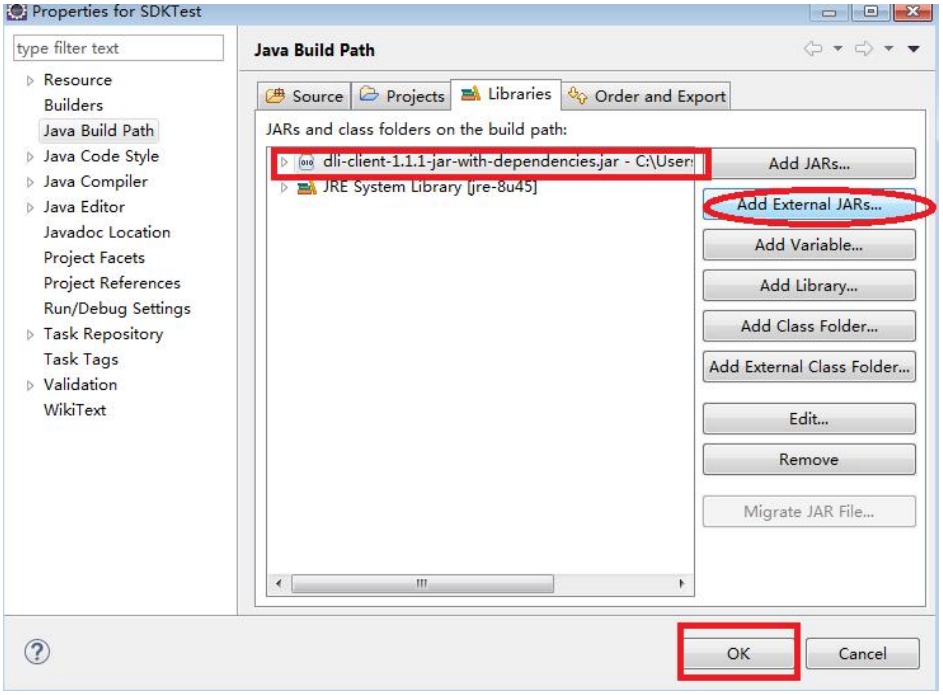
1. Right-click **JRE System Library** and choose **Build Path** > **Configure Build Path** from the shortcut menu. For details, see **Figure 4-3**.

Figure 4-3 Configuring the project path



2. Click **Add External JARs**, select the downloaded JAR file obtained in **Obtaining DLI SDKs**, and click **OK**.

Figure 4-4 Selecting the SDK JAR file



----End

4.2.3 Initializing the DLI Client

To use DLI SDK to access DLI, you need to initialize the DLI client. During DLI client initialization, you can perform authentication using the Access Key ID/Secret Access Key (AK/SK) or token. The sample code is as follows:

Prerequisites

- You have configured the Java SDK environment by following the instructions provided **Overview**.
- You have initialized the DLI Client by following the instructions provided in **Initializing the DLI Client**.

Sample Code for AK/SK Authentication

- **Sample code**

```
String ak = System.getenv("xxx_SDK_AK");//Access key ID
String sk = System.getenv("xxx_SDK_SK");//Key used together with the access key ID
String regionName = "regionname";
String projectId = "project_id";
DLIInfo dliInfo = new DLIInfo(regionName, ak, sk, projectId);
DLIClient client = new DLIClient(AuthenticationMode.AKSK, dliInfo);
```

- **Parameter description and acquisition method**
  - Parameter description
    - **ak**: Account access key
    - **sk**: Account secret access key

      NOTE

      Hard coding AKs and SKs or storing them in code in plaintext poses significant security risks. You are advised to store them in encrypted form in configuration files or environment variables and decrypt them when needed to ensure security.

      In this example, the AK and SK stored in the environment variables are used. Specify the environment variables *xxx*_**SDK_AK** and *xxx*_**SDK_SK** in the local environment first.

    - **regionName**: region name
    - **projectId**: project ID
  - You can perform the following operations to obtain the **Access Keys**, **project ID**, and **Region**:
    i. Log in to the management console.
    ii. Hover the cursor on the username in the upper right corner and select **My Credentials** from the drop-down list.
    iii. In the navigation pane on the left, choose **Access Keys** and click **Create Access Key**. Confirm that you want to proceed with the operation and click **OK**.
    iv. On the displayed page, click **Download**. Open the credential file to obtain the AK/SK information.
    v. In the navigation pane on the left, choose **API Credentials**. In the **Projects** pane, locate **project_id** and obtain the region information.

Sample code for token-based authentication

- Sample code

```
String domainName = "domainname";
String userName = "username";
String password = "password";
String regionName = "regionname";
String projectId = "project_id";
DLIInfo dliInfo = new DLIInfo(regionName, domainName, userName, password, projectId);
DLIClient client = new DLIClient(AuthenticationMode.TOKEN, dliInfo);
```

- Parameter description
  - **domainname**: Name of the account to which the IAM user belongs
  - **username**: Username

- **password**: User password
- **regionname**: Region name
- **project_id**: Project ID

NOTE

- Hard coding passwords or storing them in code in plaintext poses significant security risks. You are advised to store them in encrypted form in configuration files or environment variables and decrypt them when needed to ensure security.
- You can change the endpoint in **set** mode. Run the following statement: **dliInfo.setServerEndpoint(endpoint)**.

4.3 OBS Authorization

Prerequisites

- You have configured the Java SDK environment by following the instructions provided **Overview**.
- You have initialized the DLI Client by following the instructions provided in **Initializing the DLI Client**.

Example Code

You can use the API to grant operation rights on OBS buckets to DLI to save data and run logs of users' jobs.

The example code is as follows:

```
private static void authorizeBucket(DLIClient client) throws DLIException {
        String bucketName ="obs_name";
        ObsBuckets obsBuckets = new ObsBuckets();
        obsBuckets.addObsBucketsItem(bucketName);
        GlobalResponse res = client.authorizeBucket(obsBuckets);
        System.out.println(res);
}
```

4.4 Queue-Related SDKs

Prerequisites

- You have configured the Java SDK environment by following the instructions provided **Overview**.
- You have initialized the DLI Client by following the instructions provided in **Initializing the DLI Client**.

Creating a Queue

You can use the API provided by DLI to create a queue. The example code is as follows:

```
 private static void createQueue(DLIClient client) throws DLIException {
   //Call the createQueue method of the DLIClient object to create a queue.
   String qName = "queueName";
   int cu = 16;
   String description = "test for sdk";
   Queue queue = client.createQueue(qName, cu, mode, description);
```



```
    System.out.println("---------- createQueue success ---------");
  }
```

Deleting a Queue

You can use the API provided by DLI to delete the queue. The example code is as follows:

```
  private static void deleteQueue(DLIClient client) throws DLIException {
    //Call the getQueue(queueName) method of the DLIClient object to obtain queue queueName.
    String qName = "queueName";
    Queue queue = client.getQueue(qName);
    //Call the deleteQueue() method to delete queue queueName.
    queue.deleteQueue();
  }
```

Obtaining the Default Queue

DLI provides an API for querying the default queue. You can use the default queue to submit jobs. The example code is as follows:

```
private static void getDefaultQueue(DLIClient client) throws DLIException{
  //Call the getDefaultQueue method of the DLIClient object to query the default queue.
     Queue queue = client.getDefaultQueue();
     System.out.println("defaultQueue is:"+ queue.getQueueName());
}
```

NOTE

All users can use the default queue. However, DLI limits the maximum number of times a user can use the default queue.

Querying All Queues

You can use the API provided by DLI to query the queue list and select the corresponding queue to execute the job. The example code is as follows:

```
  private static void listAllQueues(DLIClient client) throws DLIException {
    System.out.println("list all queues...");

    //Call the listAllQueues method of the DLIClient object to query the queue list.
    List<Queue> queues = client.listAllQueues();
    for (Queue queue : queues) {
      System.out.println("Queue name:" + queue.getQueueName() + "  " + "cu:" + queue.getCuCount());
    }
  }
```

4.5 Resource-Related SDKs

Prerequisites

- You have configured the Java SDK environment by following the instructions provided **Overview**.
- You have initialized the DLI Client by following the instructions provided in **Initializing the DLI Client**.

Uploading a Resource Package

You can use the interface provided by the DLI to upload resource packages. The code example is as follows:


```
private static void uploadResources(DLIClient client) throws DLIException {
  String kind = "jar";
  String[] paths = new String[1];
  paths[0] = "https://bucketname.obs.com/jarname.jar";
  String description = "test for sdk";
  //Call the uploadResources method of the DLIClient object to upload resources.
  List<PackageResource> packageResources = client.uploadResources(kind, paths, description);
  System.out.println("---------- uploadResources success ---------");
}
```

NOTE

The following describes the request parameters. For details, see **Overview**.

- **kind**: resource package type. The options are as follows:
  - **jar**: JAR file
  - **Pyfile**: User Python file
  - **file**: User file
  - **modelfile**: User AI model file
- **paths**: OBS path of the resource package. The parameter format is {bucketName}.{obs domain name}/{jarPath}/{jarName}.
- **description**: description of the resource package

Querying All Resource Packages

You can use the API provided by DLI to query the list of uploaded resources. The example code is as follows:

```
private static void listAllResources(DLIClient client) throws DLIException {
  System.out.println("list all resources...");
  //Call the listAllResources method of the DLIClient object to query the queue resource list.
  Resources resources = client.listAllResources();
  for (PackageResource packageResource : resources.getPackageResources()) {
    System.out.println("Package resource name:" + packageResource.getResourceName());
  }
  for (ModuleResource moduleResource : resources.getModuleResources()) {
    System.out.println("Module resource name:" + moduleResource.getModuleName());
  }
}
```

Querying a Specified Resource Package

You can call an API to query information about the specified resource package. The sample code is as follows:

```
private static void getResource(DLIClient client) throws DLIException {
  String resourceName = "xxxxx";
  // group: If the resource package is not in the group, leave this parameter empty.
  String group= "xxxxxx";
  // Call getResource on the DLIClient object to query a specified resource package.
  PackageResource packageResource=client.getResource(resourceName,group);
  System.out.println(packageResource);
}
```

Deleting a Resource Package

You can call an API to delete an uploaded resource package. Sample code is as follows:

```
private static void deleteResource(DLIClient client) throws DLIException {
  String resourceName = "xxxxx";
  // group: If the resource package is not in the group, leave this parameter empty.
  String group= "xxxxxx";
  //Call deleteResource on the DLIClient object to upload resources.
```



```
  client.deleteResource(resourceName,group);
  System.out.println("---------- deleteResource success ---------");
}
```

4.6 SDKs Related to SQL Jobs

4.6.1 Database-Related SDKs

Prerequisites

- You have configured the Java SDK environment by following the instructions provided **Overview**.
- You have initialized the DLI Client by following the instructions provided in **Initializing the DLI Client** and created queues by following the instructions provided in **Queue-Related SDKs**.

Creating a Database

DLI provides an API for creating a database. You can use the API to create a database. The sample code is as follows:

```
private static Database createDatabase(DLIClient client) throws DLIException {
  //Call the createDatabase method of the DLIClient object to create a database.
  String dbName = "databasename";
  Database database = client.createDatabase(dbName);
  System.out.println("create database:" + database);
  return database;
}
```

NOTE

The **default** database is a built-in database. You are not allowed to create a database named **default**.

Deleting a Database

DLI provides an API for deleting a database. The example code is as follows:

```
  //Call the deleteDatabase interface of the Database object to delete a database.
  //Call the getDatabase(String databaseName) interface of the DLIClient object to obtain the Database object.
private static void deletedatabase(Database database) throws DLIException {
   String dbName = "databasename";
   database=client.getDatabase(dbName);
   database.deleteDatabase();
   System.out.println("delete db " + dbName);
}
```

NOTE

- A database that contains tables cannot be deleted. To delete a database that contains tables, delete the tables first.
- A deleted database cannot be restored. Therefore, exercise caution when deleting a database.

Querying All Databases

You can use the API provided by DLI to query the list of created databases. The example code is as follows:

```
private static void listDatabases(DLIClient client) throws DLIException {
  //Call the listAllDatabases method of the DLIClient object to query the database list.
  List<Database> databases = client.listAllDatabases();
  for (Database db : databases) {
    System.out.println("dbName:" + db.getDatabaseName() + " " + "tableCount:" + db.getTableCount());
  }
}
```

4.6.2 Table-Related SDKs

Creating a DLI Table

DLI provides an API for creating DLI tables. You can use it to create a table for storing DLI data. The example code is as follows:

```
private static Table createDLITable(Database database) throws DLIException {
  // Construct a table column set and instantiate the Column object to construct columns.
  List<Column> columns = new ArrayList<Column>();
  Column c1 = new Column("c1", DataType.STRING, "desc for c1");
  Column c2 = new Column("c2", DataType.INT, "desc for c2");
  Column c3 = new Column("c3", DataType.DOUBLE, "desc for c3");
  Column c4 = new Column("c4", DataType.BIGINT, "desc for c4");
  Column c5 = new Column("c5", DataType.SHORT, "desc for c5");
  Column c6 = new Column("c6", DataType.LONG, "desc for c6");
  Column c7 = new Column("c7", DataType.SMALLINT, "desc for c7");
  Column c8 = new Column("c8", DataType.BOOLEAN, "desc for c8");
  Column c9 = new Column("c9", DataType.DATE, "desc for c9");
  Column c10 = new Column("c10", DataType.TIMESTAMP, "desc for c10");
  Column c11 = new Column("c11", DataType.DECIMAL, "desc for c11");
  columns.add(c1);
  columns.add(c2);
  columns.add(c3);
  columns.add(c4);
  columns.add(c5);
  columns.add(c6);
  columns.add(c7);
  columns.add(c8);
  columns.add(c9);
  columns.add(c10);
  columns.add(c11);

  List<String> sortColumns = new ArrayList<String>();
  sortColumns.add("c1");
  String DLITblName = "tablename";
  String desc = "desc for table";
  // Call the createDLITable method of the Database object to create a DLI table.
  Table table = database.createDLITable(DLITblName, desc, columns, sortColumns);
  System.out.println(table);
  return table;
}
```

NOTE

The default precision of **DataType.DECIMAL** is **(10,0)**. To set the precision of data of the decimal type, perform the following operation:

```
Column c11 = new Column("c11", new DecimalTypeInfo(25,5), "test for c11");
```


Creating an OBS Table

DLI provides an API for creating OBS tables. You can use it to create a table for storing OBS data. The example code is as follows:

```
private static Table createObsTable(Database database) throws DLIException {
    // Construct a table column set and instantiate the Column object to construct columns.
    List < Column > columns = new ArrayList < Column > ();
    Column c1 = new Column("c1", DataType.STRING, "desc for c1");
    Column c2 = new Column("c2", DataType.INT, "desc for c2");
    Column c3 = new Column("c3", DataType.DOUBLE, "desc for c3");
    Column c4 = new Column("c4", DataType.BIGINT, "desc for c4");
    Column c5 = new Column("c5", DataType.SHORT, "desc for c5");
    Column c6 = new Column("c6", DataType.LONG, "desc for c6");
    Column c7 = new Column("c7", DataType.SMALLINT, "desc for c7");
    Column c8 = new Column("c8", DataType.BOOLEAN, "desc for c8");
    Column c9 = new Column("c9", DataType.DATE, "desc for c9");
    Column c10 = new Column("c10", DataType.TIMESTAMP, "desc for c10");
    Column c11 = new Column("c11", DataType.DECIMAL, "desc for c11");
    columns.add(c1);
    columns.add(c2);
    columns.add(c3);
    columns.add(c4);
    columns.add(c5);
    columns.add(c6);
    columns.add(c7);
    columns.add(c8);
    columns.add(c9);
    columns.add(c10);
    columns.add(c11);
    CsvFormatInfo formatInfo = new CsvFormatInfo();
    formatInfo.setWithColumnHeader(true);
    formatInfo.setDelimiter(",");
    formatInfo.setQuoteChar("\"");
    formatInfo.setEscapeChar("\\");
    formatInfo.setDateFormat("yyyy/MM/dd");
    formatInfo.setTimestampFormat("yyyy-MM-dd HH:mm:ss");
    String obsTblName = "tablename";
    String desc = "desc for table";
    String dataPath = "OBS path";
    // Call the createObsTable method of the Database object to create an OBS table.
    Table table = database.createObsTable(obsTblName, desc, columns,StorageType.CSV , dataPath,
formatInfo);
    System.out.println(table);
    return table;
}
```

NOTE

The default precision of **DataType.DECIMAL** is **(10,0)**. To set the precision of data of the decimal type, perform the following operation:

```
Column c11 = new Column("c11", new DecimalTypeInfo(25,5), "test for c11");
```

Deleting a Table

DLI provides an API for deleting tables. You can use it to delete all the tables in a database. The example code is as follows:

```
private static void deleteTables(Database database) throws DLIException {
    // Call the listAllTables interface of the Database object to query all tables.
    List<Table> tables = database.listAllTables();
    for (Table table : tables) {
    // Traverse tables and call the deleteTable interface of the Table object to delete tables.
      table.deleteTable();
      System.out.println("delete table " + table.getTableName());
    }
  }
```


NOTE

A deleted table cannot be restored. Therefore, exercise caution when deleting a table.

Querying All Tables

DLI provides an API for querying tables. You can use it to query all tables in a database. The example code is as follows:

```
private static void listTables(Database database) throws DLIException {
  // Call the listAllTables method of the Database object to query all tables in a database.
  List<Table> tables = database.listAllTables(true);
  for (Table table : tables) {
    System.out.println(table);
  }
}
```

Querying the Partition Information of a Table (Including the Creation and Modification Time of the Partition).

DLI provides an API for querying table partition information. You can use it to query the partition information (including the creation time and modification time) in the database table. The example code is as follows:

```
private static void showPartitionsInfo(DLIClient client) throws DLIException {
    String databaseName = "databasename";
    String tableName = "tablename";
    // Call the showPartitions method of the DLIClient object to query the partition information (including the partition creation and modification time) in the database table.
    PartitionResult partitionResult = client.showPartitions(databaseName, tableName);
    PartitionListInfo partitonInfos = partitionResult.getPartitions();
    // Obtain the creation and modification time of the partition.
    Long createTime = partitonInfos.getPartitionInfos().get(0).getCreateTime().longValue();
    Long lastAccessTime = partitonInfos.getPartitionInfos().get(0).getLastAccessTime().longValue();
    System.out.println("createTime:"+createTime+"\nlastAccessTime:"+lastAccessTime);
}
```

Describing Table Information

You can call an API to obtain the metadata description of a table. The example code is as follows:

```
private static void getTableDetail(Table table) throws DLIException {
  // Call getTableDetail on the Table object to obtain table information.
  //  TableSchema tableSchema=table.getTableDetail();
  // Output
  System.out.println(List<Column> columns = tableSchema.getColumns());
  System.out.println(List<String> sortColumns = tableSchema.getSortColumns());
  System.out.println(String createTableSql = tableSchema.getCreateTableSql());
  System.out.println(String tableComment = tableSchema.getTableComment());
}
```

4.6.3 Job-related SDKs

Importing Data

DLI provides an API for importing data. You can use it to import data stored in OBS to a created DLI or OBS table. The example code is as follows:

```
//Instantiate the importJob object. The input parameters of the constructor include the queue, database name, table name (obtained by instantiating the Table object), and data path.
private static void importData(Queue queue, Table DLITable) throws DLIException {
```



```
    String dataPath = "OBS Path";
    queue = client.getQueue("queueName");
    CsvFormatInfo formatInfo = new CsvFormatInfo();
    formatInfo.setWithColumnHeader(true);
    formatInfo.setDelimiter(",");
    formatInfo.setQuoteChar("\"");
    formatInfo.setEscapeChar("\\");
    formatInfo.setDateFormat("yyyy/MM/dd");
    formatInfo.setTimestampFormat("yyyy-MM-dd HH:mm:ss");
    String dbName = DLITable.getDb().getDatabaseName();
    String tableName = DLITable.getTableName();
    ImportJob importJob = new ImportJob(queue, dbName, tableName, dataPath);
    importJob.setStorageType(StorageType.CSV);
    importJob.setCsvFormatInfo(formatInfo);
    System.out.println("start submit import table: " + DLITable.getTableName());
    //Call the submit interface of the ImportJob object to submit the data importing job.
    importJob.submit(); //Call the getStatus interface of the ImportJob object to query the status of the data importing job.
    JobStatus status = importJob.getStatus();
    System.out.println("Job id: " + importJob.getJobId() + ", Status : " + status.getName());
}
```

NOTE

- Before submitting the data importing job, you can set the format of the data to be imported. In the sample code, the setStorageType interface of the ImportJob object is called to set the data storage type to csv. The data format is set by calling the setCsvFormatInfo interface of the ImportJob object.
- Before submitting the data import job, you can set the partition of the data to be imported and whether to overwrite the data. You can call the **setPartitionSpec** API of the **ImportJob** object to set the partition information, for example, **importJob.setPartitionSpec(new PartitionSpec("part1=value1,part2=value2"))**. You can also create the partition using parameters when creating the **ImportJob** object. By default, data is appended to an import job. To overwrite the existing data, call the **setOverWrite** API of the **ImportJob** object, for example, **importJob.setOverWrite(Boolean.TRUE)**.
- If a folder and a file under an OBS bucket directory have the same name, data is preferentially loaded to the file, instead of the folder. It is recommended that the files and folders of the same level have different names when you create an OBS object.

Importing the Partition Data

DLI provides an API for importing data. You can use it to import data stored in OBS to a specified partition of the created DLI or OBS table. The example code is as follows:

```
//Instantiate the importJob object. The input parameters of the constructor include the queue, database name, table name (obtained by instantiating the Table object), and data path.
private static void importData(Queue queue, Table DLITable) throws DLIException {
    String dataPath = "OBS Path";
    queue = client.getQueue("queueName");
    CsvFormatInfo formatInfo = new CsvFormatInfo();
    formatInfo.setWithColumnHeader(true);
    formatInfo.setDelimiter(",");
    formatInfo.setQuoteChar("\"");
    formatInfo.setEscapeChar("\\");
    formatInfo.setDateFormat("yyyy/MM/dd");
    formatInfo.setTimestampFormat("yyyy-MM-dd HH:mm:ss");
    String dbName = DLITable.getDb().getDatabaseName();
    String tableName = DLITable.getTableName();
    PartitionSpec partitionSpec = new PartitionSpec("part1=value1,part2=value2");
    Boolean isOverWrite = true;
    ImportJob importJob = new ImportJob(queue, dbName, tableName, dataPath, partitionSpec, isOverWrite);
    importJob.setStorageType(StorageType.CSV);
    importJob.setCsvFormatInfo(formatInfo);
```



```
    System.out.println("start submit import table: " + DLITable.getTableName());
    //Call the submit interface of the ImportJob object to submit the data importing job.
    importJob.submit(); //Call the getStatus interface of the ImportJob object to query the status of the data importing job.
    JobStatus status = importJob.getStatus();
    System.out.println("Job id: " + importJob.getJobId() + ", Status : " + status.getName());
}
```

NOTE

- When the **ImportJob** object is created, the partition information **PartitionSpec** can also be directly transferred as the partition character string.
- If some columns are specified as partition columns during **partitionSpec** import but the imported data contains only the specified partition information, the unspecified partition columns after data import contain abnormal values such as null.
- In the example, **isOverWrite** indicates whether to overwrite data. The value **true** indicates that data is overwritten, and the value **false** indicates that data is appended. Currently, **overwrite** is not supported to overwrite the entire table. Only the specified partition can be overwritten. To append data to a specified partition, set **isOverWrite** to **false** when creating the import job.

Exporting Data

DLI provides an API for exporting data. You can use it to export data from a DLI table to OBS. The example code is as follows:

```
//Instantiate the ExportJob object and transfer the queue, database name, table name (obtained by instantiating the Table object), and storage path of the exported data. The table type must be MANAGED.
private static void exportData(Queue queue, Table DLITable) throws DLIException {
    String dataPath = "OBS Path";
    queue = client.getQueue("queueName");
    String dbName = DLITable.getDb().getDatabaseName();
    String tableName = DLITable.getTableName();
    ExportJob exportJob = new ExportJob(queue, dbName, tableName, dataPath);
    exportJob.setStorageType(StorageType.CSV);
    exportJob.setCompressType(CompressType.GZIP);
    exportJob.setExportMode(ExportMode.ERRORIFEXISTS);
    System.out.println("start export DLI Table data...");
    // Call the submit interface of the ExportJob object to submit the data exporting job.
    exportJob.submit();
    // Call the getStatus interface of the ExportJob object to query the status of the data exporting job.
    JobStatus status = exportJob.getStatus();
    System.out.println("Job id: " + exportJob.getJobId() + ", Status : " + status.getName());
}
```

NOTE

- Before submitting the data exporting job, you can optionally set the data format, compression type, and export mode. In the preceding sample code, the setStorageType, setCompressType, and setExportMode interfaces of the ExportJob object are called to set the data format, compression type, and export mode, respectively. The setStorageType interface supports only the CSV format.
- If a folder and a file under an OBS bucket directory have the same name, data is preferentially loaded to the file, instead of the folder. It is recommended that the files and folders of the same level have different names when you create an OBS object.

Submitting a Job

DLI provides APIs for submitting and querying jobs. You can submit a job by calling the API. You can also call the API to query the job result. The example code is as follows:

```
//Instantiate the SQLJob object and construct input parameters for executing SQL, including the queue, database name, and SQL statements.
```



```
private static void runSqlJob(Queue queue, Table obsTable) throws DLIException {
    String sql = "select * from " + obsTable.getTableName();
    String queryResultPath = "OBS Path";
    SQLJob sqlJob = new SQLJob(queue, obsTable.getDb().getDatabaseName(), sql);
    System.out.println("start submit SQL job...");
    // Call the submit interface of the SQLJob object to submit the querying job.
    sqlJob.submit();
    // Call the getStatus interface of the SQLJob object to query the status of the querying job.
    JobStatus status = sqlJob.getStatus();
    System.out.println(status);
    System.out.println("start export Result...");
    //Call the exportResult interface of the SQLJob object to export the query result. queryResultPath refers
to the path of the data to be exported.
    sqlJob.exportResult(queryResultPath, StorageType.CSV,
            CompressType.GZIP, ExportMode.ERRORIFEXISTS, null);
    System.out.println("Job id: " + sqlJob.getJobId() + ", Status : " + status.getName());
}
```

Canceling a Job

DLI provides an API for canceling jobs. You can use it to cancel all jobs in the **Launching** or **Running** state. The following sample code is used for canceling jobs in the **Launching** state:

```
private static void cancelSqlJob(DLIClient client) throws DLIException {

  List<JobResultInfo> jobResultInfos = client.listAllJobs(JobType.QUERY);
  for (JobResultInfo jobResultInfo : jobResultInfos) {
      //Cancel jobs in the LAUNCHING state.
      if (JobStatus.LAUNCHING.equals(jobResultInfo.getJobStatus())) {
          //Cancel the job of a specific job ID.
          client.cancelJob(jobResultInfo.getJobId());
      }
  }
}
```

Querying All Jobs

DLI provides an API for querying jobs. You can use it to query all jobs of the current project. The example code is as follows:

```
private static void listAllSqlJobs(DLIClient client) throws DLIException {
   //Return the collection of JobResultInfo lists.
    List < JobResultInfo > jobResultInfos = client.listAllJobs();
   //Traverse the JobResultInfo lists to view job information.
    for (JobResultInfo jobResultInfo: jobResultInfos) {
        //job id
        System.out.println(jobResultInfo.getJobId());
        //Job description
        System.out.println(jobResultInfo.getDetail());
        //job status
        System.out.println(jobResultInfo.getJobStatus());
        //job type
        System.out.println(jobResultInfo.getJobType());
    }
   //Filter the query result by job type.
    List < JobResultInfo > jobResultInfos1 = client.listAllJobs(JobType.DDL);
   //Filter the query result by job type and start time that is in the Unix timestamp format.
    List < JobResultInfo > jobResultInfos2 = client.listAllJobs(1502349803729L, 1502349821460L,
JobType.DDL);
   //Filter the query result by page.
    List < JobResultInfo > jobResultInfos3 = client.listAllJobs(100, 1, JobType.DDL);
   //Filter the query result by page, start time, and job type.
    List < JobResultInfo > jobResultInfos4 = client.listAllJobs(100, 1, 1502349803729L, 1502349821460L,
JobType.DDL);

    // Use Tags to query jobs that meet the conditions.
    JobFilter jobFilter = new JobFilter();
```



```
    jobFilter.setTags("workspace=space002,jobName=name002");
    List < JobResultInfo > jobResultInfos1 = client.listAllJobs(jobFilter);
    // Use Tags to query target jobs of a specified page.
    JobFilter jobFilter = new JobFilter();
    jobFilter.setTags("workspace=space002,jobName=name002");
    jobFilter.setPageSize(100);
    jobFilter.setCurrentPage(0);
    List < JobResultInfo > jobResultInfos1 = client.listJobsByPage(jobFilter);
}
```

NOTE

- Parameters in the OVERRIDE method can be set to **null**, indicating that no filter conditions are specified. Ensure that all parameters are set to valid values. If the page parameter is set to **-1**, the query will fail.
- APIs in this SDK do not support SQL patterns. You cannot match SQL patterns for job query.

  To query DLI jobs, use the **Querying All Jobs** API.

Querying Job Results

DLI provides an API for querying job results. You can use it to query information about a job of the specific job ID. The example code is as follows:

```
private static void getJobResultInfo(DLIClient client) throws DLIException {
    String jobId = "4c4f7168-5bc4-45bd-8c8a-43dfc85055d0";
    JobResultInfo jobResultInfo = client.queryJobResultInfo(jobId);
   //View information about a job.
    System.out.println(jobResultInfo.getJobId());
    System.out.println(jobResultInfo.getDetail());
    System.out.println(jobResultInfo.getJobStatus());
    System.out.println(jobResultInfo.getJobType());
}
```

Querying Jobs of the SQL Type

DLI provides an API for querying SQL jobs. You can use it to query information about recently executed jobs submitted using SQL statements in the current project. The example code is as follows:

```
private static void getJobResultInfos(DLIClient client) throws DLIException {

  //Return the collection of JobResultInfo lists.
  List<JobResultInfo> jobResultInfos = client.listSQLJobs();
  //Traverse the list to view job information.
  for (JobResultInfo jobResultInfo : jobResultInfos) {
        //job id
        System.out.println(jobResultInfo.getJobId());
        //Job description
        System.out.println(jobResultInfo.getDetail());
        //job status
        System.out.println(jobResultInfo.getJobStatus());
        //job type
        System.out.println(jobResultInfo.getJobType());
   }

    // Use Tags to query SQL jobs that meet the conditions.
    JobFilter jobFilter = new JobFilter();
    jobFilter.setTags("workspace=space002,jobName=name002");
    List < JobResultInfo > jobResultInfos1 = client.listAllSQLJobs(jobFilter);
    // Use Tags to query target SQL jobs of a specified page.
    JobFilter jobFilter = new JobFilter();
    jobFilter.setTags("workspace=space002,jobName=name002");
    jobFilter.setPageSize(100);
    jobFilter.setCurrentPage(0);
    List < JobResultInfo > jobResultInfos1 = client.listSQLJobsByPage(jobFilter);
}
```


Exporting Query Results

DLI provides an API for exporting query results. You can use the API to export the query job result submitted in the editing box of the current project. The example code is as follows:

```
 //Instantiate the SQLJob object and construct input parameters for executing SQL, including the queue, database name, and SQL statements.
 private static void exportSqlResult(Queue queue, Table obsTable) throws DLIException {
   String sql = "select * from " + obsTable.getTableName();
   String queryResultPath = "OBS Path";
   SQLJob sqlJob = new SQLJob(queue, obsTable.getDb().getDatabaseName(), sql);
   System.out.println("start submit SQL job...");
   //Call the submit interface of the SQLJob object to submit the querying job.
    sqlJob.submit();
   //Call the getStatus interface of the SQLJob object to query the status of the querying job.
    JobStatus status = sqlJob.getStatus();
    System.out.println(status);
    System.out.println("start export Result...");
   //Call the exportResult interface of the SQLJob object to export the query result. exportPath indicates the path for exporting data. JSON indicates the export format. queueName indicates the queue for executing the export job. limitNum indicates the number of results of the export job. 0 indicates that all data is exported.
   sqlJob.exportResult(exportPath + "result", StorageType.JSON, CompressType.NONE,
       ExportMode.ERRORIFEXISTS, queueName, true, 5);
 }
```

Previewing Job Results

DLI provides an API for previewing job results. You can call this API to obtain the first 1000 records in the result set.

```
// Initialize a SQLJob object and pass the queue, database name, and SQL statement to execute the SQL.
private static void getPreviewJobResult(Queue queue, Table obsTable) throws DLIException {
   String sql = "select * from " + obsTable.getTableName();
   SQLJob sqlJob = new SQLJob(queue, obsTable.getDb().getDatabaseName(), sql);
   System.out.println("start submit SQL job...");
   // Call the submit method on the SQLJob object.
   sqlJob.submit();
   // Call the previewJobResult method on the SQLJob object to query the first 1000 records in the result set.
   List<Row> rows = sqlJob.previewJobResult();
   if (rows.size() > 0) {
       Integer value = rows.get(0).getInt(0);
       System.out.println("Obtain the data value in the first column at the first row." + value);
   }
   System.out.println("Job id: " + sqlJob.getJobId() + ", previewJobResultSize : " + rows.size());
}
```

Deprecated API

The **getJobResult** method has been discarded. You can call **DownloadJob** instead to obtain the job result.

For details about the **DownloadJob** method, obtain the **dli-sdk-java-x.x.x.zip** package by referring to **Obtaining and Installing the SDK** and decompress the package.

4.7 SDKs Related to Flink Jobs

Prerequisites

- You have configured the Java SDK environment by following the instructions provided **Overview**.

- You have initialized the DLI Client by following the instructions provided in **Initializing the DLI Client** and created queues by following the instructions provided in **Queue-Related SDKs**.

Creating a SQL Job

DLI provides an API for creating a Flink streaming SQL job. You can use it to create a Flink streaming SQL job and submit it to DLI. Sample code is as follows:

```
private static void createSQLJob(DLIClient client) throws DLIException {
    SubmitFlinkSqlJobRequest body = new SubmitFlinkSqlJobRequest();
    body.name("job-name");
    body.runMode(SubmitFlinkSqlJobRequest.RunModeEnum.SHARED_CLUSTER);
    body.checkpointEnabled(false);
    body.checkpointMode(1);
    body.jobType(SubmitFlinkSqlJobRequest.JobTypeEnum.JOB);
    JobStatusResponse result = client.submitFlinkSqlJob(body);
    System.out.println(result);
}
```

Customizing a Job

DLI provides an API for creating a user-defined Flink job. Currently, the job supports the JAR format and runs in dedicated queues. The example code is as follows:

```
private static void createFlinkJob(DLIClient client) throws DLIException {
     CreateFlinkJarJobRequest body = new CreateFlinkJarJobRequest();
     body.name("jar-job");
     body.cuNumber(2);
     body.managerCuNumber(1);
     body.parallelNumber(1);
     body.entrypoint("dli/WindowJoin.jar");
     JobStatusResponse result = client.createFlinkJarJob(body);
     System.out.println(result);
 }
```

Updating a SQL Job

DLI provides an API for updating Flink streaming SQL jobs. You can use it to update a Flink streaming SQL job. Sample code is as follows:

```
private static void updateSQLJob(DLIClient client) throws DLIException {
     UpdateFlinkSqlJobRequest body = new UpdateFlinkSqlJobRequest();
     body.name("update-job");
     JobUpdateResponse result = client.updateFlinkSqlJob(body,203L);
     System.out.println(result);
 }
```

Updating a Custom Job

DLI provides an API for updating user-defined Flink jobs. You can use it to update custom jobs, which currently support the JAR format and run in dedicated queues. The example code is as follows:

```
  private static void updateFlinkJob(DLIClient client) throws DLIException {
      UpdateFlinkJarJobRequest body = new UpdateFlinkJarJobRequest();
      body.name("update-job");
      JobUpdateResponse result = client.updateFlinkJarJob(body,202L);
      System.out.println(result);
   }
```


Querying the List of Jobs

DLI provides an API for querying the Flink job list. The following parameters are involved in this API: **name**, **status**, **show_detail**, **cursor**, **next**, **limit**, and **order**. In this example, the query results are displayed in descending order and information about the jobs whose IDs are less than the value of **cursor** is displayed. The example code is as follows:

```
private static void  QueryFlinkJobListResponse(DLIClient client) throws DLIException {
        QueryFlinkJobListResponse result = client.getFlinkJobs(null, "job_init", null, true, 0L, 10, null,
null,null,null,null);
        System.out.println(result);
    }
```

Querying Job Details

DLI provides an API for querying Flink job details. The example code is as follows:

```
private static void  getFlinkJobDetail(DLIClient client) throws DLIException {
Long jobId = 203L; //Job ID
    GetFlinkJobDetailResponse result = client.getFlinkJobDetail(jobId);
    System.out.println(result);
}
```

Querying the Job Execution Plan Diagram

DLI provides an API for querying the execution plan of a Flink job. The example code is as follows:

```
private static void  getFlinkJobExecuteGraph(DLIClient client) throws DLIException {
Long jobId = 203L; //Job ID
        FlinkJobExecutePlanResponse result = client.getFlinkJobExecuteGraph(jobId);
        System.out.println(result);
    }
```

Querying Job Monitoring Information

DLI provides an API for querying Flink job monitoring information. Monitoring information about multiple jobs can be queried at the same time. The example code is as follows:

```
public static void getMetrics(DLIClient client) throws DLIException{
    List < Long > job_ids = new ArrayList < > ();
    Long jobId = 6316L; //Job 1 ID
    Long jobId2 = 6945L; //Job 2 ID
    job_ids.add(jobId);
    job_ids.add(jobId2);
    GetFlinkJobsMetricsBody body = new GetFlinkJobsMetricsBody();
    body.jobIds(job_ids);
    QueryFlinkJobMetricsResponse result = client.getFlinkJobsMetrics(body);
    System.out.println(result);
}
```

Querying the APIG Address of a Job

DLI provides an API for querying the APIG access address of a Flink job. The example code is as follows:

```
 private static void  getFlinkApigSinks(DLIClient client) throws DLIException {
        Long jobId = 59L; //Job 1 ID
        FlinkJobApigSinksResponse result = client.getFlinkApigSinks(jobId);
        System.out.println(result);
    }
```


Running a Job

DLI provides APIs for running Flink jobs. The example code is as follows:

```
public static void runFlinkJob(DLIClient client) throws DLIException{
   RunFlinkJobRequest body = new RunFlinkJobRequest();
    List<Long> jobIds = new ArrayList<>();
    Long jobId = 59L; //Job 1 ID
    Long jobId2 = 192L; //Job 2 ID
    jobIds.add(jobId);
    jobIds.add(jobid2);
    body.resumeSavepoint(false);
    body.jobIds(jobIds);
    List<GlobalBatchResponse> result = client.runFlinkJob(body);
    System.out.println(result);
}
```

Stopping a Job

DLI provides an API for stopping Flink jobs. The example code is as follows:

```
public static void stopFlinkJob(DLIClient client) throws DLIException{
    StopFlinkJobRequest body = new StopFlinkJobRequest();
    List<Long> jobIds = new ArrayList<>();
    Long jobId = 59L; //Job 1 ID
    Long jobId2 = 192L; //Job 2 ID
    jobIds.add(jobId);
    jobIds.add(jobid2);
    body.triggerSavepoint(false);
    body.jobIds(jobIds);
    List<GlobalBatchResponse> result = client.stopFlinkJob(body);
    System.out.println(result);
}
```

Deleting Jobs in Batches

DLI provides an API for deleting Flink jobs in batches. You can use the API to batch delete Flink jobs in any status. The example code is as follows:

```
public static void deleteFlinkJob(DLIClient client) throws DLIException{
   DeleteJobInBatchRequest  body = new DeleteJobInBatchRequest ();
   List<Long> jobIds = new ArrayList<>();
   Long jobId = 202L; //Job 1 ID
   Long jobid2 = 203L; //Job 2 ID
   jobIds.add(jobId);
   jobIds.add(jobid2);
   body.jobIds(jobIds);
   List<GlobalBatchResponse>  result = client. deleteFlinkJobInBatch(body);
   System.out.println(result);
}
```

4.8 SDKs Related to Spark Jobs

Prerequisites

- You have configured the Java SDK environment by following the instructions provided **Overview**.
- You have initialized the DLI Client by following the instructions provided in **Initializing the DLI Client** and created queues by following the instructions provided in **Queue-Related SDKs**.

Submitting Batch Jobs

DLI provides an API to perform batch jobs. The example code is as follows:

```
private static void runBatchJob(Cluster cluster) throws DLIException {
    SparkJobInfo jobInfo = new SparkJobInfo();
    jobInfo.setClassName("your.class.name");
    jobInfo.setFile("xxx.jar");
    jobInfo.setCluster_name("queueName");
   // Call the asyncSubmit method on the BatchJob object to submit the batch job.
    BatchJob job = new BatchJob(cluster, jobInfo);
    job.asyncSubmit();
    while (true) {
        SparkJobStatus jobStatus = job.getStatus();
        if (SparkJobStatus.SUCCESS.equals(jobStatus)) {
            System.out.println("Job finished");
            return;
        }
        if (SparkJobStatus.DEAD.equals(jobStatus)) {
            throw new DLIException("The batch has already exited");
        }
        try {
            Thread.sleep(1000);
        } catch (InterruptedException e) {
            e.printStackTrace();
        }
    }
}
```

NOTE

- A cluster is a queue created by a user.
- The input parameter cannot be in JSON format.
- DLI provides the following two APIs related to batch jobs:
  - asyncSubmit: This API is asynchronous. After the API is submitted, the job result is directly returned.
  - submit: This API is synchronous. After the API is submitted, the result is returned only after job execution is complete.

Deleting Batch Jobs

DLI provides an API for deleting batch processing jobs. The example code is as follows:

```
private static void deleteBatchJob(DLIClient client) throws DLIException {
   // Submit the ID of the Spark batch processing job.
    String batchId = "0aae0dc5-f009-4b9b-a8c3-28fbee399fa6";
   // Call the delBatch method on the BatchJob object to cancel the batch job.
    MessageInfo messageInfo = client.delBatchJob(batchId);
    System.out.println(messageInfo.getMsg());
}
```

Querying All Batch Jobs

DLI provides an API for querying batch processing jobs. You can use it to query all batch jobs of the current project. The example code is as follows:

```
private static void listAllBatchJobs(DLIClient client) throws DLIException {
  System.out.println("list all batch jobs...");
  // Call the listAllBatchJobs method on the DLIClient object to query the batch jobs.
  String queueName = "queueName";
  int from = 0;
  int size = 1000;
  // Set paging, start page, and size of each page.
```



```
 List<SparkJobResultInfo> jobResults = client.listAllBatchJobs(queueName, from, size);
 for (SparkJobResultInfo jobResult : jobResults) {
  // Job ID
  System.out.println(jobResult.getId());
  // Job app ID
  System.out.println(jobResult.getAppId());
  // Job status
  System.out.println(jobResult.getState());
 }
}
```

Querying a Batch Job Status

DLI provides an API for querying status of batch processing jobs. The following sample code calls the API to query the job status:

```
private static void getStateBatchJob(DLIClient client) throws DLIException  {
        BatchJob batchJob = null;
        SparkJobInfo jobInfo = new SparkJobInfo();
        jobInfo.setClusterName("queueName");
        jobInfo.setFile("xxx.jar");
        jobInfo.setClassName("your.class.name");
        batchJob = new BatchJob(client.getCluster("queueName"), jobInfo);
        batchJob.asyncSubmit();
        SparkJobStatus sparkJobStatus=batchJob.getStatus();
        System.out.println(sparkJobStatus);

}
```

Querying Batch Job Logs

DLI provides an API for querying logs of batch processing jobs. The following sample code calls the API to query the job logs:

```
private static void getBatchJobLog(DLIClient client) throws DLIException  {
        BatchJob batchJob = null;
        SparkJobInfo jobInfo = new SparkJobInfo();
        jobInfo.setClusterName("queueName");
        jobInfo.setFile("xxx.jar");
        jobInfo.setClassName("your.class.name");
        batchJob = new BatchJob(client.getCluster("queueName"), jobInfo);
        batchJob.submit();
        // Call getLog on the BatchJob object to query the batch processing job.
        int from = 0;
        int size = 1000;
        List<String> jobLogs = batchJob.getLog(from,size);
        System.out.println(jobLogs);

}
```

4.9 SDKs Related to Flink Job Templates

Prerequisites

- You have configured the Java SDK environment by following the instructions provided **Overview**.
- You have initialized the DLI Client by following the instructions provided in **Initializing the DLI Client**.

Creating a Job Template

DLI provides an API for creating a Flink job template. The example code is as follows:


```
public static void createFlinkJobTemplate(DLIClient client) throws DLIException{
    CreateFlinkJobTemplateRequest body = new CreateFlinkJobTemplateRequest();
    body.name("template");
    FlinkJobTemplateCreateResponse  result = client.createFlinkJobTemplate(body);
    System.out.println(result);
}
```

Updating a Job Template

DLI provides an API for updating a Flink job template. The example code is as follows:

```
  public static void updateFlinkJobTemplate(DLIClient client) throws DLIException{
      Long templateId = 277L; //Template ID
      UpdateFlinkJobTemplateRequest body = new UpdateFlinkJobTemplateRequest();
      body.name("template-update");
      GlobalResponse result = client.updateFlinkJobTemplate(body,templateId);
      System.out.println(result);
  }
```

Deleting a Job Template

DLI provides an API for deleting a Flink job template. A template used by jobs can also be deleted. The example code is as follows:

```
public static void deleteFlinkJobTemplate(DLIClient client) throws DLIException{
    Long templateId = 277L; //Template ID
    FlinkJobTemplateDeleteResponse result = client.deleteFlinkJobTemplate(templateId);
    System.out.println(result);
}
```

Querying the List of Job Templates

DLI provides an API for querying Flink job templates. In this example, the query results are displayed in descending order and information about the job templates whose IDs are less than the value of **cursor** is displayed. The example code is as follows:

```
  public static void getFlinkJobTemplates(DLIClient client) throws DLIException{
      Long offset = 789L; // Long | Template offset.
      Integer limit = 56; // Integer | Maximum number of records that can be queried.
      String order = "asc"; // String | Query result display. The query results can be displayed in ascending or
descending order.
      FlinkJobTemplateListResponse result = client.getFlinkJobTemplates(offset,limit,order);
      System.out.println(result);
  }
```

5 Python SDK

5.1 Overview

Scenario

With DLI's SDKs, you can quickly and easily use DLI without worrying about the details of the requests. This section describes how to obtain and use SDKs in a Python environment.

Notes

- To use DLI's Python SDKs to access a specific service's API, you need to ensure that the current service has been enabled and authorized on the DLI management console.
- Python 2.7.10, 3.4.0, or later versions are required. The Visual C++ compilation environment is required, and Visual C++ build tools or Visual Studio must be installed.

  For details about how to configure the Python development environment, see **Configuring the Python SDK Environment**.
- The DLI Python SDK dependencies include urllib3 1.15 or later, six 1.10 or later, certifi, and python-dateutil.
- For details about how to obtain and install Python SDKs, see **Obtaining and Installing SDKs**.
- To use SDKs to access DLI, you need to initialize the DLI client. During DLI client initialization, you can use the AK/SK or token for authentication. For details, see **Initializing the DLI Client**.

Python SDKs

Table 5-1 Python SDKs

SDK	Description
Queue-Related SDKs	This section provides instructions on how to use DLI's Python SDKs to retrieve a list of all queues.
Resource-Related SDKs	This section provides instructions on how to use DLI's Python SDKs to upload resource packages, query all resource packages, query specific resource packages, and delete resource packages.
SDKs Related to SQL Jobs	This section provides instructions on how to use DLI's Python SDKs for database-related operations, table-related operations, and job-related operations.
SDKs Related to Spark Jobs	This section provides instructions on how to use DLI's Python SDKs to submit Spark jobs, cancel Spark jobs, and delete Spark jobs.

5.2 Configuring the Python SDK Environment

Scenario

If you are preparing for secondary development, you need to deploy the environment as required in **Table 5-2**.

Table 5-2 Development environment

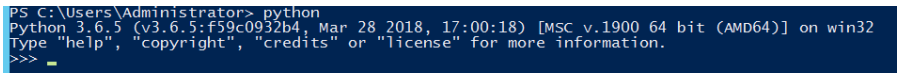
Item	Description
Operating system (OS)	Windows OS. Windows 7 or later is recommended.
Python	Python 2.7.10, 3.4.0, or later versions are required. The Visual C++ compilation environment is required, and Visual C++ build tools or Visual Studio must be installed.
Python dependencies	The DLI Python SDK dependencies include urllib3 1.15 or later, six 1.10 or later, certifi, and python-dateutil.

Procedure

Step 1 Download Python from **Python's official website** and install it.

1. Install Python according to the Python official guidelines.
2. Check whether the configurations succeed. Specifically, at the **Start** menu, enter **cmd** and press **Enter** to bring up the command prompt window. Enter **python** and press **Enter**. If the version information is displayed, as shown in Figure 5-1, Python is successfully installed and configured.

Figure 5-1 Checking the configuration



NOTE

If an error similar to "error: Microsoft Visual C++ xx.x is required. Get it with Build Tools for Visual Studio" is reported when you install the Python application package, the C++ compiler may not been installed. Install the Visual Studio compiler of the required version. For some OSs, restart the system after Visual Studio is installed.

Step 2 Install the DLI Python SDK.

1. Select the installation package obtained in **Obtaining and Installing SDKs** and decompress it.

   Decompress **dli-sdk-python-<version>.zip** to a local directory that can be adjusted.

2. Install the SDK.

   a. On a PC running the Windows OS, choose **Start** > **Run**, enter **cmd**, and press **Enter**.

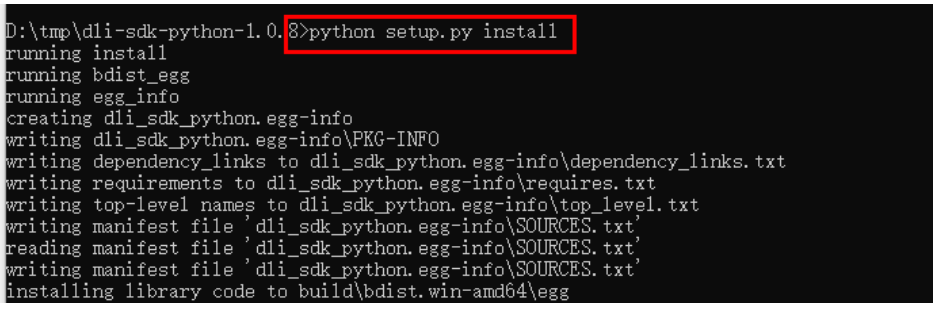
   b. In the command-line interface (CLI) window, access the **windows** directory in the directory where **dli-sdk-python-<version>.zip** is decompressed. For example, **D:\tmp\dli-sdk-python-1.0.8**.

   c. Run the following command to install DLI Python SDK (During the installation, the third-party dependencies are automatically downloaded):

   python setup.py install

   Figure 5-2 shows the installation result.

Figure 5-2 Installing Python SDK



----End

5.2.1 Preparing a Python Development Environment

Scenario

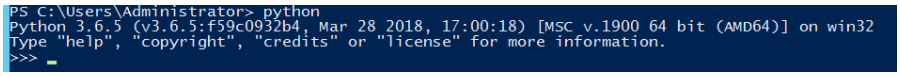
Before installing and using Python SDKs, make sure you have completed the basic configuration of your development environment.

Python 2.7.10, 3.4.0, or later versions are required. The Visual C++ compilation environment is required, and Visual C++ build tools or Visual Studio must be installed.

Procedure

1. Download Python from **Python's official website** and install it.
2. Install Python according to the Python official guidelines.
3. Check whether the configurations succeed. Specifically, at the **Start** menu, enter **cmd** and press **Enter** to bring up the command prompt window. Enter **python** and press **Enter**. If the version information is displayed, as shown in **Figure 5-3**, Python is successfully installed and configured.

Figure 5-3 Checking the configuration



NOTE

If an error similar to "error: Microsoft Visual C++ xx.x is required. Get it with Build Tools for Visual Studio" is reported when you install the Python application package, the C++ compiler may not been installed. Install the Visual Studio compiler of the required version. For some OSs, restart the system after Visual Studio is installed.

5.2.2 Obtaining and Installing SDKs

Installing Python SDKs

This section provides instructions on how to install Python SDKs.

Obtaining DLI SDKs

1. Log in to the DLI management console.
2. On the **Overview** page, click **SDK Download** under **Common Links**.
3. On the **DLI SDK DOWNLOAD** page, select a driver and download it.

   Obtain the **dli-sdk-python-*x.x.x*.zip** package and decompress it. The following table shows the directory structure of the package.

Table 5-3 Directory structure

Parameter	Description
dli	DLI SDK basic module in the Python environment

Parameter	Description
examples	Python sample code
pyDLI	Implementation interface of PyHive
setup.py	Python SDK installation script

Installing DLI Python SDKs

1. Download and decompress the SDK installation package.

   Decompress **dli-sdk-python-<version>.zip** to a local directory that can be adjusted.

2. Install the SDK.

   a. On a PC running the Windows OS, choose **Start** > **Run**, enter **cmd**, and press **Enter**.

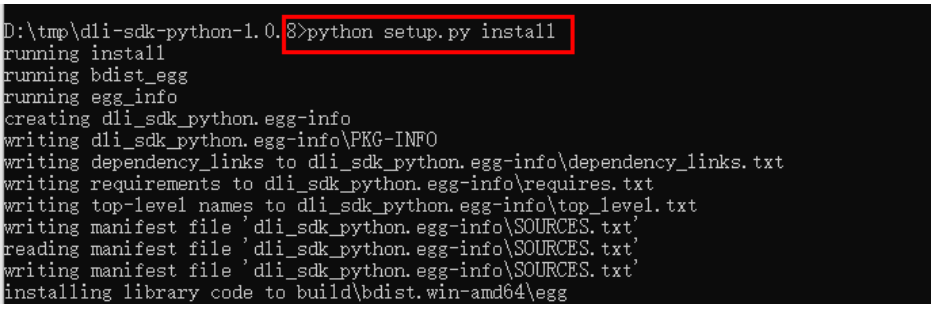
   b. In the command-line interface (CLI) window, access the **windows** directory in the directory where **dli-sdk-python-<version>.zip** is decompressed. For example, **D:\tmp\dli-sdk-python-1.0.8**.

   c. Run the following command to install DLI Python SDK (During the installation, the third-party dependencies are automatically downloaded):

   python setup.py install

   Figure 5-4 shows the installation result.

   Figure 5-4 Installing Python SDK



5.2.3 Initializing the DLI Client

To use DLI Python SDK to access DLI, you need to initialize the DLI client. During DLI client initialization, you can use the AK/SK or token for authentication. For details about the dependencies and complete sample code, see **Overview**.

Example Code for AK/SK Authentication

- Sample code

```
def init_aksk_dli_client():
    auth_mode = 'aksk'
    region = 'xxx'
    project_id = 'xxxx'
    ak =  System.getenv("xxx_SDK_AK")//Access key ID
    sk = System.getenv("xxx_SDK_SK")//Key used together with the access key ID
    dli_client = DliClient(auth_mode=auth_mode, region=region, project_id=project_id,ak=ak, sk=sk)
    return dli_client
```

- Parameter description and acquisition method
  - Parameter description
    - **ak**: Account access key
    - **sk**: Account secret access key

      NOTE

      Hard coding AKs and SKs or storing them in code in plaintext poses significant security risks. You are advised to store them in encrypted form in configuration files or environment variables and decrypt them when needed to ensure security.

      In this example, the AK and SK stored in the environment variables are used. Specify the environment variables *xxx*_**SDK_AK** and *xxx*_**SDK_SK** in the local environment first.

    - **regionName**: Region name
    - **projectId**: Project ID
  - You can perform the following operations to obtain the **Access Keys**, **project ID**, and **Region**:
    i. Log in to the management console.
    ii. Hover the cursor on the username in the upper right corner and select **My Credentials** from the drop-down list.
    iii. In the navigation pane on the left, choose **Access Keys** and click **Create Access Key**. Confirm that you want to proceed with the operation and click **OK**.
    iv. On the displayed page, click **Download**. Open the credential file to obtain the AK/SK information.
    v. In the navigation pane on the left, choose **API Credentials**. In the **Projects** pane, locate **project_id** and obtain the region information.

Example Code for Token-based Authentication

- Sample code

```
def init_token_dli_client():
   auth_mode = 'token'
    region = 'xxx'
    project_id = 'xxxx'
    account = 'xxx account'
    user = 'xxxx'
    password = 'xxxx'
    dli_client = DliClient(auth_mode=auth_mode, region=region, project_id=project_id,account=account,
user=user, password=password)
    return dli_client
```

- Parameter description
  - **domainname**: Name of the account to which the IAM user belongs
  - **username**: Username
  - **password**: User password
  - **regionName**: Region name
  - **project_id**: Project ID

NOTE

- Hard coding passwords or storing them in code in plaintext poses significant security risks. You are advised to store them in encrypted form in configuration files or environment variables and decrypt them when needed to ensure security.
- You can change the endpoint in **set** mode. Run the following statement: **dliInfo.setServerEndpoint(endpoint)**.

5.3 Queue-Related SDKs

Constraints

Jobs created using the SDK cannot run on the default queue.

Querying All Queues

You can use the API provided by DLI to query the queue list and select the corresponding queue to execute the job. Sample code is as follows:

```
def list_all_queues(dli_client):
    try:
       queues = dli_client.list_queues()
    except DliException as e:
        print(e)
        return

    for queue in queues:
        print(queue.name)
```

For details about the dependencies and complete sample code, see **Overview**.

5.4 Resource-Related SDKs

Prerequisites

- You have configured the Java SDK environment by following the instructions provided **Overview**.
- You have initialized the DLI Client by following the instructions provided in **Initializing the DLI Client**.

Uploading a Resource Package

You can use the APIs provided by DLI to upload resource packages. The following is an example. For details about the dependencies and complete sample code, see **Overview**.

```
def upload_resource(dli_client, kind, obs_jar_paths, group_name):
    try:
        dli_client.upload_resource(kind, obs_jar_paths, group_name)
    except DliException as e:
        print(e)
        return
```


NOTE

The following describes the request parameters. For details, see **Overview**.

- **kind**: resource package type. The options are as follows:
  - **jar**: JAR file
  - **Pyfile**: User Python file
  - **file**: User file
  - **modelfile**: User AI model file
- **obs_jar_paths**: OBS path of the resource package. The parameter format is {bucketName}.{obs domain name}/{jarPath}/{jarName}.

  Example: "https://bucketname.obs.com/jarname.jar"
- **group_name**: Name of the group to which the resource package belongs

Querying All Resource Packages

You can use the API provided by DLI to query the list of uploaded resources. The example code is as follows:

```
def list_resources(dli_client):
    try:
        resources = dli_client.list_resources()
    except DliException as e:
        print(e)
        return

    for resources_info in resources.package_resources:
        print('Package resource name:' + resources_info.resource_name)

    for group_resource in resources.group_resources:
        print('Group resource name:' + group_resource.group_name)
```

For details about the dependencies and complete sample code, see **Overview**.

Querying a Specified Resource Package

You can call an API to query information about the specified resource package. The sample code is as follows:

```
def get_package_resource(dli_client, resource_name, group_name):
 try:
        pkg_resource = dli_client.get_package_resource(resource_name, group_name)
        print(pkg_resource)
    except DliException as e:
        print(e)
        return
```

Deleting a Resource Package

You can call an API to delete an uploaded resource package. The sample code is as follows:

```
def delete_resource(dli_client, resource_name, group_name):
    try:
        dli_client.delete_resource(resource_name, group_name)
    except DliException as e:
        print(e)
        return
```

5.5 SDKs Related to SQL Jobs

5.5.1 Database-Related SDKs

Creating a Database

DLI provides an API for creating a database. You can use the API to create a database. The sample code is as follows:

```
def create_db(dli_client):
    try:
        db = dli_client.create_database('db_for_test')
    except DliException as e:
        print(e)
        return

    print(db)
```

NOTE

- The **default** database is a built-in database. You are not allowed to create a database named **default**.
- For details about the dependencies and complete sample code, see **Overview**.

Deleting a Database

DLI provides an API for deleting a database. The example code is as follows:

```
def delete_db(dli_client, db_name):
    try:
        dli_client.delete_database(db_name)
    except DliException as e:
        print(e)
        return
```

NOTE

- A database that contains tables cannot be deleted. To delete a database that contains tables, delete the tables first.
- A deleted database cannot be restored. Therefore, exercise caution when deleting a database.
- For details about the dependencies and complete sample code, see **Overview**.

Querying All Databases

DLI provides an API for querying the database list. The example code is as follows:

```
def list_all_dbs(dli_client):
    try:
        dbs = dli_client.list_databases()
    except DliException as e:
        print(e)
        return

    for db in dbs:
        print(db)
```

For details about the dependencies and complete sample code, see **Overview**.

5.5.2 Table-Related SDKs

Creating a DLI Table

DLI provides an API for creating DLI tables. Sample code is as follows:

```
def create_dli_tbl(dli_client, db_name, tbl_name):
    cols = [
        Column('col_1', 'string'),
        Column('col_2', 'string'),
        Column('col_3', 'smallint'),
        Column('col_4', 'int'),
        Column('col_5', 'bigint'),
        Column('col_6', 'double'),
        Column('col_7', 'decimal(10,0)'),
        Column('col_8', 'boolean'),
        Column('col_9', 'date'),
        Column('col_10', 'timestamp')
    ]
    sort_cols = ['col_1']
    tbl_schema = TableSchema(tbl_name, cols, sort_cols)
    try:
        table = dli_client.create_dli_table(db_name, tbl_schema)
    except DliException as e:
        print(e)
        return

    print(table)
```

For details about the dependencies and complete sample code, see **Overview**.

Creating an OBS Table

DLI provides an API for creating OBS tables. The example code is as follows:

```
def create_obs_tbl(dli_client, db_name, tbl_name):
    cols = [
        Column('col_1', 'string'),
        Column('col_2', 'string'),
        Column('col_3', 'smallint'),
        Column('col_4', 'int'),
        Column('col_5', 'bigint'),
        Column('col_6', 'double'),
        Column('col_7', 'decimal(10,0)'),
        Column('col_8', 'boolean'),
        Column('col_9', 'date'),
        Column('col_10', 'timestamp')
    ]
    tbl_schema = TableSchema(tbl_name, cols)
    try:
        table = dli_client.create_obs_table(db_name, tbl_schema,
                                            'obs://bucket/obj',
                                            'csv')
    except DliException as e:
        print(e)
        return

    print(table)
```

NOTE

- You need to create an OBS path in advance and specify it when creating an OBS table.
- For details about the dependencies and complete sample code, see **Overview**.

Deleting a Table

DLI provides an API for deleting tables. The example code is as follows:

```
def delete_tbls(dli_client, db_name):
    try:
        tbls = dli_client.list_tables(db_name)
        for tbl in tbls:
            dli_client.delete_table(db_name, tbl.name)
    except DliException as e:
        print(e)
        return
```

NOTE

- A deleted table cannot be restored. Exercise caution when deleting a table.
- For details about the dependencies and complete sample code, see **Overview**.

Querying All Tables

DLI provides an API for querying tables. The example code is as follows:

```
def list_all_tbls(dli_client, db_name):
    try:
        tbls = dli_client.list_tables(db_name, with_detail=True)
    except DliException as e:
        print(e)
        return

    for tbl in tbls:
        print(tbl.name)
```

For details about the dependencies and complete sample code, see **Overview**.

Describing Table Information

You can call an API to obtain the metadata description of a table. The sample code is as follows:

```
def get_table_schema(dli_client, db_name, tbl_name):
 try:
        table_info = dli_client.get_table_schema(db_name, tbl_name)
        print(table_info)
    except DliException as e:
        print(e)
        return
```

5.5.3 Job-related SDKs

For details about the dependencies and complete sample code, see **Overview**.

Importing Data

DLI provides an API for importing data. You can use this API to import OBS to a DLI table. Sample code is as follows:

```
def import_data(dli_client, db_name, tbl_name, queue_name):
    options = {
        "with_column_header": True,
        "delimiter": ",",
        "quote_char": "\"",
        "escape_char": "\\",
        "date_format": "yyyy/MM/dd",
        "timestamp_format": "yyyy/MM/dd hh:mm:ss"
```



```
    }

try:
    job_id, status = \
        dli_client.import_table(tbl_name, db_name,
                                'obs://bucket/obj/data.csv',
                                'csv',
                                queue_name=queue_name,
                                options=options)
except DliException as e:
    print(e)
    return

print(job_id)
print(status)
```

NOTE

- Before submitting the importing job, you can specify the **data_type** parameter to set the type of the data to be imported. For example, set **data_type** to **csv**. Use the **options** parameter to set details about the CSV data format, such as the delimiter and escape character.
- If a folder and a file under an OBS bucket directory have the same name, data is preferentially loaded to the file, instead of the folder. It is recommended that the files and folders of the same level have different names when you create an OBS object.

Exporting Data

DLI provides an API for exporting data. You can use this API to export DLI table data to an OBS bucket. The example code is as follows:

```
def export_data(dli_client, db_name, tbl_name, queue_name):
    try:
        job_id, status = dli_client.export_table(tbl_name, db_name,
                                                 'obs://bucket/obj',
                                                 queue_name=queue_name)
    except DliException as e:
        print(e)
        return

    print(job_id)
    print(status)
```

NOTE

- Before submitting the export job, you can set the data format, compression type, and export mode. The data can only be exported in the CSV format.
- If a folder and a file under an OBS bucket directory have the same name, data is preferentially loaded to the file, instead of the folder. It is recommended that the files and folders of the same level have different names when you create an OBS object.

Submitting a Job

DLI provides an API for querying jobs. The example code is as follows:

```
def run_sql(dli_client, db_name, queue_name):
    # execute SQL
    try:
        sql_job = dli_client.execute_sql('select * from tbl_dli_for_test', db_name, queue_name=queue_name)
        result_set = sql_job.get_result(queue_name=queue_name)
    except DliException as e:
        print(e)
        return

    if result_set.row_count == 0:
```



```
    return

for row in result_set:
    print(row)

# export the query result to obs
try:
    status = sql_job.export_result('obs://bucket/obj',
                                   queue_name=queue_name)
except DliException as e:
    print(e)
    return

print(status)
```

Canceling a Job

DLI provides an API for canceling jobs. You can use it to cancel a submitted job. A job that has been completed or failed cannot be canceled. The example code is as follows:

```
def cancel_sql(dli_client, job_id):
    try:
        dli_client.cancel_sql(job_id)
    except DliException as e:
        print(e)
        return
```

Querying All Jobs

DLI provides an API for querying all jobs. You can use the API to query information about all jobs in the current project and obtain the query result. The example code is as follows:

```
def list_all_sql_jobs(dli_client):
    try:
        sql_jobs = dli_client.list_sql_jobs()
    except DliException as e:
        print(e)
        return
    for sql_job in sql_jobs:
        print(sql_job)
```

NOTE

APIs in this SDK do not support SQL patterns. You cannot match SQL patterns for job query.

To query DLI jobs, use the **Querying All Jobs** API.

Querying SQL Jobs

You can call an API to query information about all SQL jobs in the current project and obtain the query result. The sample code is as follows:

```
def list_sql_jobs(dli_client):
    try:
        sql_jobs = dli_client.list_sql_jobs()
    except DliException as e:
        print(e)
        return
```

5.6 SDKs Related to Spark Jobs

For details about the dependencies and complete sample code, see **Overview**.

Submitting Batch Jobs

DLI provides an API to perform batch jobs. The example code is as follows:

```
def submit_spark_batch_job(dli_client, batch_queue_name, batch_job_info):
    try:
        batch_job = dli_client.submit_spark_batch_job(batch_queue_name, batch_job_info)
    except DliException as e:
        print(e)
        return

    print(batch_job.job_id)
    while True:
        time.sleep(3)
        job_status = batch_job.get_job_status()
        print('Job status: {0}'.format(job_status))
        if job_status == 'dead' or job_status == 'success':
            break

    logs = batch_job.get_driver_log(500)
    for log_line in logs:
        print(log_line)
```

Canceling a Batch Processing Job

DLI provides an API for canceling batch processing jobs. If the job execution is complete or fails, you cannot cancel this job. The example code is as follows:

```
def del_spark_batch(dli_client, batch_id):
    try:
        resp = dli_client.del_spark_batch_job(batch_id)
        print(resp.msg)
    except DliException as e:
        print(e)
        return
```

Deleting Batch Processing Jobs

DLI provides an API for deleting batch processing jobs. The following sample code calls the API to delete a batch processing job:

```
def del_spark_batch(dli_client, batch_id):
    try:
        resp = dli_client.del_spark_batch_job(batch_id)
        print(resp.msg)
    except DliException as e:
        print(e)
        return
```

