

Alibaba Cloud MaxCompute

Tools and Downloads

Issue: 20181105

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Generic conventions

Table -1: Style conventions

Style	Description	Example
	This warning information indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	 Danger: Resetting will result in the loss of user configuration data.
	This warning information indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	 Warning: Restarting will cause business interruption. About 10 minutes are required to restore business.
	This indicates warning information, supplementary instructions, and other content that the user must understand.	 Note: Take the necessary precautions to save exported data containing sensitive information.
	This indicates supplemental instructions, best practices, tips, and other content that is good to know for the user.	 Note: You can use Ctrl + A to select all files.
>	Multi-level menu cascade.	Settings > Network > Set network type
Bold	It is used for buttons, menus, page names, and other UI elements.	Click OK .
Courier font	It is used for commands.	Run the <code>cd /d C:/windows</code> command to enter the Windows system folder.
<i>Italics</i>	It is used for parameters and variables.	<code>bae log list --instanceid Instance_ID</code>
[] or [a b]	It indicates that it is a optional value, and only one item can be selected.	<code>ipconfig [-all -t]</code>
{ } or {a b}	It indicates that it is a required value, and only one item can be selected.	<code>swich {stand / slave}</code>

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1 Client

This article describes how to use the basic functions of the MaxCompute using client command line tool. Before using the MaxCompute client, you must [install and configure the client](#).

**Note:**

- Do not perform the analysis operation based on the output format of the client. The output format of the client is not ensured for forward compatibility. Clients of different versions are different in their command formats and behaviors.
- For more information about basic commands of the client, see [Basic commands](#).
- Download [MaxCompute console](#)
- The client supports JDK 1.9 from the 0.28.0 version, and the previous version can only use JDK 1.8.
- The client supports MaxCompute 2.0 from the 0.27.0 version [New data type](#).

After the client is installed and configured, you can use a command line to perform the following operations.

Get Help

To view the help information of the console, the command format is as follows:

```
odps @> ./bin/odpscmd-h;
```

You can also input `h;` or `help;` (case-insensitive) in an interactive mode.

The console also provides the `help [keyword];` command to get the command prompts related to the keyword. For example, input `help table;` to get command prompts related to the table operation as follows:

```
odps @ odps> help table;
Usage: alter table merge smallfiles
Usage: show tables [in]
       a list of tables | ls [-p,-project]
Usage: describe deserves mention | [.] [partition ()]
Usage: read [.] [partition ()] [line_num]
```

Start parameters

When start the console, you can specify a series of parameters as follows:

```
Usage: odpscmd [option]...
```

```
where options include:
--help (-h) for help
--project= use project
--endpoint= set endpoint
-u-p user name and password
-k will skip beginning queries and start from specified position
-r set retry times
-f <"file_path;"> execute command in file
-e <"command; [command;]..."> execute command, include sql command
-C will display job counters
```

Take the -f parameter as an example, the operation is as follows:

1. Prepare the local script file script.txt. Suppose that the file is located in the disk D, and the content is shown as follows:

```
DROP TABLE IF EXISTS test_table_mj;
CREATE TABLE test_table_mj (id string, name string);
DROP TABLE test_table_mj;
```

2. Run the following command:

```
odpscmd\bin>odpscmd -f D:/script.txt;
```

Interactive mode

Run the console to directly enter the interactive mode:

```
[admin: ~]$odpscmd
Aliyun ODPS Command Line Tool
Version 1.0
@Copyright 2012 Alibaba Cloud Computing Co., Ltd. All rights reserved.
odps@ odps> INSERT OVERWRITE TABLE DUAL SELECT * FROM DUAL;
```

Enter the command at the cursor position (use a semicolon as a statement terminator), and press Enter to run.

Continuous running

- When using -e or -f option to run a command, if there are multiple statements, and you want to start running from a middle statement, you can specify the parameter -k, indicating to ignore the previous statements and to start running from the specified position. When the parameter <= 0 is specified, the execution starts from the first statement.
- Each statement separated by a semicolon is considered as a valid statement. The statements which run successfully or fail to run are printed out at runtime.

For example,

suppose there are three SQL statements in the file /tmp/dual.sql:

```
drop table dual;  
create table dual (dummy string);  
insert overwrite table dual select count(*) from dual;
```

To ignore the first two statements, and start running from the third statement, the command format is as follows:

```
odpscmd -k 3 -f dual.sql
```

Get current logon user

To get current logon user, the command format is as follows:

```
whoami;
```

Use example:

```
odps@ hiveut>whoami;  
Name: odpstest@aliyun.com  
End_Point: http://service.odps.aliyun.com/api  
Project: lijunsecuritytest
```

Use the preceding command to get the current logon user Alibaba Cloud account, endpoint configuration, and project name.

Exit

To exit the console, the command format is as follows:

```
odps@ > quit;
```

You can also use the following command to exit the console:

```
odps@ > q;
```

2 MaxCompute Studio

2.1 What is Studio

MaxCompute Studio is a big data integrated development environment (IDE) tool that is provided by the Alibaba Cloud MaxCompute platform and installed on the developer's client. It is a development plug-in based on the popular integrated development platform [IntelliJ IDEA](#), helping users develop data conveniently. This article describes functional interfaces and common application scenarios of MaxCompute Studio.

Basic user interface

MaxCompute Studio is a plug-in on the IntelliJ IDEA platform, which shares basic development interfaces with IntelliJ IDEA. For more information about the IntelliJ IDEA interfaces, see [the Interface operation guide](#).

Based on the IntelliJ IDEA interfaces, MaxCompute Studio provides the following functional interfaces.

- **SQL Editor:** Provides features such as SQL syntax highlighting, code complementing, real-time error prompting, local compilation, and job submission.

Compiler View: Displays locally compiled prompts and error messages, and locates the code in the editor.

- **Project Explorer:** Connects to a MaxCompute project, and browses table structures, custom functions, and resource files in the project.

Table Details View: Displays details and sample data of tables, views, and other resources.

- **Job Explorer:** Browses and searches for historical jobs of MaxCompute.
 - Job Details View: Displays running details of a job, including the execution plan and details of each execution task.
 - Job Output View: Displays output information of a running job.
 - Job Result View: Displays the output result of the SELECT job.
- **MaxCompute Console:** Integrates the [MaxCompute client](#), on which MaxCompute client commands can be input and executed.

Connect to MaxCompute project

Before using most features of MaxCompute Studio, you must [Create a project connection](#). After the project connection is created, you can view related data structures and resource information in

the **Project Explorer**. MaxCompute Studio automatically creates a local metadata backup task for each project to increase the access frequency to MaxCompute metadata and reduce the latency.

**Note:**

- You must specify the target project connection to modify SQL scripts, submit jobs, view job information, open the MaxCompute console, and implement other functions using MaxCompute Studio. Therefore, creating a connection to the MaxCompute project is necessary.
- For more information about MaxCompute projects, see [Project](#).
- For more information about project management using MaxCompute Studio, see [Project space connection management](#).

Manage data

You can use the **Project Explorer** of MaxCompute Studio to quickly browse table structures, custom functions, and resource files in the project. The tree control can be used to list data tables, columns, partition columns, virtual views, custom functions, function signatures, and resource files and types of all project connections. It also supports fast locating.

You can double-click a data table to open the **Table Details View** and view metadata, structure, and sample data of the data table. If you do not have the permission for a project, an error message is prompted.

MaxCompute Studio integrates [MaxCompute Tunnel](#) and supports local data upload and download. For more information, see [Import and export data](#).

Write SQL scripts

You can easily compile a MaxCompute SQL script on MaxCompute Studio.

1. Open MaxCompute Studio and select **File > New > Project** or **File > New > Module...**
2. Create a MaxCompute Studio project or module.
3. Select **File > New > MaxCompute Script** or right-click the menu and select **New > MaxCompute Script** , to create a maxcompute SQL script file.

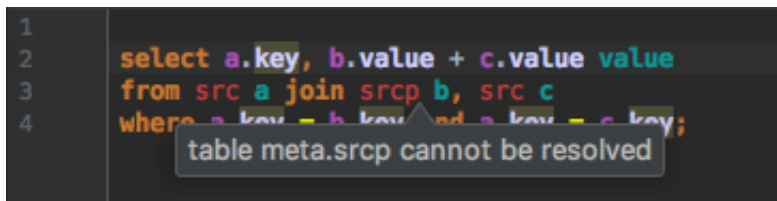
**Note:**

When a MaxCompute SQL script is created, MaxCompute Studio prompts you to select an associated MaxCompute project. You can also modify the associated project using the **project selector** on the right of the toolbar on the SQL editor. The editor automatically checks

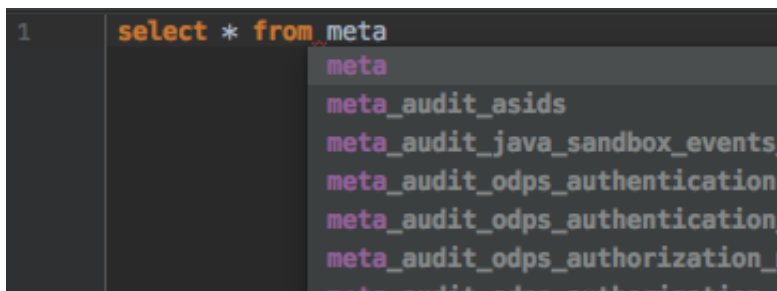
metadata (such as the table structure) and reports errors of an SQL statement based on the project associated with the SQL script. The editor also sends the SQL statement to the associated project for execution when it submits the SQL statement for running. For more information, see [Compile an SQL script](#).

SQL code intelligent prompt

After you enter the code, the SQL editor provided by MaxCompute Studio intelligently prompts the syntax errors, type matching errors, or warnings of SQL statements, and marks them on the code in real time. as shown in the following figure.




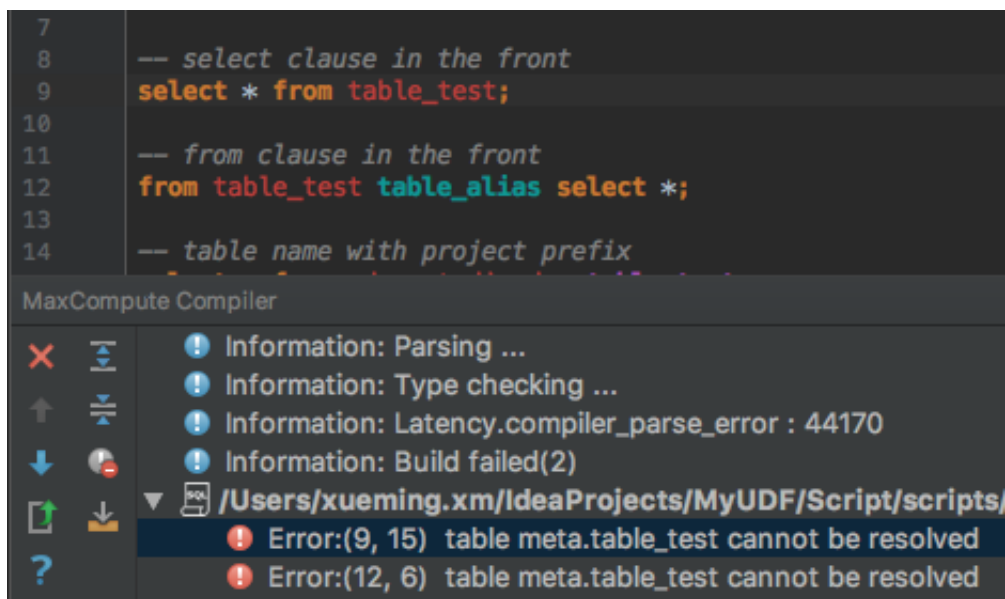
By using the code complementing function, MaxCompute Studio prompts you the name, table, field, function, type, and code keyword of a project based on the code context, and automatically complements the code based on your selections. as shown in the following figure.




Compile and submit a job

- Compile a job

Click the  icon on the toolbar of the SQL editor to locally compile an SQL script. If syntax or semantic errors occur, the editor reports it.



- Submit a job

Click the  icon on the toolbar of the SQL editor to submit an SQL script to the queue of the project specified by MaxCompute.

View history jobs

Open **Job Explorer** to view recently executed jobs in the specified project.



Note:

List only displays jobs submitted by the user ID of the current connection.

InstanceId	Status	Owner	StartTime	EndTime
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	SUCCESS	ODPS...	2017-...	2017-...
20170...	FAILED	ODPS...	2017-...	2017-...

Double-click a job to view the job details. as shown in the following figure.

Job ID: 201702170653179gu5qrzk2

Task Name: sql_optimizer_201702170653179gu5qrzk2_SQL_0_0_0_job_0

Task	I/O Records	Status	Progress	StartTime	EndTime
M1	1/1	TERMINA	100.0	2017-02...	2017-02...

M1

Instance	I/O Recor...	Status	FinishedP...	StartTime	EndTime	IP & Path	LogId
M1#0_0	1/1	TERMI...	100.0	2017-...	2017-...	10.10...	d01U...

2017-02-17 14:53:17 14:53:35

可视化 概要 (JSON) 概要 (文本) 结果 SQL

If you have the Log view URL of a job, you can select **MaxCompute > Open Logview** from the menu to go to the details page of the job.

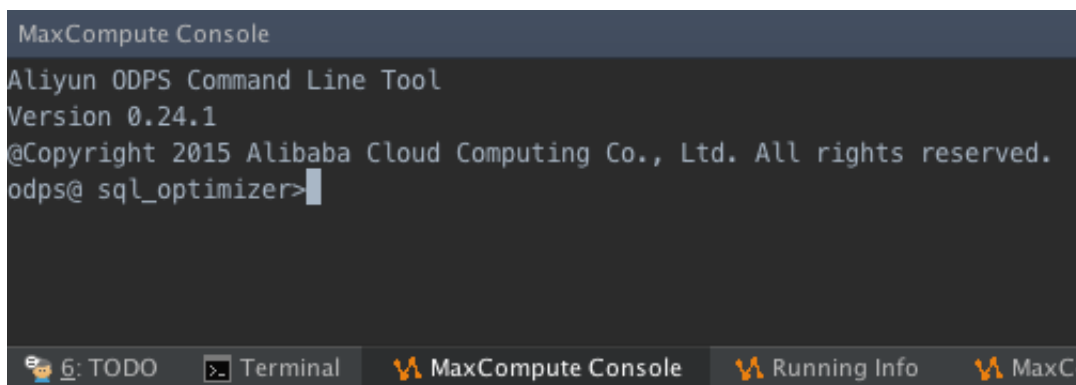
Develop a MapReduce program and UDF program

MaxCompute Studio also allows you to develop [MapReduce](#) and [Java UDF](#) programs.

Connect to a MaxCompute client

MaxCompute Studio is integrated with the [MaxCompute Client](#) of the latest version. Alternatively, you can specify the path of the locally installed MaxCompute client on the [Configuration page](#) of MaxCompute Studio.

On the **Project Explorer**, right-click a project and select **Open in Console** to open the **MaxCompute Console** window.



Next step

Now, you know the functional interfaces and common application scenarios of MaxCompute Studio. Continue to the next tutorial. In this tutorial, you will learn how to install MaxCompute Studio. For more information, see [Install IntelliJ IDEA](#).

2.2 Tools Installation and version history

2.2.1 Install IntelliJ IDEA

This document describes how to install the basic platform IntelliJ IDEA of MaxCompute Studio.

Context

Procedure

Procedure

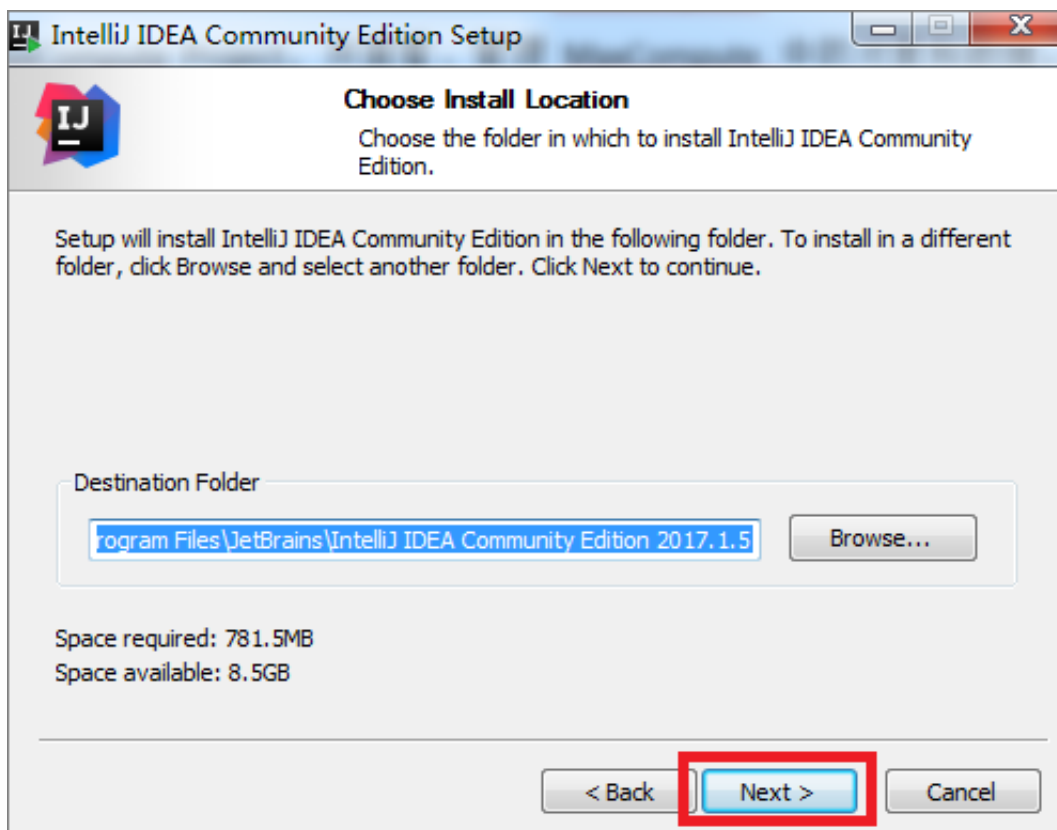
1. Click [here](#) to download the IntelliJ IDEA of the version corresponding to your operating system (Windows, macOS, or Linux). The following assumes that the Windows operating system is used.

Download IntelliJ IDEA 14.1.4 or a later version. (The Ultimate version, PyCharm version, and free Community version are supported.)

2. After the download is complete, double-click the installation program to enter the installation page, and click **Next**, as shown in the following figure.



3. Specify the installation directory, and click **Next**, as shown in the following figure.

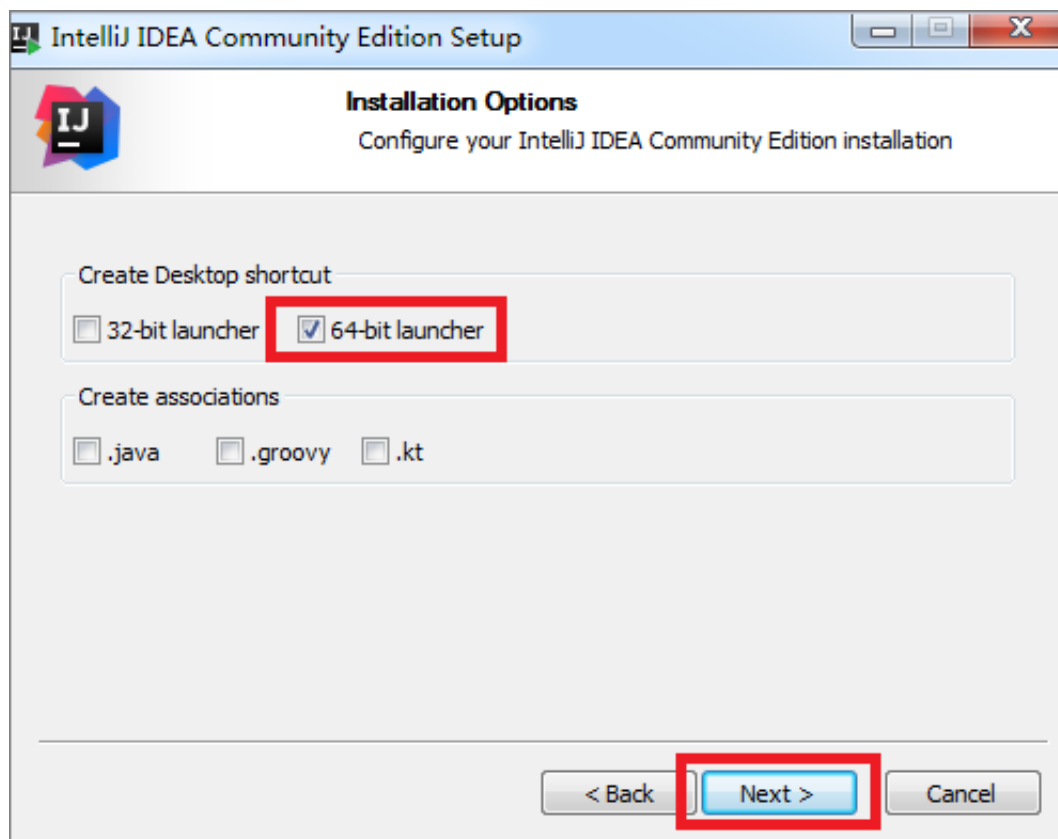


4. Select the 32-bit or 64-bit IntelliJ IDEA based on the version of the local operating system.

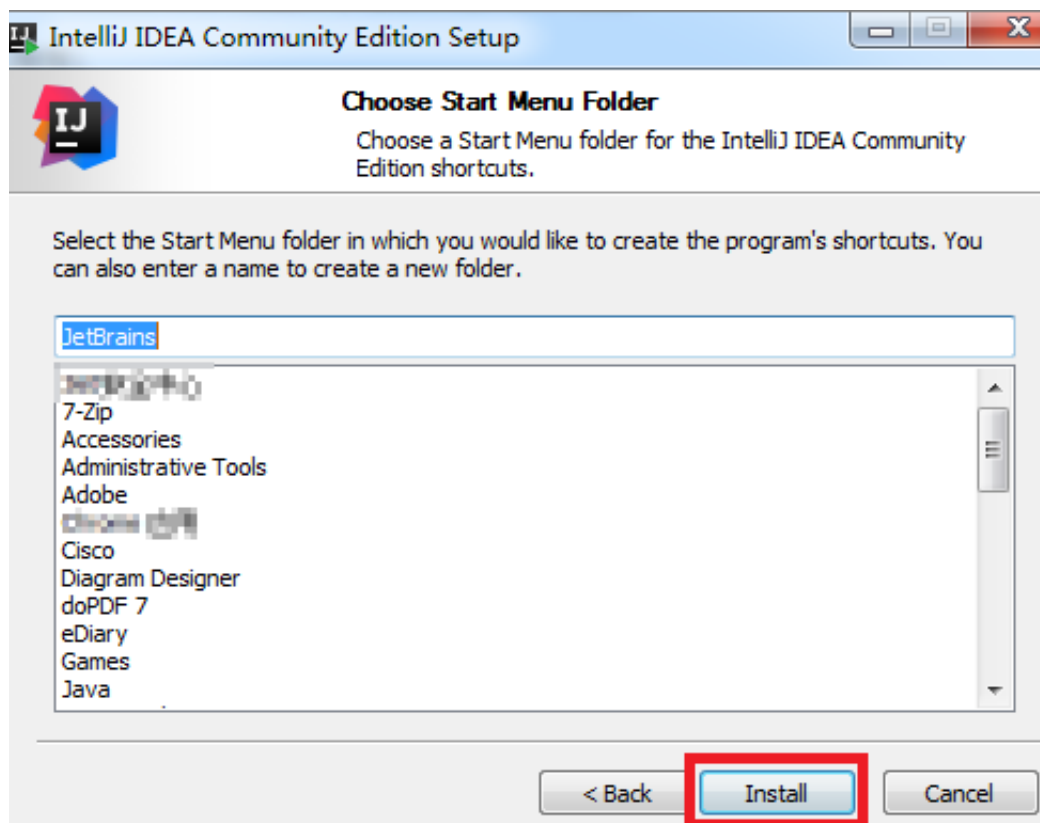
You can query the local operating system version by following these steps:

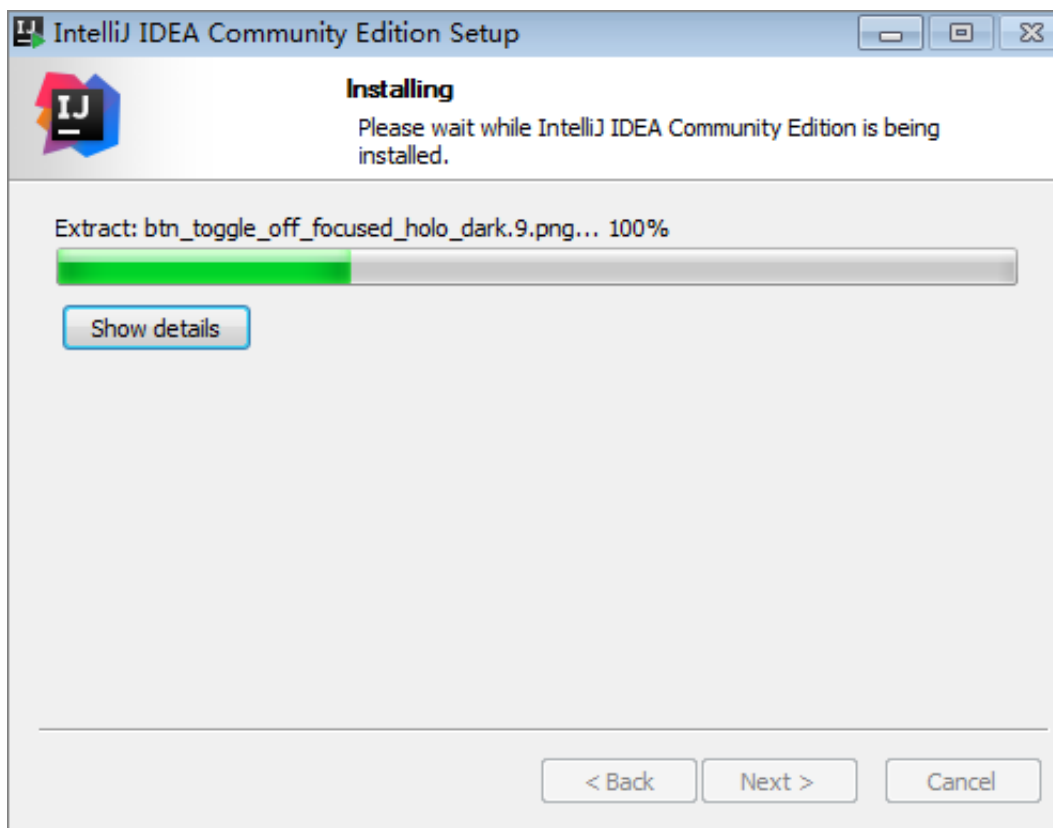
- Open Windows Resource Manager, right-click **Computer** and select **Properties** from the shortcut menu. as shown in the following figure.
- In the displayed window, check the type of the operating system.

5. Select the corresponding system type and click **Next** , as shown in the following figure.



6. Click **Install** to start installation, as shown in the following figure.





7. After the installation is complete, click **Finish**.



What's next

Now you know how to install IntelliJ IDEA. Continue to the next tutorial. In this tutorial, you will learn how to install the MaxCompute Studio plugin. For more information, see [Install the MaxCompute Studio plugin](#).

2.2.2 Installation procedure

Environment requirements

IntelliJ IDEA can be installed on *Windows*, *Mac*, *Linux*. For more information about the hardware and system environment requirements, click [here](#). IntelliJ IDEA-based MaxCompute Studio can also be installed on clients running these operating systems.

MaxCompute Studio has the following requirements on the your environment:

- A client running Windows, macOS, or Linux.
- IntelliJ IDEA 14.1.4 or a later version is installed. (The Ultimate version, PyCharm version, and free [Community version](#) are supported.)
- JRE 1.8 is installed. (JRE 1.8 has been bound to the latest IntelliJ IDEA.)
- JDK 1.8 is installed. (*Optional*: JDK is required if you need to develop and debug Java UDF.)



Note:

The client supports JDK 1.9 from the 0.28.0 version. The previous version only supports JDK 1.8.

Installation method

MaxCompute Studio is a plugin of IntelliJ IDEA, which can be installed using either of the following two methods:

- Online installation using the plugin library (recommended)
- Installation using a local file

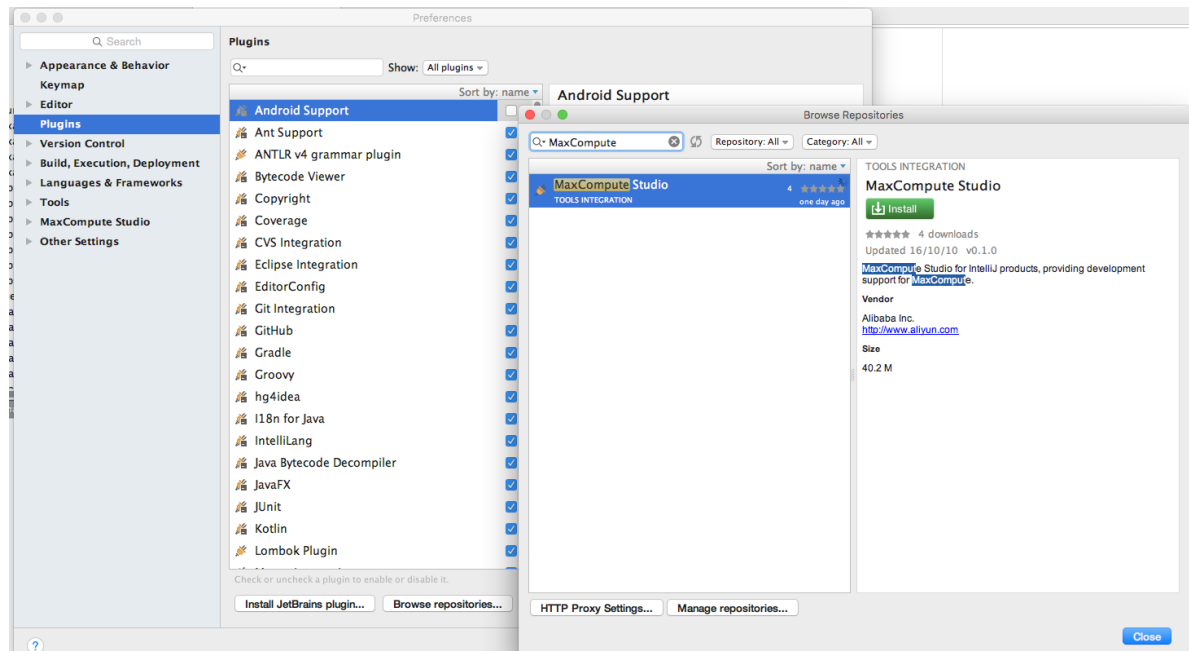
Online installation (recommended)

MaxCompute Studio The MaxCompute Studio plugin has been opened for all users on the Internet. You can install MaxCompute Studio using the official IntelliJ IDEA plugin library.

Procedure

1. Open the plugin configuration page on IntelliJ IDEA. (If you are a Windows/Linux user, choose **File > Settings > > Plugins**. If you are a macOS user, choose **IntelliJ IDEA > Preferences > Plugins**).
2. Click **Browse repositories...** and search for `MaxCompute Studio`.

3. On the MaxCompute Studio plugin page, click **Install**.
4. After the installation is confirmed, restart IntelliJ IDEA to complete installation.



Local installation

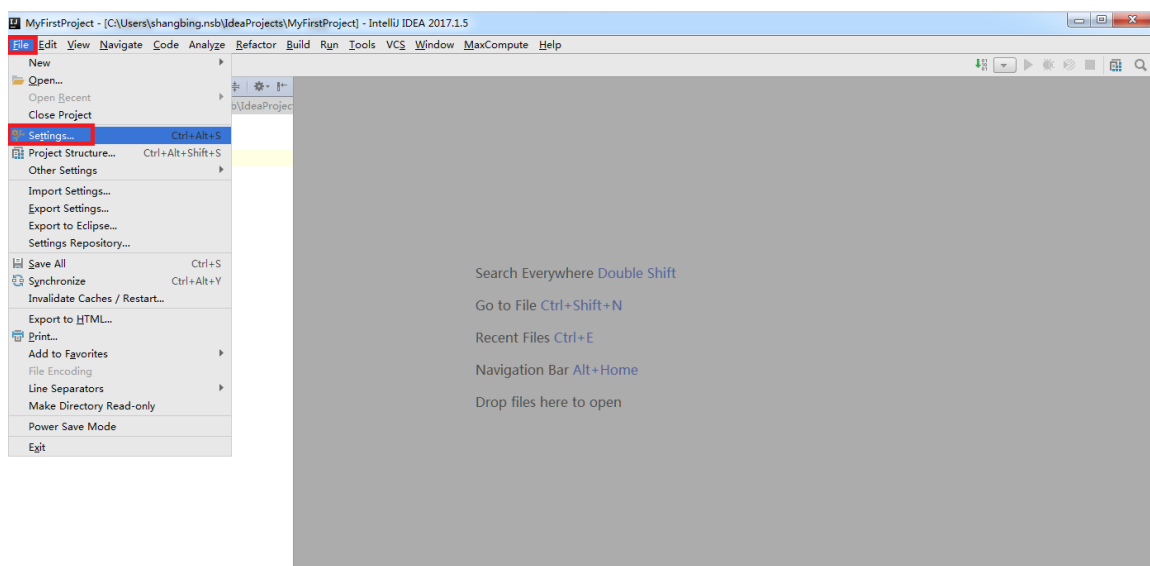
MaxCompute Studio MaxCompute Studio can also be installed in a local environment.

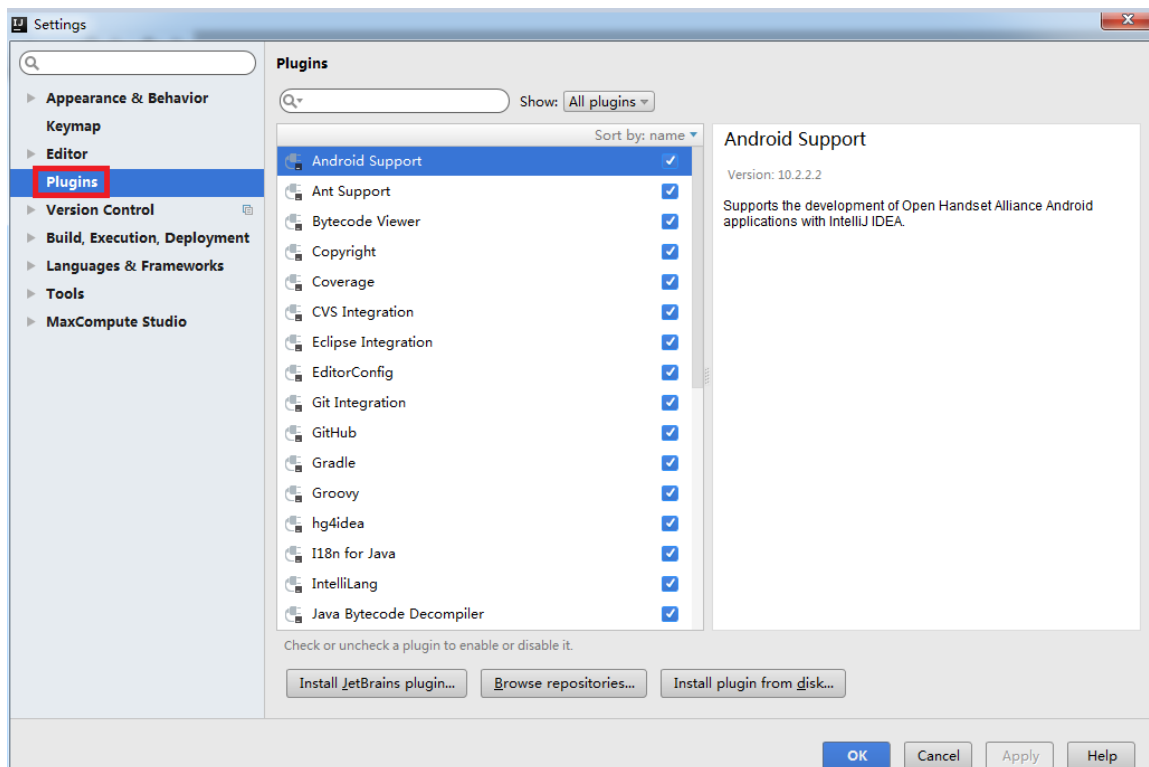
Procedure

1. Go to the [MaxCompute Studio plugin page](#) to download the plugin package.
2. Run IntelliJ IDEA.
 - If you access IntelliJ IDEA for the first time, a welcome page is displayed. Click **Configure** and select **Plugins** from the shortcut menu, as shown in the following figure.

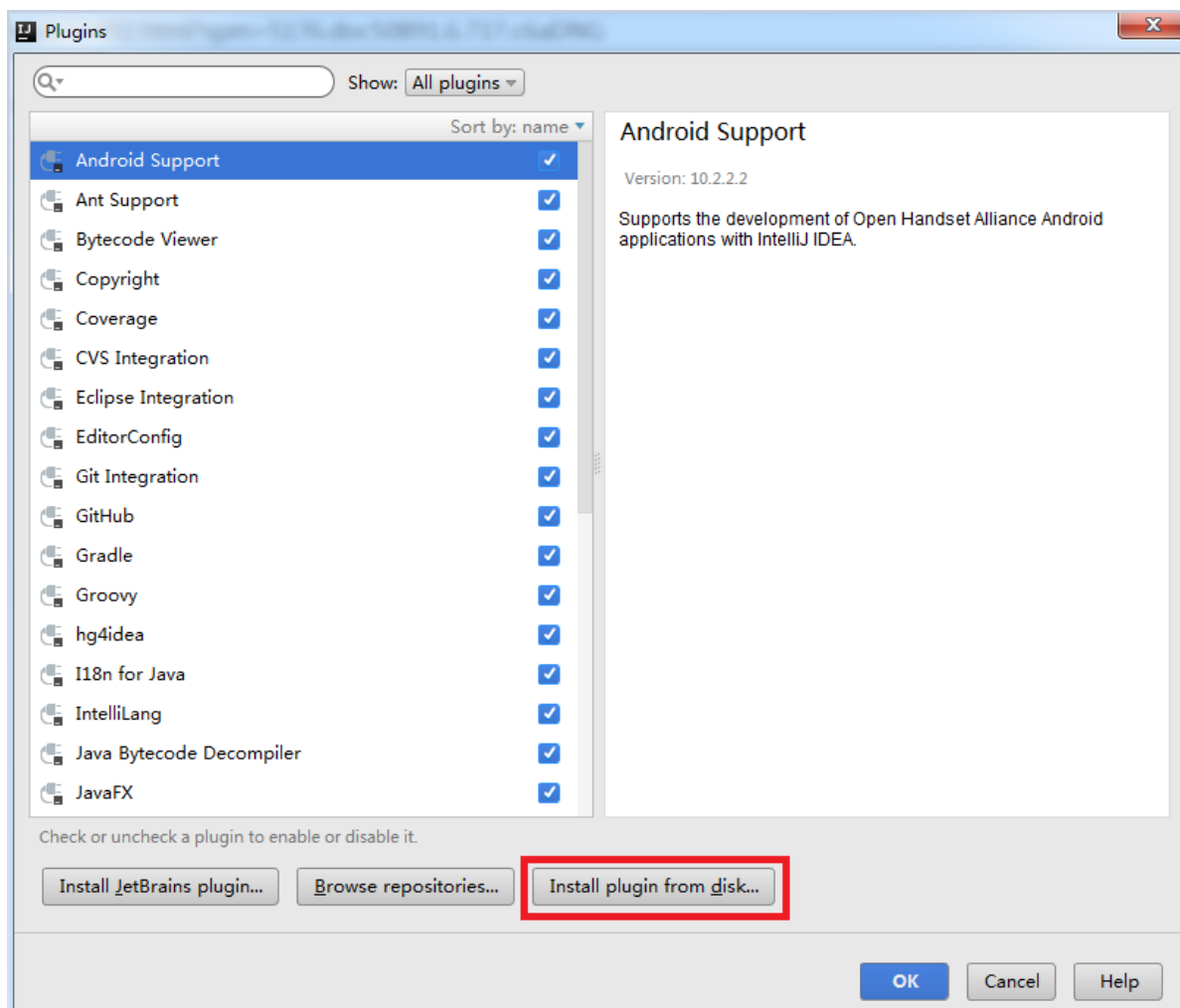


- If you have accessed IntelliJ IDEA before, choose **File > Settings > Plugins** to enter the same page, as shown in the following figure.

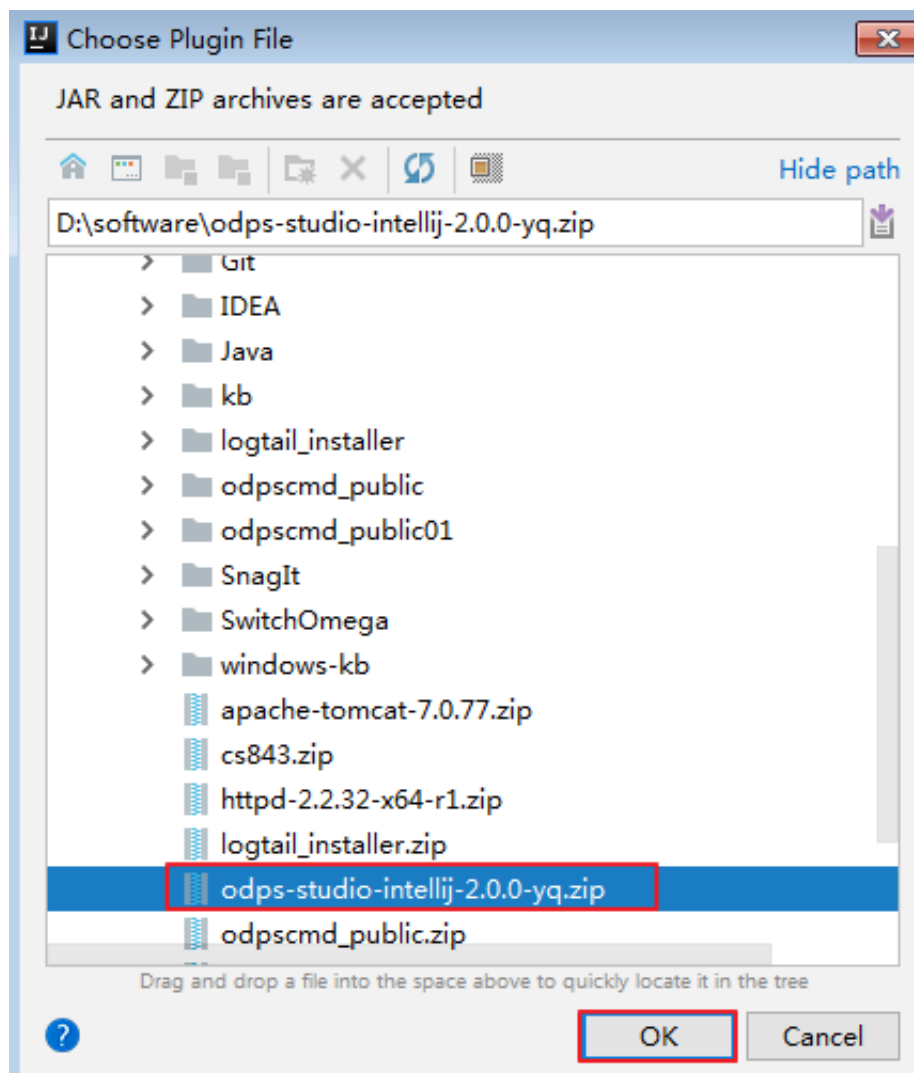




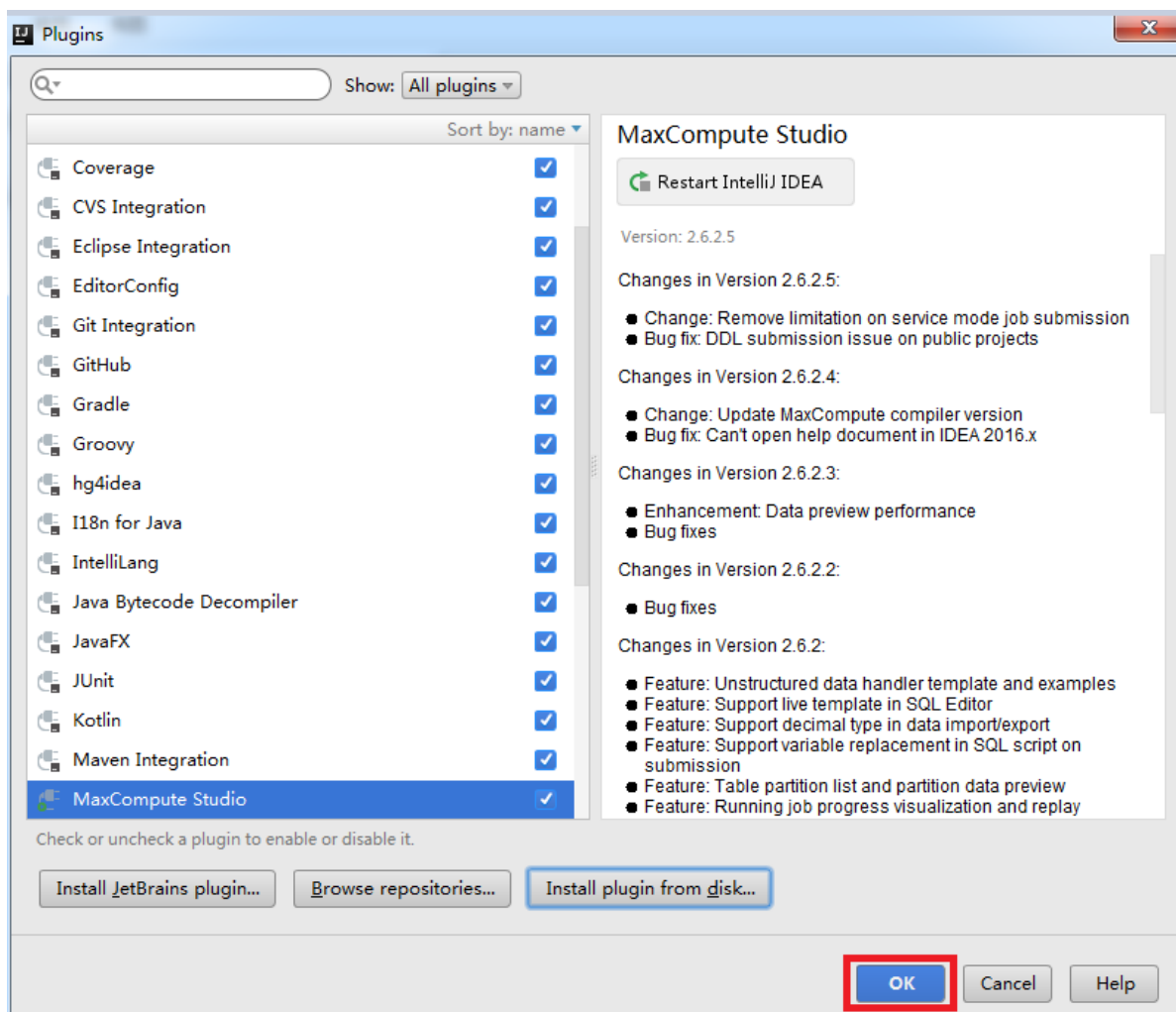
3. On the Plugins page, click **Install plugin from disk...**, as shown in the following figure.



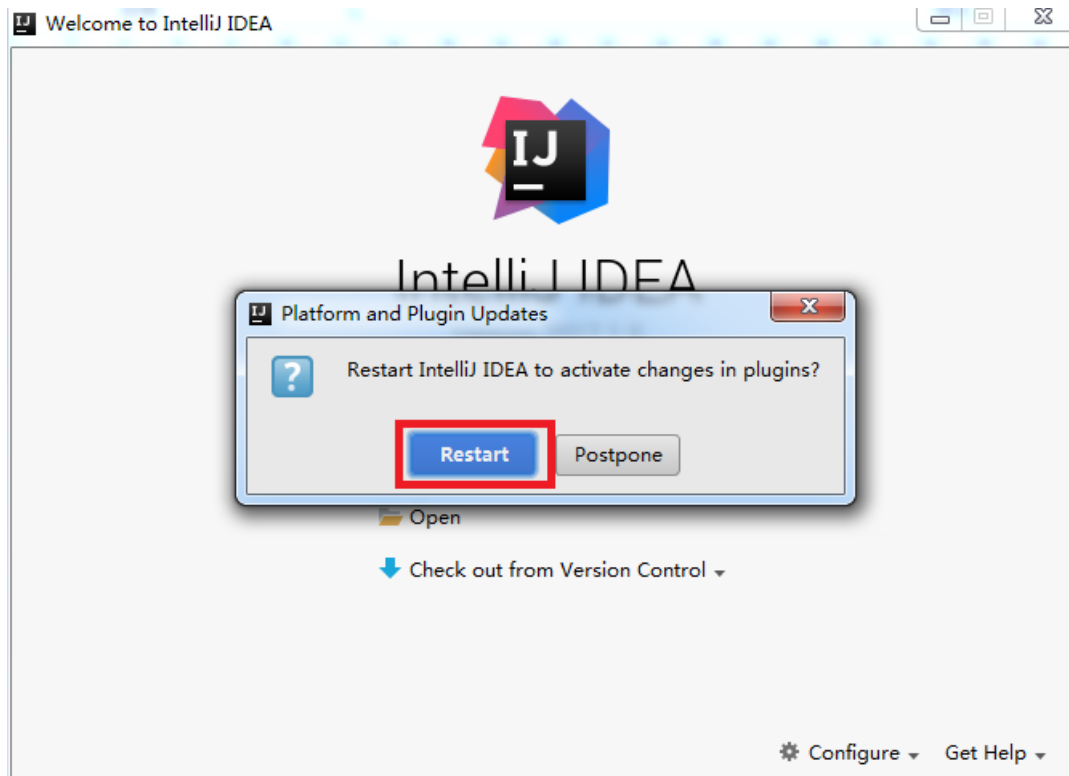
4. In the displayed window, click the gray icon before a directory for navigation, find the plugin file, select it, and click **OK**.



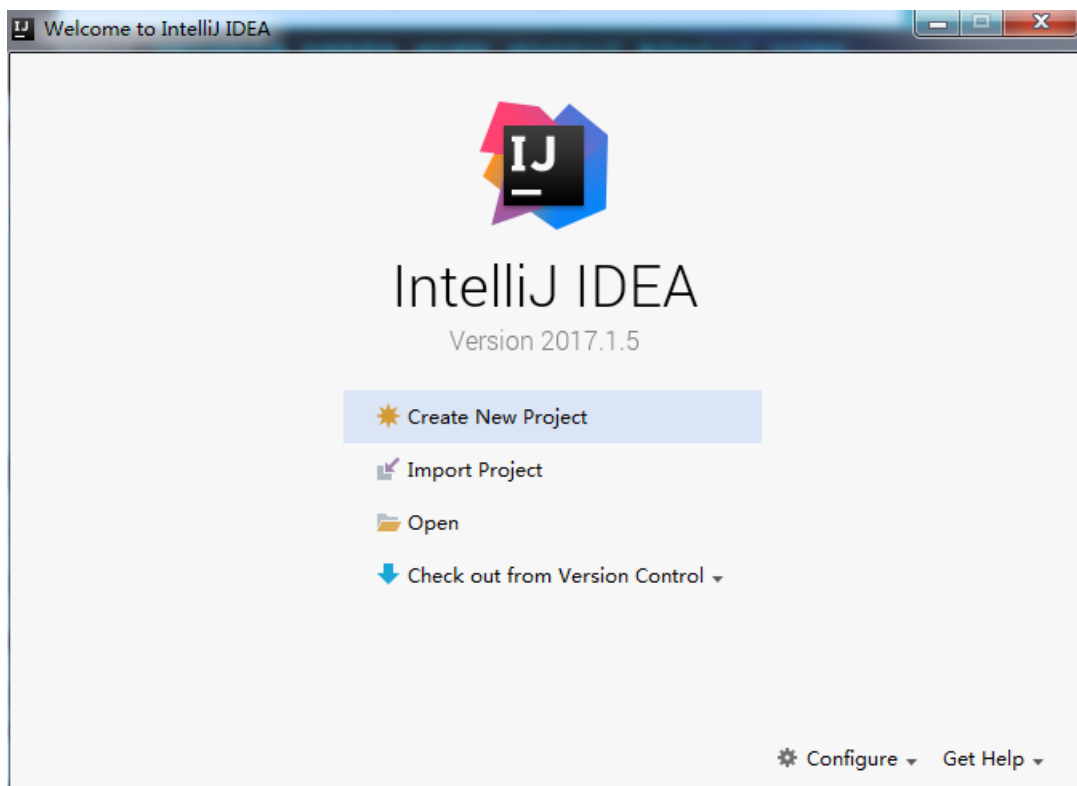
5. Return to the Plugins page and click **OK** to install the local plugin.



6. After the installation is complete, a dialog box is displayed, prompting you to restart IntelliJ IDEA. Click **Restart**.



7. After IntelliJ IDEA is restarted, the page is displayed as shown in the following figure.



Next step

Now, you know how to install the MaxCompute Studio plugin. Continue to the next tutorial. In the tutorial, you will learn how to configure a MaxCompute project connection to manage data and resources. For more information, see [Create a MaxCompute project connection](#).

2.2.3 View and upgrade the version

View the MaxCompute Studio version

Perform the following steps to view the Studio version:

1. Go to the **Settings/Preferences** page (by pressing `Ctrl-Alt-S` in Windows or `⌘` in macOS).
2. Select **Plugins** on the left bar of the dialog box and search for *MaxCompute Studio*.
3. View the MaxCompute Studio version number and release information.

Alternatively, you can select **MaxCompute Studio** on the left bar of the **Settings** page to view the current version number.

Check new versions

By default, MaxCompute Studio automatically detects new versions. If a new version is available, MaxCompute Studio automatically notifies you.

After receiving an update prompt, you can select:

- **Install**: Click the Install link in the update prompt. The new version is automatically downloaded and installed. After the installation is complete, restart IntelliJ IDEA.
- **Configure**: Click the Configure link in the update prompt. You can configure whether to detect new versions automatically.

If the automatic update function is disabled, you can perform the following steps to check and install a new version of MaxCompute Studio.

1. Go to the **Settings/Preferences** page (by pressing `Ctrl-Alt-S` in Windows or `⌘` in macOS).
2. Select **MaxCompute Studio** on the left bar of the dialog box.
3. On the MaxCompute Studio configuration page, click **Check new versions**.
4. If a new available version is detected, Studio notifies you of the new version number. Click **Install new version** and restart IntelliJ IDEA to complete installation.

You can use the **Automatically checks for new version** check box to control the switch for automatic version update check.

Next step

[Create a MaxCompute project connection](#)

2.3 Developing Java

2.3.1 Create MaxCompute Java Module

MaxCompute Studio supports Java user-defined function (UDF) and MapReduce development.

First, a MaxCompute Java module must be created.

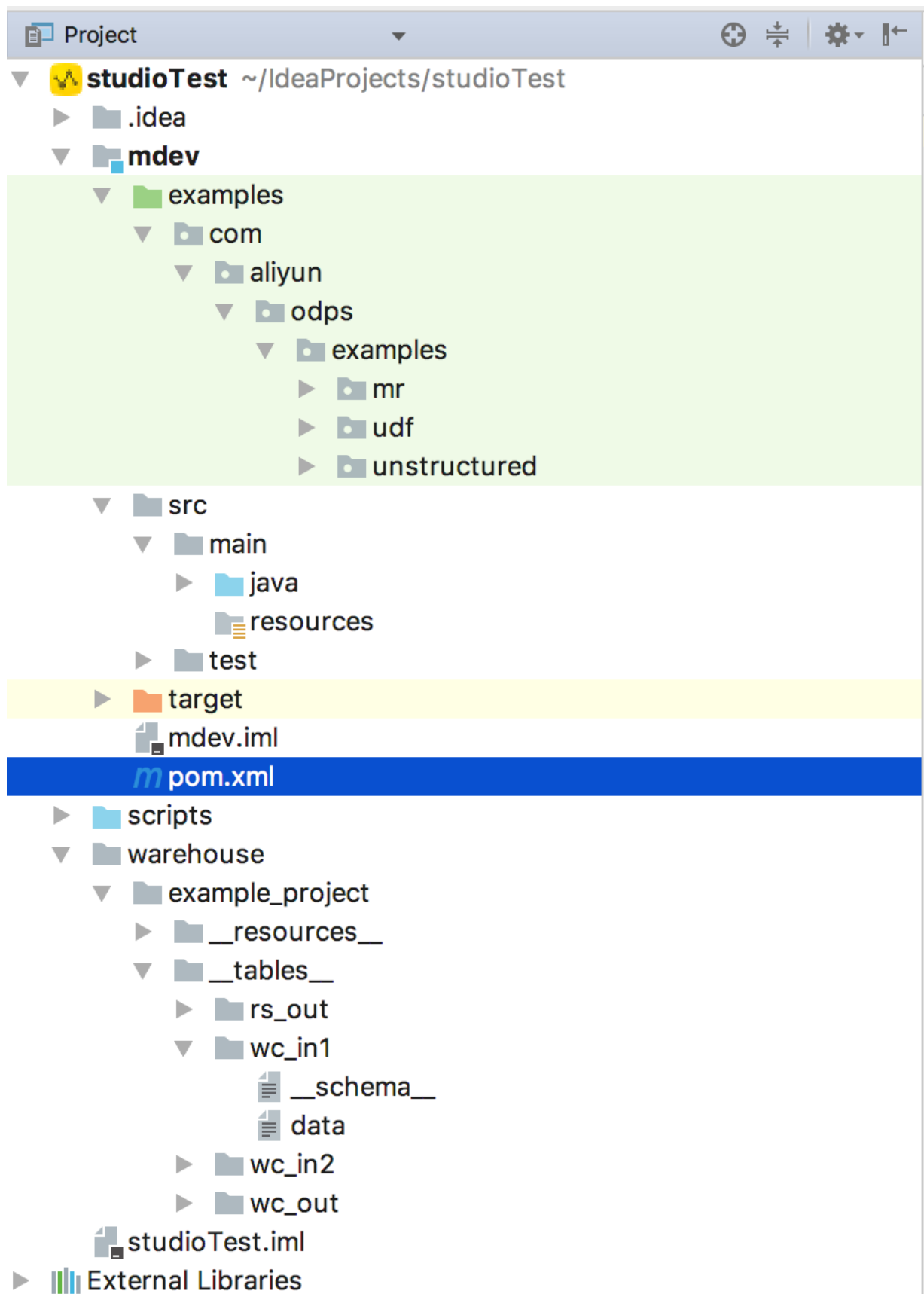
Create a module

Choose **File** > **New** > **Module**, set the module type to **MaxCompute Java**, and configure **Java JDK**. Click **Next**, enter a module name, and click **Finish**. MaxCompute Studio automatically creates a Maven module and introduces MaxCompute dependencies.

Module structure

So far, a module for developing a MaxCompute Java program has been established, that is the mDev shown in the following figure. Its main directories include:

- **src/main/java**: Source code for Java program development.
- **examples**: Sample code, including unit test (UT) examples. You can see the examples to develop or compile UT.
- **warehouse**: Schema and data required for running locally.

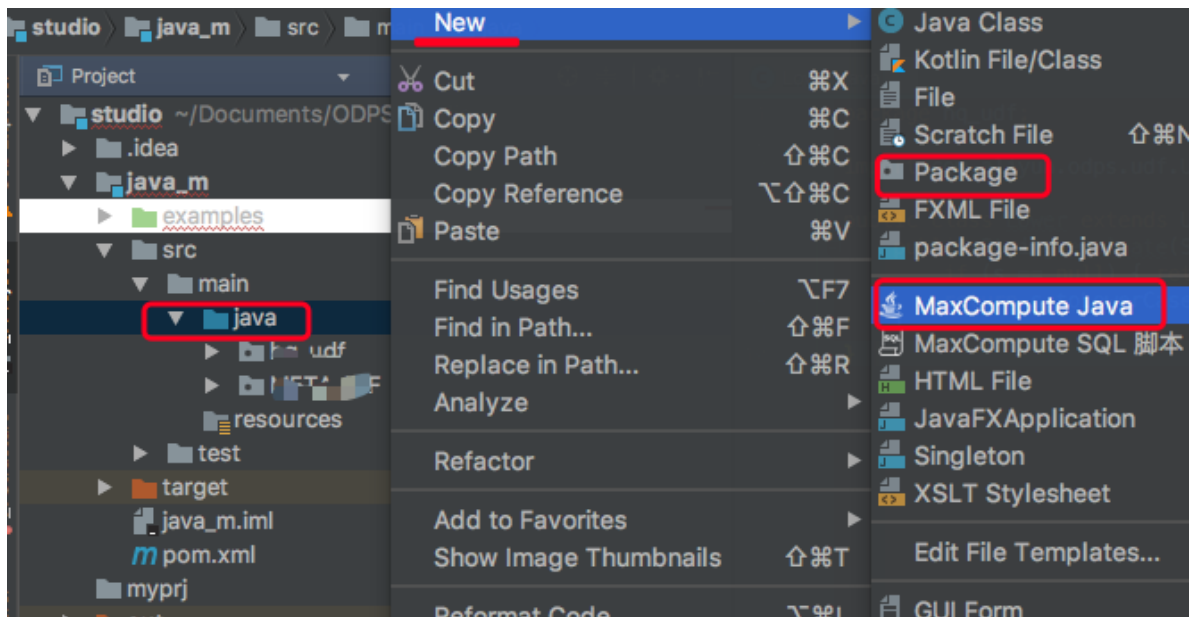


2.3.2 Develop and debug UDF

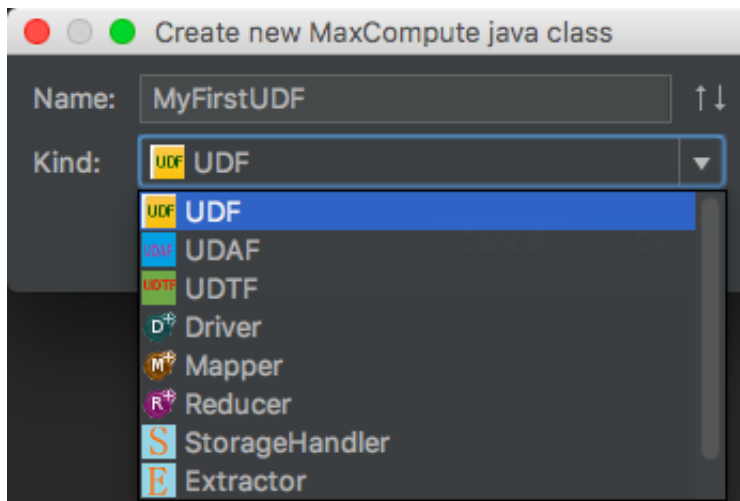
Once the [MaxCompute Java Module](#) has been created, udfs can be developed.

Procedure

1. Expand the MaxCompute Java Module Directory that you created and navigate to **src > main > java > new**, and click **MaxCompute Java** as shown in the following figure.

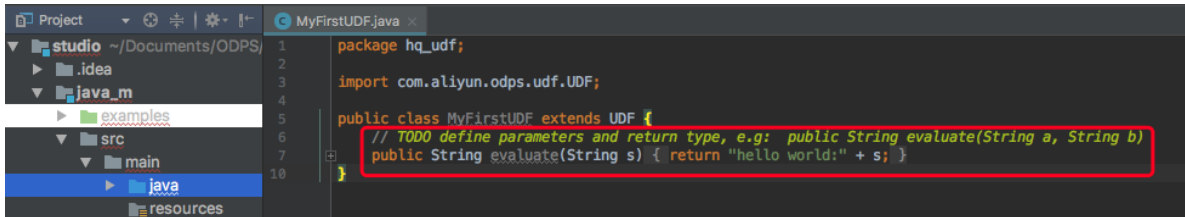


2. Set **Name** and **Kind**, and click **OK**, as shown in the following figure.



- **Name:** Specifies the name of the MaxCompute Java Class. If you have not created a package, you can enter packagename.classname to automatically create a package.
- **Kind:** Specifies the type. Supported types include custom functions (UDF/UDAF/UDTF), MapReduce (Driver/Mapper/Reducer), and non-structural development (StorageHandler/Extractor).

3. After the creation is successful, the Java program can be developed, modified, and tested.



Note:

Here's a code template that can be customized in IntelliJ. You can define it in **Preference > Editor > File > Code Templates**. Then look for the corresponding template in the **Code** tab.

For detailed development steps, see [JAVA UDF development](#).

Normally, the development of JAVA UDF can be done in the following ways:

- Use MaxCompute Studio to complete the whole process of JAVA UDF development.
- Use [Develop and debug JAVA UDF using the Eclipse plug-in](#), export the Jar package, then [Add resources](#) through commands or DataWorks, and [Register the function](#).

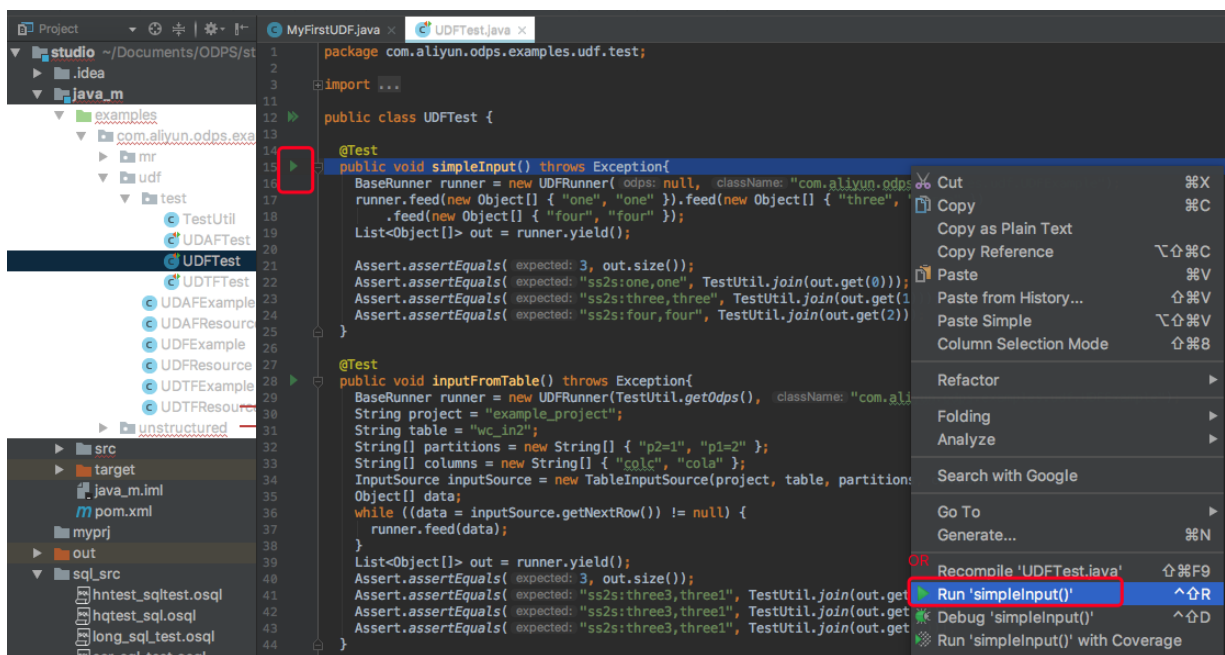
For detailed development steps, see [JAVA UDF Development](#).

Debug the UDF program

After the UDF program is developed, it can be tested using unit test (UT) or local running to check whether it meets expectations.

Unit Testing

There are various UT examples in the examples directory and you can refer to them to compile your UT.



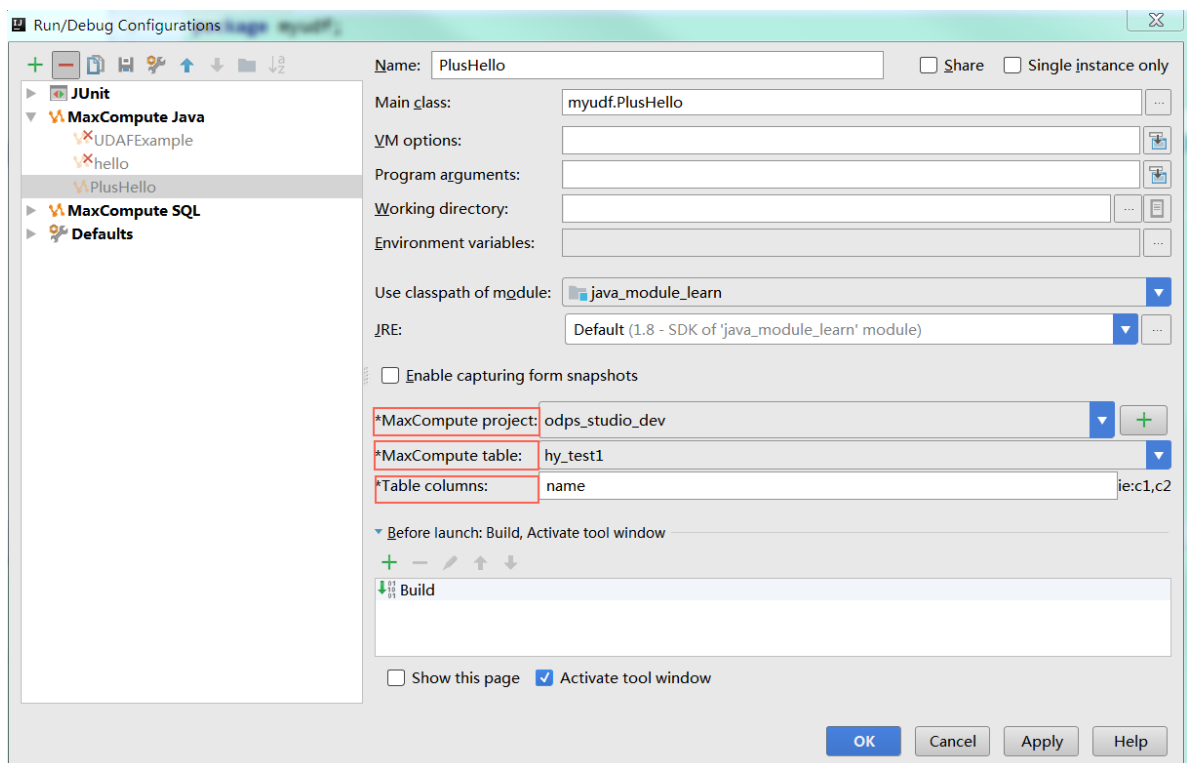
Run locally

During local running of the UDF program, the running data source must be specified. The following two methods are provided to set the test data source:

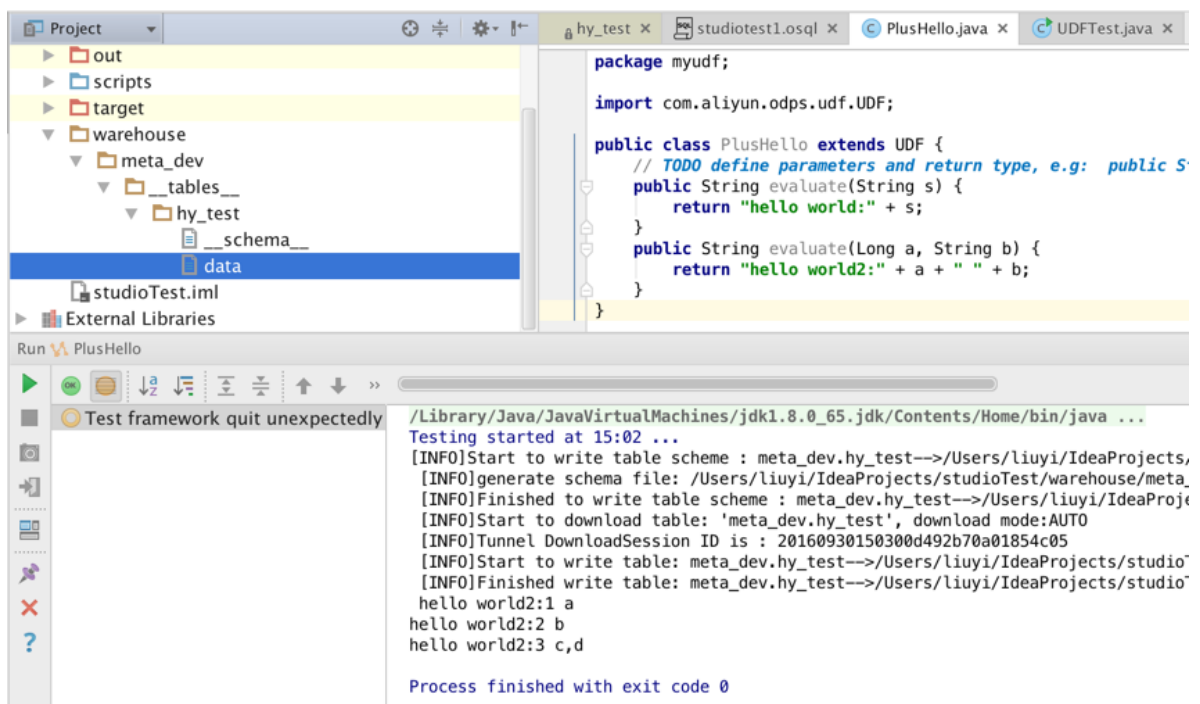
- MaxCompute Studio uses the Tunnel Service to automatically download table data of a specific project to the warehouse directory.
- The mock project and table data are provided. You can see example_project in warehouse to set it by yourself.

Procedure

1. Right-click UDF Class and select **Run UDF class.main()**. The Run Configuration dialog box is displayed. In normal cases, UDF/UDAF/UDTF data is used as columns in tables of a select sub-statement. The MaxCompute project, table, and column need to be configured. (**The metadata is from the mock project under project explorer and warehouse.**) Debugging for complex types is also supported, as shown in the following figure:



2. Click **OK**.

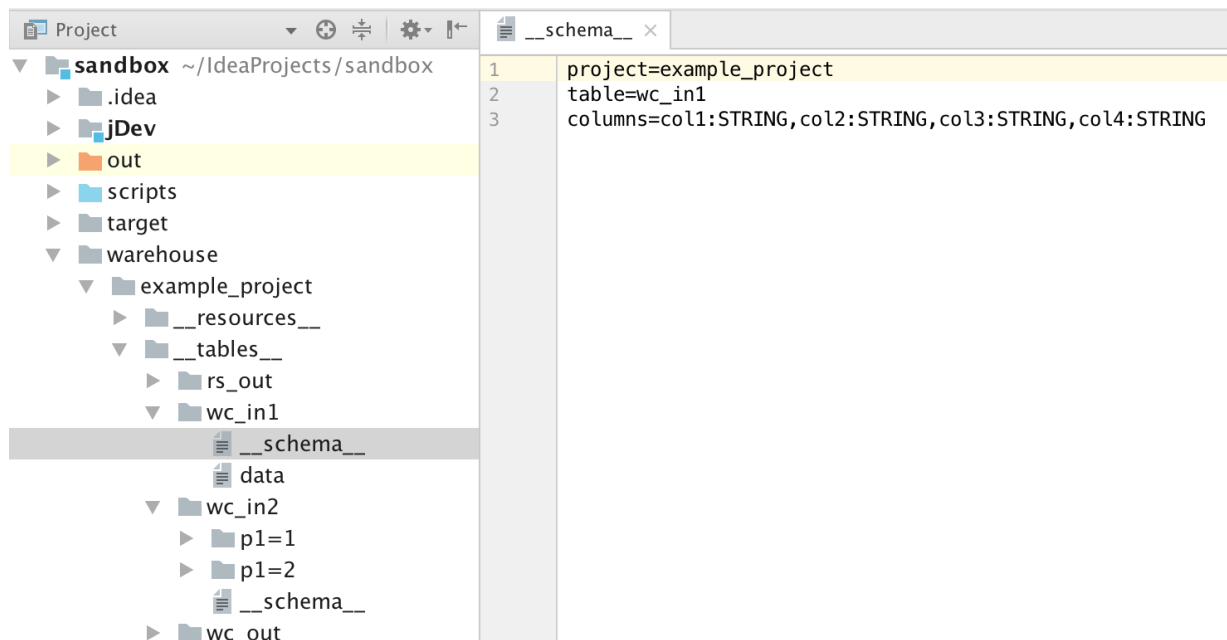


Note:

- If the table data under the specified project is not downloaded into glashourse, You need to download the data first, default download 100 entries. If more data is required, use the Tunnel Command of the console or table downloading function of Studio.
- If the mock project is used or the table data is downloaded, directly run the program.
- The UDF local run framework uses data in specific columns in warehouse as the UDF input and run the UDF program locally. You can view log output and result display on the console.

Local warehouse directory

The local warehouse directory is used to store tables (including meta and data) or resources for local UDF or MR running. The following figure shows the warehouse directory.



Note:

- The project name, tables, table name, table scheme, and sample data are under the warehouse directory in sequence.
- The schema file is configured with the project name, table name, and column name and type (separated using a colon) in sequence. For a partition table, the partition column also needs to be configured. (For a non-partition table, refer to wc_in1. For a partition table, refer to wc_in2).
- The data file uses the standard CSV format to store table sample data.
 - Special characters include comma, double quotation marks, and line feed (\n or \r\n).
 - The column separator is comma and the line separator is \n or \r\n.

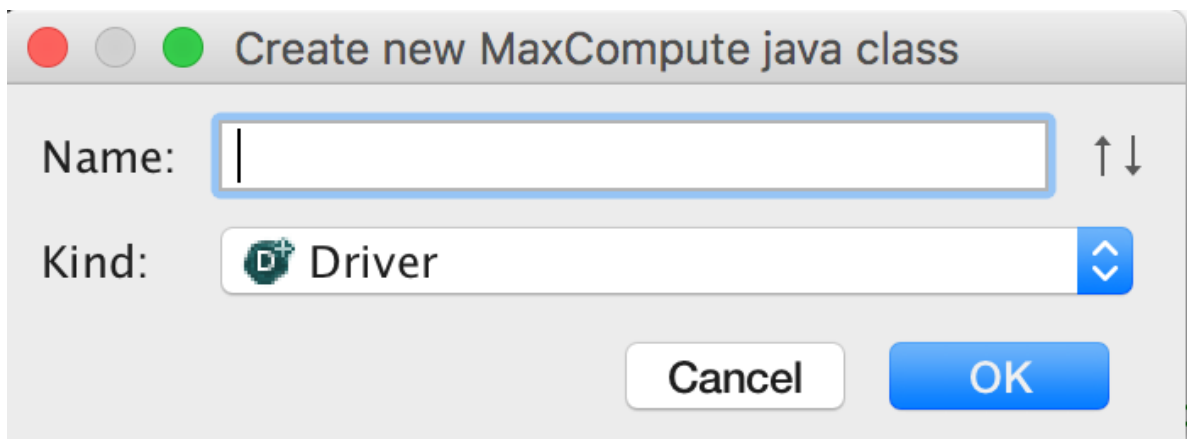
- If the column content includes special characters, double quotation marks (") must be added before and after the column content. For example, if the column content is 3,No, it is changed to "3, No".
- If the column content includes double quotation marks, each double quotation mark is converted to two double quotation marks. For example, if the column content is a"b"c, it is changed to "a""b""c".
- \N indicates that a column is null. If the column content (string type) is \N, it must be converted to ""\N"".
- The file character code is UTF-8.

2.3.3 Develop MapReduce

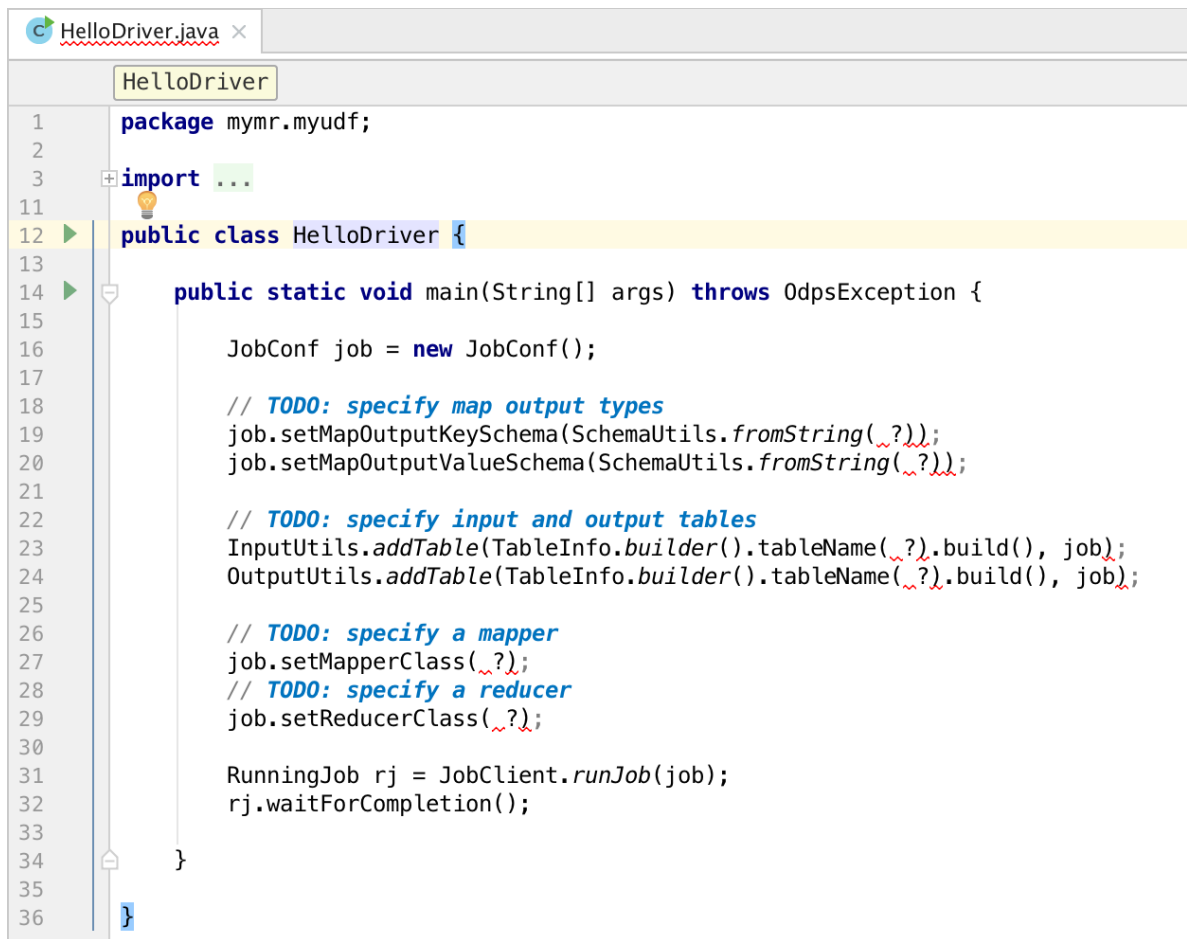
After the [MaxCompute Java module](#) is created, [MR](#) can be developed.

Develop the MR program

1. Right-click the module source code directory src > main, select **New**, and select **MaxCompute Java**.
2. Create Driver, Mapper, and Reducer.



3. Set the input/output table and Mapper/Reducer class. The framework code is automatically filled in the template.



```
1 package mymr.myudf;
2
3 import ...
4
11
12 public class HelloDriver {
13
14     public static void main(String[] args) throws OdpsException {
15
16         JobConf job = new JobConf();
17
18         // TODO: specify map output types
19         job.setMapOutputKeySchema(SchemaUtils.fromString(?));
20         job.setMapOutputValueSchema(SchemaUtils.fromString(?));
21
22         // TODO: specify input and output tables
23         InputUtils.addTable(TableInfo.builder().tableName(?).build(), job);
24         OutputUtils.addTable(TableInfo.builder().tableName(?).build(), job);
25
26         // TODO: specify a mapper
27         job.setMapperClass(?);
28         // TODO: specify a reducer
29         job.setReducerClass(?);
30
31         RunningJob rj = JobClient.runJob(job);
32         rj.waitForCompletion();
33     }
34 }
35
36 }
```

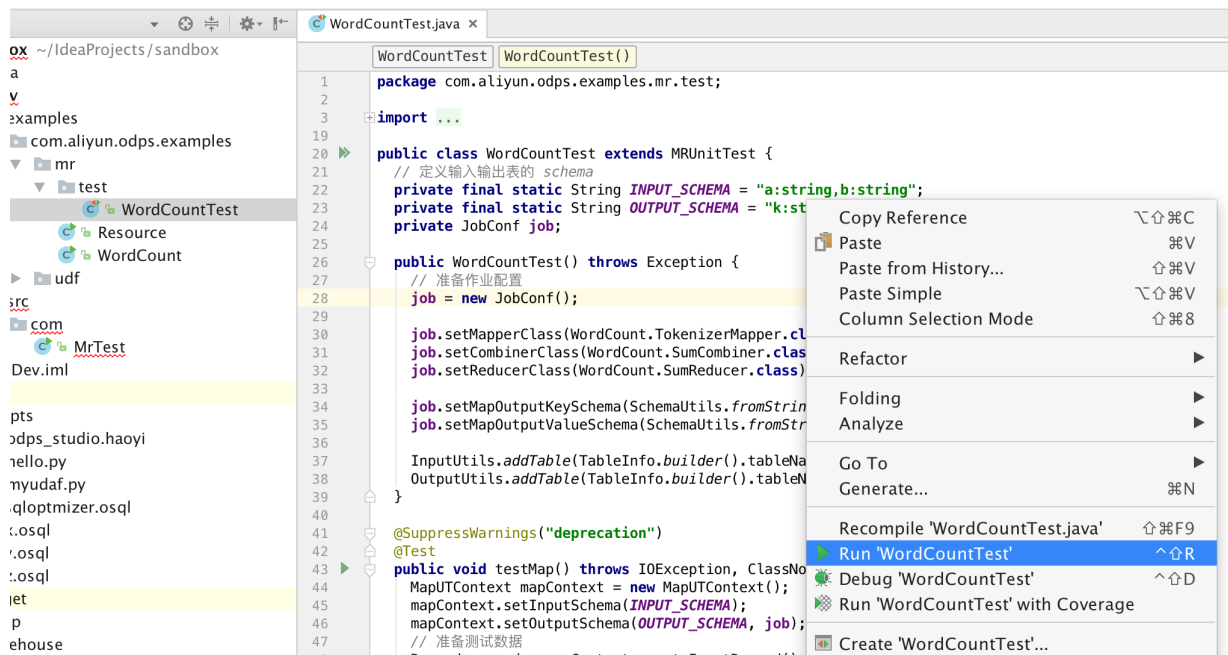
For details of developing MR, see [To write MapReduce](#).

Debug the MR program

After the MR program is developed, test your code and check whether it meets the expectations.

The following two methods are supported:

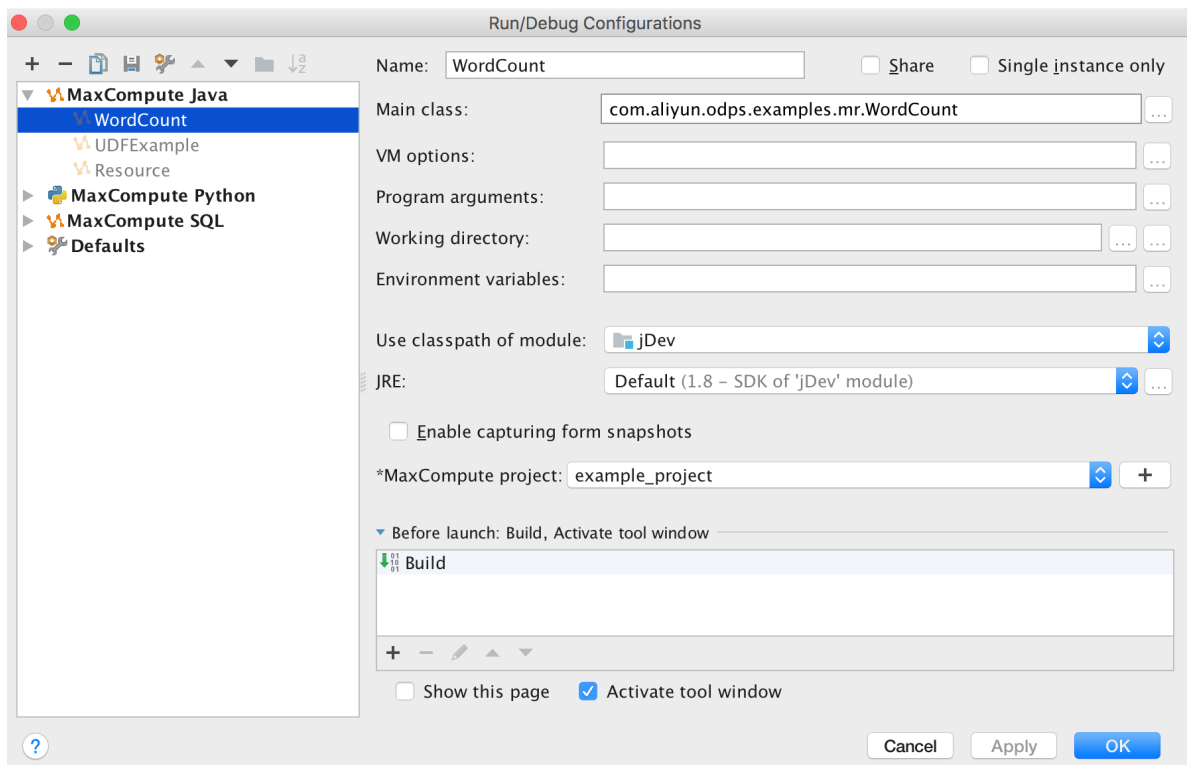
Unit test (UT): There are WordCount UT examples in the examples directory. You can refer to them to compile your UT.



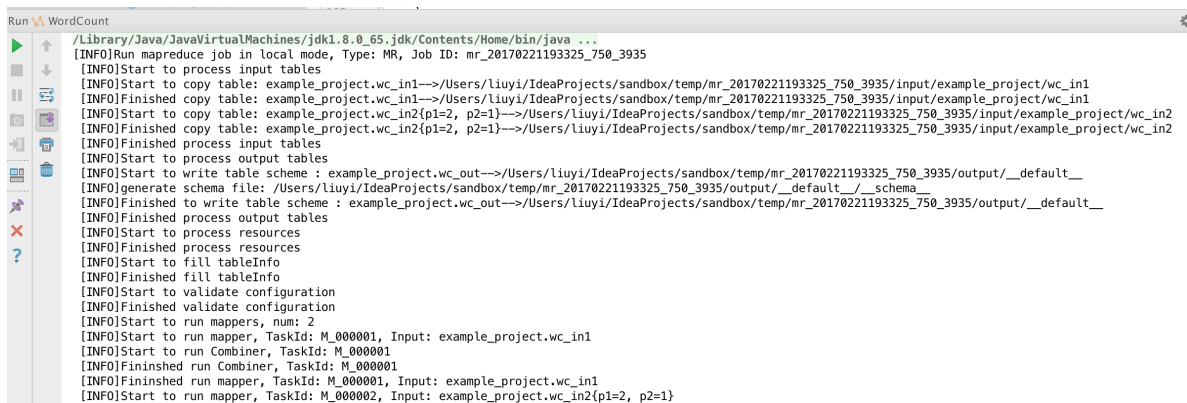
Local MR running: During local running, the running data source must be specified. The following two methods are provided to set the test data source:

- MaxCompute Studio uses the Tunnel Service to automatically download table data of a specific MaxCompute project to the warehouse directory. By default, 100 data records are downloaded. If more data is required for testing, use the Tunnel Command of the console or table downloading function of MaxCompute Studio.
- Provide the mock project (example_project) and table data. You can see example_project in warehouse to set it by yourself.

1. Run the MR program. Right-click the Driver class and select **Run**. In the displayed **Run Configuration** dialog box, configure the MaxCompute project on which the MR program runs.



- Click **OK**. If table data of the specified MaxCompute project is not downloaded to warehouse, download data first. If a mock project is used or the MaxCompute project table data is downloaded, skip this step. Then, the MR local run framework reads specified table data in warehouse as the MR input and runs the MR program locally. You can view log output and result display on the console.



Run the MR program in the production environment

After local debugging is complete, release the MR program to the server and run it in the MaxCompute distributed environment.

- Package the MR program to a JAR package and release it to the server. [For more information](#), see [How to package and release MR](#).

2. Use the MaxCompute console integrated with MaxCompute Studio in seamless mode, that is, in the Project Explorer window, right-click Project and select Open in Console, and input the commands similar to the following *JAR command* in the console command line:

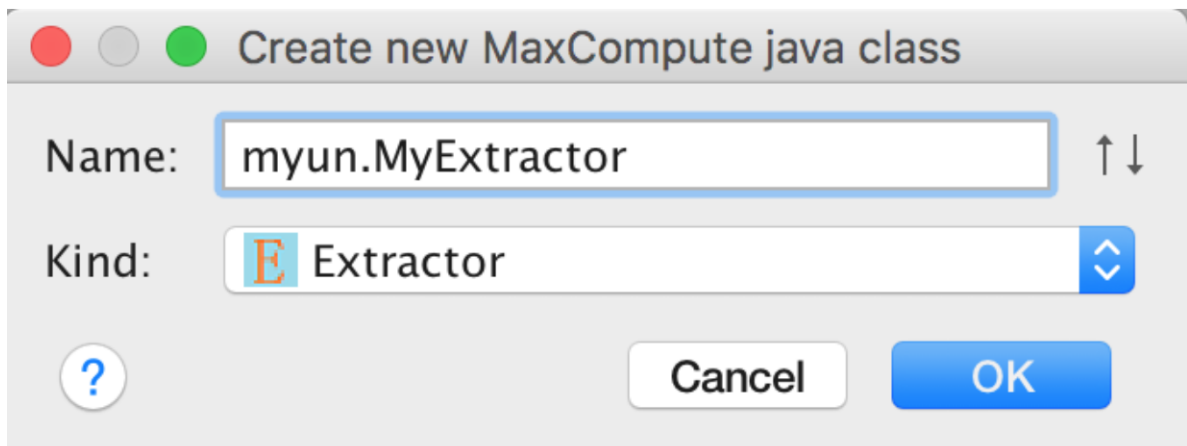
```
jar -libjars wordcount.jar -classpath D:\odps\clt\wordcount.jar com.
aliyun.odps.examples.mr.WordCount wc_in wc_out;
```

2.3.4 Unstructured development

An *unstructured data processing framework* is added for MaxCompute 2.0, supporting access to the OSS and Table Store using external tables. Studio provides some code templates for the framework, facilitating users' fast development.

Compile StorageHandler/Extractor/Outputter

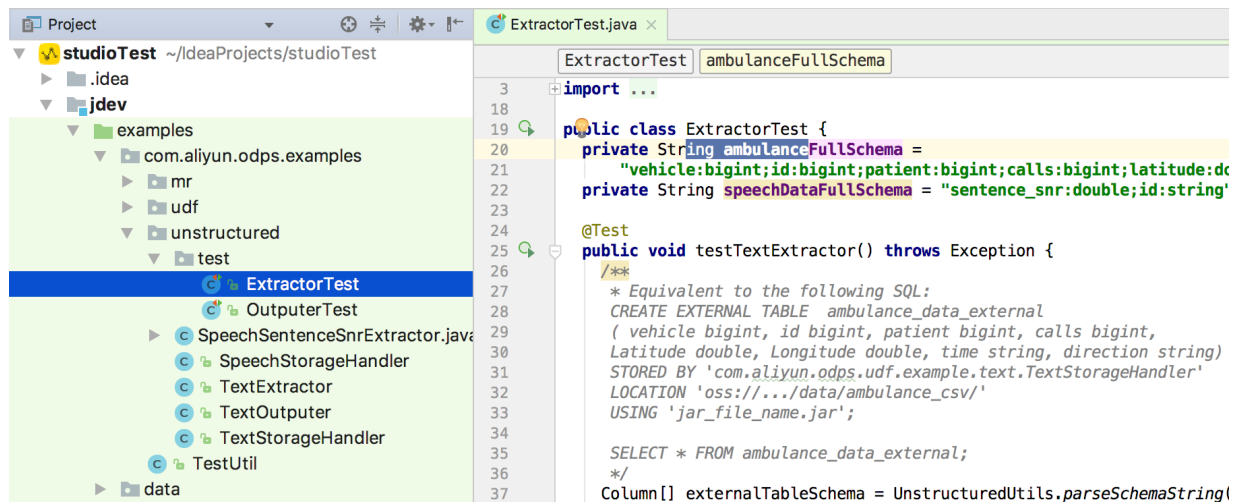
1. After the *MaxCompute Java Module* (Sample code is provided in the unstructured folder of the examples directory for your reference).
2. Right-click the module source code **directory src > > main**, select **new**, and select **MaxCompute Java**.
3. Specify Name and Kind. For example, set Name to myun.MyExtractor and Kind to Extractor. Click **OK**.



4. The framework code has been automatically filled in the template. Compile your logic code.
5. Compile Outputter and StorageHandler by following the preceding steps.

Unit Testing

You can compile the unit test (UT) by following the examples in the examples directory to test your Extractor/Outputter.

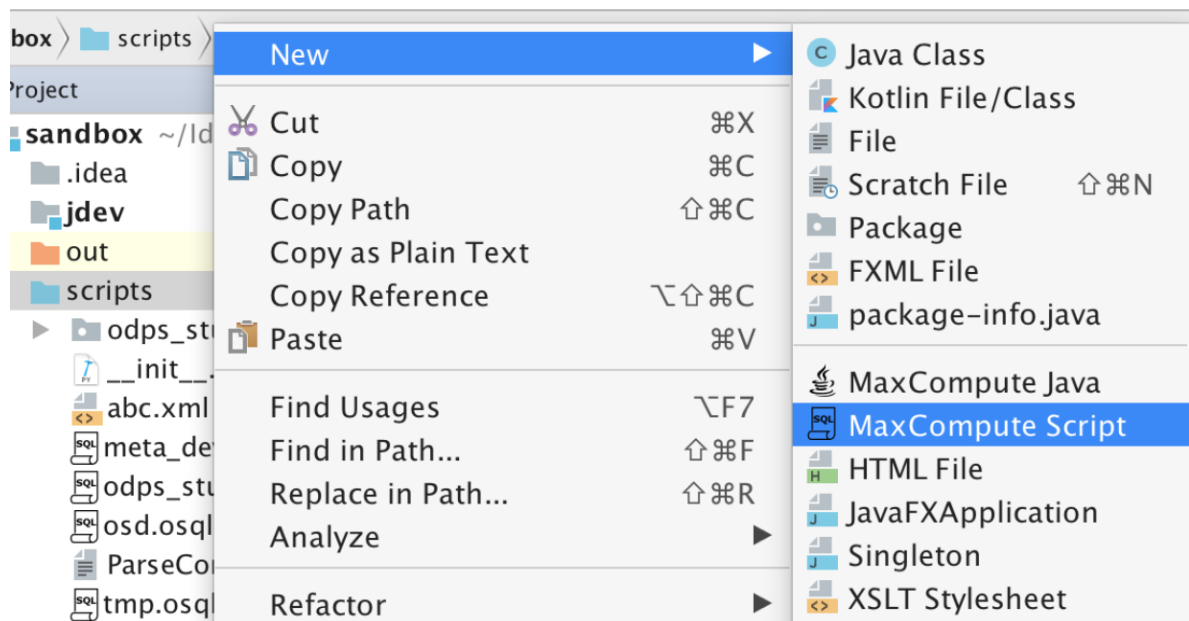


Package and upload

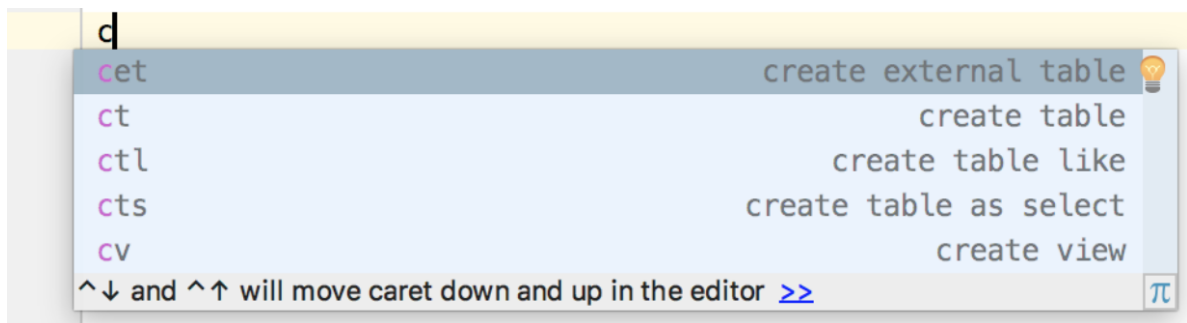
After StorageHandler/Extractor/Outputter is compiled, compress the completed Java program to a JAR package, and upload the package as a resource to the server, see [Package and release](#).

Create External Table

1. Right-click **scripts** and select **new > MaxCompute Script**.



2. Enter the SQL script name. Select the MaxCompute project in which the script is to be executed for Target Project and click **OK**.
3. Select create external table live template in the editor to rapidly insert the script template for creating an external table.



Modify the external table name, column, type, StorageHandler class path, configuration parameter, external path, and JAR name. Click Run MaxCompute SQL Script to create the external table.

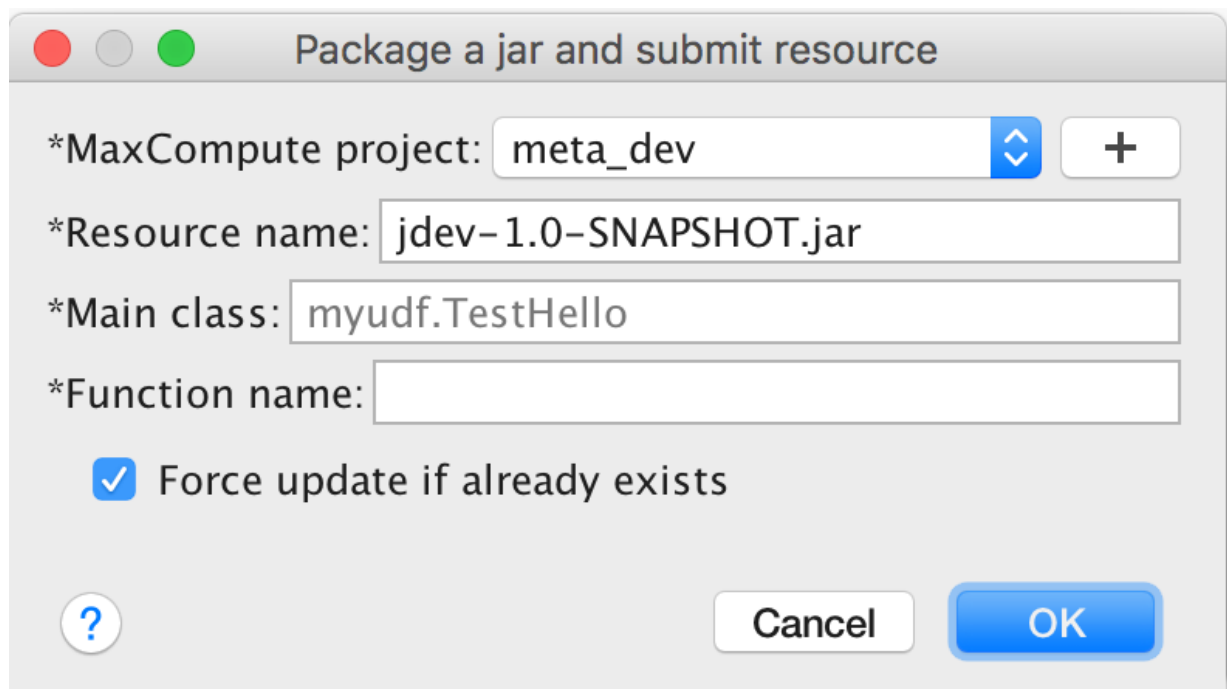
4. Query the created external table, such as:

2.3.5 Package/Upload/Register

After a [user-defined function](#) or [MapReduce](#) is developed, you must package and release it to the MaxCompute system.

Package a UDF or MapReduce

To release a UDF or MapReduce to the MaxCompute server for production use, you must complete **packaging** > **uploading** > **registration** in sequence. You can use the one-click release function to complete these procedures. MaxCompute Studio runs the mvn clean package command, uploads a JAR package, and registers the UDF in one stop. To use this function, right-click the UDF or MapReduce and select Deploy to server.... Make sure that the target class is in the **src** > **main** > **java** subdirectory and is successfully compiled on the Maven module. The dialog box shown in the following figure appears. Select the MaxCompute project to be deployed and enter a resource name and a function name. Click OK and wait until the operation in the background is complete.

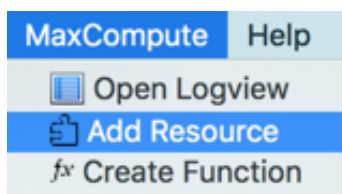
**Note:**

If you require special packaging, you can modify relevant settings in the pom.xml file. After packaging, follow these steps to upload the JAR package and register the UDF.

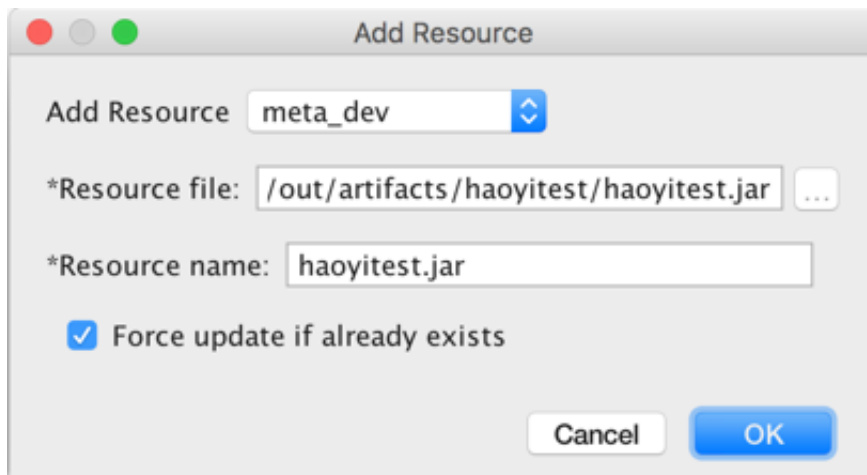
Upload the JAR package

After the JAR package is prepared, upload it to the MaxCompute server.

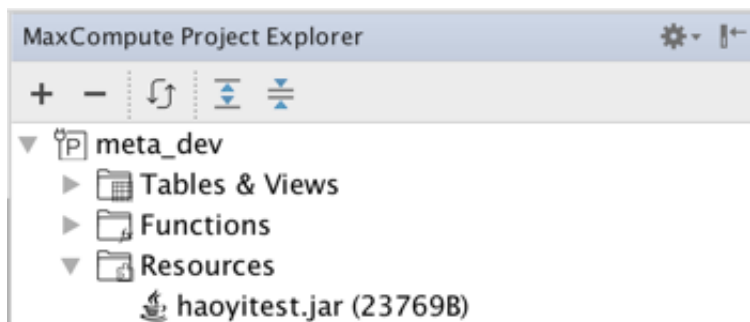
1. Select Add Resource from the MaxCompute menu.



2. Select the MaxCompute project you want to upload the resource to, the JAR file path, and the resource name you want to register. Determine whether to force update when the resource or function already exists. Then click OK.



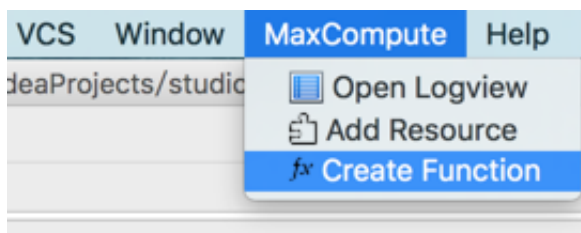
3. After uploading is successful, you can view the resource under the Resources node of the Project Explorer window.



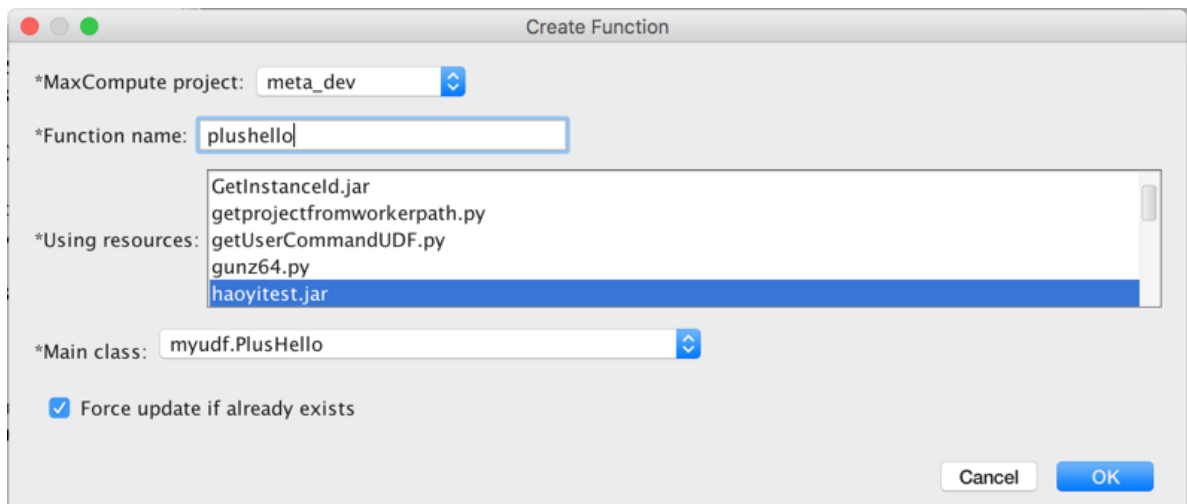
Register the UDF

After the JAR package is uploaded, register the UDF.

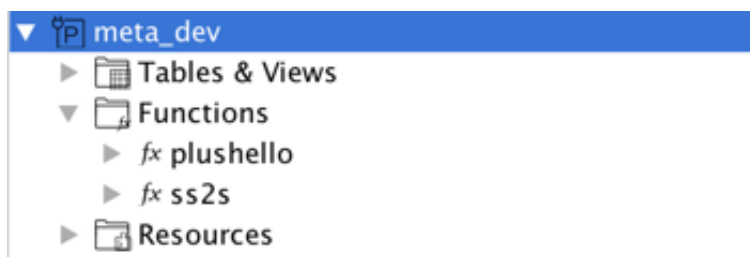
1. Select **Create Function** from the MaxCompute menu.



2. Select the required resource JAR and JAR main class, and enter the function name. Click **OK**.

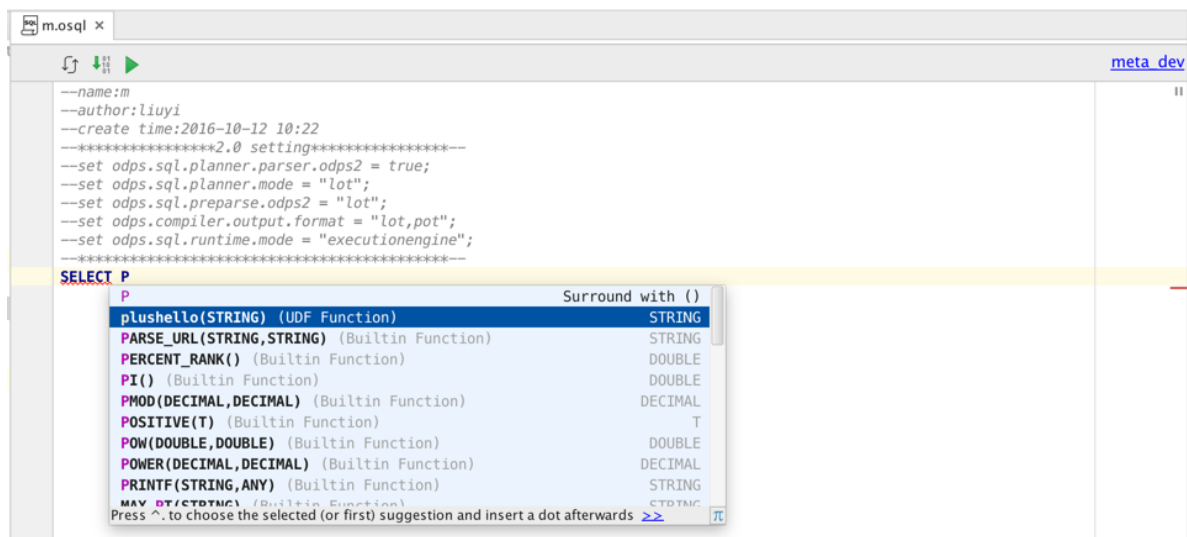


3. After the registration is successful, you can view the function under the Functions node of the Project Explorer window.



Apply the UDF

- Apply the UDF in SQL to complete subsequent development.

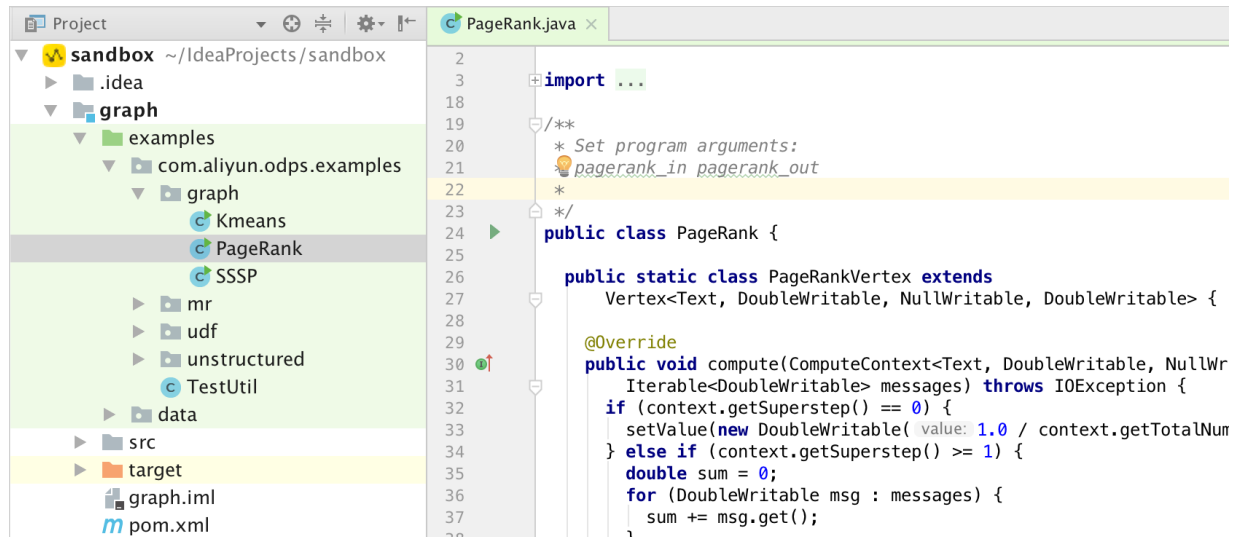


2.3.6 Develop Graph

After the [MaxCompute Java module](#) is created, [Graph](#) can be developed.

Sample Code

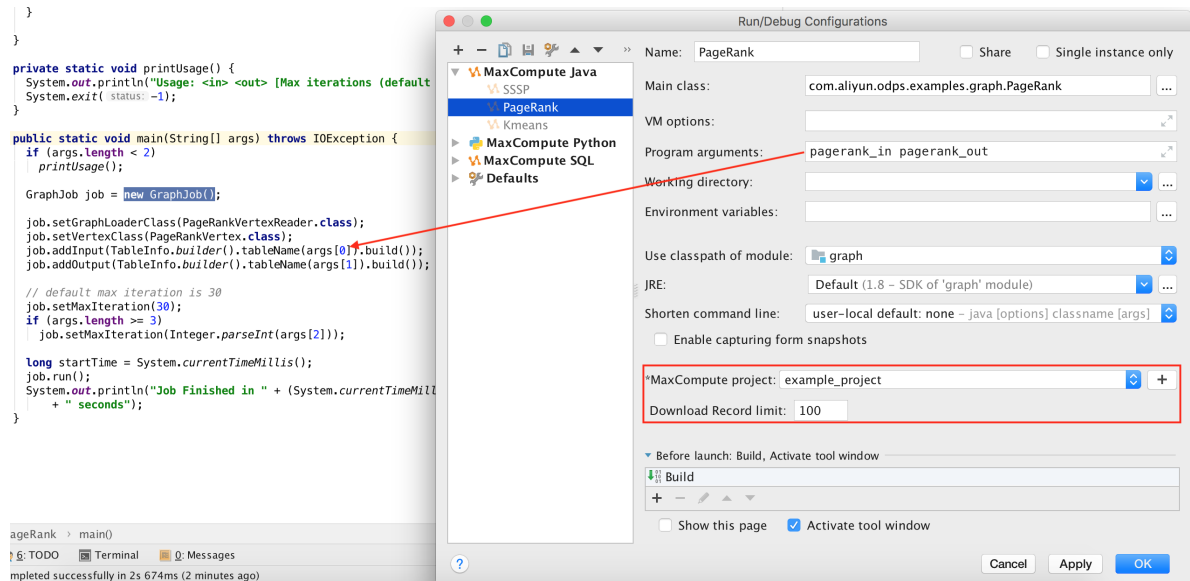
There are some code examples of Graph in the examples directory, and you can refer to the example to get familiar with the structure of the Graph program.



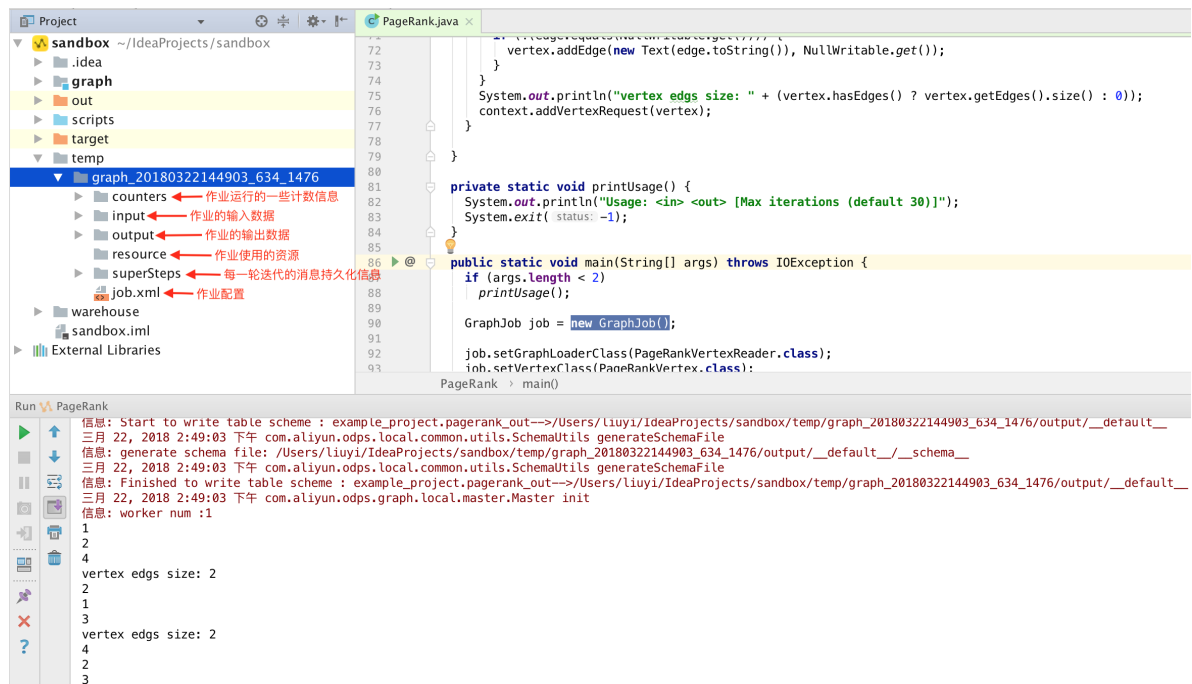
Debug Graph Locally

After the Graph program is developed, test your code and check whether it meets the expectations. You can run the Graph code locally.

1. Run the Graph program: Right-click the Driver class and select **Run**. In the displayed **Run Configuration** dialog box, configure the MaxCompute project on which the Graph program runs.



2. Click **OK**. If table data of the specified MaxCompute project is not downloaded to warehouse, download data first. If a mock project is used or the MaxCompute project table data is downloaded, skip this step. Then, the graph local run framework reads specified table data in warehouse as the Graph input and runs the Graph program locally. You can view log output and result display on the console. Each time you debug locally, a new temporary directory is created under the IntelliJ directory, as shown in the following figure:

**Note:**

For a detailed introduction to warehouse, see [Local Warehouse Directory](#) section in [Develop UDF](#).

Run the Graph Program in the Production Environment

After local debugging is complete, release the Graph program to the server and run it in the MaxCompute distributed environment.

1. Package the Graph program to a JAR package and release it to the server. [For more information, see How to package and release Graph.](#)
2. Use the MaxCompute console integrated with MaxCompute Studio in seamless mode, that is, in the Project Explorer Window, right-click Project and select Open in Console, and input the commands similar to the following [JAR command](#) in the console command line:

```
jar -libjars xxx.jar -classpath /Users/home/xxx.jar com.aliyun.odps.graph.examples.PageRank pagerank_in pagerank_out;
```

2.4 Configure options

2.4.1 Configure MaxCompute Studio

After the MaxCompute Studio plug-in is installed, you can find configuration items of MaxCompute Studio on the left bar of the Settings page of IntelliJ IDEA. For more information about how to open the IntelliJ IDEA configuration page, see [IntelliJ IDEA Documentation](#).

MaxCompute Studio configuration option page

The MaxCompute Studio configuration option page provides the following configuration items:

1. Path for storing the local metadata base

Specifies the path for locally storing metadata of a MaxCompute project. On MaxCompute Studio, the metadata is stored in the hidden directory `.odps.studio/meta` of the local user directory by default.

2. Version update options

- You can use the **Automatically checks for new version** check box to control whether MaxCompute Studio automatically checks for new version updates.
- You can use the **Check new versions** button to manually check new versions. After you click this button, if a new version is available, the **Install new version** button is displayed. You can click this button to install the new version, and restart IntelliJ IDEA after the installation is complete.

SDK and Console configuration option page

The SDK and Console configuration option page provides the following configuration items:

1. Path for installing a MaxCompute client

Specifies the path for local installation of MaxCompute client. MaxCompute Studio detects the version of the MaxCompute client installed in the path. If detection fails, an error message is prompted.



Note:

MaxCompute Studio later than the 2.6.1 version provides the latest MaxCompute client. You do not need to specify the path. If you must use a MaxCompute client of a specific version, you can specify the path.

MaxCompute SQL configuration option page

The MaxCompute SQL configuration option page provides the following configuration items:

1. Enable syntax coloring

Select **Enable syntax coloring** to enable the syntax highlighting feature.

2. Enable code completion

Select **Enable code completion** to enable the automatic code complementing feature.

3. Enable code formatting

Select **Enable code formatting** to enable the code formatting feature.

4. Compiler options

These are global default compiler options. The following options can be separately set for each file on the toolbar of the SQL compiler.

- **Compiler Mode**

- Statement Mode: In this mode, the compiler compiles and submits a single statement of an SQL file as a unit.
- Script Mode: In this mode, the compiler compiles and submits an entire SQL file as a unit. *NOTE: Script Mode enables the compiler and optimizer to optimize the execution plan and improve the overall execution efficiency. This mode is in the test phase now.*

- **Type System**

- Legacy TypeSystem: Indicates the type system of original MaxCompute.
- MaxCompute TypeSystem: Indicates the new type system introduced by MaxCompute 2.0.
- Hive Compatible TypeSystem: Indicates the type system in Hive compatibility mode introduced by MaxCompute 2.0.

- **Compiler Version**

- Default Version: Indicates the default version of the compiler.
- Flighting Version: Indicates the experimental version of the compiler, which includes new features of the compiler being tested.

Account configuration option page

You can add or manage accounts used to access MaxCompute on the Account configuration option page. For more information, see [User authentication](#).

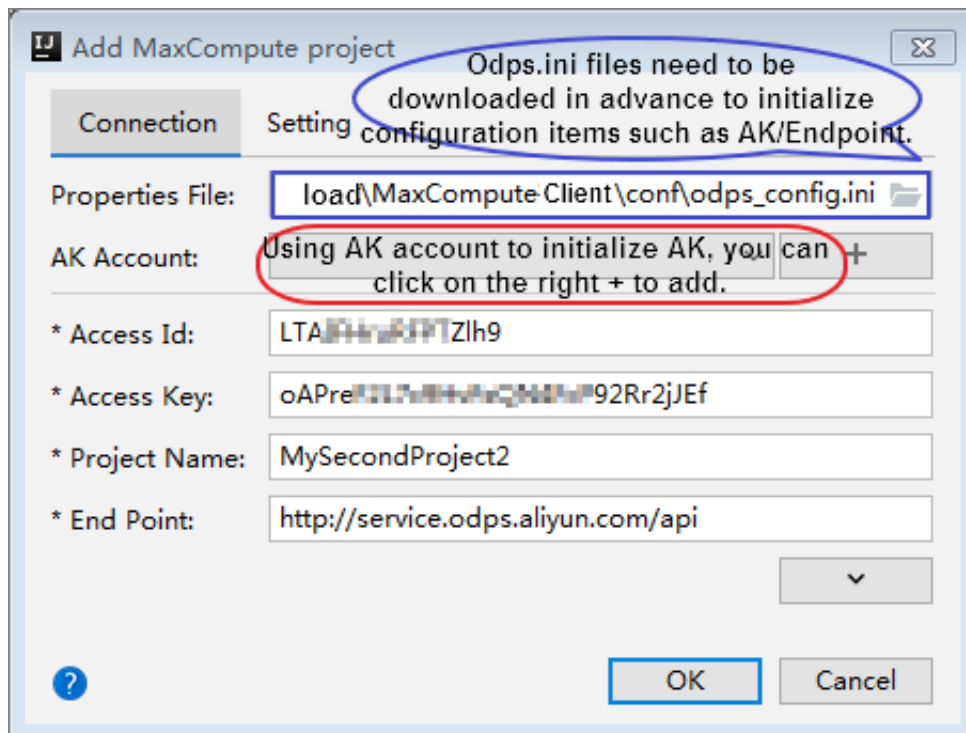
You must specify an account on MaxCompute Studio to access a MaxCompute project and run or submit jobs. MaxCompute Studio currently supports the following account type:

- Alibaba Cloud account (AccessKey)

Add an account

On the Account configuration option page, follow these steps:

1. Click **+** or press **Ctrl-N**.
2. Select the account type **Aliyun Account by AccessKey**.
3. In the displayed **Add Account** window, set the following items:
 - **Account Name**: Indicates the name of the account on MaxCompute Studio.
 - **Using properties file**: Read the AccessKey ID and AccessKey Secret from the configuration file.
 - Select the configuration file `conf/odps_config.ini` after you process [User authentication](#).
 - **Using properties**: Manually enter the AccessKey ID and AccessKey Secret.
 - **Access Id**: Enter the AccessKey ID of your Alibaba Cloud account.
 - **Access Key**: Enter the AccessKey Secret of your Alibaba Cloud account.



4. Click **OK** to complete addition. Then, the account will be displayed in the Account list on the Account configuration option page.

Delete an account

On the Account configuration option page, follow these steps: (This operation only deletes the account configuration on Studio configuration, which does not affect your account.)

1. Select the account to be deleted in the Account list.
2. Click -.
3. In the displayed dialog box, click **OK**.

Modify the AccessKey of an account

On the Account configuration option page, follow these steps:

1. Select the account to be deleted in the Account list.
2. Click the pencil icon.
3. In the displayed **Edit Account** window, modify the account information. The content is similar to that in the preceding section **Add Account**.

View the opening and connection of MaxCompute Region and the settings of Endpoint, see [Endpoints and Data Centers](#).

3 Downloads

This document provides you with the download address of the relevant tools and plugins.

- SDK Downloads: Maven users can search odps-sdk from Maven library to get different versions of the Java SDK.
- [MaxCompute console](#)
- [Eclipse plugin](#)
- [Intelij plugin](#), [Studio](#)