

Using Javascript User Functions

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Creating User Defined Functions

With SQL Stream Builder, you can create user functions to write powerful functions in JavaScript, that you can use to enhance the functionality of SQL.

About this task

User functions can be simple translation functions like Celsius to Fahrenheit, more complex business logic, or even looking up data from external sources. User functions are written in JavaScript. When you write them, you create a library of useful functions.

Procedure

1. Navigate to the Streaming SQL Console.
 - a) Go to your cluster in Cloudera Manager.
 - b) Select SQL Stream Builder from the list of services.
 - c) Click SQLStreamBuilder Console .

The **Streaming SQL Console** opens in a new window.

2. Click Create Job or select a previous job on the **Getting Started** page.

You are redirected to the **Console** page. The Materialized View button will be available when you add a query to the SQL Editor.

3. Select Functions from the main menu.
4. Click New function.

User Defined Function

Properties

Name *

Description

Enter text ...

Output Type *

Input Types

Add Input Type

Function (JavaScript) Usage: 0

```
1 function myFunction(input){
2   return "Hello World 2";
3 }
4
5 myFunction($p0); // this line must exist
```

Cancel Create

5. Add a Name to the UDF.

For example, name the UDF to HELLO_WORLD.
6. Add a Description to the UDF.
7. Select the Output and Input data type.

For example, select STRING.

8. Paste the JavaScript code to the editor.

For example:

```
// check to see if the card is VISA
function HELLO_WORLD(card){
  var cardType = "Other";
  if (card.charAt(0) == 4){
    cardType = "Visa";
  }
  return cardType;
}
HELLO_WORLD($p0); // this line must exist
```

9. Click Create.**10.** Once created, you can use a User Function in your SQL statement:

For example:

```
-- simple usage
SELECT HELLO_WORLD(card) AS IS_VISA
FROM ev_sample_fraud;

-- in the predicate
SELECT amount, card
FROM ev_sample_fraud
WHERE HELLO_WORLD(card) = "Visa";
```



Note: Valid inputs can be a field in the source virtual table or any other valid input. Functions must be in upper case.



Note: User Functions have access to the Java 8 API, this increases the overall usefulness and power. For example:

```
function GETPLANE(icao) {
  try {
    var c = new java.net.URL('http://yyyyyy.io' + icao).openConnection();
    c.requestMethod='GET';
    var reader = new java.io.BufferedReader(new java.io.InputStreamReader(c.inputStream));
    return reader.readLine();
  } catch(err) {
    return "Unknown: " + err;
  }
}
GETPLANE($p0);
```

Developing JavaScript functions

When developing JavaScript functions that are more complicated than just simple logic, it is recommended to use the `jjs` command-line utility to create and iterate while writing functions.

About this task

After the function performs the required task, migrate it to the console. Additionally these files/functions can be saved in a source code control system like git/Github.

Procedure

1. Create a file for your function.



Note: It is recommended to name the file with the same name as that of the function.

2. Create some sample input when calling the function.
3. Call `jjjs` on the command line to test the function.

```
$>cat TO_EPOCH.js
function TO_EPOCH(strDate) {
  var strFmt = "yyyy-MM-dd HH:ss:mm";
  var c = new java.text.SimpleDateFormat(strFmt).parse(strDate).getTime()
/1000;
  return c.toString();
}

print(TO_EPOCH("2019-02-02 22:23:13"));

then
$>jjs TO_EPOCH.js
1549167203
```

What to do next

After you have successfully developed the JavaScript code, copy and paste only the function to your code window when creating the JavaScript function in SQL Stream Builder.

Adding Java to the Functions language option

You can create User Defined Functions (UDF) using Java after manually adding the UDF function JAR file that contains the UDF class to the Flink connectors. After creating the function in the SQL window, you can select Java as a language for the UDFs.

Procedure

1. Create a Java UDF function JAR file based on the following example:

```
package udf;
import org.apache.flink.table.functions.ScalarFunction;

public class UdfTest extends ScalarFunction {
  public String eval(String input){
    return "Hello World " + input;
  }
}
```



Note: The function needs to be named as 'eval' in the JAR file.

2. Copy the JAR file to the flink connectors folder:

```
scp <jar_location>/<jar_filename> <your_hostname>:/usr/share/flink-connectors
```

3. Navigate to the Streaming SQL Console.
 - a) Go to your cluster in Cloudera Manager.
 - b) Select SQL Stream Builder from the list of services.
 - c) Click SQLStreamBuilder Console .

The **Streaming SQL Console** opens in a new window.

4. Run the following query to create the function:

```
CREATE FUNCTION myFunction AS 'udf.UdfTest' LANGUAGE java;
```

5. Test the function by running a SELECT query.

```
SELECT myFunction('test');
```

Using System Functions

The same set of system functions can be used for SQL Stream Builder as for Apache Flink.

As SSB runs on Flink, the following built-in system functions can also be used for data transformations in your SQL Jobs.

- [Comparison Functions](#)
- [Logical Functions](#)
- [Arithmetic Functions](#)
- [String Functions](#)
- [Temporal Functions](#)
- [Conditional Functions](#)
- [Type Conversion Functions](#)
- [Collection Functions](#)
- [JSON Functions](#)
- [Value Construction Functions](#)
- [Value Access Functions](#)
- [Grouping Functions](#)
- [Hash Functions](#)
- [Aggregate Functions](#)
- [Column Functions](#)

For more information about the list of supported Functions, see the [Apache Flink documentation](#).