SNOWFLAKE INTRODUCES JAVASCRIPT STORED PROCEDURES

MAY 02, 2019 | 4 MIN READ

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How to Use Snowflake, Snowflake Technology

<https://www.snowflake.com/blog/snowflake-introduces-javascript-stored-procedures/>

At Snowflake, we have been building a complete relational SQL data warehouse from day one. Also from day one, we have always put our customers first. We heard from customers about the need to extend our SQL programmability to allow encapsulating and running complex business logic more easily within Snowflake. We have a long history of extending our SQL programmability. For example, we provided built-in new SQL primitives that allow customers to query and process semi-structured data in a flexible fashion, and we introduced JavaScript user-defined functions (UDFs) customers can use to easily and intuitively manipulate and process variant and JSON data.

Today, we are reaching another important milestone in our extensibility journey: We are excited to announce the General Availability of Snowflake’s new JavaScript-based stored procedure language, which is production-ready and available in our standard edition. We have been piloting this feature for some time; it has been largely adopted and we have received great feedback since the start of this feature’s preview. With the feature becoming generally available, users in all clouds and all regions can now use Snowflake’s new stored procedure language to:

* Implement and invoke complex business logic, such as ETL procedures, in an easier and more modern language within Snowflake to support arrays, exceptions, control structures, and garbage collection—to name a few relevant language attributes
* Deploy well-known access control primitives without the need to manage an external environment
* Build and run dynamic SQL
* Do all of the above with seamless support for both structured and semi-structured data

**With the introduction of Snowflake’s stored procedures, users will be able to:**

* Use a first-class SQL object (procedure) along with the corresponding DDL statements
* Grant schema privileges on stored procedures
* Make use of procedural logic via IF/ELSE statements
* Iterate over result sets
* Implement error handling via TRY/CATCH
* Use the owner’s rights stored procedure to protect access to objects (that is, there is no need for explicit permissions on the actual referenced objects)
* Use the caller’s rights stored procedure to run all the supported SQL as the current user

We are introducing a new DDL statement in Snowflake to allow users creating stored procedures. It includes the ability to define owner’s or caller’s rights as an optional parameter with owner’s rights as the default:



CREATE [ OR REPLACE ] PROCEDURE <function\_name>( [ <arg\_name>

    <arg\_type> [ , ... ] ] )

    RETURNS { <result\_data\_type> }

   [ LANGUAGE JAVASCRIPT ]

   [ CALLED ON NULL INPUT |

     {RETURNS NULL ON NULL INPUT | STRICT } ]

   [ COMMENT = '<string\_literal>' ]

**[ EXECUTE AS = OWNER | CALLER ]**

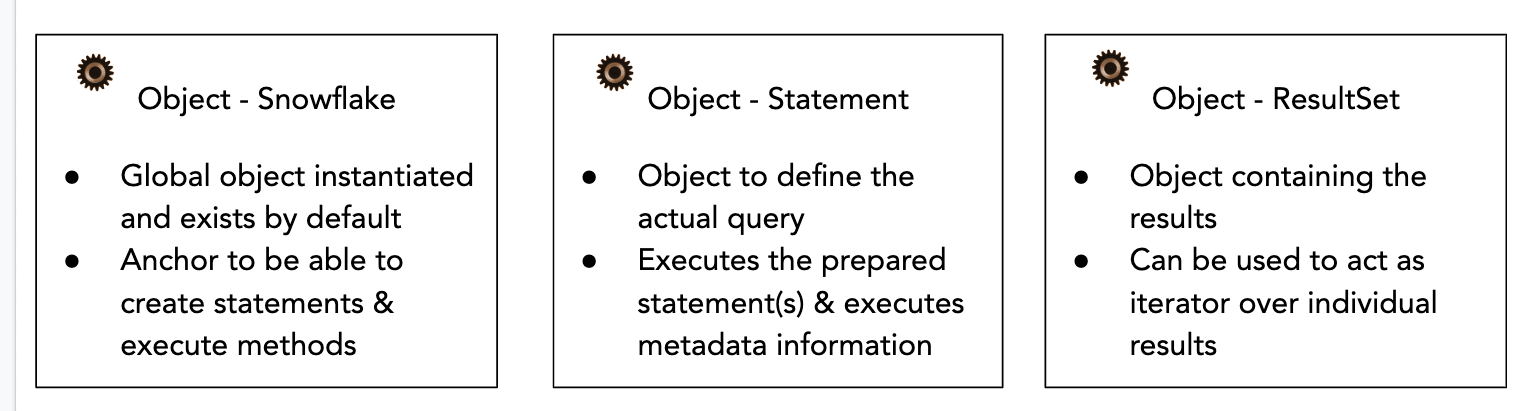
   AS

   $$

   <procedure\_body>

   $$

Finally, we are introducing a light-weight JavaScript API users can use to easily wrap and execute numerous SQL queries:



Here are a few simple stored procedure examples illustrating the new capabilities and concepts.

**Example #1:**

The following is a stored procedure that iterates over tables in a source schema and copies them into the current schema using Create Table as Select. Queries run are logged in SP\_OUTPUT.

create or replace procedure ctas\_tables (SRC\_DB STRING, SRC\_SCHEMA STRING)

returns float

language javascript

strict

as

$$

 var counter = 0;

 // create the logging table

var create\_log\_table\_stmt = snowflake.createStatement({ sqlText: `create or

replace table sp\_output (qry string);` });

create\_log\_table\_stmt.execute();

  // list the tables in the source schema

var list\_tables\_stmt = snowflake.createStatement({

sqlText: `SELECT table\_catalog, table\_schema, table\_name

             FROM information\_schema.tables

             WHERE table\_catalog = :1

             AND table\_schema = :2

             AND table\_type = 'BASE TABLE';`,

   binds: [SRC\_DB, SRC\_SCHEMA]

   });

   var tables = list\_tables\_stmt.execute();

 // for each table

 while (tables.next())

 {

   var database = tables.getColumnValue(1);

   var schema = tables.getColumnValue(2);

   var table = tables.getColumnValue(3);

   var ctas\_qry = `create or replace table ` + table + ` as select \* from ` +

   database + `.` + schema + `.` + table + `;`

   var ctas\_stmt = snowflake.createStatement({ sqlText: ctas\_qry });

   ctas\_stmt.execute();

   // log the ddl query to the output table

   var log\_stmt = snowflake.createStatement({ sqlText: `insert into sp\_output

   (qry) values (:1);`,

   binds: [ctas\_qry]});

   log\_stmt.execute();

   counter++;

}

 return counter;

$$;

**Example #2:**

The following is a stored procedure that interrogates the information schema and returns the result set as “ARRAY of ARRAYS” (each row is represented as an ARRAY).

CREATE OR REPLACE PROCEDURE SP\_ARRAY\_GET\_INF\_SCHEMA\_TABLES (

 )

RETURNS VARIANT

LANGUAGE JAVASCRIPT

AS $$

 var results\_array = [];

  var rs = snowflake.createStatement( { sqlText: `SELECT TABLE\_SCHEMA,

TABLE\_NAME FROM INFORMATION\_SCHEMA.TABLES` } ).execute();

 while (rs.next()) {

   var schema\_name = rs.getColumnValue(1);

   var table\_name = rs.getColumnValue(2);

   results\_array.push([schema\_name, table\_name]);

 }

 return results\_array;

$$

;

CALL SP\_ARRAY\_GET\_INF\_SCHEMA\_TABLES()

;

Here are a few more examples from our partners and users illustrating their use of Snowflake’s stored procedures:

* [How to ingest and enrich IOT data with Apache NiFi and Snowflake stored procedures](https://medium.com/hashmapinc/how-to-ingest-enrich-iot-data-at-scale-into-snowflake-with-apache-nifi-5b57c313a06f)
* [How to use Snowflake’s stored procedure to implement a machine learning algorithm](https://towardsdatascience.com/machine-learning-in-snowflake-fdcff3bdc1a7)

Please visit our official [documentation](https://docs.snowflake.net/manuals/sql-reference/stored-procedures.html) to learn more about this new feature. We have already received great feedback from customers, and we will continue working with them to further evolve and extend our stored procedure language. We also invite you to join our new Stored Procedure group in the [Snowflake lodge](https://community.snowflake.com/s/group/0F90Z000000PurrSAC/stored-procedures).

Separately, we are in the final stages of releasing additional enterprise SQL capabilities, which we will announce during our [first user conference (Snowflake Summit) in San Francisco](https://www.snowflake.com/summit/). Stay tuned.

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[Review how to load XML data into Snowflake and query with ANSI-standard SQL.](https://www.snowflake.com/blog/easily-load-xml-sql/)

[The Power of Secure User-Defined Functions for...](https://www.snowflake.com/blog/the-power-of-secure-user-defined-functions-for-protecting-shared-data/)

[Secure User Defined Functions allow Snowflake users to link, join, and analyze fine-grained data with data from other Snowflake users.](https://www.snowflake.com/blog/the-power-of-secure-user-defined-functions-for-protecting-shared-data/)

[Power BI Enables Connectivity to Snowflake](https://www.snowflake.com/blog/power-bi-enables-connectivity-snowflake/)

[Guest Post from Miguel Llopis, Senior Program Manager for Power BI at Microsoft, where Miguel explains how to utilize Snowflake's cloud-native...](https://www.snowflake.com/blog/power-bi-enables-connectivity-snowflake/)

[Data Science Bootcamps](https://www.snowflake.com/trending/data-science-bootcamps)

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