



Week 1: What's New in SAP HANA 2.0 SPS 03

Unit 4: SQLScript Troubleshooting

SQLScript Troubleshooting

SQLScript code analyzer – Overview

The SQLScript code analyzer consists of two built-in procedures that scan CREATE FUNCTION / CREATE PROCEDURE statements. By applying a selected set of rules, they search for certain patterns that indicate problems regarding code quality, performance, or security.

- Rules are defined in view SQLSCRIPT_ANALYZER_RULES; currently 9 rules.
- Procedure ANALYZE_SQLSCRIPT_DEFINITION can be used to analyze the source code of a single procedure or function which has yet to be created. Procedure ANALYZE_SQLSCRIPT_OBJECTS can be used to analyze the source code of multiple already existing procedures or functions.
- The SQLScript code analyzer is deactivated by default. It can be activated with an ini parameter or a session parameter:

```
alter system alter configuration ('indexserver.ini', 'SYSTEM') set  
    ('sqlscript', 'enable_code_scanner') = 'true' with reconfigure;
```

```
set '___SQLSCRIPT_ENABLE_CODE_SCANNER' = 'true';
```

SQLScript Troubleshooting

SQLScript code analyzer – Rules

UNNECESSARY_VARIABLE: Each variable is tested if it is used by any output parameter of the procedure or if it influences the outcome of the procedure. Relevant statements for the outcome could be DML statements, implicit result sets, conditions of control statements.

UNUSED_VARIABLE_VALUE: If a value assigned to a variable is not used in any other statement, the assignment can be removed. In case of default assignments in DECLARE statements, the default is never used.

UNCHECKED_SQL_INJECTION_SAFETY: Parameters of string type should always be checked for SQL injection safety if they are used in dynamic SQL. This rule checks if for any such parameter the function `is_sql_injection_safe` was called. For a simple conditional statement like `IF is_sql_injection_safe(:var) = 0 THEN...`, the control flow in the true branch is checked. The procedure should either end (by returning or by throwing an error) or the unsafe parameter value should be escaped with the functions `escape_single_quotes` or `escape_double_quotes`, depending on where the value is used. If the condition is more complex (e.g. more than one variable checked in one condition), a warning will be displayed, as it could only be checked if any execution of the dynamic SQL has passed the SQL injection check.

SINGLE_SPACE_LITERAL: This rule searches for string literals consisting of only one space. If ABAP VARCHAR MODE is used, such string literals are treated as empty strings. In this case, `CHAR(32)` can be used instead of `' '`.

SQLScript Troubleshooting

SQLScript code analyzer – Rules continued

USE_OF_UNASSIGNED_SCALAR_VARIABLE – detects variables which are used but were never assigned explicitly. Those variables will still have their default value when used, which might be undefined. It is recommended to assign a default value (can be NULL) to be sure that you get the intended value when you read from the variable.

USE_OF_CE_FUNCTIONS – checks whether calculation engine plan operators (CE functions) are used. Since they make optimization more difficult and lead to performance penalties, they should be avoided.

DML_STATEMENTS_IN_LOOPS – detects the following DML statements inside of loops: INSERT, UPDATE, DELETE, REPLACE/UPSERT. Sometimes it is possible to rewrite the loop and use a single DML statement to improve performance instead.

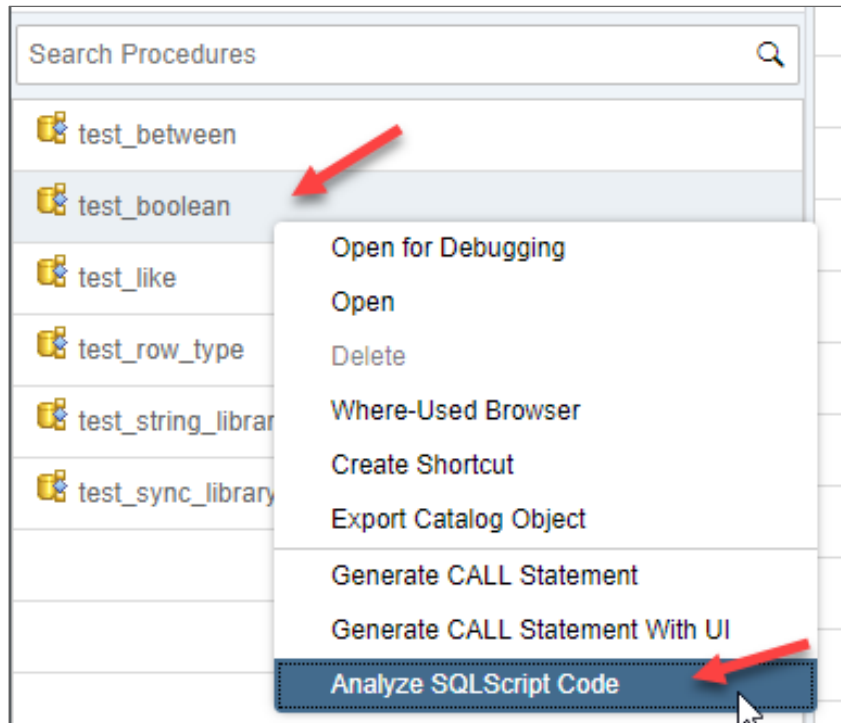
USE_OF_SELECT_IN_SCALAR_UDF – detects if SELECT is used within a scalar UDF, which can lower the performance. If table operations are really needed, procedures or table UDFs should be used instead.

COMMIT_OR_ROLLBACK_IN_DYNAMIC_SQL – detects dynamic SQL which uses the COMMIT or ROLLBACK statement. Since COMMIT and ROLLBACK can be used directly in SQLScript without the need of dynamic SQL, it is recommended to use COMMIT and ROLLBACK directly.

SQLScript Troubleshooting

SQLScript code analyzer in database explorer

Initially released in SPS02, the SQLScript code analyzer is now accessible from the database explorer.



The screenshot shows the 'SQLScript Code Analysis Results' window. The title bar indicates 'SQLScript Code Analysis'. The main content area displays the results for the 'test_boolean' procedure. It states: 'Analyzed test_boolean for security and consistency issues.' Below this, it shows the database and schema information: 'Database: WORKSHOP_00-op85vxjfkolf9pxg-Dem...' and 'Schema: DEMO_1'. On the right side, it reports 'Objects Analyzed: 1' and 'Issues Found: 1'. A checkbox labeled 'Include Objects without Issues' is present, along with a search filter 'Type to filter'. Below this is a table with the following data:

Object Name	Issue Description	Rule Category	Rule Name	Code Snippet	Start	End
test_boolean	Variable EX_INT is used but may be unassigned	CONSISTENCY	USE_OF_UNASSIGNE...	ex_int int	86	96

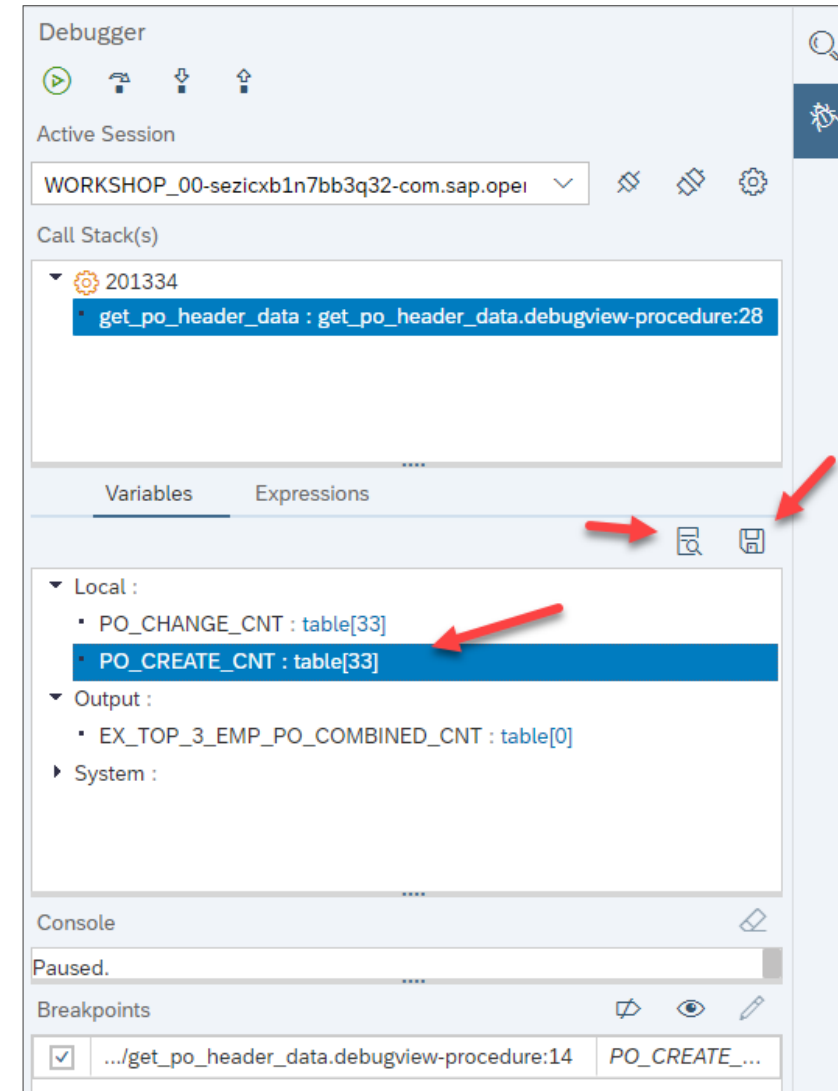
SQLScript Troubleshooting

Functional issues

Your procedure returns wrong result?

Use SQLScript debugger

- Investigate intermediate result
- Query on intermediate result using expression editor
- Save intermediate result as a persistent table



SQLScript Troubleshooting

Performance issues

Your procedure is still running and you want to know where it is stuck? You want to know how long your statements (SQL, DML) are running? PlanViz or Perftrace takes too long or cannot be used?

Use M_ACTIVE_PROCEEDURES – Monitors running procedures and their internal statements

```
SELECT * FROM M_ACTIVE_PROCEEDURES
        WHERE procedure_name = <proc_name>
               AND procedure_schema_name = <proc_schema>;
```

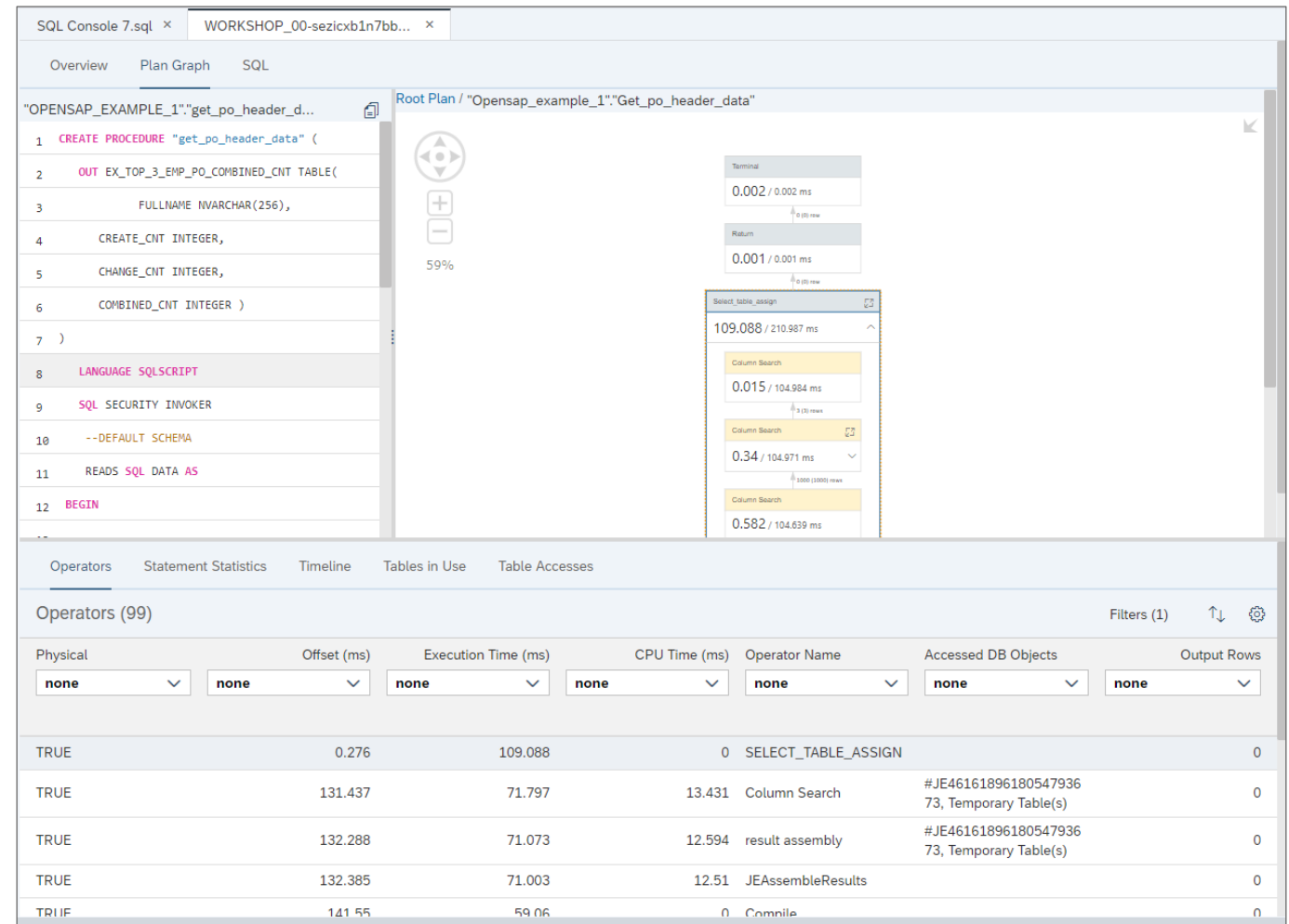
SQLScript Troubleshooting

Performance issues – Continued

You identified an expensive statement and want to analyze it?

Use SQL analyzer in database explorer

- Execute statement: Enables users to reproduce the execution of a single statement or CALL procedure statements



Thank you.

Contact information:

open@sap.com

Follow all of SAP



www.sap.com/contactsap

© 2018 SAP SE or an SAP affiliate company. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP SE or an SAP affiliate company.

The information contained herein may be changed without prior notice. Some software products marketed by SAP SE and its distributors contain proprietary software components of other software vendors. National product specifications may vary.

These materials are provided by SAP SE or an SAP affiliate company for informational purposes only, without representation or warranty of any kind, and SAP or its affiliated companies shall not be liable for errors or omissions with respect to the materials. The only warranties for SAP or SAP affiliate company products and services are those that are set forth in the express warranty statements accompanying such products and services, if any. Nothing herein should be construed as constituting an additional warranty.

In particular, SAP SE or its affiliated companies have no obligation to pursue any course of business outlined in this document or any related presentation, or to develop or release any functionality mentioned therein. This document, or any related presentation, and SAP SE's or its affiliated companies' strategy and possible future developments, products, and/or platforms, directions, and functionality are all subject to change and may be changed by SAP SE or its affiliated companies at any time for any reason without notice. The information in this document is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. All forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from expectations. Readers are cautioned not to place undue reliance on these forward-looking statements, and they should not be relied upon in making purchasing decisions.

SAP and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP SE (or an SAP affiliate company) in Germany and other countries. All other product and service names mentioned are the trademarks of their respective companies.

See www.sap.com/corporate-en/legal/copyright/index.epx for additional trademark information and notices.