SAP Note

SAP   **3369799 - Error "division by zero undefined" is Raised After Upgrade to HANA 2 SP07 or Higher**

Version	6	**Validity:** 27.09.2023 - active	**Language** English

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Header Data

Released On	27.09.2023 06:14:48 **By** Jinsol Kim (I533393)
Release Status	Released for Customer
Component	HAN-DB SAP HANA Database Display ACRF Content
Priority	Recommendations / Additional Info
Responsible	Jinsol Kim (I533393)
Processor	Jinsol Kim (I533393)
Category	Consulting
Relevant for Translation	No

Symptom

A query that once ran successfully fails now with "division by zero undefined" error.

[Example Scenario]

    CREATE COLUMN TABLE TEST_TABLE (col1 int, col2 int, col3 int);

    INSERT INTO TEST_TABLE VALUES (1, 1, 1);
    INSERT INTO TEST_TABLE VALUES (1, 1, 1);

    INSERT INTO TEST_TABLE VALUES (2, 2, 2);
    INSERT INTO TEST_TABLE VALUES (2, 2, 2);

    SELECT **A/B** FROM (

        SELECT 1 as A, **SUM(W)** as B FROM (
            SELECT col1-LEAD(col1, 1) OVER (PARTITION BY col3 ORDER BY col2) W, col3 FROM TEST_TABLE
)
)

    WHERE **B > 0;**

There are three possible (and valid) outcomes of the SELECT statement above:

1. null (displayed as "?")
2. [HEX engine used] Could not execute 'select A/B from (select 1 as A, SUM(W) as B from (select col1-LEAD(col1, 1) over (partition by ...' in 3 ms 500 µs . [304]: division by zero undefined: exception 71000304: SQL Error

3. [Legacy engines used] Could not execute 'select A/B from (select 1 as A, SUM(W) as B from (select col1-LEAD(col1, 1) over (partition by ...' in 8 ms 909 μs . [304]: division by zero undefined: div by zero occurred error returned from /

Other Terms

HEX

Reason and Prerequisites

Issue number 312428

Reason:

Execution order of SQL expressions is not predefined. That is, different execution orders can be selected for a certain query string, and it is an expected behavior.

One example of such an execution order is that division expression (i.e, A/B) is processed before filter expression (B > 0) is processed.

With filter expression executed first in the example in **Symptom,** B is evaluated to NULL so A/B also evaluates to NULL. However, with the filter expression executed at the end, B is evaluated to 0 and then A/B is executed before this division expression is filtered out with expression "B > 0".

Though it is technically possible that such problematic execution orders can be selected with other legacy engines, HEX engine is likely to be in more favor of such execution orders. You may observe this symptom more often after upgrading to HANA 2.0 SP07 or higher, or migrating to HANA Cloud because HEX is a default execution engine for HANA onPrem instance of revision 2.0 SP07 or higher and HANA Cloud with more extensive usage.

Affected Releases:

- All revisions

Solution

Please modify the affected query string with SQL expressions of more deterministic logics. Consider SQL functions like *NULLIF()* and *COALESCE()* to handle unexpected "division by zero" situation.

A combination of these SQL functions can enforce the division expression to comply with the expected outcome.

```
CREATE COLUMN TABLE TEST_TABLE2 (a int);
INSERT INTO TEST_TABLE2 VALUES (0);
INSERT INTO TEST_TABLE2 VALUES (null);
SELECT 1 / SUM(a) FROM TEST_TABLE2; -- raise error "divide by zero undefined"
```

SELECT 1 / NULLIF(SUM(a), 0) FROM TEST_TABLE2; -- return null
SELECT COALESCE(1 / NULLIF(SUM(a), 0), 0) FROM TEST_TABLE2; -- returns 0

Though applying a statement hint like NO_USE_HEX_PLAN might help avoid selecting a problematic execution order, it is not recommended as it is still subject to the "division by zero" error with different execution orders.

In case this error is raised from a query that is requested by native SAP solutions like Solution Manager or HANA, please open SAP support ticket so that component experts at SAP modify affected queries.

Workaround

In case this error occurs for a query involving monitoring views, setting below parameter to "false" can be considered as it disables HEX for such queries so the frequency in such occurrences is expected to be reduced.

ALTER SYSTEM ALTER CONFIGURATION ('**<service>**.ini','SYSTEM') SET ('sql', 'hex_enable_monitor_scan') = 'false' WITH RECONFIGURE COMMENT 'SAP Note *3369799*'; -- replace <service> with a relevant HANA service which issues affected monitoring queries

Please use this parameter with great care as it affects every query involving monitoring views so that it can lead to query performance degradation.

Validity

Software Component	From Rel.	To Rel.	And Subsequent	
HDB	1.00	1.00		
	2.00	2.00		

References

This document refers to:

SAP Notes
2380229　HAN-DB　SAP HANA Platform 2.0 - Central Note
1523337　HAN-DB　SAP HANA Database 1.00 - Central Note

This document is referenced by:

Customer Incident (1)

Number	Year	Title	Status	Processor	Customer Number	Customer Name
0000706364	2023	SQL_error_after_HANA upgrade	Restricted	Walter Jahn	0000879827	G3G (UK) Limited

ServiceNow Case (1)

Number	Year	Text	Status	Processor	Customer Number	Customer

0000706364	2023	SQL_error_after_HANA upgrade	Closed	Walter Jahn (D036173)		

0000706364	2023	SQL_error_after_HANA upgrade	Closed	Walter Jahn (D036173)		