

Technical Articles



Todd Witter

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Optimize CDS views using dbHints annotation

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Discover CDS views with potential Quick Wins

Gateway performance analysis via /IWFND/STATS gives powerful tools to analyze load on backend S4 system from a volume perspective, among others. What about expensive CDS statements within S4? From SQL Editor in S4 via DBACOCKPIT -> Diagnostics -> SQL Editor we can determine which CDS views can be optimized by running following statement:

```
• SELECT TOP 50 plan_size_count AS plansize, *  
  FROM m_sql_plan_cache  
 WHERE statement_string like '%Z<CDS View(s)>%'  
 ORDER BY plansize DESC
```

Add dbHint annotation and confirm performance benefit

Hints placed on CDS view itself @AbapCatalog.dbHints: [{dbSystem: #HDB, hint: '<hint_name>'}]. Since CDS views are not actual tables, and indices less relevant, the join engines should be considered to optimize performance: OLAP, JOIN, HEX, or ESX engines (see [SAP HANA Performance Developer Guide](#)). With CDS view(s) having potential for performance benefit, run following SQL statement, with and without hints, selecting fields causing joins or emulating long run times with searching on non-key fields, for example:

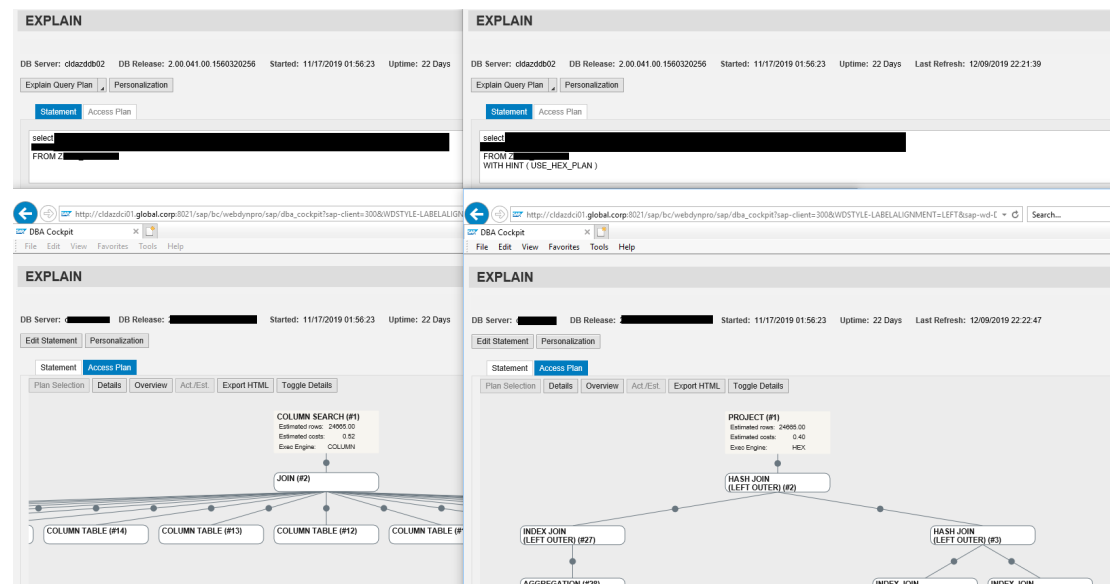
- SELECT *
- FROM Z<CDS View>
- WITH HINT (USE_ESX_PLAN)

Also try following hints, among others from [relevant documentation from SAP](#), to understand engines and associated costs (see corresponding engines and hints below).

- Column
 - USE_OLAP_PLAN
 - NO_USE_OLAP_PLAN
 - NO_USE_HEX_PLAN
 - NO_USE_ESX_PLAN
- HEX
 - USE_HEX_PLAN
- ESX
 - USE_ESX_PLAN

SAP HANA Execution Engine (HEX)

HEX engine is preferable in this case, with all things remaining the same.



Discover current join engine

What does PlanViz show without dbHints annotation on this particular CDS view? Column, which is the same as without the hint declared in SQL Statement. To confirm set SQL trace using ST05, run odata request, display trace, Execution Trace download as .plv file (see Display Execution Plan below), and upload .plv in Eclipse. Alternatively Graphical Explain will show similar PlanViz information.

Start Time	z	Display Execution Plan	Plan Name	Object Name	Statement
15:33:58.636	237,762	5,000	CL_SADL_SQL_STATEMENT-----CP	Z	SELECT WHERE "MANDT" = '300' ORDER BY "Z" LIMIT 5000 WITH
15:33:51.631	1,240	0	SAPLSYST	V_RFC_BL_SERVER	SELECT WHERE "RFM_NAME" = 'RFCPING' WITH RANGE_RESTRICTION('CURRENT')
15:33:51.699	1,110	0	SAPLSADT_REST		SELECT WHERE "RFM_NAME" = 'SADT_REST RFC_ENDPOINT' WITH RANGE_RESTRICTION('CURRENT')
15:33:51.791	986	0	SAPLSADT_REST		SELECT WHERE "RFM_NAME" = 'SADT_REST RFC_ENDPOINT' WITH RANGE_RESTRICTION('CURRENT')
15:33:51.851	900	0	SAPLSADT_REST		SELECT WHERE "RFM_NAME" = 'SADT_REST RFC_ENDPOINT' WITH RANGE_RESTRICTION('CURRENT')
15:33:53.632	8,425	0	/IWBEP/SAPLFGF_MGW_CLIENT_IF		SELECT WHERE "RFM_NAME" = '/IWBEP/FM_MGW_HANDLE_REQUEST' WITH RANGE_RESTRICTION('CU'
15:33:56.095	1,088	0	SAPLSADT_REST		SELECT WHERE "RFM_NAME" = 'SADT_REST RFC_ENDPOINT' WITH RANGE_RESTRICTION('CURRENT')

Explain Plan -> Graphical Explain will launch Browser

Display Execution Plan for SQL Statement

Graphical Explain Execution Trace

SQL Statement

```

SELECT
/* Contains Native SQL */
FROM
/* Entity name: z
WHERE
"MANDT" = '300'
ORDER BY
"Z" LIMIT '5000' WITH PARAMETERS( 'LOCALE' = 'CASE_INSENSITIVE' )
WITH HINT(USE_HEX_PLAN) WITH RANGE_RESTRICTION('CURRENT')

```

Run Explain Query plan

DBA Cockpit

File Edit View Favorites Tools Help

EXPLAIN

DB Server: DB Release: Started: 11/17/2019 01:56:23 Uptime: 22 Days Last Refresh: 12/09/2019 22:21:39

Explain Query Plan Personalization

Statement Access Plan

```

select
FROM z
WITH HINT ( USE_HEX_PLAN )

```

Execution Trace or PlanViz from Eclipse using Open File... -> .plv

Executed [362.065 ms]

Overview Executed Plan

PlanViz Options

- Node Grouping
 - ☒ None
 - ☐ Operation
- Default Inner Plan
 - ☒ Physical
 - ☐ Logical
- Node Detail
 - ☐ Simple
 - ☒ Detailed
 - ☐ Custom
- Graph Layout

Column Search

Inclusive Time: 181.1 ms
Exclusive Time: 0.1 ms

5,000 (5,000) rows

Column Search

Inclusive Time: 181 ms
Exclusive Time: 11.9 ms

5,000 (5,000) rows

Results

Add dbHints annotation with HEX to CDS view and check performance improved:

@AbapCatalog.dbHints: [{dbSystem: #HDB, hint: 'USE_HEX_PLAN'}]

```
1 @AbapCatalog.sqlViewName: 'Z'
2 @AbapCatalog.compiler.compareFilter: true
3 @AbapCatalog.preserveKey: true
4 @AccessControl.authorizationCheck: #NOT_REQUIRED
5 @EndUserText.label: 'CDS View'
6 @Analytics.dataCategory: #CUBE
7 @AbapCatalog.dbHints: [{ dbSystem: #HDB, hint: 'USE_HEX_PLAN' }]
8 @odata.publish: true
9 define view 'Z' as
10   as select from vbak
11     left outer join vbuk on vbak.vbeln = vbuk.vbeln
12     left outer join knal on knal.kunnr = vbak.kunnr
```

Results

Odata Gateway result without hint is 6.5 seconds

The screenshot shows the SAP Gateway Client interface. The HTTP Method is GET. The Request URI is /sap/opu/odata/sap/Z...?\$top=5000&\$select=... The Protocol is HTTP. The HTTP Response - Processing Time is 6536 ms. The response headers are: ~status_code: 200, ~status_reason: OK.

Odata Gateway result with hint is 1.4 seconds

The screenshot shows the SAP Gateway Client interface. The HTTP Method is GET. The Request URI is /sap/opu/odata/sap/Z...?\$top=5000&\$select=... The Protocol is HTTP. The HTTP Response - Processing Time is 1446 ms. The response headers are: ~status_code: 200, ~status_reason: OK.

Conclusion

In conclusion the HEX engine capitalizes on SAP HANA, see note 2570371 – FAQ: SAP HANA Execution Engine (HEX). Without dbHints set to USE_HEX_PLAN in the CDS views, consumption via gateway odata requests using SADL framework, are not using the latest, most innovative query processing engine from SAP.

Thanks for reading

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