IBM Education Assistance (IEA) for z/OS V2R3

TDS LDAP TDBM Health Check

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Trademarks

- See url http://www.ibm.com/legal/copytrade.shtml for a list of trademarks.

- Additional Trademarks:

    – None

Session Objectives

- TDBM health check: This provides an health check to notify LDAP administrator if DB2 tuning is needed to avoid LDAP performance problems caused by DB2 maintenance.

Overview

- Problem Statement / Need Addressed

  - DB2 tuning is crucial for improving TDBM performance so the database administrator should periodically reorganize database (REORG) and maintain database statistics (RUNSTATS).

  - Reorganizing database with DB2 REORG utility improves access performance and reclaims fragmented space. Optimizing database updates statistics with DB2 RUNSTATS utility is helpful to DB2 optimizer to select efficient access path and improve query speed.

  - Customers do not know when REORG and RUNSTATS are needed and often get LDAP performance issues that can be solved by running DB2 REORG and RUNSTATS utilities.

- Solution

  - Add a TDS-DB2 health check to z/OS Health Checker to evaluate the need of running DB2 REORG and RUNSTATS utilities and notify system administrators.

- Benefit / Value

  - Customers can leverage z/OS Health Checker to determine if REORG and RUNSTATS are required and avoid DB2 related performance issue.

Usage & Invocation

- On server startup, a new check (IBMTDS,TDS_DB2_MAINTENANCE) is registered to z/OS Health Checker as a local check. The LDAP server periodically runs the check to generate health check report for its TDBM backends and DB2-based GDBM backend.

```
SDSF HEALTH CHECKER DISPLAY   DCEIMGWK                LINE 1-16 (191)
NP   NAME                            CheckOwner        State              Status
     TDS_DB2_MAINTENANCE             IBMTDS            ACTIVE(ENABLED)    SUCCESSFUL
     IOS_DYNAMIC_ROUTING             IBMIOS            ACTIVE(ENABLED)    SUCCESSFUL
     SUP_SYSTEM_SYMBOL_TABLE_SIZE    IBMSUP            ACTIVE(ENABLED)    SUCCESSFUL
     RRS_DELAYED_TRANSACTIONS        IBMRRS            INACTIVE(ENABLED)  INACTIVE
     ZFS_VERIFY_CACHESIZE            IBMZFS            ACTIVE(ENABLED)    SUCCESSFUL
     ZFS_CACHE_REMOVALS              IBMZFS            ACTIVE(ENABLED)    SUCCESSFUL
     CTRACE_DEFAULT_OR_MIN           IBMCTRACE         ACTIVE(ENABLED)    SUCCESSFUL
     ZOSMIGV2R2_NEXT_CS_SENDMAILCLIEN IBMCS            INACTIVE(ENABLED)  INACTIVE
     ZOSMIGV2R2_NEXT_CS_SENDMAILDAEMN IBMCS            INACTIVE(ENABLED)  INACTIVE
     ZOSMIGV2R2_NEXT_CS_SENDMAILMSA  IBMCS             INACTIVE(ENABLED)  INACTIVE
     ZOSMIGV2R2_NEXT_CS_SENDMAILMTA  IBMCS             INACTIVE(ENABLED)  INACTIVE
     ZOSMIGV2R2_NEXT_CS_SMTPDDAEMON  IBMCS             INACTIVE(ENABLED)  INACTIVE
     ZOSMIGV2R2_NEXT_CS_SMTPDMTA     IBMCS             INACTIVE(ENABLED)  INACTIVE
     USS_KERNEL_RESOURCES_THRESHOLD  IBMUSS            ACTIVE(DISABLED)   ENV N/A
     RACF_RRSF_RESOURCES             IBMRACF           ACTIVE(DISABLED)   UNEXPECTED ERROR
     USS_KERNEL_PVTSTG_THRESHOLD     IBMUSS            ACTIVE(ENABLED)    SUCCESSFUL
COMMAND INPUT ===>                                    SCROLL ===> CSR
```

Usage & Invocation

- To enable the TDS-DB2 health check support, make sure at least one TDBM backend or DB2-based GDBM backend is defined and update the server configuration file

  - Define the health check in the global section: _healthcheck DB2 [TOD]_

    - TOD optionally specifies the time of day between 00:00 and 23:59 the check is scheduled to run

    - The check will not be scheduled if TOD is set to an invalid value or is not specified

  - Update the section of TDBM / GDBM backend that will be checked

    - Enable TDS-DB2 health check for the backend: _db2CheckHealth on_

    - Customize the TDS-DB2 health check settings by overwriting default values: _db2ExtentLimit_, _db2RRIAppendInsertPct_, _db2RRIDeletesAbs_, _db2RRIDeletesPct_, _db2RRIInsertsAbs_, _db2RRIInsertsPct_, _db2RRILeafLimit_, _db2RRIMassDelLimit_, _db2RRINumLevelsLimit_, _db2RRIPseudoDeletePct_, _db2RRTDataSpaceRat_, _db2RRTDeletesAbs_, _db2RRTDeletesPct_, _db2RRTDisorgLOBPct_, _db2RRTIndRefLimit_, _db2RRTInsertsAbs_, _db2RRTInsertsPct_, _db2RRTMassDelLimit_, _db2RRTUnclustInsPct_, _db2SRIInsDelAbs_, _db2SRIInsDelPct_, _db2SRIMassDelLimit_, _db2SRTInsDelUpdAbs_, _db2SRTInsDelUpdPct_ and _db2SRTMassDelLimit_

Usage & Invocation

- To view the health check status, use console command *f dssrv,display health*

- To dynamically enable or disable the TDS-DB2 health check, use console command *f dssrv,health db2=on* or *f dssrv,health db2=off*

- Besides the TOD schedule, the LDAP administrator can also run the TDS-DB2 health check manually with console command *f dssrv,health db2=run*

- Once requested, the LDAP server calls the DB2 stored procedure DSNACCOX to generate REORG and RUNSTATS recommendations for each backend participated in the TDS-DB2 health check and sends the result to check (IBMTDS,TDS_DB2_MAINTENANCE) registered in z/OS Health Checker to issue health check report

- TDS-DB2 health check also examines if the following frequent values are gathered in the backend:

  - AEID column in DIR_DESC table

  - PEID column in DIR_ENTRY table

  - ATTR_ID column in DIR_SEARCH table

  - (ATTR_ID,VALUE) column group in DIR_SEARCH table

Usage & Invocation

- Check (IBMTDS,TDS_DB2_MAINTENANCE) is registered as an one-time check in z/OS Health Checker and designed to be programmatically called by the LDAP server, so the system administrator should use MODIFY hzsproc command to run the check

- An exception message will be written to both the check report and console if some REORG or RUNSTATS action is recommended

```
******************************** TOP OF DATA ***********************************
CHECK(IBMTDS,TDS_DB2_MAINTENANCE)
SYSPLEX:    CFCIMGWK  SYSTEM: DCEIMGWK
START TIME: 11/10/2016 22:31:28.545797
CHECK DATE: 20160101  CHECK SEVERITY: LOW

TDSH001I DB2 health check report for backend 'TDBM-02':
Frequent values of AEID column in DIR_DESC table are not gathered.
Frequent values of PEID column in DIR_ENTRY table are gathered.
Frequent values of ATTR_ID column in DIR_SEARCH table are gathered.
Frequent values of (ATTR_ID,VALUE) group in DIR_SEARCH table are
gathered.
Index 'GLDSRVT.DIR_ATTRIDX1' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVT.DIR_CACHEX1' (part 0) needs REORG.
Index 'GLDSRVT.DIR_DESCX1' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVT.DIR_EIDX1' (part 0) needs REORG.
Index 'GLDSRVT.DIR_ENTRYX3' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVT.DIR_ENTRYX2' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVT.DIR_ENTRYX1' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVT.DIR_ENTRYX0' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVT.DIR_LONGATTRX1' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVT.DIR_LONGENTRYX1' (part 0) needs REORG.
Index 'GLDSRVT.DIR_LONGREPX1' (part 0) needs REORG.
Index 'GLDSRVT.DIR_LONGREPLCHANGEX1' (part 0) needs REORG.
Index 'GLDSRVT.DIR_LONGREPLERRORX2' (part 0) needs REORG.
Index 'GLDSRVT.DIR_LONGREPLERRORX1' (part 0) needs REORG.
Index 'GLDSRVT.DIR_REPENTRYX1' (part 0) needs REORG.
Index 'GLDSRVT.DIR_REPLCHANGEX3' (part 0) needs REORG.
Index 'GLDSRVT.DIR_REPLCHANGEX2' (part 0) needs REORG.
Index 'GLDSRVT.DIR_REPLCHANGEX1' (part 0) needs REORG.
Index 'GLDSRVT.DIR_REPLERRORX2' (part 0) needs REORG.
Index 'GLDSRVT.DIR_REPLERRORX1' (part 0) needs REORG.
Index 'GLDSRVT.DIR_REPLICAX1' (part 0) needs REORG.
Index 'GLDSRVT.DIR_REPLSTATUSX1' (part 0) needs REORG.
Index 'GLDSRVT.DIR_SEARCHX2' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVT.DIR_SEARCHX1' (part 0) needs REORG and RUNSTATS.
Tablespace 'GLDDBT.ENTRYTS' (part 0) needs REORG and RUNSTATS.
Tablespace 'GLDDBT.DESCTS' (part 0) needs REORG and RUNSTATS.
Tablespace 'GLDDBT.MISCTS' (part 0) needs REORG.
Tablespace 'GLDDBT.SEARCHTS' (part 0) needs REORG and RUNSTATS.
```

```
Tablespace 'GLDDBT.LATTRTS' (part 0) needs REORG and RUNSTATS.

TDSH001I DB2 health check report for backend 'GDBM-01':
Frequent values of AEID column in DIR_DESC table are not gathered.
Frequent values of PEID column in DIR_ENTRY table are not gathered.
Frequent values of ATTR_ID column in DIR_SEARCH table are not gathered.
Frequent values of (ATTR_ID,VALUE) group in DIR_SEARCH table are not
gathered.
Index 'GLDSRVG.DIR_ATTRIDX1' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVG.DIR_CACHEX1' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVG.DIR_DESCX1' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVG.DIR_ENTRYX3' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVG.DIR_ENTRYX2' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVG.DIR_ENTRYX1' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVG.DIR_ENTRYX0' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVG.DIR_LONGATTRX1' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVG.DIR_LONGENTRYX1' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVG.DIR_SEARCHX2' (part 0) needs REORG and RUNSTATS.
Index 'GLDSRVG.DIR_SEARCHX1' (part 0) needs REORG and RUNSTATS.
Tablespace 'GLDDBG.REPTS' (part 0) needs RUNSTATS.
Tablespace 'GLDDBG.DESCTS' (part 0) needs RUNSTATS.
Tablespace 'GLDDBG.MISCTS' (part 0) needs RUNSTATS.
Tablespace 'GLDDBG.SEARCHTS' (part 0) needs RUNSTATS.
Tablespace 'GLDDBG.LATTRTS' (part 0) needs RUNSTATS.
Tablespace 'GLDDBG.LENTRYTS' (part 0) needs RUNSTATS.
Tablespace 'GLDDBG.ENTRYTS' (part 0) needs RUNSTATS.

* Low Severity Exception *

TDSH002E Exception detected. Some tablespace or index needs REORG and/or
RUNSTATS.

  Explanation:  Turn on LDAP server debug level 'INFO' and see
    parameters returned by DSNACCOX.

  Check Reason:  DB2 maintenance health check for IBM Tivoli Directory
    Server for z/OS

END TIME: 11/10/2016 22:31:28.546628  STATUS: EXCEPTION-LOW
******************************** BOTTOM OF DATA *********************************
```

Usage & Invocation

- If some frequent value is reported as not gathered, run the recommended RUNSTATS script in topic "TDBM performance consideration" in chapter 31 of "IBM Tivoli Directory Server Administration and Use for z/OS" to update DB2 statistics and use LDAP console command *f dssrv,refresh db2runstats* to load frequent values to the backend

- If some tablespace or index is reported as needing REORG / RUNSTATS, run the DB2 REORG / RUNSTATS utility to reorganize the tablespace or index and update the DB2 statistics

- LDAP server debug INFO is also helpful to determine which TDS-DB2 health check parameter causes DSNACCOX to generate a REORG / RUNSTATS recommendation. Parameters returned by DSNACCOX that exceed threshold values set in the server configuration file will be displayed in the LDAP server job log

```
+----------------------------------------------------------------------+
| TABLESPACE | GLDDBG.SEARCHTS (PART 0)                                 |
+----------------------------------------------------------------------+
| REORG      | YES                                                      |
|            | LastTime: 2016-08-31 03:36:00.482476                     |
|            | RRTInsertsPct: 518.8244373892757                         |
|            | RRTInsertsAbs: 295787                                    |
|            | RRTDeletesPct: 418.8244373892757                         |
|            | RRTDeletesAbs: 238776                                     |
+----------------------------------------------------------------------+
| RUNSTATS   | YES                                                      |
|            | LastTime: N/A                                            |
+----------------------------------------------------------------------+
```

Usage & Invocation

- The LDAP administrator can utilize the DSNACCOX exception table to exclude unnecessary REORG / RUNSTATS recommendations from the health check report

  - Create a record for the tablesapce or index that will not be examined in the DSNACCOX exception table

  - Refer to "DSNACCOX stored procedure" in Appendix A of "DB2 11 for z/OS Managing Performance" for more details

- Usually, tablespace ENTRYTS, SEARCHTS and DESCTS, and indexes related to DIR_ENTRY, DIR_DESC and DIR_SEARCH table should not be placed in the exception table

Interactions & Dependencies

- Software Dependencies

    - z/OS Health Checker

    - z/OS DB2 v10 or higher version, or v9 with UK32795

    - WLM

    - RRS

    - System Logger

- Hardware Dependencies

    - None

- Exploiters

    - No announced exploiters

Migration & Coexistence Considerations

- DB2 v8 or earlier versions are not supported. If using DB2 v9, PTF UK32795 is required.

- Only one TDS-DB2 health check can be registered to the same z/OS. Different TDS-DB2 health checks running on different z/OS systems that belong to the same sysplex will not affect others. Different LDAP servers can have different TDS-DB2 health check settings.

Installation

- DB2 v10 or later version, or DB2 v9 with PTF UK32795 is required

- WLM-established application environment is required by DSNACCOX stored procedure, refer to section "Setting up a WLM application environment for stored procedures during migration" in the DB2 publication "Installation and Migration Guide".

Session Summary

- At the end of this presentation, you should have an understanding of the following enhancements for the z/OS IBM Tivoli Directory Server in V2R3:

    - TDBM Health Checks

Appendix

- Publication References

    - SC23-6788 IBM Tivoli Directory Server Administration and Use for z/OS

    - SA23-2296 IBM Tivoli Directory Server Messages and Codes for z/OS