SAP® MaxDB™ Expert Session

SAP® MaxDB™: Detection tool for database corruptions
Thiago Lüttig Nov. 19, 2015
SAP® MaxDB™ Expert Session

Introduction into Detection tool for database corruptions

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Agenda

- Introduction
- B*Tree
- FILEID
- Database corruptions
- Connecting to database
- Database objects input / search
- Identifying corrupted objects
- Results
- Next steps
- Additional documentation
Introduction

- This tool's objective is assist users in the process of identification of corrupted SAP MaxDB and SAP liveCache database objects either by manual specification of database objects or automating this detection and identification in the database.

- This tool DOES NOT substitute the need of keeping regular database structure checks and backups generation and recovery strategy.

- This tool DOES NOT fix any sort of detected corruption or inconsistencies that might have be found.

- This tool DOES NOT restore/recover any data.
In MaxDB, data is stored in B* tree structures. The smallest storage unit is the page. In MaxDB, the size of a page is 8 KB.

A B* tree is created for each table and secondary index. A B* tree reaches from the highest level, the root level, to the lowest, the leaf level. The data is always on the leaf level.

The primary index of the tables serves as a sorting criterion for the setup of the tree structure. It can be demonstrated that a B* tree procedure generally requires fewer accesses to find single records than other access methods.
FILEID

- A table, which is known to the user by a name, is internally administered with a ‘tableid’. The correlation between the names and tableids is registered in the database system dictionary (catalog).

- There is also the database file directory, which contains the assignments of the root nodes of the B* trees to the tableids of the database objects. The tableids are stored in the file directory along with a type flag which indicates what contents the underlying B* tree has.
Database Corruptions 1/2

- Most likely related to hardware failures (i.e. disks, I/O controller)
- Detected by database structure checks (SAP note 940420)
- Detected when the corrupted page is read by the database
- Report in database logs KnIMsgArchive (SAP MaxDB >= 7.7) or knldiag.err (SAP MaxDB 7.6)
- Reported as root page (i.e. 44668)
- Reported as FILEID (i.e. 00000000000506DC)
Database Corruptions 2/2: Examples

- In above examples, the part of interest for this detection is the root page of the object. This is the first data page of the object’s B+tree and it is the single entry point of the B+tree.

In the examples, we can see that it is reported in the following lines respectively:

```
An error occurred while checking the structure of the database object with Root '44668'.
```

and

```
The data page with page number '147077838' belongs to the database object with the fileID '00000000000032C8' respectively to root '646407'.
```

and

```
ERR 18 Data Bad data page 14888 of filetype 13 identified by root 14888
```

- Also, there are some cases where the fileID (or FILENO) field is the relevant one for the search of the corrupted objects (versions >= 7.6).

Whenever you see it being reported like:

```
The data page with page number '147077838' belongs to the database object with the fileID '00000000000032C8' respectively to root '646407'.
```

or

```
Mark index as not accessible,REASON=no redo of index creation,ROOT=2147483647,FILENO=000000000000506DC
```

or

```
Check data on database object failed,KNL_BASE_ERROR=index_not_accessible,ROOT=NIL,FILENO=000000000000506D,C__FILE=vbd38.cpp,_LINE=674
```
In this screen, you need to fill all the connection details for the database that will be verified. You need to specify:

- Database server name or IP address
- Database name
- Database system administrator (name i.e. SUPERDBA and password)
- DBM operator (name i.e. CONTROL, SUPERDBA and password)

You can also select a previously saved connection from the dropdown list.
Connecting to Database 2/3

- Once the details are entered of the existent connection is selected, user can establish the database connection by clicking on the Connect to the database button save the existent connection.

- If the connection is successful user can advance to the next screen.

- If the connection fails, a connection failed message will be displayed alongside the relevant error (i.e. invalid host, user or password is invalid).
Once user has established a successful connection, its details (server, database name, users) can be saved for later usage by clicking on **Add** button.

- User can remove previously saved connection by selecting the desired connection from the list, and clicking on **Delete** button.

- User can also save an existent connection if any details have been changed (i.e. user has changed the database system administrator password in the database).

  It can be done by clicking on **Save** button once the connection is successful.
To use the manual input mode, user has to know which are the root pages or FILEIDs beforehand.

Automatic search directly scans database logs (either via `diagpkg.tgz` diagnostics package or directly in the server) and identifies the reported root pages and FILEIDS as of the specified search date.
The root page is identified by a numeric value.
- FILEID is identified by a HEX value.
Database Objects Input / Search: Automatic Search 1/3

- With this option, user can trigger a search in the database logs as of a given selected date and the automatic detection of reported corrupted objects.

- The search period can be defined by the date selector.

- Logs can be searched using a generated diagnostics package (diag_pack).

- If user wants to use the diag_pack, a selection window will be displayed.
Database Objects Input / Search: Automatic Search 2/3

- User can also search the logs directly in the database server.

- The search runtime can depend on network’s performance and the database logs size.

- Once the search start date and location is specified user can start the search by clicking on Start Search button.
• All detected objects will be added to the list.

• If no reported objects were identified as of the specified search date, an information message will be displayed.
Identifying Corrupted Objects

- Once all objects were entered or detected, the summary screen will be shown with the database details and objects that will be identified.

- The identification process is started once user click on the Start the Object Verification button.
- CLASSCONTAINER is a data type relevant for SAP liveCache databases only.

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<th>If any of the reported objects is identified it will be added to the list correspondent to the object's type list with all details. I.e. TABLE, INDEX, CLASSCONTAINER, LOB.</th>
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The .zip package can be provided to SAP support if requested alongside any other database logs.
Next Steps

- If the corrupted object is a TABLE, LOB or CLASSCONTAINER most likely the database has to be recovered from backups. To check what are the most recent backups that would allow a complete database recovery, user can click on the Recovery Info button.

- If the corrupted object is an INDEX, it could be re-created using Database Studio or ABAP dictionary tools (like SE14).

- For more information about database recovery check SAP note [1377148](#).
Additional documentation

- Corrupted objects tool download:
  http://maxdb.sap.com/training/ → Session 28: SAP MaxDB Tool: Supported Detection of database corruptions → Tool

- Detailed usage guide of the corrupted objects tool:
  2219353 - SAP MaxDB/liveCache: Detection Tool for Database Corruptions

- Database structure check:
  940420 - FAQ: Database structure check (CHECK DATA/VERIFY)

- Backup and recovery:
  1377148 - FAQ: SAP MaxDB backup / recovery

- Handling of database corruptions by SAP support:
  1116190 - Handling of database corruptions by SAP Support
Questions

SAP® MaxDB™ Detection tool for database corruptions
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- Session 23: SAP MaxDB & Content Server Architecture
- Session 24: SAP MaxDB & Content Server Housekeeping
- Session 25: SAP MaxDB & Content Server ODBC Tracing

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Thank you

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Thank You!
Bye, Bye – And Remember Next Session

- Feedback and further information:
  http://www.scn.sap.com/lirj/sdn/maxdb

- Next Session: follows in 2016