BMC Next Generation Technology Check for DB2 for z/OS Reference Manual

Supporting products

Version 12.1.00 of BMC Next Generation Technology Check for DB2 for z/OS

December 2016
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<tbody>
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  — System hardware configuration
  — Serial numbers
  — Related software (database, application, and communication) including type, version, and service pack or maintenance level
■ Sequence of events leading to the problem
■ Commands and options that you used
■ Messages received (and the time and date that you received them)
  — Product error messages
  — Messages from the operating system
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About this book

This book contains detailed information about the associated product or products. This preface explains the special conventions that the book uses, and how to access related publications.

If applicable, the preface also summarizes the major changes included in the latest release of the product.

Related publications

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  - Support Central (at http://www.bmc.com/support/mainframe-demonstrations)
  - BMC Mainframe YouTube channel (https://www.youtube.com/user/BMCSoftwareMainframe)


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Tip

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Conventions

This document uses the following special conventions:

- All syntax, operating system terms, and literal examples are presented in this typeface.

- Variable text in path names, system messages, or syntax is displayed in italic text: `testsys/instance/fileName`

- Menu sequences use a symbol to convey the sequence. For example, **Actions => Create Test** instructs you to choose the **Create Test** command from the **Actions** menu.

Syntax diagrams

The following figure shows the standard format for syntax diagrams:
The following example illustrates the syntax for a hypothetical DELETE statement. Because the FROM keyword, alias variable, and WHERE clause are optional, they appear below the main command line. In contrast, the tableName variable appears on the command line because the table name is required. If the statement includes a WHERE clause, the clause must contain a search condition or a CURRENT OF clause. (The searchCondition variable appears on the main line for the WHERE clause, indicating that this choice is required.)

The following guidelines provide additional information about syntax diagrams:

- Read diagrams from left to right and from top to bottom.

- A recursive (left-pointing) arrow above a stack indicates that you may choose more than one item in the stack.

- An underlined item is a default option.

- If a diagram shows punctuation marks, parentheses, or similar symbols, you must enter them as part of the syntax.

- In general, IBM commands, keywords, clauses, and data types are displayed in uppercase letters. However, if an item can be shortened, the minimum required portion might be shown in uppercase letters, with the remainder in lowercase (for example, CANcel).

- The following conventions apply to variables in syntax diagrams:
  - Variables are typically displayed in lowercase letters and are always italicized.
  - If a variable is represented by two or more words, initial capitals distinguish the second and subsequent words (for example, databaseName).
Overview of NGT Check

The BMC Next Generation Technology Check for DB2 for z/OS product is a utility for validating index pointers to table rows. Run NGT Check proactively to identify discrepancies before applications encounter problems.

NGT Check offers the following benefits:

- **Minimal processing requirements**
  
  NGT Check does not need to sort table rows in order to check indexes. The product does not require sort work files that invoke I/O operations.
  
  NGT Check runs on the actual objects, not copies of them. The table space and all of its indexes remain in read/write (RW) mode during the check process.

- **Speed**
  
  The time that NGT Check requires to check all indexes on a table space is nearly identical to the time that other products need in order to check just one index. So the NGT Check syntax is simplified to always check all indexes in a table.
Operational considerations for NGT Check

This chapter provides information that you need to know to run the NGT Check utility.

NGT Check software requirements

The NGT Check product requires a minimum of version 12.1.00 of the BMC DB2 Solution Common Code (SCC).

Required authorizations for NGT Check

Using NGT Check requires the following authorizations:
- On the database, COPY authority
- For the user, SYSADM authority or DBADM authority

Status requirements for NGT Check

When running NGT Check, the index must be in RW status and cannot be in any restricted status.

Drain considerations

NGT Check is an online utility. All of the objects that it processes remain in RW mode during execution. NGT Check requires a drain before it can proceed with processing.
If NGT Check cannot acquire a drain before the time limit expires, the product issues message the following message. RETRY(0) indicates that NGT Check will make no more attempts to acquire the drain.

NGTC267 DRAIN(WTR) FAILED. DB(databaseName) SP(objectSpaceName) PART(partitionNumber) RETRY(0)

The global parameter +QRETRY(duration,numRetries) sets the duration and number of retries that the product performs in order to acquire the drain. The parameter is defined in the //UTLPARMS section of your JCL. For more information about UTLPARMS, see “UTLPARMS DD statement” on page 16. For more information about +QRETRY, see the BMC Next Generation Technology General User Guide.
Input for NGT Check

This chapter describes the DD statements and SYSIN input (statement syntax) specific to the NGT Check utility.

DD statements

The list below describes the DD statements that you can use with NGT Check.

SYSIN

SYSIN is the only DD statement required for running NGT Check.

Specify utility statements as follows:

```
//SYSIN DD *
   (statement)
   (statement)
   (statement)
```

NGTAUTO DD

If you are using automation control points with your job, you can specify an NGTAUTO DD statement to override the default data set (specified during configuration or with the +NGTAUTO1 or +NGTAUTO2 parameter).

This statement must reference a partitioned data set containing the NGT automation control points. For example:

```
//NGTAUTO DD DISP=SHR,DSN=NGT.AUTOMATN.CTRL.PTS
```

For more information about NGT automation control points, see the *BMC Next Generation Technology Automation Reference Manual.*
UTLPARMS DD statement

You use the UTLPARMS DD statement to override the NGT utilities global parameters that were specified at installation.

You can specify the parameters in a data set or in the JCL, as shown in the following examples:

```
//UTLPARMS DD DISP=SHR,NGT.UTIL.PARMS
//UTLPARMS DD *
```

For more information about NGT utilities global parameters, see the *BMC Next Generation Technology General User Guide*.

CIXPARMS

You must use the CIXPARMS DD statement if you want to override the NGT Check parameters specified at installation time.

You may specify CIXPARMS in a data set or in the JCL. For example:

```
//CIXPARMS DD DISP=SHR,DSN=NGT.CHECK.PARMS
```

or

```
//CIXPARMS DD *
```

SYSIN syntax

This topic describes the NGT Check SYSIN syntax.

CHECK INDEX

CHECK INDEX is the primary command for the NGT Check utility.
If you do not specify a database name or database name pattern, NGT Check uses the default DSNDB04.

The database name and table space name patterns use DB2 SQL wildcard characters to reference groups of objects. You can use any combination of the standard SQL wildcard characters % and underscore (_). The product constructs and issues an SQL query to obtain the names of all objects that match the specified patterns. The product prints a line on SYSPRINT and SUMMARY for each object that it finds.

**Example**

To check all indexes in all table spaces in a database, type `databaseName.%` as in the following example:

```
CHECK INDEX (ALL) TABLESPACE BIGDBASE.%
```
Parameters for NGT Check

This chapter describes the NGT Check parameters.

Overview of NGT Check parameters

Each NGT utility has a set of parameters that let you control how the utility processes and uses resources. For NGT Check, you can specify these parameters in the CIXPARMS DD in your NGT job stream.

Also available are global parameters that apply to all NGT utilities. Installing an NGT utility configures the defaults for the global parameters, separately for each DB2 subsystem. Each utility job can then override these default parameters if needed. Each utility job’s output lists the default parameters and any overrides. For more information about the global parameters, see the BMC Next Generation Technology General User Guide.

Syntax rules for parameters

The following rules apply to the syntax for parameters for the Next Generation Technology (NGT) products:

- All parameters must start with a plus symbol (+).

- Parameters can start anywhere, but must be contained within the first 72 character positions of the line. Columns 73-80 are ignored and can contain sequence numbers.

- You can code parameters over multiple lines. Continuation is automatic.

- You can code multiple parameters on the same line.

- You can code comments by enclosing the comment between /* (beginning) and */ (end). You can place comments anywhere, including in the middle of a word. The utility removes all comment strings before checking syntax.
Note
If you specify parameters by using a DD statement in your JCL, do not begin a comment with /* in column one. Placing /* in column one causes IBM MVS to generate a //SYSLIN statement for any subsequent records in the data set unless you use DLM= to change the JCL comment delimiter.

- You can nest comments, with no limit to the number of nested levels that you can use. Ensure that each /* has a corresponding */.
- When specifying a series of values, you must separate them with commas. Blanks, wherever they are coded, have no significance. The utility removes all blanks before checking syntax.
- If the same parameter is specified multiple times within the same input data set, the latest specification prevails.
- Do not use the plus symbol inside parentheses for any parameter.

+INFOONLY

This parameter specifies whether NGT Check reports internal identifiers and object information or performs an index check.

```
+INFOONLY(Y N)
```

- Y—Produces the internal identifiers and object space reports
- N—Checks the indexes and report inconsistencies

Example
In the following example, NGT Check checks all indexes and reports issues.
```
+INFOONLY(N)
```

+MAXERRORS

This parameter terminates the utility when NGT Check finds the specified number of errors.

```
+MAXERRORS(integer)
```

- integer—maximum number of errors
Example
In the following example, NGT Check terminates when the utility finds 1000 errors.

+MAXERRORS(1000)

+MAXPRINT

This parameter stops error reporting when NGT Check reports the specified number of errors.

Use this parameter to limit the length of the report and to reduce runtimes.

-integer—maximum number of errors

Example
In the following example, NGT Check stops reporting errors when the utility reports 1000 errors.

+MAXPRINT(1000)
Syntax examples for NGT Check

This chapter provides examples of specific tasks that you can perform by using NGT Check.

Checking all of the indexes in a table space

This topic displays two examples of ways to check all of the indexes in a table space.

- //SYSIN DD *
  CHECK INDEX(ALL) TABLESPACE YOURDB.SALESTSP
- //SYSIN DD *
  CHECK INDEXSPACE(ALL) TABLESPACE YOURDB.SALESTSP
Checking all of the indexes in a table space
Recommended automation control points for NGT Check

This chapter describes some of the ways that you can use automation control points with NGT Check.

Overview of automation control points

NGT automation control points are integrated into all NGT utilities.

The presence of the NGTAUTO DD statement, as in the following example, triggers automation control point processing:

```
//NGTAUTO DD DISP=SHR,DSN=NGT.AUTO.CTRL.POINTS
```

The automation control point data set contains one member with each of the control points chosen for use.

**Note**

If you do not include an NGTAUTO DD statement in your JCL, NGT Check uses the values specified in the +NGTAUTO1 or +NGTAUTO2 parameters (either specified in the configuration or overridden in the UTLPARMS DD).

This chapter describes recommended automation control points for use with NGT Check, but you can use other NGT automation control points as needed. For more information, see the *BMC Next Generation Technology Automation Reference Manual*.

Recommended automation control points

BMC recommends that you use the following NGT automation control points with NGT Check. However, you can also use other automation control points.
<table>
<thead>
<tr>
<th>Automation control point</th>
<th>Run by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSUTGLOB</td>
<td>Server jobs</td>
<td>Set global variables that multiple automation control points use</td>
</tr>
<tr>
<td>XSUT0000</td>
<td>Master job</td>
<td>Stop a job before it starts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This automation control point is called before any processing starts.</td>
</tr>
<tr>
<td>XSUTSYIN</td>
<td>Master job</td>
<td>Modify SYSIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The master job calls XSUTSYIN before the parser reads SYSIN.</td>
</tr>
<tr>
<td>XSUTTIME</td>
<td>Master job</td>
<td>Cancel a job based on the time</td>
</tr>
<tr>
<td>XSUTDBMG</td>
<td></td>
<td>Set volumes for initial allocation and to extend processing</td>
</tr>
<tr>
<td>XSUTTERM</td>
<td></td>
<td>Perform additional termination processing (for example sending an audit report)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The utility calls XSUTTERM after processing is complete.</td>
</tr>
<tr>
<td>XSVRXERR</td>
<td></td>
<td>Alerts a user, raises an error flag, or performs cleanup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The utility calls XSVRXERR if processing ends with an error condition.</td>
</tr>
</tbody>
</table>
NGT Check reports

This chapter describes the NGT Check reports.

Reporting when no discrepancies are found

If there are no discrepancies between the index and its table, NGT Check writes a report to that effect to the SUMMARY DD.

The number in parentheses indicates the partition number. If the message is for a nonpartitioning index, the number in parentheses is 0. The following figure illustrates a report for a two-partition table space with one partitioning index and two nonpartitioning indexes:

NGTB120 - CHECK SUCCESSFUL FOR INDEX CD40IX01 (1), 500 ROWS.
NGTB120 - CHECK SUCCESSFUL FOR INDEX CD40IX01 (2), 496 ROWS.
NGTB120 - CHECK SUCCESSFUL FOR INDEX CD40IX03 (0), 996 ROWS.
NGTB120 - CHECK SUCCESSFUL FOR INDEX CD40IX02 (0), 996 ROWS.

For details of the SUMMARY DD, see the *BMC Next Generation Technology General User Guide*.

Reporting when discrepancies are found

If there are discrepancies between an index and the table, NGT Check issues information about those discrepancies.

NGT Check writes a discrepancies summary report to the SUMMARY DD. The number in parentheses indicates the partition number. If the message is for a nonpartitioning index, the number in parentheses is 0. The following figure illustrates an example discrepancies summary report:

NGTB120 - CHECK SUCCESSFUL FOR INDEX CD40IX01 (1), 500 ROWS.
NGTB120 - CHECK SUCCESSFUL FOR INDEX CD40IX01 (2), 496 ROWS.
NGTB120 - CHECK SUCCESSFUL FOR INDEX CD40IX03 (0), 996 ROWS.
NGTB990 - STARTING ERROR ANALYSIS:
NGTB990 - INDEX = BI12DW,C040IX02
NGTB990 - TABLE = BI12DW,TEST_TS0040_TBL0
NGTB990 - TBSPC = BI12DW9,PART0040
The SYERROR output includes the discrepancies summary report and the additional details that appear in the following example:

This example report shows that NGT Check found four discrepancies.

You can use the +MAXPRINT parameter to limit the number of reported errors and reduce runtime. For more information, see “+MAXPRINT” on page 21.

For details of the SUMMARY DD, see the *BMC Next Generation Technology General User Guide*. 

---

**NGTB990**

**IXDSN** = BI12Y9DV.DSNDBC.BI12DWW9.C040IX02.I0001.A001

**NGTB990**

**IX** BI12DWW9.C040IX02 - 4 ERRORS, 4 RECORDED. MAXERROR = 7952,576

**NGTB909**

2 TSPC ROWS WITH NO MATCHING INDEX ENTRY

**NGTB909**

2 INDEX KEYS WITH NO MATCHING TS ROW

**NGTB909**

TS ROW HAS NO IX ENTRY POINTING TO IT - TSPG 00000006, RW 26, IX C040IX02

**NGTB909**

TSKEY - 00C100E7C1 C3C5404040 C8C5D3D3D6 4040404040 20060428 A XACE HELLO

**NGTB909**

TS ROW HAS NO IX ENTRY POINTING TO IT - TSPG 00000006, RW 27, IX C040IX02

**NGTB909**

TSKEY - 00C100E7C1 C3C5404040 C8C5D3D3D6 4040404040 20060428 A XACE HELLO

**NGTB909**

IX ENTRY HAS NO MATCHING TS ROW, TSPG 0000000A, RW 2, IXPAGE 00000003, IX C040IX02

**NGTB909**

IXKEY - 00C200C3C4 C5D3E3C140 C5C3C8D640 4040404040 20070101 B CDELTA ECHO

**NGTB909**

IX ENTRY HAS NO MATCHING TS ROW, TSPG 0000000A, RW 22, IXPAGE 00000003, IX C040IX02

**NGTB909**

IXKEY - 00C200C3C4 C5D3E3C140 C5C3C8D640 4040404040 20070101 B CDELTA ECHO

**NGTB117**

RUN TERMINATED - 1 INDEXES WITH ERRORS.
Index

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+MAXERRORS 20
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