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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>BMC SOFTWARE INC</td>
<td>1 713 918 8800</td>
<td>1 713 918 8000</td>
</tr>
<tr>
<td>2101 CITYWEST BLVD HOUSTON TX 77042-2827 USA</td>
<td>or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 800 841 2031</td>
<td></td>
</tr>
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</table>

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<thead>
<tr>
<th>Telephone</th>
<th>Fax</th>
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<tbody>
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<td>+01 713 918 8800</td>
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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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Table Of Contenst

Chapter 1  Summary ..................................................................................................................................... 1-1
    1.1    Advanced Processing ............................................................................................................ 1-2
    1.2    Drain Considerations ........................................................................................................... 1-2

Chapter 2  Input: DD Statements, Syntax, Keywords ................................................................................ 2-1
    2.1    DD Statements ....................................................................................................................... 2-1
    2.2    SYSIN Syntax Diagrams ........................................................................................................ 2-2
    2.2.1   CHECK INDEX Syntax .................................................................................................... 2-2
    2.2.2   CHECK INDEX Keywords ............................................................................................... 2-2

Chapter 3  Parameters .................................................................................................................................. 3-1
    3.1    +INFOONLY ........................................................................................................................... 3-1
    3.2    +MAXERRORS ...................................................................................................................... 3-2
    3.3    +MAXPRINT ........................................................................................................................... 3-3

Chapter 4  Examples ..................................................................................................................................... 4-1
    4.1    Checking all indexes in a table space .................................................................................... 4-1

Chapter 5  Relevant Automation .................................................................................................................. 5-1
    5.1    General Utility Automation Control Points .............................................................................. 5-1

Chapter 6  Technical Details ........................................................................................................................ 6-1
    6.1    Sample Reports ..................................................................................................................... 6-1
    6.1.1   No Discrepancies ............................................................................................................ 6-1
    6.1.2   With Discrepancies ............................................................................................................ 6-2

Index ...................................................................................................................................................................... X-1
BMC Next Generation Technology Check for DB2 (NGT CHECK)

NGT Check is a utility for validating index pointers to the table rows.

<table>
<thead>
<tr>
<th>When To Use It</th>
<th>NGT Check should be run as a proactive way to determine errors before applications encounter problems. Because this utility’s online design and fast processing speed, you can run NGT Check EVERY DAY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorizations Required</td>
<td>Database: COPY authority</td>
</tr>
<tr>
<td></td>
<td>User: SYSADM authority DBADM authority</td>
</tr>
<tr>
<td>Statuses</td>
<td>DB2 Status RW, non-restricted states only</td>
</tr>
</tbody>
</table>
1.1 **Advanced Processing**

Great speed advantages have been gained by using some of the same techniques that make BMC Next Generation Technology Reorg Index so much faster than other vendors Reorg. The Check is performed without Sort and without all the sort work files and all the I/O to them.

Other vendors copy the table space and all the indexes, then perform the Check on the copy. NGT Check performs the Check on the object directly. The table space and all of its indexes are Read-Write the whole time.

The difference in time to Check all the indexes on a table space verses checking one index is negligible so the NGT Check syntax has been simplified to always check all indexes on a table space.

1.2 **Drain Considerations**

NGT Check is an online utility. All objects processed will remain in RW mode during the execution.

NGT Check requires a Drain before it can proceed with processing. If it is unable to acquire a Drain before the time limit expires, message CDBR236 is written to CDBPRINT. The message text is:

*CDBR236 QUIESCE HAS TIMED OUT, RETRY IS IN PROGRESS.*

The global parameter `+QRETRY(mmssth,nnn)` controls the duration and number of retries for the Drain. (This parameter is found in the //UTLPARMS section of your JCL.) The time limit (the first parameter) specified with `+QRETRY` is the maximum time that DB2 will be allowed to delay SQL processing while trying to get the Drain. After the time limit expires, the Quiesce process will be cancelled and re-tried, up to a maximum number of times as specified by the second operand of the `+QRETRY` global parameter.

If the Drains cannot be obtained within the specified number of retries, then message CDBR835 is issued:

*CDBR835 QUIESCE FAILED for database-name.table-space-name*

Alternatively, if the Drain is for a table space set or for a group of objects, message CDBR834 is issued:

*CDBR834 QUIESCE FAILED ON SOME OBJECT IN THE SET.*

As an example, if `+QRETRY(002000,100)` is the value specified in the global parameters for a run of NGT Check, then the Drain time limit will be 20.00 seconds, and the retry count will be 100 times.

For further details on the `+QRETRY` global parameter, please see the *BMC Next Generation Technology General User Guide*, Sec. 4.4.18, "+QRETRY."
Chapter 2

**Input: DD Statements, Syntax, Keywords**

This chapter covers the DD statements, SYSIN input (statement syntax), keywords and parameters for this utility.

### 2.1 DD Statements

**SYSIN**

The only required DD statement for use with this utility is SYSIN. Specify utility statements as follows:

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

Statement syntax is covered in Sec. 2.2, "SYSIN Syntax Diagram".

**UTLPARMS**

UTLPARMS is only required to override the NGT Utilities global parameters specified at installation time. They may be specified in a dataset or in the JCL, as in:

```plaintext
//UTLPARMS DD DISP=SHR,DSN=CDB.UTIL.PARMS
```

or

```plaintext
//UTLPARMS DD *
```

For more information on global parameters, see the manual *BMC Next Generation Technology General User Guide*.

**CDBEXEC**

To use automation control points, specify a CDBEXEC DD statement. This statement should reference a partitioned dataset containing the CDB automation control points needed for processing. An example of this DD statement is shown here:

```plaintext
//CDBEXEC DD DISP=SHR,DSN=CDB.AUTOMATN.CTRL.PTS
```

For more information on automation exits, see the manual *BMC Next Generation Technology General User Guide*. 
2.2 SYSIN Syntax Diagrams

2.2.1 CHECK INDEX Syntax

\[
\text{CHECK INDEX — (ALL) — dbname.spacename}
\]

2.2.2 CHECK INDEX Keywords

\textit{dbname.spacename}

If the dbname is not specified, the default name is \textit{DSNDB04}.

\textit{dbmask.spacemask}

The dbmask and spacemask parameters employ DB2 SQL wildcards to reference any number of different objects. DB2 SQL wildcards are used precisely as they are used in a DB2 WHERE clause after the LIKE keyword. Any combination of characters, "%" sign, or "_" sign can be used in either name. An SQL query will be constructed and issued to obtain the names of all table spaces that match the specified dbmask and spacemask. A line will print on SYSPRINT and SUMMARY for each object found.

To check all indexes in all the table spaces in a database, specify \textit{dbname.\%}. For example,

\[
\text{CHECK INDEX (ALL) BIGDBASE.\%}
\]
Parameters

Chapter 3

These parameters are used by NGT Check and can be overridden in the CIXPARMS DD in the NGT job stream. If not overridden, the default values will be used from the specific system configuration. For more about the system configuration see the paragraph on INSCNFIG in the Installation section of the BMC Next Generation Technology General User Guide.

3.1 +INFOONLY

Whether to only report object information or perform a Check Index

Syntax

\[ +\text{INFOONLY}(\ Y \ N \ ) \]

Description

+INFOONLY specifies whether the check index utility is to only report internal identifiers and object information (Y), or perform a Check Index (N).

Operands

Y Produce the Internal Identifiers and Object Space reports only and not perform the Check of the indexes.

N Checks the indexes and report inconsistencies if any.

Example

+INFOONLY(N)

Check all indexes and report issues.
3.2  **+MAXERRORS**
Limit the number of errors found before terminating the utility

**Syntax**

```
+MAXERRORS(integer)
```

**Description**

+MAXERRORS is used to terminate the Check Index utility after the specified number of errors is found.

**Operands**

- **integer**
  The maximum number of errors to check for. Terminate the utility if this number of errors is found.

**Example**

```
+MAXERRORS(1000)
```

After 1000 errors are found, terminate the utility.
3.3  **+MAXPRINT**  
Used to restrict the number of errors reported.

Syntax

```
+MAXPRINT(integer)
```

Description

+MAXPRINT is used to prevent the NGT Check utility from reporting errors after the specified number of errors are reported.

This parameter should be used to prevent the reporting of thousands of discrepancies that will not be read. This will also reduce runtimes.

Operands

**integer**  
The maximum number of errors to check for. Terminate the utility if this number of errors is found.

Example

```
+MAXPRINT(1000)
```

After 1000 errors are reported, suppress the reporting of any more.
Chapter 4

Examples

This chapter covers the syntax for specific examples of NGT Check.

4.1 Checking all indexes in a table space

There are two ways in which you can check all the indexes in a table space.

```
//SYSIN DD *
  CHECK INDEX(ALL) TABLESPACE YOURDB.SALESTSP

//SYSIN DD *
  CHECK INDEXSPACE(ALL) TABLESPACE YOURDB.SALESTSP
```
Chapter 5 Relevant Automation

NGT Automation control points are integrated into all NGT Utilities and can greatly enhance and expand processing options. This chapter presents automation control points recommended but not required.

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

```
//CDBEXEC DD DISP=SHR,DSN=CDB.AUTO.CTRL.POINTS
```

The automation control point dataset will contain one member with each of the control points chosen for use.

In listing the automation control points below, be aware that these are not the only ones that can be used with this product. These should serve only as a basic recommendation for automation. This recommendation should be used to spawn more ideas or give insight into how others are utilizing this powerful facility. Any of the automation control points may be incorporated for whatever uses are required.

The following standard NGT Automation control points may be used with this utility:

### 5.1 General Utility Automation Control Points

**XSUTGLOB**
Can be used by server jobs for early access to global variables. Suitable place for declaring "global-global" variables (variables "visible" across all server jobs and their associated automation control points that will be activated).

**XSUT0000**
Can be used by the master job for early setting of global and global-global variables. Run by master jobs only, not called by server jobs.

**XSUTSYIN**
Called before the parser reads SYSIN. It has full access to the SYSIN and can modify it. It may be used to override or disallow some input parameters. Run by master jobs only, not called by server jobs.

**XSUTTIME**
Called to allow canceling utility based on time of day. Run by master jobs only, not called by server jobs.

**XSUTDBMG**
Called to set volumes for initial allocation and extend processing.

**XSUTTERM**
Called after processing has finished. It may be used, for example, to insert run statistics into a DB2 table or to e-mail an audit report at the completion of processing, automatically.

**XSVRXERR**
Called if processing ends with an error condition. It may be used to alert a user, raise an error flag, or perform cleanup.

For further information and details on the use of all of these automation control points, please see the manual *BMC Next Generation Technology General User Guide*.
Chapter 6  Technical Details

6.1  Sample Reports

6.1.1  No Discrepancies

When Check Index finds no issues between the Index and its table a report like the following is in the SUMMARY. The number in parenthesis is the part number, 0 if a non-partitioning index.

This report was for a two partition table space with a Partitioning Index and two Non-Partitioning Indexes.

CDBB120 - CHECK SUCCESSFUL FOR INDEX C040IX01 (1), 500 ROWS.
CDBB120 - CHECK SUCCESSFUL FOR INDEX C040IX01 (2), 496 ROWS.
CDBB120 - CHECK SUCCESSFUL FOR INDEX C040IX03 (0), 996 ROWS.
CDBB120 - CHECK SUCCESSFUL FOR INDEX C040IX02 (0), 996 ROWS.
6.1.2 **With Discrepancies**

When Check Index finds a discrepancy between an index and the table a report like the following will be in the SUMMARY.

| CDBB120 - CHECK SUCCESSFUL FOR INDEX C040IX01 (1), 500 ROWS. |
| CDBB120 - CHECK SUCCESSFUL FOR INDEX C040IX01 (2), 496 ROWS. |
| CDBB120 - CHECK SUCCESSFUL FOR INDEX C040IX03 (0), 996 ROWS. |

| CDBB990 - STARTING ERROR ANALYSIS: |
| CDBB990 - INDEX = BI12DWW.C040IX02 |
| CDBB990 - TABLE = BI12DWW.TEST_TS0040_TBL0 |
| CDBB990 - TBSPC = BI12DWW9.PART0040 |
| CDBB990 - IXDSN = BI12V90V.DSNDBC.BI12DWW9.C040IX02.I0001.A001 |
| CDBB990 - IX BI12DWW9.C040IX02 - 4 ERRORS, 4 RECORDED, MAXERROR = 7952,576 |

The SYSERROR output will have the above summary followed by this detail:

| CDBB909 - IX BI12DWW9.C040IX02 - 4 ERRORS, 4 RECORDED, MAXERROR = 7952,576 |
| CDBB909 - 2 TSPC ROWS WITH NO MATCHING INDEX ENTRY |
| CDBB909 - 2 INDEX KEYS WITH NO MATCHING TS ROW |
| CDBB909 - TS ROW HAS NO IX ENTRY POINTING TO IT - TSPG 00000006, RW 26, IX C040IX02 |
| CDBB909 - TSKEY - 00C100E7C1 C3C5404040 C8C5D3D3D6 4040404040 20060428 A XACE HELLO |
| CDBB909 - TS ROW HAS NO IX ENTRY POINTING TO IT - TSPG 00000006, RW 27, IX C040IX02 |
| CDBB909 - TSKEY - 00C100E7C1 C3C5404040 C8C5D3D3D6 4040404040 20060428 A XACE HELLO |
| CDBB909 - IX ENTRY HAS NO MATCHING TS ROW, TSPG 0000000A, RW 2, IXPAGE 00000003, IX C040IX02 |
| CDBB909 - IXKEY - 00C200C5C4 C5D3E3C140 C5C3C8D640 4040404040 20070101 B CDELTA ECHO |
| CDBB909 - IX ENTRY HAS NO MATCHING TS ROW, TSPG 0000000A, RW 22, IXPAGE 00000003, IX C040IX02 |
| CDBB909 - IXKEY - 00C200C3C4 C5D3E3C140 C5C3C8D640 4040404040 20070101 B CDELTA ECHO |
| CDBB117 - RUN TERMINATED - 1 INDEXES WITH ERRORS. |

This report only had four discrepancies to report. The +MAXPRINT parameter can be used to limit the number of errors reported. The use of this parameter can both prevent volumes of useless output and greatly reduce runtime.
Index

+  
+INFOONLY, 3-1
+MAXERRORS, 3-2
+MAXPRINT, 3-3

A  
Authorizations, 1-1
automation exit processing, 5-1

C  
CDBEXEC, 2-1, 5-1
CHECK INDEX, 2-2
COPY, 1-1

D  
DB2 Status, 1-1
DBADM, 1-1
dbmask.spacemask, 2-2
dbname.spacename, 2-2
DD Statements, 2-1
DSNDB04, 2-2

G  
global parameters, 2-1

I  
input, 2-1

P  
Parameters, 3-1

S  
Sample Reports, 6-1
Status, 1-1
Summary, 1-1
Syntax, 2-1, 2-2
SYSADM, 1-1
SYSIN, 2-1

U  
UTLPARMS, 2-1

X  
XSUT0000, 5-1
XSUTGLOB, 5-1
XSUTSYIN, 5-1
XSUTTERM, 5-1
XSUTXERR, 5-1