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| **Physical and Logical Block Corruptions. All you wanted to know about it. (Doc ID 840978.1)** | [To Bottom](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=351201426565768&id=840978.1&_adf.ctrl-state=ahlj0rovk_504)  [To Bottom](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=351201426565768&id=840978.1&_adf.ctrl-state=ahlj0rovk_504) |  |



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| **In this Document**   |  |  |  | | --- | --- | --- | |  | [Purpose](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=351201426565768&id=840978.1&_adf.ctrl-state=ahlj0rovk_504#PURPOSE) | | |  | [Scope](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=351201426565768&id=840978.1&_adf.ctrl-state=ahlj0rovk_504#SCOPE) |  |  |  | | --- | --- | |  | [Details](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=351201426565768&id=840978.1&_adf.ctrl-state=ahlj0rovk_504#BODYTEXT) | |  | [Physical Block Corruptions](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=351201426565768&id=840978.1&_adf.ctrl-state=ahlj0rovk_504#aref_section31) | |  |  |  |  | | --- | --- | --- | |  | [Fractured Block](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=351201426565768&id=840978.1&_adf.ctrl-state=ahlj0rovk_504#aref_section32) | | |  | [Bad Checksum](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=351201426565768&id=840978.1&_adf.ctrl-state=ahlj0rovk_504#aref_section33) |  |  |  | | --- | --- | |  | [Block Misplaced](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=351201426565768&id=840978.1&_adf.ctrl-state=ahlj0rovk_504#aref_section34) | |  | [Logical Block Corruptions](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=351201426565768&id=840978.1&_adf.ctrl-state=ahlj0rovk_504#aref_section35) | |  |  |  | | --- | --- | |  | [References](https://support.oracle.com/epmos/faces/DocumentDisplay?_afrLoop=351201426565768&id=840978.1&_adf.ctrl-state=ahlj0rovk_504#REF) |       **Applies to:**  Oracle Database - Enterprise Edition - Version 9.2.0.1 to 11.2.0.3 [Release 9.2 to 11.2]  Oracle Database - Enterprise Edition - Version 11.2.0.4 to 11.2.0.4 [Release 11.2]  Oracle Database - Enterprise Edition - Version 12.1.0.2 to 12.1.0.2 [Release 12.1]  Information in this document applies to any platform.  \*\*\*Checked for relevance on 21-May-2012\*\*\*    **Purpose**  Oracle classifies the Data File Block corruptions as Physical and Logical.  This is also referred as intra block corruptions.  This document is intended to provide detailed information and errors example about it.  **Scope**  This document is intended for Database Administrators.  **Details**  **Physical Block Corruptions**  This kind of block corruptions are normally reported by Oracle with error ORA-1578 and the detailed corruption description is printed in the alert log.    Corruption Examples are:   * Bad header - the beginning of the block (cache header) is corrupt with invalid values * The block is Fractured/Incomplete - header and footer of the block do not match * The block checksum is invalid * The block is misplaced * Zeroed out blocks [Note 1545366.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=840978.1&id=1545366.1)   Detailed Corruption Description:  ***Fractured Block***  A Fractured block means that the block is incomplete. Information from the block header does not match the block tail.  Corrupt block relative dba: 0x0380e573 (file 14, block 58739)  **Fractured block found during buffer read**  Data in bad block -  **type: 6** format: 2 rdba: 0x0380e573  last change scn: 0x0288.8e5**a2f78** **seq: 0x1** flg: 0x04  consistency value in **tail: 0x00780601**  check value in block header: 0x8739, computed block checksum: 0x2f00  spare1: 0x0, spare2: 0x0, spare3: 0x0  \*\*\*  Reread of rdba: 0x0380e573 (file 14, block 58739) found same corrupted data    ***Bad Checksum***  Block Checksums are used to identify if the block was changed by something external to Oracle and after the block was last written by Oracle.  Checksum is calculated by DBWR or direct loader before writing the block to disk and stored in the block header. Every time that the block is read and if db\_block\_checksum is different than false, Oracle calculates a checksum and compares it to the one stored in the block header. Reference [Note 30706.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=840978.1&id=30706.1)    Example of a corrupt block due to invalid checksum:  Corrupt block relative dba: 0x0380a58f (file 14, block 42383)  **Bad check value found during buffer read**  Data in bad block -  type: 6 format: 2 rdba: 0x0380a58f  last change scn: 0x0288.7784c5ee seq: 0x1 flg: 0x06  consistency value in tail: 0xc5ee0601  check value in block header: 0x68a7, **computed block checksum: 0x2f00**  spare1: 0x0, spare2: 0x0, spare3: 0x0  \*\*\*  Reread of rdba: 0x0380a58f (file 14, block 42383) found same corrupted data    A value different than zero (0x0) in "computed block checksum" means that the checksum differs and the result of this comparison is printed.    ***Block Misplaced***  This is when Oracle detected that the content of the block being read belongs to a different block and the checksum is valid:  Corrupt block relative dba: **0x0d805a89** (file 54, block 23177)  Bad header found during buffer read  Data in bad block -  type: 6 format: 2 **rdba: 0x0d805b08** **----> Block is different than expected 0x0d805a89**  last change scn: 0x0692.86dc08e3 seq: 0x1 flg: 0x04  consistency value in tail: 0x08e30601  check value in block header: 0x2a6e, **computed block checksum: 0x0**  spare1: 0x0, spare2: 0x0, spare3: 0x0  \*\*\*    **Logical Block Corruptions**  This is when block contains a valid checksum and the structure below the beginning of the block is corrupt (Block content is corrupt). It may cause different ORA-600 errors.  The detailed corruption description for Logical Corruptions are not normally printed in the alert.log. DBVerify will report what is logically corrupted in the block.    Corruption Examples are:   * row locked by non-existent transaction - ORA-600 [4512], etc * the amount of space used is not equal to block size * avsp bad * etc.   When db\_block\_checking is enabled, it may produce the internal errors ORA-600 [kddummy\_blkchk] or ORA-600 [kdBlkCheckError].    If db\_block\_checking is enabled and the block is already logically corrupt on disk, the next block update will mark the block as Soft Corrupt and future reads of this block will produce the error ORA-1578. In that case DBVerify reports this corruption with error "DBV-200: Block, dba <rdba>, already marked corrupted". Reference [Note 1496934.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=840978.1&id=1496934.1)  **References**  [NOTE:1088018.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=840978.1&id=1088018.1) - Master Note for Handling Oracle Database Corruption Issues  [NOTE:1578.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=840978.1&id=1578.1) - OERR: ORA-1578 "ORACLE data block corrupted (file # %s, block # %s)" Master Note  [NOTE:28814.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=840978.1&id=28814.1) - Handling Oracle Block Corruptions  [NOTE:794505.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=840978.1&id=794505.1) - ORA-1578 / ORA-26040 Corrupt blocks by NOLOGGING - Error explanation and solution  [NOTE:819533.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=840978.1&id=819533.1) - How to identify the corrupt Object reported by ORA-1578 / RMAN / DBVERIFY  [NOTE:836658.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=840978.1&id=836658.1) - Identify the Corruption Extension for Block Corruption, Table/Index Inconsistency, Data Dictionary and Lost Writes  [NOTE:1545366.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=840978.1&id=1545366.1) - Physical Corrupted Blocks consisting of all Zeroes indicate a problem with OS, HW or Storage  [NOTE:1496934.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=840978.1&id=1496934.1) - Soft Corrupt Blocks - Definition and information |