

# Repair Damaged RPM Database

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If you encounter any of the following messages:

```
rpmdb: PANIC: fatal region error detected; run recovery
error: db3 error(22) from dbenv->open: Invalid argument
error: cannot open Packages index using db3 - Invalid argument (22)
error: cannot open Packages database in /var/lib/rpm
error: rpmdb: damaged header #1439 retrieved -- skipping.
```

or a similar RPM-related error message, it is probable that your RPM database is damaged.

RPM uses a database to maintain the package dependency information. This database is normally located at `/var/lib/rpm`.

```
# cd /var/lib/rpm
# ls -al
total 86420
drwxr-xr-x.  2 root root    4096 Nov 18 21:09 .
drwxr-xr-x. 45 root root    4096 Aug 25  2013 ..
-rw-r--r--.  1 root root 5820416 Sep  8  2013 Basenames
-rw-r--r--.  1 root root  16384 Aug 25  2013 Conflictname
-rw-r--r--.  1 root root 237568 Nov 18 21:30 __db.001
-rw-r--r--.  1 root root  73728 Nov 18 21:30 __db.002
-rw-r--r--.  1 root root 1318912 Nov 18 21:30 __db.003
-rw-r--r--.  1 root root 2695168 Sep  8  2013 Dirnames
-rw-r--r--.  1 root root  28672 Sep  8  2013 Group
-rw-r--r--.  1 root root  28672 Sep  8  2013 Installtid
-rw-r--r--.  1 root root  73728 Sep  8  2013 Name
-rw-r--r--.  1 root root  36864 Aug 19  2013 Obsoletename
-rw-r--r--.  1 root root 76402688 Sep  8  2013 Packages
-rw-r--r--.  1 root root  921600 Sep  8  2013 Providename
-rw-r--r--.  1 root root  647168 Sep  8  2013 Requirename
-rw-r--r--.  1 root root      0 Aug 18  2013 .rpm.lock
-rw-r--r--.  1 root root 172032 Sep  8  2013 Shalheader
-rw-r--r--.  1 root root 102400 Sep  8  2013 Sigmd5
-rw-r--r--.  1 root root   8192 Aug 19  2013 Triggername
```

RPM uses [Berkeley DB](#), either version 3 or 4, for its database engine. Each of the Berkeley DB subsystems within an environment is described by one or more shared memory regions. Regions contain the per-process and per-thread shared information, including mutexes, that comprise a Berkeley DB environment.

Any files created in the filesystem to back the regions are created in the environment home directory specified to the DB `open` call. These files are named `__db.###`, e.g. `__db.001`, `__db.002` and so on. When region files are backed by the filesystem, as in RPM, one file per region is created.

By the way, statistics about these regions can be displayed using the `db_stat` utility:

```
# cd /var/lib/rpm
# db_stat -e
```

## Repair Damaged RPM Database

```
Thu Dec 10 23:01:10 2015    Local time
0x120897    Magic number
0    Panic value
5.2.36    Environment version
9    Btree version
9    Hash version
1    Lock version
18    Log version
4    Queue version
2    Sequence version
1    Txn version
Wed Nov 18 21:09:09 2015    Creation time
0xcfcfa7f84    Environment ID
2    Primary region allocation and reference count mutex [0/10269 0% !Own]
1    References
232KB    Current region size
808KB    Maximum region size
=====
Thread tracking information
7    Thread blocks allocated
8    Thread allocation threshold
37    Thread hash buckets
Thread status blocks:
    process/thread 1475/3077674688: active
    process/thread 1318/3078076096: out
    process/thread 1453/3077822144: out
    process/thread 1452/3078510272: out
    process/thread 1274/3078506176: out
    process/thread 1448/3078063808: out
    process/thread 1451/3078309568: out
=====
Environment file handle information
__db.001    file-handle.file name
0    file-handle.mutex [!Set]
0    file-handle.reference count
3    file-handle.file descriptor
0    file-handle.page number
0    file-handle.page size
0    file-handle.page offset
0    file-handle.seek count
0    file-handle.read count
0    file-handle.write count
DB_FH_OPENED    file-handle.flags
....
```

To fix a corrupted RPM database:

```
# rm -rf /var/lib/rpm/__db*
# db_verify /var/lib/rpm/Packages
# rpm --rebuilddb
```

I would also run the following commands to clear out YUMs caches and test the rebuilt RPM database:

```
# yum clean all
# rpm -qa
```

Obviously to minimize risk, you should make a backup of all files in `/var/lib/rpm/` before attempting to rebuild the RPM database.

What causes a RPM database corruption? It is typically due to an aborted database update process.

Occasionally, it occurs when the RPM package itself is updated. When RPM accesses the Berkeley DB files, it makes temporary entries within the tables while it searches for data. If you abort RPM often, this issue will occur much sooner because locks were not cleared when a thread died in Berkeley DB library routines.

The *db\_verify* utility is a Berkeley DB utility which verifies the structure of one or more files and the databases they contain. It should only be used on files that are not being modified by another thread of control. It is used here to ensure that the installed package headers are not corrupted.

Finally, *rpm -rebuilddb* is used to rebuild the database indices from the installed package headers.

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