

zeptodb

for version 3.0, updated 12 June 2016

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This manual is for zeptodb (version 3.0, updated 12 June 2016).

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1 Introduction

zeptodb is a small collection of relatively tiny command-line tools for interacting with *DBM databases*. DBM databases are flat (non-relational) a databases; in other words, they are persistent key-value hash tables. Typically they are created via a library for C, Python, Perl, etc. These tools fill in a gap by providing useful command-line tools. Some DBM libraries come with really basic binaries for manipulating the databases, but they are not designed to be very flexible or useful in the real world.

These tools may be helpful in scripts, for example, when persistent data storage is needed but when a full database would be overkill. DBM databases offer a constant look-up time for any record in them, as opposed to, say, searching through a text file, which scales linearly with the number of lines in the file. Thus, scripts requiring fast data look-up would benefit greatly from them (but note that, of course, disk access is slower than memory access, so if you really need the performance and you can fit your table in memory, these are not the appropriate tools). These commands may also be useful if, for whatever reason, one would like to manipulate, via the command-line or scripts, DBM databases created by other programs.

1.1 Tutorial

The zeptodb tools are used to create small databases that are stored to disk and then to store, fetch and remove records from those databases. These databases are much simpler than, say, SQL databases, so no queries need to be constructed. The databases follow the DBM format as created by the GDBM library. Each record in a DBM database consists of a key and a value. All keys and values are stored as plain text, regardless of their formats.

First, you create a new database with `zdbc`:

```
$ jdbc foo.db
```

With the database created, you may now store values to it using `zdfs`. `zdfs` normally takes its input from `stdin`. It expects one record per line and for each key/value pair to be separated by a delimiter character (‘|’ by default). Note that records are unique: an attempt to store a record with a pre-existing key will overwrite that record with a new value.

For example, let’s say that you have a text file `emails.txt` containing the following records:

```
Brandon|foo@example.com
Joe|bar@example.com
Mary|baz@example.com
```

You could store the records in `foo.db` like so:

```
$ zdfs foo.db <emails.txt
```

Note that if you simply don’t like shell redirections like this, you can also use the `-i` or `--input` option to specify the input file:

```
$ zdfs -i emails.txt foo.db
```

Of course, it’s more likely that you’ll want to pipe in records from some other process:

```
$ fancy_pipeline.sh | zdfs foo.db
```

If your records are formatted differently, using, say, '-' as the delimiter (i.e "key-value"), you would specify it using the `-d` or `--delimiter` option.

Records can then be fetched from the database using `zdbf`. In this case, queries in the form of keys with one key per line are read from `stdin`:

```
$ zdbf foo.db
Brandon
foo@example.com
Joe
bar@example.com
Jon
../trunk/src/zdbf: Key does not exist in the database: Jon: Invalid argument
```

As with `zdfs`, you can also specify a file containing the queries using the `-i` option or you can read them in through a pipe.

If you would prefer the output to include the key, you must specify your desired delimiter using the `-d` option:

```
$ echo Brandon | zdbf -d':' foo.db
Brandon:foo@example.com
```

Finally, you can dump out all of the contents of the database using the `-a` option. Note that the order of the records is in no way guaranteed.

```
$ zdbf -d'|' -a foo.db
Joe|bar@example.com
Brandon|foo@example.com
Mary|baz@example.com
```

Records may then be removed from the database using `zdbf`. `zdbf` operates in a very similar way to `zdbf`:

```
$ zdbf foo.db <<EOF
> Brandon
> Joe
> EOF
$ zdbf -a -d'|' foo.db
Mary|baz@example.com
```

Of course, these examples are not realistic. Rather than using the programs from the command-line, you are more likely to use them in scripts. For example, one script might save data to a database while another script reads from that data. You can even build up relations between multiple databases, storing the keys of one database as values in another database, allowing quite complex, but always fast, look-ups within your scripts.

1.2 Common Options

The following options are available for all `zeptodb` commands.

`-b, --block-size=NUM`

The block size (in bytes) to be used, representing the size of a transfer from disk to memory. The default value is 512.

- `-m, --mmap-size=NUM`
The size (in bytes) of the memory-mapped region to be used. With a value greater than zero, a memory map of the database will be created; thus the size specified must be large enough to fit the entire database.
- `-c, --cache-size=NUM`
The size (in bytes) of the bucket cache size to be used.
- `-l, --no-lock`
Do not perform file locking on the database.
- `-n, --no-mmap`
Do not create a memory map of the database.
- `-v, --verbose`
Print more run-time information.
- `-, --help`
Show helpful information.
- `--usage` Show shorter helpful information.
- `-V, --version`
Print the program version.

2 Commands

Five commands are provided with zeptodb: **zdbc**, for creating databases, **zdfs** for storing records in them, **zdbf**, for fetching records, **zdbd**, for removing records, and **zdbi** for displaying information about a database.

2.1 **zdbc**

zdbc is used to create a new database file. It accepts all of the common options. Running the command on an existing database will *overwrite* the existing contents!

In addition to the database file to be used and the common options, the **zdbc** command accepts the following options:

-s, --sync
Automatically synchronize all database operations to the disk.

2.2 **zdfs**

zdfs is used to store records in a database file. Records are entered via **stdin** or, optionally, they are read from an input file, with one record per line. Each record should consist of one key-value pair. The values should be separated from the keys by a common delimiter ('|' by default), for example "key|value".

In addition to the database file to be used and the common options, the **zdfs** command accepts the following options:

-d, --delim=CHAR
Delimiter character separating keys from values (default '|').

-i, --input=FILE
Read new records from a file instead of from **stdin**.

-s, --sync
Automatically synchronize all database operations to the disk.

2.3 **zdbf**

zdbf is used to fetch records from a database file. Queries are read from **stdin** or, optionally, from a text file. Records with key values that match the queries will be printed to **stdout**. By default, only the corresponding values will be printed. However, if a delimiter character is provided, both keys and values will be printed. Finally, an option is available to simply print all records in the database.

In addition to the database file to be used and the common options, the **zdbf** command accepts the following options:

-a, --all Fetch all the records in the database.

-d, --delim=CHAR
Delimiter character to separate printed keys from values (default none; only values will be printed).

-i, --input=FILE
Read queries from a file instead of from **stdin**.

2.4 zdbf

zdbf is used to remove records from a database. The records to be removed are specified by their keys and are entered via **stdin** or, optionally, they are read from a text file. If many records are removed from the database, some fragmentation can occur. In this case, it is advisable to reorganize the database, which is possible via the **--reorganize** option.

In addition to the database file to be used and the common options, the **zdbf** command accepts the following options:

- i, --input=FILE**
Read queries from a file instead of from **stdin**.
- r, --reorganize**
Reorganize the database.
- s, --sync**
Automatically synchronize all database operations to the disk.

2.5 zdbi

zdbi prints out information on a database file. It accepts the common options.

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