LSM-HS

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Outline

- LevelDB & LSM-HS
- Functional Concepts
- Demo

LevelDB

“LevelDB is a fast key-value storage library written at Google that provides an ordered mapping from string keys to string values.”

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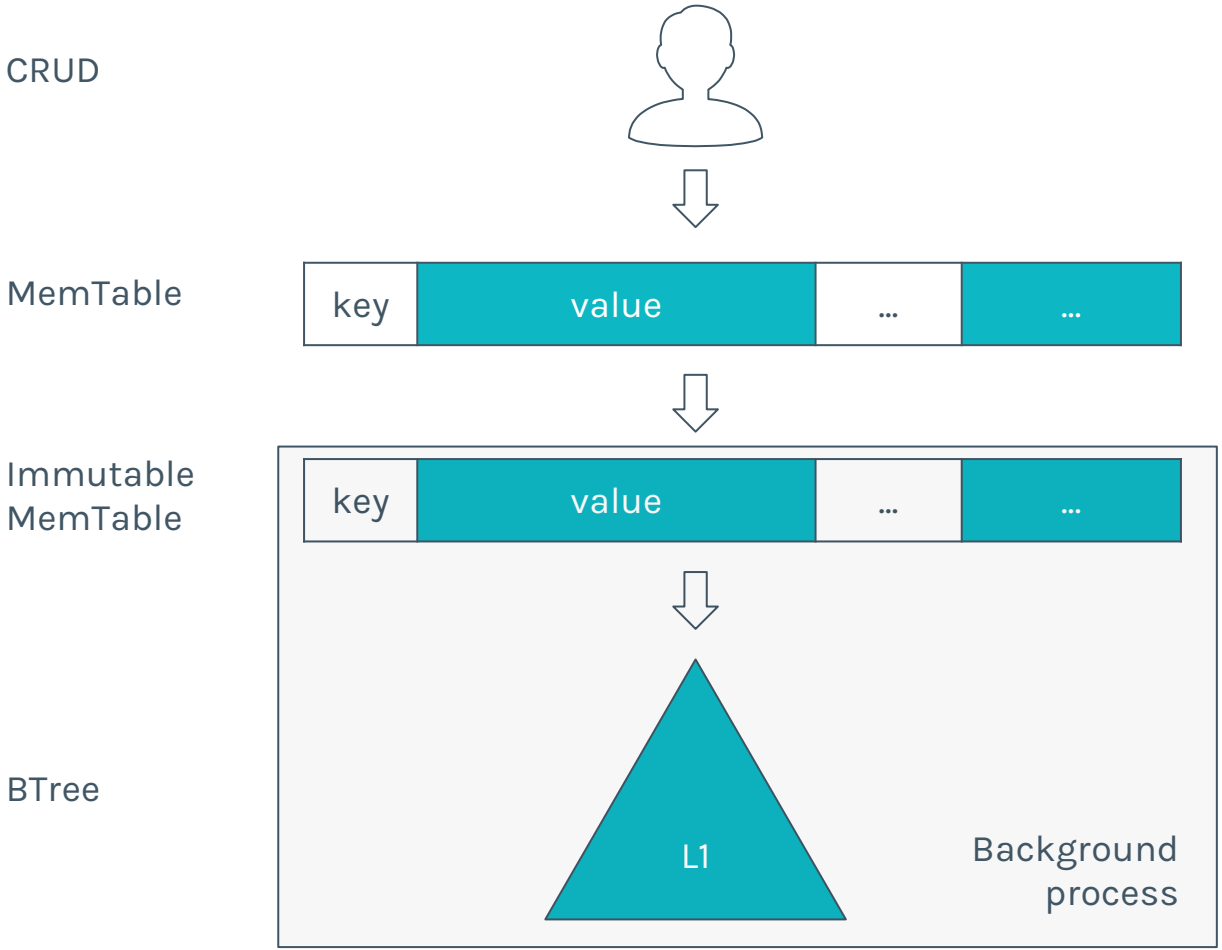
How LSM-HS works



Recovery

- Logging transactions
- Log layout:

length (64 bits)	key (length bits)	sha256 (256 bits)
length (64 bits)	value (length bits)	sha256 (256 bits)
...	...	...

- Merge log files to L1

The LSM Monad

```
newtype LSM a = LSM (ReaderT DBOptions (StateT DBState IO) a)
    deriving ( Functor
             , Monad
             , MonadIO
             , MonadState DBState
             , MonadReader DBOptions
             )
```

Monadic API

```
withLSM :: DBOptions -> LSM a -> IO a
withLSM opts action = do ...

withLSM def { dbName = "/tmp/ExampleDB" } $ do
    add (C.pack "Key") (C.pack "Value")
    _ <- get (C.pack "Key")
    update (C.pack "Key") (C.pack "New Value")
    delete (C.pack "Key")
```

Demo

How LevelDB works