

## Title

SRFI XYZ: Ordered Key Value Store (wip)

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## Status

???

## Abstract

This library describe an interface for ordered key-value store that is suitable to implement a storage engine for the generic tuple store SRFI. It maps cleanly with existing ordered key-value databases that may or may not provide transactions.

## Rationale

Ordered key-value stores offers a powerful set of primitives to build databases abstractions (also sometimes called layers). The generic tuple store SRFI is an example of such abstraction. A standard interface for such databases will allow more people to experiment with other abstractions.

This SRFI does not overlap with existing SRFIs and complement the generic tuple store SRFI.

## Specification

### Database and Transaction

Database is a mapping that may or may not support transactions where keys are lexicographically ordered bytevectors and values are bytevectors.

The following specification defines two disjoint types:

- `database` is a handle over the database
- `transaction` is a handle over a currently running transaction

**(make . args)**

Returns a database object. **ARGS** is implementation dependant and allows to configure the underlying database connection. It might be the path to the directory or file where the database is stored or the location of a configuration file or the host and port in case the database is accessed over the network.

**(close database . args)**

Close DATABASE. **ARGS** are implementation dependant.

**(begin! database . args)**

Start a transaction and returns a transaction object. **ARGS** allow to configure the transaction and are implementation dependant.

**(commit! transaction . args)**

Commit the transaction. **ARGS** allow to configure the transaction and are implementation dependant.

**(rollback! transaction . args)**

Rollback the transaction. **ARGS** allow to configure the transaction and are implementation dependant.

**(ref transaction key)**

Returns the bytevector associated with **KEY** bytevector using **TRANSACTION**. If there is no such key returns **#f**.

**(set! transaction key value)**

Associates **KEY** bytevector to **VALUE** bytevector using **TRANSACTION**.

**(rm! transaction key)**

Delete the pair associated with **KEY** bytevector using **TRANSACTION**.

**(range transaction prefix)**

Returns a srfi 158 generator of key-value pairs where keys starts with **PREFIX** bytevector. The stream must lexicographically ordered. **PREFIX** can be the empty bytevector, in that case the all the pairs are returned in a generator.

## Lexicographic Packing

This section defines two procedures (**pack . items**) and (**unpack bytevector**) which allows to translate back-and-forth scheme objects to bytevectors in a way that preserves lexicographic ordering. The ordering between types is defined as follow:

1. **\*null\***
2. bytevector
3. string
4. exact number
5. float
6. double
7. boolean

The implementation might support symbols, lists and vectors at the risk of being incompatible with existing databases.

**\*null\*** is a singleton that must be provided by the implementation.

Note: This is different from srfi 128 because a) it is not possible to pack inexact and exact numbers using the same algorithm while preserving a total order. b) it allows to be compatible with existing FoundationDB packing function.

**(pack . items)**

Returns a bytevector that preserve lexicographic ordering as described above. The accepted object types is implementation dependant, see the above note.

**(unpack bytevector)**

Returns values packed in **BYTEVECTOR**. It is an error, if **BYTEVECTOR** encode object not supported by the implementation.

## Implementation

The sample implementation rely on scheme mapping (srfi 146) and srfi 158.

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