SqueakSave

An Automatic Object-Relational Mapping Framework

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Outline

- motivation
- basic usage
- framework architecture
- performance
- summary & outlook

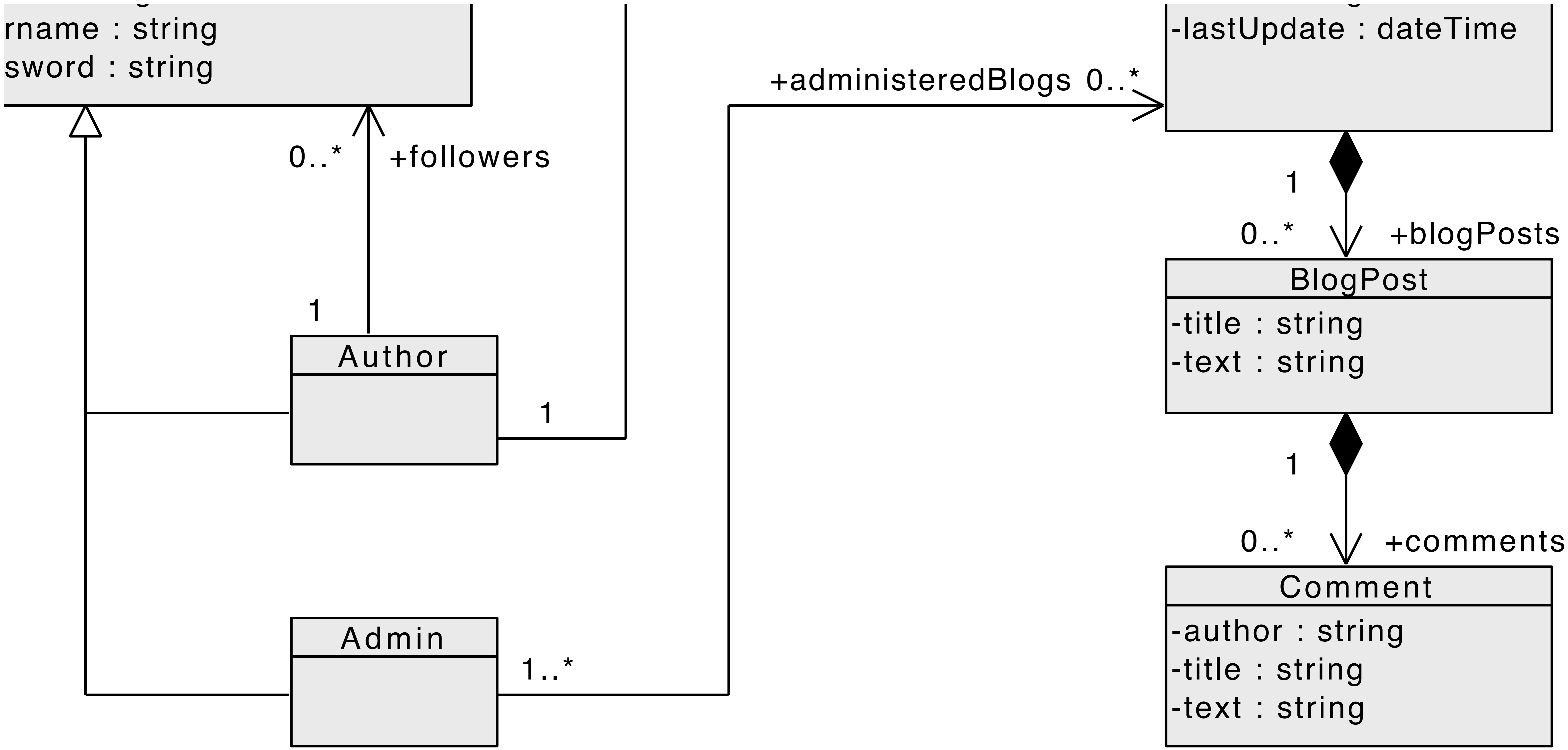
Available Persistence Approaches

- image storing
- object databases
- (object-)relational persistence

SqueakSave – Project Goals

- automatic mapping deduction
- simplistic API
- seamless integration into existing applications

Guiding Example



API – Configuration

- configuration based on naming conventions

```
SqsConfig subclass: #BlogExampleSqsConfig
     instanceVariableNames: ''
     classVariableNames: ''
     poolDictionaries: ''
     category: 'BlogExample'

BlogExampleSqsConfig
class>>#connectionSpecification
     ^ SqsMySQLConnectionSpecification
           user: 'admin'
           password: 'password'
           database: 'blog_example_db'
```

API – Basic Operations

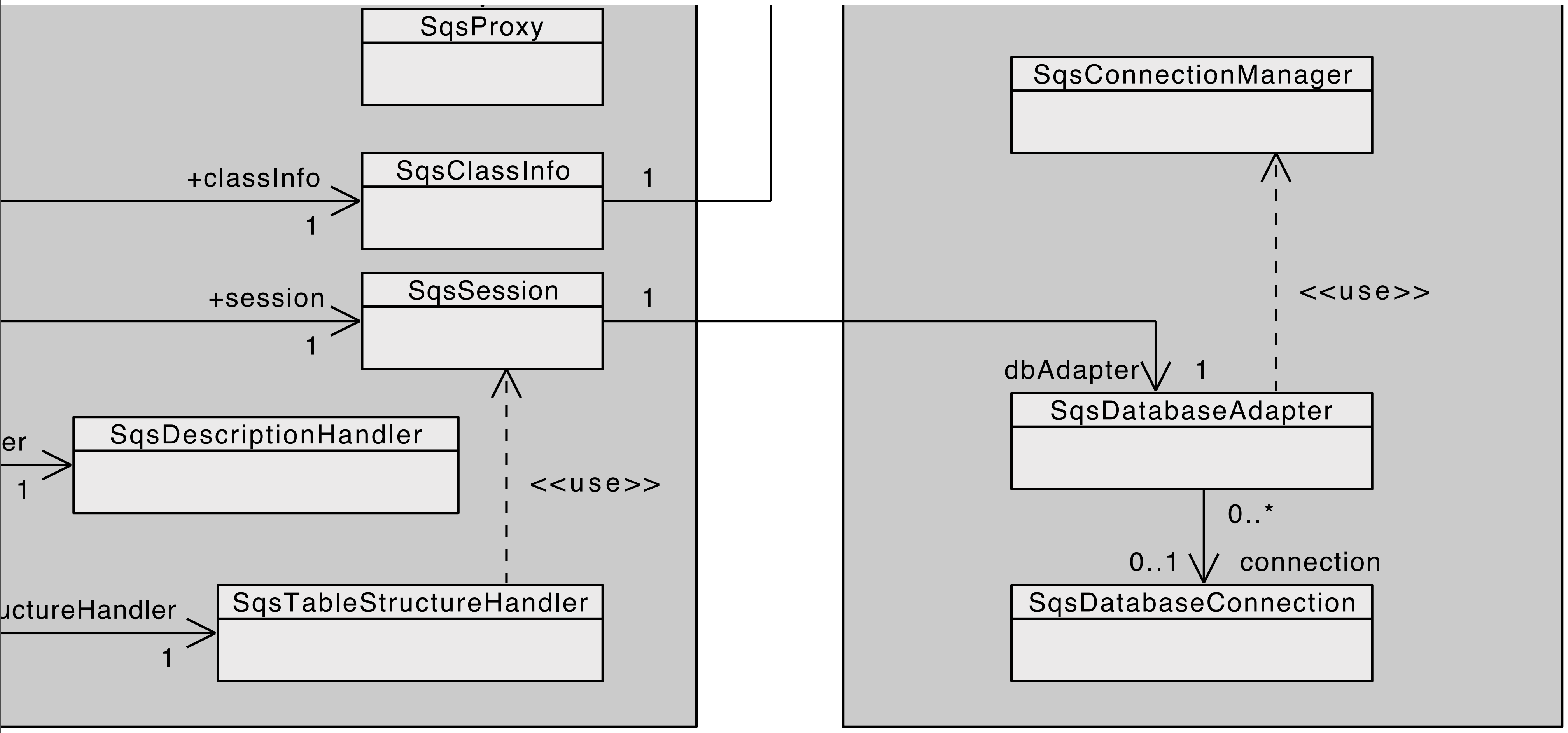
```
author := Author new
    password: 'password';
    username: 'testuser';
    email: 'user@example.org'.

author blog: (Blog new title: 'My Blog').

author save.


...


author destroy.
```

API – Queries

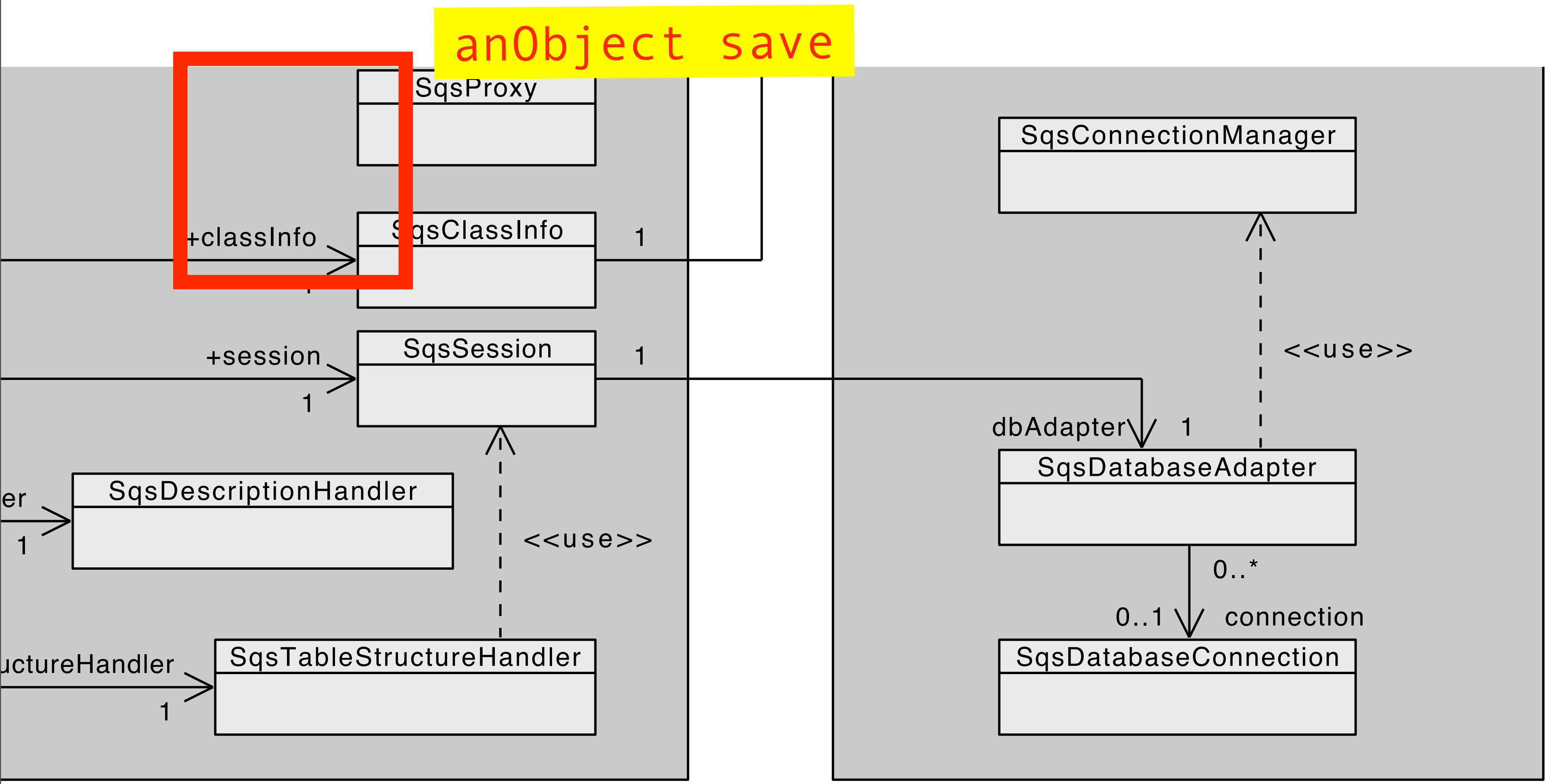
```
(SqsSearch for: User) detect: [:aUser |
    aUser username = 'testuser']

(SqsSearch for: Author) select: [:anAuthor |
    anAuthor blog blogPosts size > 10 ]

(SqsSearch for: Blog) anySatisfy: [:aBlog |
     aBlog blogPosts noneSatisfy: [:aBlogPost |
         aBlogPost comments isEmpty ] ]
```

```
(SqsSearch for: Blog) findByTitle: 'testblog'

(SqsSearch for: Comment)
    findByAuthor: 'author' andTitle: 'comment'.
```

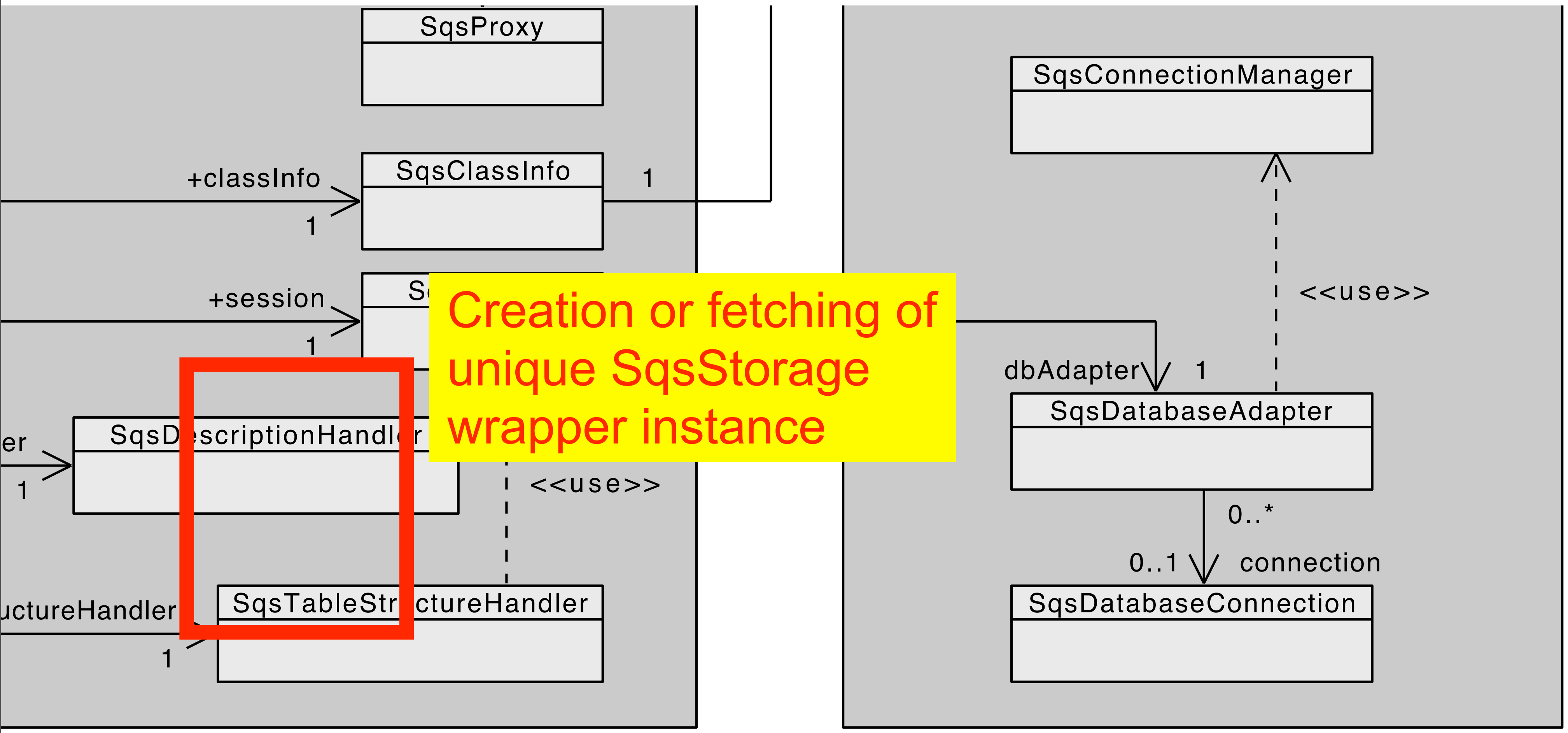
SqueakSave – Architecture



SqueakSave – Architecture

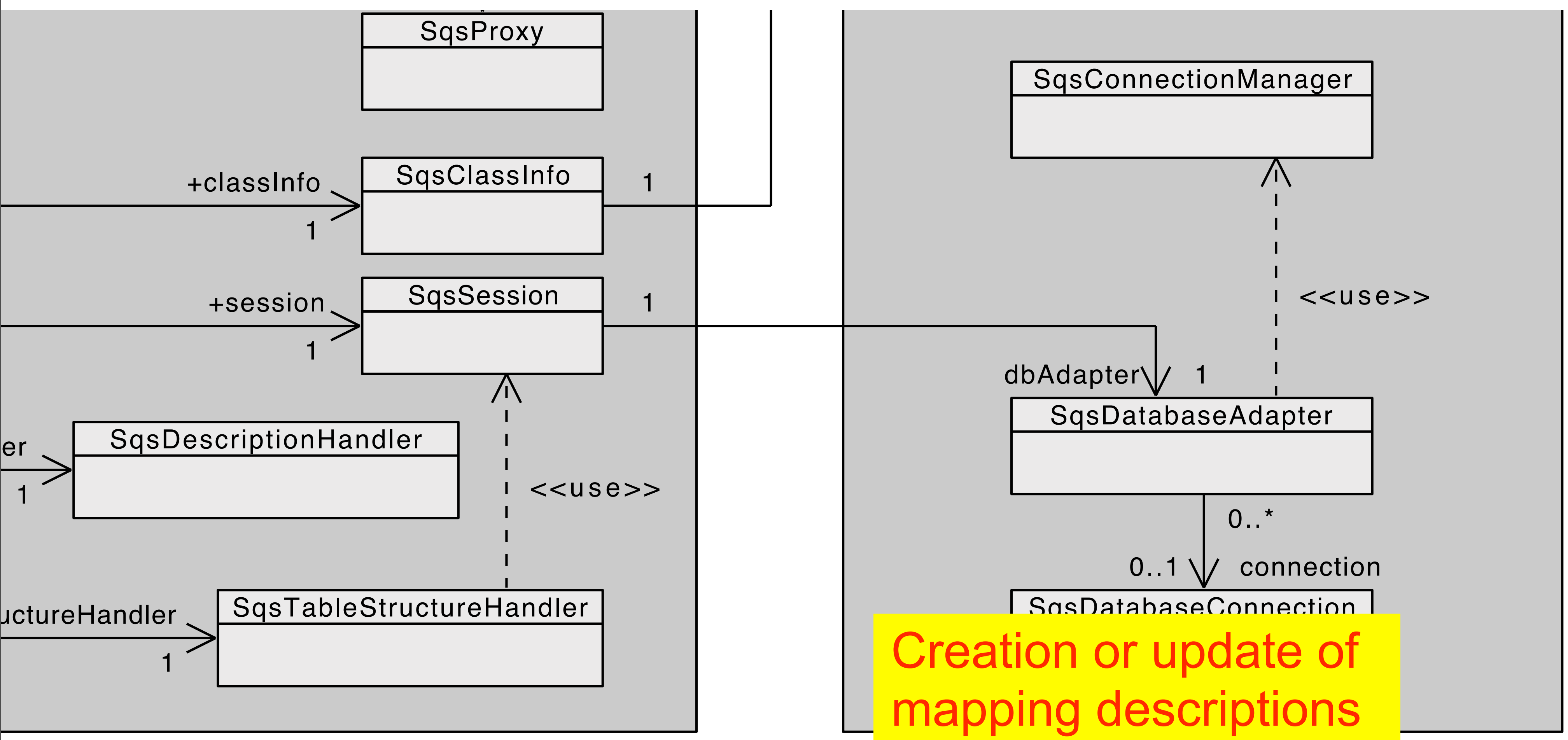


SqueakSave – Architecture



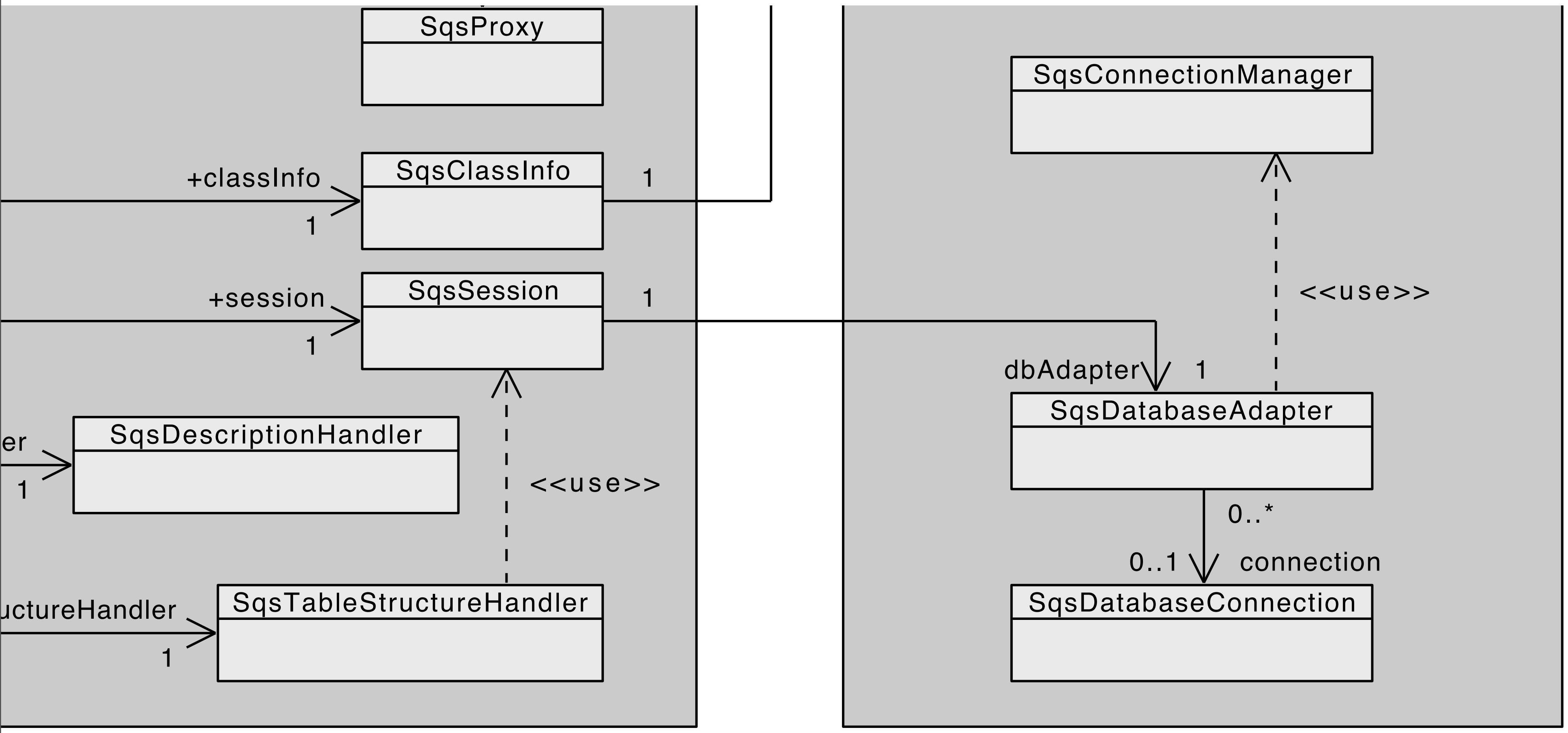
Creation or fetching of unique SqsStorage wrapper instance

SqueakSave – Architecture



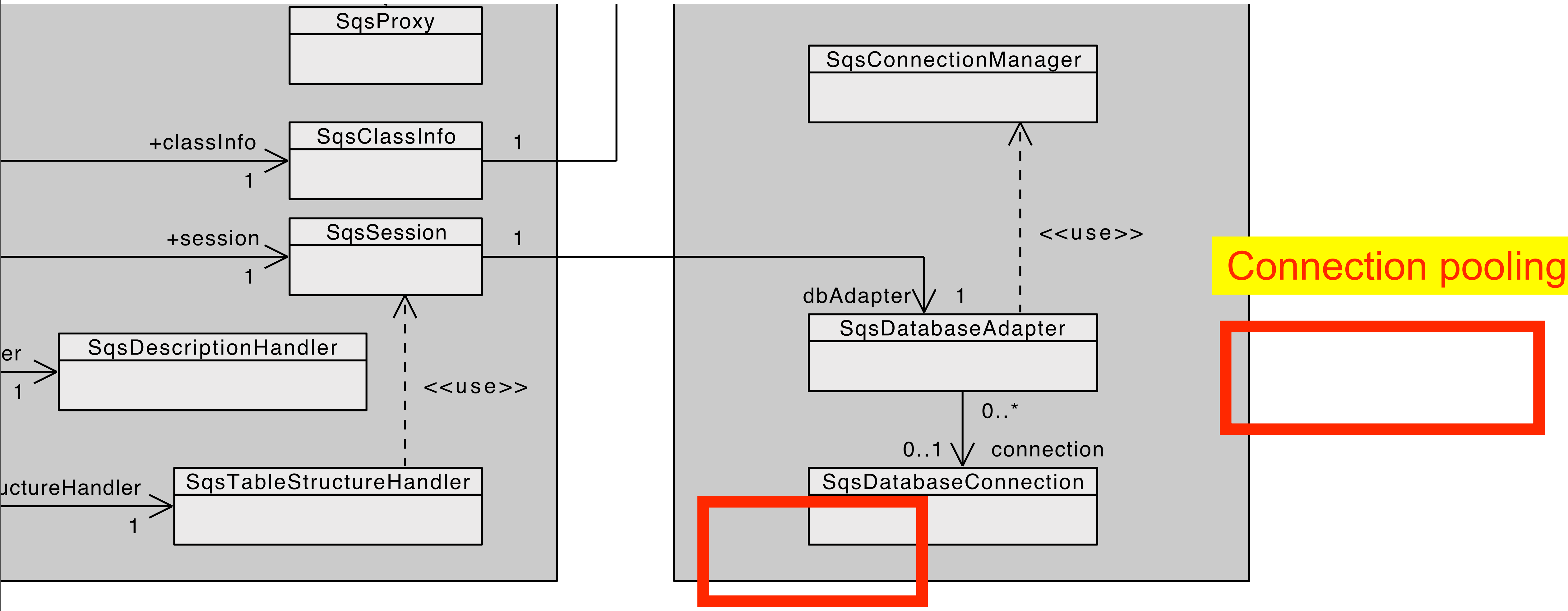
Creation or update of mapping descriptions

SqueakSave – Architecture



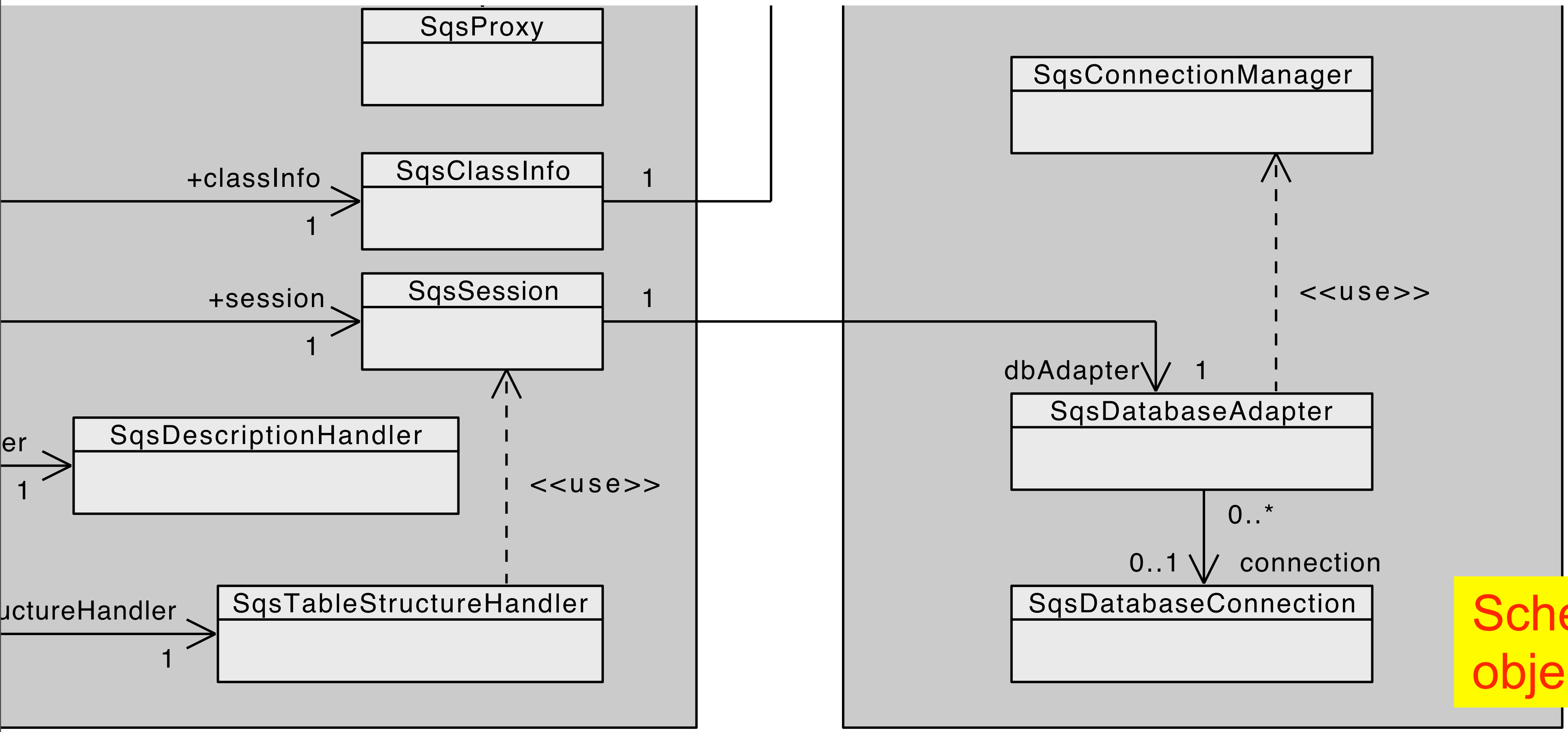
Calculation of changes to the relational database schema

SqueakSave – Architecture



Connection pooling

SqueakSave – Architecture



Schema update and object insertion or update

Query Analysis

- SQL statement generation through block execution with placeholder objects
- one placeholder class per ‘simple type’, SqsQueryObject and SqsQueryCollection for complex cases

```
(SqsSearch for: User) detect: [:aUser |
    aUser username = 'testuser']
```

Query Analysis

- SQL statement generation through block execution with placeholder objects
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```
(SqsSearch for: User) detect: [:aUser |
    aUser username = 'testuser']
```

```
queryObject := SqsQueryObject new
 depictedClass: User.
result := aBlock value: queryObject.
```

Query Analysis

- SQL statement generation through block execution with placeholder objects
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```
(SqsSearch for: User) detect: [:aUser |
    aUser username = 'testuser']
```

The query object does not know what `#username` does, but generates the SQL to scope to the respective column.

Query Analysis

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```
(SqsSearch for: User) detect: [:aUser |
    aUser username = 'testuser']
```

```
WHERE users.username
```

Query Analysis

- SQL statement generation through block execution with placeholder objects
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```
(SqsSearch for: User) detect: [:aUser |
    aUser username = 'testuser']
```

The result of the first call is an SqsQueryString.
It knows how to map the #= to SQL properly.

Query Analysis

- SQL statement generation through block execution with placeholder objects
- one placeholder class per ‘simple type’, SqsQueryObject and SqsQueryCollection for complex cases

```
(SqsSearch for: User) detect: [:aUser |
    aUser username = 'testuser']
```

```
WHERE users.username =
```

Query Analysis

- SQL statement generation through block execution with placeholder objects
- one placeholder class per ‘simple type’, SqsQueryObject and SqsQueryCollection for complex cases

```
(SqsSearch for: User) detect: [:aUser |
    aUser username = 'testuser']
```

```
WHERE users.username = ‘testuser’
```

Evaluation

- evaluation based on OO7 benchmark
  - CAD application data structure
  - complex object model with many cyclic dependencies
- set of queries with increasing complexity
- number of traversals of an object graph
- comparison with GLORP

Evaluation – Query Performance

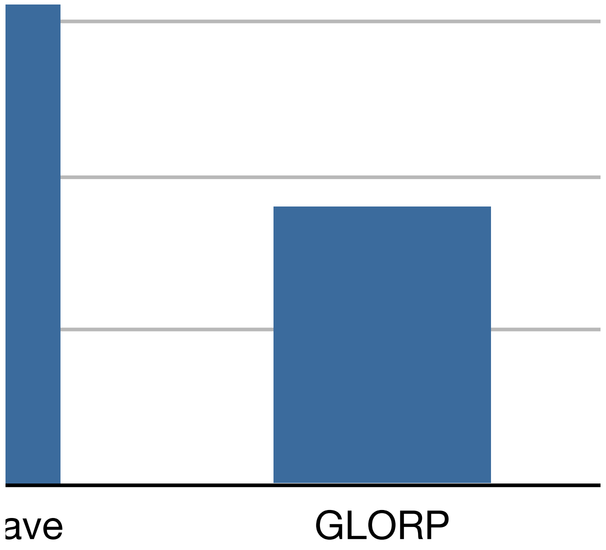
- approx. 20% slower than GLORP
- two exceptions
  - caching mechanism (10x slower)

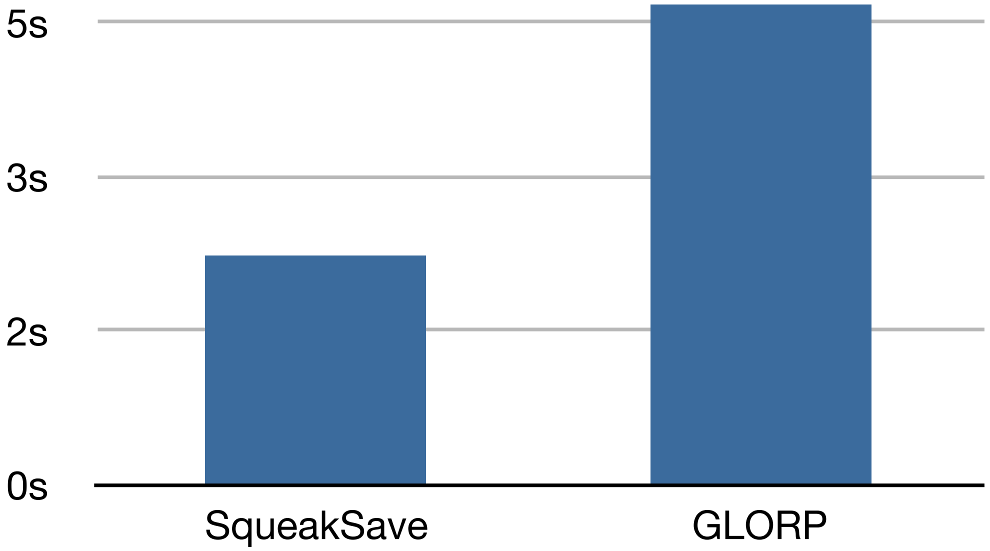
```
(SqsSearch for: SqsAtomicPart) detect:
    [:ap | ap oid = id].
```

  - query creation with joins (1/3x faster)

```
(SqsSearch for: SqsBaseAssembly) select: [:ba |
    ba unsharedParts anySatisfy: [:part |
        part document = id ]].
```

Evaluation – Traversal Performance





– missing eager loading (n+1 queries problem)

– minimal intrusion into object models (only collection proxies)

Summary and Outlook

- simple usage & setup
  - integration into existing applications almost seamless
- automatic deduction of database structures

Summary and Outlook

- simple usage & setup
  - integration into existing applications almost seamless
- automatic deduction of database structures

- possible extensions
  - SqueakDBX usage
  - eager loading
  - performance optimizations