Welcome

Kexi - Database Environment and Introduction to KDE Database Layer

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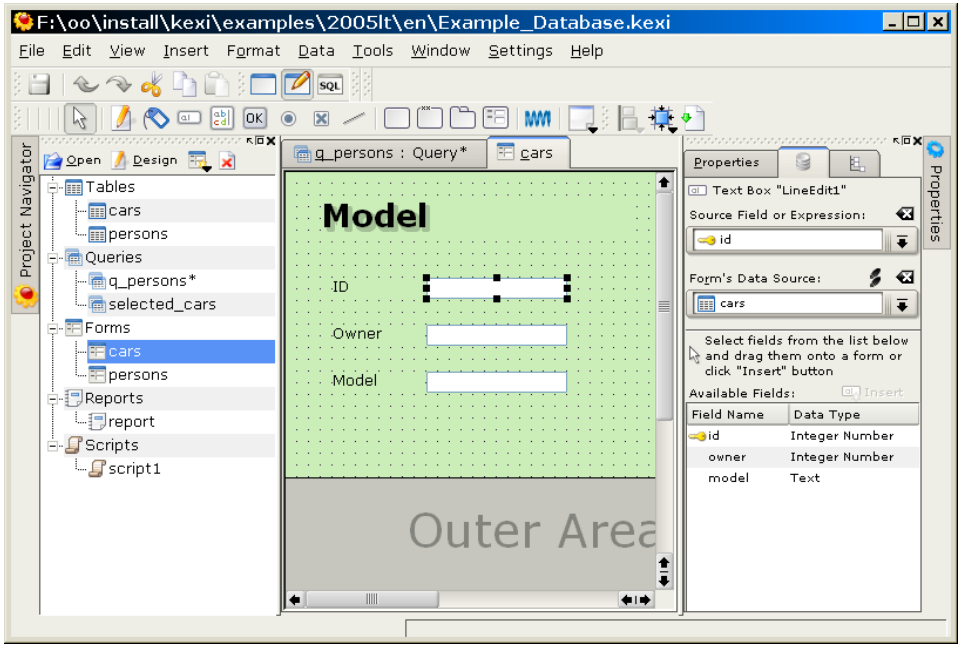
Overview

1. Kexi in Details
2. Kexi & KOffice
3. Reusable Components
4. Plans

What is Kexi?

- **Integrated data management application** for KDE (KOffice member)
  - We are talking about **desktop databases**, geared to vertical solutions, user interaction

- Direct competition for:
  - MS Access
  - Filemaker
  - Oracle Forms
  - OpenOffice.org Base



What Kexi is not?

- **It's not a database administering tool**
  (there are many specific administering tasks
  a database designer is not willing to perform)

- **It's not a database frontend specialized for a single database engine**
  (specific tasks will be always better handled by
  specialized tools dedicated for a single engine)

People

- **Late 2002:** project started by Lucijan Bush; contributions from Peter Simonsson and Joseph Wenninger
- **Feb 2003:** joined Jarosław Staniek, current lead developer sponsored by OpenOffice Polska

openoffice polska

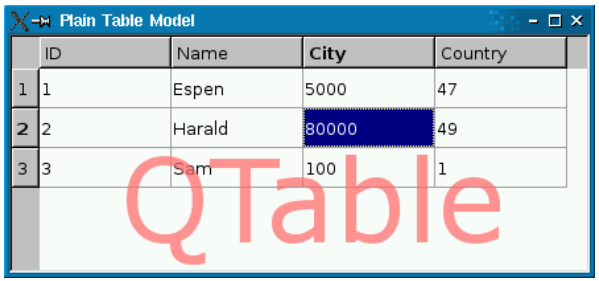
- **Dec 2003:** joined Cédric Pasteur, now core developer (forms)
- **Jun 2004**: joined Martin Ellis (databases)
- **Sep 2004**: joined Sebastian Sauer (scripting)

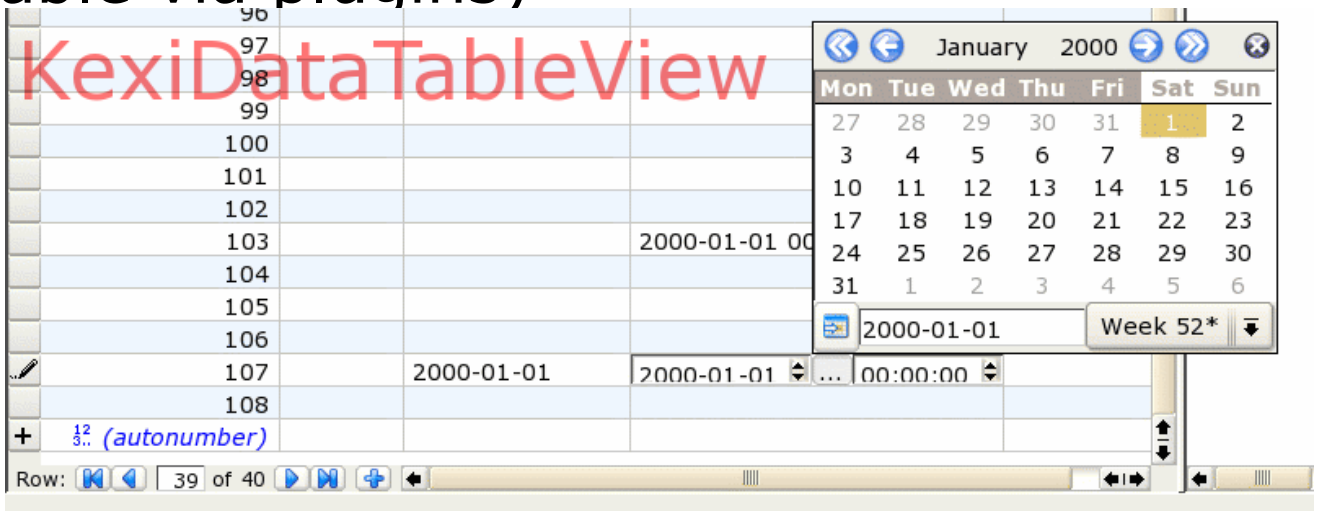
Important Milestones

- September 2003: High-level generic database layer (KexiDB)
- May 2004: Visual table and query designers
- October 2004: Graphical support for server databases
- July 2005: Final version of database forms with advanced designer
- June 2005: First version officially bundled with KOffice

Main Modules - Stable

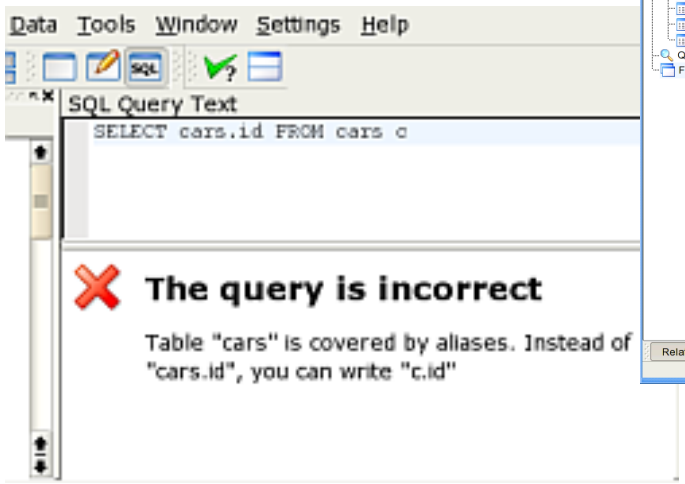
- **Database Library (KexiDB)**
  uniform schema designing and database accessing API
- **Data Sheet and Table Designer**
  more flexible than QTable
  or MS Access Data Sheet:
  - uses KDE editor widgets for custom data types (extendable via plugins)
  - uses data model for database table
  - Record-oriented with navigator, not spreadsheet -like

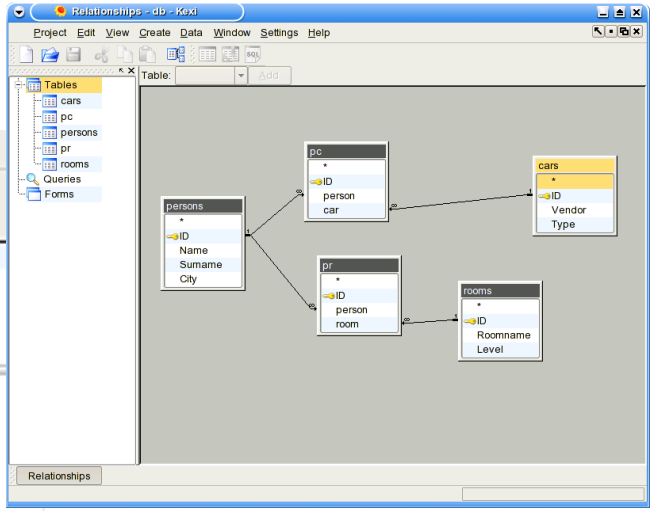




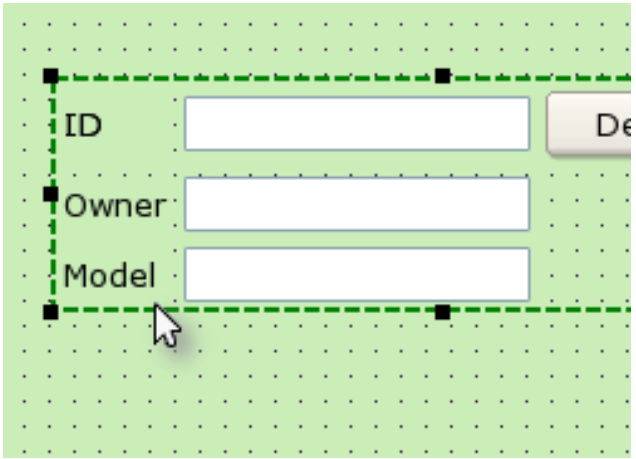
Main Modules – Stable (2)

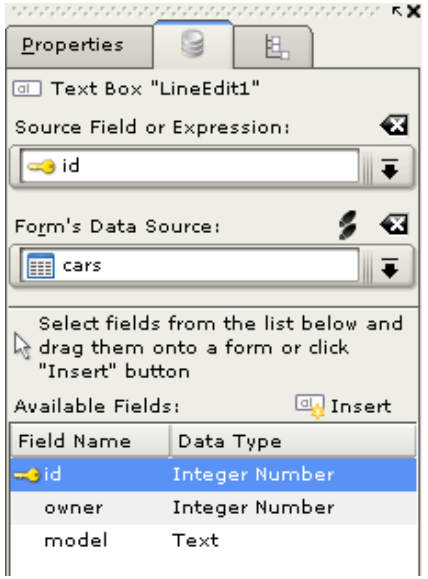
- **Query Designer**
  - visual mode
  - SQL mode with SQL parser





- **Database Forms**
  - built-in designer
  - Data Source pane
  - plugins (factories)
  - more user friendly than Qt Designer





Main Modules - In Progress

- **Database reports** with built-in designer
- **Scripting with Python**
- **Macros** (simplified method of scripting)
- **Form templates and autoforms**

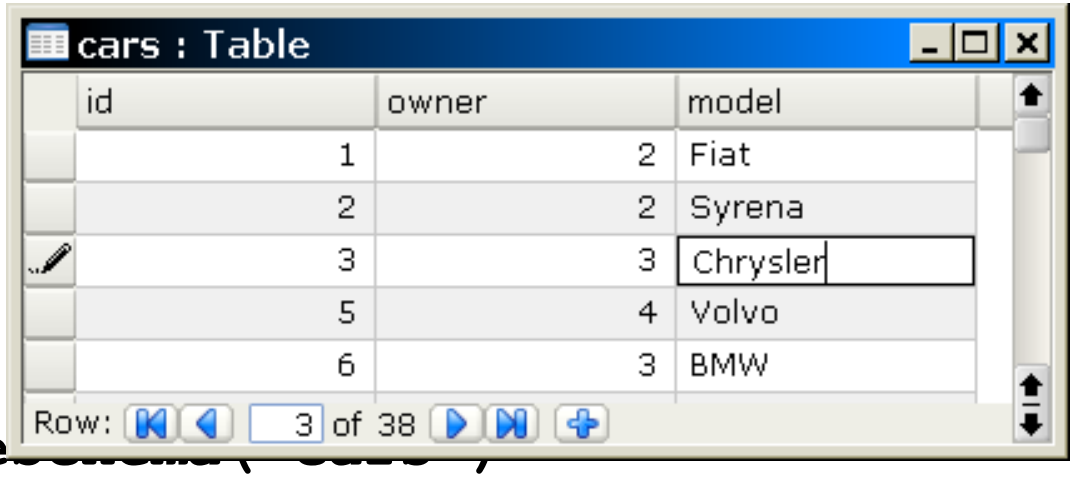
Database support - KexiDB

- **Plugin-based** driver system on higher and wider level than QtSQL
- Detailed information about status of every operation (full i18n)
- **KEXISQL** dialect is translated for backends
- **SQLite** as defaut built-in file-based SQL database engine:
  - no need to use a server
  - endianess-neutral
  - empty database file takes about 10 kilobytes
- **MySQL and PostgreSQL** database servers are currently supported

Python Scripting Example for KexiDB

Opening Data Table View (looks similar in C++)

```
# setup data
driverManager = kexidb.DriverManager()
driver = drivermanager.driver("SQLite3")
connData = drivermanager.createConnectionData()
db="/home/foo/project.kexi"
connData.setFileName(db)
connection = driver
  .createConnection(connData)
connection.connect()
connection.useDatabase(db)
# setup gui
carsTable = connection.table
cursor = connection.prepareQuery( carsTable )
tableView = KexiDataTableView(0, cursor)
tableView.show()
```



Features

- **Plugin-based data and project migration tools**
  - with wizards, built on top of KexiDB library
  - user can quickly migrate a project from one database engine to another
  - MS Access files supported as data source
- **Portable to win32**
  (using KDElibs for win32)
- **Good database engine-independency (KexiDB)**
  - db engines have 1) different APIs, 2) features
    3) SQL dialects
  - libraries like QtSQL only support independency for 1)

Formats

- A set of formats defined for Kexi database projects:
  - table metadata: represented as a simple tabular data
  - query: represented as a XML string + SQL statement compatible with KexiSQL parser
  - form: XML format inherited from Qt Designer's format
  - report: inherited form's XML format
  - script: XML string + source code string

  - connection data: ini-like format used to store information required to perform a server connection

File Types

- .kexi – **project** saved as SQLite-based database file
- .kexis – **shortcut to a project** on a database server
- .kexic – **shortcut** to a database **server** connection

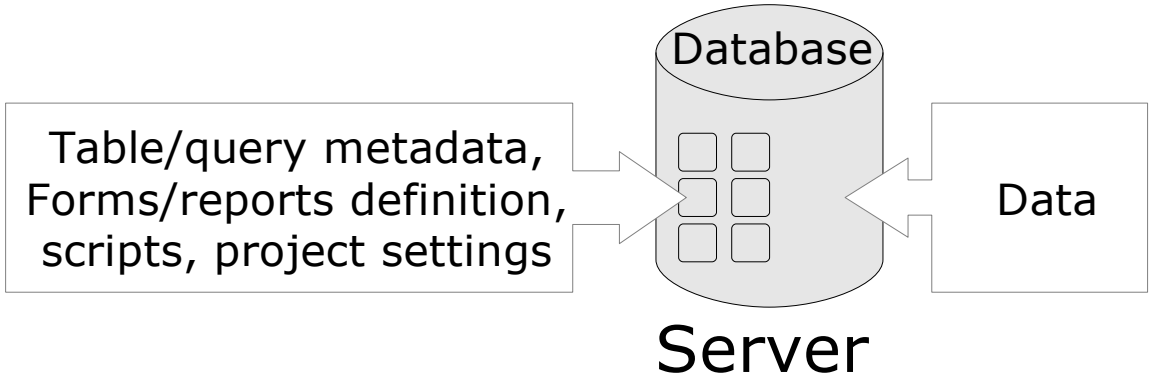
- Note: if server databases are used, small shortcut files are the only data stored locally.

A New Hope: Kexi and OpenDocument Formats

- Proposals to making OpenDocument more generic have been recently submitted to OASIS
  - Specific information bits (like Java-dependency) is now removed
  - This will allow to exchange schema and data to a larger extent (OpenOffice.org Base, Kexi, others?)

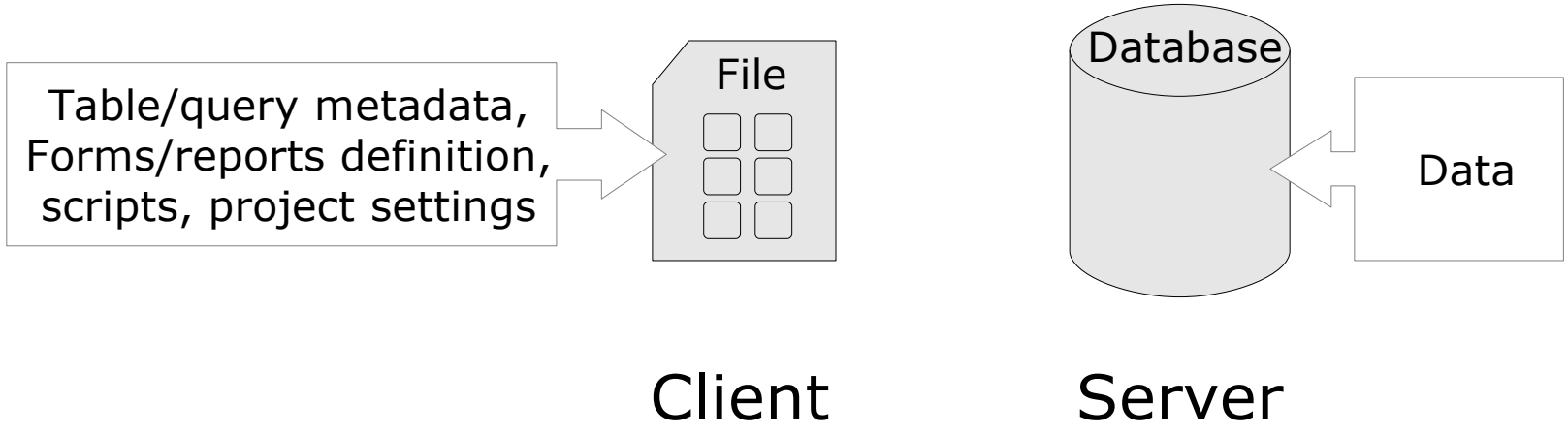
Storage

- By default, **Kexi stores database schema data in "system" database tables** within the same database as user-defined tables. Advantages:
  - If SQLite is used, this gives a **single file** containing both schema and data
  - Good level of database independence (easy migration)
  - Efficiency, multiuser access and data integrity inherited from database engines



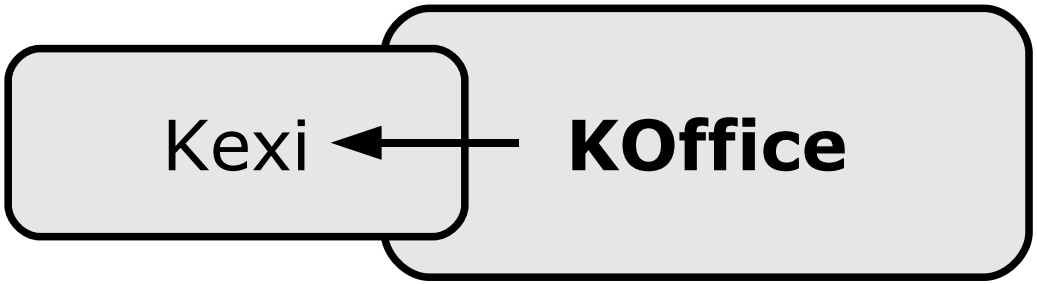
Storage – Differences to OpenOfice.org Base

- On the contrary:
  OpenOffice.org Base stores database schema data **in a separate "XML Archive"**, very much like e.g. OpenOffice.org Writer does.
  (lack of mentioned advantages)



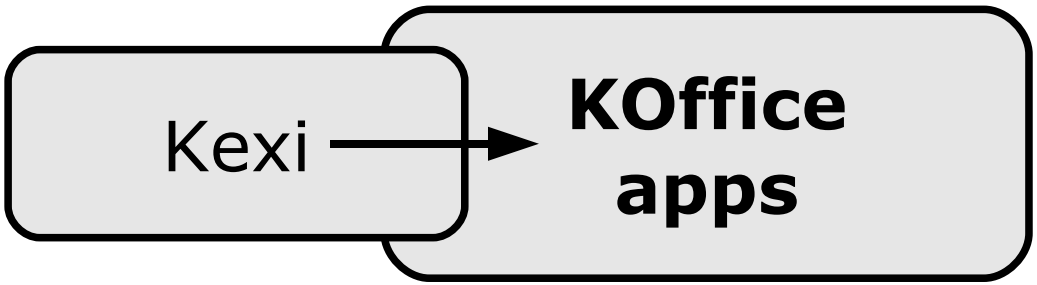
Integration with KOffice

- **KOffice features used in Kexi**
  - **CSV Import** shared with KSpread (improved, support for Fixed Width Text is planned)
  - Planned: **Embedding KOffice documents** (via KoPart) as frames in Kexi forms and reports



Integration with KOffice (2)

- **Kexi features provided for other KDE applications:**
  - Planned: integration with **mail merge** for KWord
  - **Integration with KSpread**
    (mapping spreadsheet's cells to database rows)



Problem: Embedding Kexi Components in KOffice Apps (as KoParts)

- In real world, KOffice documents are in most cases shared by sending them within email
- Documents have to support OASIS specifications. Moreover, they are often converted to Microsoft's proprietary formats.
- Data sheets or forms containing "live" data (loaded from a database on demand) **require database access**.

Problem: Embedding Kexi Components in KOffice Apps (as KoParts) (2)

Possible solution:

- When a document containing live data (loaded from a database) is saved, just save a copy of the data within the document.

Pro:

- Compatibility with OASIS and MS formats can be maintained

Problem: Embedding Kexi Components in KOffice Apps (as KoParts) (3)

Cons:

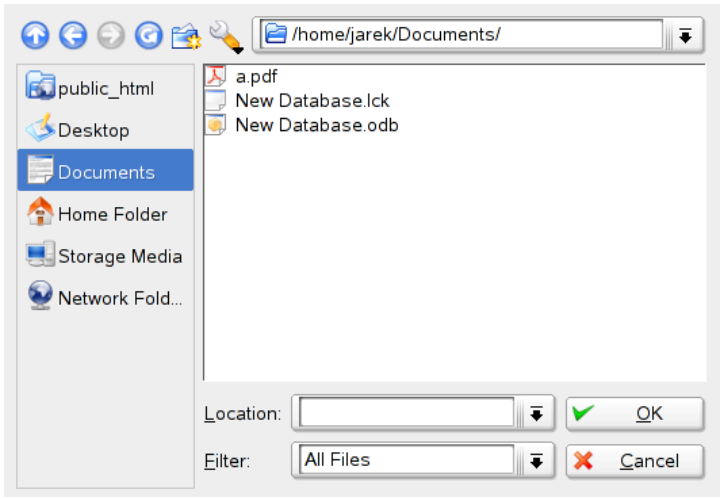
- This can extremely increase document size
- No client-server/multiuser advantages: data will not be "live" anymore nor editable (unless replication feature is implemented)
- Problems with data updates when database schema or related data has been changed in the meantime

Conclusion:

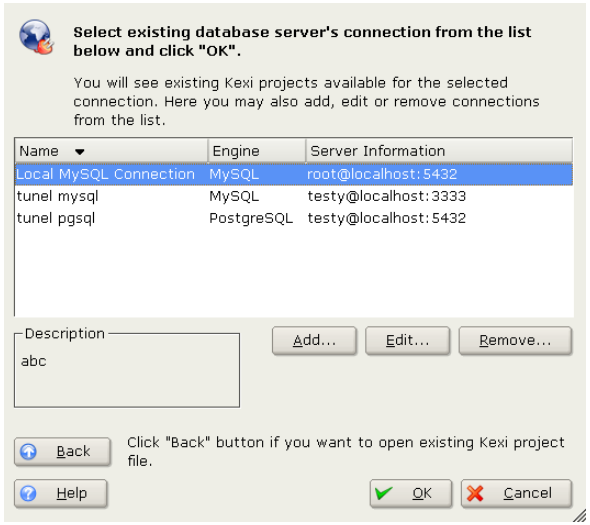
- Embedding a **rich**, **custom** content (like KParts or MS OLE interface) within exchangeable document formats could be a design flaw, inherited from MS formats

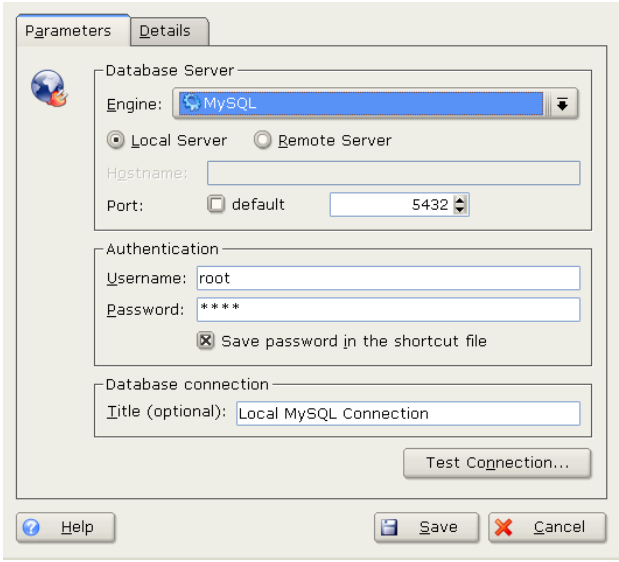
Using Database Framework by Other KDE Apps

- **Using Kexi data sources**
  - One shortcut file with **description format for data source connection** available for all KDE apps (proposed as freedesktop.org specification)
  - Planned: configuring KDE database access in KControl
  - Predefined “open” dialogs for server based data sources:



Conventional file dialog





Dialogs for server-based data source

Using Database Framework by Other KDE Apps (2)

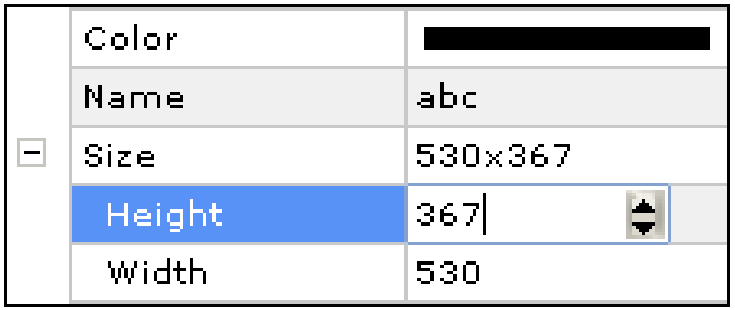
- **Reuse path for developers**
  1. Prepares logical design for app's data structures
  2. Create database schema using Kexi
  3. Add data input and output functions for using KexiDB connectivity library
  4. Reuse data-aware widgets, like data sheet views and forms, if needed
- **Further possibilities**
  - Reuse reporting functionality
  - Enable scripting so data processing can be extended by users

Other Reusable Components

- **Data migration framework**
  e.g. to add CSV files import/export functionality to other applications
- **Form Designer plugin**
  to allow designing data-aware forms within other applications (not yet in public API)
- **Property library with editor widget**
  - supports grouping and custom property values
  - currently merged with KOffice libs as KoProperty
  - reused by Kexi Form/Report Designer and Kugar

Other Reusable Components Example: Property Library

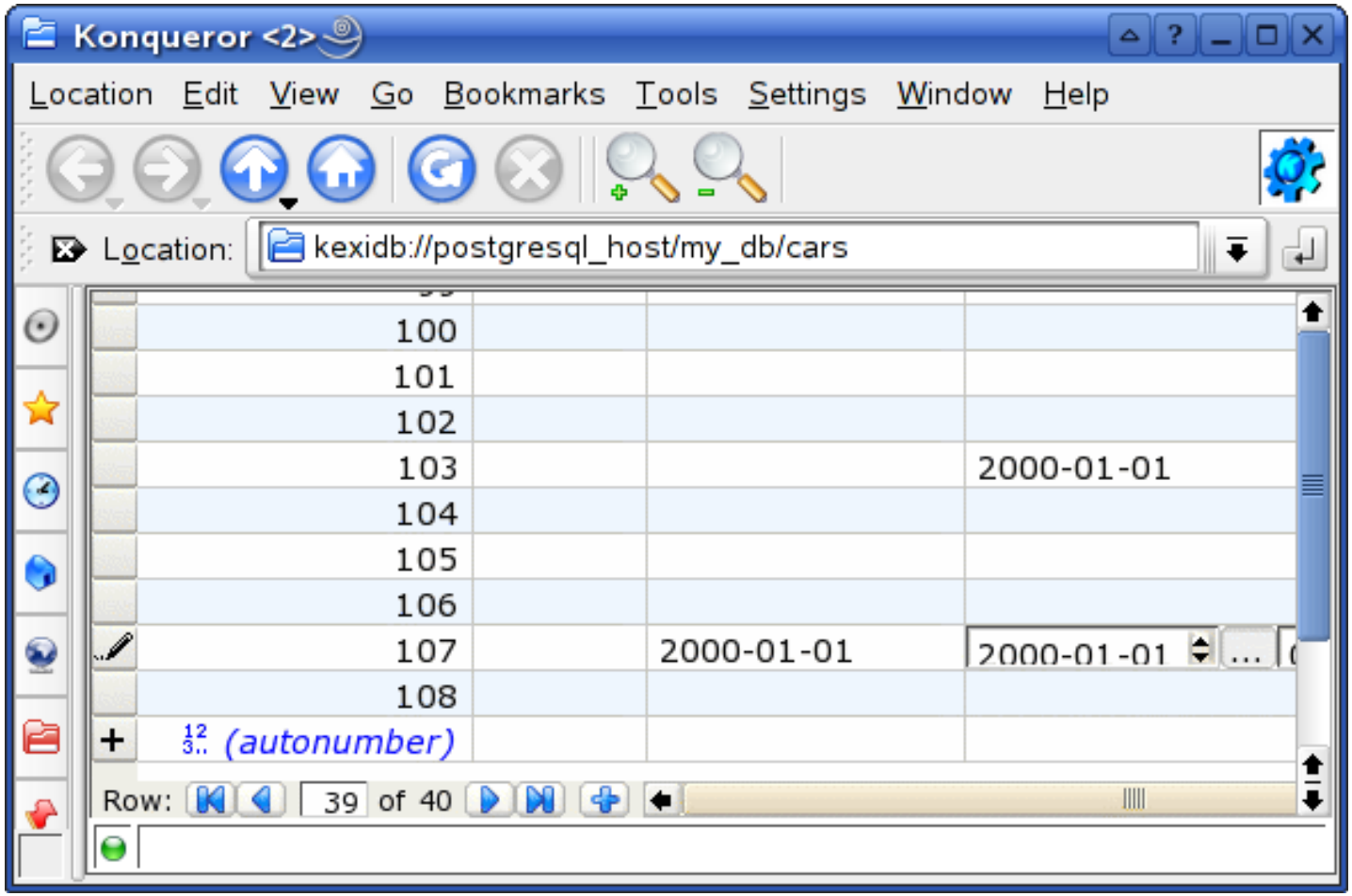
Displaying 3 editable properties




```
using namespace KoProperty;
//setup data model
Set* set = new Set();
set->addProperty(
  new Property("color", Qt::black, i18n("Color")) );
set->addProperty(
  new Property("name", "abc", i18n("Name")) );
set->addProperty( new Property("size", //composed
  QSize(367,530), i18n("Size")) );
//setup GUI
Editor* editor = new Editor();
editor->changeSet(propSet);
```

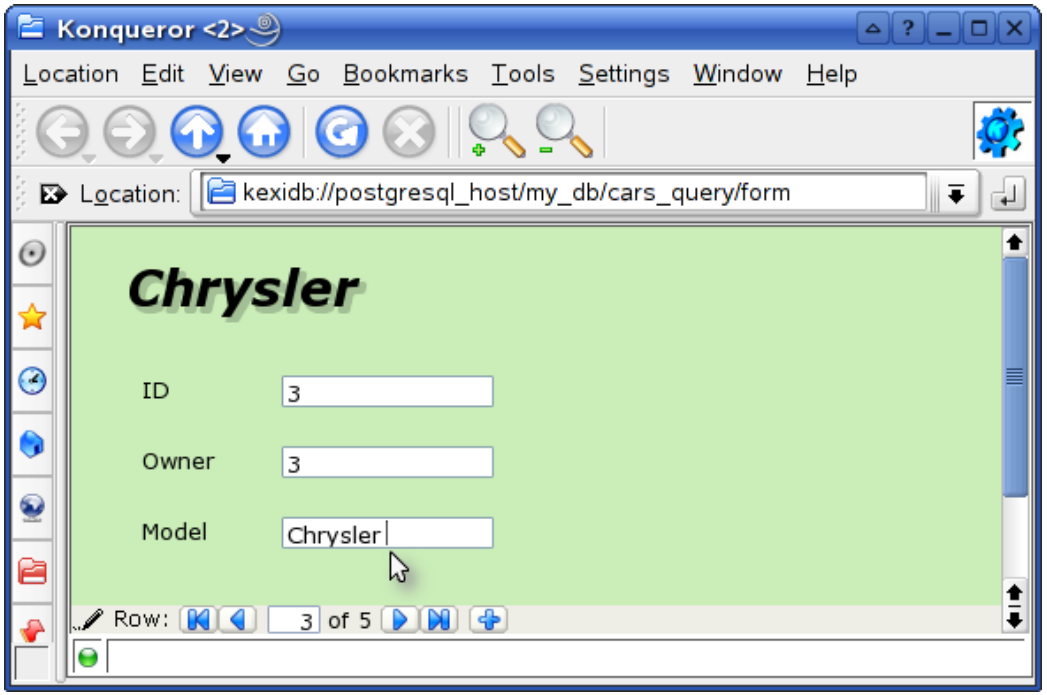
Plans: KPart Database Components Provided by Kexi

- **Data sheet inside Konqueror**



Plans: KPart Database Components Provided by Kexi (2)

- **KPart Form based on data source (query) inside Konqueror**



- Database components are wrapped to be usable via KParts interface.
- Many actions like design mode are hidden: even if data is read-write, db schema is usally read-only.

TODOs

- **Deploying Kexi projects**
  - **User mode** (i.e. with design actions disabled)
  - **Precompiler** (creating standalone executables)
- **More database drivers**: Firebird, Oracle, DB2 and ODBC/JDBC bridges
- **More data/schema migration tools**
- **Scripting with Java Script** (KJSEmbed)
- **Fine-grained permissions management**
- **User-defined i18n**

More TODOs

- **Asynchronouos connections and threading**
  - Multiple processing tasks can be executed concurrently in using kioslaves-like API
  - Support for interrupting operations (reusing database transactions)
  - Better user experience for large data sets or low bandwidth and higher latency
- **Server-side extensions, middleware**
  - Triggers and data processing scripts
  - Data-driven web applications and services

Our Needs

- **Increase interest** in KexiDB within KDE apps and desktop
  - gnome-db is going surprisingly well in this department - about 15 GNOME applications use gnome-db API...
- **Usability studies**, especially for KDE-wide database support
- **Developers!** Developers! Developers! Wanted for:
  - developing report module, GUIs, especially wizards
  - developing database drivers
  - integrating with other KOffice/KDE apps

Thank You

- **More Information**
  - **Project Home**
    http://www.kexi-project.org/
  - **Development Pages**
    http://www.kexi-project.org/wiki/wikiview/
  - **KOffice Page**
    http://koffice.org/kexi/