Extend your KDE application

Using QML!

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openBossa

Software in a creative way

Agenda

- (Big) Introduction
- A problem
- KDE Solution
- Issues
- Future

Qt Script

QtScript

C++ API to make your applications scriptable

QScriptEngine

- Environment to evaluate a script
- Context
- Global Object
- Use QMetaObject system to automatically export QObjects

QObjects

Can be exported out of the box:

- Properties
- Signals
- Slots
- Q_INVOKABLE

QScriptValue

Container for QtScript data types:

- Support for ECMA-262 types
- Support for QObject, QVariant and QMetaObject
- Prototype property that is common to all instances of an object

JS Bindings

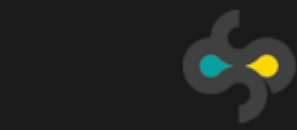
JS Bindings for Qt

Bindings are proxy objects/functions to interface with the 'real' libraries

JS Bindings for Qt

Steps to create your bindings:

- Create wrap code (check context arguments)
- Register your wrappers with the engine
- Be happy :)



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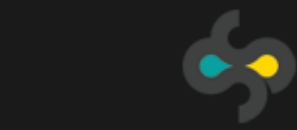

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Post No Bills
by Order of
King George III
IN CONGRESS, JULY 4, 1776.
The unanimous Declaration of the thirteen united States of America,

QML

QML

Declarative language to ease the development of UIs

QDeclarativeEngine

- Handles QML code
- Does not inherit QScriptEngine
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QDeclarativeEngine
Public API

- QML specific methods
- It has its own 'context': QDeclarativeContext
- QObject works out of the box
- It's possible to register C++ declarative items

QDeclarativeExpression

Evaluate a JS expression in a QML context

KDE

First of all...
... why use QML?

Declarative languages are way better (and faster) to build rich UIs!

- Microblog plasmoid (C++): 1250 LOC
- Declarative Microblog: 500 LOC

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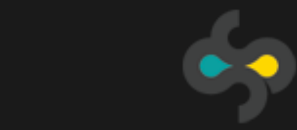
KDE Use case

- Uses QtScript since a long time ago
- It has a lot of JS bindings for non-QObject classes
  - i18n
  - QGraphicsLayout
  - QFont
  - UI loader
  - ...



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The problem

QDeclarativeEngine does not export its QScriptEngine!
Because of this, there is no way to register our bindings.

Possible solution

Export all non-QObject classes using QObject wrappers

KDE Solution

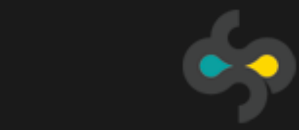
The rise of libkdeclarative

Spoiler alert: This is the way you're going to use QML in your KDE app!

QScriptValue

Let's take a look at QScriptValue API

- QScriptEngine* engine() const
- All slots' arguments are QScriptValues on the script side



Access to the internal QScriptEngine!

Example

```
root->setContextProperty("__eng", engineAccess);
QDeclarativeExpression expr("__eng.setEngine(this)");

expr.evaluate();
```

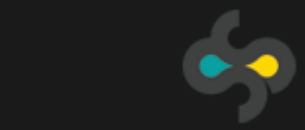
Access to the internal QScriptEngine!

Example

```
void EngineAccess::setEngine(QScriptValue val) {
    m_kDeclarative->d->scriptEngine = val.engine();
}
```

Still one last problem

The Global Object used by QML is read-only



Let's change the global object

Example

```
QScriptValue originalO = engine->globalObject();
QScriptValue newO = engine->newObject();

QScriptValueIterator iter(originalO);
while (iter.hasNext()) {
    // read props, flags
    newO.setProperty(iter.scriptName(), iter.value());
}
scriptEngine->setGlobalObject(newO);
```

Using QML right now

Use libkdeclarative in your application in order to have QML integration with KDE environment.

Integration with KDE

- QIcon
- QPixmap
- QFont
- KJob
- KConfig
- .ui loader
- Plasma's DataEngines and Services
- ...

What about widgets?
KDE Components

- GSoC 2011 Project: Daker Fernandes
- Step one: port all Plasma Widgets to QML
- Step two: start porting kdelibs/ui

This GSoC project is only about step one!

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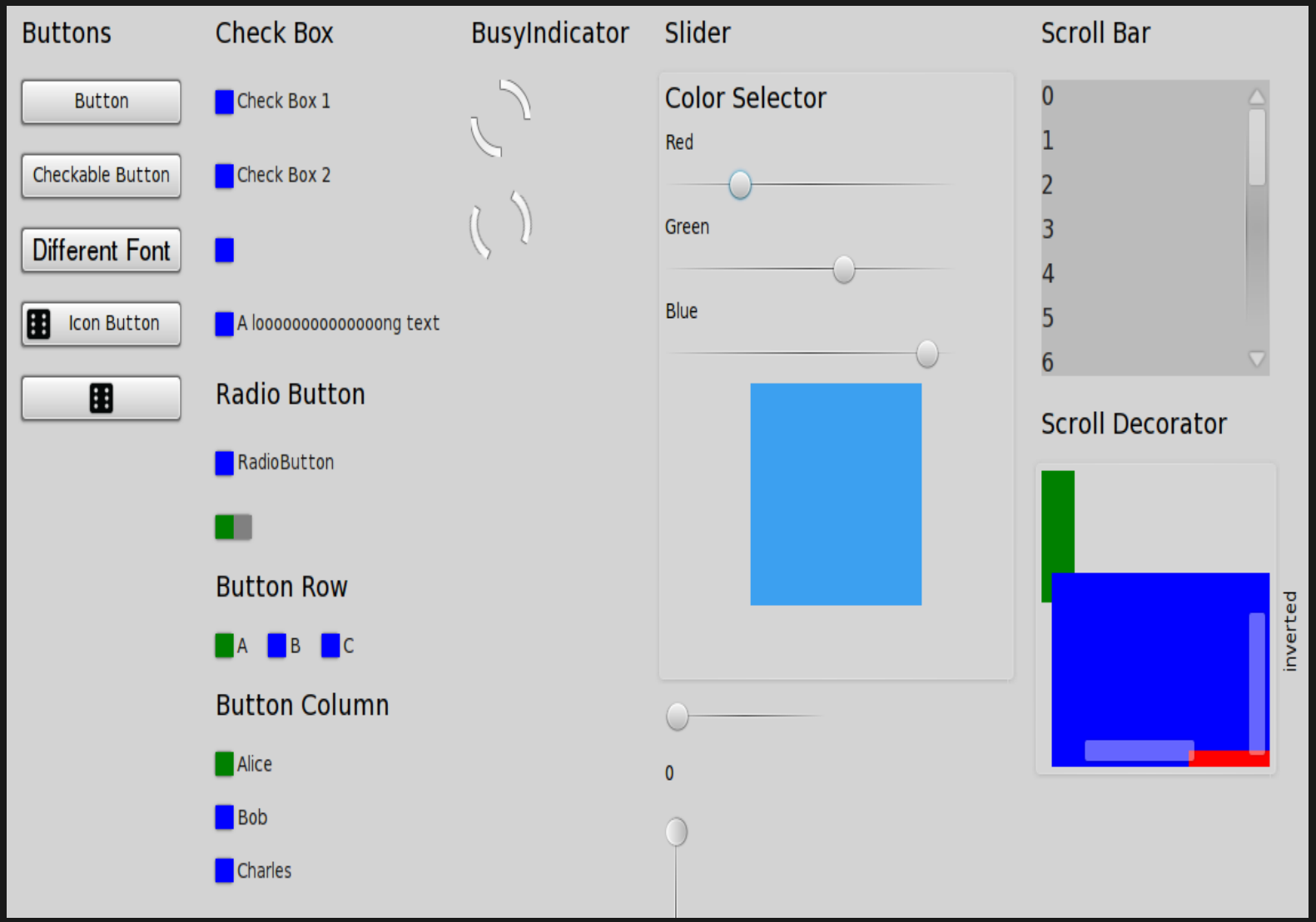
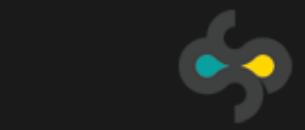


Issues

Issues

QML internal objects may not behave as documented



Issues

Done this way because of performance issues

Example: QScriptString has persistent handle to the string, and that is expensive

Future

Qt 5 and QtQuick 2.0

- QML will switch from JavaScriptCore to V8
- The 'KDE solution' will stop working: everything needs to be QObject

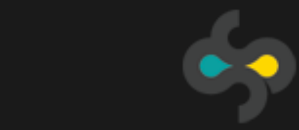
QScriptValue can be used as a module API

Only in JavaScript code, as it's imperative

Example

```
import My.Qml.Module as Module

Item {
    Component.onCompleted: {
        var obj = new Module.MyType;
        Module.doSomething(obj);
    }
}
```



Thanks!
Questions?

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