

QtCore in Depth

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About Me



About Me

KDE



(Kopete, knotify)

About Me

TROLLTECH®



About Me

- QStyleSheetStyle
- Itemviews
- Animation Framework
- QtScript (porting to JSC and V8)
- QObject, moc
- QML Debugger
- Modularisation
- ...

About Me

woboq

Offering Qt help and services: Visit <http://woboq.com>

C++ Code browser: <http://code.woboq.org>

Outline

- 1 Event Loop
- 2 Private Implementations
- 3 Containers
- 4 Signals and Slots

Not In This Talk

- Threading
- StateMachine, Animations
- ItemModels
- QVariant, QMetaType
- IO, Plugins



Outline

- 1 Event Loop
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Event Loop

(Demo)



Outline

- 1 Event Loop
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Outline

2 Private Implementations

- d pointers
- Implicit Sharing

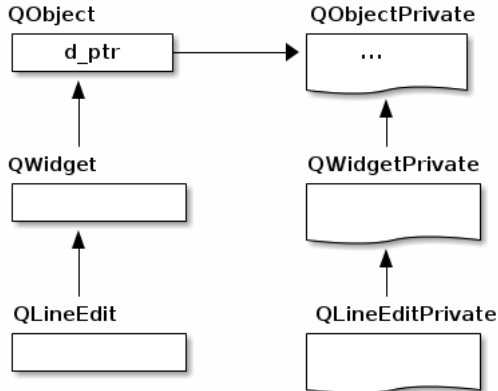
d pointers

- Hide the implementation.
- Allow keeping binary compatibility.
- Nice side effect: reduced compile time.

d pointer: the idea

```
1  class FooPrivate;
2  class Foo
3  {
4  public:
5      /* public members */
6  private:
7      const QScopedPointer<FooPrivate> d;
8  };
9
10 // In the .cpp file:
11 class FooPrivate
12 {
13     /* ... */
14 };
15
16 Foo::Foo() : d(new FooPrivate)
17 { /* ... */ }
```

d pointer: Hierarchy



Case Study

QTimeLine

Outline

2 Private Implementations

- d pointers
- Implicit Sharing

Implicit sharing

(Copy on write)

- QString, QByteArray, ...
- QList, QVector, ...
- QHash, QSet, QMap, ...
- QImage, QPixmap, QPen, QPalette, ...

Outline

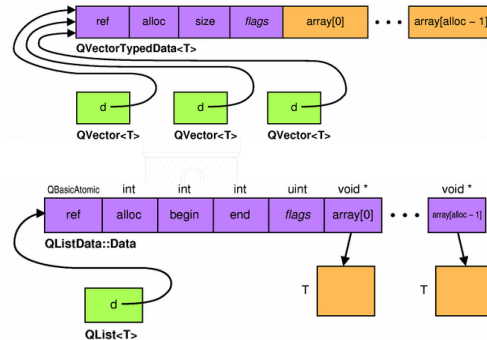
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Outline

3 Containers

- Sequential containers
- Associative containers
- String and ByteArray
- Smart Pointers

QList vs. QVector



<http://doc.qt.digia.com/qq/qq19-containers.html>

qlist.h QVector.h

QList vs. QVector

QVector

- Consecutive Items
- Allocated space at the end

QList

- List of pointers
- Space on both sides
- Shared implementation

Optimisations

In QList, small movable are stored inline.

```
1  
2 if (TypeInfo<T>::isLarge || TypeInfo<T>::isStatic)  
⇒ QDECLARE_TYPE_INFO, TypeInfo
```

Sequential containers

```
QVarLenghtArray<T, int = 256>  
QLinkedList
```

Outline

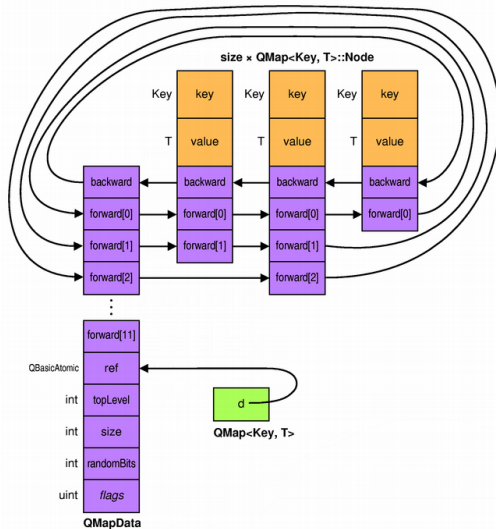
3 Containers

- Sequential containers
- **Assosiative containers**
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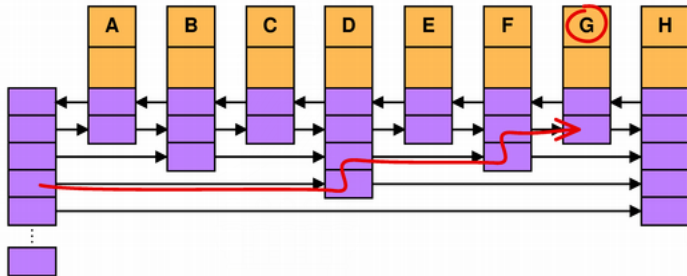
QMap



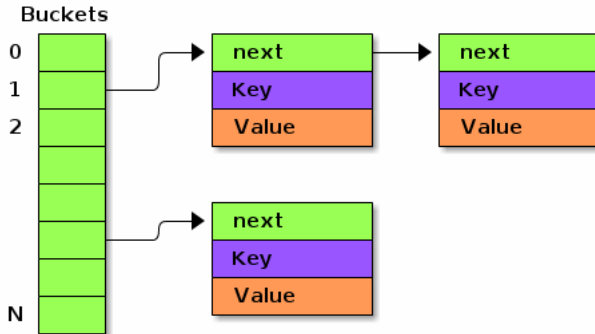
QMap in Qt 4



QMap in Qt 4

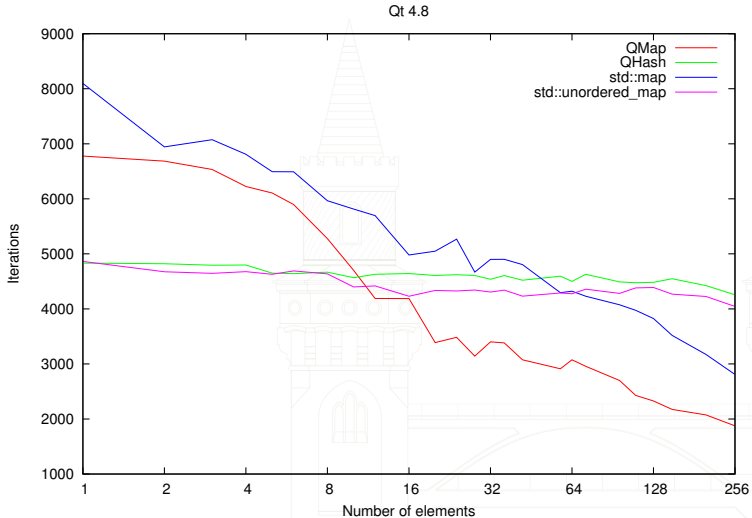


QHash

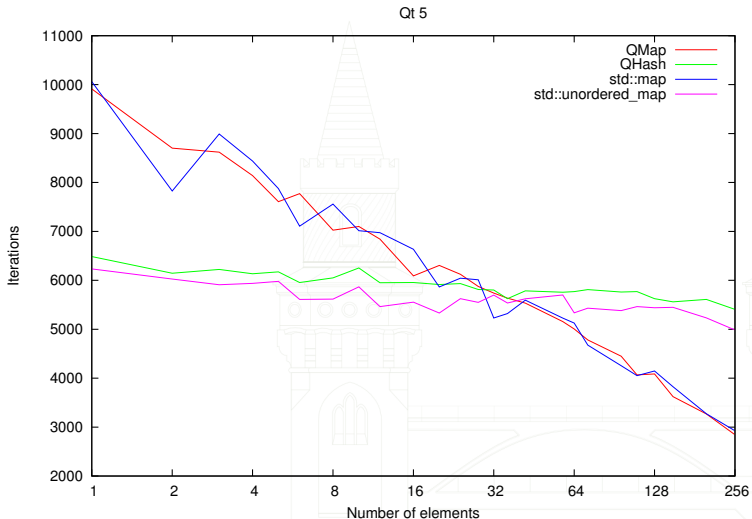


qhash.h

Benchmarks Qt 4.8



Benchmarks Qt 5



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3 Containers

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Smart Pointers

- `QSharedPointer`, `QWeakPointer`
- `QSharedDataPointer`,
`QExplicitlySharedDataPointer`
- `QPointer`
- `QScopedPointer`

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Outline

- 4 Signals and Slots
 - Moc
 - Emitting a Signal
 - Connection in Qt5

Outline

4 Signals and Slots

- Moc
- Emitting a Signal
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Relative Indexes

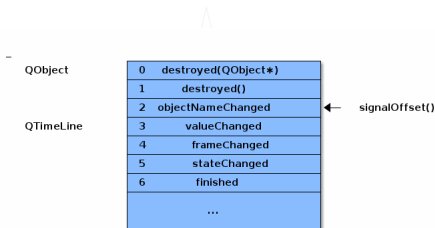
QTimeLine

0	valueChanged
1	frameChanged
2	stateChanged
3	finished
4	start
5	resume
6	stop
7	setPaused
8	setCurrentTime
9	toggleDirection

Absolute Indexes

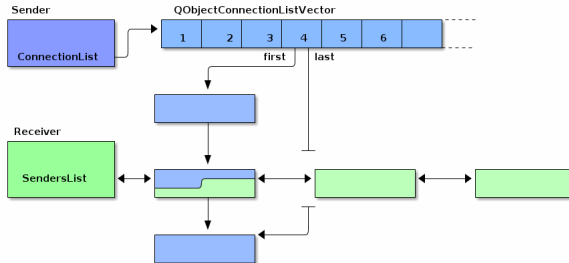
QObject	0	destroyed(QObject*)	
	1	destroyed()	
	2	objectNameChanged	← signalOffset()
	3	deleteLater	
	4	_q_reregisterTimers	← methodOffset()
QTimeLine	5	valueChanged	
	6	frameChanged	
	7	stateChanged	
	8	finished	
	9	start	
	10	resume	
	11	stop	
	12	setPaused	
	13	setCurrentTime	
	14	toggleDirection	
		...	
		...	

(Internal) Signal Indexes

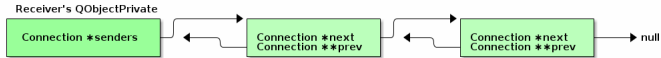


QObject	0	destroyed(QObject*)	
	1	destroyed()	
	2	objectNameChanged	← signalOffset()
QTimeLine	3	valueChanged	
	4	frameChanged	
	5	stateChanged	
	6	finished	
		...	

Connections



Connections



Outline

- 4 Signals and Slots
 - Moc
 - Emitting a Signal
 - Connection in Qt5

The END

Questions

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visit <http://woboq.com>

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