



# KDE's Journey to Qt 6

## Strategies and Lessons Learned

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# About KDE

About KDE — Kate

 KDE - Be Free!

About Report Bugs or Wishes Join KDE Support KDE



**KDE** is a world-wide community of software engineers, artists, writers, translators and creators who are committed to [Free Software](#) development. KDE produces the Plasma desktop environment, hundreds of applications, and the many software libraries that support them.

KDE is a cooperative enterprise: no single entity controls its direction or products. Instead, we work together to achieve the common goal of building the world's finest Free Software. Everyone is welcome to [join and contribute](#) to KDE, including you.

Visit <https://www.kde.org/> for more information about the KDE community and the software we produce.

Close



# KDE and Qt

- All KDE things are based on Qt5
- Some date back to 1996 and Qt1
- Regular contributor to Qt
- KDE Free Qt Foundation safeguards Open Source Qt





# KAboutData

```
1 KAboutData aboutThisTalk("qtdevcon_2022", "KDE's Journey to Qt6");
2
3 KAboutPerson me;
4 me.setName("Nicolas Fella");
5 me.setEmail("nicolas.fella@kde.org");
6 me.setWebsite("nicolasfella.de");
7 me.setRole("KDE Developer since 2017");
8
9 aboutThisTalk.setAuthor(me);
```



## Goals for this Talk

- Answer “Does KDE use Qt6?”
- And “Why not?”
- Share our approach and experience
- Allow you to learn from our experience



## KDE's Codebase

- KDE has *a lot* of code: ~15 Mio. LoC
- Virtually all C++, Qt5, QML
- Many independent subprojects
- Multi-generational code
- Both Widgets and QML
- Graphics-intensive applications
- CMake build system



# KDE Frameworks

- 80+ modular libraries
- Available for external users
- Stable API + ABI
- Qt6 means new major versions for KDE Frameworks



# Kickoff

- First planning session at Akademy 2019
- KDE Frameworks 6 sprint in 2019 (with virtual David Faure)







# KDE Frameworks 6 Design Goals

- Easy porting
- Delay branching as much as possible
- Improve APIs
- Drop unused stuff
- Separate Core/Widgets/QML
- Improve cross-platform support
- Separate interface and implementation



## Initial Porting Experiments

- 2019-2020: Preparation work
- First porting experiments in late 2020
- “Probieren geht über studieren”
- Typical issues:
  - Missing Qt modules
  - Missing includes
  - Qt6 is stricter in some cases
  - Changed signatures



## Build system adaptations

- In late 2021 we started adapting our build system
- `s/5/6/` works good for plain porting
- Versions-less targets/functions are cool
- But not suitable for libraries
- Worst case: `Qt${QT_MAJOR_VERSION}::Core`
- Some things need further adaptation (e.g. `Qt5Compat`, `QtX11Extras`)



## Problem: QTextCodec

- Replaced with QStringConverter in Qt6
- Limited codec support, only UTF and Latin1
- Available in Qt5Compat
- KDE apps need more codec support (Qt ~~6.4~~ 6.5 will fix it)
- QTextStream defaults to UTF-8 in Qt6



## Problem: QStringRef

- Replaced by QStringView
- QStringView is part of Qt5, but incomplete
- Porting has subtle details
- QStringRef is available in Qt5Compat
- Only of limited usefulness



## Problem: QRegExp

- Replaced with QRegularExpression in Qt 5.0
- Available in Qt5Compat
- Behavior differences, no blind porting!



## Problem: QtX11Extras/QtAndroidExtras

- Qt(X11 | Android | Windows | Mac)Extras are gone
- Functionality available in QtBase
- Using private API is not good
- Proper solution yet to be found



## Graphics Stack

- OpenGL replaced with RHI
- Some low-level code needs adaption, e.g. custom shaders
- Impact is somewhat unclear
- Big problem for Krita due to dropped Angle support





## QML Porting

- Lack of `#ifdef` complicates QML porting
- `QtGraphicalEffects` was deprecated/moved
- Breaking changes to QML languages were announced, impact unclear



## Where are we now?

- No Qt6-based releases
- 178 repos out of 690 have Qt6 CI: <https://iskdeusingqt6.org>
- We found some bugs
- Work on Frameworks 6 is ongoing
- Most QML porting is still to do



## Goodies

- A maintained Qt
- All the small things
- Performance improvements
- Wayland improvements
- QAction in QtGui
- New QtMultimedia
- Improved QML/QtQuick



## Conclusion

- We had/have some challenges
- But overall the experience has been alright
- Porting could have been faster without other frameworks changes
- Looking forward to the future



# Questions?



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