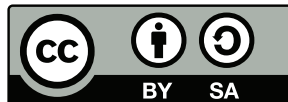


Config Workshop

Markus Raab

Akademy 2018, TU Wien

13.8.2018



Motivation

- 1 Motivation
- 2 Topics
- 3 Some Research Input

Problems

- configuration settings can be very complex
- not all configuration settings changeable via GUI
- configuration settings not sharable

Misconfiguration

- configuration is a user interface for both developers and system administrators
- *misconfigurations* are a major cause of system failures
- much time needed to fix misconfigurations

Examples

Not every misconfiguration involves big companies, cloud, and huge amounts of money:

- No internet access because resolv.conf symlink broken.
- KDE crash because of ulimit setting.
- Crash if config files are missing. KDE #262307
- Akonadi fails to start after mysql upgrade. Debian #843534

Game

Task

We start by getting to know each other.

- Go to someone you do not know.
- Ask about the person:
 - Name
 - free software activities
 - What is your motivation for coming here?
 - Have you already experienced misconfiguration?
 - Did you read about misconfiguration in the news?
 - ...
- When all are finished, introduce the person you asked.

Who?

- David Faure <faure@kde.org>
- Markus Raab <markus.raab@tuwien.ac.at>
- Sandro Knauß <sknauss@kde.org>
- David Edmundson
- Adriaan de Groot
- Johannes Zarl-Zierl
- Dan
- Tobias Fischbach <fit@mailbox.org>
- Allan
- Sune
- Fabian Vogt
- Elvis Angelaccio <elvis.angelaccio@kde.org>
- Kevin Kofler
- Bernhard Schiffner
- Helio Chissini de Castro

Organization

Slides available at

<http://www.complang.tuwien.ac.at/raab/akademy.pdf>

More Slides/book <https://book.libelektra.org>

Time Line:

10:30 Slot 1: brainstorm+decide on topics

11:30 Slot 2

12:30 Lunch: Pizza

13:00 Slot 2 $\frac{1}{2}$

14:00 Slot 3

Topics

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Topic: *Code generation*

- KConfig XT quite enhanced compared to other projects
- improve CMake for users
- GenElektra (not discussed)
- Standard Path for Installing the files?
- Config Options for KConfig XT
- QML
- Wrap with QObject
- Have run-time validation? (not discussed)

Talk: Dan

Topic: *some research input*

- sources of configuration
- trend
- early detection of misconfiguration

Talk: Markus Raab

Topic: *notification*

- out-of-sync problems
- emergent misbehavior
- notification at sync time
- kconfig might return outdated config
- In Elektra: `src/libs/notification/example/example_notification_async.c`

Talk: David Edmundson

Topic: *Caching*

- what happened with the caching of configuration files (iirc it was available somewhere in KDE3)
- mmap cache

Talk: David Faure <faure@kde.org>

Topic: *LDAP*

- bring back Backends?
- needs to be async
- needs local cache

Talk: Helio Chissini de Castro

Topic: *Interfaces to Config*

- generated interfaces
- custom manually-implemented interfaces
- generic interfaces (key/value)

Talk: Markus Raab

Topic: *configuration specification*

- make configuration settings safer
- complexity reduction
- configuration-less systems (auto-detection)
- agreement that override is often needed

Talk: Markus Raab

Topic: *configuration design*

- separate more and less volatile configuration (state) e.g. have screen resolution in the config path
- avoid binary blobs
- see configuration setting as human interface
- guidelines, e.g., avoid complexity: limit number and range of configuration as much as possible

Talk: Sandro Knauß <sknauss@kde.org> (till 14:00)

kconf_update

- who uses it?
- problems: not always performed
- future?
- Waldo?

Talk: David Edmundson

Elektra

- Add as dep in KDE?
- Maybe in KDE Plasma 6 (year 2020)
- Alternative: improvements in Kconfig

Talk: Markus Raab

Topic: *kiosk mode*

- who uses it?
- problems?
- how is it used?

Talk: ?

In which topics are you interested?

Task (1)
Topics to drop?

Task (2)
Further Topics to be discussed?

Task (3)
Scheduling Constraints?

Some Research Input

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Method

- S*: source code analysis of 16 applications (including akonadi), comprising 50 million lines of code
- Q*: survey with 672 persons visiting, 162 persons completing the survey
- R*: runtime logs of applications with Elektra's getenv

Q: “What is your experience with the following configuration systems/libraries/APIs?” (very) frustrating to work with:

- getenv (10 %, $n = 198$)
- configuration files (6 %, $n = 190$)
- command-line options (4 %, $n = 210$)
- X/Q/GSettings (41 %, 14 %, 35 %)
- KConfig (21 %)
- dconf (42 %)
- plist (32 %)
- Windows Registry (69 %)

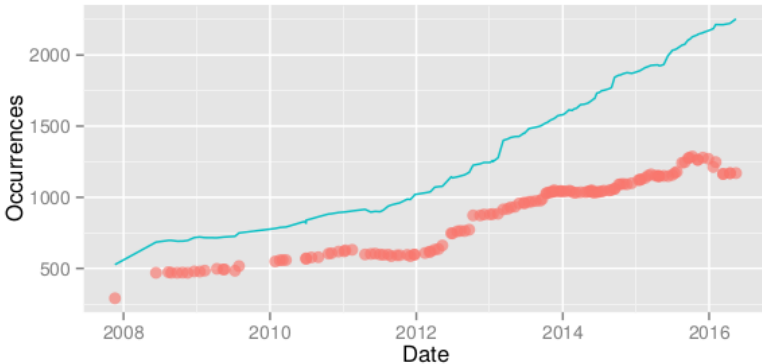
No-Futz

- *futz*ing is “tinkering or fiddling experimentally with something.”
- With ***no-futz computing*** means “futz~~ing~~ should be allowed, but should never be required.”
- currently configuration is error-prone and under-specified, *futz*ing is often required

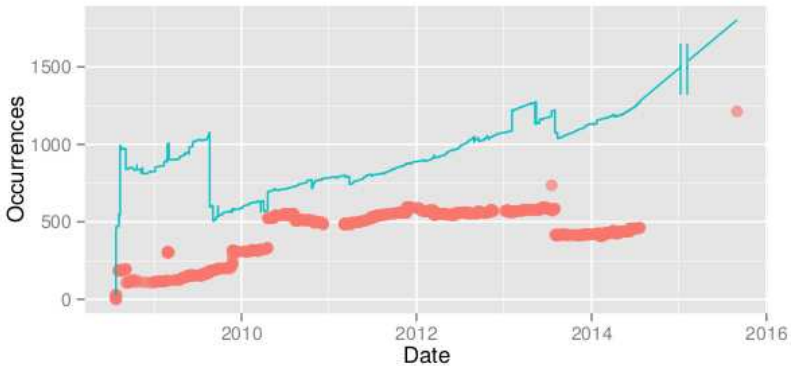
Counter measurements:

- no configuration
- specified, introspectable configuration

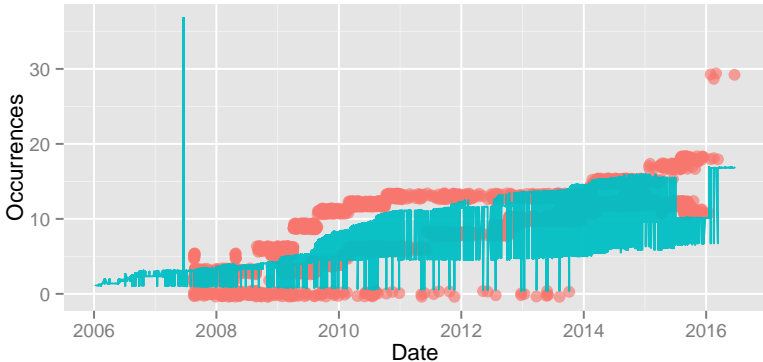
Number of Getenv Firefox



Number of Getenv Chromium



Number of Getenv Akonadi



R: Akonadi had the largest number of `getenv` invocations at run-time.

The environment variable `LANGUAGE` alone was requested 5126 times.

KDE startup: 27 % of all `getenv` invocations used the parameter `LANGUAGE`.

requested/unique parameters: median is 14 % but for Akonadi it is only ~ 1 %.

Early detection

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- Applications often have latent misconfigurations (14 % – 93 %)
- Latent misconfigurations are particular severe (75 % of high-severity misconfigurations)
- Latent misconfiguration needs longer to diagnose