



KRunner: Past, Present, and Future

Porting, New Features, and Plugin Distribution

By Alexander Lohnau
Akademy 2023

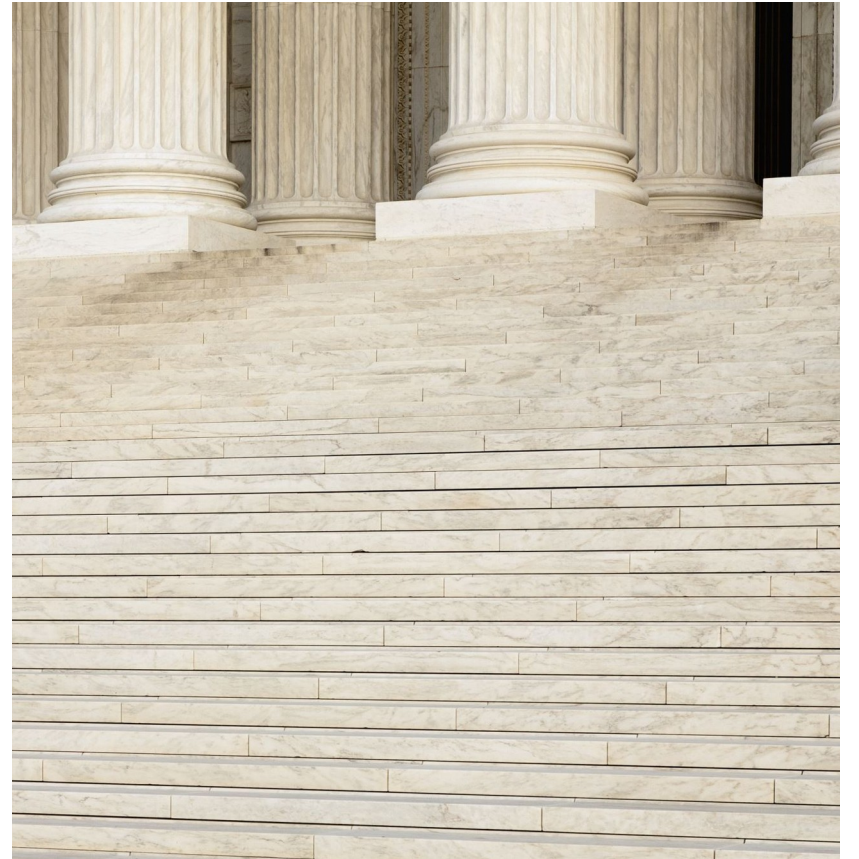


How does KRunner affect you?

- Most people know it as the standalone executable
 - Launched by Alt+Space/ Alt+F2
 - Invoked when typing on desktop
- KRunner is also a flexible framework
- Powers normal application launchers
- Essential part of desktop experience

Structure

- Who am I and how did I end up in KDE?
- Where we came from - looking back at the KDE4 times
- Major improvements and features
- It all about the plugins - KRunner's ecosystem
- Upcoming changes & improvements in KF6
- Future plans



Who am I and how did I end up in KDE?

- I first tried KDE in 2019, immediately loved it
- Initially played a lot around with applets
- Only later discovered KRunner and all its features
- Played around with third party plugins
- Eventually wrote my first plugin using krunner-bridge

Who am I and how did I end up in KDE?

- Hit some architectural constraints and performance issues
- Rewrote my plugins in C++
- (which I barely knew at the time)
- Most of them are still around on GitHub

My GitHub projects



Alexander Lohnau
alex1701c

Edit profile

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Customize your pins

 **krunner-firefox** Public

Launch your Firefox profiles from Krunner and register them in the Firefox .desktop file

● C++ ☆ 16 🍷 3

 **JetBrainsRunner** Public

A Krunner Plugin which allows you to open your recent projects

● C++ ☆ 42 🍷 3

 **EmojiRunner** Public

Search for emojis in Krunner and copy/paste them

● C++ ☆ 36 🍷 4

 **JetBrainsDolphinPlugin** Public

Dolphin plugin for the JetBrains IDEs

● C++ ☆ 13 🍷 2

 **KDevelopTemplates** Public

This repository contains all my KDevelop templates

● Shell ☆ 16 🍷 6

 **krunner-kwallet** Public

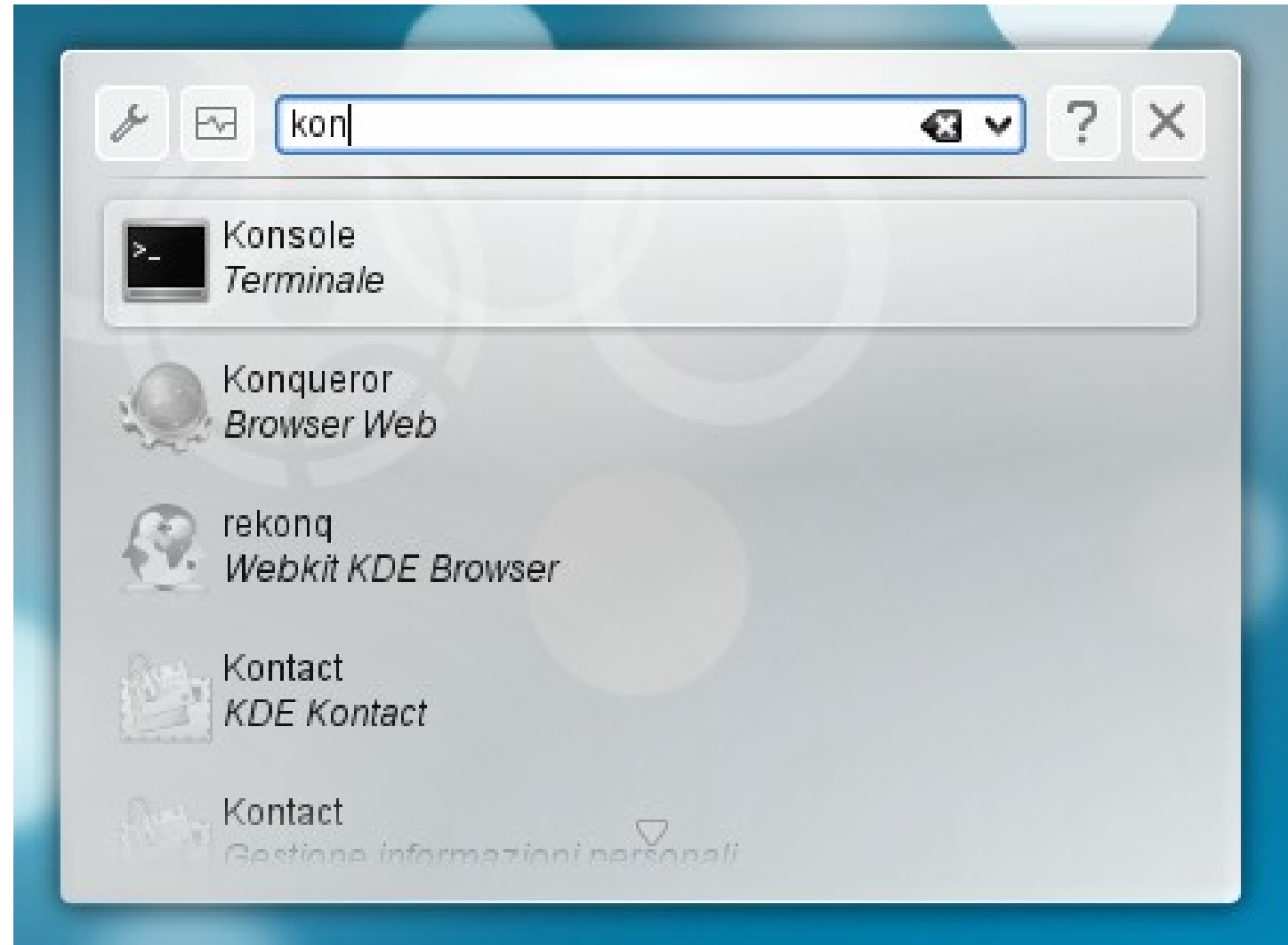
This is a Krunner plugin which allows you to copy/show/edit/add entries from KWallet

● C++ ☆ 4 🍷 2

My origin story - how I ended up in KDE

- Some of my runners required configuration
- Should ideally be done right after installation
- Simple idea: Launch runner's config when opening KCM with argument
 - <https://phabricator.kde.org/D26738>
- It proved to be quite addictive :)

Where we
came from -
looking
back at the
KDE4 times



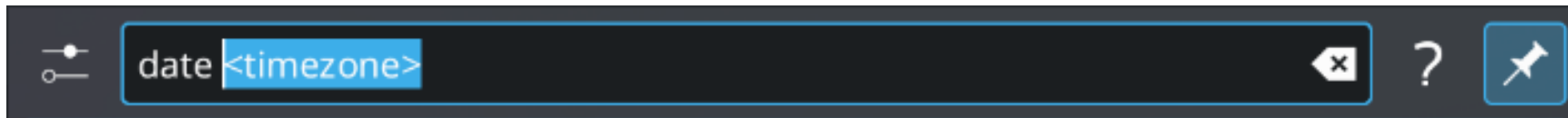
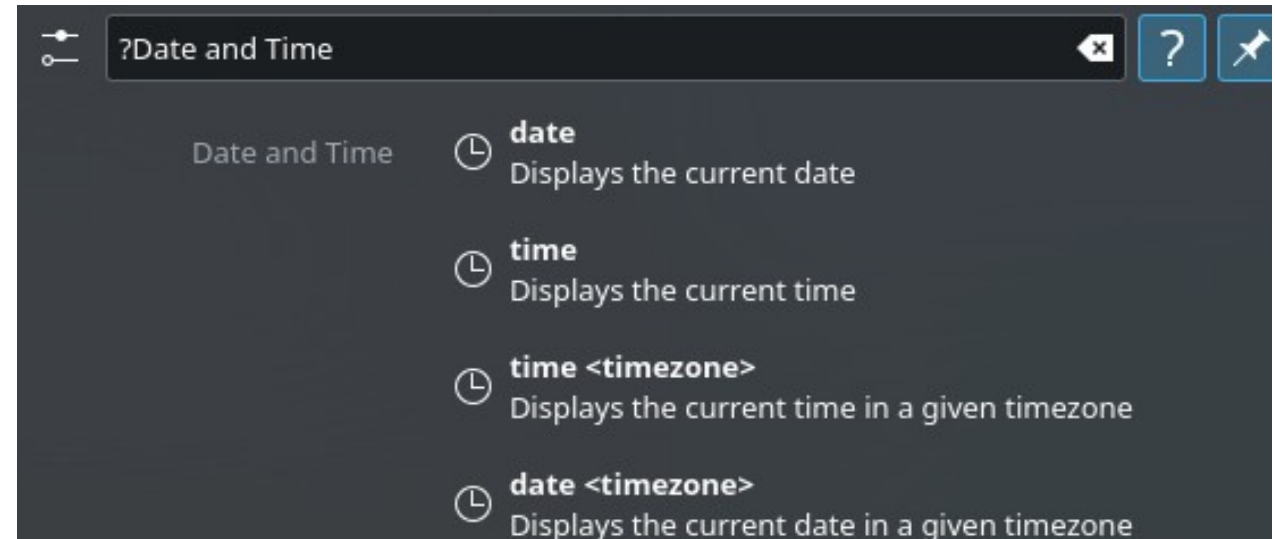
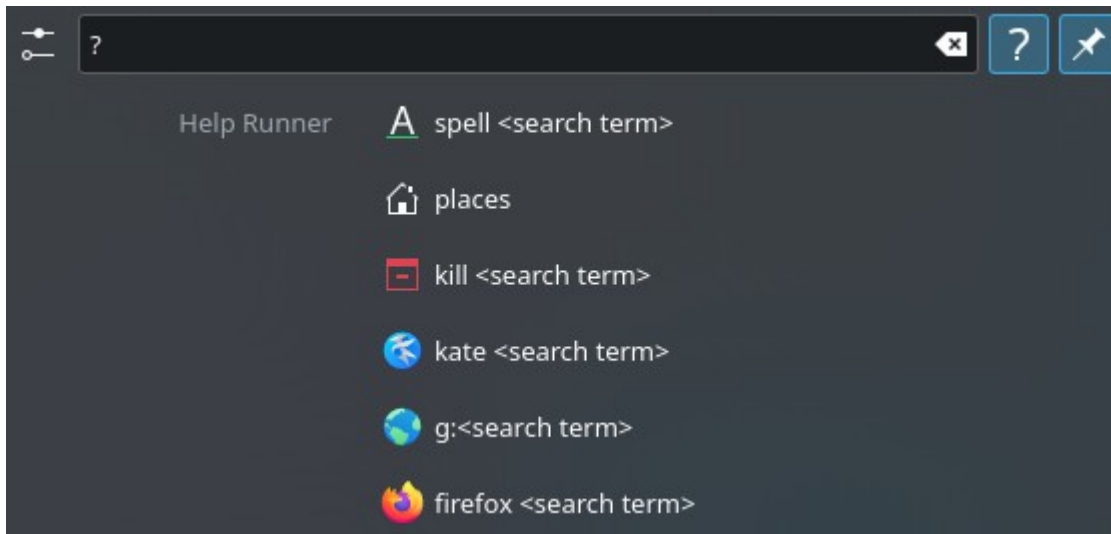
Where we came from - looking back at the KDE4 times

- QWidgets based UI
 - Runoptions with match-specific widget
- Help-Button
- Scrollable view
- Scripting support using Kross
 - Python, Ruby, JavaScript

Important features – Help plugin

- Help button KRunner 4 was coded as part of UI
- RunnerSyntax class still existed in KF5 and runners used it
- More flexibility by implementing it as a plugin
- Magic trick: Cast parent to RunnerManager and access other runners

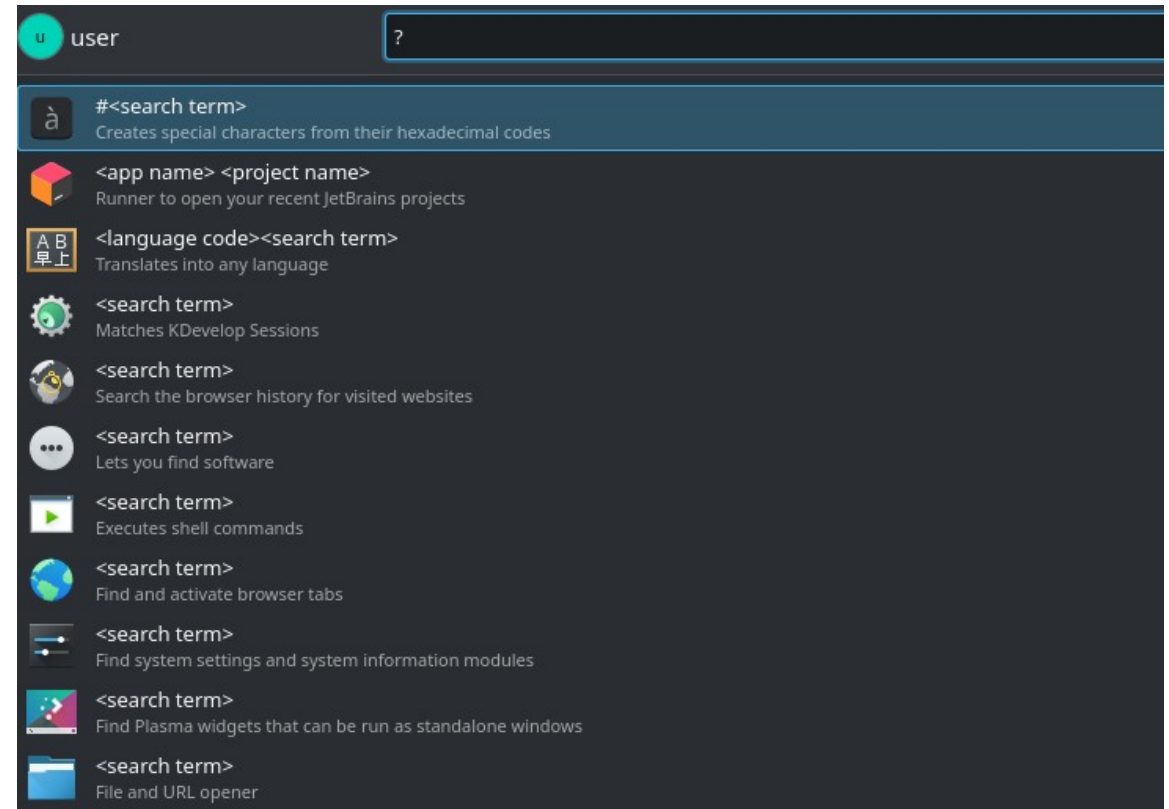
Important features – Help plugin



Important features

- Help plugin

- Available in Kickoff due to being a plugin



Important features – Help plugin



Posted by u/wael_ch  2 years ago   2  2 



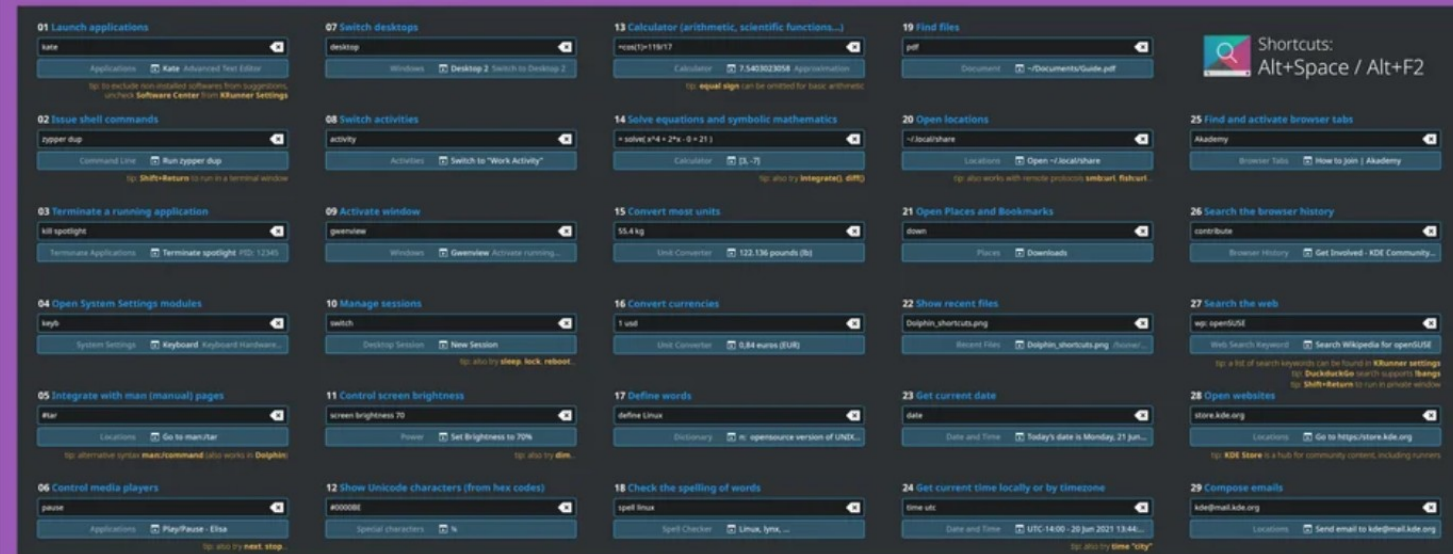
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Akademy 2021 Day 3: Took too much time, but at last ... behold KRunner!



Tip

Features of KRunner, Command launcher by KDE



The screenshot displays a grid of 29 numbered features of KRunner, each with a search bar and a list of results. The features include:

- 01 Launch applications: Search for 'kate', results include Kate Advanced Text Editor.
- 02 Issue shell commands: Search for 'zypper dup', results include Command Line, Run zypper dup.
- 03 Terminate a running application: Search for 'kill spotlight', results include Terminate Applications, Terminate spotlight PID: 12345.
- 04 Open System Settings modules: Search for 'keyb', results include System Settings, Keyboard: Keyboard Hardware.
- 05 Integrate with man (manual) pages: Search for 'man', results include Locations, Go to man:man.
- 06 Control media players: Search for 'pause', results include Applications, Play/Pause - Elisa.
- 07 Switch desktops: Search for 'desktop', results include Desktops, Desktop 2: Switch to Desktop 2.
- 08 Switch activities: Search for 'activity', results include Activities, Switch to "Work Activity".
- 09 Activate window: Search for 'gwenview', results include Windows, Gwenview: Activate running...
- 10 Manage sessions: Search for 'switch', results include Desktop Sessions, New Session.
- 11 Control screen brightness: Search for 'screen brightness 70', results include Power, Set Brightness to 70%.
- 12 Show Unicode characters (from hex codes): Search for 'a00000', results include Special characters, %.
- 13 Calculator (arithmetic, scientific functions...): Search for 'res(1+1)*17', results include Calculator, 7.5423023058 Approximation.
- 14 Solve equations and symbolic mathematics: Search for '= solve x^4 + 2x^3 - 6x + 21', results include Calculator, (5, -7).
- 15 Convert most units: Search for '55.4 kg', results include Unit Converter, 122.136 pounds (lb).
- 16 Convert currencies: Search for '1 usd', results include Unit Converter, 0.84 euros (EUR).
- 17 Define words: Search for 'define linux', results include Dictionary, open-source version of UNIX.
- 18 Check the spelling of words: Search for 'spell linux', results include Spell Checker, Linux, linux, ...
- 19 Find files: Search for 'pdf', results include Locations, ~/Documents/Guide.pdf.
- 20 Open locations: Search for '~/Acad/share', results include Locations, Open ~/Acad/share.
- 21 Open Places and Bookmarks: Search for 'down', results include Places, Downloads.
- 22 Show recent files: Search for 'Dolphin_shortcuts.png', results include Recent Files, Dolphin_shortcuts.png / Dolphin.
- 23 Get current date: Search for 'date', results include Date and Time, Today's date is Monday, 21 Jun...
- 24 Get current time locally or by timezone: Search for 'time utc', results include Date and Time, UTC 14:00 - 20 Jun 2021 13:44...
- 25 Find and activate browser tabs: Search for 'Academy', results include Browser Tabs, How to join | Academy.
- 26 Search the browser history: Search for 'contribute', results include Browser History, Get involved - KDE Community...
- 27 Search the web: Search for 'wpi: openUSE', results include Web Search Keyword, Search Wikipedia for openUSE.
- 28 Open websites: Search for 'store.kde.org', results include Locations, Go to https://store.kde.org.
- 29 Compose emails: Search for 'kde@mail.kde.org', results include Locations, Send email to kde@mail.kde.org.

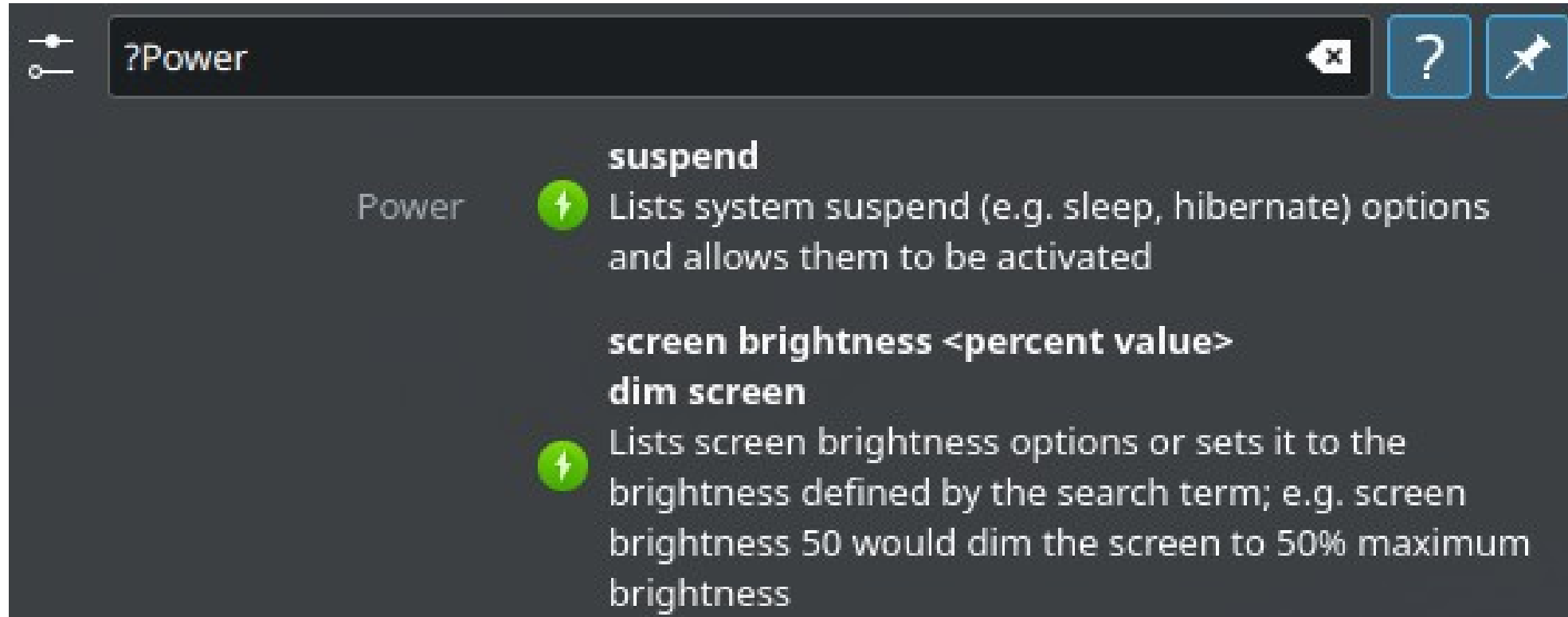
Bonus tip: **Alt+Shift+F2** to run command from clipboard.

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Important features – Multiline text

- Used in dictionary and help runner
- Allows usage of Qt's styled text markup
- Used for highlighting and organizing information
- Activated using `QueryMatch::setMultiline`

Important features – Multiline text



Important features – Testing

- KRunner got more test coverage – framework and individual plugins
- Writing tests that use the runner directly was hard
 - Either manually load a plugin
 - Or build a static lib
- "krunner_configure_test" CMake function to the rescue

Important features – Testing

CMake function for DBus runners and C++ plugins

- `krunner_configure_test(dbusrunnertest testremoterunner DESKTOP_FILE ".../dbusrunnertest.desktop")`
- `krunner_configure_test(datetimerunnertest org.kde.datetime)`

Accompanied by `AbstractRunnerTest` header:

- `void initProperties()`
- `QProcess *startDBusRunnerProcess(...)`
- `void killRunningDBusProcesses()`
- `QList<KRunner::QueryMatch> launchQuery(QString query)`

Important features – Deduplication

- Previously lots of duplicate results:
 - Recent documents and Baloo
 - Shell runner and applications
- Deduplication based on QueryMatch::id
- Explicitly enabled in metadata



All about the plugins - KRunner's ecosystem

- In KDE4 -> KDE5 transition, all scripted runners became unsupported
- With DBus-Runners, we once again have a thriving ecosystem!
- Various API improvements since initial creation
 - Lifecycle methods
 - Optimizations
 - Setting only specific actions for matches
 - RunnerSyntax support in metadata

All about the plugins - KRunner's ecosystem

- Promise to keep KF5 DBus-Runners compatible with KF6
- If you don't get a deprecation warning about the desktop file location ;)
- `${KDE_INSTALL_DATAROOTDIR}/krunner/dbusplugins` install location available since KF 5.72

All about the plugins - KRunner's ecosystem

- In Plasma 5.21 KDE Store integration was added
- Support for install scripts or prebuild deb/rpm/other packages
- Of course, warnings and recommendation for manual review implemented
- Terminal window was opened to allow manual intervention and adjustments

All about the plugins - KRunner's ecosystem

- Worked great and many more plugins on KDE Store
- But still not great UX
- Most install scripts for DBus-Runners are from official template
- Idea: Specify files in metadata format and install them without custom script
 - Could be extended with dependency installation/checks

Changes in KF6

- Lots of old code was removed and API refactored
- Most consumer-facing changes were prepared with deprecation macros
- Namespace was changed from "Plasma" to "KRunner"
- Significantly reduced dependency tree

Changes in KF6

- Model from Milou is now part of framework
 - Core functionality is in one place
 - More flexibility when changing code
- Kicker uses this unified model
- KRunner::Action as simple data class introduced
- Refactoring of threading was large effort

Changes in KF6 - Threading

- "Currently KRunner uses mental multi-threading for everything" - Kai
- Referring to `AbstractRunner::match` being called in different threads
- `Prepare/teardown/init/reloadConfiguration` are still done in main thread

Changes in KF6 - Threading

- Data initialization is a hassle if one does not want to block main thread
- Solution is to move runners to their own thread
- Prepare/teardown/init/reloadConfiguration are called in the runner's thread
 - Safe initialization and cleanup of data
- Even less code in frameworks
- Possibility for further optimizations



Further Plans & Ideas

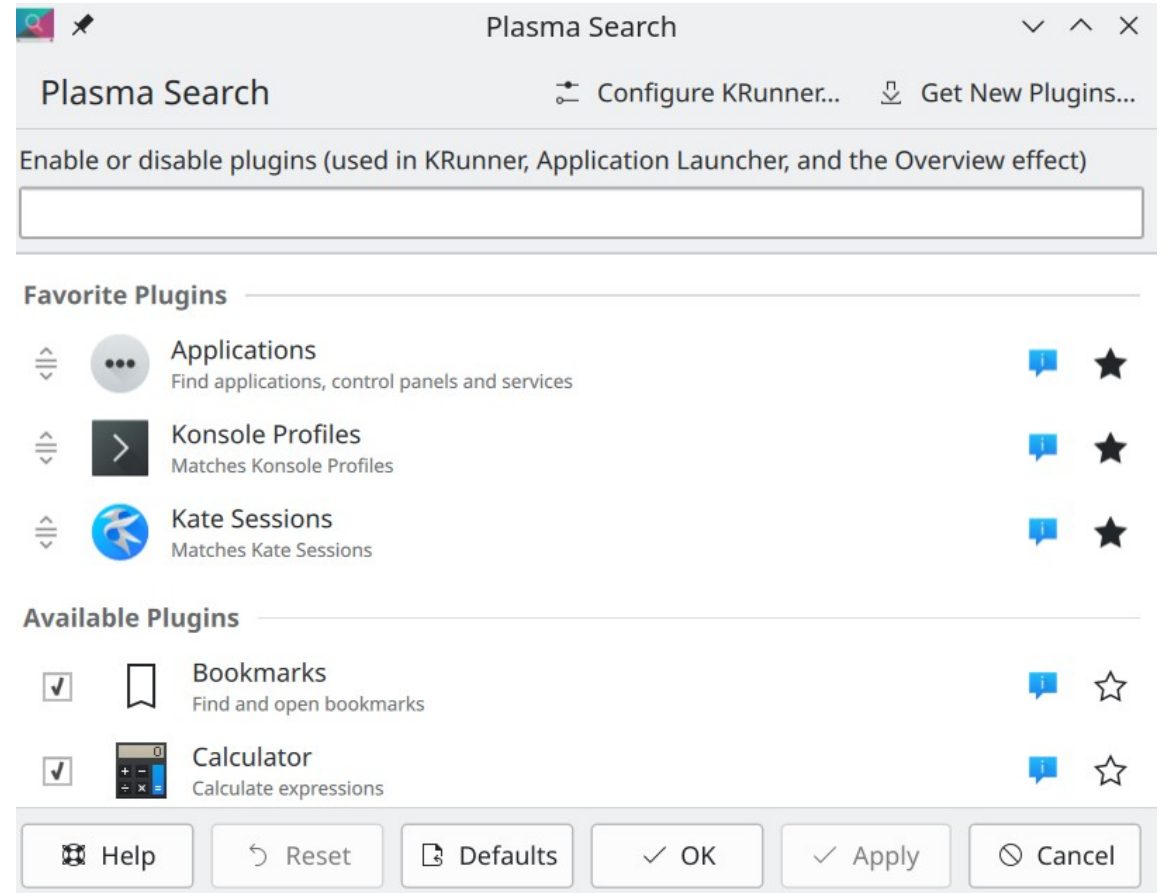
- Overall, KRunner is in a pretty good state
- We utilize DBus-Runners where appropriate:
 - Plasma-Browser-Integration
 - KWin
 - Kactivitymanagerd
- Utility library for deduplicating C++ DBus-Runner code

Further Plans

- Sorting still needs improvements
- We use both match type and relevance for sorting
 - Match type is enum with magic values
 - If the match type is different, the higher one wins
 - Only if the match type is the same, relevance is considered
- Instead, separate sorting for categories and within category
- Smarter learning of your preferred results

Further Plans

- Making sort order configurable in plasmasearch KCM
- Fixed order for favorites
- Order within category unchanged
- Long requested feature with many duplicate reports





Big thanks to the community!

- All this would not have been possible without other members of KDE
- David Edmundson
- Natalie Clarius
- Kai Uwe Broulik
- Fushan Wen
- Nate Graham

KRunner BoF!

- Tuesday 9:00 EEST in Room 2!
- Plan to discuss DBus-Runner ideas and visual improvements
- Hope to see you there!

