Boosting your code and simplifying your life with clazy

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Akademy 2025, Berlin

What is Clazy?

- A Clang-based static analysis tool for C++
- Developed primarily for Qt code
- Provides compile-time checks to catch common performance and correctness issues
- Runs as a Clang plugin or via command-line interface

What is Clazy?

- Checks are organized in levels: level0, level1,level2 and manual level
- Indication for how critical the issue and how reliable the check is
- Some checks provide replacement snippets called “fixits”

My history with Clazy

- Initially started playing as part of dev process
- Had to compile from source
    - Broken Neon packages with incompatible ABI ;)
- First real contact with clazy development

My history with Clazy

- First patch in December 2023 improving docs
  - … and a few days later fixing a false positive
- Snippet from plasma-workspace:
- QRegularExpression(QString("Panel %1$").arg(panelId()))

Starting the Dev-Streak

- First steps to compile and run tests were rather hard, no checks on CI other than compilation
- Mission: Make it easier to get started

Starting the Dev-Streak

- Improve test setup, run test via “ctest” without install
  - Parallel execution makes CI blazing fast 🚀
- Ensure proper formatting and freshness of generated files

- Better safety-net for contributors

Starting the Dev-Streak

- Many checks did not work with Qt6
- … or C++ 17 due to changed syntax tree

- Version 1.12 with full Qt6 support, first release since 2.5 years

Maintaining & Improving

- Lots of check could use improvements and fixes for false-positives
- Used KDE codebase to look for real-world cases 😎
- Focus on providing new fixits to existing checks

Maintaining & Improving

- Example “qcolor-from-literal” fixits
- QColor("#001020") => QColor(0x001020)
- QColor("#00112233") => QColor(0x11, 0x22, 0x33, 0)
- Invalid string-patterns are also reported!

Integrating & running clazy

- Two main ways:
  - As a clang plugin during compilation
  - Using a clazy-standalone executable

Integrating & running clazy

- Clang-plugin is wrapped in “clazy” shell-script
- Can be used as normal compiler:
  - -DCMAKE_CXX_COMPILER=clazy
  - export CXX=clazy

Integrating & running clazy

- clazy-standalone does same checks, but does not compile code
- Utilizes compile_commands.json file
- Example:
    - clazy-standalone -p build src/**.cpp

Integrating & running clazy

- Checks are configured using “CLAZY_CHECKS” environment variable
- Combination of levels and individual check names
- level0,level1,used-qunused-variable,no-qproperty-without-notify

clang-tidy, if all
people only run clazy

Clazy & Clang-Tidy

- Clang ecosystem has its own linter: clang-tidy
- Offers performance, modernization and bug checks
- Operates like clazy-standalone on compile commands file

Clazy & Clang-Tidy

- Clang-Tidy has plugin support in latest release
  - KDE loooves plugins ;)
- Plugin-API is far more restrictive than compiler plugin/standalone

Clazy & Clang-Tidy

- Refactorings proceeded integration, 9 pull requests in total
- Improving flexibility of internal API
- Check registration is more restricted in clang-tidy
  - No concept of check-levels, only wildcards

Clazy & Clang-Tidy

- Clang-Tidy command needs plugin file
  - -load=ClazyClangTidy.so
  - If not in library path, absolute path to plugin

Clazy & Clang-Tidy

- All checks of clazy plugin have “clazy-” prefix
- Example command line flag to enable some:
  - -checks=clazy-qdatetime-utc,clazy-qgetenv"

Clazy & Clang-Tidy

- Instead of levels, define check list as ENV variable
  - https://alex1701c.github.io/2025/07/27/clazy-clangtidy.html
- Enable/disable checks after level is specified
  - -checks="$CLAZY_LEVEL0,-clazy-use-static-qregularexpression"

Clazy & Clang-Tidy

- “run-clang-tidy” executable allow parallel execution 🚀
- Warnings outside of source file are hidden by default
  - Specify header-filter to view all
- Use full power of NOLINT commands – supported by other modes of clazy too 😎

Thank you
& Happy Hacking

Read more on my blog:
https://alex1701c.github.io/