# A Tale of Kleopatra

Accessibility: From Insufficient to Minor Limitations

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# ABOUT ME

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# KLEOPATRA

The KDE Certificate Manager

Packaged for Windows by g10 Code GmbH as

Gpg4Win and GnuPG VS-Desktop®

GnuPG VS-Desktop® is approved by the German BSI for

handling EU RESTRICTED (VS-NfD) data

# ACCESSIBILITY

January 2022

Not compliant with BITV 2.0

| Users | Accessibility |
|---|---|
| visually impaired | limited |
| blind | insufficient |
| mobility impaired | insufficient |
| cognitive impaired | limited |

**Kleopatra**

22 findings

Rated with 3 levels of severity for the considered types of impairment

All findings of levels 2 and 3 and most findings of level 1 were addressed

# ACCESSIBILITY

**Kleopatra**

January 2022

Not compliant with BITV 2.0

| Users | Accessibility |
|---|---|
| visually impaired | limited |
| blind | insufficient |
| mobility impaired | insufficient |
| cognitive impaired | limited |

February 2023

Partially compliant with BITV 2.0

| Users | Accessibility |
|---|---|
| visually impaired | limited |
| blind | limited |
| mobility impaired | limited |
| cognitive impaired | not checked |

"Compared to the previously tested version, 8 problems have been fully solved and 5 problems have been partially solved."

# Main View

# Main View

**as seen by assistive tools (January 2022)**

# Details View

# Details View

**as seen by assistive tools (in January 2022)**
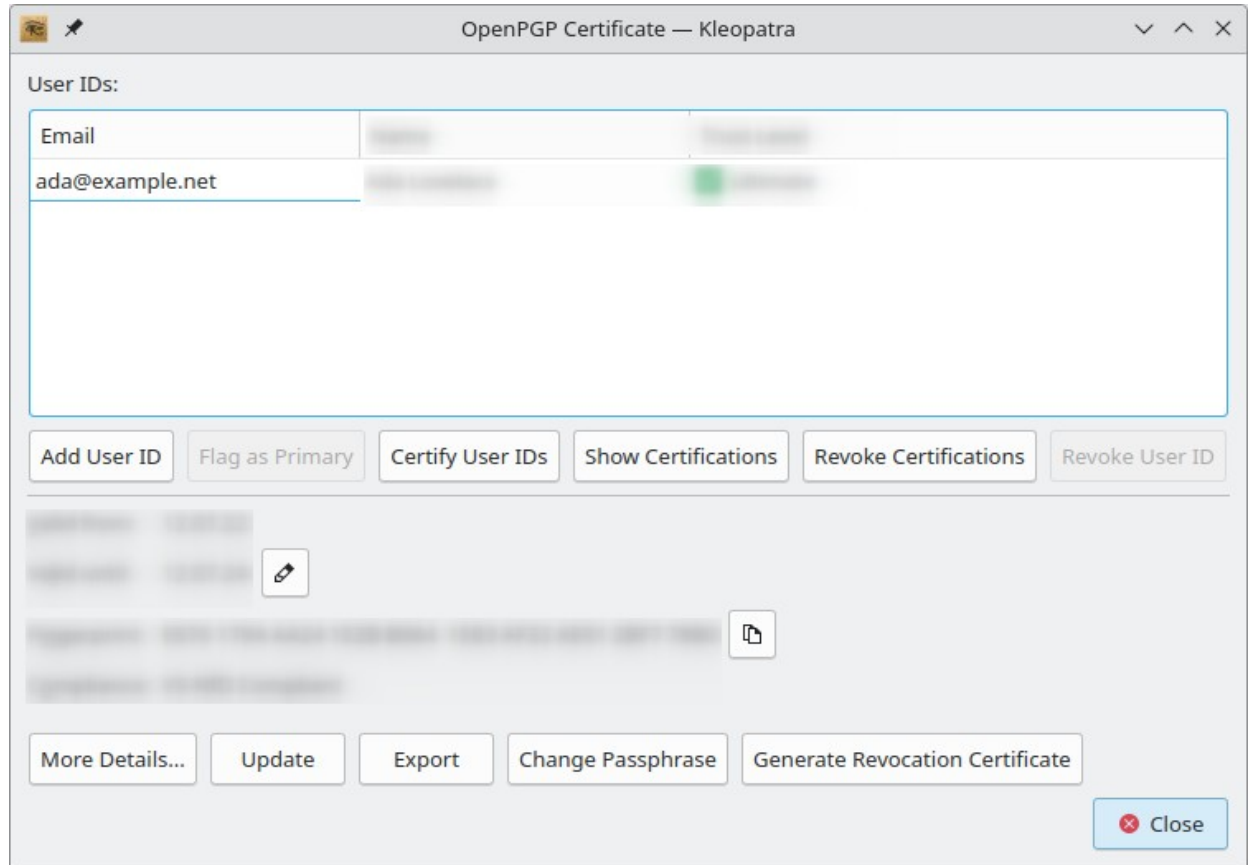
# Colors & Contrast

**Dark high contrast mode on Windows (mock-up, January 2022)**

Problems

Bad contrast where colored background is used

Dark icons on dark background (not shown on mock-up)
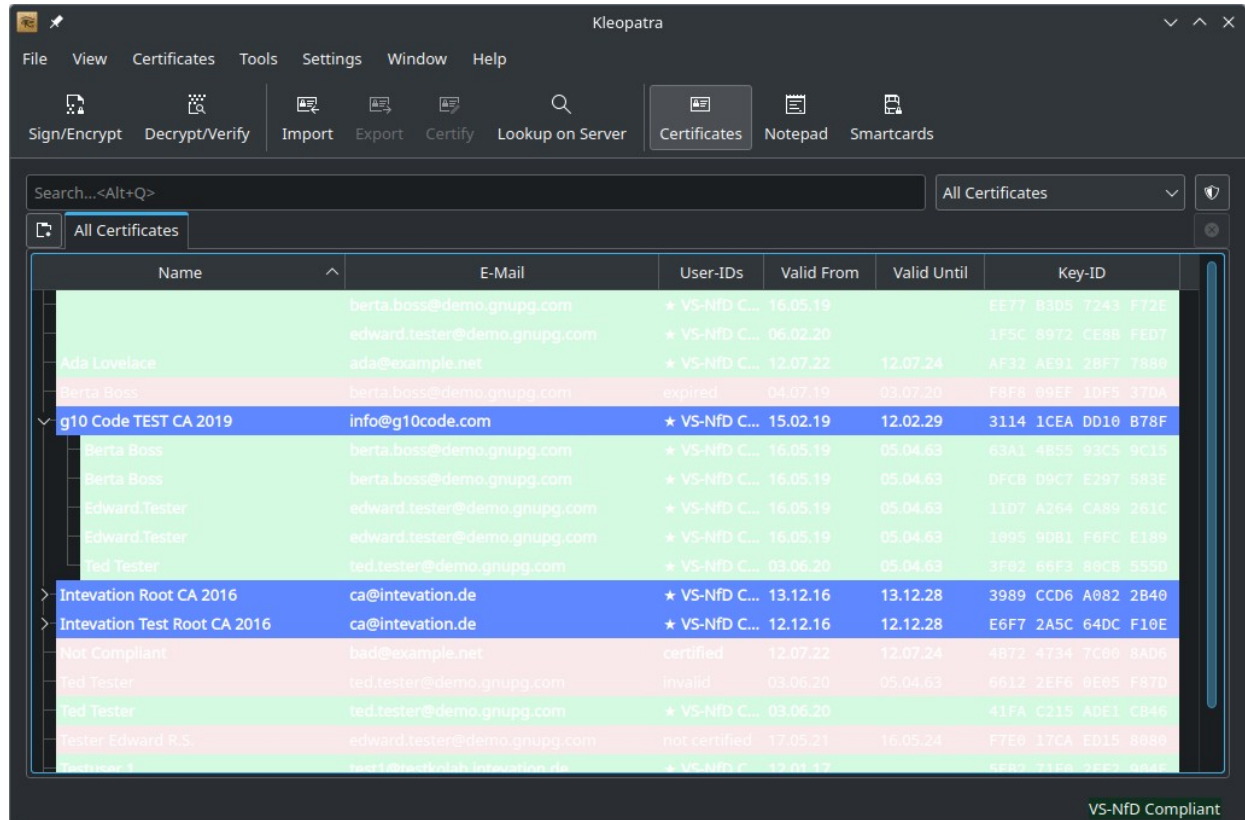
# Colors & Contrast

**Dark high contrast mode on Windows (image shows simulation on Linux)**

Changes

Don't use colors if high contrast mode is enabled on Windows

Use Breeze-dark icons if dark high contrast mode is enabled on Windows

Open

Requires a restart of Kleopatra
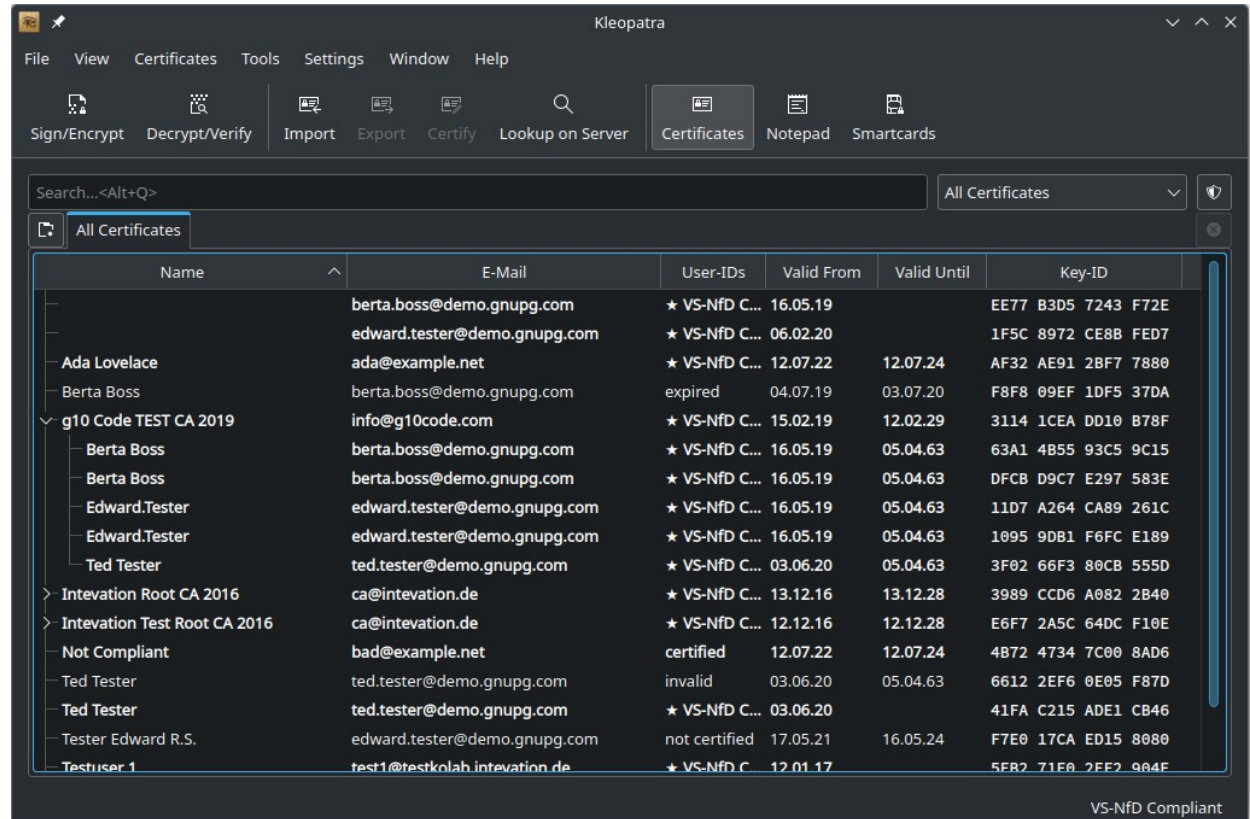
# Tool Bars

**Tool bar should be usable with the keyboard**

Changes

Allow all tool bar buttons to get focus

Fix tab order

Open

Upstream to KXMLGui?
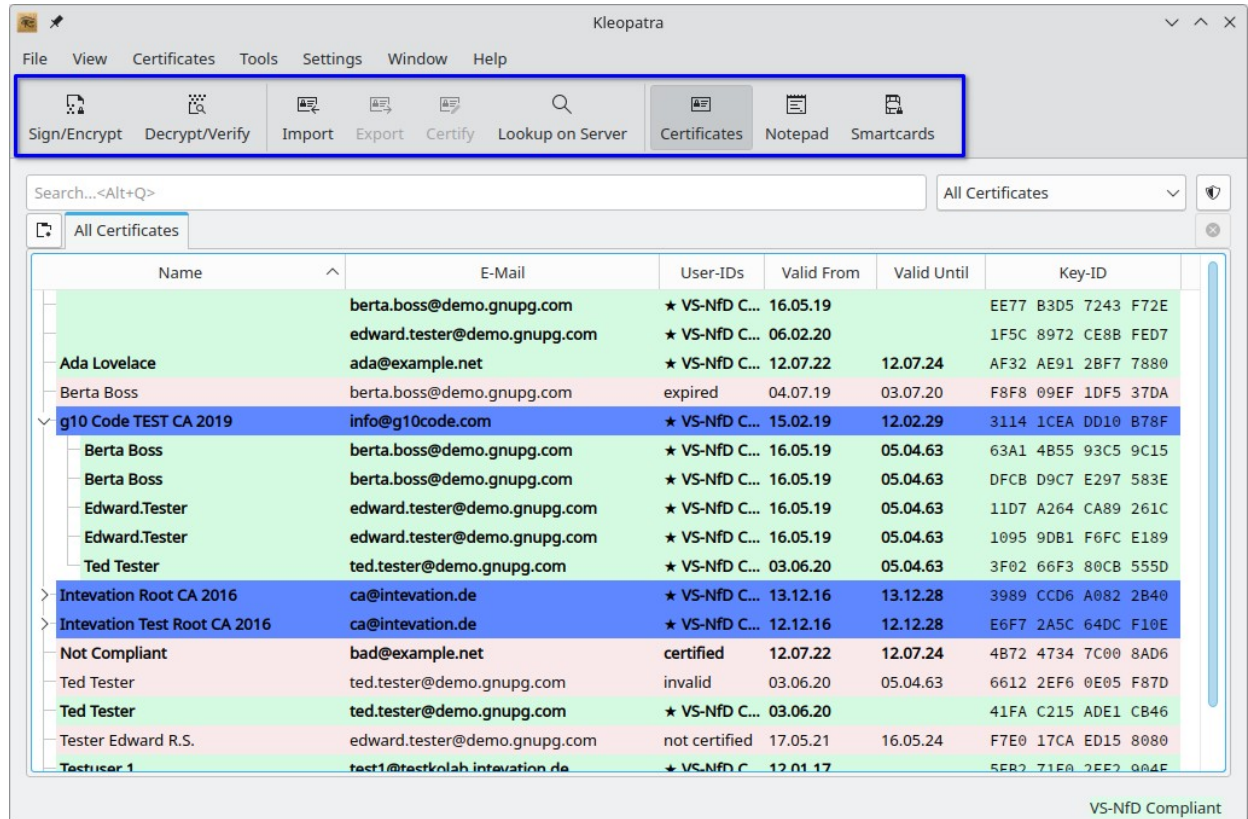
# Labeling

**All form elements should be labeled**

Changes

Set accessible names on search field and filter drop down

Add some labels to other form elements

Set buddy of all labels

Open

On Linux, Qt reports the value of the combo box as accessible name instead of the label or the accessible name (AT-SPI spec bug?)
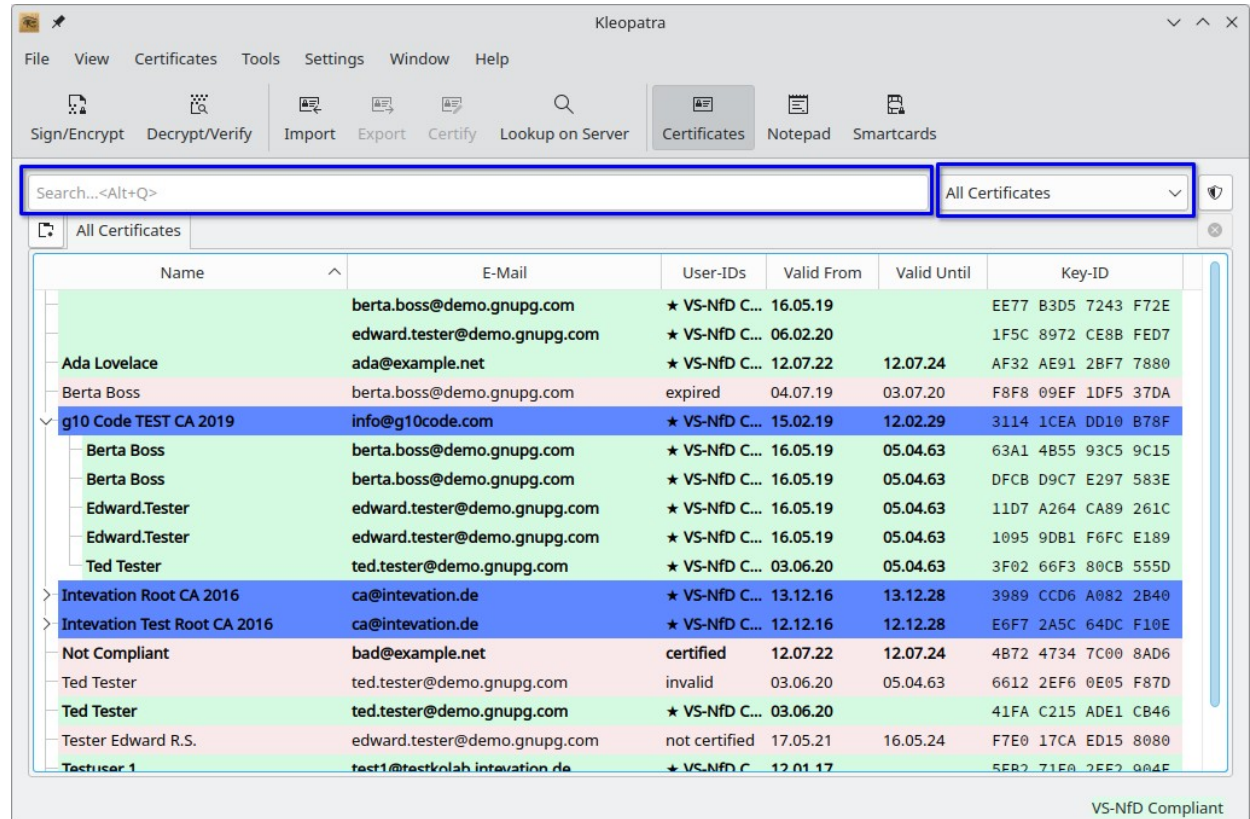
# Icon Buttons

**Icon-only buttons must have an accessible name**

Changes

Set accessible name for all icon-only buttons

# Tab Bars

Changes

Create top-left corner widget, then tab widget, then top-right corner widget for correct tab order

Do not (auto-)hide tab bar with less than 2 tabs (breaks keyboard navigation)

Open

Report and fix in Qt

# Tree Views

**Cell-by-cell keyboard navigation for assistive tools**

Changes

Set accessible name for list/tree views

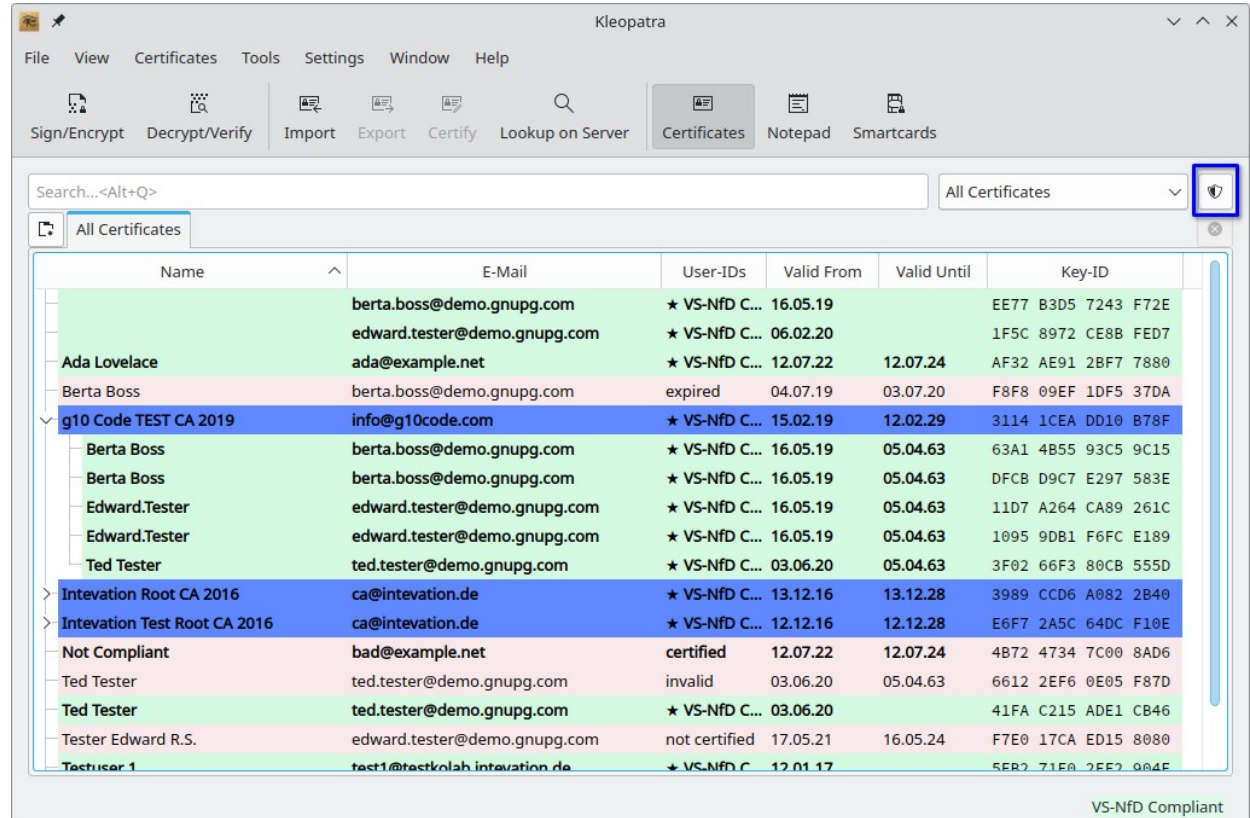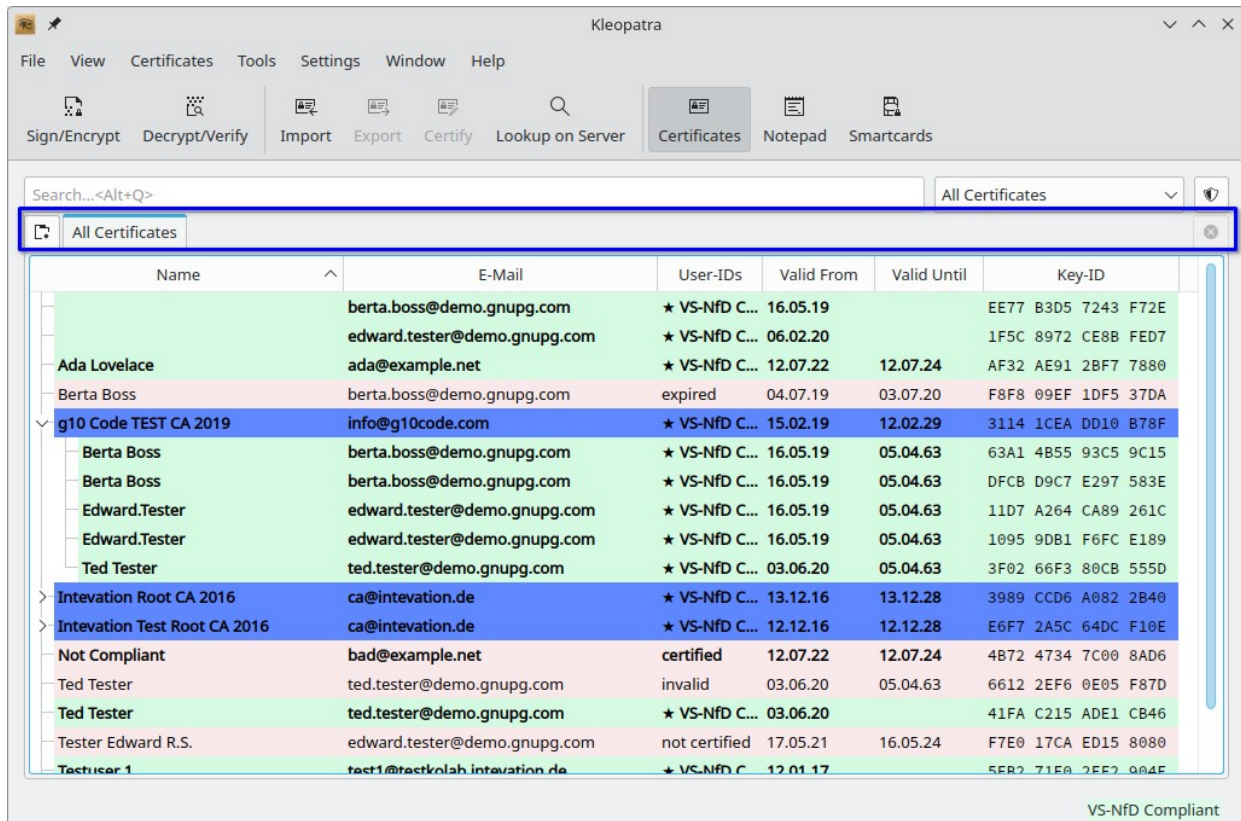Allow column-by-column navigation with keyboard despite full-row selection mode; disable parent-child navigation with arrow keys

Announce current item when tree view gets focus (workaround for accessible event order problem In QTreeView)

Skip QListView's currentChanged in override (workaround to prevent accessible focus event when list view doesn't have focus)
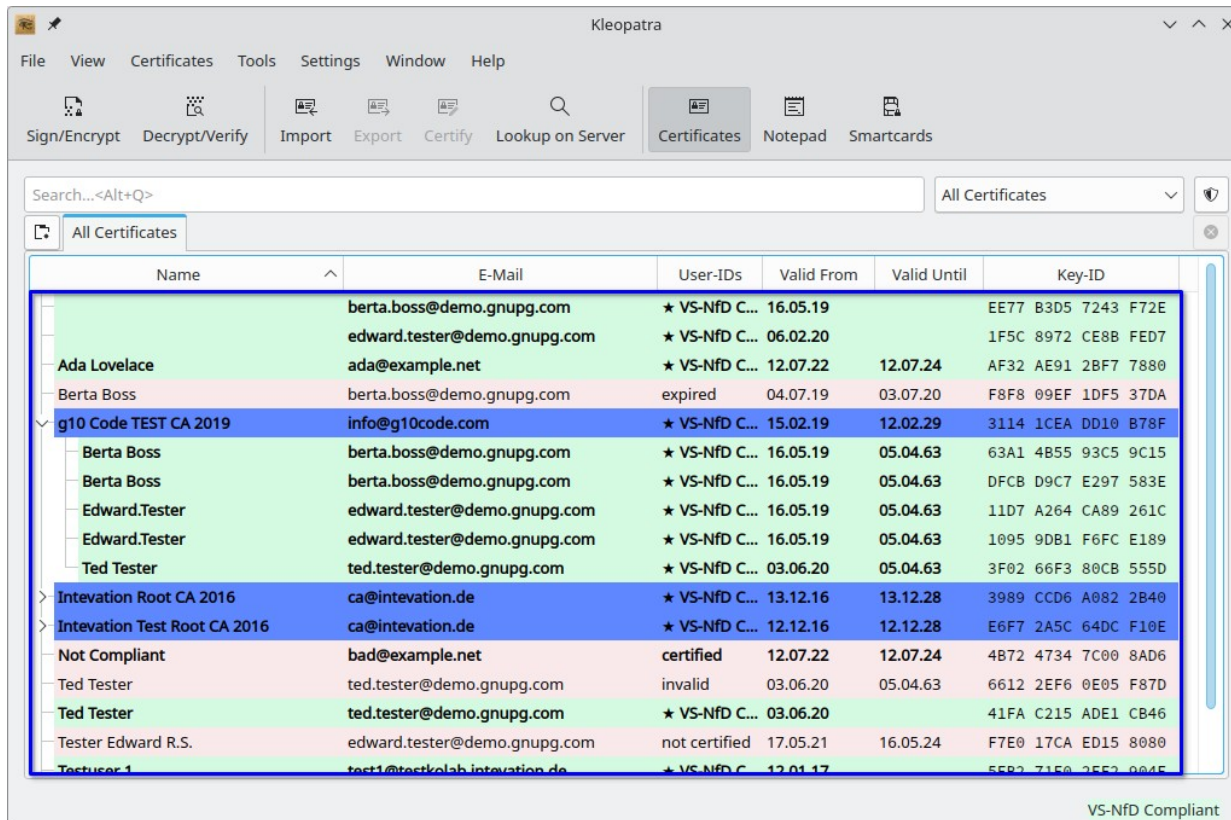
# Tree Views

**Cell-by-cell keyboard navigation for assistive tools**

Open

Upstream full-row selection with cell-by-cell navigation (?)

Report and fix problems in Qt

New findings in second test

Changing the sort order not possible with the keyboard

Showing additional columns not possible with the keyboard

# Special Values

**Help screen readers reading structured text**

Changes

Return more accessible text representations (Qt::AccessibleTextRole) for some model entries, e.g. dates and hex strings

Return more accessible text representations for empty model entries (workaround for orca saying nothing)

# Labeled Values

**Static text like labeled values should be accessible with the keyboard**

Changes

Add InfoField class to make name-value pairs displayed with two labels accessible; requires a custom accessible role for the value label to make it work as intended on Windows

Show focus indicator for value that has focus

# Input Forms

**New form for creating OpenPGP certificate**

# Kill your darlings

**Fancy is the enemy of usable and accessible**

Changes

Replace wizard with normal dialog (QWizard has too many accessibility issues)

Replace "Choose type of certificate" step with two separate actions (QCommandLinkButton has accessibility issues, e.g. appears as radio button and secondary text is not accessible)



Assistent zur Erstellung eines Schlüsselpaars

## Art des Schlüsselpaars auswählen

Bitte wählen Sie, welchen Typ Sie erstellen wollen.

→ Persönliches OpenPGP-Schlüsselpaar erstellen
OpenPGP-Schlüsselpaare werden durch die Überprüfung des Fingerabdrucks des öffentlichen Schlüssels beglaubigt.

→ Persönliches X.509-Schlüsselpaar und Beglaubigungs-Anfrage erstellen
X.509-Schlüsselpaare werden von einer Beglaubigungsstelle (CA) beglaubigt. Die generierte Anfrage muss zu einer CA gesendet werden, um die Erstellung abzuschließen.

Weiter    Abbrechen

# S/MIME Dialog

**OpenPGP dialog looked like this**

# Required Values

**How not to do it**

Assistive tools cannot provide useful information to their users

orca doesn't read "required"/"optional" because of less-than-3-words-heuristic for static text

In OpenPGP dialog, name and email address were both marked as optional although one of them has to be given

# Error Reporting

**How not to do it**

Error is displayed far from the corresponding input field

Assistive tools cannot provide useful information to their users

Challenging for users with cognitive or visual impairments

# Optional Values

**Instruct users what they are expected to do**

Changes

No superfluous and confusing "optional"

Word the description as easily understandable instruction
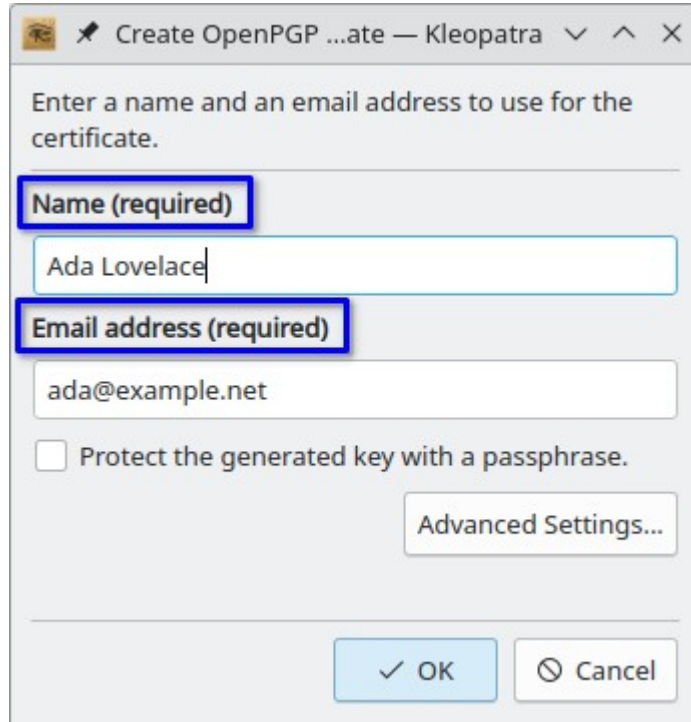
# Required Values

**How to do it**

Changes

Mark labels of required inputs

Side note: HTML has special attributes for required inputs which allows marking with * and still being accessible; could be emulated by adding "required" to the accessible name if orca didn't prefer the label over the accessible name

# Error Reporting

**A better solution**

Changes
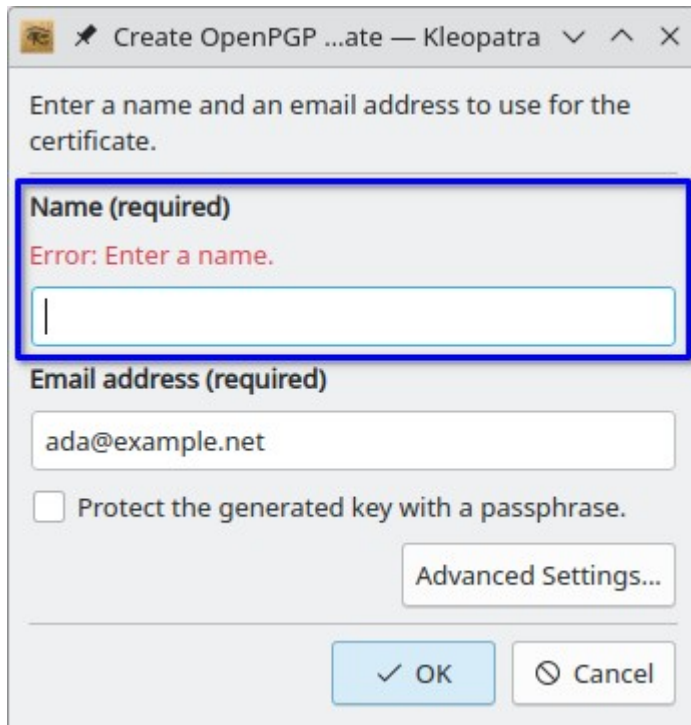
Append ", invalid data" to the accessible name of the input field (emulates handling of IA2's "invalid entry" state by screen readers)

Set error message as accessible description of the input field (emulates handling of "described by" relations by screen readers)

Word error messages as instructions if appropriate, e.g. "Enter a name." instead of "A name is required."

Open

Extend Qt to support the "invalid entry" state

# Error Reporting

**Another example**

Changes

Again: The error message is worded as an instruction and gives an example.

# Bonus: Hints

**Tell the users what is expected**

Changes

Similar to error messages the hints are worded as instructions

Set hint as accessible description of the input field (emulates handling of "described by" relations by screen readers)

Open

Add support for "described by" relations to Qt (currently Qt supports "labeled by")

# Links in Labels

**Make them more accessible**

Changes

Add subclass of QLabel, corresponding
AccessibleWidget subclass and
AccessibleLink class (with role Link)
representing links of rich text labels to make
the links displayed by the label accessible in
the same way as links displayed by a web
browser

Open

Add support for accessible links to QLabel
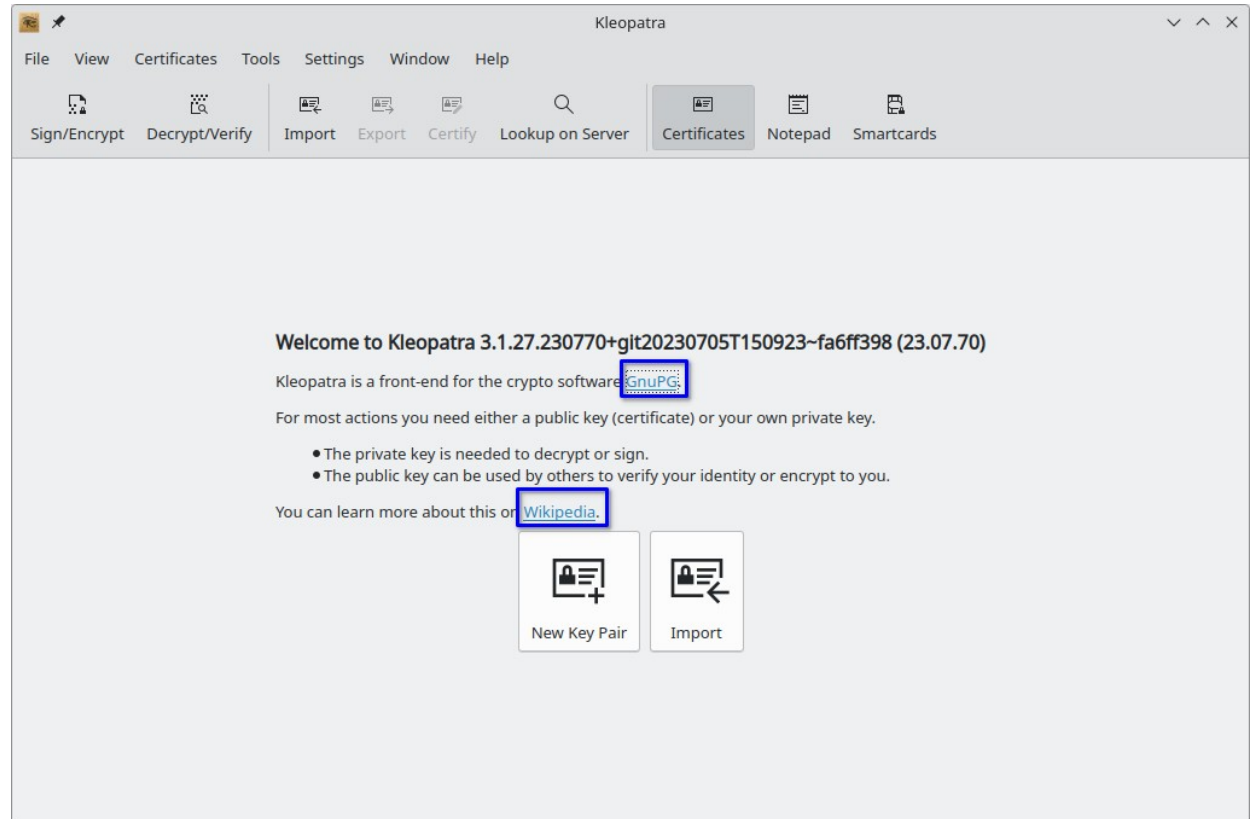
# Line Edit Actions

**Use them with care**

Custom QLineEdit actions (like Show/Hide Password or Clear) are unreachable with the keyboard and invisible for assistive tools; avoid them or ensure that there is an easily accessible alternative way to achieve the same result

Changes

Replace some custom QLineEdit actions with buttons next to the input field

Show a message box instead of an error label if the two passwords do not match (orca ignores labels that become visible)
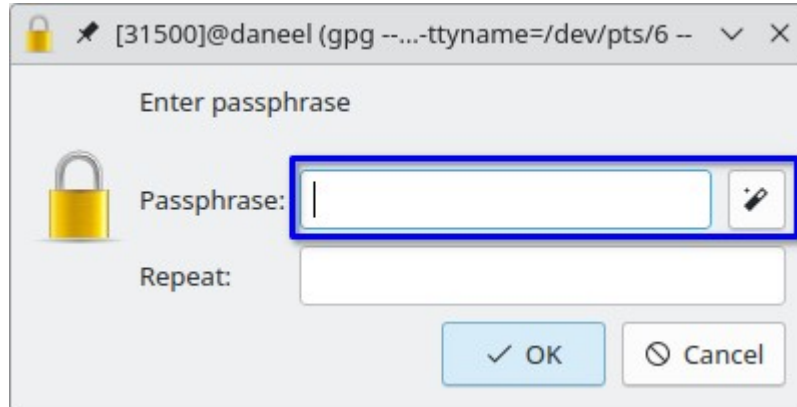
# Focus for Text

**For more accessible errors and other static text**

Changes

Add a helper that allows labels to receive keyboard focus if an assistive tool is active

Show focus indicator for static text that has focus

Open

Make all static texts (all QLabel) accessible

Thank you!

Questions?

# Links

Parent ticket for many accessibility tickets

Accessibility for QWidget Applications (Qt 5)

Source code of gui/accessible and widgets/accessible

# More Changes

**These didn't fit on the slides**

Ensure that empty line edits that get focus are announced by orca (workaround for an event order problem in QLineEdit that makes orca not announce the line edit)
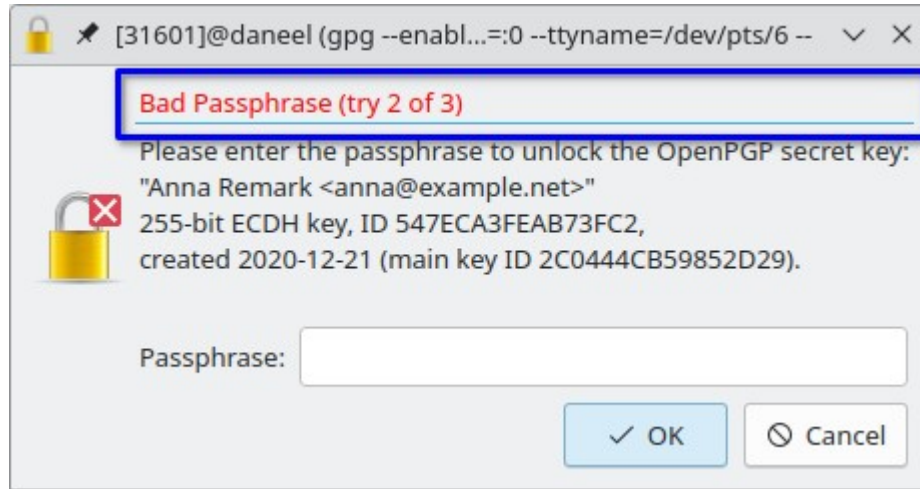
Fix tab order problems everywhere

Set accessible name and/or description where appropriate

Send a state-change event if a checkable list item is checked or unchecked

Emulate setting accessible name of a QAction with a custom property (workaround for lack of accessible name in QAction)

Make dialogs work on narrow displays resp. with large magnification

Take the added scroll areas out of the tab order (there is no focus indicator and the screen readers also give no useful hint which element has focus)

Ensure that screen readers correctly read a list of disallowed characters like '<' and '>' in email addresses

Ensure that a QLabel showing just a link can be left with Shift+Tab

Make multi-column models used with combo boxes or as completion model work correctly for screen readers