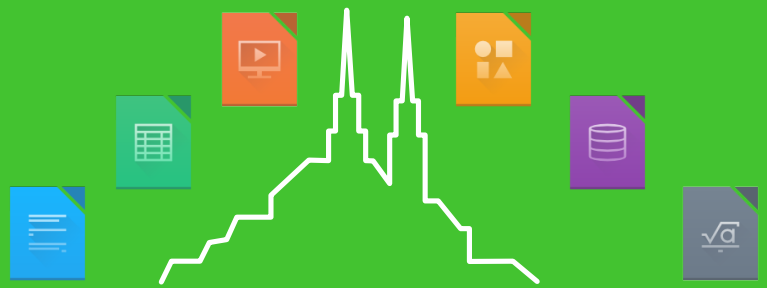
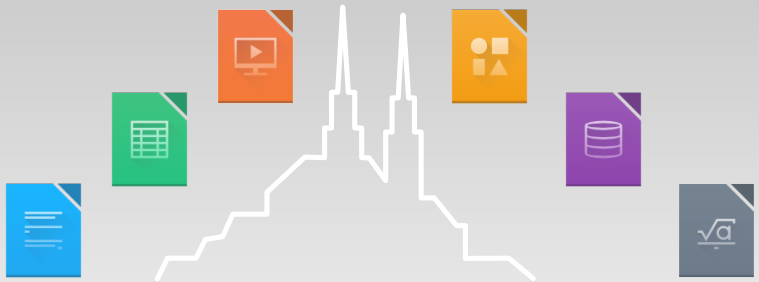
BRNO 2016 CONFERENCE



Unifying LibreOffice Low Level Text Layout

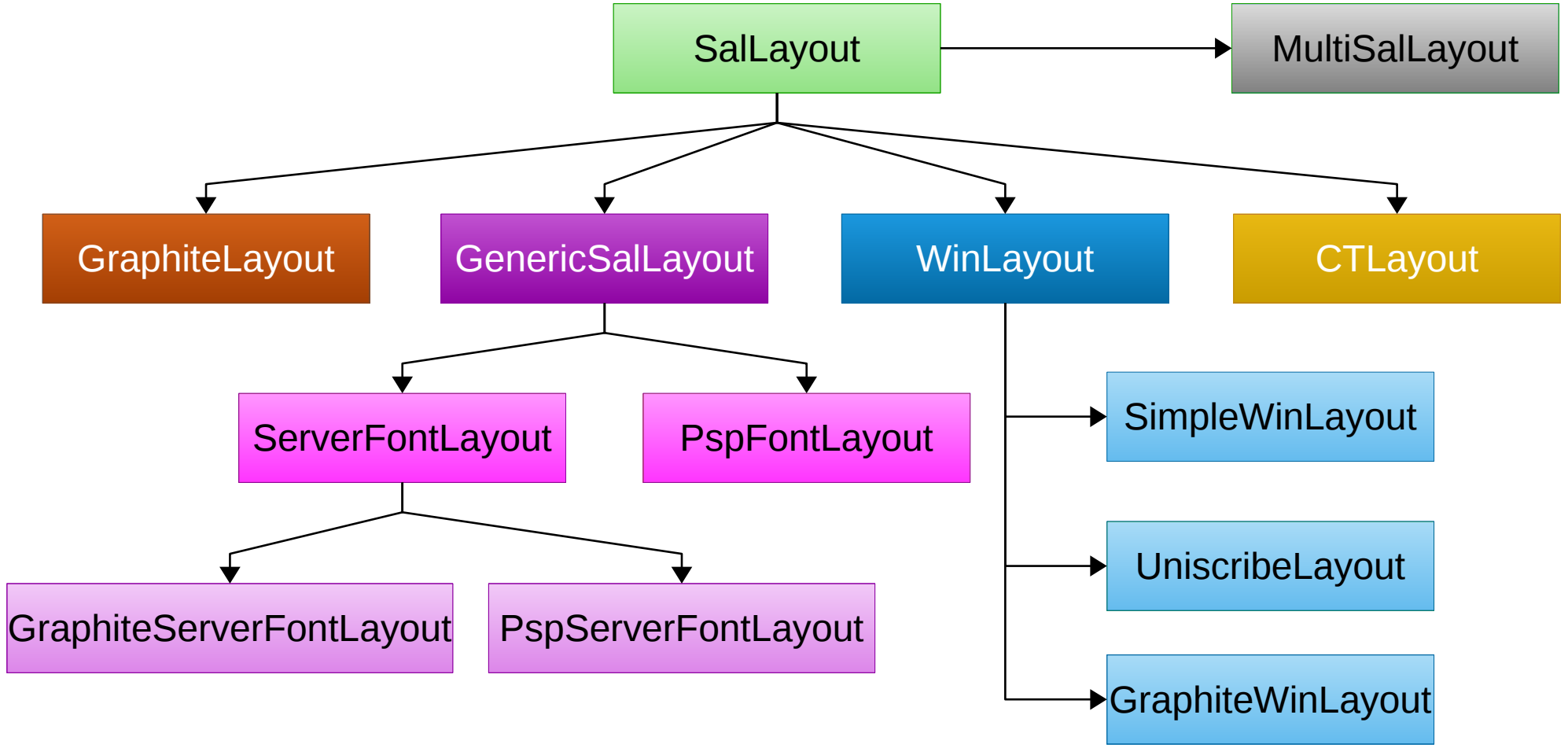
- Khaled Hosny
- Akash Jain (autoit)

How text is laid out?

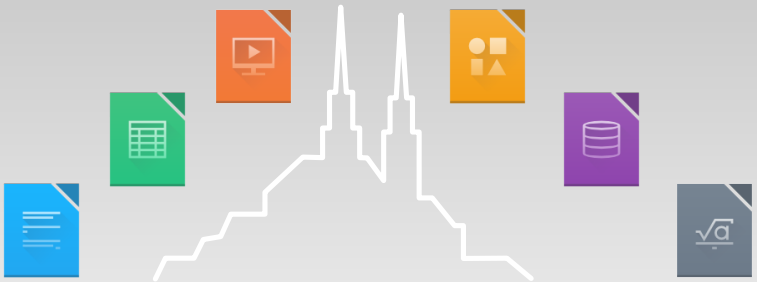


- Handled by VCL, other parts of LibreOffice just talk to it.
- Interface is provided by OutputDevice class:
  - DrawText(), DrawTextArray(), GetTextWidth(), GetTextHeight(), etc.
- Which in turn uses SalLayout class to do the actual layout:
- SalLayout, however, doesn’t do much by itself, actual layout is done by its platform-specific, font technology specific sub-classes.

Problem

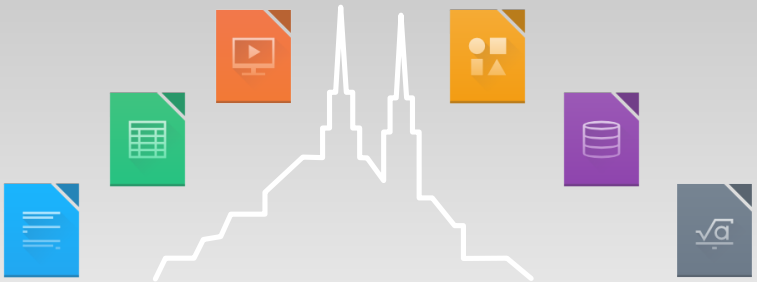

SalLayout
MultiSalLayout
GraphiteLayout
GenericSalLayout
WinLayout
CTLayout
ServerFontLayout
PspFontLayout
SimpleWinLayout
UniscribeLayout
GraphiteWinLayout
GraphiteServerFontLayout
PspServerFontLayout

Problem: complexity



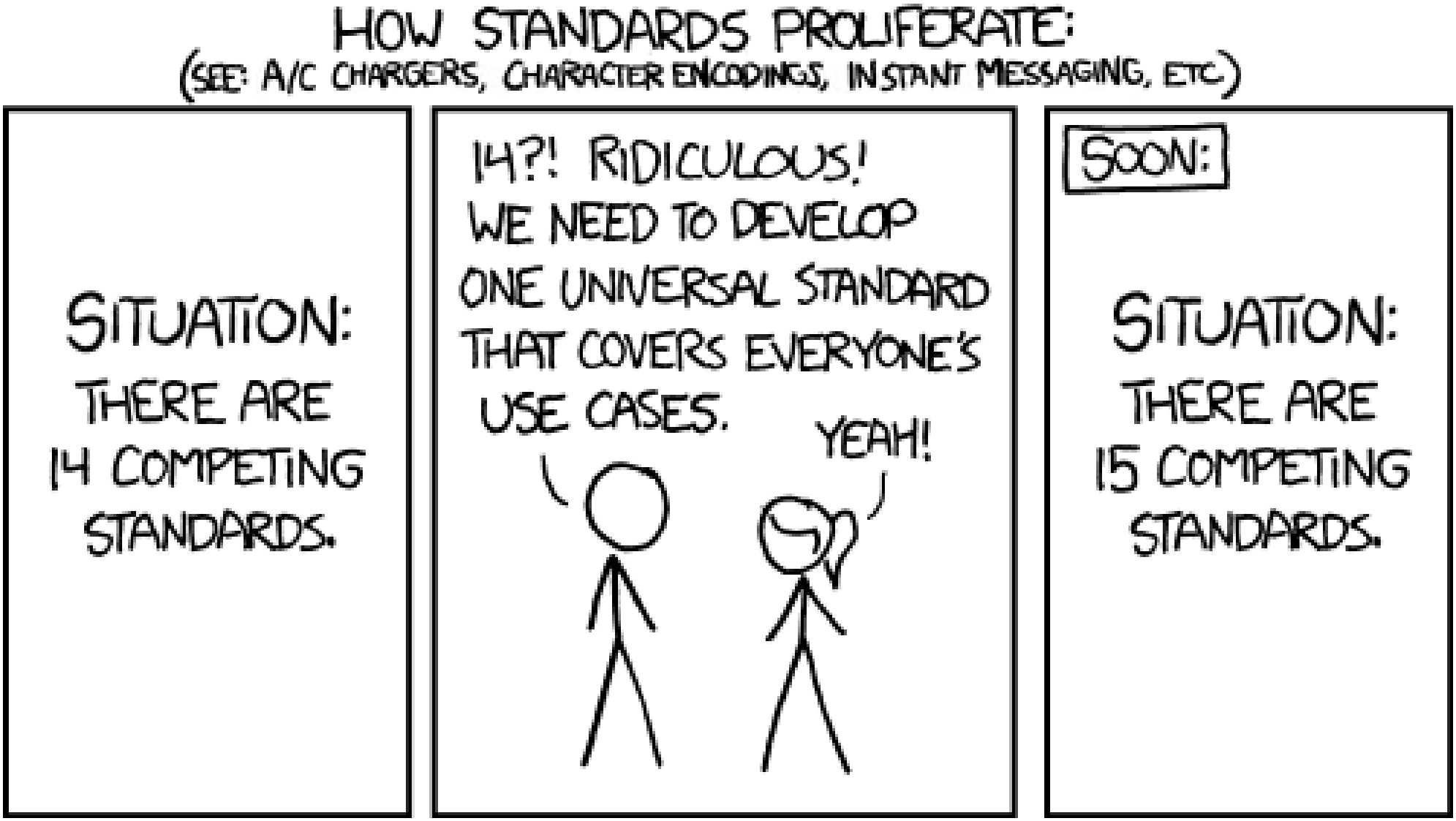
- 3 classes on Windows, simple, OpenType and Graphite.
- 4 classes on Unix, OpenType, Graphite, and 2 just for PostScript printing.
- 1 class on macOS, but no Graphite support.
- Now imagine how much work is needed to add support for something as simple as user controllable font features.

Problem: inconsistency

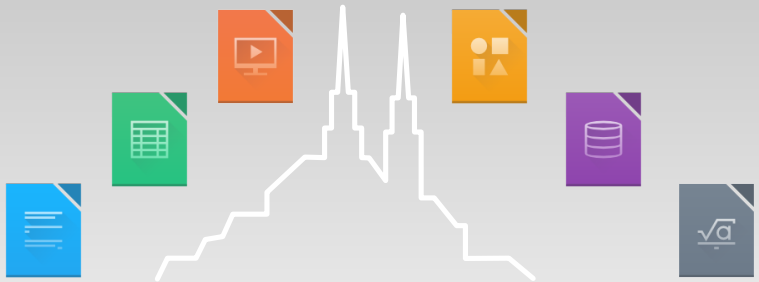


- Different code paths on different platform, or even for different writing systems, with little to no code sharing.
- Language/writing systems support varies between platform APIs.
- It varies even between different versions of the same platform.
- Different platform APIs allow for different levels of integration.

Solution

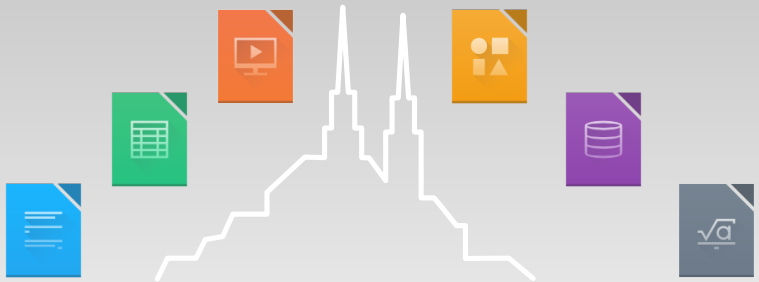

HOW STANDARDS PROLIFERATE:
(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC)
SITUATION: THERE ARE 14 COMPETING STANDARDS.
14?! RIDICULOUS! WE NEED TO DEVELOP ONE UNIVERSAL STANDARD THAT COVERS EVERYONE'S USE CASES.
YEAH!
SOON:
SITUATION: THERE ARE 15 COMPETING STANDARDS.

GSoC project



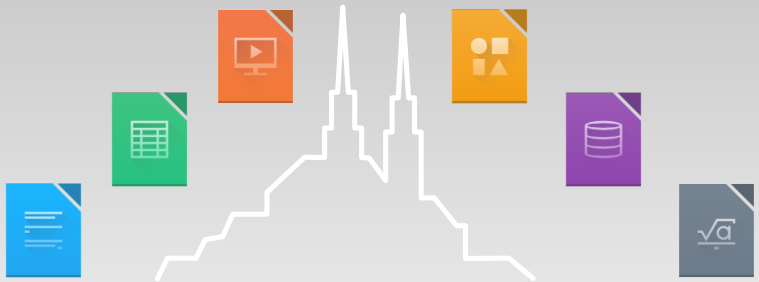
- Unify text layout across platforms.
- By Akash Jain, all the credit goes to him, and the blame too.
- Proposed and mentored by Khaled Hosny, me, but I deny everything.
- Also part of TDF -funded project for reliable cross-platform layout testing.

GSoC project: idea



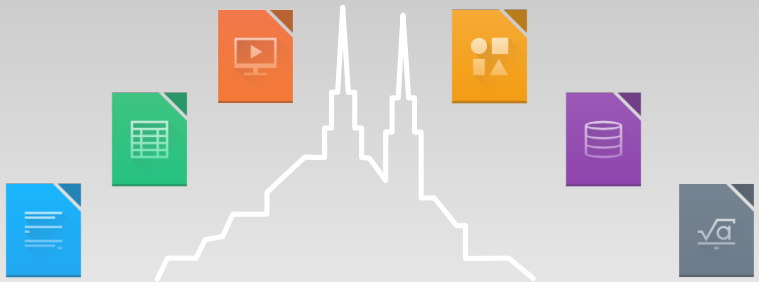
- One class to rule them all.
- Based mostly on the existing Unix implementation.
- Uses HarfBuzz for everything; OpenType, Graphite and even AAT on macOS.
- Font loading is still done by platform APIs, for better integration.

GSoC project: rationale



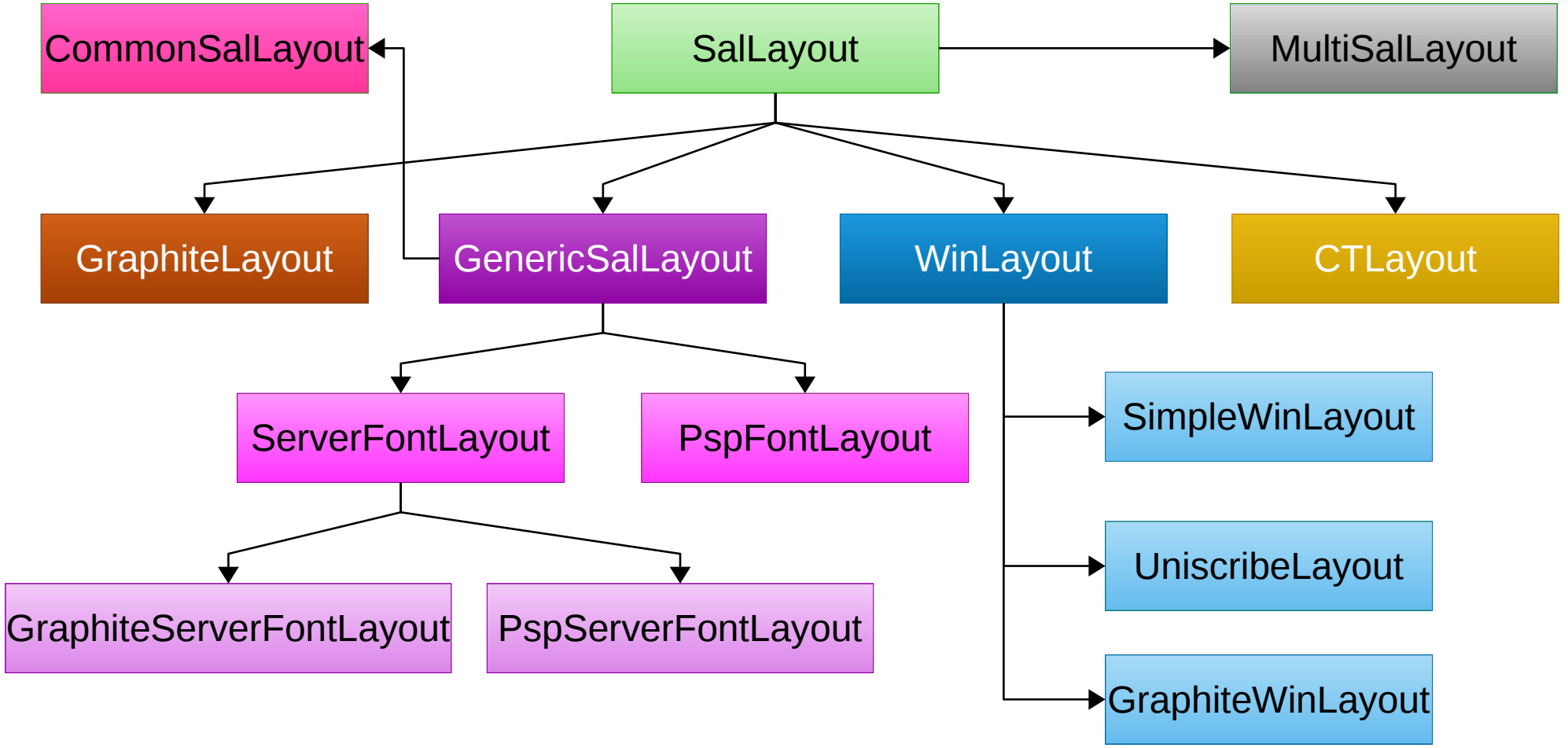
- Why HarfBuzz:
  - Well tested, actively maintained, feature-complete, cross-platform, and free software library.
  - Tracks latest versions of Unicode and OpenType standards.
  - We get the same high quality output regardless of the platform supports natively.
  - Used by Firefox and Chrome in all platforms, so we are in good company.

GSoC project: status



- A new class, CommonSalLayout. Naming is really hard!
- Code integrated with font and graphics libraries on all supported platforms. Can be switched on/off at run time.
- Some issues remain:
  - There seem to be some performance regressions.
  - Font fallback does not work on macOS.
  - Some Graphite fonts are broken (e.g. Awami font), GenericSalLayout::ApplyDXArray() I'm looking at you!
  - Non-SFNT (e.g. Type 1) fonts are not currently supported.
  - Controlling font features is not yet supported.
  - Windows XP is not supported.
- Code should land on master soonish.

Soon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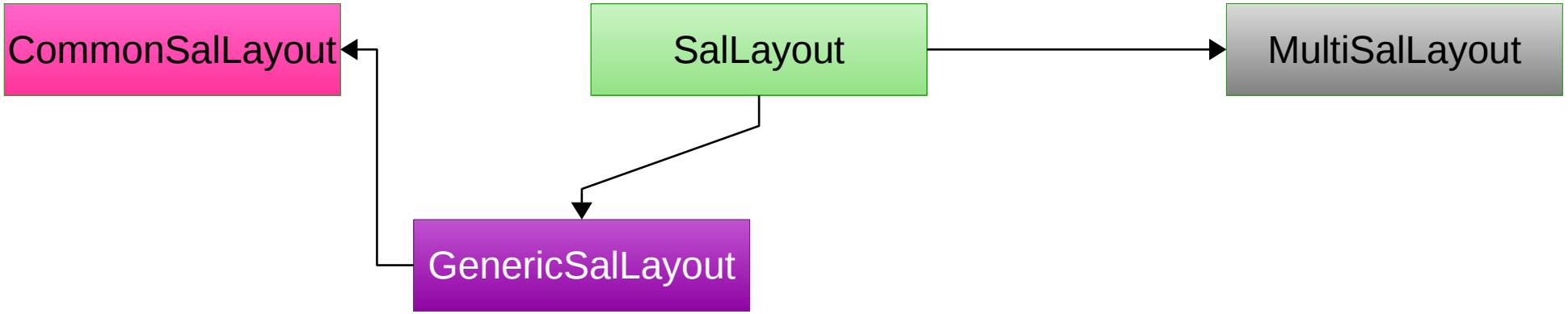
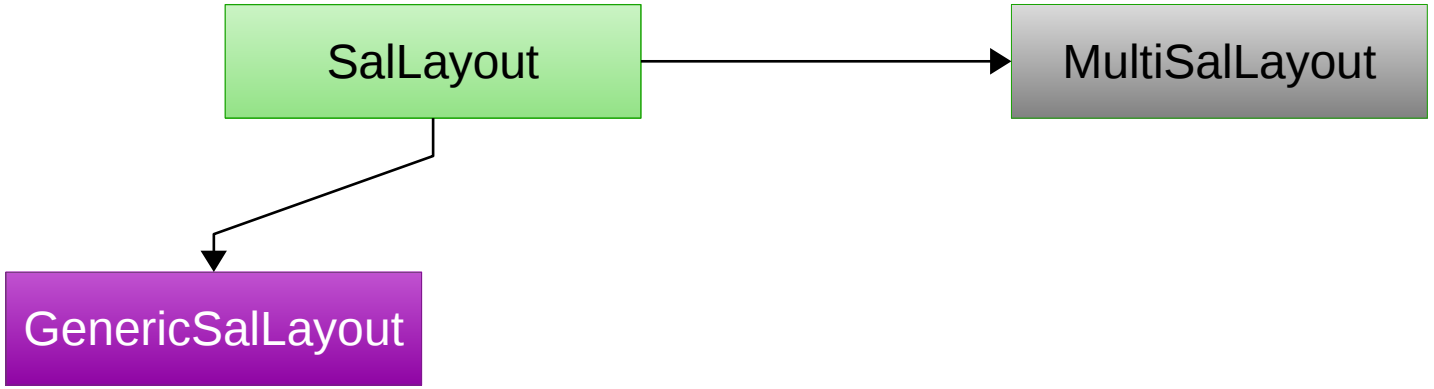
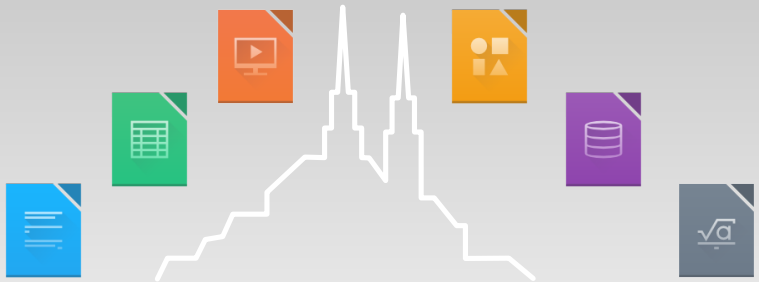
Wishful thinking



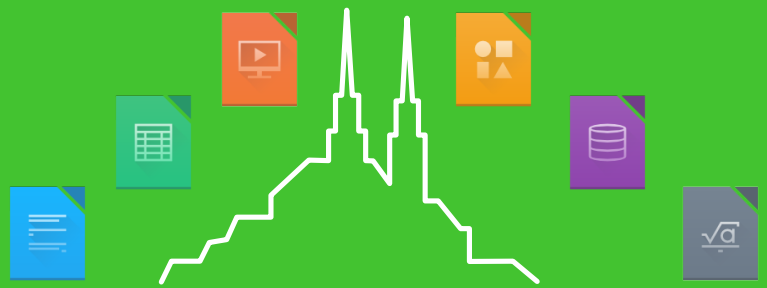
Even more wishful thinking



Daydreaming



SalLayout



Thank you!

- Special thanks to TDF for sponsoring my work on this project and allowing me to attend this conference.